

NTSC Test Signal 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. Test signals selected at the front panel include: SMPTE and full-field color bars; split field bars; 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

- Dedicated SMPTE Bars Output with 16 Character Programmable SID
- Balanced Audio Test Tones
- Occupies Only 1 $\frac{3}{4}$ " of Vertical Rack Space

genlock with front panel fast and slow advance and delay fingertip control. A separate SMPTE color bar output featuring a 16 digit alphanumeric source identifier provides a convenient color bar/source ID available at all times. 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 $\frac{3}{4}$ " of vertical rack space.

KEY SPECIFICATIONS

SYSTEM

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

SYNCHRONIZATION

Level
-286 mV \pm 5.7 mV

Blanking Level

0 V \pm 10 mV

SCH Phase

Within 10 $^\circ$

SETUP

Zero or 7.5 IRE front panel switch

TEST SIGNALS

SMPTE Color Bars

Complies with SMPTE ECR1-1978

Y/C Delay: Within 20 ns

Full Field Color Bars

Description: 8 colors with black and 100% white

Window

Bar Amplitude: 100 IRE \pm 1 IRE

Bar Rise and Fall Time: 241 ns \pm 20 ns

Pulse and Bar

2T Pulse, Inverted 2T Pulse

Pulse to Bar Ratio: 100% \pm 1%

Ringing: 10 mVp-p or less

Modulated 12.5 T Pulse

Pulse to Bar Ratio: 100% \pm 1%

Y/C Delay: 10 ns or less

2T Bar

Amplitude: 100 IRE \pm 1 IRE

Rise and Fall Time: 241 ns \pm 20 ns

Convergence (Dot/Crosshatch)

17 V x 14 H lines, Dots: 16 x 13

White Raster

100 IRE

50 IRE

Red Raster

Luminance Amplitude: 28.31 IRE \pm 1 IRE

Chroma Amplitude: 88.21 IRE \pm 2 IRE

Chrominance Phase: 103.4 $^\circ$ \pm 1 $^\circ$

Blue Raster

Luminance Amplitude: 15.13 IRE \pm 1 IRE

Chroma Amplitude: 62.19 IRE \pm 2 IRE

Chrominance Phase: 347.1 $^\circ$ \pm 1 $^\circ$

Multiburst, 100 IRE

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

Multiburst Amplitude: 50 IRE \pm 1 IRE

Frequency/N cycles: Same as

100 IRE Multiburst

Matrix Signal

Dot/Crosshatch, Multiburst, Pulse and

Bar, Dot/Crosshatch, Color Bars,

Reverse Blue Bars, (SMPTE),

Dot/Crosshatch

Staircase: 10 STEP and RAMP

Linearity: Within 1%

Differential Gain: Within 0.3%

Differential Phase: Within 0.3 $^\circ$

100% Chrominance Signal

Luminance Amplitude: 50 IRE \pm 0.5 IRE

Chrominance Amplitude: 100 IRE \pm 2 IRE

Chrominance Phase: 180 $^\circ$ \pm 1 $^\circ$

APL 10

1 line of test signal and 4 lines of black

APL 90

1 line of test signal and 4 lines of white

Bounce

Rate: 1 sec. of APL 10, 1 sec. of APL 90

SYNC GENERATOR

Black Burst

Outputs: 2

SCH: Within 10 $^\circ$

Burst Relative Phase: Within 10 $^\circ$

Pulse Outputs

Amplitude: 4 V p-p \pm 5% into 75 Ω

Timing: Within \pm 10 ns of referenced

test signal

Number of Outputs: 1 for each signal;

Composite Sync, Composite Blanking,

H Drive, V Drive, Burst Flag, Field Reference

Subcarrier Output

2 V p-p \pm 0.2 V into 75 Ω

\pm 20 $^\circ$ 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

Audio

Frequency: 400 Hz, 1 kHz switchable

Amplitude: 0 \pm 0.5 dB into 600 Ω

POWER REQUIREMENTS

100, 120, 220, 240 V ac \pm 10%

50/60 Hz, 35 VA

PHYSICAL

Size (W x H x D)

16 $\frac{3}{4}$ x 1 $\frac{3}{4}$ x 21 $\frac{7}{8}$ in.

426 x 44 x 530 mm

Weight

13.2 lbs., 6 kg

SUPPLIED ACCESSORIES

2 Rackmount Brackets

Spare Fuse

NTSC Test Signal Generator



Model 410C

- 10 Bit Digital Synthesizer
- Complies with RS-170A
- Pulse/Bar with Modulated 12.5T Pulse
- Multiburst at 50% and 100%
- Modulated and Unmodulated Staircase
- 3 Black Burst Outputs

Maintenance and alignment instructions for professional-grade video equipment call for the use of specialized test signals such as the \sin^2 pulse, modulated 12.5T pulse, multiburst, modulated staircase and others. The 410C meets these needs and ensures both short and long term accuracy through the use of 10 bit digital synthesis. Rear

panel facilities include a 14 pin remote control connector, a second video feed (isolated from the front panel output), CW subcarrier output (2 V p-p) and three black burst outputs. The 410C occupies 1³/₄" of vertical rack space and weighs 13.1 lbs. making it well suited for rack, bench or field use.

KEY SPECIFICATIONS

SYSTEM

NTSC
(Complies with EIA RS-170A)

Subcarrier Frequency
3.579545 MHz \pm 10 Hz

SCH

Within 10°

TEST SIGNALS

MULTIBURST, 100 IRE

Reference Bar Amplitude

100 IRE \pm 1 IRE

Multiburst Frequencies

0.5, 1, 2, 3, 3.58, 4.2 MHz

Multiburst Amplitude

100 IRE \pm 2 IRE p-p

Pedestal Level

50 IRE \pm 0.5 IRE

MULTIBURST, 50 IRE

Reference Bar Amplitude

50 IRE \pm 0.5 IRE

PULSE/BAR

2T Pulse

Pulse Bar Ratio

100% \pm 1%

HAD

250 ns \pm 20 ns

Ringing

10 mV p-p or less

Modulated 12.5T Pulse

Pulse/Bar Ratio

100% \pm 1%

HAD

1.563 μ s \pm 150 ns

Y/C Delay

\leq 10 ns

Y/C Amplitude Difference

\leq 1%

Subcarrier Phase

180° \pm 2°

2T Bar

Amplitude

100 IRE \pm 1 IRE

Rise/Fall Time

241 ns \pm 20 ns

MODULATED 5-STEP STAIRCASE

Luminance Amplitude

100 IRE \pm 1 IRE

Luminance Rise/Fall Time

250 ns \pm 20 ns

Linearity

\leq 0.5%

Chrominance Amplitude

40 IRE \pm 0.8 IRE p-p

Chrominance Phase

180° \pm 1°

Chrominance Rise/Fall Time

400 ns \pm 40 ns

Differential Gain and Phase

\leq 0.5%, 0.5°

UNMODULATED 5-STEP STAIRCASE

Luminance values same as modulated staircase

WINDOW

Bar Amplitude

100 IRE \pm 1 IRE

Bar Rise/Fall Time

241 ns \pm 20 ns (2T bar)

Bar Tilt

Line: \leq 0.5%

Field: \leq 0.5%

CONVERGENCE (DOT/CROSSHATCH)

Peak Amplitude

77 IRE \pm 2 IRE

Number of Vertical Lines

17

Number of Horizontal Lines

14

Number of Dots

16 x 13

RED RASTER (75%)

Luminance Amplitude

28.31 IRE \pm 1 IRE

Chrominance Amplitude

88.21 IRE \pm 2 IRE p-p

Chrominance Phase

103.4° \pm 1°

WHITE RASTER

Amplitude

100 IRE \pm 1 IRE

EIA COLOR BARS

Complies with EIA RS-189A

SMPTE COLOR BARS

Complies with SMPTE ECR1-1978

FULL FIELD COLOR BARS

8 colors including 100% white and black

COMPOSITE SYNC OUTPUT

Output Amplitude

4 V p-p \pm 5% into 75 Ω

Polarity

Pulse negative

Timing

\pm 10 ns or less referenced to falling edge of sync of composite video

SUBCARRIER OUTPUT

Output Amplitude

2 V p-p \pm 0.2 V p-p into 75 Ω

Phase

\pm 10° referenced to composite-signal burst

BLACK BURST OUTPUTS

Number of Outputs

3

SCH Phase

10° or less

Burst Phase

\pm 10° referenced to composite signal burst

PHYSICAL

Size (W x H x D)

16³/₄ x 1³/₄ x 15³/₄ in.

426 x 44 x 400 mm

Weight

13.1 lbs., 6 kg

POWER REQUIREMENTS

100, 120, 220, 240 V ac \pm 10%

50/60 Hz, 25 VA

SUPPLIED ACCESSORIES

BNC-BNC Cable

Spare Fuse

2 Rackmount Brackets

AVAILABLE OPTIONS

Rackmount Adapter Kit (LR-2407I)