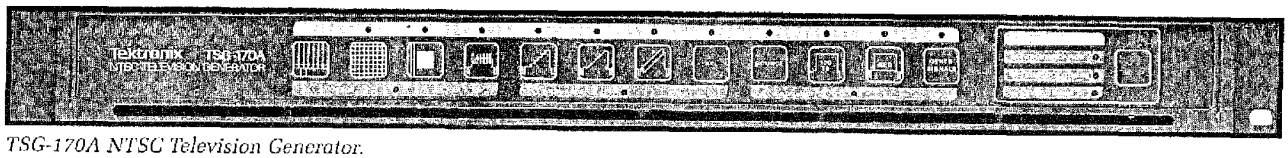
NTSC Television Generator

TSG-170A



TSG-170A NTSC Television Generator.

Features

- Simple, Effective Test Signal Complement
- Master Sync Generator With Digital Genlock
- Separate Timing Controls for Sync and Test Signals
- Separate SMPTE Color Bars Output With Programmable ID (Option 01)
- Audio Tone Output (Option 01)
- Tape Leader Countdown (Option 01)
- Option 1V Signal Set for VM700A Measurements

For your local Tektronix representative see the list in the back of this catalog or outside the U.S. call: 1-503-627-1933, inside the U.S. call: 1-800-426-2200.

See Tektronix on the World Wide Web: http://www.tek.com

ISO 9001 *Tektronix Measurement products are manufactured in ISO registered facilities.*

CE

The Tektronix TSG-170A NTSC Television Generator offers you the test signals you need plus the advantages of master and genlock sync capability. It provides true 10-Bit digital signal accuracy with a full complement of test signals and a stable master sync generator.

The rugged, compact TSG-170A is designed to support both operational and maintenance requirements. The TSG-170A Option 1 provides even more versatility by adding a separate SMPTE color bar generator, programmable identification, audio tone output, and tape leader countdown.

TEST SIGNAL GENERATOR

The accuracy and long term stability of the TSG-170A test signals are enhanced by its precision digital to analog converter. Each converter is automatically laser trimmed to 12-Bit accuracy. The TSG-170A test signal generator's simple front panel controls provide selection of:

- SMPTE Color Bars
- Convergence
- Pulse & Bar with Window
- Multiburst
- 5-Step Luminance Staircase
- Luminance Ramp
- Modulated Ramp
- Selectable 10% or 90% APL
- Bounce
- 10 and 100 IRE Flat Fields
- Red Field
- Multibars
- NTC 7 Composite
- System Test Matrix
- Monitor Setup Matrix
- 5 MHz Line Sweep
- Multipulse

Color bar blanking width is 10.9 µs to facilitate verification of proper blanking throughout your system.

VM700A MEASUREMENTS

A signal set designed specifically to support VM700A measurements is now available for the TSG-170A. This signal set is available as Option 1V and differs from the standard signal set as follows:

Standard Signal Set	Option 1V Signal Set
Pulse & Bar	NTC7 Composite
Other Signals:	
Multibars	FCC Color Bars
NTC7 Composite	(Sin x)x
Line Sweep w/Markers	Chroma Freq Response
Multipulse	Field squarewave
System Test Matrix	NTC7 Combination
Monitor Set Matrix	New Matrix
10% Flat Field	50% Flat Field
Red Field	Red Field
(12.5% pedestal)	(50% pedestal)

The new matrix is composed of FCC color bars, 50% flat field, NTC 7 combination and composite, (Sin x)x, red field, and chroma frequency response.

MASTER SYNC GENERATOR WITH DIGITAL GENLOCK

The TSG-170A sync generator's stable color standard and unique digital genlock make it ideal for either master generator or slave operation. All outputs are correctly SCH phased, even if the TSG-170A is locked to an improperly SCH phased reference input. The digital genlock calculates sync timing and subcarrier phase to properly identify color framing of the input reference signal. The TSG-170A automatically senses composite video or 3.58 MHz subcarrier reference inputs and, in the absence of a reference input signal, automatically switches to its own internal reference. This high stability crystal oscillator, with its constant temperature oven, ensures long term frequency stability.

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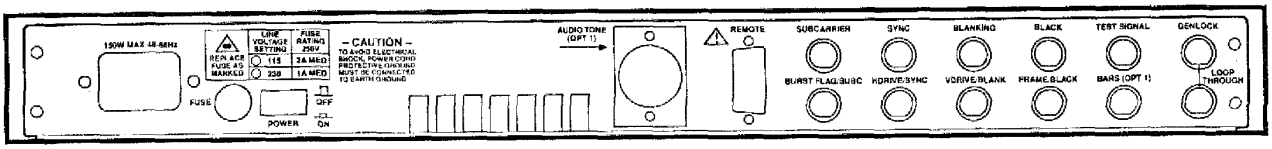

TSG-170A rear panel.

SYSTEM TIMING CONTROL
Front panel controls are provided for phasing of all outputs relative to the genlock source. In addition, a separate set of timing controls is provided to move the pulse and subcarrier outputs relative to the black burst and test signal outputs. This simplifies system timing and eliminates delay lines. Up to eight genlock and sync timing settings may be stored in non-volatile memory to prevent loss in the event of a power failure. The timing presets may be recalled through the remote control port. A front panel lockout feature prevents inadvertent changes to the front panel timing controls.

FLEXIBLE PULSE OUTPUT
The TSG-170A has eight sync generator outputs; four fixed and four programmable. The primary outputs for SUBCARRIER, SYNC, BLANKING, and BLACKBURST, are fixed. The secondary outputs, BURST FLAG, H DRIVE, V DRIVE, and COLOR-FRAME PULSE, are programmable and can be changed to provide a second set of primary outputs. The BLANKING output may be set to 10.2, 10.7, or 10.9 µs.

SMPTE COLOR BARS WITH PROGRAMMABLE ID, AUDIO TONE AND TAPE LEADER COUNTDOWN (OPTION 01)
Option 01 adds a separate SMPTE color bar output for routine studio needs, such as tape leaders, freeing the front panel selected test signals for engineering and maintenance.

An ID of up to 12 alphanumeric characters may be inserted in the SMPTE color bar output. This front panel programmable ID is ideal for identifying satellite feeds, and videotapes.

Option 01 also provides a 450 Hz audio tone output, useful for checking program line continuity and adjusting audio levels. The tone can be adjusted over a 0 dBm to 8 dBm range into 150 Ω or 600 Ω.

Also included in Option 01 is a tape leader countdown. When initiated, the full time SMPTE color bars output goes to black and the audio tone is switched off. Simultaneously, a ten-to-two (in seconds) countdown is initiated and overlayed on the black background. The black background remains until the count down program is terminated. Control of the tape leader countdown is through the remote control connector.

REMOTE CONTROL
Remote selection of internal/external reference, ID preset, genlock and sync timing presets, and test signal is provided. Selection is made with ground closures through a rear panel connector.

PACKAGING
The TSG-170A's rugged, 1 3/4 inch package makes it ideal for remote vans or anywhere space is at a premium.

Characteristics

TEST SIGNAL GENERATOR
Luminance Amplitude Accuracy – ±1%.
Chrominance-to-Luminance Gain – ±1%.
Output Impedance – *75 Ω*.
Return Loss – 36 dB to 4.2 MHz.

TEST SIGNALS
SMPTE Color Bars

Convergence –
14 lines per field, 17 lines per horizontal.

Pulse & Bar with Window –
2T Pulse HAD: 250 ns ±25 ns.
White Bar Amplitude: 100 IRE.
Field Tilt: 0.5%.
Line Tilt: 0.5%.

Multiburst –
White Reference Bar Amplitude: 428.6 mV (60 IRE).
Packet Amplitude: 428.6 mV (60 IRE) p-p.
Burst Frequencies: 0.5, 1.0, 2.0, 3.0, 3.58 and 4.2 MHz.

5-Step Staircase –
714.3 mV (100 IRE).

Luminance Ramp –
0 to 714.3 mV (100 IRE).

Modulated Ramp –
Chrominance Amplitude: 285.7 mV (40 IRE).
Diff Gain: 0.6%.
Diff Phase: 0.3.

APL –
10% and 90%.

AC Bounce –
Bounce Rate: 1 second high, 1 second lo.

Flat Fields –
10 IRE, 100 IRE.

Red Field –
Luminance Pedestal: 153.6 mV (21.5 IRE).

Multibars –
Color bars and multiburst.

NTC 7 Composite –
80 IRE, 5-step modulated staircase and pulse & bar.

Line Sweep –
714.3 mV_{p-p}. Linear sweep from 500 kHz to 5 MHz.

NTSC Television Generator

TSG-170A

Multipulse –
Amplitude: 714.3 mV.
Frequencies: 0.5, 1.0, 2.0, 3.0, 3.58, and 4.2 MHz.

System Test Matrix –
Multibars and NTC7.

Monitor Setup Matrix –
Convergence, IWQB, convergence, color bars, reverse bars, and convergence.

DAC Test –
500 kHz and 3.58 MHz.

Option 01 Color Bars –
SMPTE color bars.

Identification –
12 characters, 7x9 matrix.

Audio Tone –
449.55 Hz (locked to vertical), distortion less than 0.01%, 0 to 8 dBu into 150 Ω, 600 Ω, or high impedance. Click ID adjustable 0.2 to 4 Hz.

SYNC GENERATOR

Subcarrier Stability –
3.579545 MHz ±1 Hz over temperature; typically less than 1 ppm per year drift after initial aging.

Black Burst Output –
Setup: 7.5 IRE.
Blanking: Less than 10.6 µs.

Pulse Outputs (General Characteristics) – Amplitude: 4.0 ±0.1 V.
Impedance: 75 Ω.
Return Loss: 30 dB to 4.2 MHz.
Rise Time: 140 ns ±20 ns.

Pulse Outputs (Signals) –
Composite Sync –
Blanking:
Horizontal Blanking Duration: 10.7 µs ±0.1 µs, jumper selectable for 10.5 µs or 10.9 µs.
Vertical Blanking Duration: 20 lines, jumper selectable for 19 or 20 lines.
Burst Flag.
Horizontal Drive.
Vertical Drive.
Color Frame Pulse: Field 1, Line 11.

Subcarrier Output –
Amplitude: 2 v ±0.2 V.

Pulse and Subcarrier Outputs –
Timing Range: 4 µs advance, 4 µs delay relative to the test signal and black burst outputs.

GENLOCK

Genlock Source (Comp Video) –
Input Configuration: 75 Ω loop-through.
Return Loss: At least 40 dB to 4.2 MHz.
Burst Amplitude: 286 mV +1 dB to –6 dB.
Sync Amplitude: 286 mV +3 dB to –6 dB.

Genlock Performance –
Horizontal Timing Range: 8 µs advance, 8 µs delay.
Vertical Timing Range: 0, 1, or 2 lines advance or line delay, jumper selectable.
Burst Lock Range: 3.579545 MHz ±20 Hz.
Jitter: 0.5°.

POWER SOURCE

Mains –
Voltage Range: 90 to 132 V AC or 180 to 250 V AC.
Frequency Range: 48 to 62 Hz.

Power Consumption – 40 W typical, 60 W maximum.

ENVIRONMENTAL

Temperature –
Operating: 0° to 50°C.
Nonoperating: –40 to 65°C.

CERTIFICATIONS

EMC – Certified to the EMC Directive 89/336/EEC.

Safety – Approved to: UL1244, CAN/CSA-C22.2 No.231.
Complies with: HD401 S1, IEC 348.

PHYSICAL CHARACTERISTICS

Dimensions	mm	in.
Height	44	1.734
Width	483	19
Depth	561	22.1
Weight	**kg**	**lb.**
Net	6.14	13.5
Shipping	10.4	22.9

ORDERING INFORMATION

For pricing information contact your local Tektronix representative.

TSG-170A
NTSC Television Generator.

Opt. 01 – Adds separate SMPTE Color Bars output with 12 character ID, Audio Tone Output and Tape Leader Countdown.

Opt. 1V – VM700A signal set.

FIELD UPGRADE KITS

TVGF01 – Kits to add Opt. 01 to a TSG-170A Generator.

TVGF1V Opt. 01 – Kit to add Opt. 1V to a TSG-170A Generator.

MEASUREMENT SERVICE OPTIONS

Opt. C3 – Three years of Calibration Services.

Opt. C5 – Five years of Calibration Services.

Opt. D3 – Test Data (requires Opt. C3).

Opt. D5 – Test Data (requires Opt. C5).

Opt. R2 – Two years repair protection.

Opt. R3 – Repair warranty extended to cover three years.

Opt. R5 – Repair warranty extended to cover five years.

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