

# SPECIFICATIONS

## INTRODUCTION

The Tektronix 7633 Storage Oscilloscope is a solid-state, high-performance instrument designed for fast writing rate storage applications. This instrument accepts Tektronix 7-series plug-in units to form a complete measurement system. The flexibility of this plug-in feature and the variety of plug-in units available allow the system to be used for many measurement applications.

This instrument will meet the electrical characteristics listed in the Performance Requirement column of Table 2-1 following complete calibration as given in the Service manual. The following characteristics apply over an ambient temperature range of 0°C to +50°C, except as otherwise indicated. Warmup time for given accuracy is 30 minutes.

### NOTE

*Many of the measurement capabilities of this instrument are determined by the choice of plug-in units. The following characteristics apply to the 7633 Storage Oscilloscope only. See the System Specifications later in this section for characteristics of the complete system.*

**TABLE 2-1  
ELECTRICAL**

Characteristic	Performance Requirement	Supplemental Information
<b>VERTICAL DEFLECTION SYSTEM</b>		
Deflection Factor	Compatible with all 7000-series plug-in units.	
Between Compartments	Within 1%.	
Low Frequency Linearity	0.1 division or less compression or expansion of a 2-division (at center-screen) signal when positioned vertically within the graticule area.	
Bandwidth	See System Specifications for 7600-series instruments.	
Step Response Risetime	See System Specifications for 7600-series instruments.	
Isolation Between Vertical Compartments	At least 100:1 from DC to 100 MHz.	

TABLE 2-1 (cont.)

ELECTRICAL

Characteristic	Performance Requirement	Supplemental Information
Delay Line		Permits viewing leading edge of trigger signal.
Chopped Mode		
Repetition Rate	1 MHz within 20%.	
Time Segment From Each Compartment	0.4 to 0.6 $\mu$ s.	
Difference in Delay Between Vertical Compartments		0.5 ns or less.
Vertical Display Modes	LEFT: Left vertical unit only.	Selected by VERT MODE switch.
	ALT: Dual trace, alternate between vertical units.	
	ADD: Added algebraically.	
	CHOP: Dual trace, chopped between vertical units.	
	RIGHT: Right vertical unit only.	

TRIGGERING

Trigger Source	LEFT VERT: From left vertical only.	Selected by TRIGGER SOURCE switch.
	VERT MODE: Determined by vertical mode switch.	
	RIGHT VERT: From right vertical only.	

HORIZONTAL DEFLECTION SYSTEM

Fastest Calibrated Sweep Rate	5 ns/division.	
Deflection Factor	Compatible with all 7000-series plug-in units.	

TABLE 2-1 (cont.)  
ELECTRICAL

Characteristic	Performance Requirement	Supplemental Information
Low Frequency Linearity	0.1 division or less compression or expansion of a 2-division (at center-screen) signal when positioned horizontally within the graticule area.	
Phase Shift Between The Vertical and Horizontal Amplifiers	Less than 2° from dc to 35 kHz.	
Frequency Response Bandwidth (8-Division Reference)	At least 2 MHz.	

CALIBRATOR

Wave shape	Positive-going square wave or dc (dc voltage selected by internal jumper).	
Voltage Outputs	40 mV, 0.4 V, and 4 V.	Into 1 M $\Omega$ load.
Voltage Output Accuracy +15°C to +35°C	Within 1%.	
0°C to +50°C	Within 2%.	
Current Output	40 mA.	
Current Output Accuracy +15°C to +35°C	Within 2%.	Within optional current loop accessory (012-0259-00) connected between 4 V pin jack and ground pin jack.
0°C to +50°C	Within 3%.	
Repetition Rate		Approximately 1 kHz.
Output Resistance 50 mV and 0.4 V		Approximately 50 $\Omega$ .
4 V		Approximately 450 $\Omega$ .

TABLE 2-1 (cont.)  
ELECTRICAL

Characteristic	Performance Requirement	Supplemental Information
<b>OUTPUTS</b>		
Camera Power (P1041 at crt bezel)		
Pin 1 — +15 V		
Pin 3 — single sweep reset		
Pin 5 — ground		
<b>EXTERNAL Z AXIS INPUT</b>		
Sensitivity (Full Intensity Range)	2 V peak to peak.	
Useful Input Voltage Versus Frequency	2 V peak to peak, dc to 2 MHz; reducing to 0.4 V peak to peak at 10 MHz.	
Polarity of Operation	Positive-going signal decreases intensity.	
Maximum Input Voltage		10 V (dc to peak ac).
Input Resistance		Approximately 500 $\Omega$ .
<b>CHARACTER GENERATOR</b>		
Character Size	Adjustable (Vertically Only).	
Modes of Operation	Free-run independent of sweep.	Selected by internal Readout mode switch.
	Triggered after sweep.	
<b>POWER SOURCE</b>		
Line Voltage Ranges 110 V nominal	100 V $\pm$ 10%.	
	110 V $\pm$ 10%.	
	120 V $\pm$ 10%.	

TABLE 2-1 (cont.)  
ELECTRICAL

Characteristic	Performance Requirement	Supplemental Information
Line Voltage Ranges 220 V nominal	200 V $\pm$ 10%.	
	220 V $\pm$ 10%.	
	240 V $\pm$ 10%.	
Line Frequency		50 to 60 Hz.
Maximum Power Consumption (115 Vac ; 60 Hz)		7633: 170 W, 1.9 A. R7633: 180 W, 2 A.
Fuse Data		
110 V line (F1000)		3.2 A slow blow.
220 V line (F1000)		1.6 A slow blow.
+130 V Supply (F855)		0.15 A fast blow.
+15 V unregulated		2.0 A fast blow.

DISPLAY (CRT)

Cathode-Ray Tube Type	T7411.	
Graticule		
Type	Internal and illuminated.	
Area	8 x 10 divisions	
Reduced Scan	8 x 10 divisions in center of faceplate	
Division	0.9 centimeter Full Scan 0.45 centimeter Reduced Scan	
Phosphor	P31	
Accelerating Potential	Approximately 8.5 kV (approximately 10 kV in Reduced Scan).	
BEAMFINDER	Limits display to within graticule area when BEAMFINDER switch is actuated.	

TABLE 2-1 (cont.)  
ELECTRICAL

Characteristic	Performance Requirement	Supplemental Information
Stored Writing Speed		
Full Scan (center 6 x 8 divisions)		
FAST VAR PERSIST	150 div/ $\mu$ s	
FAST BISTABLE	50 div/ $\mu$ s	
VAR PERSIST	0.5 div/ $\mu$ s	
BISTABLE	0.03 div/ $\mu$ s	
Reduced Scan		
FAST VAR PERSIST	2222 div/ $\mu$ s	
FAST BISTABLE	400 div/ $\mu$ s	
VAR PERSIST	3 div/ $\mu$ s	
BISTABLE	0.2 div/ $\mu$ s	

SIGNALS OUT

VERT SIG OUT	See Systems Specifications for 7600-series instruments.	
Vertical Signals	LEFT, RIGHT, ALT and ADD	Selected by TRIG SOURCE switch.
Gain		
Into 50 $\Omega$		25 mV/division $\pm$ 20% system crt to VERT SIG OUT.
Into 1 M $\Omega$		0.5 V/division $\pm$ 20% system crt to VERT SIG OUT.
Risetime (Into 50 $\Omega$ )		5 ns or less.
Centering		$\pm$ 3 division system crt to VERT SIG OUT. (1.5 V into 1 M $\Omega$ or 75 mV into 50 $\Omega$ .)
Output Resistance		950 $\Omega$ within 2%.

TABLE 2-1 (cont.)  
ELECTRICAL

Characteristic	Performance Requirement	Supplemental Information
<b>+GATE OUT</b>		
Gate Signals	MAIN, AUXILIARY, and DELAY.	Selected by Gate Selector switch.
Output		
Into 50 $\Omega$		0.5 V within 10%.
Into 1 M $\Omega$		10 V within 10%.
Risetime (Into 50 $\Omega$ )		20 ns or less.
Output Resistance		950 $\Omega$ within 2%.
<b>+SAWTOOTH OUT</b>		
Output		
Into 50 $\Omega$		50 mV/unit time <sup>1</sup> within 15%.
Into 1 M $\Omega$		1 V/unit time <sup>1</sup> within 10%.
Output Resistance		950 $\Omega$ within 2%.

**ELECTRO-MAGNETIC INTERFERENCE**

Electro-magnetic interference(emi) in accordance with MIL-STD-461A as tested in MIL-STD-462 (when equipped with Option 3)	Any unused plug-in compartments must be covered with a blank plug-in panel (emi shielded) in order to meet emi specifications. See Options section for additional information.	
Radiated interference	Interference radiated from the instrument under test within the given limits from 150 kilohertz to 1000 megahertz.	
Conducted interference	Interference conducted out of the instrument under test through the power cord within the given limits from 150 kilohertz to 25 megahertz.	
Transportation (packaged instrument, without plug-ins)	Qualifies under National Safe Transit Committee test procedure 1A, Category II.	

<sup>1</sup> Referenced to Time/Div setting.

**TABLE 2-2  
ENVIRONMENTAL**

Characteristic	Information
<i>NOTE</i>	
<i>This instrument will meet the electrical characteristics given in the Performance Requirement column of the Specifications over the following environmental limits.</i>	
Temperature Range	
Operating	0° C to +50° C.
Non-Operating	-55° C to +75° C.
Altitude	
Operating	15,000 ft.
Non-Operating	Test limit 50,000 ft.

Transportation (packaged instrument, without plug-in units) qualifies under National Safe Transit test procedure 1A, Category II.

**TABLE 2-3  
PHYSICAL**

Characteristic	Information
Ventilation	Safe operating temperature maintained by forced cooling. Automatic resetting thermal cutout protects instrument from overheating.
Finish	Anodized aluminum front panel. Painted cabinet.
7633 Overall Dimensions (measured at maximum point)	
Height	12.0 in (30.4 cm).
Width	8.7 in (23.0 cm).
Length	23.7 in (50.2 cm).
Net Weight (instrument only)	30 lb (13.6 kg).

TABLE 2-3 (cont.)  
PHYSICAL

Characteristic	Information
R7633 Overall Dimensions (measured at maximum points)	
Height	5.25 in (13.4 cm).
Width	19 in (48.3 cm).
Length	23 in (57.96 cm).
Net Weight (instrument only)	30 lb (13.6 kg).

#### STANDARD ACCESSORIES

Standard accessories supplied with the 7633 are given in the Mechanical Parts List, in the Service manual. For optional accessories available for use with this instrument, see the Tektronix, Inc., catalog.

TABLE 2-4  
7633 SYSTEM SPECIFICATIONS

Amplifier Plug-In Unit	Probe	Bandwidth	Risetime (Calculated)	Accuracy *			SIG OUT	
				EXT CAL	INT CAL	BW	T <sub>r</sub>	
				0.25% Acc	15 to 35° C			0 to 50° C
7A11	Integral	100 MHz	3.5 ns	2%	3%	4%	60 MHz	5.9 ns
7A12	None P6053B	80 MHz	4.4 ns	2%	3%	4%	55 MHz	6.4 ns
		80 MHz	4.4 ns	3%	4%	5%	55 MHz	6.4 ns
7A13	None or P6053B or P6055	75 MHz	4.7 ns	1.5%	2.5%	3.5%	55 MHz	6.4 ns
		55 MHz	6.4 ns	1.5%	2.5%	3.5%	45 MHz	7.8 ns
7A14	P6021 P6022	50 MHz	7.0 ns	2%	3%	4%	40 MHz	8.8 ns
		80 MHz	4.7 ns	2%	3%	4%	50 MHz	7.0 ns
7A15A	None P6065A	65 MHz	5.4 ns	2%	4%	5%	50 MHz	7.0 ns
		60 MHz	5.4 ns	3%	4%	5%	50 MHz	7.0 ns
7A16A	None P6053B	100 MHz	3.5 ns	2%	3%	4%	60 MHz	5.9 ns
		100 MHz	3.5 ns	3%	4%	5%	60 MHz	5.9 ns
7A17	None	100 MHz	3.5 ns				15 MHz	24 ns
7A18	None P6065A	75 MHz	4.7 ns	2%	3%	4%	50 MHz	7.0 ns
		70 MHz	4.7 ns	3%	4%	5%	50 MHz	7.0 ns
7A19	None P6056/ P6057	100 MHz	3.5 ns	3%	4%	5%	65 MHz	5.4 ns
		100 MHz	3.5 ns	4%	5%	6%	65 MHz	5.4 ns
7A22	None or P6055/ P6060	1.0 MHz, ±10%	350 ns, ±9%	2%	3%	4%	1.0 MHz, ±10%	350 ns ±9%
7A24	None P6056/ P6057	100 MHz	3.5 ns				60 MHz	5.9 ns
		100 MHz	3.5 ns				60 MHz	5.9 ns
7A26	None P6053B	100 MHz	3.5 ns	2%	3%	4%	60 MHz	5.9 ns
		100 MHz	3.5 ns	3%	4%	5%	60 MHz	5.9 ns

\*Deflection Factor Accuracy. Plug-in gain set at a temperature within 10°C of the operating temperature.

Bandwidth checked from 0°C to +50°C.

The bandwidth of a vertical plug-in used in the horizontal compartment is 2 MHz except for the 7A22 which has a bandwidth of 850 kHz. The X-Y phase shift between 2 similar units is 2° at 35 kHz.