Genlockable NTSC Test/Sync Generator

Model 411

- Precision 10-Bit D/A
- Digital Genlock
- 17 Test Signals + APL + Bounce
- Front Panel Setup Switch (0 or 7.5%)

An ideal choice as the master sync and test-signal generator for production, post production, component and systems maintenance and the engineering lab, the Model 411 offers the stability and precision of digitally synthesized analog signals. A 10 bit D/A provides excellent accuracy for all test signals while an 8 bit D/A is used for sync blanking and related signals. Test signals selected at the front panel include: SMPTE and full-field color bars; split field bars with reversed bars in lower half; window; pulse-bar (2T, modulated 12.5T and bar); dot/crosshatch; red and blue rasters; white rasters at 100 and 50 IRE; 100 and 50 IRE multiburst; matrix test pattern that includes crosshatch, pulse bar, SMPTE bars and multiburst; 10 step staircase and ramp with modulation ON/OFF for each; and a 10 and 90 APL signal with bounce ON/OFF control. The unit features digital genlock with front panel fast and slow advance and delay fingertip control. MODE LEDs show sync generator status in terms of internal reference and both burst and sync lock. A dedicated SMPTE color bar output featuring a 16 digit alphanumeric source identifier provides a convenient color bar/source ID available at all times. Character selection is easily set up at front panel fingertip controls. Included are audio tones at 400 or 1000 Hz (internally switchable) at 0 dBm (internally adjustable from -3 to +6 dBm), balanced output at XLR connector. A master sync generator that offers long-term dependability, accuracy and stability, with all the test signals that an NTSC environment is likely to need, the 411 stands out in overall value and yet uses up only one unit (1/4”) of vertical rack space.

1. Auto genlock when reference signal is received at the genlock input jacks. LED shows burst and sync lock or internal reference.
2. Recessed SETUP switch offers either zero or 7.5% setup to forestall obsolescence.
3. Flat field white raster at 100% and 50%, the latter for standard luminance S/N measurements.
4. Standard signal to measure chroma S/N.
5. MATRIX signal combines the most frequently used test signals in one single pattern.
6. Precision linearity measurements with stairstep signals modified for 10% or 90% APL. Bounce signal evaluates clamp action and monitor regulation.
7. Control of genlock phase and H timing uses fast and slow keys.
8. Full front panel control of 16 character source identifier superimposed on dedicated SMPTE bar feed.
9. Loop-through genlock input jacks.
10. Two test signal outputs.
11. Two black-burst outputs.
13. Dedicated, full time SMPTE bars with settable 16-character source ID and balanced audio tone output.
14. TTL remote control of pushbutton selections.
**KEY SPECIFICATIONS**

**SYSTEM**
- NTSC (complies with EIA RS-170A)
- Subcarrier Frequency: 3.579545 MHz ± 2 Hz (INT)
- Composite Outputs (2)
  - 1V p-p ±200 mV p-p into 75 Ω

**SYNCHRONIZATION**
- Level: -286 mV ± 5.7 mV
- Blanking Level: 0 V ± 10 mV
- Rise and Fall Time: 130 ns ± 10 ns
- SCH Phase: Within 10°

**SETUP**
- Zero or 7.5 IRE selected internally
  (applies to color bars, red and blue raster)

**TEST SIGNALS**

**SMPT Color Bars**
- Complies with SMPTE ECR1-1978
- Luminance Amplitude Accuracy: ±1%
- Chrominance Amplitude Accuracy: ±1%
- Chrominance Phase Accuracy: ±1°
- Y/C Delay: Within 40 ns

**Window**
- Bar Amplitude: 100 IRE ± 1 IRE
- Bar Rise and Fall Time: 241 ns ± 20 ns
- Bar Width: 31.78 µs ± 0.1 µs (0.5H)
- Bar Height: 131 lines (0.5 V)
- Bar Tilt: Line/Field: within 0.5%

**Pulse and Bar**
- 2T Pulse, Inverted 2T Pulse
  - Pulse to Bar Ratio: 100% ± 1%
  - Ringing: 1 IRE or less
- Modulated 12.5 T Pulse
  - Pulse to Bar Ratio: 100% ± 1%
  - Y/C Delay: 10 ns or less
  - Y/C Amplitude Ratio: 1% or less
- Subcarrier Phase: 180° ± 2°
- Subcarrier Harmonics: -40 dB or better
- 2T Bar
  - Amplitude: 100 IRE ± 1 IRE
  - Rise and Fall Time: 241 ns ± 20 ns

**Convergence (Dot/Crosshatch)**
- Peak Amplitude: 77 IRE ± 2 IRE
- Vertical Lines: 17 lines V x 14 lines H
- Dot, number: 16 x 13

**White Raster**
- 100 IRE White Raster
  - Amplitude: 100 IRE ± 1 IRE
  - 50 IRE White Raster
  - Amplitude: 50 IRE ± 0.5 IRE

**Red Raster**
- Luminance Amplitude: 28.31 IRE ± 1 IRE
- Chroma Amplitude: 88.21 IRE ± 2 IRE
- Chrominance Phase: 103.4° ± 1°

**Blue Raster**
- Luminance Amplitude: 15.13 IRE ± 1 IRE
- Chroma Amplitude: 62.19 IRE ± 2 IRE
- Chrominance Phase: 347.1° ± 1°

**Multiburst, 100 IRE**
- Reference Bar Amplitude: 100 IRE ± 1 IRE
- Multiburst Amplitude: 100 IRE ± 2 IRE
- Harmonics: -40 dB or better
- Frequency/N Cycles: 0.5 MHz/4, 1.0 MHz/7, 2.0 MHz/10, 3.0 MHz/12, 3.58 MHz/14, 4.2 MHz/16

**Multiburst, 50 IRE**
- Reference Bar Amplitude: 50 IRE ± 0.5 IRE
- Multiburst Amplitude: 50 IRE ± 1 IRE
- Harmonics: -40 dB or better
- Frequency/N Cycles: Same as 100 IRE Multiburst

**Matrix Signal**
- A composite test pattern of horizontal bands arranged as follows:
  - Dot/Crosshatch, Multiburst, Pulse and Bar, Dot/Crosshatch, Color Bars, Reverse Blue Bars, (SMPT), Dot/Crosshatch

**Staircase: 10 STEP and RAMP**
- Luminance Amplitude: 100 IRE ± 1 IRE
- Linearity: Within 1%
- Chrominance Amplitude: 40 IRE ± 1 IRE

**100% Chrominance Signal**
- Luminance Amplitude: 50 IRE ± 0.5 IRE
- Chrominance Amplitude: 100 IRE ± 2 IRE
- Chrominance Phase: 180° ± 1°
- Chrominance Rise Time: 130 ns ± 10 ns

**SYNC GENERATOR**

**Black Burst**
- Output Impedance: 75 Ω
- Outputs: 2
- SCH: Within 10°
- Burst Relative Phase: Within 10°
- Pulse Outputs, General
  - Pulse Rise and Fall Time: 130 ns ± 10 ns
  - Timing: Within ±10 ns of referenced test signal

**MULTIBURST**
- Number of Outputs: 1 for each signal;
  - Composite Sync, Composite Blanking, H Drive, V Drive, Burst Flag
- Subcarrier Output
  - 2 V p-p ± 0.2 V into 75 Ω ± 20° with respect to composite burst

**REMOTE CONTROL**

**Connector**
- Type D-SUB, 9 pin

**Functions**
- Test signal selection, all functions

**SOURCE IDENTIFIER SPECIFICATIONS**

**Source Identifier**
- Characters: A-Z, 0-9
- Number of Characters: 16
- Character Height: 28 lines
- Character Width: 2.25 µs

**Audio**
- Output Connector: XLR
- Output Impedance: 600 Ω, balanced
- Frequency: 400 Hz ± 5%
- Amplitude: 0 dBm (0.775 V rms) ± 0.5 dB into 600 Ω
- Waveform: Sinewave

**POWER REQUIREMENTS**
- 100, 120, 220, 240 V ac ± 10%
- 50/60 Hz, 35 VA

**PHYSICAL**
- Size (W x H x D): 16¼ x 1¼ x 21¼ in.
- 426 x 44 x 530 mm
- Weight: 13.2 lbs., 6 kg

**SUPPLIED ACCESSORIES**
- 2 Rackmount Brackets
- Spare Fuse