NOVATECH
INSTRUMENTS, INC.
Model 2955AR
Synthesized Rubidium Frequency Standard

The Model 2955AR Rubidium Frequency Standard provides simultaneous sinewave outputs of 10MHz, 1MHz, a 1pulse per second output, along with a synthesized sinewave output. Containing an Atomic Resonance Rubidium Oscillator, the 2955AR provides long term stability of better than $\pm5\times10^{-11}$ per month and short term stability of $<1\times10^{-11}$ in 10 seconds. The 2955AR is ideal for use as a master oscillator in laboratories and ground stations, as well as for test and calibration applications. The synthesized output, which is internally locked to the Rubidium Oscillator, can be set using RS232 serial commands to generate any frequency from 100Hz to 30MHz with a resolution of 1µHz.

Specifications:

FREQUENCY STABILITY

Short Term:	τ=1s	$<3.0\times10^{-11}$
	τ=10s	$<1.0\times10^{-11}$
	τ=100s	$<0.3\times10^{-11}$

| Aging: | Monthly | $<\pm5\times10^{-11}$ after 3 months |
| | Yearly | $<\pm4\times10^{-10}$ after 3 months |

Temperature: +0 to +50°C $<\pm3\times10^{-10}$

Line Voltage: ±10% $<\pm0.5\times10^{-11}$

FREQUENCY ACCURACY
At shipment: $<=\pm5\times10^{-11}$ at 20°C.
Retrace: $<=\pm2\times10^{-11}$ from last frequency after 12 hours ON and 24 hours OFF (constant temperature).

SINE OUTPUTS
10MHz and 1MHz (or 5MHz optional), $1V_{RMS} \pm0.25V_{RMS}$ into 50Ω.

SYNTHESIZED SINE OUTPUT
RS232 serial programmable 48-bit, 1µHz resolution, $1V_{RMS}\pm0.25V_{RMS}$ into 50Ω. 100Hz to 30MHz. This output is locked to the Rb and has the same accuracy as the 10MHz and 1MHz. Phase Noise: <-140dBc, 10kHz offset, 1MHz out. Harmonics <-45dBc, spurious <-55dBc.

OUTPUT IMPEDANCE
50Ω, ±10%

SPECTRAL PURITY (10MHz and 1MHz outputs)
Sine outputs: Harmonic <-40dBc, Non-Harmonic/Sub-Harmonic: <-55dBc.

PHASE NOISE (Typical, 10MHz output)
Frequency Offset	dBc
10 Hz	-87
100 Hz	-125
1 kHz	-137
10 kHz	-145

ENVIRONMENTAL
Temperature: +0°C to +50°C operating.
Humidity: 80% to 31°C, decreasing linearly to 50% at 40°C.

SIZE
6.4cm H, 18.5cm W, 24.1cm L, excluding bail and feet.

CONNECTORS
BNCs on front panel for sine outputs. BNCs on rear panel for 1pps. DE9 on rear panel for RS232.

LINE POWER
120/240VAC ±10%, 50/60Hz. 40VA (50VA max during warm up <10minutes).

FRONT PANEL INDICATORS
POWER OK Indicates that AC power is applied and on. RUBIDIUM LOCK Indicates that the Oscillator is locked.

Synthesized Output Serial Commands

Serial Command	Function
`F xx.xxxxxxxxxxxx`	Set Frequency in MHz to nearest 1µHz. Decimal point required.
`E x`	Serial Echo Control. x=D for Echo **D**isable, x=E for Echo **E**nable. Default is **E**nabled.
`S`	Save current state into EEPROM and sets valid flag. State saved is used as default upon next power up or reset.
`R`	Reset. This command resets the synthesizer. EEPROM data is preserved and, if valid, it is used upon restart.
`CLR`	Clear. This command clears the EEPROM valid flag and restores all factory default values.
`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 synthesizer and will only equal the values from "`Qe`" if no changes have been made in the settings. See manual for details of returned information.