

# 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-ke multivibrator. A function selector switch permits the operator to turn power on, and select CW, stand-by (heaters only energized), 1-ke square wave (internally generated), or external modulation. In-

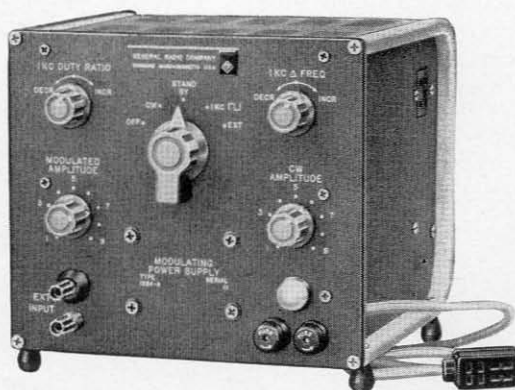


Figure 1. Panel view of the Type 1264-A Modulating Power Supply.

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-ke 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  $1.5 \mu\text{sec}$  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-

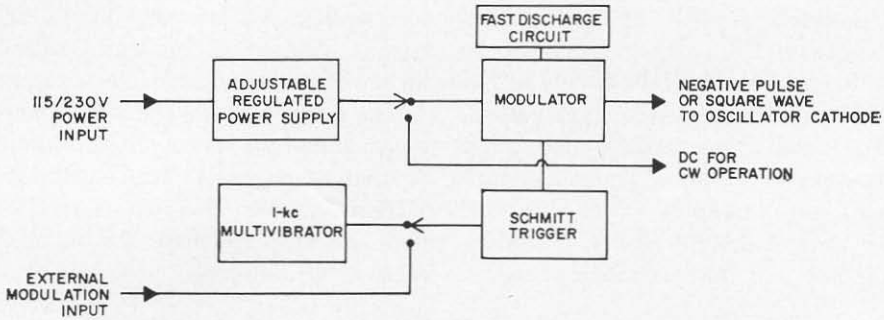


Figure 2. Block diagram of the Type 1264-A Modulating Power Supply.

provement of the modulator video characteristics cannot be justified. Pulse widths from  $1.5 \mu\text{sec}$  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 ke, or sine waves up to 50 ke, 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-ke multivibrator of adjustable rate ( $\pm 15\%$ ) 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

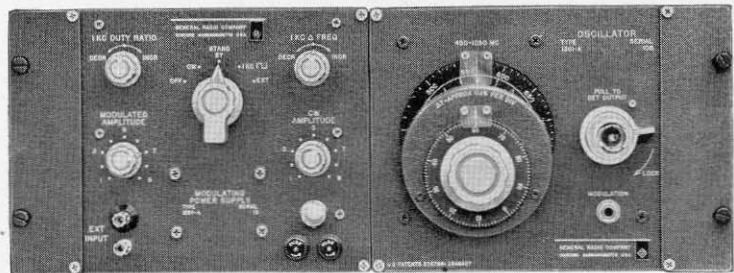
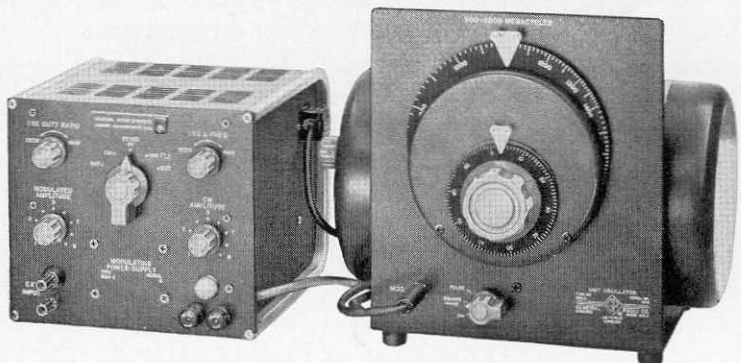


Figure 3. The Type 1264-A Modulating Power Supply is shown (above) relay-rack mounted with the Type 1361-A UHF Oscillator and (below) used on a laboratory bench with the Type 1218-A Unit Oscillator.





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 7½, 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:

LANDSEAS PRODUCTS CORPORATION

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General Radio Company