

# NOVATECH INSTRUMENTS, INC.

## 4 Channel 400MHz DDS Signal Generator

### Model 1940A



The Model 1940A is a four channel 400MHz DDS Signal Generator in a rackmount (1U) instrument case. The 1940A generates up to four different output frequencies simultaneously from 200kHz to 400MHz in 1Hz steps. The 1940A can be locked to an external frequency standard or used stand-alone with its internal temperature compensated crystal oscillator (TCXO). Sine waves with up to 60dB of attenuation are standard. The 1940A can be configured with 2 or 4 (standard) frequencies. Simple front panel control or RS232 allows setting of all parameters, which can be saved into non-volatile EEPROM memory upon power down. The 1940A is an ideal high frequency upgrade for the 2910B/RACK.

### Specifications:

#### OUTPUT

TYPES: Sinewave.

IMPEDANCE: 50 $\Omega$ , Sine.

RANGE: 200kHz to 400MHz in 1Hz steps.

#### AMPLITUDE

Sine: approx. +4dBm (1V<sub>pp</sub> at 25MHz) into 50 $\Omega$ . Front panel or RS232 programmable step attenuator from 0 to 60dB on two channels in each group.  $\pm$ 6dB, 1MHz to 400MHz at 0dB attenuation.

#### CONTROL

Three front panel buttons and a rotary encoder per section allow setting of frequency and menu selections. The same functions can be set using RS232 to 19.2kbaud. Output Frequency, status and menus are displayed on a 2-line LCD for each section. Other than AC line power, each synthesizer section is independent.

#### ACCURACY AND STABILITY (internal clock)

On-board TCXO gives  $\leq$ 1.5ppm at 18-28  $^{\circ}$ C. The internal TCXO is stable to an additional  $\pm$ 2ppm per year, 18-28  $^{\circ}$ C.

#### LOCK TO EXTERNAL STANDARD

LEVEL: 0.5-3V<sub>rms</sub> Sine or Square Wave can be applied to the EXT STD Input BNC. 50 $\Omega$ .

EXT. STD. FREQUENCY: 1, 2, 5, 10, 1.544 (T1), or 2.048MHz (E1), selectable from front panel or serial commands. When locked, the accuracy and stability of the 1940A are equal to those of the standard.

LOCK RANGE: The 1940A will lock and track an EXT.

STD. input as long as the frequency is equal to the selected frequency  $\pm$ 5ppm (typically  $\pm$ 10ppm).

#### SPECTRAL PURITY (sine output, 50 $\Omega$ load)

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

Spurious:  $<$ -50dBc below 10MHz (typ. 500MHz span)  
 $<$ -45dBc below 80MHz  
 $<$ -40dBc below 160MHz  
 $<$ -35dBc below 400MHz

Harmonic:  $<$ -50dBc below 1MHz  
 $<$ -45dBc below 20MHz  
 $<$ -40dBc below 80MHz  
 $<$ -35dBc below 160MHz  
 $<$ -30dBc below 400MHz

Output-output isolation  $>$ 40dBc.

#### POWER REQUIREMENTS

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

#### ENVIRONMENTAL

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

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

#### STANDARD CONFIGURATIONS

1940A/S-04: eight Sine Outputs, BNC connectors, four frequencies, four attenuators, two displays.

Consult factory for other configurations.

11-Apr-2006

**Table 1: 2910A Legacy Serial Commands**

<b>RS232 Command</b>	<b>Function</b>
F XXX.XXXXXX	Set Frequency in MHz to nearest 1Hz. Decimal point required. Both outputs set to same frequency. Maximum frequency 399.999999MHz.
E x	x=D for Echo <b>D</b> isable, x=E for Echo <b>E</b> nable
P x	x=D, power up with default settings; x=S, power up with Saved Settings
Reset	This command resets the 1940A. EEPROM data is preserved and, if valid, is used upon restart. This is the same as cycling power.
Reset All	This command clears the EEPROM valid flag and restores all factory default values.
X n	n=D, 1, 2, 3, 4, 5, or 6. Use to select a preset reference value. Setting n=D selects the internal clock. If n=1, selects 5MHz external reference; n=2, selects 10MHz. Values 3, 4, 5 and 6 have been added to the 1940A. Setting a 3 selects 1MHz, 4 selects 2MHz, 5 selects 1.544MHz and 6 selects 2.048MHz.

**Table 2: 1940A Serial Commands**

<b>RS232 Command</b>	<b>Function</b>
Fx XXX.XXXXXX	Set Frequency in MHz to nearest 1Hz. Decimal point required. x=a or b, depending upon which frequency is set. In a 4-frequency system, there are two serial ports, each requiring Fa and Fb. Maximum frequency 399.999999MHz.
Qe	Query the non-volatile memory (EEPROM) storage. See manual for details of returned information.
Qr	Query the volatile (RAM) memory storage. These are the values currently output by the 1940A and will only equal the values from "Qe" if no changes have been made in the settings. See manual for details of returned information.
C	Same as "Reset All" command. Restores factory defaults and clears EEPROM valid flag.
Ax N	Set Attenuation. x=a or b, depending upon which attenuation is set. N=0, 1, 2, 3, 4, 5, 6 for 0dB to 60dB attenuation.
S	Saves current state into EEPROM and sets valid flag. State used as default upon next power up or reset. Use the "Reset All" or "C" command to return to factory default values. Automatically sets EEPROM valid flag and overrides the legacy "P" command.

# Model 1940A Rear Panel



POWER IN

FUSE

4dBm

0-60dB

GROUP 0  
A = Frequency A  
B = Frequency B

4dBm

0-60dB

GROUP 1  
A = Frequency A  
B = Frequency B