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One of the many uses of the new Strobotac® Electronic Stroboscope, Type 1531-A, is in vibration testing. The cover photograph shows a 3300-rpm saucer fan being tested for blade resonance on a shake table at Rotron Manufacturing Company, Woodstock, New York.

A NEW UHF SIGNAL SOURCE

THE TYPE 1361-A UHF OSCILLATOR

Figure 1. Panel view of the Type 1361-A UHF Oscillator.

Many laboratory and production-line tests require a compact signal source which can deliver more output than the average standard-signal generator, while not requiring an accurate calibration of absolute output level. Measurements with the TYPE 874-LBA Slotted Line, the TYPE 1602-B UHF Admittance Meter, the TYPE 1607-A Transfer-Function and Immittance Bridge, as well as the TYPE 874-MR Mixer Rectifier in a heterodyne detector system, all require such a source. There is a demand for some features not previously available in the popular General Radio line of Unit Oscillators, such as a readily resettable front-panel output control, and provision for square-wave and pulse modulation. The TYPE 1361-A UHF Oscillator has been designed with these requirements in mind. It provides a 100-milliwatt output in the 450 to 1050 Mc part of the UHF frequency range. Typical curves of power output *vs.* frequency are shown in Figure 2.

The usefulness of this oscillator for many applications is enhanced by its precision drive with easily repeatable setting. By means of the TYPE 1750-A Sweep Drive or the TYPE 908-R Dial Drives, the output frequency can be swept mechanically for oscillographic display or X-Y recording. External power supplies are available to maintain constant amplitude and for amplitude modulation by sine waves, square waves, or pulses.

The oscillator design has been closely coordinated with that of the companion TYPE 1264-A Modulating Power Supply (see page 6) which provides CW, square-wave, or pulse-modulated operation. Square-wave modulation is generally preferred to sinusoidal modulation be-

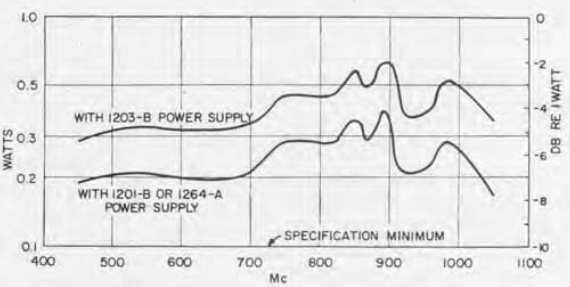

Figure 2. Typical power output characteristic of the Type 1361-A UHF Oscillator.

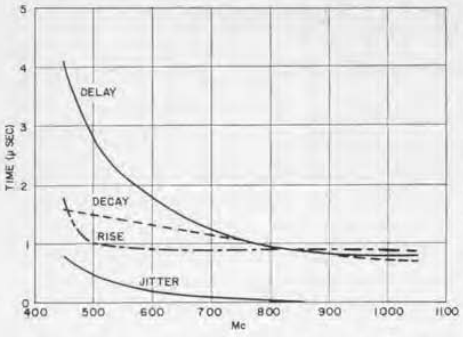

Figure 3. Pulse-modulation characteristics of the Type 1361-A UHF Oscillator used with the Type 1264-A Modulating Power Supply.

cause incidental frequency modulation is much less. Pulse-modulation characteristics are shown in Figure 3.

Frequency Control

A TYPE 5675 Pencil Tube is used in the oscillator. Frequency is determined by a General Radio butterfly circuit (no sliding contacts) and is controlled by a 4-inch precision dial calibrated to ±1%. The main frequency scale is approximately logarithmic. A vernier dial on the slow-motion drive carries 100 linear divisions, each corresponding to a 0.1% change in frequency. Each full turn of the vernier dial corresponds to a numbered sector on the main dial, so that settings can be recorded and repeated in terms of sector number and vernier divisions.

Output System

The output is adjustable by a waveguide-below-cutoff attenuator located on the front panel. The attenuator is calibrated in relative attenuation over an 80-db range. Additional uncalibrated ranges are provided at the high and low output ends. The output coupling loop slides in and out for output adjustment and can be locked at any point. The output terminal is the new locking TYPE 874 Coaxial Connector which permits semi-permanent installation of adaptors to virtually any standard military type of connector.

The radiated and conducted fields have been reduced to a very low value by complete shielding, together with the use of ferrite-loaded filters and a ceramic rotor shaft.

Housing

Considerable attention has been paid to providing compatible packages, so that the oscillator can be semi-permanently attached to the TYPE 1264-A Modulating Power Supply to form a single rigid unit. Each instrument is housed in a rack-bench instrument cabinet* 7 inches high by 8 inches wide. The combination or either individual unit can be readily mounted in a standard relay rack by means of accessory panel extensions.

Power Supply and Modulation

For continuous-wave output the TYPE 1201-B Unit Regulated Power Supply is recommended to provide maximum stability; where maximum output is required, the TYPE 1203-B Unit Power Supply can be used.

The TYPE 1216-A Unit I-F Amplifier will supply adequate power to operate the oscillator in a heterodyne detector.

When square-wave or pulse modulation is required in addition to CW operation, the TYPE 1264-A Modulating Power Supply should be used.

* H. C. Littlejohn, "The Case of the Well-Designed Instrument," *General Radio Experimenter*, 34, 3, March, 1960.

400-cycle or 1-kc sine-wave modulating voltage from the TYPE 1214-A Unit Oscillator can be superimposed on the dc plate voltage from any of the above power supplies by way of a panel jack, but the incidental frequency modulation will be appreciable.

The output amplitude can be held constant over the frequency range at a level of approximately 2 volts by use of the TYPE 1263 Amplitude-Regulating Power Supply. This power supply is recommended for sweep frequency applications in conjunction with a dial drive unit.

— G. P. McCOUCH

Figure 4. Type 1361-A UHF Oscillator relay-rack mounted with Type 480-P408 Panel Extensions.

SPECIFICATIONS

Frequency

Range: 450 to 1050 Mc.

Calibration: Logarithmic frequency scale; vernier dial calibrated in 0.1% increments.

Accuracy: ±1%.

Stability: Warm-up frequency drift is 0.2%, max.

Attenuator: Range, 80 db with 5-db scale divisions, relative attenuation. Additional uncalibrated range is provided.

Power Supply: Five types of external power supply are available, each designed for a particular purpose:

Tube: One 5675, supplied.

Accessories Supplied: Coaxial patch cord.

Other Accessories Available: Panel Extensions for rack mount (see below), TYPE 874 Coaxial Elements to fit output connector, adaptors to military connectors.

Cabinet Dimensions: Width 8, height 7⅝, depth 9½ inches (205 by 185 by 240 mm.), over-all.

Net Weight: 7 pounds (3.2 kg).

Type	*Oscillator Modulation Possibilities*[1]	*Oscillator Output*[2] *into 50 ohms*	*Remarks*
1203-B[3]	Sine Wave	125 mw	Gives maximum rf output
1201-B[3]	Sine Wave	100 mw	Gives maximum frequency stability
1263-B	Sine Wave 1-kc square wave	20 mw	Holds oscillator output constant with frequency
1264-A[3]	Sine, pulse, and square waves	100 mw	Power level given is for CW operation
1216-A	Sine Wave	Adequate for heterodyning	

[1] Sine-wave modulation depth is 30% with 40 volts into 6000 ohms. TYPE 1214-A Unit Oscillator is recommended.
[2] At least as great as stated.
[3] Will operate from 400-cycle line.

Type		*Code Word*	*Price*
1361-A	**UHF Oscillator**	OLIVE	**$285.00**
480-P408	**Panel Extensions (For oscillator only)**	EXPANELJAG	**8.00**
480-P416	**Panel Extensions (For oscillator and Type 1263-B or Type 1264-A Power Supply)**	EXPANELNIT	**6.00**

THE TYPE 1264-A MODULATING POWER SUPPLY

SQUARE-WAVE AND PULSE MODULATION FOR HIGH-FREQUENCY OSCILLATORS

Amplitude modulation of signal sources such as the TYPE 1361-A UHF Oscillator and the various Unit Oscillators is frequently required, either to simulate the modulation employed in navigation or communication systems, or to permit audio amplification of the detected signal in bridge or slotted-line measurements. At frequencies in the VHF and UHF region, pulse or square-wave modulation is usually employed in preference to sinusoidal modulation, largely because of the difficulty in obtaining amplitude modulation which is linear and free from incidental frequency modulation.

The TYPE 1264-A Modulating Power Supply produces 100% pulse or square-wave amplitude modulation of high-frequency oscillators as well as permitting continuous-wave operation. While designed especially as a companion to the new TYPE 1361-A UHF Oscillator, this power supply can also be used with the General Radio Unit Oscillators, TYPES 1215-B (50-250 Mc), 1209-B (250-920 Mc), 1209-BL (180-600 Mc), and 1218-A (900-2000 Mc).

This power supply (see block diagram, Figure 2) comprises an electronically regulated, adjustable-output, high-voltage, dc supply, a dc-coupled power modulator of the series type driven by a Schmitt trigger circuit, and a 1-kc multivibrator. A function selector switch permits the operator to turn power on, and select CW, stand-by (heaters only energized), 1-kc square wave (internally generated), or external modulation. In-

Figure 1. Panel view of the Type 1264-A Modulating Power Supply.

dependent front panel controls vary the regulated supply voltage for CW operation and the modulator output-pulse amplitude. Controls are also provided to adjust the frequency of the internal 1-kc multivibrator, and the duty ratio of the square wave which it produces.

The modulator stage provides a negative pulse which is applied to the oscillator cathode. Since there is no dc output in the quiescent condition between pulses, the oscillator is completely cut off and modulation is a full 100%. The modulator has high peak current capability in order to charge and discharge rapidly the RF filter capacitances used to control leakage in the associated oscillator. Rise and decay times of less than 1.5 μsec are obtained when feeding the 300-pf shunt capacitance of the filtering employed in the TYPE 1361-A Oscillator. Inasmuch as these are comparable to the inherent starting and delay characteristics of the oscillator itself, further im-

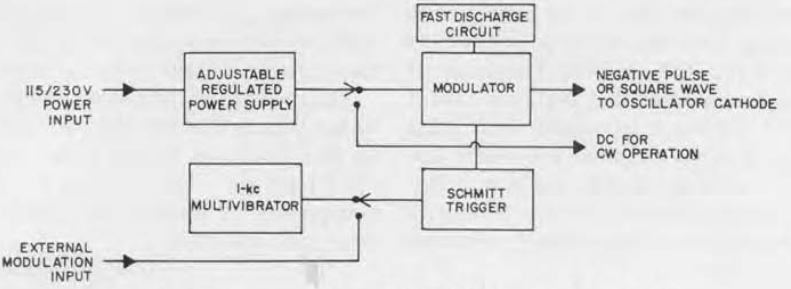

Figure 2. Block diagram of the Type 1264-A Modulating Power Supply.

provement of the modulator video characteristics cannot be justified. Pulse widths from 1.5 μsec to square waves are obtainable with external modulation input. Overshoot of the leading edge of the video pulse is less than 5%, there is no droop, and the output amplitude is independent of pulse width and rate.

The input trigger circuit will accept single or multiple positive pulses or square waves at rates up to 100 kc, or sine waves up to 50 kc, from any source of 20-volt amplitude such as a TYPE 1217-A Unit Pulser or TYPE 1210-C Unit RC Oscillator. No adjustment of triggering is necessary. The built-in stable 1-kc multivibrator of adjustable rate (±15%) and duty cycle provides ideal square-wave modulation for use with sharply selective amplifiers following the signal detector.

In the design of the TYPE 1264-A Modulating Power Supply, several problems of compatibility were considered. It

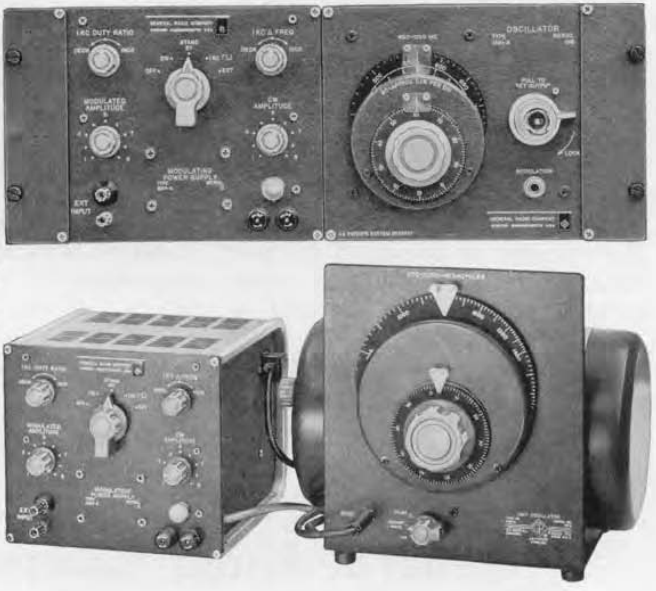

Figure 3. The Type 1264-A Modulating Power Supply is shown (above) relay-rack mounted with the Type 1361-A UHF Oscillator and (below) used on a laboratory bench with the Type 1218-A Unit Oscillator.

was desirable that it be usable with existing Unit Oscillators as well as the new TYPE 1361-A UHF Oscillator. It was also desirable that the TYPE 1361-A UHF Oscillator be usable with other existing power supplies. The nearly universal solution adopted works with B+ or B− grounded in the oscillator, and requires only that the cathode be available for pulsing. To use the TYPE 1264-A with previously existing Unit Oscillators, an accessory adaptor cable is required.

The rack-bench instrument cabinet, 7 inches high by 8 inches wide, is identical to that employed in the TYPE 1361-A UHF Oscillator. The two may be semi-permanently attached for bench or relay-rack mounting.

— G. P. MCCOUCH

SPECIFICATIONS

Output

Regulated dc (unmodulated): Adjustable 200 to 300 v, 50 ma.

Heater Power: 6.3 v ac, 2.1 amps.

Square Waves (internally generated): 850 to 1150 cps, 160 to 210 v (approx.).

Pulses (externally generated): 1.5 μsec to square waves, rise and decay times less than 1.5 μsec each, amplitude 160 to 210 v (approx.), overshoot less than 5%, no ramp off.

Inputs

Power Input: 105 to 125 (or 210 to 250) volts, 50 to 1000 cps, 85 watts.

External Driver: 20 to 50 volts peak positive pulse, or rms sinusoidal; 20 to 100,000 pps for pulses, 20 to 50,000 cps for sine waves.

Accessories Available: TYPE 1264-P1 Adaptor Cable, used to connect TYPE 1264-A to TYPE 1209-B, TYPE 1209-BL, or TYPE 1215-B Unit Oscillators. TYPE 1264-P2 Adaptor Cable, used to connect TYPE 1264-A to TYPE 1218-A Unit Oscillator. One pair of TYPE 480-P408 Panel Extensions is required for individual relay rack mounting, or one pair of TYPE 480-P416 Panel Extensions for use with the TYPE 1361-A UHF Oscillator.

Dimensions: Width 8, height 7⅝, depth 9½ inches (205 by 195 by 245 mm.), over-all.

Net Weight: 12 lb (5.5 kg).

Type		*Code Word*	*Price*
1264-A	Modulating Power Supply	MODUL	$285.00
1264-P1	Adaptor Cable for Types 1209-B, 1209-BL, and 1215-B	MODULCABLE	15.00
1264-P2	Adaptor Cable for Type 1218-A	MODULADAPT	8.50
480-P408	Panel Extension (For power supply only)	EXPANELJAG	8.00

ISRAELI REPRESENTATIVES

In the January-February issue of the *Experimenter*, we announced the new name, Eastronics, Ltd., for our representative in Israel. We neglected to mention that our representative in the United States for Israel is the associate organization:

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