

Automatic Calibration Modules: ACM2509, ACM2520



Quick Specs:

Models: ACM2509 and ACM2520

Impedance: 50Ω

Frequency Range: 20 kHz - 9 GHz and 100 kHz - 20.0 GHz

Number of Ports: 2

Automatic compatibility with CMT software

Supports the USBTMC-USB488 standard

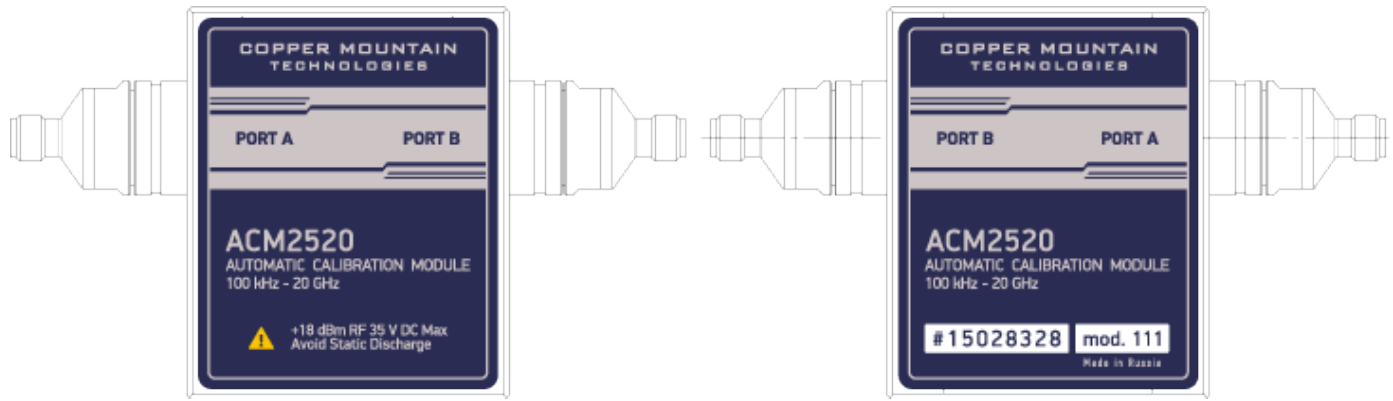
**USB Mini-B or Type B (female) connection to
PC (depending on model)**

Multiple hardware configurations available



**COPPER MOUNTAIN
TECHNOLOGIES**

ACM2520-111



Automatic Calibration Modules

All Copper Mountain Technologies' Automatic Calibration Modules (ACMs) are designed for full one-port through four-port calibrations of vector network analyzers (VNA) produced by Copper Mountain Technologies.

Copper Mountain Technologies' VNAs have a built-in function of one-touch automatic calibration performed with these ACMs. The ACM calibrates the VNA in fully automatic mode through the built-in functions of the analyzer software. The ACM switches through impedance states one by one in the process of calibration. The VNA calibration coefficients are calculated using the measured S-parameters of the ACM impedance states and the data stored in the ACM memory.

Control Protocol

The ACMs are produced with an open control protocol compatible with the USBTMC-USB488 standard, which means they can be used to calibrate VNAs of various brands, in combination with an external control program. The set of commands is detailed in the ACM Programming Manual.

Advantages of Automatic Calibration

ACM calibration offers the following advantages over traditional mechanical SOLT calibration:

- Reduced number of connections (for example, full two-port calibration requires only one connection of the ACM to a VNA instead of 7 connections of mechanical standards)
- Faster calibration procedure
- Reduced risk of human error
- Higher accuracy
- Reduced wear on test port connectors

The ACM contains two RF connectors for connection to VNA test ports, USB type B (female) or mini-B control port, several different transmission and reflection impedance states and electronic switches. ACM2520 has eight reflection states (four for each port) and a Thru. The precise S-parameters of the calibration impedance states are stored in the ACM memory (factory characterization data).

User-Defined Characterization

In addition to the factory characterization, the ACM memory can store up to three user characterizations. The user characterizations allow use of the ACM with adapters and other fixtures connected.

Attenuator State

The ACM features an additional attenuator state, which is not used in calibration. The attenuator for confidence check of the performed calibration via a specific VNA function, which compares the measured S-parameters of the attenuator against the ACM memory data.

Thermal Compensation

Thermal compensation is used to enhance ACM calibration accuracy across the entire range of operating temperatures (64F to 82F) (18C to 28C). It is a software function for correcting the ACM characterization data for ambient temperature variations. Temperature dependence of S-parameters of each ACM is determined at the factory and saved into the device memory.

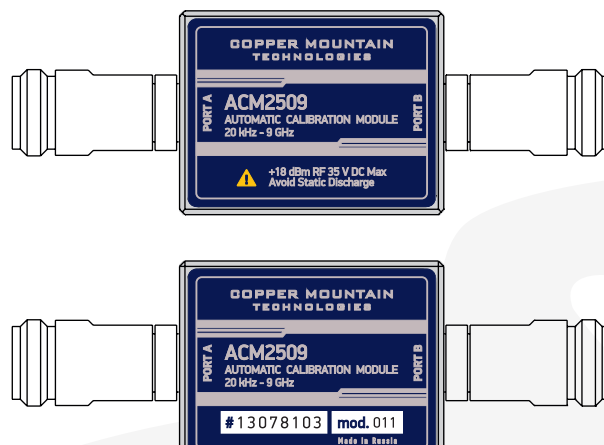
Hardware Configurations

Model	Connector Type	
	Port A	Port B
ACM2509 - 011	N-Type female	N-Type female
ACM2509 - 012	N-Type male	N-Type female
ACM2509 - 111	3.5 mm female	3.5 mm female
ACM2509 - 112	3.5 mm male	3.5 mm female
	Port A	Port B
ACM2520 - 011*	N-Type female	N-Type female
ACM2520 - 012*	N-Type male	N-Type female
ACM2520 - 111	3.5 mm female	3.5 mm female
ACM2520 - 112	3.5 mm male	3.5 mm female

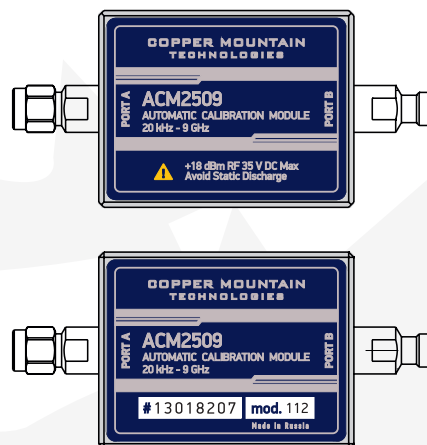
* All N-Type ACM2520 models are only operational up to 18 GHz instead of 20 GHz.

50 Ω

ACM2509-011



ACM2509-112



Specifications ^{3,4}

Model	50 Ω		
	ACM2509	ACM2520	
Frequency Range	20 kHz - 9 GHz	100 kHz - 20 GHz*	
Fmin	0.02 MHz	0.1 MHz	1 MHz 9000 MHz
Fmax	9000 MHz	1 MHz	9000 MHz 20000 MHz*
Directivity	46 dB	36 dB	47 dB 40 dB
Source match	-40 dB	32 dB	40 dB 36 dB
Load match	-46 dB	36 dB	47 dB 40 dB
Reflection tracking	0.04 dB	0.08 dB	0.04 dB 0.04 dB
Transmission tracking	0.06 dB	0.06 dB	0.06 dB 0.06 dB
Max number of characterization points	1601	1601	
Max input power	0 dBm	0 dBm	
Max input DC voltage ¹	10 V	10 V	
Input power limit ²	+18 dBm	+18 dBm	
Input DC voltage limit ²	35 V	35 V	
Connection to PC	USB Mini-B connector type with USB 2.0 interface	USB Type B (female) connector type with USB 2.0 interface	
Dimensions	115 x 74 x 25 mm	106.4 x 55 x 28 mm	
Weight	550 g	435 g	

Operating Conditions

Ambient temperature	41°F to 104°F (5°C to 40°C)
Relative air humidity at 25°C	90%
Atmospheric pressure	84 to 106.7 kPa

¹ Exceeding max values reduces VNA measurement accuracy.

² Exceeding limit values results in ACM failure.

³ VNA maximum effective parameters after calibration.

⁴ All parameters are determined in the temperature range of 23±5°C with the temperature variation after calibration of no more than ±1°C and output power of -5dBm output.

⁵ All specifications subject to change without notice.

⁶ Verification of performance requires mechanical kit of corresponding capability.



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