


Model 9500 Specifications

Specifications (Total Uncertainties for 1 year, T_{cal} ± 5°C. Frequency specifications valid for 5 year s)


DC Voltage 

Amplitude: ±1mV to ±200V into 1MΩ
±1mV to ±5V into 50Ω

Accuracy: ±(0.025% + 25μV)

Ranging: 1, 2, 5 or 1, 2, 2.5, 4, 5
or continuous

Deviation: ±11.2%

Square wave 

Amplitude: Range: 40μV to 200V pk-pk into 1MΩ
40μV to 5V pk-pk into 50Ω

Polarity: Positive, negative or
symmetrical about ground

Accuracy (10Hz to 10kHz):
<1mV ±(1% + 10μV)
1mV-21mV ±(0.10% + 20μV)
21mV-556mV ±(0.10% + 1μV)
556mV-210V ±(0.05% + 1μV)

Ranging: 1, 2, 5 or 1, 2, 2.5, 4, 5
or continuous


Deviation: ±11.2%

Rise/Fall Time:
<100V <150ns
≥100V <200ns

Aberrations: <2% peak for first 500ns

Frequency:
Range: 10Hz to 100kHz
Accuracy: ±10ppm (±0.25ppm with
Option 100)

Ranging: 1, 2, 5 or 1, 2, 2.5, 4, 5
or continuous

Low-Edge Pulse 

Amplitude: Range: 5mV to 3V pk-pk into 50Ω

Accuracy: ±3%

Ranging: 1, 2, 5 or 1, 2, 2.5, 4, 5
or continuous

Deviation: ±11.2%


Rise/Fall Time: 500ps return to ground

Mark/Space Ratio: 1:9

Aberrations: <2% peak for first 10ns
<0.25% peak 10 ns to 1μs
<0.1% peak beyond 1μs

Frequency:
Range: 10Hz to 2MHz
Accuracy: ±10ppm (±0.25ppm with
Option 100)

Ranging: 1, 2, 5 or 1, 2, 2.5, 4, 5
or continuous

High-Edge Pulse 

Amplitude: Range: 1V to 200V pk-pk into 1MΩ
1V to 5V pk-pk into 50Ω

Accuracy: ±3%

Ranging: 1, 2, 5 or 1, 2, 2.5, 4, 5
or continuous

Deviation: ±11.2%


Rise/Fall Time:
<100V <150ns
≥100V <200ns

Mark/Space Ratio: 1:1

Aberrations: <2% peak for first 500ns
<0.1% peak 500ns to 100μs
<0.01% peak beyond 100μs

Frequency:
Accuracy: ±10ppm (±0.25ppm with
Option 100)

Ranging: 1, 2, 5 or 1, 2, 2.5, 4, 5
or continuous

Fast-Edge  (only available
on Model 9520 and Model 9530 Active Heads)

Amplitude: Range: 5mV to 3V pk-pk into 50Ω

Accuracy: ±3%

Ranging: 1, 2, 5 or 1, 2, 2.5, 4, 5
or continuous

Deviation: ±11.2%


Rise/Fall Time: 150ps return to ground

Mark/Space Ratio: 1:9

Aberrations: <3% peak for first 1ns
<2% peak 1 ns to 10ns
<0.25% peak 10 ns to 50ns

Frequency:
Range: 10Hz to 2MHz
Accuracy: ±10ppm (±0.25ppm with
Option 100)

Ranging: 1, 2, 5 or 1, 2, 2.5, 4, 5
or continuous

Timing Marker s 

Styles: Square/Sine, Pulse or
Narrow Triangle

Square/Sine:
Period Square: 10ns to 50s
Period Sine:
9500/400 2.0ns to 10ns
9500/600 1.0ns to 10ns
9500/1100 0.5ns to 10ns
9500/3200 0.5ns to 10ns

Pulse:
Period: 1μs to 50s
Rise/Fall Time: <700ps

Narrow Triangle:
Period: 1μs to 50s
Rise/Fall Time: 2.5% of period

Ranging: 1, 2, 5 or 1, 2, 2.5, 4, 5
or continuous for period of
all waveshapes


Timing Accuracy:
Normal: ±10ppm
With Option 100: ±0.25ppm

Timing Jitter: ≤ 10ps pk-pk

Deviation: ±45% for period

Amplitude: 100mV to 1V pk-pk

Sub-Division: Every 10th marker can be set to
higher amplitude for periods
≥1μs for all waveshapes

Leveled Sine and Dual Sine 

Frequency
Range:
9500/400 0.1 Hz to 400 MHz
9500/600 0.1 Hz to 600 MHz
9500/1100 0.1 Hz to 1.1 GHz
9500/3200 0.1 Hz to 3.2 GHz

Accuracy:
Normal: ±12ppm
With Option 100: ±0.25ppm for f ≥ 12kHz
±3ppm max for f < 12kHz


Deviation: ±11.2%

Amplitude (Leveled Sine into 50Ω):
0.1Hz - 550MHz 4.44mV to 5.560V pk-pk
550MHz - 2.5GHz 4.44mV to 3.336V pk-pk
2.5GHz - 3.2GHz 4.44mV to 2.224V pk-pk
Accuracy ±1.5% at 50 kHz

Flatness (Leveled Sine relative to 50kHz):
0.1Hz - 100MHz ±1.5%
100MHz - 550MHz ±3%
550MHz - 1.1GHz ±4%
1.1GHz - 3.2GHz ±5%

Ranging: 1, 2, 5 or 1, 2, 2.5, 4, 5
or continuous

Sine Purity:
2nd Harmonic <-35dBc
3rd Harmonic <-40dBc
All Other Spurious
Signals <-40dBc (typical)

Input Impedance 

Resistance Measurement:

Range: 10Ω - 150Ω and 50kΩ - 12MΩ

Accuracy:



(Ω) 10 - 40	±0.5%
40 - 90	±0.1%
90 - 150	±0.5%
50k - 800k	±0.5%
800k - 1.2M	±0.1%
1.2M - 12M	±0.5%

Capacitance Measurement:

Range: 1pF to 95pF

Accuracy:

1pF - 35pF	2% ± 0.25pF
35pF - 95pF	3% ± 0.25pF

Current  

Amplitude:

DC: ±100μA to ±100mA


Squarewave: 100μA to 100mA pk-pk

Accuracy: ±(0.25% + 0.5μA)

Frequency: 10Hz to 100kHz

Accuracy: ±10ppm (±0.25ppm with Option 100)

Ranging: 1, 2, 5 or 1, 2, 2.5, 4, 5 or continuous


Composite Video Output 

Amplitude: 1.0V, 0.7V, 0.3V

Pattern: White, Grey or Black


Sync Polarity: Positive or negative

Standards: 625-line 50Hz or 525-line 60Hz

LF Linear Ramp 

Waveforms: 1V pk-pk symmetrical triangle

Ramp Time: 1ms to 1s


Overload Pulse 

Amplitude: 5V to 20V into 50Ω

Polarity: Positive or negative

Duration: 0.2s to 100s


Trigger: Manual

Zero Skew 

Unadjusted Skew: ±50ps channel to channel

Adjusted Skew: ±5ps channel to channel


Frequency Range: 10Hz to 100MHz

Short/Open Output 

Output Leakage:

Open Circuit: ±50pA

Short Circuit: ±15μV

Auxiliary Input 

Signal Routing: Rear input to any Active Head

Maximum Input:

Voltage: ±40V pk-pk

Current: ±400mA pk-pk

Trigger

Amplitude: ≥1V pk-pk into 50Ω

Risetime: <700ps

Rate:

User Selectable: f (up to 120 MHz), f/10 or f/100

Free Run: 100Hz

Reference Frequency Input

Frequency Range: 1MHz to 20MHz in 1MHz steps

Level: 90 mV to 1V pk-pk (typical)

Lock Range: ±50ppm

Reference Frequency Output

Frequency: 1MHz or 10MHz

Level:

Into 50Ω: 1V pk-pk (typical)

Into 1MΩ: 2V pk-pk (typical)

Environment

Temperature:

Operating: 5°C to 40°C

Storage: 0°C to 50°C

Humidity: (non-condensing)

Operating: <90% over 5°C to 30°C

<75% over 30°C to 40°C

Storage: <95% over 0°C to 50°C

Power

Voltage: 95V to 132V rms

or 209V to 264V rms

Frequency: 48Hz to 63Hz

Consumption: 400 VA

Warm-up: 20 minutes

Dimensions

Model 9500 Mainframe:

H x W x D 133 x 427 x 440 mm

(5.24 x 16.8 x 17.3 inches)

Weight: 12 kg approx. (27 lbs approx.)

Module 9510, 9520 or 9530:

H x W x D 65 x 31 x 140 mm

(2.56 x 1.22 x 5.51 inches)

Weight: 0.45 kg approx. (1 lb approx.)

Safety

Designed to UL3111 and EN61010-1-1:1993/A2:1995.

CE Marked

EMC (including options)

Emissions: EN55011:1991

Immunity: EN50082-1:1992

FCC Rules part 15 sub-part J class B

Warranty

Period:

Mainframe 1-year

Active Heads 3-year Active Plus CarePlan

Ordering Information

- Model 9500/400 400 MHz High-Performance Oscilloscope Calibration Workstation, complete with Windows™ Automated IEEE-488 Calibration Software, GPIB Interface and Security Key, Inventory Management Software and Scope Procedures. A Certificate of Traceable Calibration and a Trigger Lead are also included. (Note: Requires one 9510 or 9520 Output Module)
- Model 9500/600 600 MHz High-Performance Oscilloscope Calibration Workstation (otherwise as above)
- Model 9500/1100 1.1 GHz High-Performance Oscilloscope Calibration Workstation (otherwise as above)
- Model 9500/3200 3.2 GHz High-Performance Oscilloscope Calibration Workstation (otherwise as above)
- Model 9510 1.1 GHz Active Head with 500 ps pulse risetime (3-year *Active Plus CarePlan* warranty)
- Model 9520 1.1 GHz Active Head with 150 ps and 500 ps pulse risetime (3-year *Active Plus CarePlan* warranty)
- Model 9530 3.2 GHz Active Head with 150 ps and 500 ps pulse risetime (3-year *Active Plus CarePlan* warranty)
- Option 5 5-Channel Output (allows any mix of 9510/9520/9530 Heads up to a total of five. Upper frequency limited by Model 9500 mainframe.)
- Option 10 Blank 256-Kbyte FLASH PCMCIA card (for procedure mode procedures)
- Option 30 Blank 256-Kbyte battery-backed SRAM PCMCIA card (for procedure mode results)
- Option 40 PCMCIA Read/Write Module (for desktop or tower PC)
- Option 50 Tracker Ball
- Option 60 Soft Carrying Case
- Option 90 Rack Mounting Kit
- Option 100 High-Stability Crystal Reference
- Software Option 10 Software Support Program (access to all procedures, software updates and enhancements produced by Wavetek's Software Support Group over a 12-month period.)