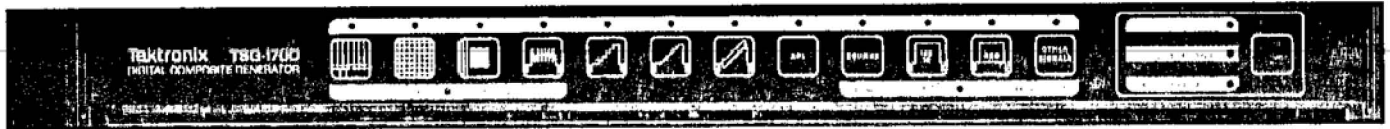


Digital Composite NTSC Generator

TSG-170D



TSG-170D Digital Composite NTSC Generator.



Features

- Conforms to SMPTE 244M, 259M, RP 155, RP 165, and ANSI S4.40
- Digital and NTSC Analog Test Signal Outputs
- Digital and Analog Audio Tone Outputs
- Black Burst Output for Master SPG Application
- Genlock With Output Timing Offset
- 12 Character Identification
- Tape Leader Countdown
- Optional Signal Set for VM700A Measurements
- Optional Serial Digital Video Interface

The TSG-170D Digital Composite NTSC Generator is suitable for both the operation and maintenance of NTSC composite digital television equipment. The TSG-170D provides test signals and audio tone in both digital and analog form plus an analog black burst for equipment synchronization.

TEST SIGNAL GENERATOR

The TSG-170D uses 10-bit, 4 FSC digital test signal generation. The digital test signal data is converted to analog with a precision digital to analog converter. This ensures signal accuracy and long-term stability. The TSG-170D test signal complement includes:

- 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

VM 700A MEASUREMENTS

A signal set designed specifically to support VM 700A measurements is now available for the TSG-170D. This signal set is available as Option 1V and differs from the standard signal set as follows:

Standard Signal Set

Pulse & Bar
Other Signals
Multibars
NTC/ Composite
Line Sweep w/Markers
Response
Multipulse
System Test Matrix
Monitor Set Matrix
10% Flat Field
Red Field
(12.5% pedestal)

Option 1V Signal Set

NTC/ Composite
FCC Color Bars
(Sin x)x
Chroma Freq
Field squarewave
NTC 7 Combination
New Matrix
50% Flat Field
Red Field
(50% pedestal)

CHARACTER ID/TAPE LEADER COUNTDOWN

An ID of up to 12 alphanumeric characters may be superimposed over the selected test signal. This ID is front panel programmable and is useful for source identification.

A tape leader countdown program is also included in the TSG-170D. When initiated, the test signal output switches to black and the audio tone is switched off. Simultaneously, a ten to two (in seconds) countdown is initiated and overlaid on the black background. The black background remains until the countdown program is terminated.

The character ID and tape leader countdown functions are available on both the digital and analog test signal outputs.

INTERNAL REFERENCE/GENLOCK OPERATIONS

The TSG-170D provides a stable black burst output for equipment synchronization. Correct SCH phase is maintained in both internal reference and genlock operation. The digital genlock maintains proper color framing irrespective of reference signal SCH phase. In the absence of an external reference, the TSG-170D automatically switches to its own internal reference.

Front panel controls are provided for phasing the TSG-170D outputs relative to the genlock source. Nonvolatile memory storage of up to eight different timing offsets are provided for applications where the picture source output is delegated to different locations.

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.



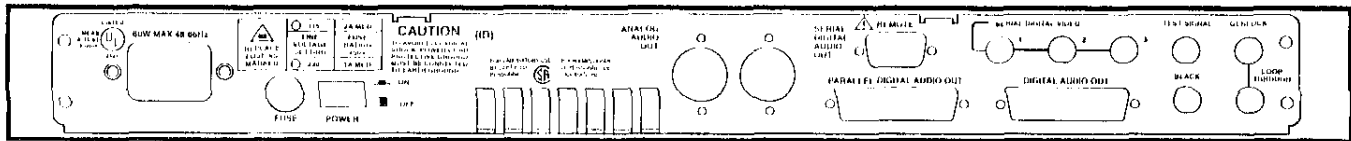
See Tektronix on the World Wide Web:
<http://www.tek.com>



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

Digital Composite NTSC Generator

TSG-170D



TSG-170D Option 1S rear panel.

AUDIO TONE GENERATOR

The parallel and serial audio tone generators produce 20- and 24-Bit digital streams respectively, each representing a sine wave reference signal.

Frequency of the reference signal is 800 Hz or 1 kHz, user selectable. The parallel digital data output is a byte-wide serial interface clocked at 768 kHz. The serial digital data is output in the AFS/FBU serial format.

The analog tone output frequency will be the same as that selected for the digital tone outputs. Amplitude is adjustable over a 0 to +8 dBu range.

REMOTE CONTROL

Remote selection of internal/external reference, ID preset, genlock timing preset, and test signal is provided. Selection is via ground closure through a rear panel connector.

SERIAL DIGITAL VIDEO INTERFACE

The serial digital video option for the TSG-170D provides three user configurable serial outputs. Each may be internally set for either black or test signal. If configured for test signal, the output follows the front panel test signal selector. Signal specifications meet all related digital video and audio standards.

An error detection (EDH) signal is located in the ancillary data area on line 9. This signal contains two cyclic redundancy code (CRC) calculations, one for the digital data in each field and one for the digital data in the active picture of each field. Comparison of the CRC values with those calculated in the receiver will provide a real time, on-line error rate measurement.

Four channels of AES/FBU digital audio are embedded in the serial digital video. Internal DIP switch selection of frequency, silence, or off is provided for each channel pair. In addition, the status bit may be set to indicate emphasis on or off for checking of devices with automatic detection and switching of audio de-emphasis. This feature provides functionality checking only as there is no pre-emphasis of the embedded audio at any time.

Serial digital video output is available as an option for new generators and as a field upgrade kit for existing TSG-170D generators.

Characteristics

TEST SIGNAL GENERATOR

Luminance Amplitude Accuracy – +1%.

Chrominance-to-Luminance Gain – ±1%.

Chrominance-to-Luminance Delay – <10 ns.

Blanking Width – 10.9 ±0.2 μs.

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%.

Modulated Pulse: 12.5T.

Multiburst –

White Reference 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% max.

Diff Phase: 0.3° max.

Flat Fields –

10 IRE, 100 IRE.

Red Field –

Luminance Amplitude: 202.2 mV (28.3 IRE).

Multibars: Color bars and multiburst.

NTC 7 Composite –

90 IRE, 5-step modulated staircase and pulse & bar.

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

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, IWOB, convergence, color bars, reverse bars, and convergence.

APL – 10% and 90%.

AC Bounce –

Bounce Rate: 1 second high, 1 second low.

Identification –

12 characters, 7x9 matrix.

Audio Tone –

800 Hz or 1 kHz, 0 to +8 dBu into 150 Ω, 600 Ω, or high impedance. Connector: XLR (male pins).

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 Width: 10.2 ±0.2 μs.

GENLOCK

Genlock Source (Composite 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 1 line delay, jumper selectable.

Burst Lock Range: 3.579545 MHz ±20 Hz.

Jitter: 0.5° max.

Digital Composite NTSC Generator

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DIGITAL VIDEO INTERFACE

Sampling Frequency – 4 FSC (14.3 MHz).

Sampling Phase – I and Q axes.

Digital Coding – 10-Bit linear PCM.

Dynamic Range – Hex Value:

Sync Tip: 10 hex.

Blanking Level: F0 hex.

White Level: 320 hex.

LSB/IRE: 5.6.

Output Format – Balanced ECL (10K Series); 10 data pairs, 1 clock pair, system ground, chassis ground.

PARALLEL DIGITAL AUDIO INTERFACE

Sampling Frequency – 48 kHz.

Digital Coding: 20 bits linear PCM; two's complement coding.

Dynamic Range (16 MSB's only) –

Positive Peaks: 0CCD (hex).

Negative Peaks: F333 (hex).

Output Format –

Byte serial transmission clocked at 768 kHz. Four channels transmitted every 48 kHz sample period. Balanced ECL (10K series); 8 data pairs, 1 clock pair, 1 sync pair, system ground, and chassis ground. Connector: 25-Pin D.

SERIAL DIGITAL VIDEO INTERFACE

Digital Format –

4 FSC Composite NTSC; 8 or 10-Bit Data; Scrambled NRZI.

Bit Rate –

143 Mb/s.

Ancillary Data – Error Detection: Active Picture CRC Full Field CRC Words Located on Line 9.

Digital Data –

Amplitude: 800 mV \pm 10% into 75 Ω .

Rise and Fall Times: 1 ns \pm 250 ps

(20% to 80% Amplitude Points).

Jitter: $<$ \pm 250 ps (measured over a one horizontal line period)

DC Offset: 0 \pm 0.5 V.

Outputs –

Number of/Connector: 3/BNC.

Impedance: 75 Ω .

Return Loss: $>$ 15 dB, 5 to 270 MHz.

Sampling Frequency Digital Coding –

48 kHz. 24 bits linear PCM; two's complement coding.

Dynamic Range –

Positive Peaks: 0CCD00 (hex).

Negative: F33300 (hex).

Output Format –

Bit serial, biphasic mark encoded. Two channels transmitted in every 48 kHz clock period. Balanced transformer coupled output; 1 signal pair and ground. Connector: XLR (male pins).

POWER SOURCE

Mains –

Voltage Range: 90 to 132 or 180 to 250 V AC. Frequency Range: 48 to 66 Hz.

Power Consumption – 60 W maximum.

ENVIRONMENTAL

Temperature –

Operating: 0° to 50°C.

Nonoperating: -40° to 65°C.

CERTIFICATIONS

Safety – Approved to: UL1244,

CAN/CSA-C22.2 No.231.

Complies with: IEC 348.

PHYSICAL CHARACTERISTICS

Dimensions	mm	in.
Height	44	1.734
Width	483	19
Depth	561	22.1
Weight	kg	lb.
Net	8.6	18.9

ORDERING INFORMATION

For pricing information contact your local Tektronix representative.

TSG-170D

Digital Composite NTSC Generator.

Opt. 1S – Adds serial digital video outputs.

Opt. 1V – VM700A signal set.

FIELD UPGRADE KITS

TVGF1S – Kit to add serial digital video outputs to a TSG-170D Generator.

TVGF1V – Kit to add Option 1V to a TSG-170D 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. R3 – Repair warranty extended to cover three years.

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

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