SPECIFICATION

The following electrical characteristics (Table 8) are valid only if the instrument has been calibrated at an ambient temperature between +20°C and +30°C, the instrument is operating at an ambient temperature between −15°C and +55°C (unless otherwise notes), and the instrument has had a warmup period of about 20 minutes.

Environmental characteistics are given in Table 9. The 468 meets the requirements of MIL-T-28800B, Class 3, Style D equipment. Physical characteristics are listed in Table 10, and option electrical characteristics are presented in Table 11.

Table 8
ELECTRICAL CHARACTERISTICS

Characteristics	Performance Requirements	Supplemental Information
VERTICAL SYSTEM		
Deflection Factor (Nonstorage Mode)		
Range		5 mV per division to 5 V per division in a 1-2-5 sequence of 10 steps.
DC Accuracy	Graticule indication is within 3% of true input voltage up to ±12 divisions, referenced to instrument ground, for all calibrated VOLTS/DIV switch settings.	Gain set with VOLTS/DIV switch set to 5 mV per division.

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
VERTICAL SYSTEM (cont)		
Deflection Factor (cont) Uncalibrated (VAR) Range (Nonstorage Mode)	Continuously variable between settings of VOLTS/DIV switch. Extends deflection factor to at least 12.5 V per division.	
Low-Frequency Linearity		0.1 division or less compression or expansion of a 2-division signal at center screen with waveform positioned to upper and lower extremes of graticule area.
Frequency Response		5-division reference signal from a 25 Ω source; centered vertically, with VAR VOLTS/DIV control in calibrated detent.
Bandwidth (Channel 1 and Channel 2 Nonstorage Mode)		
−15°C to +40°C	Dc to at least 100 MHz.	
+40°C to +55°C	Dc to at least 85 MHz.[a]	

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
VERTICAL SYSTEM (cont)		
Frequency Response (cont) AC Coupled Lower −3 dB Point		
1X Probe	10 Hz or less.	
10X Probe	1 Hz or less.	
Step Response (Non-Storage Mode)		5-division reference signal, dc coupled at all deflection factors, from a 25 Ω source; vertically centered with VAR VOLTS/DIV control in calibrated detent.
Risetime		
0°C to +40°C	3.5 ns or less (calculated).[a]	Rise Time = $\frac{0.35}{\text{BW (in MHz)}}$
Positive-Going Step (Excluding ADD Mode)		
Aberrations		
0°C to +40°C		+4%, −4%, 4% p-p or less. +6%, −6%, 6% p-p or less (5 V setting only).

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
VERTICAL SYSTEM (cont)		
Step Response (cont) Position Effect 0°C to +40°C		Total aberrations less than +6%, −6%, 6% p-p; checked at 5 mV per division.
Negative-Going Step		Add 2% to all positive-going specifications; checked at 5 mV per division.
ADD Mode Operation		Add 5% to all aberration specifications; checked at 5 mV per division.
Common Mode Rejection Ratio (ADD Mode With Channel 2 Inverted)		At least 10:1 at 20 MHz for common mode signals of 6 divisions or less with GAIN adjusted for best CMRR at 50 kHz. (10:1 at 10 MHz for storage mode.)
Trace Shift as VAR VOLTS/DIV Control Is Rotated		1 division or less. Digital Storage scale-factor LED will indicate voltage measurements are in divisions in a storage mode with the VAR control out of calibrated detent.

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
VERTICAL SYSTEM (cont)		
INVERT Trace Shift		Less than 2 divisions when switching from non-inverted to inverted.
Input Gate Current		
+20°C to +30°C		0.5 nA or less (0.1 division or less trace shift when switching input coupling between dc and GND with VOLTS/DIV switch set to 5 mV per division).
−15°C to +55°C		4 nA or less (0.8 division or less trace shift when switching input coupling between dc and GND with VOLTS/DIV switch set to 5 mV per division).
Channel Isolation		At least 100:1 at 25 MHz (10 MHz in storage).
Vertical POSITION Range		At least +12 and −12 divisions from graticule center.
Chopped Mode Repetition Rate (Nonstorage Mode)	Approximately 500 kHz.	Within 20%

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
VERTICAL SYSTEM (cont)		
Input R and C		
Resistance	1 MΩ, within 2%.[a]	
Capacitance	Approximately 20 pF.[a]	Within 3%.
R and C Product (+20°C to +30°C)		Aberrations 2% or less using a P6105 probe.
Maximum Input Voltage DC Coupled	250 V (dc + peak ac).[a] 500 V (p-p ac at 1 kHz or less).[a]	
AC Coupled	250 V (dc + peak ac).[a] 500 V (p-p ac at 1 kHz or less).[a]	
Cascaded Operation		CH 1 VERT OUT SIGNAL OUT coupled into CH 2 input; ac coupled, using 50 Ω, 42-inch RG-58 C/U cable, terminated in 50 Ω at the CH 2 input connector.
Bandwidth (Nonstorage)	Dc to at least 50 MHz.	
Cascaded Sensitivity	At least 1 mV per division; terminated in 50 Ω at the CH 2 input connector.	

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
DIGITAL STORAGE VERTICAL ACQUISITION		
Resolution		8 bits, 25 levels per division. 10.24 divisions dynamic range.
DC Accuracy	Scaled binary value of stored digital word is within 3% of true input voltage up to ±12 divisions, referenced to instrument ground, for all calibrated VOLTS/DIV switch settings.	Gain set with VOLTS/DIV set to 5 mV per division.
Range		0.5 mV to 5 V per division in a 1-2-5 sequence of 13 steps.
Digital Sample Rate		10 Hz to 25 MHz as determined by the TIME/DIV switch setting.
Digital Chop Rate		5 Hz to 12.5 MHz (1/2 of the non-chopped sample rate at all TIME/DIV switch settings).
Analog Step Response	3% or less acquired overshoot on a 5-division pulse with Display Response set to PULSE.	Checked on a saved waveform display using horizontal expaneion (X10 MAG off).

Table 8 (cont)

Characteristics	Performance Requirements		Supplemental Information
DIGITAL STORAGE VERTICAL ACQUISITION (cont)			
Analog Bandwidth	Dc to 10 MHz, with ±1 dB, measured in ENVELOPE Storage Mode with the TIME/DIV switch set to 1 ms.		At exactly 10 MHz input signal frequency, it is possible for aliasing to occur and produce an envelope with variable amplitude. If aliasing occurs, shift the test frequency slightly to obtain an envelope with flat amplitude.
Useful Storage Bandwidth			
NORM Storage Mode	**Single Trace or Alt**	**CHOP**	
SINE Display Response	Dc to 10 MHz, with +1, −3 dB, measured p-p over any single cycle, with TIME/DIV switch set to 0.2 μs (X10 MAG off).	Dc to 5 MHz, within +0.5, −1.5 db, measured p-p over any single cycle, with TIME/DIV switch set to 0.2 μs (X10 MAG off).	For SINE Display Response, useful storage bandwidth is limited to that frequency where there are 2.5 samples per input cycle period at the maximum sampling rate (max sampling rate is 25 MHz in Single Trace or ALT and 12.5 MHz in CHOP). Accuracy at useful storage bandwidth limit is measured with respect to a 6 division, 50 kHz reference sine wave.

Table 8 (cont)

Characteristics	Performance Requirements		Supplemental Information
DIGITAL STORAGE VERTICAL ACQUISITION (cont)			
Useful Storage Bandwidth (cont) PULSE Display Response	Dc to 3.5 MHz, within +0.5, −1.5 dB, measured p-p over any single cycle, with TIME/DIV switch set to 0.2 μs (X10 MAG off).	Dc to 1.75 MHz, within +0.5, −1.5 dB, measured p-p over any single cycle, with TIME/DIV switch set to 0.2 μs (X10 MAG off).	For PULSE Display Response, useful storage bandwidth is limited to that frequency where there are 7 samples per input cycle period at the maximum sampling rate (max sampling rate is 25 MHz in Single Trace or ALT and 12.5 MHz in CHOP). Accuracy at useful storage bandwidth limit is measured with respect to a 6-division, 50 kHz reference sine wave.
Useful Storage Rise Time NORM Storage Mode PULSE Display Response	64 ns.	128 ns.	Useful storage rise time is defined as 1.6 times the minimum sampling interval (40 ns in Single Trace or ALT and 80 ns in CHOP).

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
TRIGGERING		
Sensitivity		In EXT/10, multiply requirements by 10.
AC Coupled Signal	0.3 division internal or 50 mV external from 30 Hz to 10 MHz; increasing to 1.5 divisions internal or 150 mV external up to 100 MHz.	
LF REF Coupled Signal	0.5 division internal or 100 mV external from 50 kHz to 10 MHz; increasing to 1.5 divisions internal or 300 mV external up to 100 MHz.	Attenuates signals below approximately 50 kHz.
HF REJ Coupled Signal	0.5 division internal or 100 mV external from 30 Hz to 50 kHz.	Attenuates signals above approximately 50 kHz.
DC Coupled signal	0.3 division internal or 50 mV external from dc to 10 MHz; increasing to 1.5 divisions internal or 150 mV external up to 100 MHz.	

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
	TRIGGERING (cont)	
Trigger Jitter		
Nonstorage Mode	0.5 ns or less at 100 MHz at 2 ns per division (X10 MAG on).	
Storage Mode	±1 sample period for data transmitted on the GPIB. See Jitter Correction Performance Requirement.[a]	Inherent ±1 sample jitter between sample clock and asychronous trigger is partially compensated for by the jitter correction circuitry.
External Trigger Inputs		
Maximum Input Voltage	250 V (dc + peak ac).[a] 250 V (p-p ac at 1 kHz or less).[a]	
Input Resistance	1 MΩ within 10%.[a]	
Input Capacitance		Approximately 20 pF, within 30%.
LEVEL Control Range		
EXT	At least + and −2 V, 4 V p-p.	
EXT/10	At least + and −20 V, 40 V p-p.	

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
TRIGGERING (cont)		
A External Trigger View (Nonstorage Mode Only)		
Deflection Factor		Dc trigger coupling only; checked with a 1 kHz signal.
EXT	100 mV per division +5%.	
EXT/10	1 V per division ±5%.	
Rise Time	5 ns or less.[a]	BW Limit at full (button out).
Delay Difference	≤ ±0.20 division (≤ ±300 ps at 2 ns per division).	5-division signal with 5 ns rise time or less from a 25 Ω source; centered vertically with equal 50 Ω cable length from signal source to vertical channel and external trigger input connectors; terminated in 50 Ω at each input.
Centering of Triggering Point		Within 1 division of center screen.
Flatness and Aberrations		+10%, −10%, 10% p-p.

Table 8 (cont)

Characteristics	Performance Requirements		Supplemental Information
HORIZONTAL DEFLECTION SYSTEM			
Sweep Rate (Nonstorage Mode)			
Calibrated Range			
A Sweep			0.5 s per division to 0.02 μs per division in 23 steps in a 1-2-5 sequence. X10 MAG extends maximum sweep rate to 2 ns per division.
B Sweep			50 ms per division to 0.02 μs per division in 20 steps in a 1-2-5 sequence. X10 MAG extends maximum sweep rate to 2 ns per division.
Accuracy	Within the given percentages of the indicated value.		Accuracy specification applies over the full 10 div of the unmagnified sweep.
	Unmagnified	**Magnified**	In X10 MAG, at TIME/DIV switch setting of .02 μs, .1 μs, and .2 μs, exclude the first and last 50 ns of the sweep; and at a TIME/DIV switch setting of .5 μs, exclude the first 100 ns of the sweep.
+20°C to +30°C	Within 2%	Within 3%	
−15°C to +55°C	Within 3%[a]	Within 4%[a]	

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
HORIZONTAL DEFLECTION SYSTEM (cont)		
Sweep Rate (cont) Two-Division Linearity Check		±5% over any two-division portion (or less) of the full 10 divisions. When in X10 MAG exclude first and last magnified divisions when checking 2 ns, 5 ns, and 10 ns per division rates.
Alternate Sweep Trace Separation (Nonstorage Mode Only)		≥ ±4 divisions.
Variable Range (A Only) (Nonstorage Mode)	Continuously variable between calibrated settings of the A TIME/DIV switch. Extends slowest A sweep rate to at least 1.25 s per division.	At least 2.5:1.
A Sweep Length (Nonstorage Mode)		10.5 to 11.5 divisions.
A Trigger HOLDOFF (Variable)		Increases A sweep holdoff time by at least a factor of 10 (Nonstorage Mode). Storage holdoff time is a function of microprocessor operation.
Magnifier Registration		Within 0.2 division from graticule center (X10 MAG on to X10 MAG off).

Table 8 (cont)

Characteristics	Performance Requirements		Supplemental Information
HORIZONTAL DEFLECTION SYSTEM (cont)			
POSITION Range (Horizontal)			Start of sweep must position to right of graticule center. End of sweep must position to left of graticule center.
Differential Time Measurement Accuracy (Nonstorage Mode)	**Measurements of 1 or more major dial divisions**	**Measurements of less than 1 major dial division**	With the A TIME/DIV switch at 0.5 μs per division, or 0.2 μs per division, the differential time measurement accuracy limit is valid only for DELAY TIME POSITION dial settings between 1.50 and 8.50.
+15°C to +35°C	With 1% of indicated value.	±0.01 major dial division.	
−15°C to +55°C	Within 2.5% of indicated value.[a]	±0.03 major dial division.[a]	

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
HORIZONTAL DEFLECTION SYSTEM (cont)		
Delay Time Jitter (Nonstorage Mode)	One part or less in 50,000 (0.002% of 10 times the A TIME/DIV switch setting) when operating on an ac-power-source frequency above 50 Hz. One part of less in 20,000 (0.005% of A TIME/DIV switch setting) when operating on a 50 Hz or lower ac-power source frequency.[a]	
Calibrated Delay Time (VAR Control in Calibrated Detent)	Continuous from 0.2 μs to at least 5 s after the delaying (A) sweep.	
X-Y Operation (Nonstorage Mode Only)		
X-Axis Deflection Factor	Same as vertical system, with X10 MAG off.	
Variable Range	Same as vertical system.	
X-Axis Bandwidth	Dc to at least 4 MHz.	10 division reference signal.

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
HORIZONTAL DEFLECTION SYSTEM (cont)		
X-Y Operation (cont)		
Input Resistance	Same as vertical system.[a]	
Input Capacitance	Same as vertical system.[a]	
Maximum Usable Input Voltage	Same as vertical system.[a]	
Phase Difference Between X and Y Amplifiers		Within 3° from dc to 50 kHz.
Deflection Accuracy	Graticule indication is within 4% of true input voltage.	

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
DIGITAL STORAGE HORIZONTAL ACQUISITION		
Horizontal Resolution		
Single Waveform Acquisition		9 bit. 512 data points (50 data points per division across the graticule area).
Chopped Acquisition (NORM Storage Mode Only)		8 bit. 256 data points per division (25 data points per division across the graticule area).
Range		5 s per division to 20 ns per division in a 1-2-5 sequence. At TIME/DIV switch settings of 5 s to 2 μs, waveform sampling rate is determined by the switch setting. From 1 μs to 0.02 μs per division, sampling rate is at the 2 μs per division rate. Interpolation and analog gain are used to expand the signal to the correct horizontal scale.

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
DIGITAL STORAGE HORIZONTAL ACQUISITION (cont)		
Accuracy (Sample Period)		Sample clock is within 0.01% of selected sample period, ±50 ps ADC aperture uncertainity. Crystal oscillator: 0°C to +70°C V_{cc} = +5 V ±0.5 V.
Dynamic Range	10.24 divisions.	
STORAGE DISPLAY		
Vertical		
Resolution		1 part in 1024 (10 bit). Calibrated for 100 points per division.
Differential Accuracy	Graticule indication of voltage cursor difference is within 2% of LED readout value, measured over center six divisions.	

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
STORAGE DISPLAY (cont)		
Vertical (cont) POSITION Range		Any portion of a stored waveform vertically magnified X10 can be positioned to the top and to the bottom of the graticule area.
Position Registration NON STORE to NORM		Within ±0.5 division at graticule center at VOLTS/DIV settings from 5 mV to 5 V per division.
NORM, ENVELOPE, or AVG to SAVE		Within ±0.2 divisions at VOLTS/DIV settings from 5 mV to 5 V per division.
SAVE Mode Gain Range (Vertical)		Up to X10 as determined by the setting of the VOLTS/DIV switch.
ENVELOPE Fill		90% or more of a six division ENVELOPE display.

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
	STORAGE DISPLAY (cont)	
Vertical (cont) Rise Time		≤0.3 horizontal graticule division for a five-division step, with horizontal X10 MAG on. Checked with no samples on the rising edge of the waveform.
Aberrations		+6%, −6%, 6% p-p or less on a five-division step (fast rise) input.
Horizontal Resolution		1 part in 1024 (10 bit). Calibrated for 100 points per division.
Differential Accuracy	Graticule indication of time cursor difference is within 2% of LED readout value, measured over center eight divisions.	
SAVE Mode Gain Range (Horizontal)		Up to X100 as determined by the setting of the TIME/DIV switch.

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
STORAGE DISPLAY (cont)		
Horizontal (cont) Position Registration		Sweep start between NON STORE and Storage within ±0.2 division at TIME/DIV switch setting of 1 ms.
Display Response (Selectable) SINE		Microprocessor performs an interpolation between data points that is optimized to produce the best response for input signals that have no frequency components above Fs/2, when Fs is the sampling rate. For a 6-division, sinusoidal input digitized at 2.5 samples per input cycle and expanded 10X with the TIME/DIV switch, SINE Display Response envelope distortion produces a maximum amplitude error at any peak which is less than 5% of the ideally reconstructed reference p-p amplitude, assuming no distortion in the acquired input signal.

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
STORAGE DISPLAY (cont)		
Display Response (cont) PULSE		Microprocessor performs linear interpolation between data points to optimize the display response for fast-rise and fast-fall waveforms (rise and fall times faster than 3 times the sampling interval). For a 6-division sinusoidal input at seven samples per input cycle period, PULSE Display Response envelope distortion produces a maximum amplitude error at any peak which is less than 5% of the ideally reconstructed reference p-p amplitude.

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
STORAGE DISPLAY (cont)		
Jitter Correction		Reduces effect of sample clock-to-trigger jitter.
Gain		0.4 division, ±10%; X10 MAG on.
Resolution		±0.1 sample period for TIME/DIV switch settings of 20 μs to 5 s per division. ±3 ns for switch settings of 0.02 μs to 10 μs per division. *NOTE* *Due to inherent uncertainty involved in the jitter correction, the resolution will occasionally, at random intervals, exceed the limits given above.*

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
STORAGE DISPLAY (cont)		
Display Type		Four-digit, seven-segment LED indicators.
VOLTS Readout		Displays calculated voltage difference between horizontal cursors in VOLTS measurement mode. Scale factor is determined by VOLTS/DIV switch setting.
Resolution		1 part in 1024 (10 bit).
TIME Readout		Displays calculated time difference between cursor dots in TIME measurement mode. Scale factor determined by setting of the appropriate TIME/DIV switch (A or B).

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
	STORAGE DISPLAY (cont)	
TIME Readout (cont) Resolution		1 part in 1024 (10 bit). *NOTE* *Scale-factor LED indicates measurement is in DIV in the VOLTS measurement mode when vertical UNCAL LED is illuminated, or are used in a dual-channel mode.*
	CRT DISPLAY	
Display Area		8 X 10 cm.
Geometry		0.1 division or less of tilt or bowing.
Trace Rotation Range		Adequate to align trace with horizontal graticule lines. At least ±3°.

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
CRT DISPLAY (cont)		
Standard Phosphor		P31 (green).
Nominal Accelerating Potential		18.5 kV.
Electrode Voltages to Ground		
Heater Voltage Between CRT Pins 1 and 14		6.3 Vrms, ±3 V; elevated to −2450 V.
Cathode (Pin 2)		−2450 V, ±2%.
Grid No. 1 (Pin 3)		≈−2455 V to −2555 V.
Focus (Pin 4)		≈−1780 V to −2000 V.
Astigmatism (Pin 5)		0 V to ≈ +95 V.
Isolation Shield (Pin 7)		+35 V, ±5 V.
First Anode (Pin 8)		≈+55 V.
Geometry (Pin 10)		0 to ≈+95 V.
Mesh (Pin 12)		≈−150 V.

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
CALIBRATOR		
Output voltage		
0°C to +40°C	0.3 V, within 1.0%	Within 0.5% at 25°C, ±5°C.
−15°C to +55°C		0.3 V, within 1.5%.
Repetition Rate	Approximately 1 kHz.	Within 25%.
Output Resistance		Approximately 10.3 Ω.
Output Current		
+20°C to +30°C	30 mA, within 2%.[a]	
−15°C to +55°C		30 mA, within 2.5%.

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
Z-AXIS INPUT		
Sensitivity	5 V p-p signal causes noticeable modulation at normal intensity.	Positive-going signal decreases intensity.
Usable Frequency Range	Dc to 50 MHz.[a]	
Input Resistance		25 kΩ, within 10%. Decreases to approximately 200 Ω at 2 MHz and above.
Maximum Input Voltage		25 V (dc + peak ac).

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
SIGNAL OUTPUTS		
CH 1 VERT SIGNAL OUT		
Output Voltage	At least 50 mV per division of displayed signal into 1 MΩ. At least 25 mV per division of displayed signal into 50 Ω.	
Output Resistance		Approximately 50 Ω.
Bandwidth	Dc to at least 50 MHz into 50 Ω.	
DC Level	Approximately 0 V.	Within 100 mV.
A and B + GATES		
Output Voltage	Approximately 5.5 V, positive-going rectangular pulse.	Starts at 0 V, within 500 mV.
Output Resistance		Approximately 500 Ω.

Table 8 (cont)

Characteristics	Performance Requirements	Supplemental Information
	POWER SOURCE	
AC-Source Voltage Ranges		
115 V		
(High)	108 V to 132 V.[a]	
(Low)	90 V to 110 V.[a]	
230 V		
(High)	216 V to 250 V.[a]	
(Low)	198 V to 242 V.[a]	
AC-Source Frequency	48 Hz to 440 Hz.[a]	
Power Consumption		
Typical	115 watts (140 VA).[a]	
Maximum	150 watts (190 VA).[a]	48 Hz, 110 Vac, low regulating range.

Table 8 (cont)

INTERNAL POWER SUPPLIES

Characteristics	Supplemental Information			
	Initial Setting	Any 500-Hour Period After First 200 Hours	Maximum p-p Ripple	Accuracy From −15°C to 55°C
Main Supply Accuracy (+20°C to +30°C)				
−8 V	±0.9%	±1.7%	2 mV	Within 0.5% of 25°C value
+5 V	±0.9%	±1.7%	2 mV	Within 0.5% of 25°C value
+15 V	±0.9%	±1.7%	2 mV	Within 0.5% of 25°C value
+55 V	±0.3%	±0.7%	4 mV	Within 0.5% of 25°C value
−2450 V	±1.2%	±2.2%		
+110 V	±3%		100 mV	
Digital Storage Power Supplies (Not Adjustable)				
Voltage	−6 V	−12 V	+5 V	+12 v
Tolerance	+4%	±5%	±4%	±5%
Maximum p-p Ripple			150 mV	

[8] **Performance requirement not checked in manual.**

Table 9

ENVIRONMENTAL CHARACTERISTICS

Characteristics	Description
	NOTE *All of the environmental tests performed meet the requirement of MIL-T-28800B, Class 3, Style D equipment.*
Temperature	
Nonoperating (Storage)	−62°C to +85°C.
Operating	−15°C to +55°C.
Altitude	
Nonoperating (Storage)	To 50,000 ft.
Operating	To 15,000 ft.
Humidity (Operating and nonoperating)	5 cycles (120 hrs) referenced to MIL-T-28800B, Par. 3.9.2.2. Class 3, 95% to 97% relative humidity.
Vibration (Operating)	15 minutes along each of 3 major axes at a total displacement of 0.025 inch p-p (4 g's at 55 Hz), with frequency varied from 10 Hz to 55 Hz to 10 Hz in 1-minute sweeps. Hold 10 minutes at each major resonance, or if no major resonance present, hold 10 minutes at 55 Hz.
Shock (Operating and Nonoperating)	30 g's, half-sine, 11 ms duration, 3 shocks per axis in each direction for a total of 18 shocks.
EMI	
Option 04 Only	Meets TEKTRONIX Standard 062-2866-00 with exception of RE02 relaxed 20 dB.

Table 10
PHYSICAL CHARACTERISTICS

Characteristics	Description
Weight	
With Panel cover, Accessories, and Accessory Pouch	33 pounds (15 kg).
Without Panel Cover, Accessories, and Accessory Pouch	30 pounds (13.6 kg).
Domestic Shipping Weight	47 pounds (21.7 kg).
Height	
With Feet and Pouch	7.5 inches (19.1 cm).
Without Pouch	7.2 inches (18.3 cm).
Width	
With Handle	12.9 inches (32.8 cm).
Without Handle	11.5 inches (29.2 cm).
Depth	
Including Panel Cover	21.7 inches (55 cm).
Handle Extended	23.7 inches (60 cm).

Table 11
OPTION ELECTRICAL CHARACTERISTICS

Characteristics	Performance Requirement	Supplemental Information
GENERAL PURPOSE INTERFACE BUS (GPIB) OPTION 02		
Interface Function[a]	SH1 Source Handshake. AH1 Acceptor Handshake. T1 Basic talker, talk only mode, serial poll. LO No Listener. SR1 Service Request. RL0 No Remote/Local. PP0 No Parallel Poll. DC2 Device Clear. DT0 No Device Trigger. C0 No Controller.	
Waveform Data Transmitted	Conforms to Tektronix Interface Standard, GPIB Codes and Formats (Rev. C).[a]	When no waveform has been acquired, only the ID portion of the waveform message will be transmitted.

Table 11 (cont)

Characteristics	Performance Requirements	Supplemental Information
ANALOG X-Y OUTPUT OPTION 11		
X and Y Output		
Sensitivity	200 mV/div	Within ±3%, measured with respect to on-screen cursors.
Range	0 to 2.048 V.	0 to 10.24 div.
Resolution		
Y-Axis		8 bit.
X-Axis		8 or 9 bit.
PEN LIFT		Relay contact closure to ground, polarity switchable. Maximum relay current is 200 mA, fused at 250 mA. Maximum applied voltage is 30 V peak. A 10-kilohm pull-up resistor to the +5-V supply is switchable to provide TTL pen-lift levels.
PLOT SPEED		Switch selectable between fast and slow
Switch Open	Fast plot.	40 ms ±10% per data point.
Switch Closed	Slow plot	320 ms ±10% per data point.

Table 11 (cont)

Characteristics	Performance Requirements	Supplemental Information
SIGNAL AVERAGING OPTION 12		
Averaging		
Range	Two to 256 waveforms in a 2-4-8 binary sequence. Number of sweeps to be averaged set with CURSOR/NO. OF SWEEPS control knob when NO. OF SWEEPS push button (on side panel) is pressed in.	Uncorrelated noise, signal-to-noise ratio is improved by the square root of the number of waveforms averaged.

[a] **Performance requirement not checked in manual.**

ACCESSORIES

STANDARD ACCESSORIES INCLUDED

Basic 468 Accessories

2 Probes, 10X, length 2 m, with accessories	010-6105-03
1 Accessory Pouch	016-0594-00
1 Accessory Pouch, Zipper	016-0537-00
1 Operators Manual	070-2906-01
1 Service Manual, Volume I	070-3515-00
1 Service Manual, Volume II	070-3516-00
2 Fuses, 1.5 A, 3AG slow-blow	159-0160-00
1 Fuse, 0.70 A, 3AG, slow-blow	159-0040-00
1 Crt Filter, Blue Plastic (installed)	337-1674-00
1 Crt Filter, Clear Plastic	337-1674-01
1 Adapter, Ground Wire	134-0016-01

Option 05 Accessories

2 Adapter, probe tip	103-0051-01
1 Graticule, NTSC	337-1674-02
1 Graticule, CCIR	337-1674-03

OPTIONAL ACCESSORIES

C-5C Option 02 low-cost general-purpose Camera–order C-5C Option 02.

Protective Cover, waterproof, blue vinyl–order 016-0365-00.

Polarized Collapsible Viewing Hood–order 016-0180-00.

Folding Viewing Hood, light-shielding–order 016-0592-00.

Collapsible Viewing Hood, binocular–order 016-0566-00.

Mesh Filter–improves contrast and filters emi–order 378-0726-01.

SCOPE-MOBILE Cart–Occupies less than 18 inches of aisle space, with storage area in base–order 200C.

Crt Filter, smoke-gray–order 337-1674-07.

GPIB Option–GPIB I/F cable, single shielded:

2 meter length–order 012-0630-01.
4 meter length–order 012-0630-02.

Optional Power Cords

Standard, 3 meter length–order 161-0104-00.
Option A1, 3 meter length–order 161-0104-06.
Option A2, 3 meter length–order 161-0104-07.
Option A3, 3 meter length–order 161-0104-05.
Option A4, 3 meter length–order 161-0104-08.