

# NOVATECH INSTRUMENTS

## 170MHz Dual Channel Signal Generator Model 2918A



The Model 2918A is a 170MHz Dual Channel Signal Generator in a compact bench top instrument case. The 2918A generates two independent sine and cosine outputs along with one LVCMOS output signals simultaneously up to 170MHz in 0.1Hz steps. The amplitudes and phases of the sine and cosine outputs are independently adjustable. The front panel controls, consisting of three pushbuttons and a rotary encoder allow setting of frequency or instruments setup. Text-based serial commands allow setting of phase, amplitude, and frequency. All settings can be saved upon power down. The internal temperature compensated crystal oscillator (TCXO) provides frequency accuracy better than  $\pm 2$ ppm.

### Specifications:

#### OUTPUTS

TYPES: Two sinewave and one LVCMOS (TTL compatible) simultaneously (Two different frequencies.)

IMPEDANCE: Cosine, Sine: 50 $\Omega$ ; LVCMOS: 50 $\Omega$ .

RANGE: 0.1Hz to 170MHz in 0.1Hz steps. (1MHz < LVCMOS < 125MHz)

SINE AMPLITUDE: approximately 1V<sub>pp</sub> (+4dBm) into 50 $\Omega$ . Programmable from 0/1024 to 1023/1024 of Full Scale (10-bits).

PHASE: Each channel 14-bits programmable. Defaults to quadrature, Cosine and Sine.

FLATNESS:  $\pm 3$ dB from 1kHz to 150MHz referenced to amplitude at 35MHz, full scale.

#### LVCMOS AMPLITUDE

V<sub>oh</sub>  $\geq$  2.4V and V<sub>ol</sub>  $\leq$  0.4V when series terminated. Rise and fall times < 1.5ns with < 15pF load. (1MHz < F<sub>out</sub> < 125MHz). The TTL/LVCMOS output is at the Sine output frequency.

#### CONTROL

The front panel controls allow setting of frequencies. Output frequencies, amplitudes (10-bits) and phases (14-bits) are controlled by an RS232 serial port. All settings can be saved in non-volatile (EEPROM) memory via the serial port. The outputs default to Cosine and Sine (quadrature) but the phase relationship can be modified from the serial port.

#### ACCURACY AND STABILITY

Accuracy:  $\leq \pm 2$ ppm at 10 to 40 $^{\circ}$ C. Stable to an additional  $\pm 1$ ppm per year, 18 to 28 $^{\circ}$ C.

**SPECTRAL PURITY** (Typ. 50 $\Omega$  load, internal clock, full-scale output)

Phase Noise:  $< -120$ dBc, 10kHz offset, 5MHz out.

Spurious:  $< -60$ dBc below 10MHz (typ. 300MHz span)

$< -60$ dBc below 40MHz

$< -55$ dBc below 80MHz

$< -50$ dBc below 160MHz

Harmonic:  $< -65$ dBc below 1MHz

$< -55$ dBc below 20MHz

$< -45$ dBc below 80MHz

$< -35$ dBc below 160MHz

(channel-channel isolation:  $< -60$ dBc)

#### POWER REQUIREMENTS

120/240VAC, 35VA Max. 50/60Hz.

#### ENVIRONMENTAL

Temperature: +5 $^{\circ}$ C to +40 $^{\circ}$ C operating.

Humidity: 80% to 31 $^{\circ}$ C, decreasing linearly to 50% at 40 $^{\circ}$ C.

#### SIZE

6.4cm H, 18.5cm W, 24.1cm L (excluding bail). 2.5kg.

#### CONNECTORS

Three front panel BNCs for Cosine, Sine and TTL outputs. DE9 on rear panel for RS232.

#### OPTIONS

2918A/01 adds external reference input (customer specified, 10MHz default).

## Serial Commands

RS232 Command	Function
F $x$ xxx.xxxxxxx	Set Frequency of output “x” in MHz to nearest 0.1Hz. Decimal point required. x=C or S. (Cosine or Sine channel). Maximum setting: 169.9999999MHz. Using the command “F xxx.xxxxxxx,” without the C or S, sets both channels to the same frequency.
P $x$ N	Set Phase of output “x.” N is an integer from 0 to 16383. Phase is set to $N*360^{\circ}/16384$ or $N*\pi/8192$ radians. Sets the relative phase of the frequency output depending upon the value of x=C or S.
E x	Serial echo control. x=D for Echo <b>D</b> isable, x=E for Echo <b>E</b> nable
R	Reset. This command resets the 2918A. EEPROM data is preserved and, if valid, is used upon restart. This is the same as cycling power.
CLR	Clear. This command clears the EEPROM valid flag and restores all factory default values.
S	Saves current state into EEPROM and sets valid flag. State used as default upon next power up or reset. Use the “CLR” command to return to default values.
Qr	<b>Q</b> uery <b>r</b> am. Return present frequency, amplitude and phase on both channels.
Qe	<b>Q</b> uery <b>E</b> EPROM. Return EEPROM stored frequency, amplitude, phase and register settings.
V $x$ N	Set voltage level of output “x.” By default, the amplitude is set to the maximum of approximately $1V_{pp}$ (+4dBm) into $50\Omega$ . N can range from 0 (off) to 1023 (no decimal point allowed). Voltage level is scaled by $N/1023$ . x=C or S to set the amplitude on Cosine output or the Sine output. If $N \geq 1024$ (maximum 9999), the scaling is turned off and the selected output is set to full scale.