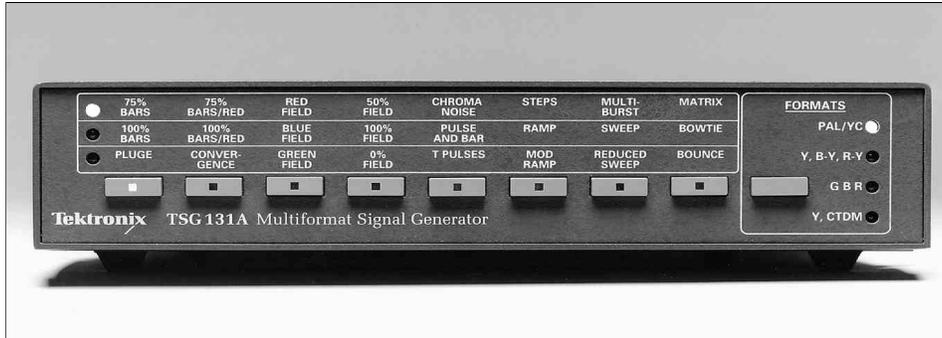




# TSG131A Multiformat Signal Generator



TSG131A Multiformat Signal Generator.

Tektronix is the worldwide leader supplying test equipment for the entire range of video and audio signal applications. Our video and audio test portfolio consists of signal processing, generation, and measurement equipment for broadcast, cable, production, manufacturing, and transmission applications.

The TSG131A is a low cost, multiformat test signal generator tailored for the testing and servicing of Betacam®, MII®, GBR, SVHS, Hi-8, PAL and monochrome 625/50 video equipment. The 10-bit digital signal generation and internal architecture allow generation of signals with the accuracy and stability until now available only in higher cost generators.

With the TSG131A, you get all the signals you need to test video levels, linearity, frequency response, phase response, clamp performance, chrominance noise, picture monitor alignment, inter-channel timing, and more.

For convenience in servicing SVHS VCRs, the TSG131A provides the PAL and Y/C outputs simultaneously, with the Y/C outputs available both from BNC

connectors and the standard 4-pin S-connector. Two channels of 1 kHz audio tone are provided on balanced XLR outputs. These phase locked tones are easily identified with the selectable ID pulse in channel one.

All this comes in a package size small enough not to clutter the service bench. And for field servicing, the TSG131A fits nicely in a briefcase with the rest of the necessary service tools.

## TSG131A Test Signals

Test Signal	PAL & YC	Y, B-Y, R-Y	GBR	Y, CTDM
75% and 100% colour bars	X	X	X	X
75% and 100% Bars over Red	X	X		
Pluge	X			
Red, green, and blue fields	X		X	
Flat fields 0, 50, 100%	X	X		X
Convergence Pattern	X		X	
Chroma noise	X			
Linearity:				
Step	X	Valid	X	
Ramp	X			
Mod ramp	X			
Pulse & bar	X	X	X	
Multiburst	X	X	X	
Sweep	X	60% 50%	X	
Matrix	X			
Channel timing (Bowtie)		X	X	

**Low cost test signal generator**

**Tailored for service applications**

**EBU N10 component levels**

**Supports Betacam®, MII®, SVHS, Hi-8, GBR, and PAL formats**

**Y, BY, RY, GBR, or YC, PAL and S connector outputs**

**High accuracy test signal generation**

**Two channels of audio tone with channel one identification**

**Compact and lightweight**

The TSG131A is part of a growing line of flexible, low cost service equipment from Tektronix. For signal generation needs, consider the TSG111 for PAL systems or the TSG121 YC/PAL Generator for systems operating with PAL or Y/C formats. Composite signal monitoring requirements are handled by our 1711x and 1731 Waveform Monitors and 1721 Vectorscope. The 1761 Component/Composite Waveform/Vector Monitor fulfills the signal monitoring role for mixed component and composite facilities.

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## Characteristics PAL, YC Test Signal Generator

**Luminance Amplitude Accuracy** —  $\pm 1\%$ .  
**Chrominance Amplitude Accuracy (C Channel)** —  $\pm 1\%$ .  
**Chrominance-to-Luminance Gain** —  $\pm 1\%$ .  
**Chrominance-to-Luminance Delay** — 10ns.  
**Frequency Response** —  $\pm 2\%$  to 5.8 MHz.  
**SCH Phase Accuracy** —  $0^\circ \pm 5^\circ$ .  
**Line Blanking Interval** —  $12.0 \mu\text{s} \pm 0.15 \mu\text{s}$ .  
**Output Impedance** — 75  $\Omega$ .

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### PAL, YC Test Signals

**Colour Bars** — 75% Bars; 100% Bars; 75% Bars/Red; 100% Bars/Red.

**Convergence Pattern** — 14 lines per field; 17 lines per horizontal.

**Red Field** —  
Luminance Pedestal: 157.0 mV.  
Chrominance Amplitude: 663.8 mV p-p.

**Green Field** —  
Luminance Pedestal: 308.2 mV.  
Chrominance Amplitude: 620.1 mV p-p.

**Blue Field** —  
Luminance Pedestal: 59.9 mV.  
Chrominance Amplitude: 470.5 mV p-p.

**Multiburst** —  
White Reference Bar Amplitude: 420 mV p-p.  
Packet Amplitudes: 420 mV p-p.  
Pedestal: 350 mV.  
Burst Frequencies: 0.5, 1.0, 2.0, 4.0, 4.8, and 5.8 MHz.

**Sweep** —  
Frequency: 500 kHz to 6.5 MHz.  
Amplitude: 700 mV p-p.

**Reduced Sweep** —  
Frequency: 500 kHz to 6.5 MHz.  
Amplitude: 420 mV p-p.

**Pulse & Bar with Window** —  
20T Modulated: 2000 ns  $\pm$  20 ns.

**Pulse HAD** —  
Chroma Phase:  $60.7^\circ$ .  
Amplitude: 700 mV.  
2T Pulse HAD: 200 ns  $\pm$  25 ns.  
White Bar Amplitude: 700 mV.  
Field Tilt: 0.5%.  
Line Tilt: <0.5%.  
Ringing: 1% peak.

**5-Step Staircase** —  
Amplitude: 700 mV.  
Linearity Error: 1%.

**Ramp/Modulated Ramp** —  
Luminance Amplitude: 700 mV.  
Chrominance Amplitude: 280.0 mV p-p.  
Differential Gain: 0.5% maximum.  
Differential Phase:  $0.7^\circ$  maximum.

**Chroma Noise** —  
Luminance Pedestal: 350 mV.  
Chroma Amplitude: 700 mV p-p.  
Chroma Phase: Red.

**Flat Fields** — 0, 350, 700 mV.

**Pluge Matrix** —  
Pluge Levels: -14 mV and +14 mV.  
Lum Ref Levels: 700 mV, 450 mV, 200 mV, and 110 mV.

**Bounce** —  
Amplitude: 0 or 700 mV flat field.  
Rate: Approx. 1 second high, 1 second low.

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### Component Test Signal Generator

**Amplitude** —  
Accuracy:  $\pm 1\%$ .  
Channel to channel match:  $\pm 0.5\%$ ; B-Y and R-Y relative to Y.

**Frequency Response** —  
Y Channel:  $\pm 2\%$  to 5.8 MHz.  
B-Y, R-Y Channels:  $\pm 2\%$  to 3 MHz.

**Channel to channel timing match** —  
Within 5 ns; B-Y and R-Y relative to Y.

**Sync Amplitude** — 300 mV.

**Blanking Width** —  $12.0 \mu\text{s} \pm 0.15 \mu\text{s}$ .

**Output Impedance** — 75  $\Omega$ .

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## Betacam/MII Test Signals

**Colour Bars —**  
Y Channel —  
75%: 75% bars with a 700 mV white reference.  
100%: 100% bars with a 700 mV white reference.  
B-Y, R-Y Channels —  
75%:  $\pm 262.5$  mV.  
100%:  $\pm 350$  mV.

**Flat Fields —** Amplitude: 0 mV, 350 mV, 700 mV.

**Valid 5 Step —**  
Amplitude: 700 mV in each channel with simultaneous offsetting signals in the other two channels.  
Linearity: 1% relative step matching.

**Pulse & Bar —**  
Amplitude —  
Y Channel: 700 mV.  
B-Y, R-Y Channels:  $\pm 350$  mV.  
Bar —  
Risetime:  $192.9$  ns  $\pm 20$  ns.  
Tilt: 0.5%.  
Pulse —  
HAD (T=100 ns): 2T, 3T, 5T, & 20T.  
Ringing: 1% peak.

**Line Sweep —**  
Amplitude —  
Y Channel: 420 mV p-p; 350 mV p-p.  
B-Y, R-Y Channels: 420 mV p-p; 350 mV p-p.  
Frequency —  
Y Channel: 200 kHz to 6 MHz.  
B-Y, R-Y Channels: 100 kHz to 3 MHz.  
Markers —  
Y Channel: 1, 2, 3, 4, 5, and 6 MHz.  
B-Y, R-Y Channels: 0.25, 0.5, 1, 1.5, 2, 2.5, and 3 MHz.

**Bowtie —**  
Amplitude —  
Y Channel: 350 mV.  
B-Y, R-Y Channels:  $\pm 175$  mV.  
Frequency —  
Y Channel: 500 kHz.  
B-Y, R-Y Channels: 502 kHz.  
Timing Markers: Eleven timing markers indicate 20 ns delay/advance between channels. Two timing markers centered about center marker indicate 5 ns delay/advance between channels.

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## CTDM Test Signals

**Bars —** 75%, 100%.

**Flat Fields —** Amplitude 0 mV, 350 mV, 700 mV.

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## GBR Test Signal Generator

**Amplitude —**  
Accuracy:  $\pm 1\%$ .  
Channel to Channel Match:  $\pm 0.5\%$ .  
Frequency Response:  $\pm 2\%$  to 5 MHz.  
Channel to Channel Timing Match: Within 5 ns; B and R relative to Y.  
Sync Amplitude: 300 mV.  
Blanking Width:  $12 \mu\text{s} \pm 0.15 \mu\text{s}$ .  
Output Impedance: 75  $\Omega$ .

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## GBR Test Signals

**Colour Bars —**  
75%: 525 mV with a 700 mV white reference.  
100%: 700 mV with a 700 mV white reference.

**10-Step Staircase —**  
Amplitude: 700 mV.  
Linearity: 1% relative step matching.

**Pulse & Bar with Window —**  
Window Timing: Lines 72 to 202.  
2T Pulse HAD: 250  $\mu\text{s}$ .  
Bar Amplitude: 700 mV.

**Colour Fields —**  
Red: 700 mV.  
Green: 700 mV.  
Blue: 700 mV.

**Multiburst —**  
Amplitude: 420 mV or 350 mV pedestal.  
White Flag: 420 mV.  
Frequencies: 0.5, 1.0, 2.0, 3.0, 4.0, and 5.0 MHz.

**100% Line Sweep —**  
Amplitude: 700 mV.  
Frequency Range: 200 kHz to 5.5 MHz.  
Markers: 0.5, 1, 2, 3, 4, and 5 MHz.

**Bowtie —**  
G Channel: 500 kHz.  
B Channel: 502 kHz.  
R Channel: 502 kHz.  
Amplitudes: 350 mV.  
Timing Markers: Eleven timing markers indicate 20 ns delay/advance between channels. Two timing markers centered about center marker indicate 5 ns delay/advance between channels.

**Convergence —**  
Amplitude: 525 mV.  
Pattern: 14H, 15V.

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## Internal Reference

**Frequency —** 4.43361875 MHz.

**Stability Over Temperature —** Within 10 Hz from 5°C to 35°C. Option 10: Within 5 Hz from 5°C to 35°C.

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## Audio Tone Generator

**Frequency —** 1 kHz.

**Amplitude —** 0 to +8 dBu into 600  $\Omega$ , or a high impedance load.

**Distortion —** 0.5% THD + noise.

**Click ID —** Rate adjustable from 0.2 Hz to 4 Hz.

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## Power Source

**Mains —**  
Voltage Range: 90-130 Vac; 180-250 Vac.  
Frequency Range: 48-62 Hz.

**Power Consumption —** 15 W typical.

**PostScript Picture  
TSG 131A REAR PANEL**

TSG131A Rear Panel.

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**Physical**

**Dimensions —**

Width: 205.7 mm (8.1 in).  
Height: 43.4 mm (1.71 in).  
Depth: 381.0 mm (15.0 in).

**Weight —**

Net: 1.47 kg (3.25 lb).  
Shipping: 3.20 kg (7.06 lb).

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**Environmental**

**Temperature —**

Operating: 0°C to +35°C  
Nonoperating: -40°C to +65°C

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**Ordering  
Information**

**TSG131A**  
Multiformat  
Signal  
Generator

**Options**

**Option 01** — MII CTCM signals.

**Option 02** — Adds a dedicated black burst.

**Option 03** — Sony PVW Series Service (Includes Special test signal set, black burst output, and TTL level color frame pulse output.)

**Option 04** — Panasonic MII Service (Includes Special test signal set and TTL level comp sync and frame pulse outputs.)

**Option 10** — ± 5 Hz internal reference.

**Option M2** — Remedial Service Support.

**Option M8** — Calibration Service.

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**Optional Mounting Kits**

**TVGF11A** — Hardware to mount any two of TSG100 Series, ASG100 or VITS100 products in a one-rack unit high space.

**TVGF13** — Hardware to mount any two of TSG100 Series, ASG100 and VITS100 products side-by-side in a two-rack unit high space.

**TVGF14** — Hardware to mount any two of TSG100 Series, ASG100 and VITS100 products vertically in a one-half of a 1700F05 rack adapter.

**For further information, contact Tektronix:**

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