FLUKE®

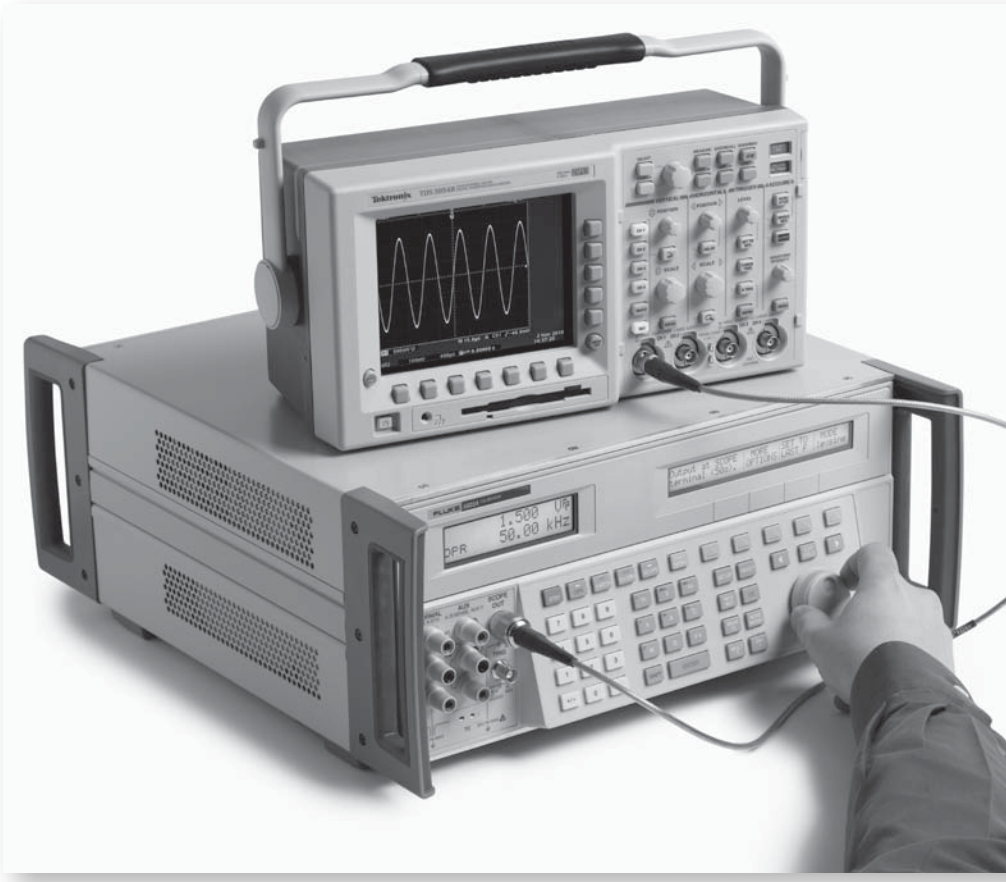
Calibration

Oscilloscope Calibration Options for 55XX Series Multi-Product Calibrators

Extended Specifications

These specifications apply to the 5520A-SC1100, 5500A-SC600 and 5500A-SC300 Oscilloscope Calibration Options. For general specifications, see the Extended Specifications for the individual calibrator of interest (downloadable from the Fluke Calibration web site or available from your Fluke Calibration representative).The specifications are valid when the calibrator is operated under the conditions specified in the operator manual, and has completed a warm-up period of at least twice the length of time the calibrator was powered off, up to a maximum of 30 minutes.

The 5520A-SC1100, with 1100 MHz bandwidth, can be installed in a 5522A calibrator. The 5500A-SC600, with 600 MHz bandwidth, can be installed in any 55XX Series Multi-Product Calibrator. The 300 MHz option, the 5500A-SC300, is only compatible with the 5502A calibrator.



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Voltage Function Specifications

5520A-SC1100 and 5500A-SC600

Volt Function		DC Signal		Square Wave Signal[1]	
Load		**Into 50 Ω**	**Into 1 MΩ**	**Into 50 Ω**	**Into 1 MΩ**
Amplitude Characteristics					
Range		0 V to ± 6.6 V	0 V to ± 130 V	± 1 mV to ± 6.6 V p-p	± 1 mV to ± 130 V p-p
	Range	Resolution			
Resolution	1 mV to 24.999 mV 25 mV to 109.99 mV 110 mV to 2.1999 V 2.2 V to 10.999 V 11 V to 130 V	1 µV 10 µV 100 µV 1 mV 10 mV			
Adjustment range		Continuous			
1-year absolute uncertainty, tcal ± 5 °C		± (0.25 % of output + 40 µV)	± (0.05 % of output + 40 µV)	± (0.25 % of output + 40 µV)	± (0.1 % of output + 40 µV)[2]
Sequence		1-2-5 (e.g., 10 mV, 20 mV, 50 mV)			
Square Wave Frequency Characteristics					
Range		10 Hz to 10 kHz			
1-year absolute uncertainty, tcal ± 5 °C		± (2.5 ppm of setting)			
Typical abberation (from 50 % of leading/trailing edge) 25 mV to 130 V: within 4 µs 10 mV to 25 mV: within 8 µs 1 mV to 10 mV: within 14 µs		< (0.5 % of output + 100 µV)			

[1]Positive or negative, zero referenced square wave.
[2]Above 1 kHz, ± (0.25 % of output + 40 µV). Assumes connectors and cables are in good condition.

5500A-SC300

Volt Function	DC Signal		Square Wave Signal[1]	
Load	**Into 50 Ω**	**Into 1 MΩ**	**Into 50 Ω**	**Into 1 MΩ**
Amplitude range	0 V to ± 2.2 V	0 V to ± 33 V	± 1.8 mV to ± 2.2 V p-p	± 1.8 mV to ± 105 V p-p
1-year absolute uncertainty, tcal ± 5 °C	± (0.25 % of output + 100 µV)			
Sequence	1-2-5 (e.g., 10 mV, 20 mV, 50 mV)			
Frequency range	10 Hz to 10 kHz			

[1]Positive or negative, zero referenced square wave.

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Edge Function Specifications

5520A-SC1100 and 5500A-SC600

Edge Characteristics into 50 Ω		1-Year Absolute Uncertainty, tcal ± 5 °C
Amplitude		
Rise time	< 300 ps	+ 0/–100 ps
Range (p–p)	5.0 mV to 2.5 V	± (2 % of output + 200 µV)
Resolution	4 digits	
Adjustment range	± 10 % around each sequence value (indicated below)	
Sequence values	5 mV, 10 mV, 25 mV, 50 mV, 60 mV, 80 mV, 100 mV, 200 mV, 250 mV, 300 mV, 500 mV, 600 mV, 1 V, 2.5 V	
Other Edge Characteristics		
Frequency range	1 kHz to 10 MHz[1]	± (2.5 ppm of setting)
Frequency range	≤ 300 ps[1]	(+ 0 ps/–100 ps)
Typical jitter, edge to trigger	< 5 ps [p–p]	
Leading edge abberations[2]	within 2 ns from 50 % of rising edge]	< (3 % of output + 2 mV)
	2 ns to 5 ns	< (2 % of output + 2 mV)
	5 ns to 15 ns	< (1 % of output + 2 mV)
	after 15 ns	< (0.5 % of output + 2 mV)
Typical duty cycle	45 % to 55 %	
Tunnel diode pulse drive	Square wave at 100 Hz to 100 kHz, with variable amplitude of 60 V to 100V p–p	

[1]Frequency range above 2 MHz has rise time specification ≤ 350 ps.
[2]Below 250 mV aberrations are typical.

5500A-SC300

Edge Characteristics into 50 Ω		1-Year Absolute Uncertainty, tcal ± 5 °C
Amplitude range (p–p)	4.5 mV to 2.75 V	± (2 % of output + 200 µV)
Frequency range	1 kHz to 1 MHz	± (25 ppm of setting + 15 mHz)
Rise time	≤ 1 ns	
Typical jitter, edge to trigger	< 5 ps (p–p)	
Leading edge aberrations	Within 10 ns	< (2 % of output + 2 mV)
	10 to 30 ns	< (1 % of output + 2 mV)
	After 30 ns	< (0.5 % of output + 2 mV)
Typical duty cycle	45 % to 55 %	

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Leveled Sinewave Function Specifications

5520A-SC1100 (> 600 MHz)

Characteristics into 50 Ω	Frequency Range	
	50 kHz (reference)	600 MHz to 1.1 GHz
Amplitude Characteristics		
Range	5 mV to 3.5 V	
Resolution	< 100 mV: 3 digits; ≥ 100 mV: 4 digits	
Adjustment Range	**Continuously Adjustable**	
1-year absolute uncertainty, tcal ± 5 °C	± (2 % of output + 300 µV)	± (7 % of output + 300 µV)
Flatness (relative to 50 MHz)[1]	not applicable	± (5 % of output + 100 µV)
Short-term amplitude stability	≤ 1 %[2]	
Frequency Characteristics		
Resolution	100 kHz	
1-year absolute uncertainty, tcal ± 5°C	± 2.5 ppm	
Distortion Characteristics		
2nd harmonic	≤ -33 dBc	
3rd and higher harmonic	≤ -38 dBc	

[1]As measured near oscilloscope bandwidth frequency.
[2]Within one hour after reference amplitude setting, provided temperature varies no more than ± 5 °C.

5520A-SC1100 and 5500A-SC600

Leveled Sine Wave Characteristics into 50	Frequency Range			
	50 kHz (Reference)	50 kHz to 100 MHz	100 MHz to 300 MHz	300 MHz to 600 MHz
Amplitude				
Range (p-p)		5 mV to 5.5 V		
1-year absolute uncertainty, tcal ± 5 °C	± (2 % of output + 300 µV)	± (3.5 % of output + 300 µV)	± (4 % of output + 300 µV)	± (6 % of output + 300 µV)
Flatness (relative to 50 kHz)[1]	Not applicable	± (1.5 % of output + 100 µV)	± (2 % of output + 100 µV)	± (4 % of output + 100 µV)
Short-term amplitude stability	≤ 1 %[2]			
Frequency				
Resolution	10 kHz			
1-year absolute uncertainty, tcal ± 5 °C	± 2.5 ppm			
Distortion				
2nd harmonic	≤ -33 dBc			
3rd and higher harmonics	≤ -38 dBc			

[1]As measured near oscilloscope bandwidth frequency.
[2]Within one hour after reference amplitude setting, provided temperature varies no more than ± 5 °C.

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5500A-SC300

Leveled Sine Wave Characteristics into 50 Ω	Frequency Range		
	50 kHz (Reference)	50 kHz to 100 MHz	100 MHz to 300 MHz[1]
Amplitude			
Range (p-p)		5 mV to 5.5 V[1]	
1-year absolute uncertainty, tcal ± 5 °C	± (2 % of output + 200 µV)	± (3.5 % of output + 300 µV)	± (4 % of output + 300 µV)
Flatness (relative to 50 kHz)[1]	Not applicable	± (1.5 % of output + 100 µV)	± (2 % of output + 100 µV)
Short-term amplitude stability	≤ 1 %[2]		
Frequency			
Resolution	10 kHz		
1-year absolute uncertainty, tcal ± 5 °C	± 2.5 ppm		
Distortion			
2nd harmonic	≤ -33 dBc		
3rd and higher harmonics	≤ -38 dBc		

[1]Extended frequency range to 350 MHz is provided, but flatness is not specified. Amplitude is limited to 3 V for frequencies above 250 MHz.
[2]Within one hour after reference amplitude setting, provided temperature varies no more than ± 5 °C.

Time Marker Function Specifications

5520A-SC1100 and 5500A-SC600

Time Marker into 50 Ω[1]	5 s to 50 ms	20 ms to 100 ns	50 ns to 20 ns	10 ns	5 ns to 2 ns
1-year absolute uncertainty, tcal ± 5 °C[2]	± (25 + t* X 1000) ppm	± 2.5 ppm	± 2.5 ppm	± 2.5 ppm	± 2.5 ppm
Wave shape	Spike or square	Spike, square, 20 %-pulse	Spike or square	Square or sine	Sine
Typical jitter (p-p)	< 10 ppm	< 1 ppm	< 1 ppm	< 1 ppm	< 1 ppm
Sequence	5-2-1 from 5 s to 2 ns (e.g., 500 ms, 200 ms, 100 ms)				

[1]Output amplitude > 1 V pk.
[2]Time marker uncertainty is ± 50 ppm when measured off of cardinal points.
*t = time in seconds.

5500A-SC300

Time Marker into 50 Ω[1]	5 s to 100 µs	50 µs to 2 µs	1 µs to 20 ns	10 ns to 2 ns
1-year absolute uncertainty, tcal ± 5 °C	± (25 + t* X 1000) pmm	± (25 + t* X 15000) pmm	± 25 ppm	± 25 ppm
Wave shape	Pulsed sawtooth	Pulsed sawtooth	Pulsed sawtooth	Sine
Sequence	5-2-1 from 5 s to 2 ns (e.g., 500 ms, 200 ms, 100 ms)			

[1]Typical amplitude > 1 V
*t = time in seconds.

Trigger Functions 5520A-SC1100, 5500A-SC600 and 5500A-SC300

Available for edge and time marker functions (volt, pulse and video are available for 5520A-SC1100 and 5500A-SC600 only).

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Wave Generator Function Specifications

5520A-SC1100, 5500A-SC600 and 5500A-SC300

Wave Generator Characteristics	Square Wave, Sine Wave, and Triangle Wave into 50 Ω or 1 MΩ
Amplitude	
Range	Into 1 MΩ: 1.8 mV to 55 V p-p Into 50 Ω: 1.8 mV to 2.5 V p-p (5520A-SC1100 and 5500A-SC600) Into 50 Ω: 1.8 mV to 2.2 V p-p (5500A-SC300)
1-year absolute uncertainty, tcal ± 5 °C 10 Hz to 10 kHz	± (3 % of p-p output + 100 µV)
Sequence	1-2-5 (eg., 10 mV, 20 mV, 50 mV,...)
Typical dc offset range	0 to ± (≥ 40 % of p-p amplitude)[1]
Frequency	
Range	10 Hz to 100 kHz
Resolution	4 or 5 digits depending on frequency

[1]The DC offset plus the wave signal must not exceed 30 V rms.

Pulse Generator Function Specifications

5520A-SC1100 and 5500A-SC600

The pulse generator is designed for oscilloscope capture function tests and trigger verification applications.

Pulse Generator Characteristics	Positive Pulse into 50 Ω
Typical rise/fall times	2 ns
Amplitude available	Discrete steps: 2.5 V, 1 V, 250 mV, 100 mV, 25 mV, 10 mV
Pulse Width[1]	
Range	4 ns to 500 ns[1]
Uncertainty[2]	5 % ± 2 ns
Pulse Period	
Range	20 ms to 200 ns (50 Hz to 6.6 MHz)
1-year absolute uncertainty, tcal ± 5 °C	± 2.5 ppm

[1]Pulse width not to exceed 40 % of period.
[2]Pulse width uncertainty for periods less than 2 µs are not specified.

TV Trigger Specifications

5520A-SC1100 and 5500A-SC600. TV Trigger is provided at the Scope Output Terminal

Trigger Signal Type	Parameters
Frame formats	Selectable NTSC, SECAM, PAL, PAL-M
Polarity	Selectable Inverted or Uninverted Video
Amplitude into 50 Ω (p-p)	Adjustable 0 to 1.5 V p-p into 50 Ω load, (± 7 % accuracy)
Line marker	Selectable Line Video Marker

Input Impedance Measurement Specifications

5520A-SC1100 and 5500A-SC600

	Range	Uncertainty
Resistance	40 Ω to 60 Ω	0.1 %
	500 kΩ to 1.5 MΩ	0.1 %
Capacitance	5 pF to 50 pF	± (5 % of input + 0.5 pF)[1]

[1]Measurements made within 30 minutes of capacitance zero reference. Scope option must be selected for at least five minutes prior to capacitance measurement or zero.

Overload Measurement Specifications

5520A-SC1100 and 5500A-SC600. The overload test function applies dc or ac (1 kHz square wave) power into the 50 Ω oscilloscope input and monitors the current. A time measurement counter indicates the time duration of the applied overload signal. When the oscillosope's input protection circuit reacts and opens up the 50 Ω load, the calibrator indication is set to "off" on the right hand display. In order to prevent oscilloscope front end damage, a limited amount of energy is applied by a user settable time limit.

Source Voltage	Time Limit dc or 1 kHz ac
5 V to 9 V	Settable from 1 Sec to 60 Sec
Typical "On" Current Indication	**Typical "Off" Current Indication**
5 V to 9 V	Settable from 1 Sec to 60 Sec

External Frequency Reference Input (5522A only)

The External Reference Input selection allows the user to provide their own high stability 10 MHz reference clock for the 5500A-SC600 and 5520A-SC1100 when fitted in a 5522A mainframe. All functions except Wave Generator and Marker greater than 50ms are then referenced to the external 10 MHz signal. The external reference input must be between 1 V to 5 V p-p.

Uncertainty of output = uncertainty of reference + 5 µHz.

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Ordering Information

Models

5502A	Multi-Product Calibrator
5502A/3	Multi-Product Calibrator with 300 MHz Oscilloscope Calibration Option
5502A/6	Multi-Product Calibrator with 600 MHz Oscilloscope Calibration Option
5522A	High-Performance Multi-Product Calibrator
5522A/6	High Performance Multi-Product Calibrator with 600 MHz Oscilloscope Calibration Option
5522A/1GHZ	High Performance Multi-Product Calibrator with 1.1 GHz Oscilloscope Calibration Option

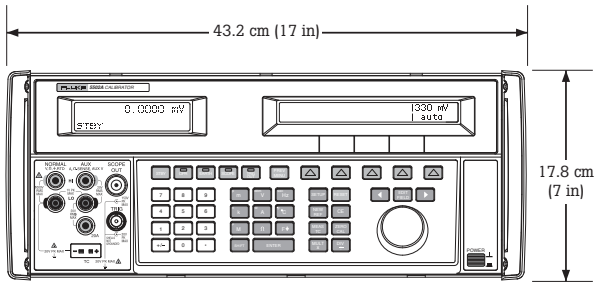
Upgrades of oscilloscope calibration options into 55XX Series calibrators can be done at a Fluke Service Center. Contact a Fluke Service Center or your Fluke Calibration representative for details.

Accessories

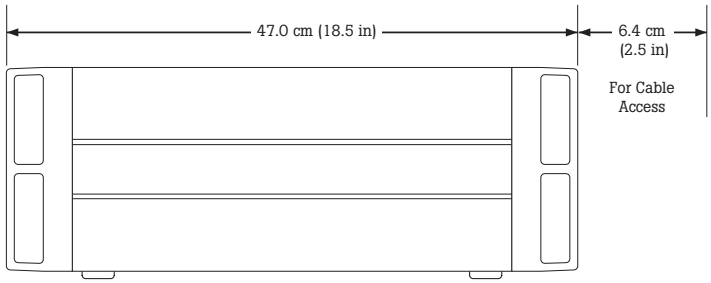
5500A/COIL	50-Turn Current Coil
9100-200	Dual 10 and 50 Turn Coil
55XX/CASE	Roll-Aboard Transit Case
5522A/CARRYCASE	Rugged Carrying Case with removable front/back panels
5500A/LEADS	Comprehensive Test Lead Kit for 5502A
5520A-525A/LEADS	Comprehensive Test Lead Set for 5522A
5500A/HNDL	Side Carry Handle
Y5537	Rack Mount Kit
MET/CAL®	Calibration Software
5800A-7002K	Two Piece Replacement Output Cable Set
5800A-7004K	Oscilloscope Calibrator BNC Connector Kit

Product Compatability Chart

Model	5502A	5522A
5500A-SC300	•	
5500A-SC600	•	•
5520A-SC1100		•



Front view and dimensions.



Side view and dimensions.

Note: 5502A and 5522A dimensions are the same.

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Electrical | RF | Temperature | Pressure | Flow | Software

ISO 9001