# Multiformat Video Generator

## TG700 Data Sheet

## Features & Benefits

- Multiformat Analog and Digital Test Signal Generation
- Ideal Channel Configuration and Performance to Support Reference Generator Needs
- Modular Expandable Platform
- Stay GenLock™ – Unique, Robust Genlock Mode provides Stable Synchronization Signals for Digital and Traditional Broadcast Facilities

## Applications

- Sync Pulse Generator and Test Signal Generator for Post Production and Broadcast Facilities
- Test Signal Generator for Research and Development
- Equipment Design and Maintenance

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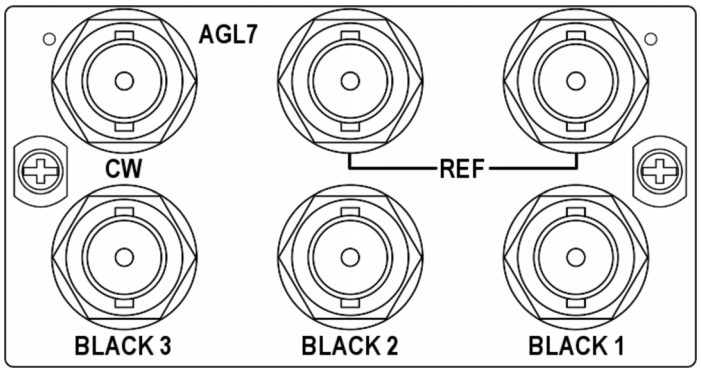
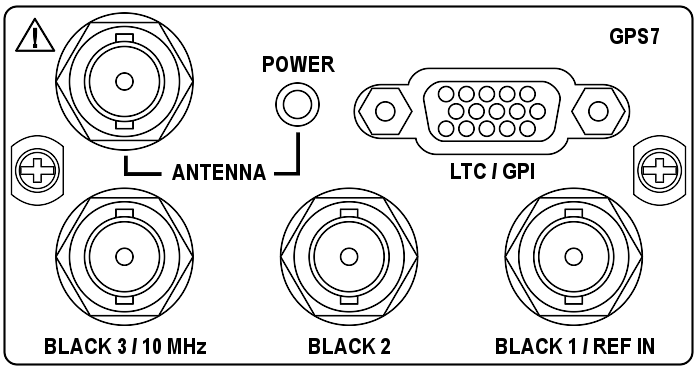
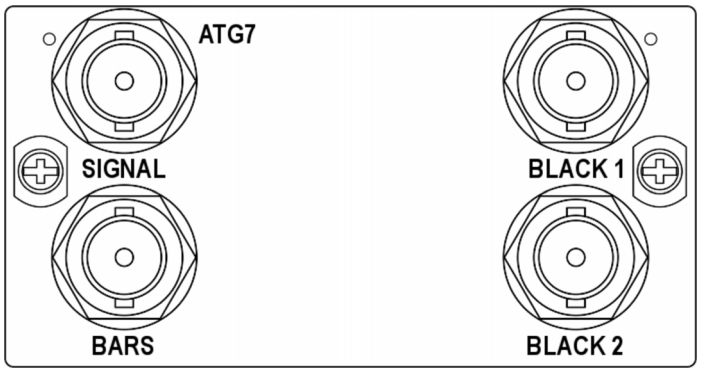



AGL7 Analog Genlock Module.




GPS7 GPS Synchronization and Time Code Module.



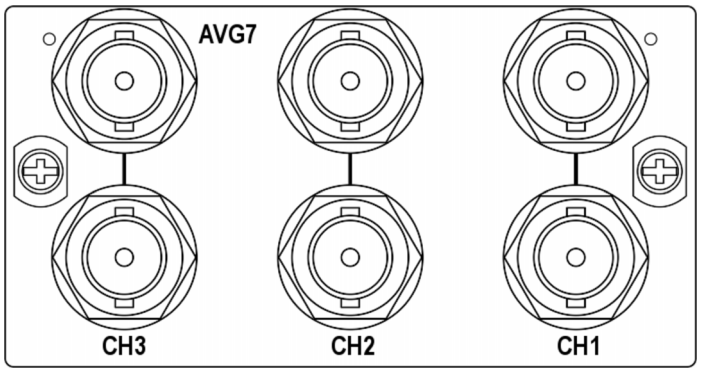

ATG7 Composite Analog Test Generator.

The TG700 is a multiformat, analog and digital, precision signal generation platform. Designed with the changing needs of the video industry in mind, the TG700 offers sync pulse generation and test signal generation for a wide array of analog, serial digital, and digital high-definition formats. The TG700 Multiformat Video Generator has a modular architecture that offers the flexibility to meet the single-format and growing multiformat needs of the video professional. The TG700 mainframe allows up to four of the following modules to be fitted in the mainframe.

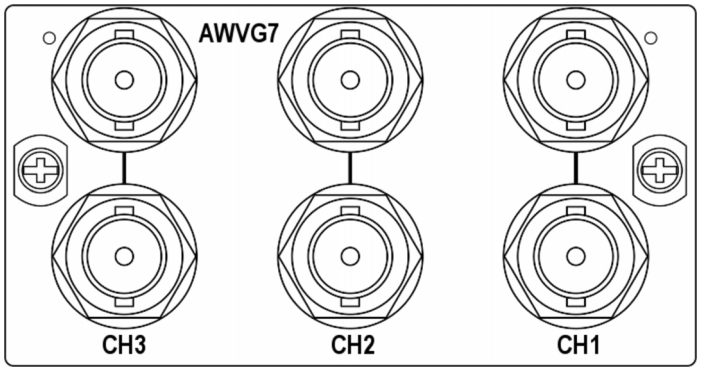
The TG700 has a high stability reference. The AGL7 Analog Genlock Module adds the capacity to lock to a variety of signals, which makes the TG700 an ideal solution as the master house reference or slave reference for broadcast and production/post-production applications. Three black outputs are available and are selectable for HDTV tri-level or NTSC or PAL. Additionally, the AGL7 can lock to a variety of formats to include NTSC/PAL black and HDTV tri-level as well as 1, 3.58, 4.43, 5, and 10 MHz CW. When the AGL7 is configured for Stay GenLock™ mode, a momentary loss of synchronization at the genlock reference input will not cause a disturbance in the TG700's test signal and black outputs. When the genlock signal is reapplied, the AGL7 will gradually reacquire lock, causing little disruption to devices synchronized to the TG700 reference.

The GPS7 GPS Synchronization and Time Code Module includes an integrated GPS receiver which can serve as the system timing reference. Synchronization to the GPS timing signals ensures long-term stability, and video frame alignment between independent systems. The GPS RF coaxial signal input is available with 3.3 V or 5 V DC power output for the GPS antenna enabling the user to select from a variety of GPS antennas available on the market. The GPS7 also includes a genlock input with VITC reader, enabling user-selectable configuration of the TG700 as the master reference or as a slave to another master, depending on the dynamic requirements of each production. The GPS7 module will maintain system timing by Stay GenLock™ technology even during periods of GPS signal loss or genlock signal loss. Three black outputs are available and are selectable for HDTV tri-level, NTSC, or PAL. Time code source can be selectable to the time-of-day (with user-selectable offsets) from GPS receiver, internal source, VITC on the reference input, LTC input, or to a "program time" counter for elapsed-time time code. The Daylight Savings Time (DST) adjustment could be recurring scheduled, based on calendar rules. Time code is available as VITC on black outputs (GPS7, BG7), as Ancillary Time Code (ATC) (HDVG7, HD3G7), from four independent LTC outputs (GPS7), and as a response to time requests on a Simple Network Time Protocol (SNTP version 3.0) Server.

The ATG7 Composite Analog Test Generator supports PAL, NTSC, and NTSC No Setup. It provides one test signal output, one color bar test signal output, and two black outputs. The black outputs can independently generate H, V, black burst, and subcarrier.



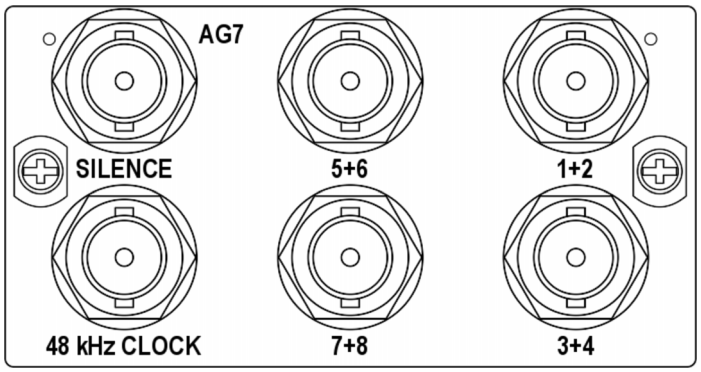

AVG7 Analog Video Generator.



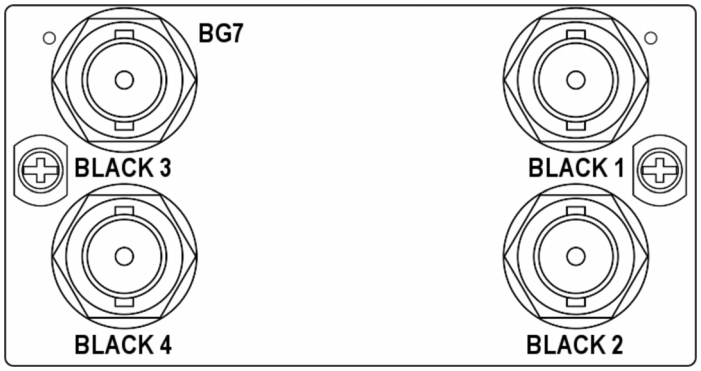

AWVG7 Analog Wideband Video Generator.

The AVG7 is an Analog Video Generator for 525/625 interlace formats supporting component (Y'P'bP'r, G,B,R, Y/C), 525 Beta, and composite (PAL, NTSC, NTSC No Setup). It provides two identical component outputs, two identical Y/C and composite, or six identical composite outputs.

The AWVG7 is an Analog Wideband Video Generator that supports a variety of HD analog component formats (Y'P'bP'r or GBR). The module provides two identical component outputs with a bandwidth of 30 MHz. Up to two AWVG7 Analog Wideband Video Generators can be placed in a single TG700 mainframe.



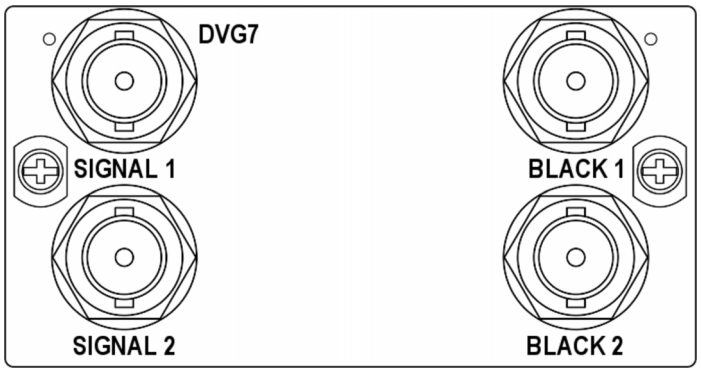

AG7 Audio Generator.



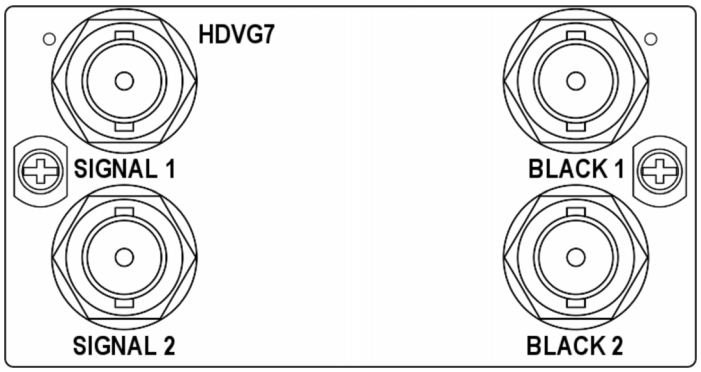

BG7 Analog Black Generator.

The AG7 provides eight channels (4 AES/EBU pairs) of audio signal generation. It also provides two channels (1 AES/EBU pair) of silence as well as a 48 kHz word clock output.

The BG7 is an analog black generator with four independently selectable outputs. The BG7 Black Generator supports NTSC and PAL black burst as well as HDTV tri-level sync. With Option CB, two of the outputs can also generate various analog NTSC and PAL color bar test signals.




DVG7 SD-SDI Digital Generator (shown with Option BK).



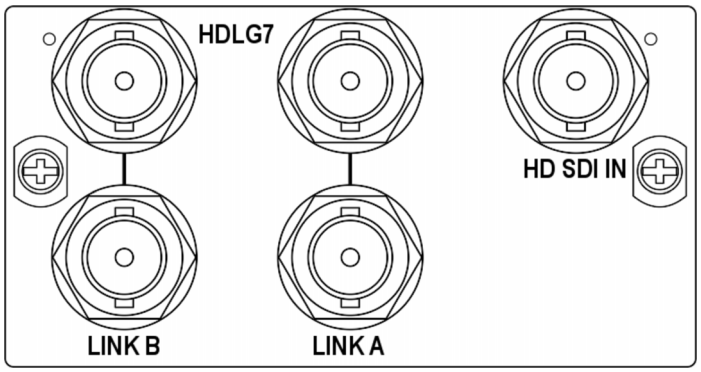

HDVG7 HD-SDI Digital Generator (shown with Option BK).

The DVG7 is a multiformat SD-SDI test signal generator. The DVG7 Digital Video Generator supports 525 line and 625 line serial digital video at 270 Mb/s and NTSC composite digital at 143.181818 Mb/s. The DVG7 Digital Video Generator has two identical test signal outputs. With Option BK, two additional identical serial digital black signal outputs are available.

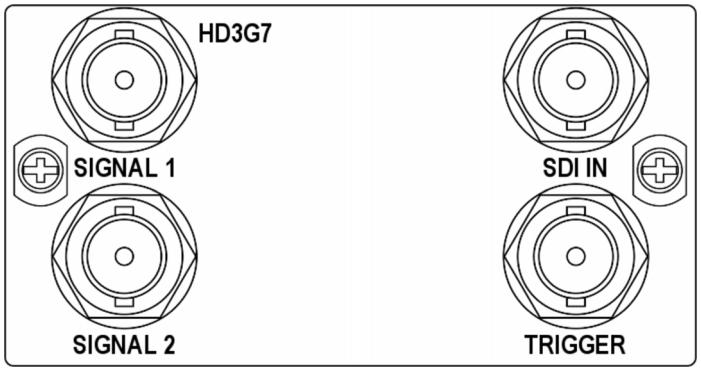
The HDVG7 is a high-accuracy, multiformat, high-definition test signal module that provides up to two identical 1.485 Gb/s serial digital video test signal outputs in a broad variety of formats. With Option BK, two additional identical serial black signal outputs are available. Ancillary Time Code (ATC) generation is available when the GPS7 is installed in the TG700 mainframe. Up to two HDVG7 modules can be placed in a single TG700 mainframe.

The digital modules DVG7 and HDVG7 support AV timing mode and up to 16 channels of 20- or 24-bit audio sampled at 48 kHz embedded on the test signal outputs. The user can independently set frequency and level for each channel.

Full frame test and custom patterns can be generated for the AVG7, AWVG7, DVG7, and HDVG7 modules. Simple full frame patterns are available on V3.1 (or higher than V3.1) CD-ROM.




HDLG7 Dual Link HD-SDI Generator.




HD3G7 HD/3G-SDI Test Signal Generator

The HDLG7 is a test signal generator that provides two identical dual-link high-definition serial digital interface (HD SDI) outputs. The module supports video formats that require the use of a dual-link interface, such as 4:4:4 R'G'B' at rates up to 1080i/60 Hz or 1080p/30 Hz, or 4:2:2: Y'C'bC'r at rates up to 1080p/60 Hz. The HDLG7 supports several standard test signals, and also has the unique ability to up-convert an arbitrary single-link HD-SDI input signal to a dual-link format for the outputs. The HDLG7 also supports digital cinema 2K formats and test patterns.

The HD3G7 is a test signal generator that provides two outputs of a HD/3G-SDI video test signal. 720-line formats and 1080-line formats described in SMPTE standards are supported for both Level A and Level B mapping structures, including 4:4:4 and/or 12-bit sampling, Y'C'bC'r, R'G'B', or XYZ color space, and 2K digital cinema formats. The 2×SMPTE 292M HD-SDI format used by some 3D TV applications is also supported.

The HD3G7 can generate up to 32 channels of 24-bit 48 kHz embedded audio, with independently set frequency and amplitude for each channel. The HD3G7 also has the ability to generate other types of ancillary data, such as video payload identifier, ancillary time code, and user-defined packets.

The HD3G7 includes a wide variety of standard test signals, including SMPTE color bars, pathological test patterns, and a programmable moving zone plate pattern, and it also has the ability to up-convert an input 1.485 Gb/s HD-SDI signal to a 3G output. The HD3G7 has a clock/frame trigger output that can be used to synchronize the output with an oscilloscope, for example.

# Characteristics

## AGL7, Analog Genlock Module

### Reference Input

| Characteristic | Description |
|---|---|
| Input Connector | BNC ×2, passive loopthrough |
| Input Impedance | 75 Ω |
| Input Signal | NTSC/PAL black burst or HDTV tri-level sync (720p, 1080i) |
| Amplitude Range | Standard ±6 dB |
| S/N Ratio | >40 dB |
| SCH Phase | 0 ±40° |
| Return Loss | ≥30 dB at 5 MHz to 30 MHz |
| Burst Lock / Sync Lock Stability | ±3 dB amplitude change: <1 ns |
| Jitter with burst lock | <0.5° |
| Jitter with sync lock | <1 ns |

### CW Input

| Characteristic | Description |
|---|---|
| Input Connector | BNC ×1, internally terminated |
| Input Impedance | 75 Ω |
| Input Signal | CW (continuous wave) |
| Amplitude | 2 V (1 to 2.25) $V_{p-p}$ |
| Frequency | NTSC/PAL FSC, 1/5/10 MHz |
| Return Loss | >30 dB to 30 MHz |
| CW Lock Stability | |
| Over the amplitude range | <1 ns |
| Jitter | <1 ns (typ. 1°) with CW input S/N >50 dB |

### Genlock

| Characteristic | Description |
|---|---|
| Genlock Time Adjustment | |
| Range | Anywhere in the color frame |
| Resolution | <0.5° of NTSC/PAL subcarrier<br>1 ns with tri-level sync input |
| Color Framing | Keeps accuracy even with ±45° SCH error of input reference input |

### Reference Outputs

| Characteristic | Description |
|---|---|
| Output Signal | |
| Black 1 | NTSC/PAL black burst output |
| Black 2, 3 | NTSC/PAL black burst output or tri-level HDTV sync |
| Output Format | Combination of the following: |
| 1. | NTSC/PAL black burst ×3 (one black burst is independent, two black burst are distributed outputs) |
| 2. | NTSC/PAL black burst ×2, HDTV tri-level sync ×1 (all three outputs are independent) |
| 3. | NTSC/PAL black burst ×1, HDTV tri-level sync ×2 (HDTV tri-level are distributed from the same source) |
| Output Impedance | 75 Ω |
| Return Loss | >30 dB to 30 MHz |

### NTSC/PAL Black Burst Output

| Characteristic | Description |
|---|---|
| Output Standard | EBU N14, SMPTE RP154<br>PAL-M and PAL-N are not supported |
| Amplitude Accuracy | Std. black burst ±2% |
| Burst Frequency | NTSC/PAL FSC ±1 Hz |
| SCH Phase | < ±5° |
| Timing Adjustment | |
| Range | Anywhere in the color frame |
| Resolution | <0.5° of NTSC/PAL subcarrier |

### HDTV Tri-level Sync Output

| Characteristic | Description |
|---|---|
| Standard | SMPTE 240M, 274M, 296M, RP211 |
| Formats | 1080i/50 Hz, 59.94 Hz, 60 Hz<br>1080p/23.98 Hz, 24 Hz, 25 Hz, 29.97 Hz, 30 Hz<br>1080psF/23.98 Hz, 24 Hz<br>720p/59.94 Hz, 60 Hz |
| Amplitude Accuracy | Std. HDTV tri-level ±2% |
| Timing Adjustment | |
| Range | Anywhere in the frame |
| Resolution | <1 ns |

## AG7, Audio Generator

### Audio Test Signal Output

| Characteristic | Description |
|---|---|
| Standard | ANSI S4.40 (AES3), AES3-ID |
| Output Channels | 8 channels (4 AES/EBU pairs) |
| Output Impedance | 75 Ω, unbalanced |
| Output Connector | BNC ×4 |
| Output Amplitude | 1 V ±0.2 V |
| Frequency (Hz) | 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 step |
| Sampling Frequency | 48 kHz (lock on video signal) |
| Quantization | Linear PCM, 20 or 24 bits (2's complement) |
| Transfer Coding | Bi-phase mark |

### Silence Output

| Characteristic | Description |
|---|---|
| Standard | ANSI S4.40 (AES3), AES3-ID |
| Channel | 2 channels (1 AES/EBU pair) |
| Output Impedance | 75 Ω, unbalanced |
| Output Connector | BNC ×1 |
| Output Amplitude | 1 ±0.2 V |
| Frequency, Level | No signal |
| Sampling Frequency | 48 kHz (lock on video signal) |
| Quantization | Linear PCM, 20 or 24 s (2's complement) |
| Transfer Coding | Bi-phase mark |

### Word Clock Output

| Characteristic | Description |
|---|---|
| Output Connector | BNC ×1 |
| Output Level | CMOS compatible |
| Frequency | 48 kHz |

## ATG7, Analog Test Signal Generator

### Signal Output

| Characteristic | Description |
|---|---|
| NTSC/NTSC No Setup Test Signals | 100%/75% Color Bars |
| | SMPTE Color Bars |
| | 0% (NTSC only)/10%/40%/50%/100% Flat Field |
| | Black Burst |
| | Black Burst with Field Reference |
| | Field Square Wave |
| | 10/5 Step, Ramp |
| | Modulated 5 Step |
| | Modulated Ramp |
| | Modulated Pedestal |
| | Shallow Ramp |
| | Convergence |
| | 2/4 Level Pedestal and Pluge |
| | 100%/75% Red Field |
| | Gray/White Window |
| | Safe Area |
| | Monitor Setup |
| | 100%/60% Multiburst |
| | Multipulse |
| | 100%/60% Sweep |
| | Chroma Frequency Response |
| | Window 2T Pulse and Bar |
| | Sin (x)/x |
| | FCC Composite/Multiburst |
| | NTC7 Composite/Combination |
| | Test Matrix SNG Color Bars and 0-100% Bounce |
| | APL High/Low, APL Bounce |

| Characteristic | Description |
|---|---|
| PAL Test Signals | 100%/75% Color Bars |
| | 100%/75% Color Bars over Red |
| | 40%/50%/100% Flat Field |
| | Black Burst |
| | Black Burst with No Field Reference |
| | Field Square Wave |
| | 5/10 Step |
| | Ramp |
| | Modulated 5/10 Step |
| | Modulated Ramp |
| | Modulated Pedestal |
| | Shallow Ramp |
| | Convergence |
| | 2/4 Level Pedestal and Pluge |
| | 100%/75% Red Field |
| | Gray/White Window |
| | Safe Area |
| | Monitor Setup Matrix |
| | 100% Multiburst |
| | Multipulse |
| | 100%/75% Sweep |
| | Window 2T Pulse and Bar |
| | Sin (x)/x |
| | CCIR 17/18/330/331 |
| | UK ITS 1/2 |
| | UK 1 Line ITS |
| | ITS Matrix and 0-100% Bounce |
| | APL High/Low, APL Bounce |
| ID Text | Max 18 characters. One row (character 14×11 pixels) |
| | Text and Position is embedded to each signal |
| Luminance Amplitude | ±1% (measured at 700 mV) |
| Chrominance-to-Luminance Gain | ±1% |
| Frequency Response | ±1% to 5.5 MHz |
| Chrominance-to-Luminance Delay | ≤10 ns |
| Linearity | ≤1% (measured at 5 step signal) |
| Differential Gain Error | ≤0.5% |
| Differential Phase Error | ≤0.5° |

### BARS Output

| Characteristic | Description |
|---|---|
| NTSC/NTSC No Setup Signals | 100%/75% Color Bars |
| | SMPTE Color Bars |
| | 40% Flat Field |
| | Black Burst |
| | Black Burst with Field REF |
| | Monitor Setup, SNG Color Bars |
| PAL Signals | 100%/75% Color Bars |
| | 100%/75% Color Bars over RED |
| | 40% Flat Field |
| | Black Burst |
| | Black Burst with No Field REF |
| | Monitor Setup, SNG Color Bars |
| ID Text | Max 18 characters. One row (character 14×11 pixels) |
| | Text and Position is embedded to each signal |
| Luminance Amplitude | ±1% (measured at 700 mV) |
| Chrominance-to-Luminance Gain | ±2% |

### BLACK 1/2 Outputs

| Characteristic | Description |
|---|---|
| NTSC/NTSC No Setup Signals | Black Burst, Black Burst with Field Reference, Subcarrier, Composite Sync, H Drive, V Drive, Composite Blanking, and Color Frame ID |
| PAL Signals | Black Burst, Black Burst with Field Reference, Subcarrier, Composite Sync, H Drive, V Drive, Composite Blanking, Color Frame ID, and PAL Pulse |
| Timing Pulse Amplitude | –0.5 to 0.5 V (1 $V_{p-p}$) |

### SIGNAL, BARS, and BLACK 1/2 (Common)

| Characteristic | Description |
|---|---|
| Standards | ITU-R BT.470-6<br>PAL-M and PAL-N are not supported |
| | SMPTE 170M |
| Output Impedance | 75 Ω |
| Return Loss | ≥36 dB to 6 MHz |
| Burst Amplitude | ±2% |
| Sync Amplitude | ±2% |
| Blanking Level | 0 mV ±50 mV |
| SCH Phase Accuracy | 0° ±5° |
| Timing Offset Range | Full color frame |
| Timing Offset Resolution | 54 MHz clock resolution |

## AVG7, Analog Video Generator

### Analog Signal Output

| Characteristic | Description |
|---|---|
| Test Signals | Output signal (preinstalled for all formats): 100%, 75%, and SMPTE Color Bars, Linearity, Flat Field, Multiburst, Sweep, Monitor, Pulse & Bar and other major test signals |
| Formats Supported | NTSC, NTSC No Setup, PAL, 525 R'G'B', 525 Y'P'bP'r, 525 Beta, 625 R'G'B', 625 Y'P'bP'r |
| Output Connector | BNC ×6 |
| Outputs | 6 identical analog composite outputs, 2 identical component video outs, or 2 identical Y/C and composite out |
| Output Impedance | 75 Ω |
| Luminance Linearity Error | ≤0.5% |
| Luminance Amplitude | ±1% (measured at 700 mV) |
| Chrominance-to-Luminance Gain Error | ≤1% (relative to 100 kHz) |
| Chrominance-to-Luminance Delay | ≤2.5 ns on a composite output (typical) |
| Channel-to-Channel Delay | ≤2 ns (relative to CH1) |
| Frequency Response | ≤0.5% to 8 MHz at 700 mV (typical) |
| Differential Gain Error | ≤0.5% |
| Differential Phase Error | ≤0.5° |
| Timing Adjustment | |
| Range | Anywhere in the frame |
| Resolution | 0.1 ns |
| Return Loss | ≥40 dB to 6 MHz |

## AWVG7, Analog Wideband Video Generator

### Analog Signal Output

| Characteristic | Description |
|---|---|
| Test Signals | (Preinstalled for all formats) 100%, 75%, and SMPTE Color Bars, Linearity, Multiburst, Sweep, Monitor, and other major test signals |
| Formats Supported | (All formats are factory preinstalled)<br>Y'P'bP'r or R'G'B' 1080i/50 Hz, 59.94 Hz, 60 Hz<br>1080p/23.98 Hz, 24 Hz, 25 Hz, 29.97 Hz, 30 Hz<br>1080psF/23.98 Hz, 24 Hz<br>720p/23.98 Hz, 24 Hz, 25 Hz, 29.97 Hz, 30 Hz, 50 Hz, 59.94 Hz, 60 Hz |
| Output Connector | BNC ×6 |
| Outputs | 2 identical analog component video outputs |
| Output Impedance | 75 Ω |
| Output Amplitude | ≤1% at 700 mV |
| Channel-to-Channel Delay | ≤2 ns (relative to CH1) |
| Frequency Response | ±1% to 20 MHz<br>±2% to 28 MHz<br>±3% to 30 MHz |
| Timing Adjustment | |
| Range | Anywhere in the frame |
| Resolution | 0.1 ns |
| Return Loss | ≥35 dB to 30 MHz |

## BG7, Black Generator

### Analog Signal Outputs

| Characteristic | Description |
|---|---|
| Output Connector | BNC ×4 |
| Output Impedance | 75 Ω |
| Output Formats | NTSC/PAL black burst or HDTV tri-level sync, each output independently selectable. PAL-M and PAL-N are not supported. With Option CB, NTSC/PAL test signals are available on outputs 3 and 4 |
| Return Loss | ≥30 dB to 30 MHz |
| Jitter | ≤1 ns |

### NTSC/PAL Black Burst Output

| Characteristic | Description |
|---|---|
| Output Standard | EBU N14, SMPTE RP 154, RP318M-B |
| Time Code | Optional VITC insertion (if GPS7 module is present) |
| Line | One or two lines, user selectable |
| Source | Time-of-day with adjustable offset, or program (elapsed) time counter |
| Amplitude Accuracy | Std. black burst ±2% |
| SCH Phase | < ±5° |
| Timing Adjustment | |
| Range | Anywhere in the color frame |
| Resolution | Clock resolution 18.5 ns (1/54 µs) |

### HDTV Tri-level Sync Output

| Characteristic | Description |
|---|---|
| Standard | SMPTE 240M, 274M, 296M, RP211 |
| Formats | 1080i/50 Hz, 59.94 Hz, 60 Hz<br>1080p/23.98 Hz, 24 Hz, 25 Hz, 29.97 Hz, 30 Hz<br>1080psF/23.98 Hz, 24 Hz<br>720p/50 Hz, 59.94 Hz, 60 Hz |
| Amplitude Accuracy | Std. HDTV tri-level ±2% |
| Timing Adjustment | |
| Range | Anywhere in the frame |
| Resolution | Clock resolution 13.5 ns (1/74.25 µs) |

### Analog Test Signal (Opt. CB)

| Characteristic | Description |
|---|---|
| NTSC and NTSC No Setup Format | 100% Color Bars, 75% Color Bars, SMPTE Color Bars, 40% Flat Field, SNG Color Bars, Monitor Setup Matrix, 10 Field ID |
| PAL Format | 100% Color Bars, 75% Color Bars, 100% Color Bars over Red, 75% Color Bars over Red, 40% Flat Field, SNG Color Bars, 4-level Pluge, Monitor Setup Matrix |
| Luminance Amplitude Accuracy | ±1% (video at 100%) |
| Chroma Amplitude Accuracy | ±2% |

## DVG7, Digital Video Generator

### Serial Digital Signal Output

| Characteristic | Description |
|---|---|
| Test Signals | (Preinstalled for all formats) 100%, 75%, and SMPTE Color Bars, Linearity, Multiburst, Sweep, Monitor, SDI Pathological, Timing, and other major test signals |
| Standards | ITU-R BT 601, 656, EBU Tech 3267, SMPTE 125M, 244M, 259M, 272M, RP165, RP178 |
| Bit Rate | 143 Mb/s, 270 Mb/s |
| Resolution | 8 or 10 bits |
| Output Connector | BNC ×2 or ×4 with Option BK |
| Output Impedance | 75 Ω |
| Output Amplitude | 800 $mV_{p-p}$ ±10% |
| Overshoot | ≤10% |
| Rise/Fall Time | 0.4 to 1.5 ns (20-80%) |
| DC Offset (AC couple) | 0 ±0.5 V |
| Jitter | ≤0.2 UI, above 10 Hz jitter frequency |
| Timing Adjustment | |
| Range | Anywhere in the frame |
| Resolution | Clock resolution (37 or 70 ns) |
| Return Loss | >15 dB at 5-270 MHz |

### Embedded Audio Signal

| Characteristic | Description |
|---|---|
| Active Channels | 1-16 channels |
| Sample Frequency | 48 kHz |
| Digital Coding | 20 or 24 bits |
| Signal Alignment | Async. and Sync. (no frame #), Synchronous (frame #) |
| Audio Tone | Frequency (Hz)<br>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 |

## GPS7, GPS Synchronization and Time Code Module

### GPS Receiver

| Characteristic | Description |
|---|---|
| Type | L1 frequency (1575.42 MHz), C/A Code, 12 channels |
| Time of Day | User-selectable time zone and DST offset adjustment |

### GPS Antenna Input

| Characteristic | Description |
|---|---|
| Connector | BNC |
| Input Impedance | 50 Ω, internally terminated |
| DC Antenna Power Output Voltage | 3.3 V or 5 V at nominal load |
| Fault Protection | Short-circuit/open detection and protection |
| Return Loss | 8 dB at 1575 MHz |

### Reference Input

| Characteristic | Description |
|---|---|
| Input Connector | BNC, terminated, shared with BLACK 1 output |
| Input Impedance | 75 Ω |
| Input Signal | NTSC/PAL black burst or HDTV tri-level sync |
| Amplitude Range | Standard –6 dB to +8 dB |
| S/N Ratio | >40 dB |
| SCH Phase | 0 ±40° |
| Return Loss | ≥30 dB at 300 kHz to 10 MHz |
| Burst Lock / Sync Lock Stability | ±3 dB amplitude change: <1 ns |
| Jitter with burst lock | <0.5° |
| Jitter with sync lock | <1 ns |

### Genlock

| Characteristic | Description |
|---|---|
| Genlock Time Adjustment | |
| Range | Anywhere in the color frame |
| Resolution | <0.5° of NTSC/PAL subcarrier<br>1 ns with tri-level sync input |
| Color Framing | Keeps accuracy even with ±45° SCH error of input reference input |
| Time Reference | VITC reader for NTSC/PAL black burst input signal |

### Analog Signal Outputs

| Characteristic | Description |
|---|---|
| Output Connector | BNC ×3 |
| Output Impedance | 75 Ω |
| Output Formats | NTSC/PAL black burst or HDTV tri-level sync, each output independently selectable. PAL-M and PAL-N are not supported. Black output 3 can be configured as a 10 MHz continuous wave output |
| Return Loss | ≥30 dB to 30 MHz |

### Black Burst Output

| Characteristic | Description |
|---|---|
| Output Standard | EBU N14, SMPTE RP 154, RP318M-B |
| Time Code | Optional VITC insertion |
| Line | One or two lines, user selectable |
| Source | Time-of-day with adjustable offset, or program (elapsed) time counter |
| Amplitude Accuracy | Std. black burst ±2% |
| SCH Phase | < ±5° |
| Timing Adjustment | Each output is independent |
| Range | Anywhere in the color frame |
| Resolution | Clock resolution 18.5 ns (1/54 μs) |

### HDTV Tri-level Sync Output

| Characteristic | Description |
|---|---|
| Standard | SMPTE 240M, 274M, 296M, RP211 |
| Formats | 1080i/50 Hz, 59.94 Hz, 60 Hz<br>1080p/23.98 Hz, 24 Hz, 25 Hz, 29.97 Hz, 30 Hz<br>1080psF/23.98 Hz, 24 Hz<br>720p/59.94 Hz, 60 Hz |
| Amplitude Accuracy | Std. HDTV tri-level ±2% |
| Timing Adjustment | Each output is independent |
| Range | Anywhere in the color frame |
| Resolution | Clock resolution 13.5 ns (1/74.25 μs) |

### LTC Input

| Characteristic | Description |
|---|---|
| LTC Input | LTC1 can be configured as an input or an output |
| Formats | 23.98, 24, 25, 30 fps drop-frame as per SMPTE 12M |
| Timing to Video | Compliant with SMPTE 12M and continues to operate over at least 90% of possible timing range |
| Signal Voltage Range | 0.5 to 10 $V_{p-p}$ differential, 1 to 5 $V_{p-p}$ single ended |
| Noise Tolerance | –30 dB SNR RMS white noise with 10 kHz BW to the p-p signal level, or –10 dB SNR for 5 MHz white noise |
| Hum Tolerance | 0 dB hum-to-signal ratio |
| Error Immunity | 100 consecutive frames with consistent time code must be detected for time to be considered valid |
| Input Impedance | Nominal 600 Ω differential, 300 Ω single ended |

### LTC Output

| Characteristic | Description |
|---|---|
| Outputs | 4 independent |
| Connector | Available through D-sub 15-pin connector. Optional break-out cable to XLR connectors available |
| Formats | 24 fps (24 Hz or 23.98 Hz), 25 fps, 30 fps, 30 fps drop-frame as per SMPTE 12M |
| Source | Time-of-day with adjustable offset, or program (elapsed) time counter |
| Output Amplitude | 5 V ±10%<br>Adjustable from 0.5 V to 5 V in 0.5 V steps |

### Network Time Protocol

| Characteristic | Description |
|---|---|
| Mode | Server only, using Ethernet interface on the TG700 mainframe |
| Standard | SNTPv3 for IPv4, per RFC 2030 |

### General Purpose Interface

| Characteristic | Description |
|---|---|
| Connector | Available through D-sub 15-pin connector. Optional break-out cable to BNC connectors available |
| Outputs | Two, user-selectable to assert when GPS synchronization is lost, GPS signal falls below threshold, or elapsed time value reaches set value. In Genlock mode, user-selectable to assert on loss-of-lock or near loss-of-lock |
| Output Level | 0.5-5 V |
| Input | One, user-selectable to signal GPS reacquisition or restart timer |
| Input Level | 0.8-2.4 V |

## HDVG7, HDTV Digital Video Generator

### Serial Digital Signal Output

| Characteristic | Description |
|---|---|
| Test Signals | (Preinstalled for all formats) 100%, 75%, and SMPTE Color Bars, Linearity, Multiburst, Sweep, Monitor, SDI Pathological, Timing, and other major test signals |
| Standards | SMPTE 240M, 272M, 274M, 292, 296M |
| Bit Rate | 1.485 Gb/s, 1.485/1.001 Gb/s |
| Output Format | 1035i/59.94 Hz, 60 Hz<br>1080i/50 Hz, 59.94 Hz, 60 Hz<br>1080p/23.98 Hz, 24 Hz, 25 Hz, 29.97 Hz, 30 Hz<br>1080psF/23.98 Hz, 24 Hz<br>720p/23.98 Hz, 24 Hz, 50 Hz, 59.94 Hz, 60 Hz |
| Time Code | Optional ATC-LTC insertion (if GPS7 module is present) |
| Source | Time-of-day with adjustable offset, or program (elapsed) time counter |
| Output Connector | BNC ×2 or ×4 with Option BK |
| Output Impedance | 75 Ω |
| Output Amplitude | 800 $mV_{p-p}$ ±10% (typ.) |
| Overshoot | ≤10% (typ.) |
| Rise/Fall Time | ≤270 ps (20-80%) (typ.) |
| DC Offset (AC coupling) | 0 V ±0.5 V (typ.) |
| Jitter | ≤135 ps (typ.) alignment |
| Timing Adjustment | |
| Range | Anywhere in the frame |
| Resolution | Clock resolution 13.5 ns (1/74.25 MHz) |
| Return Loss | ≥15 dB from 5 MHz to 750 MHz<br>≥10 dB from 750 MHz to 1.485 GHz (typ.) |

### Embedded Audio Signal

| Characteristic | Description |
|---|---|
| Active Channels | 1-16 channels |
| Sample Frequency | 48 kHz |
| Digital Coding | 20 or 24 bits |
| Signal Alignment | Async. and Sync. (no frame #), Synchronous (frame #) |
| Audio Tone | Frequency (Hz)<br>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 |

## HDLG7 HD Dual Link Video Generator

### Serial Digital Signal Output

| Characteristic | Description |
|---|---|
| Test Signals | 100%, 75%, and SMPTE Color Bars, Flat Field (0% to 100% in 10% steps), 100% and 75% Red/Green/Blue, Convergence, Ramp, Valid Ramp, 5-step Staircase, 2T30 Pulse and Bar, SDI Pathological |
| Projector Test Patterns (2K only) | Color Patch 1, Color Patch 2, Black-to-White Step Scale, Black-to-Gray Step Scale, Horizontal Gradient, Vertical Gradient, Flat Fields (each step-scale color), Red/Green/Blue/Cyan/Magenta/Yellow Color Fields, Grid, Aspect Ratio Frame, Checkerboard, Window |
| HD-SDI Converter | Input signal up-converted to dual link format for output signal |
| Standards | SMPTE 372M, 292, 274M, 352M |
| Bit Rate | 1.485 Gb/s, 1.485/1.001 Gb/s for each link |
| Output Format | 1080i/50 Hz, 59.94 Hz, 60 Hz<br>1080p/23.98 Hz, 24 Hz, 25 Hz, 29.97 Hz, 30 Hz, 50 Hz, 59.94 Hz, 60 Hz<br>1080psF/23.98 Hz, 24 Hz<br>2048×1080p/23.98 Hz, 24 Hz, 25 Hz, 29.97 Hz, 30 Hz<br>2048×1080psF/23.98 Hz, 24 Hz<br>2048×1556psF/14.99 Hz, 15 Hz, 17.98 Hz, 18 Hz |
| Sampling Format | 4:2:2 Y'C'bC'r, 4:4:4 Y'C'bC'r, 4:4:4 G'B'R', 4:4:4 X'Y'Z' |
| Word Size | 10 or 12 bits |
| Alpha Channel | Same as Y/G channel or Flat Field (0% to 100% in 10% steps) |
| Embedded Audio | 16 channels copied from input signal to Link A and/or Link B in convertor mode. No embedded audio in Generator mode |
| Payload Identifier | Link A and Link B identified as per SMPTE 352M |
| Link Timing Offset | Adjustable timing offset between Link A and Link B, ±200 ns in single clock increments |
| Output Impedance | 75 Ω |
| Output Amplitude | 800 $mV_{p-p}$ ±10% |
| Overshoot | ≤10% (typ.) |
| Rise/Fall Time | ≤270 ps (20-80%) |
| DC Offset (AC coupling) | 0 V ±0.5 V (typ.) |
| Jitter | ≤135 ps (typ.) alignment |
| Timing Adjustment | |
| Range | Anywhere in the frame |
| Resolution | Clock resolution 13.5 ns (1/74.25 MHz) |
| Return Loss | ≥15 dB from 5 MHz to 750 MHz<br>≥10 dB from 750 MHz to 1.485 GHz |

## HD3G7, HD/3G-SDI Video Generator

### Serial Digital Signal Output

| Characteristic | Description |
|---|---|
| Test Signals | 100%/75%/SMPTE (EG1, EG432-1, RP219) Color Bars, 0%/50%/100% Flat field, Red/Green/Blue/Cyan/Magenta/Yellow 100% Field, Ramp, Limit Ramp, Valid Ramp, Shallow Ramp Matrix, 5/10 Step Staircase, Checkerboard, Clean Aperture, Convergence, Black-White Step Scale, Black-Dark Gray Step Scale, Pluge and Luma Reference, Production Aperture, Window, SMPTE 303M Color Reference, ChromaDuMonde, 2T Pulse and Bar, Color Pulses, Equalizer Test, PLL Test, SDI Matrix, Co-siting Pulse, Parametric Moving Zone Plate<br><br>(More signals in the DVD disk) |
| HD-SDI Converter | Input 1080 line HD-SDI signal up-converted to output 3G SDI signal |
| Standards | SMPTE 424M, 425, 274M, 291M, 292M, 296M, 299M, 352M |
| Bit Rate | 2.97 Gb/s, 2.97/1.001 Gb/s, 1.485 Gb/s, 1.485/1.001 Gb/s |
| Alpha Channel | Same as Y/G channel or Flat Field (0% to 100% in 10% steps) |
| Payload Identifier | Per SMPTE 352M |
| Time Code | Optional ATC-LTC and/or ATC-VITC insertion |
| Source | Time-of-day with adjustable offset (if GPS7 module is present), or program (elapsed) time counter |
| Ancillary Data | User programmable |
| Content | DID, SDID, DC, UDW (255), CS. Automatically calculate checksum and/or parity, or manual override |
| Location | Line number, sample offset, luma/chroma channel, virtual link |
| Mode | Continuous insertion or single packet |
| Output Impedance | 75 Ω |
| Output Amplitude | 800 $mV_{p-p}$ ±3% |
| Overshoot | ≤5% (typ.) |
| Rise/Fall Time | ≤135 ps (20-80%) |
| DC Offset (AC coupling) | 0 V ±0.5 V (typ.) |
| Jitter | ≤67 ps (typ.) (3 Gb, alignment)<br>≤80 ps (typ.) (3 Gb, timing) |
| Timing Adjustment | |
| Range | Anywhere in the frame |
| Resolution | One clock cycle at the Y, G, or X pixel rate |
| Return Loss | ≥20 dB from 5 MHz to 2.5 GHz<br>≥10 dB from 2.5 GHz to 3 GHz |

### Embedded Audio Signal

| Characteristic | Description |
|---|---|
| Active Channels | 1-32 channels |
| Sample Frequency | 48 kHz |
| Digital Coding | 24 bits |
| Signal Alignment | Async. and Sync. (no frame #), Synchronous (frame #) |
| Audio Tone | 10.0 Hz to 20000.0 Hz, 0.5 Hz resolution |
| Level | –60 to 0 dBFS, 1 dB steps |

### Trigger Output

| Characteristic | Description |
|---|---|
| Output Format | 148.5 MHz clock, frame pulse, or line pulse |
| Output Impedance | 50 Ω |
| Output Amplitude | 720 $mV_{p-p}$ ±10% |
| Return Loss | ≥15 dB from 10 MHz to 300 MHz |

## Supported HD3G7 Generator Mode Standards

### Generator Mode – HD-SDI (1920×1080)

| Structure | | | 50i | 59.94i | 60i | 23.98p | 24p | 25p | 29.97p | 30p | 50p | 59.94p | 60p | 23.98psf | 24psf | 25psf | 29.97psf | 30psf |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YCbCr | 4:2:2 | 10b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |

### Generator Mode – HD-SDI (1280×720)

| Structure | | | 50i | 59.94i | 60i | 23.98p | 24p | 25p | 29.97p | 30p | 50p | 59.94p | 60p | 23.98psf | 24psf | 25psf | 29.97psf | 30psf |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YCbCr | 4:2:2 | 10b | | | | X | X | X | X | X | X | X | X | | | | | |

### Generator Mode – 3G Level A (1920×1080)

| Structure | | | 50i | 59.94i | 60i | 23.98p | 24p | 25p | 29.97p | 30p | 50p | 59.94p | 60p | 23.98psf | 24psf | 25psf | 29.97psf | 30psf |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YCbCr | 4:4:4 | 12b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| | | 10b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| YCbCr+A | | 10b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| YCbCr | 4:2:2 | 12b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| | | 10b | | | | | | | | | X | X | X | | | | | |
| GBR | 4:4:4 | 12b | X | X | X | X | X | X | X | X | | | | | | | | |
| | | 10b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| GBR+A | | 10b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |

### Generator Mode – 3G Level A (1280×720)

| Structure | | | 50i | 59.94i | 60i | 23.98p | 24p | 25p | 29.97p | 30p | 50p | 59.94p | 60p | 23.98psf | 24psf | 25psf | 29.97psf | 30psf |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YCbCr | 4:4:4 | 10b | | | | X | X | X | X | X | X | X | X | | | | | |
| YCbCr+A | | | | | | X | X | X | X | X | X | X | X | | | | | |
| GBR | | | | | | X | X | X | X | X | X | X | X | | | | | |
| GBR+A | | | | | | X | X | X | X | X | X | X | X | | | | | |

### Generator Mode – 3G Level A (2K×1080)

| Structure | | | 50i | 59.94i | 60i | 23.98p | 24p | 25p | 29.97p | 30p | 50p | 59.94p | 60p | 23.98psf | 24psf | 25psf | 29.97psf | 30psf |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| XYZ | 4:4:4 | 12b | | | | X | X | X | X | X | | | | X | X | X | X | X |
| GBR | | | | | | X | X | X | X | X | | | | X | X | X | X | X |

**Generator Mode – 3G Level B (1920×1080)**

| Structure | | | 50i | 59.94i | 60i | 23.98p | 24p | 25p | 29.97p | 30p | 50p | 59.94p | 60p | 23.98psf | 24psf | 25psf | 29.97psf | 30psf |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YCbCr | 4:4:4 | 12b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| | | 10b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| YCbCr+A | | 10b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| YCbCr | 4:2:2 | 12b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| | | 10b | | | | | | | | | X | X | X | | | | | |
| YCbCr+A | | 12b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| GBR | 4:4:4 | 12b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| | | 10b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| GBR+A | | 10b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |

**Generator Mode – 3G Level B (2K×1080)**

| Structure | | | 50i | 59.94i | 60i | 23.98p | 24p | 25p | 29.97p | 30p | 50p | 59.94p | 60p | 23.98psf | 24psf | 25psf | 29.97psf | 30psf |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| XYZ | 4:4:4 | 12b | | | | X | X | X | X | X | | | | X | X | X | X | X |
| GBR | | | | | | X | X | X | X | X | | | | X | X | X | X | X |

**Generator Mode – 3G Level B (2×HD 1920×1080)**

| Structure | | | 50i | 59.94i | 60i | 23.98p | 24p | 25p | 29.97p | 30p | 50p | 59.94p | 60p | 23.98psf | 24psf | 25psf | 29.97psf | 30psf |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YCbCr | 4:2:2 | 10b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |

**Generator Mode – 3G Level B (2×HD 1280×720)**

| Structure | | | 50i | 59.94i | 60i | 23.98p | 24p | 25p | 29.97p | 30p | 50p | 59.94p | 60p | 23.98psf | 24psf | 25psf | 29.97psf | 30psf |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YCbCr | 4:2:2 | 10b | | | | X | X | X | X | X | X | X | X | | | | | |

## Supported HD3G7 Converter Mode Standards

### Converter Mode – 3G Level A (1920×1080)

| HD Input Signal | | | 1080i | | | | 1080p | | | | 1080i | | | | 1080psf | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 50 | 59.94 | 60 | 23.98 | 24 | 25 | 29.97 | 30 | 50 | 59.94 | 60 | 23.98 | 24 | 25 | 29.97 | 30 |
| 3 Gb Output Format | | | 50i | 59.94i | 60i | 23.98p | 24p | 25p | 29.97p | 30p | 50p | 59.94p | 60p | 23.98psf | 24psf | 25psf | 29.97psf | 30psf |
| Output Sample Structure | | | | | | | | | | | | | | | | | | |
| YCbCr | 4:4:4 | 12b | Not Available | | | | | | | | | | | | | | | |
| | | 10b | Not Available | | | | | | | | | | | | | | | |
| YCbCr | 4:2:2 | 12b | Not Available | | | | | | | | | | | | | | | |
| | | 10b | | | | | | | | | X | X | X | | | | | |
| GBR | 4:4:4 | 12b | Not Available | | | | | | | | | | | | | | | |
| | | 10b | Not Available | | | | | | | | | | | | | | | |
| GBR+A | | 10b | Not Available | | | | | | | | | | | | | | | |

### Converter Mode – 3G Level B (1920×1080)

| HD Input Signal | | | 1080i | | | | 1080p | | | | 1080i | | | | 1080psf | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 50 | 59.94 | 60 | 23.98 | 24 | 25 | 29.97 | 30 | 50 | 59.94 | 60 | 23.98 | 24 | 25 | 29.97 | 30 |
| 3 Gb Output Format | | | 50i | 59.94i | 60i | 23.98p | 24p | 25p | 29.97p | 30p | 50p | 59.94p | 60p | 23.98psf | 24psf | 25psf | 29.97psf | 30psf |
| Output Sample Structure | | | | | | | | | | | | | | | | | | |
| YCbCr | 4:4:4 | 12b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| | | 10b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| YCbCr+A | | 10b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| YCbCr | 4:2:2 | 12b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| | | 10b | | | | | | | | | X | X | X | | | | | |
| YCbCr+A | | 12b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| GBR | 4:4:4 | 12b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| | | 10b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |
| GBR+A | | 10b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |

### Converter Mode – 3G Level B (2×HD 1920×1080)

| HD Input Signal | | | 1080i | | | | 1080p | | | | 1080i | | | | 1080psf | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 50 | 59.94 | 60 | 23.98 | 24 | 25 | 29.97 | 30 | 50 | 59.94 | 60 | 23.98 | 24 | 25 | 29.97 | 30 |
| 3 Gb Output Format | | | 50i | 59.94i | 60i | 23.98p | 24p | 25p | 29.97p | 30p | 50p | 59.94p | 60p | 23.98psf | 24psf | 25psf | 29.97psf | 30psf |
| Output Sample Structure | | | | | | | | | | | | | | | | | | |
| YCbCr | 4:2:2 | 10b | X | X | X | X | X | X | X | X | | | | X | X | X | X | X |

## TG700

### Mainframe

| Characteristic | Description |
|---|---|
| Internal Reference Frequency | 13.5 MHz |
| Long-term Stability | Less than 1 ppm/year |
| Number of Slots for Modules | 4 |
| Power Supply Slot | 1 |
| Network Interface | 10BASE-T Ethernet |

## Physical Characteristics

| Dimensions | mm | in. |
|---|---|---|
| Height | 44 | 1.73 |
| Width | 483 | 19 |
| Length | 559 | 22 |
| **Weight** | **kg** | **lb.** |
| Net | 8.2 | 18 |

## Environmental

| Characteristic | Description |
|---|---|
| Power Consumption | 100 W (max) |
| Temperature | 0 to +50 °C |
| Altitude | 4500 m (15,000 ft.) |
| Source Voltage | 100 to 240 V, 48 to 63 Hz |

# Ordering Information

## TG700

### Multiformat Video Generator

Mainframe*1. Up to four modules can be fitted in the frame.
**Included**: User Manual, CD-ROM (Containing ARIB STD-B28 standard Multiformat Color Bar library, SMPTE RP219 HD/SD Compatible Color Bar library, TG7 Communication SW, TG7 Setup SW, Logo Gen, Frame Picture Gen, Signal Viewer, Signal DNL, Sample Frame Pictures and Logos), Rackmount Kit, and Power Cord.

**Note**: Please specify power cord when ordering.

*1 Order requires one of the modules.

### Modules

| Module | Option | Description |
|---|---|---|
| AGL7 | | Analog Genlock |
| AG7 | | Audio Generator |
| ATG7 | | Analog Test Generator Module |
| AVG7 | | Component and Composite Analog Video Generator Module |
| AWVG7 | | Analog Wideband Video Generator Module |
| BG7 | | Black Generator |
| | Opt. CB | Add NTSC/PAL color bar. Option must be added at time of order. Option cannot be added later |
| DVG7 | | Digital Video Generator |
| | Opt. BK | Add SDI black outputs. Option must be added at time of order. Option cannot be added later |
| GPS7 | | GPS Synchronization and Time Code Module |
| HDVG7 | | HDTV Digital Video Generator |
| | Opt. BK | Add black outputs. Option must be added at time of order. Option cannot be added later |
| HDLG7 | | HD Dual Link Video Generator |
| HD3G7 | | HD/3G-SDI Video Generator |

### Module Limitations

Only one AGL7 or GPS7 module may be installed in one TG700 mainframe.
No more than two HDVG7, HD3G7, or AWVG7 modules, in any combination, may be installed in one TG700 mainframe.

### Common Options for All Models

| Option | Description |
|---|---|
| Opt. 88 | Module installation*2 |
| Opt. D1 | Calibration data report in English/Japanese |

*2 Applies to mainframe and all modules.

### Power Cord 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. A11 | India power |
| Opt. A12 | Brazil power |

### Service Options

| 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. G3 | Complete Care 3 Years (includes loaner, scheduled calibration and more). TG700, AGL7, AG7, AVG7, BG7, DVG7, GPS7, HDVG7, HD3G7 only |
| Opt. G5 | Complete Care 5 Years (includes loaner, scheduled calibration and more). TG700, AGL7, AG7, AVG7, BG7, DVG7, GPS7, HDVG7, HD3G7 only |
| Opt. R3 | Repair Service 3 Years (including warranty) |
| Opt. R5 | Repair Service 5 Years (including warranty) |

### Optional Accessories

| Accessory | Description | Order |
|---|---|---|
| TG700 Opt. FP Upgrade Kit | This kit upgrades any TG700 to 64 MB Flash Memory | 040-1698-xx |
| Service Manual | | 070-A800-xx |
| Power Supply Module | | 650-A810-xx |
| Blank Panel for TG700 | | 614-1051-xx |
| D-sub to XLR/BNC Cable for GPS7 Module | | 012-1717-xx |

### Warranty

1 year parts and labor.

Product Area Assessed: The planning, design/development and manufacture of electronic Test and Measurement instruments.

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Updated 10 February 2011

**For Further Information.** Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit **www.tektronix.com**



16 Mar 2011 20W-14227-12