

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 $\pm 5 \times 10^{-11}$ per month and short term stability of $< 1 \times 10^{-11}$ 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 1 μ Hz.

Specifications:

FREQUENCY STABILITY

Short Term:	$\tau=1s$	$< 3.0 \times 10^{-11}$
	$\tau=10s$	$< 1.0 \times 10^{-11}$
	$\tau=100s$	$< 0.3 \times 10^{-11}$
Aging:	Monthly	$< \pm 5 \times 10^{-11}$ after 3 months
	Yearly	$< \pm 4 \times 10^{-10}$ after 3 months
Temperature:	+0 to +50°C	$< \pm 3 \times 10^{-10}$
Line Voltage:	$\pm 10\%$	$< \pm 0.5 \times 10^{-11}$

FREQUENCY ACCURACY

At shipment: $< \pm 5 \times 10^{-11}$ at 20°C.
Retrace: $< \pm 2 \times 10^{-11}$ from last frequency after 12 hours ON and 24 hours OFF (constant temperature).

SINE OUTPUTS

10MHz and 1MHz (or 5MHz optional), $1V_{RMS} \pm 0.25V_{RMS}$ into 50 Ω .

SYNTHESIZED SINE OUTPUT

RS232 serial programmable 48-bit, 1 μ Hz resolution, $1V_{RMS} \pm 0.25V_{RMS}$ into 50 Ω . 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

50 Ω , $\pm 10\%$

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 $\pm 10\%$, 50/60Hz. 40VA (50VA max during warm up < 10 minutes).

FRONT PANEL INDICATORS

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

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Synthesized Output Serial Commands

Serial Command	Function
F xx .xxxxxxxxxxxxxx	Set Frequency in MHz to nearest 1 μ Hz. Decimal point required.
E x	Serial Echo Control. x=D for Echo D isable, x=E for Echo E nabled. 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.