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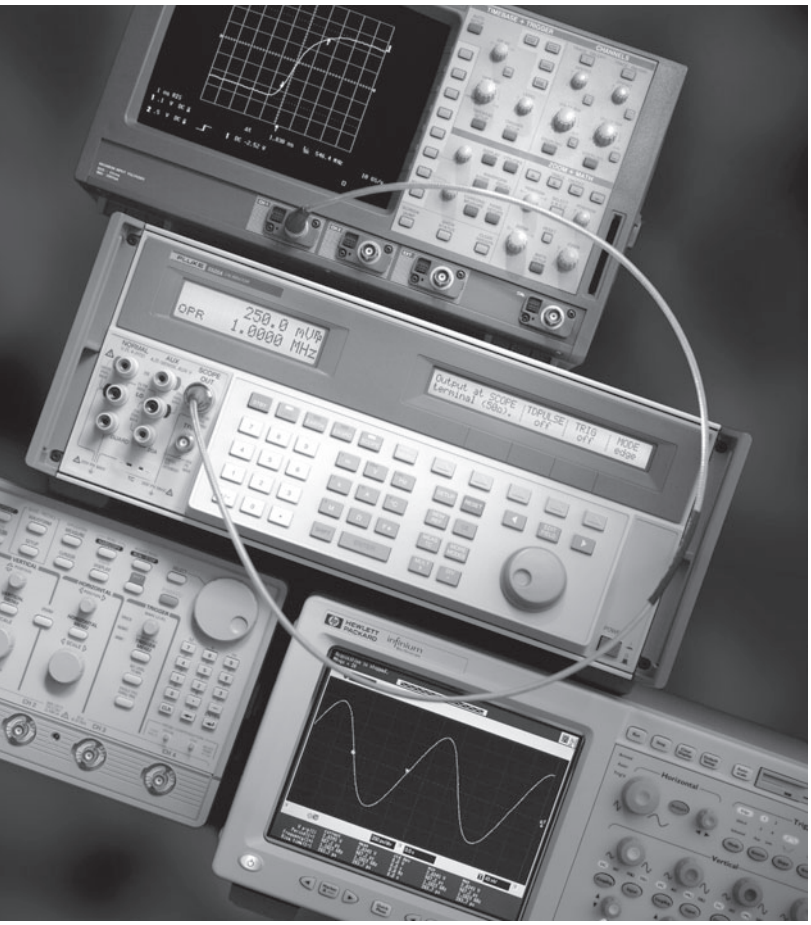
5520A-SC1100 Option for the 5520A

Technical Data



Calibrating even your highest bandwidth oscilloscopes is now easy. The SC1100 now enables the versatile 5520A to calibrate your oscilloscopes fully up to 1.1 GHz.

Calibrate even your highest bandwidth oscilloscopes... and much, much more

If you need to calibrate oscilloscopes, plus a broad array of other electrical test tools, the new SC1100 option for the versatile workhorse 5520A Multi-Product Calibrator makes it faster, easier and more cost-effective. That's because the new SC1100 now enables the 5520A to calibrate all of your oscilloscopes up to 1.1 GHz with rise times to 300 ps — even 125 ps with the 5800A/TDP tunnel diode pulser option.

That represents what is likely the highest level of oscilloscopes in your workload — along with the other workload the 5520A addresses.

Nothing comes close to the 5500A/5520A Multi-Product Calibrator family for workload coverage, flexibility and ease-of-use. They are rugged, portable instruments, ideal for use both in the field and on the bench. And they are also affordable, allowing you to match your configuration to your workload and add options as your workload changes and grows.

Plus, no matter where you are in the world, you can rest assured that Fluke is there for calibration, training, and applications support. It all adds up to a superior solution to your calibration needs. You would expect nothing less from the world leader in calibration.

What is the 5520A-SC1100?

The 1.1 GHz 5520A-SC1100 is a plug-in module that fits inside the 5520A Multi-Product Calibrator. It can be ordered factory installed with a new calibrator, or added later at a Fluke service center for an additional installation and calibration charge.

The 5520A-SC1100 option adds powerful new functionality to the 5520A:

- Voltage source (dc and square wave) for vertical amplitude calibration.
- Edge source a variable 300 ps fast edge with low aberrations — for verifying dynamic response.
- Leveled sine wave generator to 1.1 GHz, with excellent flatness and amplitude accuracy — for verifying bandwidth.
- Time marks in sawtooth, square, 20% pulse and sine wave forms from 5 seconds to 1 ns with 2.5 ppm frequency stability and low jitter — for horizontal time base calibration.
- Input resistance, capacitance and overload testing.
- Wave form generator with square, sine, triangle wave forms — for extended test capability.
- TV trigger for NTSC, SECAM, PAL and PAL-M with line marker.

- External trigger output for time marks, fast edge, voltage and pulse modes.
- Pulse generator with variable width and period to verify trigger pulse width responses and horizontal deflection.
- External clock reference.

Operating the SC1100 is easy

You access the SC1100's capabilities simply by selecting "Scope" mode on the calibrator's front panel. All outputs are conveniently located on the calibrator's output block to make hookups easy and to minimize the errors contributed by cabling. There are no fragile, bulky pulse heads to contend with.

The 5500A/5520A Family: Unmatched workload coverage

The original 5500A Multi-Product Calibrator created a whole new class of multi-product calibrators. It was designed to provide a portable, reasonably-priced solution for calibrating a large segment of your electrical test tools workload, including:

- 3½ and 4½ digit multimeters, both handheld and bench models.
- thermocouple and RTD thermometers.
- chart recorders.
- data loggers.
- analog volt/ohm/amp meters.
- panel meters.
- wattmeters.
- power harmonic analyzers.
- process calibrators.
- current clamps and clamp meters.
- oscilloscopes to 600 MHz.
- and more.

The 5520A builds on the 5500A's capabilities for even broader workload coverage including:

- 6½ digit multimeters.
- current to 20A.
- pressure measurement.
- temperature.
- oscilloscopes to 1.1 GHz.

Add to that a wide selection of accessories like 5500/CAL calibration software, the 5500A/EP enhancement package, 5500A/COIL, test lead kit, lab cart, and transit case, and you have more ways to match your calibration needs — and your budget — to the calibrator that fits best.

Highly portable, rugged and easy to use

The 5500A and 5520A are as much at home on the road performing on-site calibrations as they are in the lab. They are small, rugged, temperature tolerant and easy to transport, packing the equivalent of a complete calibration bench into a compact 44 lb (20 kg) package.

The right tools for meeting ISO 9000

There is more to meeting the requirements of ISO 9000 and other quality standards than having the right calibrator. You can rely on Fluke to provide you with a complete solution.

Automation and management software. Fluke's MET/CAL® *Plus* and 5500/CAL Calibration Software provide everything you need to document and control your calibration procedures, perform automated calibrations quickly and accurately, and report the results. You can also use these powerful software packages to document and report on the assets you use, their location, repair history, calibration history, due dates and traceability, and more.

Calibrators. If your workload includes enough oscilloscopes to warrant a dedicated calibrator, Fluke offers the 5820A Oscilloscope Calibrator. It calibrates oscilloscopes up to 600 MHz or, with its high bandwidth option, up to 2.1 GHz. Fluke also provides a complete range of multifunction calibrators, including the world standard 5700A and the most accurate calibrator available, the 5720A. Temperature calibration solutions include the 500 Series Dry-Block Calibrators and the HP 34420/PRT/SPRT NanoVolt/Micro-Ohm Meter. And when you need the best standards lab meter, Fluke's version of the HP 3458/HFL meter has been customized with special features for standards lab applications.

Standards. No measurement is complete until you can prove it's traceable to national standards. Fluke provides a complete range of working, transfer and primary standards to help.

Support. Fluke can back up your calibration capability with a wide range of service and support that help keep your calibration equipment calibrated and repaired.

Training. Fluke can help you learn how to write procedures, manage measurement assets, set up or manage a lab, and more. Our wide range of training classes, application notes and other training materials are designed to help you get the most out of your investment in Fluke equipment and software.

5520A-SC1100 Specifications

These specifications apply to the 5520A-SC1100 Oscilloscope Calibration Option. General specifications for the 5520A can be found in the "5500A/5520A Extended Specifications." The specifications are valid when the 5520A is operated under the conditions specified in the operator's 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.

Volt function specifications

Volt Function		**DC Signal**		**Square Wave Signal[1]**	
Load		**into 50Ω**	**into 1 MΩ**	**into 50Ω**	**into 1 MΩ**
Amplitude Characteristics					
Range		0 V to ±6.6V	0 V to ± 130V	± 1 mV to ±6.6 V p-p	± 1 mV to ± 130V p-p
	Range	Resolution			
Resolution	1 mV to 24.999 mV 25 mV to 109.99 mV 110 mV to 2.1999V 2.2V to 10.999V 11V to 130V	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 Aberration (from 50% of leading/trailing edge) 25 mV to 130V: 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.

Edge function specifications

Edge Characteristics into 50Ω		1-Year Absolute Uncertainty, tcal ± 5 °C
Amplitude		
Rise Time	< 300 ps	+0/–100 ps
Range (p-p)	5.0 mV to 2.5V	± (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, 1V, 2.5V	
Other Edge Characteristics		
Frequency Range	1 kHz to 10 MHz[1]	± (2.5 ppm of setting)
Typical Jitter, Edge to Trigger	< 5 ps (p-p)	–
Leading Edge Aberrations	within 2 ns from 50% of rising edge	< (3% of output + 2 mV)
	2 to 5 ns	< (2% of output + 2 mV)
	5 to 15 ns	< (1% of output + 2 mV)
	after 15 ns	< (0.5% of output + 2 mV)
Typical Duty Cycle	45% to 55%	

[1]Frequency range above 2 MHz has rise time specification < 350 psec

Leveled sine wave function specifications (<600 MHz)

Leveled Sine Wave	Frequency Range			
Characteristics into 50Ω	**50 kHz (reference)**	**50 kHz to 100 MHz**	**100 MHz to 300 MHz**	**300 MHz to 600 MHz**
Amplitude Characteristics				
Range (p-p)	5 mV to 5.5V			
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)	± (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 Characteristics				
Resolution	10 kHz			
1-Year Absolute Uncertainty, tcal ± 5 °C	± 2.5 ppm			
Distortion Characteristics				
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.

Leveled sine wave function specifications (>600 MHz)

Characteristics into 50Ω	Frequency Range	
	50 kHz (reference)	600 MHz to 1.1 GHz
Amplitude Characteristics		
Range	5 mV to 3.5V	
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 kHz)[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	≤ –33dBc	
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.

Time marker function specifications

Time Marker into 50Ω	5s to 50 ms	20 ms to 100 ns	50 ns to 20 ns	10 ns	5 ns to 1 ns
Wave Shape	spike or square	spike, square, or 20%-pulse	spike or square	square or sine	sine
Typical Output Level	> 1V pk	> 1V pk[1]	> 1V pk[1]	> 1V pk[1]	> 1V p-p
Typical Jitter (p-p)	<10 ppm	< 1 ppm	< 1 ppm	<1 ppm	<1 ppm
Sequence	5-2-1 from 5s to 2 ns (e.g., 500 ms, 200 ms, 100 ms)				
Adjustment Range	At least ± 10% around each sequence value indicated above.				
Amplitude Resolution	4 digits				
1-Year Absolute Uncertainty, tcal ± 5 °C	± (25 + 1000xt) ppm[3]	± 2.5 ppm	± 2.5 ppm	± 2.5 ppm	± 2.5 ppm

[1] Typical rise time of square wave and 20%-pulse (20% duty cycle positive pulse) is < 1.5 ns.
[2] Time Marker uncertainty is ±50 ppm off of cardinal points
[3] t is time in seconds

Wave generator specifications

Wave Generator Characteristics	Square Wave, Sine Wave and Triangle Wave into 50Ω or 1 MΩ
Amplitude	
Range	into 1 MΩ: 1.8 mV to 55V p-p into 50Ω: 1.8 mV to 2.5V p-p
1-Year Absolute Uncertainty, tcal ± 5 °C, 10 Hz to 10 kHz	± (3% of p-p output + 100 μV)
Sequence	1-2-5 (e.g., 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 upon frequency
1-Year Absolute Uncertainty, tcal ± 5 °C	± (25 + 1000 x t) ppm

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

Pulse generator specifications

The pulse generator has two pulse width ranges, 35 ns and 500 ns. It is designed for oscilloscope capture function tests, and trigger verification applications.

Pulse Generator Characteristics	Positive pulse into 50Ω
Typical rise/fall times	≤ 1.5 ns
Available Amplitudes	2.5V, 1V, 250 mV, 100 mV, 25 mV, 10 mV
Pulse Width[1]	
Range	4 ns to 500 ns
Uncertainty	5% ± 2 ns
Pulse Period	
Range[2]	20 ms to 200 ns
Resolution	4 or 5 digits depending upon frequency and width
1-Year Absolute Uncertainty, tcal ± 5 °C	± 2.5 ppm

[1] Pulse width not to exceed 40% of period.
[2] Pulse width uncertainties for periods below 2 μs are not specified.

Trigger function specifications

The trigger functions in this section are available at the trigger output connector.

Time Marker Period	Division Ratio[1]	Amplitude into 50Ω (p-p)	Typical Rise Time
Trigger Signal Specifications for the Pulse Function			
20 ms to 150 ns	off/1/10/100	≥ 1V	≤ 2 ns
Trigger Signal Specifications for the Time Marker Function			
5s to 35 ms	off/1	≥ 1V	≤ 2 ns
34.9 ms to 750 ns	off/1/10/100	≥ 1V	≤ 2 ns
749 ns to 7.5 ns	off/10/100	≥ 1V	≤ 2 ns
7.4 ns to 2 ns	off/100	≥ 1V	≤ 2 ns

Edge Signal Frequency	Division Ratio	Typical Amplitude into 50Ω (p-p)	Typical Rise Time	Typical Lead Time
Trigger Signal Specifications for the Edge Function				
1 kHz to 10 MHz	off/1	≥ 1V	≤ 2 ns	40 ns
Trigger Signal Specifications for the Square Wave Voltage Function				
10 Hz to 10 kHz	off/1	≥ 1V	≤ 2 ns	< 2 μs

TV trigger signal specifications

TV trigger is provided at the Scope Output connector.	
Trigger Signal Type	**Parameters**
Frame Formats	Selectable: NTSC, SECAM, PAL, PAL-M
Polarity	positive or negative
Amplitude into 50Ω (p-p)	Adjustable 0 to 1.5V p-p into 50 ohm load, (± 7% uncertainty)
Line Marker	Selectable Line Video Marker

Tunnel diode and tunnel diode drive capability

TD Pulse Drive	Square wave at 100 Hz to 100 kHz, with variable amplitude of 60V to 100V p-p
Tunnel Diode Option (250 mV amplitude)	<125 ps rise time

Oscilloscope input resistance measurement function specifications

Scope Input Selected	**50Ω**	**1 MΩ**
Measurement Range	40Ω to 60Ω	500 kΩ to 1.5 MΩ
Uncertainty	0.1 %	0.1 %

Oscilloscope input capacitance measurement function specifications

Scope Input Selected	**1 MegΩ**
Measurement Range	5 pF to 50 pF
Uncertainty	± (5% of input + 0.5 pF)[1]

[1] Measurement 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 function specifications

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

Source Voltage	**Typical 'On' current indication**	**Typical 'Off' current indication**	**Typical Maximum Time Limit DC or AC 1 kHz AC**
5V to 9V	100 mA to 180 mA	10 mA	setable 1 to 60 sec

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Ordering Information

Model

5500A	Multi-Product Calibrator
5500A/3	Multi-Product Calibrator + 300 MHz Oscilloscope Calibrator Option
5500A/6	Multi-Product Calibrator + 600 MHz Oscilloscope Calibrator Option
5520A	High Performance Multi-Product Calibrator
5520A/3	High Performance Multi-Product Calibrator + 300 MHz Oscilloscope Calibrator Option
5520A/6	High Performance Multi-Product Calibrator + 600 MHz Oscilloscope Calibrator Option
5520A/1 GHz	High Performance Multi-Product Calibrator + 1.1 GHz Oscilloscope Calibrator Option

Options*

5520A-SC1100	1.1 GHz Oscilloscope Calibration Option
5500A-SC600	600 MHz Oscilloscope Calibration Option
5500A-SC300	300 MHz Oscilloscope Calibration Option

*SC options require Fluke Service Center installation/calibration and include report of calibration.

Accessories

5725A	Amplifier (Boosts V*Hz capability)
5500A/EP	Extended Performance Accessory (For automated calibration of 5½ and 6½ digit multimeters)
5500A/COIL	50-Turn Current Coil (For calibrating inductive clamps and clamp meters)
5500A/LEADS	Comprehensive Test Lead Kit
5500A/CASE	Transit Case with wheels
5500A/HNDL	Side handle for the 5500A/5520A
TC100	Test Cart
MET/CAL *Plus*	Calibration Software
5500/CAL	Calibration Software for the 5500A/5520A
MET/TRACK	Asset Management Software
Y5537	Rack Mount Kit

Product Compatability Chart

Model	5520A-SC1100	5500A-SC600	5500A-SC300
5520A	•	•	•
5500A		•	•
5800A/TDP	•	•	

5800A/TDP 125 ps Tunnel Diode Pulser

Pressure Modules (5520A only)

FLUKE-700PCK	Pressure Module Calibration Kit (required)
FLUKE-700P01	Pressure Module 0-10 IN. H_2O DIFF
FLUKE-700P02	Pressure Module 0-1 PSID
FLUKE-700P03	Pressure Module 0-5 PSID
FLUKE-700P04	Pressure Module 0-15 PSID
FLUKE-700P05	Pressure Module 0-30 PSIG
FLUKE-700P06	Pressure Module 0-100 PSIG
FLUKE-700P07	Pressure Module 0-500 PSIG
FLUKE-700P08	Pressure Module 0-1000 PSIG
FLUKE-700P09	Pressure Module 1500 PSIG
FLUKE-700P22	Pressure Module 0-1 PSID WET
FLUKE-700P23	Pressure Module 0-5 PSID WET
FLUKE-700P24	Pressure Module 0-15 PSID WET
FLUKE-700P29	Pressure Module 3000 PSIG WET
FLUKE-700P30	Pressure Module 5000 PSIG WET
FLUKE-700P31	Pressure Module 10000 PSIG WET
FLUKE-700PA3	Pressure Module 0-5 PSIA
FLUKE-700PA4	Pressure Module 0-15 PSIA
FLUKE-700PA5	Pressure Module 0-30 PSIA
FLUKE-700PA6	Pressure Module 0-100 PSIA
FLUKE-700PD2	Pressure Module ± 1 PSID
FLUKE-700PD3	Pressure Module ± 5 PSID
FLUKE-700PD4	Pressure Module ± 15 PSID
FLUKE-700PD5	Pressure Module -15+30 PSIG
FLUKE-700PD6	Pressure Module -15+100 PSIG
FLUKE-700PD7	Pressure Module -15+200 PSIG
FLUKE-700PV3	Pressure Module -5 PSID
FLUKE-700PV4	Pressure Module -15 PSID
FLUKE-700PMP	Pressure Pump

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Fluke Corporation
PO Box 9090, Everett, WA USA 98206

Fluke Europe B.V.
PO Box 1186, 5602 BD
Eindhoven, The Netherlands

For more information call:
In the U.S.A. (800) 443-5853 or
Fax (425) 356-5116
In Europe/M-East/Africa (31 40) 2 678 200 or
Fax (31 40) 2 678 222
In Canada (800)-36-FLUKE or
Fax (905) 890-6866
From other countries (425) 356-5500 or
Fax (425) 356-5116
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