

SPECIFICATIONS

This manual includes instructions for the T921, T922 and T922R portable oscilloscopes. The T922 is a 15 MHz, dual trace, oscilloscope and the T921 is a 15 MHz, single trace oscilloscope. The Vertical Amplifier, either single trace or dual trace, provides calibrated deflection factors from 2 mV to 10 V/div. The Time Base provides stable triggering over the full bandwidth of the Vertical Amplifier(s) and provides calibrated sweep rates from 0.5 s/div to 0.2 μ s/div. A variable X1 to X10 magnifier extends the maximum sweep rate to 20 ns/div.

The T992R is a rackmount version of the T922 oscilloscope which takes 5-1/4 inches of rack space.

Features added to the rackmount version include: single sweep; rear panel outputs for Sweep Gate, Sweep Ramp, and Vertical Signal; internally selectable Z Axis polarity; user selection of the CHOP or ALT dual trace modes; and switch-selectable front-panel or rear-panel inputs for CH 1, CH 2, and EXT TRIG signals.

The following instrument specifications apply over an ambient temperature range of 0°C to +45°C unless otherwise specified. The Adjustment Procedure in Section 4, when performed completely, allows the T921/T922/T922R to meet the electrical specifications listed in Table 1-1.

TABLE 1-1
Electrical

Characteristic	Performance Requirement
A. DISPLAY	
Probe Adjust Output	
Voltage (0°C to +40°C)	Approximately 0.5 V.
Repetition Rate	Approximately 1 kHz.
Z-Axis Input	
Sensitivity	5 volt signal causes a noticeable decrease in intensity.
Signal Polarity	
T921 and T922 T922R	Positive going from ground. Either polarity of signal can be applied, depending upon internal jumper connections.
Usable Frequency Range	Dc to 5 MHz.
Maximum Input Voltage	30 V (dc + peak ac) 30 V p-p at 1 kHz or less.
Input Impedance	Approximately 10 k Ω .
Power Source	(T922R 120 V—240 V Range and HI-LO adjustments are not externally accessible).
Line Voltage Ranges (ac,rms)	
120 V Range	HI—108 to 132 V. LO—90 to 110 V.
240 V Range	HI—216 to 250 V. LO—198 to 242 V.

Characteristic	Performance Requirement
Line Frequency	50 to 60 Hz.
Maximum Power Consumption	36 W, 0.35 A at 60 Hz, 120 V line.
CRT Display	
Display Area	8 x 10 cm.
Trace Rotation Range	Adequate to align trace with horizontal center line.
Standard Phosphor	P31.
Nominal Accelerating Potential	12,400 V.

B. VERTICAL AMPLIFIER

Deflection Factor	
Range	2 mV/div to 10 V/div; 12 steps in a 1-2-5 sequence.
Accuracy	
+20°C to +30°C	Within 3%.
0°C to +45°C	Within 4%.
Uncalibrated (VAR) Range	Continuously variable between settings. Extends deflection factor to at least 25 V/div (at least 2.5:1).

TABLE 1-1 (cont)

Characteristic	Performance Requirement
B. VERTICAL AMPLIFIER (cont)	
Frequency Response	
Bandwidth	Dc to at least 15 MHz (5 division reference signal centered vertically from a 25 Ω source with VOLTS/DIV VAR control in calibrated detent).
Risetime	23 ns or less.
Chopped Mode Repetition Rate (T922)	Approximately 250 kHz.
Input Resistance	Approximately 1 MΩ.
Input Capacitance (T921 and T922)	Approximately 30 pF.
Input Capacitance (T922R)	
CH 1 and CH 2, (front only)	Approximately 40 pF.
Maximum Input Voltage	
DC Coupled	400 V (dc + peak ac). 800 V (p-p ac) at 1 kHz or less.
AC Coupled	400 V (dc + peak ac). 800 V (p-p ac) at 1 kHz or less.
Vertical Output (T922R)	
Amplitude	
High Impedance Load	At least 0.5V/div of display.
50 Ω Load	Approximately 50 mV/div of display.
Bandwidth	Approximately 1 MHz.

Characteristic	Performance Requirement
C. TIME BASE	
Sweep Rate	
Calibrated Range	0.5 s/div to 0.2 μs/div; 20 steps in a 1-2-5 sequence. Variable X1 to X10 magnifier extends maximum sweep rate to 20 ns/div.
Accuracy	Accuracy specification applies over center 8 divisions. Exclude first 50 ns of sweep for both magnified and unmagnified sweep rates and anything beyond the 100th magnified division.
+20°C to +30°C	
Unmagnified	Within 3%.
Magnified	Within 5%.
0°C to +45°C	
Unmagnified	Within 4%.
Magnified	Within 6%.
Variable Magnifier	10:1.
X-Y Operation	
Deflection Factor	
Variable Magnifier	
X10	Approximately 100 mV/div.
X1	Approximately 1 V/div.
X-Axis Bandwidth	
T921 & T922	DC to at least 1 MHz with 10 div reference signal.
T922R	DC to at least 1 MHz with 5 div reference signal.
Input Resistance	Approximately 1 MΩ.
Input Capacitance	
T921&T922	Approxiamtely 30 pF.
T922R	Approximately 40 pF (front input only).
Phase Difference Between X- and Y-Axis Amplifiers	5° or less from dc to 50 kHz.

TABLE 1-1 (cont)

Characteristic	Performance Requirement
C. TIME BASE (cont)	
Triggering	
Sensitivity	0.5 div internal or 100 mV external from 2 Hz to 1 MHz, increasing to 1.5 div internal or 150 mV external at 15 MHz.
TV Sync	Composite sync 1 div internal or 100 mV external (approximately 2.3 div or 230 mV of composite video).
External Trigger Input	
Maximum Input Voltage	400 V (dc + peak ac). 800 V (p-p ac) (1 kHz or less).
Input Resistance	Approximately 1 MΩ.
Input Capacitance (T921 and T922)	Approximately 30 pF.
Input Capacitance (T922R, front only)	Approximately 40 pF.
Level Range	
EXT	+0.5 V to -0.5 V.
<u>EXT</u> 10	+5 V to - 5 V.

TABLE 1-2
Environmental

Characteristic	Performance Requirement
Temperature	
Storage	-55°C to +75°C.
Operating	
T921 & T922	0°C to +45°C.
T922R	0°C to +50°C.

TABLE 1-2 (cont)

Characteristic	Performance Requirement
Altitude	
Storage	To 50,000 ft.
Operating	To 15,000 ft. Maximum operating temperature decreases 1°C/1,000 ft. above 5,000 ft.

TABLE 1-3
Physical

Characteristic	Performance Requirement
Weight	
T921 and T922	
With Panel Cover, Accessories and Accessory Pouch	15.5 lbs (7.0 kg).
Without Panel Cover, Accessories and Accessory Pouch	15.0 lbs. (6.8 kg).
T922R	
Without Accessories	19.0 lbs (8.6 kg).
Domestic Shipping Wt	33.0 lbs (15.0 kg).
Overall Dimensions (T921 and T922)	Refer to Fig. 1-3.
Overall Dimensions (T922R)	Refer to Fig. 1-2.

Specifications—T921/T922/T922R

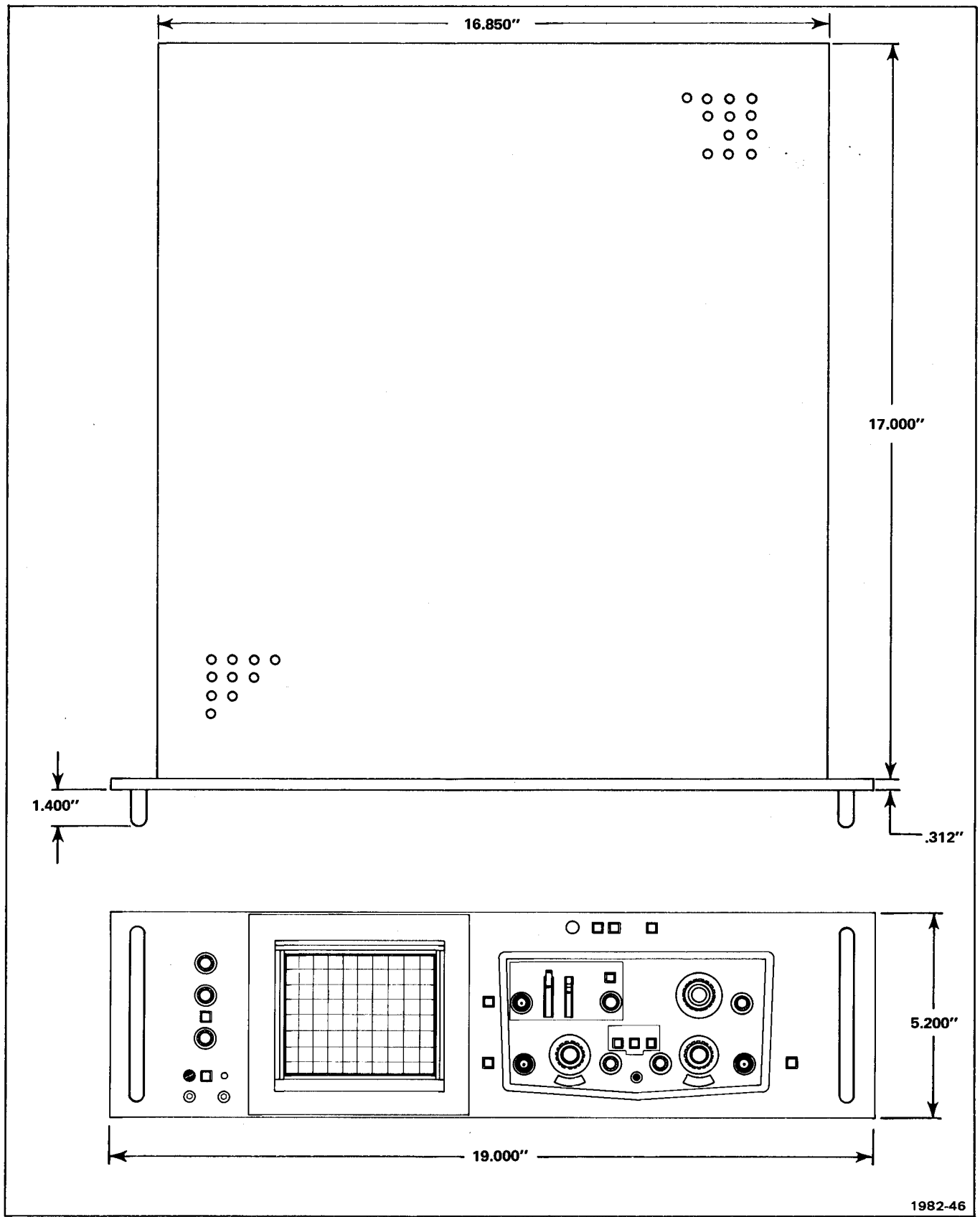


Fig. 1-2. T922R dimensional drawing.

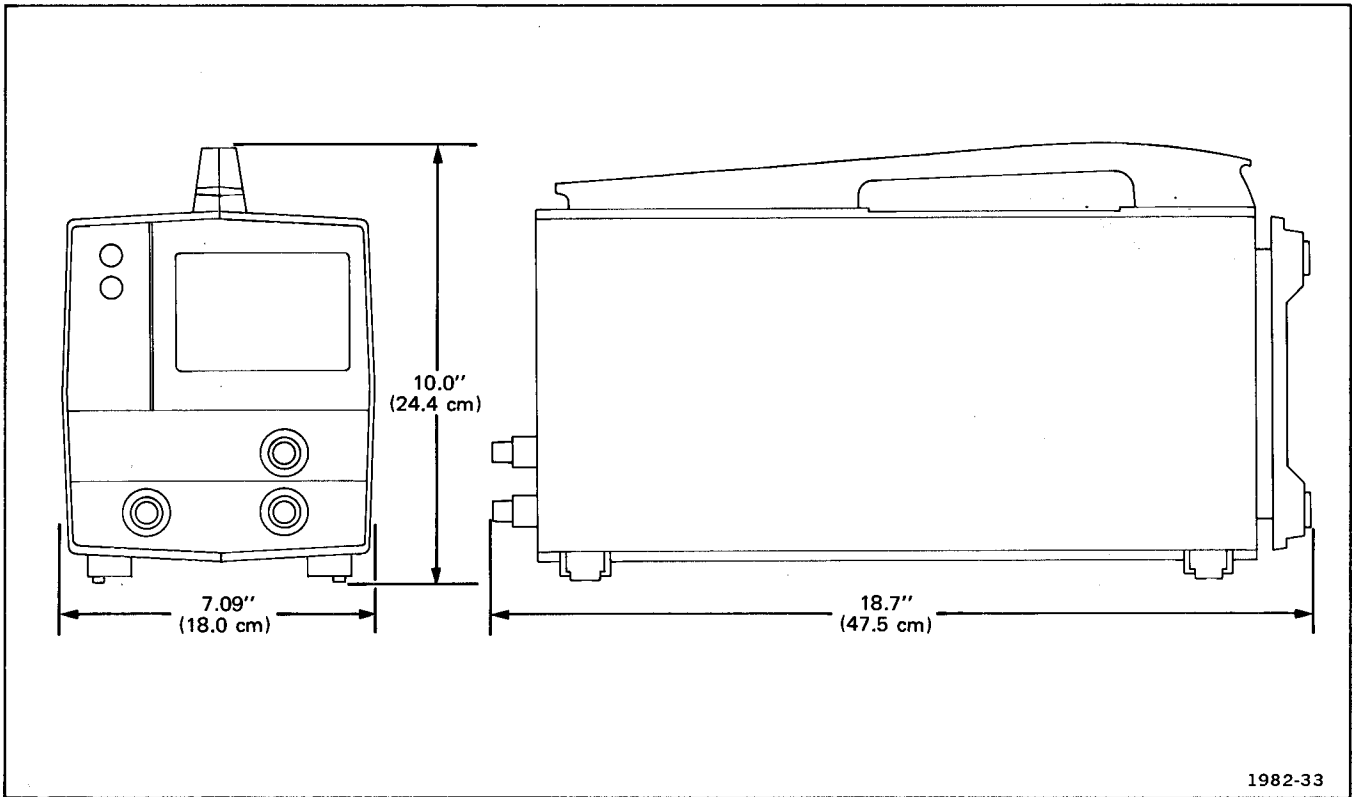


Fig. 1-3. T921/T922 dimensional drawing.

STANDARD ACCESSORIES

1	Instruction Manual	070-1982-01
1	Probe (T921)	010-0160-00
2	Probes (T922)	010-0160-00