PLANAR ACM6000T and ACM8000T
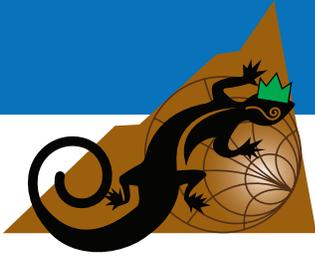## Automatic Calibration Modules

KEY FEATURES

► Frequency range:

  300 kHz to 8.0 GHz (ACM8000T)

  300 kHz to 6.0 GHz (ACM6000T)

► Automatic compatibility with CMT software

► Supports the USBTMC-USB488 standard

► USB 2.0 connection to PC

► Multiple hardware configurations available

ACM6000T and ACM8000T Automatic Calibration Modules (ACMs) are designed for full one-port and two-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 to the 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, which requires an external control program. The set of commands is detailed in the ACM Programming Manual.

Advantages of Automatic Calibration

The 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, Mini-USB control port, several different transmission and reflection impedance states and electronic changeover switches. ACM6000T has six reflection states (three for each port) and a

Thru, and ACM8000T has ten reflection states (five 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

Besides factory characterization, the ACM memory can store up to three user characterizations. The user characterization allows 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 is applied in confidence check of the performed calibration using a specific VNA function, which compares the measured S-parameters of the attenuator and the ACM memory data.

Thermal Compensation

Thermal compensation is used to enhance ACM calibration accuracy in the entire range of the operating temperatures of 64°F to 82°F (18°C to 28°C). It is a software function of 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

ACM Model	Connector Type	
ACM6000T - 011	N-type female	N-type female
ACM6000T - 012	N-type male	N-type female
ACM6000T - 111	3.5 mm female	3.5 mm female
ACM6000T - 112	3.5 mm male	3.5 mm female
ACM8000T - 011	N-type female	N-type female
ACM8000T - 012	N-type male	N-type female
ACM8000T - 111	3.5 mm female	3.5 mm female
ACM8000T - 112	3.5 mm male	3.5 mm female

Specifications [3]

Frequency range	ACM 8000T: 300 kHz to 8.0 GHz
	ACM 6000T: 300 kHz to 6.0 GHz
Directivity	46 dB
Source match	-40 dB
Load match	-46 dB
Reflection tracking	0.04 dB
Transmission tracking	0.06 dB
Max number of characterization points	1601
Max input power	ACM 8000T: -5 dBm
	ACM 6000T: 0 dBm
Max input DC voltage [1]	10 V
Input power limit [2]	+18 dBm
Input DC power limit [2]	35 V

Connection to PC: USB Mini-B connector type with USB 2.0 interface

Dimensions	4.5 x 1.6 x 1 in. (115 x 40 x 25 mm)
Weight	12 oz. (350 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 effective parameters (after calibration).

Copper Mountain Technologies is changing the way VNAs are used in the industry. Our unique VNAs deliver highly accurate measurements at a fraction of the price of traditional instrumentation. Leveraging breakthrough advances in RF technology, CMT manages to compress an advanced feature set and high performance into a compact form factor. We specialize in making affordable high performance analyzers for many environments and applications, with a wide variety of solutions from 20 kHz to 14 GHz.
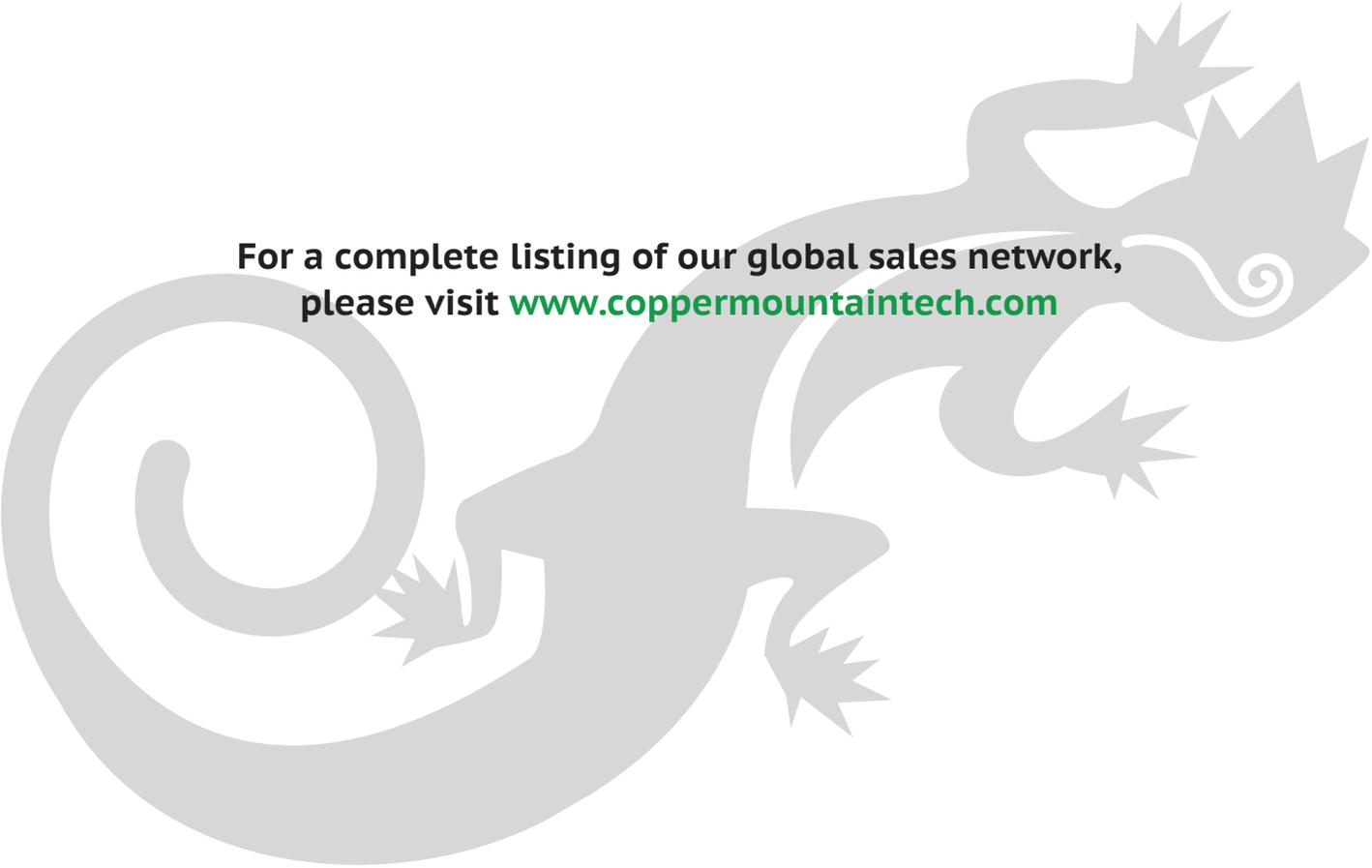
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