IMPROVED UHF OSCILLATOR

900 to 2000 MHz

A low-priced, high-powered, stable signal source covering better than an octave of uhf or "L band" has been a unique and popular member of the Unit rf oscillator family for some 10 years.[1] Additional convenience in use and greater stability of output are now offered in the completely redesigned TYPE 1218-B Unit Oscillator.

Compatible with the other oscillators in the family it heads, the new oscillator has a much lower profile than its predecessor. Seven inches high and 12 inches wide, it can be attached semi-permanently to any GR power supply of that height. If the power supply is a TYPE 1267 or 1269, both of which are 4 inches wide, the combination can be rack-mounted side by side. On the other hand, the TYPES 1263 and 1264 Power Supplies, which are 8 inches wide, mount above or below the oscillator for a total height of 14 inches in a 19-inch rack.[2]

For convenience, particularly in rack assemblies, all three controls are on the front panel. Frequency is set by a vernier-drive knob, which makes 8 complete turns, and is indicated on a custom-calibrated dial to better than $\pm 1\%$. The scale length of 10.5 inches was unchanged in the redesign. A logging scale has been added for precise interpolation or resetting of frequencies. The ΔF control operates an incremental tuning capacitor, which is considerably more effective and stable

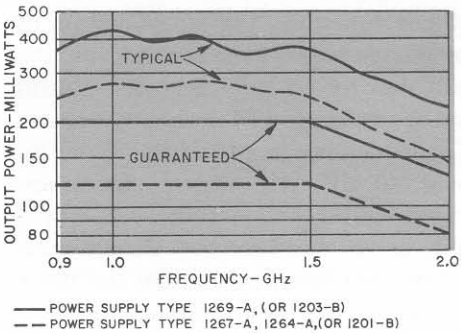

Figure 1.
Output power vs frequency.

[1] E. Karplus, "A 900–2000 Mc Unit Oscillator," *General Radio Experimenter*, February 1955.
[2] "Oscillator-Power-Supply Combinations for Frequencies from 0.5 Mc/s to 2 Gc/s," *General Radio Experimenter*, June 1965.

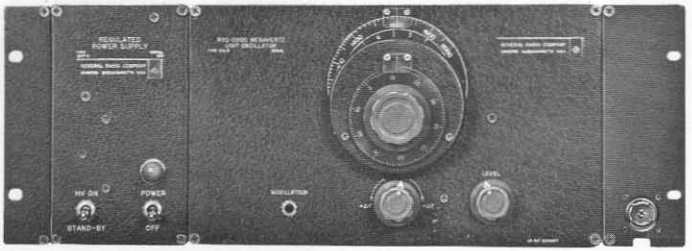

Figure 2. Panel view of the Type 1218-B7R, for rack mount.

than the variable grid resistor that it replaces. This control can be used to make adjustments as fine as 1 part per million, over a range of about 0.1%. The third control sets the output level between zero and maximum by rotation of the pickup loop. The redesign brought this control to the front and also "geared it down" so that settings as low as 30 dB below full output are easily made.

A pencil triode is used in a tuned-plate-tuned-cathode circuit (although plate, not grid, runs at dc ground potential). The plate resonator is a high-Q, quarter-wavelength, coaxial line with a contacting plunger. The output loop is mounted on the plunger and therefore maintains a position in the zone of highest magnetic-field intensity. The cathode is tuned by a curled three-quarter-wavelength line of unusual design. The rotary motion of the cathode tuner and the linear motion of the plate tuner are coupled to the main dial by an improved mechanism having negligible backlash.

The shielding has been improved by about 40 dB. All control shafts are nonconducting and act through waveguide-below-cutoff sleeves. Circuit connections are brought through the main casting wall through filters. Cathode and grid-voltage test points have been brought out so that monitoring or special-purpose modulation can be accomplished without disturbance to the shielded compartments.

The rear location of the locking GR874 output connector is convenient in many applications. In addition, the adaptor-panel set used for rack installation provides front mounting space for a similar connector to which the output is brought by a short coaxial cable. The guaranteed output power (shown in Figure 1) is now specified more precisely than before. The power available from a typical TYPE 1218-B compared to its predecessor is the same at most frequencies except where the older instrument had weak spots. These have been alleviated by improvements in the tuned circuits.

A substantial improvement in spectral purity of the output signal results from two measures. First, the cathode circuit has been isolated from the heater so that alternating current there does not modulate the oscillator appreciably. Second, the entire tuning assembly has been so mounted as to reduce the transmission of acoustic energy from the main casting to the tube, where modulation can result. The electrodes in the tube resonate mechanically at nearly 3 kHz, but the resultant frequency modulation at resonance is less than a very few parts per million at sound levels found in most laboratories.

In cw applications requiring the highest stability of frequency and amplitude, it is important to regulate both heater and plate supplies. Because the frequency is more sensitive to heater voltage changes than to proportional changes in the plate (or B+) circuit, the TYPE 1267-A Power Supply, which is fully regulated, is recommended for critical applications.

Modulation is facilitated by duplication of the usual plate-modulation jack on the front and behind the panel. A connector is also provided for direct connection of the TYPE 1264-A Modulating Power Supply (formerly possible only with adaptor cables). With that modulator, typical delay, rise, and fall times of square-wave or pulse modulation are about 1 microsecond. To obtain very constant output, cw or square wave, the TYPE 1263-B Amplitude-Regulating Power Supply should be used.

Applications for the TYPE 1218-B Unit Oscillator are widespread in laboratories and production facilities where uhf signals are handled. For example, it is an excellent, low-cost pump for a parametric amplifier. It may be the "local oscillator" in a heterodyne receiving or measuring system. It is recommended as a generator for the TYPE 900-LB Slotted Line in the 900- to-2000 MHz frequency range.

— R. W. HARLEY

SPECIFICATIONS

Frequency Range: 900 to 2000 MHz (0.9 to 2.0 GHz).

Frequency Calibration Accuracy: ±1%.

Warmup Frequency Drift: 0.1% approximate total warmup drift.

Frequency Control: A 4-inch dial with calibration in MHz over 290° (10½-inch scale length), with a slow-motion drive of about 8 turns. Supplemented by a logging scale of 800 divisions.

ΔF Control: 1.8 turns for approximately 0.1% total range.

Output Power (Into 50 Ω): 200 mW (0.9 to 1.5 GHz) guaranteed minimum, dropping linearly to 130 mW at 2.0 GHz, with TYPE 1269-A or 1203-B Power supply.

120 mW (0.9 to 1.5 GHz) guaranteed minimum, dropping linearly to 80 mW at 2.0 GHz, with TYPE 1267-A, 1264-A, or 1201-C Power Supply.

Output Connector: Locking type GR874, located at rear. Adaptors available for other connector systems.

Level Control: Full output to about 30-dB attenuation easily set by 200° rotation, uncalibrated.

Modulation: An external audio-frequency voltage for plate modulation can be introduced at the front-panel MODULATION jack. The impedance there is about 6,000 Ω; approximately 30 V, rms, is required for 30% amplitude modulation. For 400- and 1000-Hz modulation, the TYPE 1214-A Unit Oscillator is recommended.

Power Supply: Four types of power supplies are recommended; the choice depends on the intended application.

The TYPE 1267-A is fully regulated, for cw operation.

The TYPE 1269-A is unregulated, for maximum power, cw.

The TYPE 1263-B automatically controls the output level up to 2 V behind 50 Ω, cw or 1-kHz square-wave modulated.

The TYPE 1264-A provides full-power cw or modulated operation: 1-kHz square wave or pulse at externally determined duty ratio and frequency up to 100 kHz.

The oscillator is available in combination with each of these power supplies, for either bench or rack mount, as listed on page 16.

Tube: One 5675 pencil triode.

Mounting: The oscillator is housed in an aluminum casting with gray-wrinkle-finished shield covers on right and left ends and a front panel similarly finished.

Accessories Supplied: TYPE 874-R22LA Patch Cord, phone plug.

Other Accessories Available: GR874 coaxial elements.

Dimensions: Width 12, height 7⅝, depth 9 inches (320 by 205 by 240 mm), over-all.

Net Weight: 14 lb (6.5 kg).

Shipping Weight: 25 lb (11.5 kg).

Catalog Number	*Description*	*Price in USA*
1218-9702	**Type 1218-B Unit Oscillator,** only, Bench Mount	**$465.00**
0481-9642	**Type 481-P412 Rack-Adaptor Set,** for oscillator only	**20.00**

U.S. Patent Number 2,548,457.