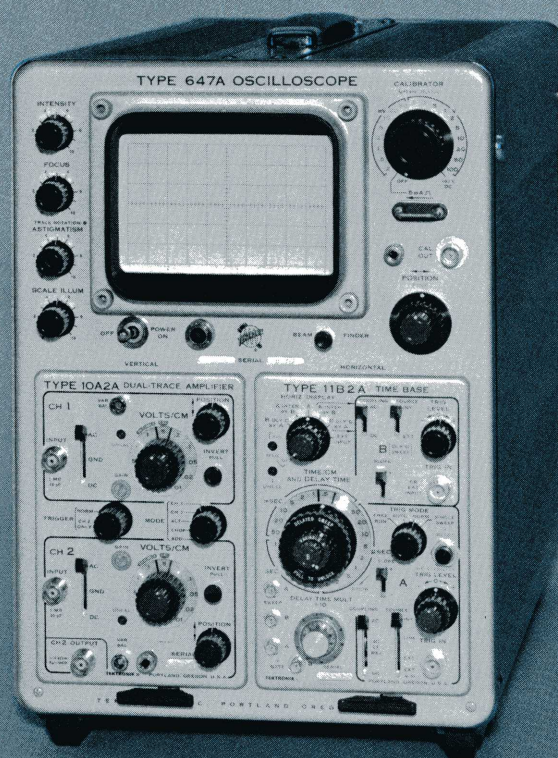


# TYPE 647A R647A

## DC-to-100 MHz OSCILLOSCOPES

**NEW**



- **DC-to-100 MHz BANDWIDTH**
- **BUILT FOR SEVERE ENVIRONMENTS**
- **HIGH WRITING SPEED**
- **ILLUMINATED NO-PARALLAX GRATICULE**
- **6 x 10-cm DISPLAY**

The Type 647A and R647A are compact, high-performance instruments capable of accurate measurements over an ambient temperature range from  $-30^{\circ}\text{C}$  to  $+65^{\circ}\text{C}$ . Accuracy is even better in normal ambient temperatures ranging from  $0^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$ .

The Type 647A and R647A Oscilloscopes offer bandwidths from DC to 100 MHz when used with the Type 10A2A Dual-Trace Plug-In Unit. Triggering over the entire 100-MHz bandwidth is possible with a Type 11B2A Sweep-Delay Time-Base Unit.

An accelerating potential of 14 kV provides a small, bright CRT spot with corresponding high writing speed. An internal, 6 x 10-cm graticule with variable illumination offers parallax-free measurements.

A new quick-change line-voltage selector permits simple and convenient adaptation to 6 different line-voltage ranges.

### CHARACTERISTIC SUMMARY

#### VERTICAL

Two vertical plug-in units are available: Type 10A1 Differential Amplifier featuring voltage-comparator capability, and Type 10A2A Dual-Trace Amplifier with 100-MHz bandwidth. Operating modes of Type 10A2A include CH 1, CH 2, ALTERNATE, CHOP ( $\sim 1\text{-MHz}$  rate), and ADD.

#### HORIZONTAL

Two time-base plug-in units are available: Type 11B1 with single time base and direct reading magnifier, and Type 11B2A with dual time bases and sweep delay; both units equipped with single sweep for photographic recording.

#### CRT

DISPLAY AREA—6 x 10 cm

ACCELERATING VOLTAGE—14 kV

#### OTHER

AMPLITUDE CALIBRATOR—0.2 mV to 100 V, 1-kHz square-wave.

POWER REQUIREMENT—90 V to 136 V and from 180 V to 272 V in six ranges; range selection accomplished by quick-change, switching device. Maximum power approx 200 watts at 115 V and 60 Hz. Type 647A: 45 to 440 Hz, Type R647A: 45 to 66 Hz.



VERTICAL DEFLECTION					
BANDWIDTH AND RISETIME					
Bandwidth figures are at 3-dB down.					
PLUG-IN	DEFLECTION FACTOR	BANDWIDTH*		RISETIME	
		0°C to +40°C	−30°C to +65°C	0°C to +40°C	−30°C to +65°C
10A1	5 mV/cm to 20 V/cm	55 MHz	50 MHz	6 ns	7 ns
	1 mV/cm and 2 mV/cm	40 MHz	35 MHz	8.5 ns	10 ns
10A2A	10 mV/cm to 20 V/cm	100 MHz	90 MHz	3.5 ns	4.1 ns

#### SIGNAL DELAY

Permits observation of the leading edge of the waveform that triggers the sweep. Delay line requires no tuning.

HORIZONTAL DEFLECTION			
Two Time-Base Plug-In Units are available for use with the Type 647A and R647A Oscilloscopes.			
PLUG-IN UNIT	CALIBRATED RANGE	SWEEP MAGNIFIER	SWEEP SYSTEM
Type 11B1	0.1 $\mu$ s/cm to 2 s/cm	Direct reading up to X50, 10 ns/cm max	Single Time Base Generator
Type 11B2A	0.1 $\mu$ s/cm to 5 s/cm	X10, Extends Range to 10 ns/cm	Dual Time Base Generator with Sweep Delay

Both plug-in units have single-sweep and external-horizontal-amplifier capability.

### CRT

#### TEKTRONIX CRT

Rectangular, flat-faced CRT. 4-kV accelerating potential for bright displays. P31 phosphor normally supplied.

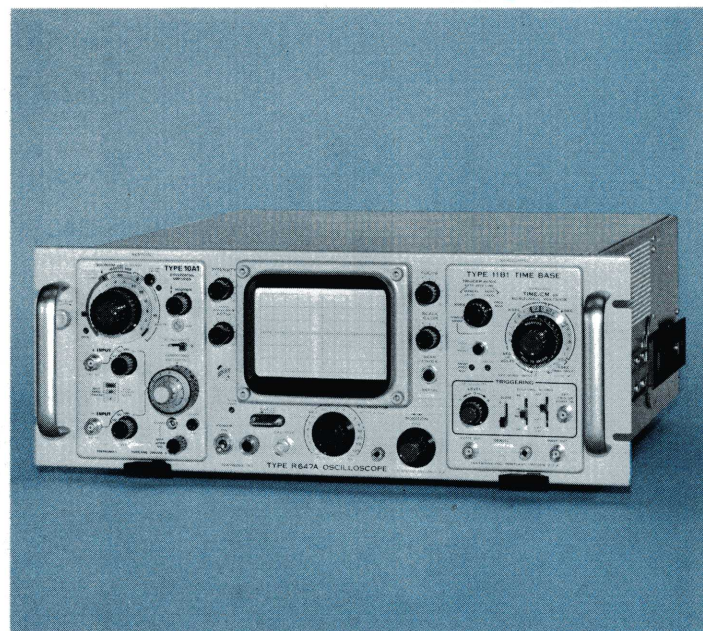
#### GRATICULE

No-parallax, 6 x 10-cm, internal graticule with variable edge illumination. Ruled in 1-cm divisions, vertical and horizontal centerlines further marked in 2-mm increments.

#### EXTERNAL CRT INPUTS

Input through unblanking amplifier to CRT grid with bandwidth from DC to 10 MHz; visible modulation with 4-V peak-to-peak signal. An additional input to CRT cathode is AC coupled (0.015  $\mu$ F and 22 k $\Omega$ ); visible modulation with 5-V peak-to-peak signal.

\*Stated frequencies are upper bandwidth limits. Lower limit is DC (when DC coupled). With AC coupling, low-frequency 3-dB-down point is  $\sim$  1.6 Hz without probe, or  $\sim$  0.16 Hz with P6047 10X Probe.



### OTHER

#### AMPLITUDE CALIBRATOR

0.2 mV to 100 V in 18 calibrated steps (1-2-5 sequence), 1-kHz squarewave. Crystal-controlled frequency accurate within 0.1% from −30°C to +65°C. Output resistance 50  $\Omega$  from 0.2 mV to 0.2 V. Squarewave duty cycle 49.9% to 50.1%. Risetime  $\leq$  1  $\mu$ s. For current-probe calibration, a 5-mA squarewave is available through a front-panel current loop. The calibrator also provides a 100-V DC output.

#### AMPLITUDE ACCURACY

	0°C to +40°C	−30°C to +65°C
100 V and 100 mV	$\pm$ 1%	$\pm$ 1.5%
All other positions	$\pm$ 2%	$\pm$ 3%

#### POWER REQUIREMENTS

Quick-change line-voltage selector permits selection of the following ranges: 90 V to 110 V, 104 V to 126 V, 112 V to 136 V, 180 V to 220 V, 208 V to 252 V, or 224 V to 272 V. Approx 200 watts maximum at 115 V and 60 Hz. Type 647A: 45 to 440 Hz. Type R647A: 45 to 66 Hz.

#### TYPE 647A DIMENSIONS AND WEIGHTS

Height	14 $\frac{5}{8}$ in	37.1 cm
Width	9 $\frac{7}{8}$ in	25.2 cm
Depth	22 in	56.0 cm
Net weight	40 lb	17.8 kg
Domestic shipping weight	$\sim$ 49 lb	$\sim$ 21.9 kg
Export-packed weight	$\sim$ 62 lb	$\sim$ 27.6 kg

#### TYPE R647A DIMENSIONS AND WEIGHTS

Height	7 in	17.8 cm
Width	19 in	48.3 cm
Rack depth	19 in	48.3 cm
Net weight	50 lb	22.2 kg
Domestic shipping weight	$\sim$ 73 lb	$\sim$ 32.4 kg
Export-packed weight	$\sim$ 96 lb	$\sim$ 42.6 kg