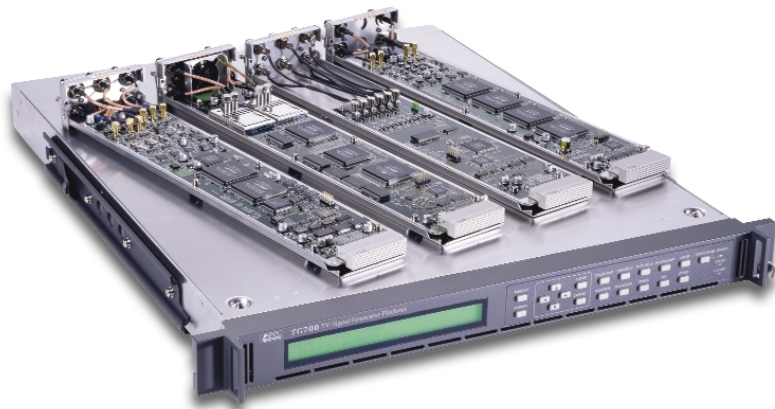


Multiformat Video Generator

► TG700



► Features & Benefits

Multiformat Analog and Digital Test Signal Generation

Ideal Channel Configuration and Performance to Support Reference Generator Needs

Modular Expandable Platform

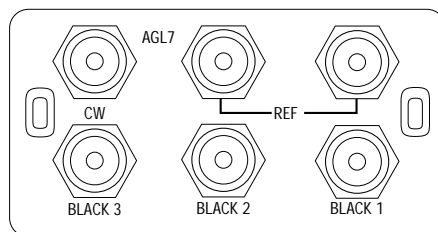
► Applications

Reference Generator and Test Signal Generator for Post-production and Broadcast Facilities

Test Signal Generator for Research and Development

Equipment Design and Maintenance

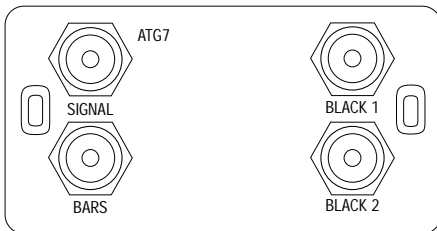
The TG700 is a multiformat, analog and digital, precision signal generation platform. Designed with the changing needs of the video industry in mind, the TG700 offers sync pulse generation and test signal generation for a wide array of analog, serial digital and digital high definition formats. The TG700 Multiformat Video Generator has 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.



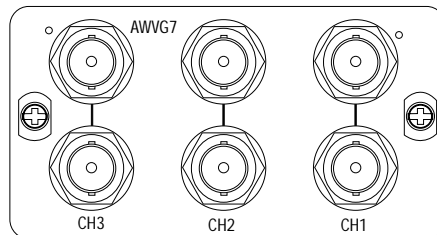
The TG700 has a high stability reference. The AGL7 Analog Genlock Module adds the capability to lock to a variety of signals, which makes the TG700 an ideal solution as the master house reference or slave reference for broadcast and production/post-production applications. Three black outputs are available and are selectable for HDTV tri-level, 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.

Multiformat Video Generator

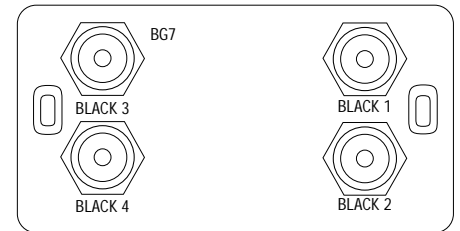
► TG700



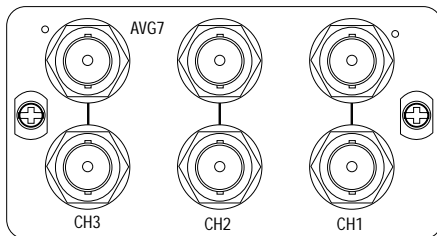
The ATG7 Composite Analog Test Generator supports PAL, NTSC and NTSC NoSetup. It provides one test signal output, one color bar test signal output and two black outputs. The black outputs can independently generate H, V, black burst and subcarrier.



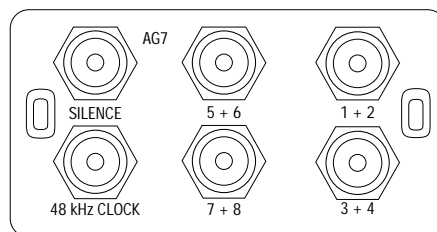
The AWVG7 is an Analog Wideband Video Generator that supports a variety of HD analog component formats (Y'P'bP'r or R'G'B'). The module provides two identical component outputs with a bandwidth of 30 MHz. Up to two AWVG7 Analog Wideband Video Generators can be placed in a single TG700 mainframe.



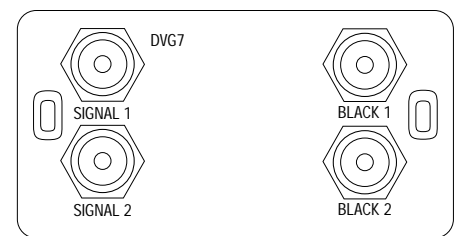
The BG7 is an analog black generator with four independently selectable outputs. The BG7 Black Generator supports NTSC and PAL black burst as well as HDTV tri-level sync. With Option CB, two of the outputs can also generate various color bar test signals.



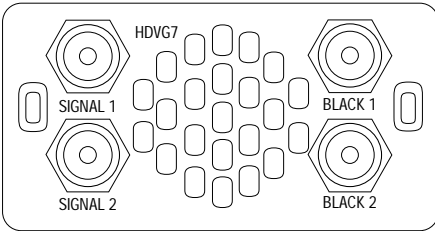
The AVG7 is an analog video generator for 525/625 interlace formats supporting component (Y'P'bP'r, R'G'B', Y/C), 525 Beta, and composite (PAL, NTSC, NTSC NoSetup). It provides two identical component outputs, two identical Y/C and Composite, or six identical composite outputs.



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



The DVG7 is a multi-format serial digital test signal generator. The DVG7 Digital Video Generator supports 525 and 625 component digital at 270 Mbps and NTSC composite digital at 143.181818 Mbps. 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, multi-format, high-definition test signal module that provides up to two identical 1.485 Gbps serial digital video test signal outputs in a broad variety of formats. With Option BK, two additional identical serial digital black signal outputs are available. Up to two HDVG7 HDTV Digital Video Generators 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.

Option FP allows generation of full frame test and custom patterns for the AVG7, AWWG7, DVG7 and HDVG7 modules. Simple full frame patterns are available on V 3.1 CD-ROM.

▶ Characteristics

TG700, Mainframe

- 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.

AGL7, Analog Genlock Module

PAL-M and PAL-N are not supported by AGL7.

Reference Input

- Loopthrough Input** –
Input connector: 75 Ω x2.
Input signal: NTSC/PAL black burst or HDTV tri-level sync.
Amplitude range: Standard ± 6 dB.
S/N ratio: > 40 dB.
SCH phase: 0 ± 40 °C.

Return Loss – ≥ 30 dB 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

- Input Impedance** – 75 Ω , internal term.
- 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 (typical 1 °) with CW input S/N > 50 dB.

Genlock Time Adjustment

- Range: Anywhere in the color frame.
- Resolution: < 0.5 ° of NTSC/PAL subcarrier.
- 1 ns with tri-level sync input.

Color Framing – Keeps accuracy even with ± 45 ° SCH error of input reference input.

Black Input 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 x3 (1 black burst is an independent, black burst x2 are distributed outputs).
 2. NTSC/PAL black burst x2, HDTV tri-level sync x1 (all black burst and HDTV tri-level sync are independent).
 3. NTSC/PAL black burst x1, HDTV tri-level sync x2 (HDTV tri-level sync x2 are distributed from the same source).

Multiformat Video Generator

▶ TG700

NTSC/PAL Black Burst Output
Output Standard – EBU N14, SMPTE RP 154.

Amplitude Accuracy – Black burst std. $\pm 2\%$.

Burst Frequency – NTSC/PAL FSC ± 1 Hz.

SCH Phase – $< \pm 5^\circ$.

HDTV Tri-level Sync Output
Matching Standard – SMPTE-240M, 274M, 296M, RP211.

Amplitude Accuracy – Std. HDTV tri-level $\pm 2\%$.

Output Signal Timing Adjustment –

NTSC/PAL Black Burst Output –

Range: Anywhere in the color frame.

Resolution: $< 0.5^\circ$ of NTSC/PAL subcarrier.

HDTV Tri-level Sync –

Range: Anywhere in the frame.

Resolution: < 1 ns.

Output Impedance – 75Ω .

Return Loss – > 30 dB over to 30 MHz.

AG7, Audio Generator

Audio Test Signal Output
Standard – ANSI S4.40 (AES3), AES3-ID.

Output Channels – 8 channels (4 AES/EBU pairs).

Output Impedance – 75Ω , unbalanced.

Output Connector – BNC x4.

Output Amplitude – $1 \text{ V} \pm 0.2 \text{ V}$.

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

Standard – ANSI S4.40 (AES3), AES3-ID.

Channel – 2 channels (one AES/EBU pair).

Output Impedance – 75Ω , balanced.

Output Connector – BNC x1.

Output Amplitude – $1 \pm 0.2 \text{ V}$.

Frequency, Level – No signal.

Sampling Frequency – 48 kHz (lock on video signal).

Quantization – Linear PCM, 20- or 24-Bits (2's complement).

Transfer Coding – Bi-phase mark.

ATG7, Analog Test Signal Generator

PAL-M and PAL-N are not supported by ATG7.

Signal Output

Output Signal (NTSC/NTSC No Setup/PAL) (preinstalled for all formats): 100%, 75% and SMPTE color bars, black burst, linearity, multiburst, multipulse, sweep, monitor, modulated, Convergence, and other major test signals.

ID Text –

Max 18 characters. One Row (character 14x11 pixels). Texts and Position is embedded to each signal.

Luminance Amplitude – $\pm 1\%$ (Measured at 700 mV).

Chrominance-to-Luminance Gain – $\pm 1\%$.

Frequency Response – $\pm 1\%$ 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

NTSC/NTSC No Setup Signals –

100%/75% Color Bar.

SMPTE Color Bar.

40% Flat Field.

Black Burst.

Black Burst with Field REF.

Monitor setup, SNG color bars.

ID Text –

Max 18 characters. One Row (character 14x11 pixels). Texts and Position is embedded to each signal.

Luminance Amplitude – $\pm 1\%$ (Measured at 700 mV).

Chrominance-to-Luminance Gain – $\pm 1\%$.

**BLACK 1/2 Outputs
NTSC/NTSC No Setup Signals –**

Black Burst.
Black Burst with Field Reference.
Timing Pulse (Subcarrier, Composite Sync, H Drive,
V Drive, Composite Blanking, and Color Frame ID).

Timing Pulse Amplitude – -0.5 to 0.5 V ($1 V_{p-p}$).

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

Standards –
ITU-R BT, 470-6.
SMPTE 170M.

Output Impedance – 75Ω .

Return Loss – 36 dB to 6 MHz.

Burst Amplitude – $\pm 2\%$.

Sync Amplitude – $\pm 2\%$.

Blanking Level – 0 V ± 50 mV.

SC/H Phase Accuracy – < 1.25 ns.

Timing Offset Range – Full Color Frame.

Timing Offset Resolution – 54 MHz Clock Resolution.

**AVG7, Analog
Video Generator**

Analog Signal Output – Output signal (preinstalled for all formats): 100%, 75% and SMPTE color bars, linearity, flat field, multiburst, sweep, monitor, Pulse and 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.

Outputs – 6 identical analog composite outputs, 2 identical component video outs, or 2 identical Y/C and composite out.

Output Impedance – 75Ω .

Luminance Linearity Error – $\leq 0.5\%$.

Luminance Amplitude – $\pm 1\%$ (Measured at 700 mV).

Chrominance-to-Luminance Gain Error – $\leq 1\%$
(Relative to 100 kHz).

Chrominance-to-Luminance Delay – < 2.5 ns on a composite output (typical).

Channel-to-Channel Delay – ≤ 1 ns (Relative to CH1).

Frequency Response – $\leq 0.5\%$ to 8 MHz at 700 mV (typical).

Differential Gain Error – $\leq 0.3\%$.

Differential Phase Error – $\leq 0.5\%$.

Timing Adjustment for the Output Signal –

Range: Anywhere in the frame.

Resolution: 0.1 ns.

Return Loss – > 40 dB to 6 MHz.

**AWVG7, Analog
Wideband Video
Generator**

Analog Signal Output – Output Signal (preinstalled for all formats). 100%, 75% and SMPTE color bars, linearity, multiburst, sweep, monitor and other major test signals.

Formats Supported –

Y'P'bP'r or R'G'B' 1080i/50 Hz, 59.94 Hz, 60 Hz.
1080p/23.98 Hz, 24 Hz, 25 Hz, 29.97 Hz, 30 Hz.
1080psF/23.98 Hz, 24 Hz.
720p/23.98 Hz, 24 Hz, 29.97 Hz, 30 Hz, 50 Hz,
59.94 Hz, 60 Hz.

Outputs – 2 identical analog component video outputs.

Output Impedance – 75Ω .

Output Amplitude – $< 1\%$ at 700 mV.

Channel to Channel Delay – ≤ 1 ns relative to CH1.

Frequency Response –

$\pm 1\%$ to 20 MHz.

$\pm 2\%$ to 28 MHz.

$\pm 3\%$ to 30 MHz.

Timing Adjustment for the Output Signal –

Range: Anywhere in the frame.

Resolution – 0.1 ns.

Return Loss – ≥ 35 dB to 30 MHz.

Multiformat Video Generator

► TG700

BG7, Black Generator

PAL-M and PAL-N are not supported by BG7.

Black Output 1/2/3/4
NTSC/PAL black burst and independently selectable
HDTV tri-level analog sync.

Black Burst Output
Output Standard – EBU N14, SMPTE RP 154,
RP318M-B.
Amplitude Accuracy – Std. black burst $\pm 2\%$.
SCH Phase – $< \pm 5^\circ$.

HDTV Tri-level Sync Output
Standard – SMPTE 240M, 274M, 296M, RP211.

Amplitude Accuracy – Std. HDTV tri-level $\pm 2\%$.
Timing Adjustment (each output is independent).

NTSC/PAL Black Burst –
Range: Anywhere in the color frame.
Resolution: Clock resolution 18.5 ns (1/54 μ s).

HDTV Tri-level Sync –
Range: Anywhere in the frame.
Resolution: Clock resolution 13.5 ns (1/74.25 μ s).

Analog Test Signal (Opt. CB) –

Test Signal (black 3/4 output) –
NTSC: SMPTE bar, 75% full field bar,
100% full field bar, 40% flat field, 10 field ID.
PAL: 75% full field bar, 100% full field bar,
75% bar with red, 100% bar with red.
Luminance amplitude accuracy: $\pm 1\%$ (video at 100%).
Chroma amplitude accuracy: $\pm 2\%$.

Output Impedance – 75 Ω .

Return Loss – > 30 dB to 30 MHz.

Jitter – < 1 ns.

DVG7, Digital Video Generator

Serial Digital Signal Output – Output signal.
(Preinstalled for all formats): 100%, 75% and SMPTE
color bars, linearity, multiburst, sweep, monitor, SDI
Checkfield, timing and other major test signals.

Standards – ITU-R BT 601, 656, EBU Tech 3267,
MPTE 125M, 244M, 259M, 272M, RP165, RP178.

Bit Rate – 143 Mbps, 270 Mbps.

Resolution – 8- or 10-Bits.

Output Impedance – 75 Ω .

Output Amplitude – 800 mV_{p-p} $\pm 10\%$.

Overshoot – $< 10\%$.

Rise/Fall Time – 0.4 to 1.5 ns (20 to 80%).

DC Offset (AC couple) – 0 ± 0.5 V.

Jitter – < 0.2 UI, above 10 Hz jitter frequency.

Timing Adjustment for the Output Signal –
Range: Anywhere in the frame.
Resolution: Clock resolution (37 or 70 ns).

Return Loss – > 15 dB 5 to 270 MHz.

Embedded Audio Signal

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): 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.

HDVG7, HDTV Digital Video Generator

Serial Digital Signal Output –
Output Signal (preinstalled for all formats).
100%, 75% and SMPTE color bars, linearity, multiburst,
sweep, monitor, SDI pathological timing and other major
test signals.

**Serial Digital Test Signal Output, Shared Black
Signal** – SMPTE 240M, 272M, 292M, 296M.

Bit Rate – 1.485 Gbps, 1.485/1.001 Gbps.

Output Format –

1035i/59.94 Hz, 60 Hz.
1080i/50 Hz, 59.94 Hz, 60 Hz.
1080p/23.98 Hz, 24 Hz, 25 Hz, 29.97 Hz, 30 Hz.
1080psF/23.98 Hz, 24 Hz.
720p/59.94 Hz, 60 Hz.

Output Amplitude – 800 mV_{p-p} $\pm 10\%$ (typical).

Overshoot – $< 10\%$ (typical).

Rise/Fall Time – < 270 ps (20 to 80%) (typical).

DC Offset (AC coupling) – 0 V ± 0.5 V (typical).

Jitter – < 135 ps (typical).

Output Impedance – 75 Ω .

Return Loss – ≥ 15 dB from 5 MHz to 750 MHz.
 ≥ 10 dB from 750 MHz to 1.485 GHz (typical).

Timing Adjustment for the Output –

Range: Anywhere in the frame.
Resolution: Clock resolution 13.5 ns (1/74.25 MHz).

Embedded Audio Signal –

Active channels: 1 to 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): 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.

Sample frequency: 48 kHz.



Environmental
 Power Line – 85 to 250 VAC.
 Power Consumption – 100 W (max.).
 Temperature – 0 °C to +50 °C.
 Altitude – 4500 meters.
 Source Voltage – 100 to 240 V, 48 to 63 Hz.

Physical Characteristics

Dimensions	mm	in.
Height	44	1.73
Width	483	19
Length	559	22
Weight	kg	lbs.
Net	8.2	18

▶ **Ordering Information**

Standard with every product is a Calibration Certificate traceable to Japanese JACO standard.

TG700

Mainframe*1. Up to four modules can be fitted in the frame. Please specify power cord when ordering.

Opt. FP – Frame picture function (available only for AVG7, AWVG7, DVG7 and HDVG7 modules).

Option must be added at time of order.

Option cannot be added later.

*1Order requires one of the modules.

Modules

AGL7

Analog Genlock.

AG7

Audio Generator.

ATG7

Composite 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.

HDVG7

HDTV Digital Video Generator.

Opt. BK – Add black outputs. Option must be added at time of order. Option cannot be added later.

Warranty

Module Limitations –

Only one AGL7 module may be installed in one TG700 mainframe.

Up to two HDVG7 or two AWVG7 in any combination may be installed in one TG700 mainframe.

1 year parts and labor.

Common Options for All Models

Opt. D1 – Calibration data report in English/Japanese.

Options FP, CB and BK are installed at the factory and can not be added later.

Standard Accessories

Manual – User Manual.

Software Package – CD-ROM.

CD-ROM Contents: TG7 Communication SW, Logo Gen, Frame Picture Gen, Signal DNL.

Rackmount Kit.*2

Power Cord – 125 V/6A.

Power Cord Options

Opt. A0 – US Plug, 115 V, 60 Hz.

Opt. A1 – Universal Euro 220 V, 50 Hz.

Opt. A2 – United Kingdom 220 V, 50 Hz.

Opt. A3 – Australian 240 V, 50 Hz.

Opt. A4 – North American 240 V, 60 Hz.

Opt. A5 – Switzerland 220 V, 50 Hz.

Optional Accessories

Service Manual: Order 070-A800-00.

Blank Panel for TG700: Order 614-A021-00.

*2Applies to mainframe and all modules.

Multiformat Video Generator

▶ TG700

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Updated 17 June 2002

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09/02 HB/XBS

20W-14227-3