

Coaxial Electronic Cal Kits

Parts for Type-N 50 ohm ECal Modules

Description	Qty	HP Part Number
HP 85064B 1GHz to 18 GHz Microwave ECal Modules		
Insertable (Standard)	1	85064-60002
Non-Insertable Male (Option 00M)	1	85064-60004
Non-Insertable Female (Option 00F)	1	85064-60006
HP 85092A 30 kHz to 6 GHz RF ECal Modules		
Insertable (85064B Option 001 or 85092A)	1	85092-60001
Non-Insertable Male (85064B Option 001 and Option 00M or 85092A Option 00M)	1	85092-60002
Non-Insertable Female (85064B Option 001 and Option 00F or 85092A Option 00F)	1	85092-60003
Adapters (added with option 00A)		
Type-N Female-to-Female	1	85054-60037
Type-N Male-to-Male	1	85054-60038



Parts for 3.5mm ECal Modules

Description	Qty	HP Part Number
HP 85062B 1GHz to 26.5 GHz Microwave ECal Modules		
Module with Male/Female Connectors (standard)	1	85062-60002
Module with Male/Male Connectors (option 00M)	1	85062-60004
Module with Female/Female Connectors (option 00F)	1	85062-60006
HP 85093A 30 kHz to 6 GHz RF ECal Modules		
Module with Male/Female Connectors (85062B option 001 or 85093A)	1	85093-60001
Module with Male/Male Connectors (85062B option 001 and 00M, or 85093A option 00M)	1	85093-60002
Module with Female/Female Connectors (85062B option 001 and 00F, or 85093A option 00F)	1	85093-60003
Adapters (added with option 00A)		
3.5 mm Female/Female	1	85052-60012
3.5 mm Male/Male	1	85052-60014



Electronic calibration (ECal) is a precision, single-connection, one or two-port calibration technique for your HP vector network analyzer. HP ECal modules use fully-traceable and verifiable electronic impedance standards. The modules are state-of-the-art, solid-state devices with programmable and highly repeatable impedance states. ECal modules are transfer standards that provide consistent calibrations and eliminate operator errors while bringing convenience and simplicity to your calibration routine. Consistent calibrations provide consistent measurements.

ECal replaces the traditional calibration technique which uses mechanical standards. With mechanical standards you are required to make numerous connections to the test ports for a single calibration. These traditional calibrations require intensive operator interaction, which are prone to error. With ECal, a full two-port calibration can be accomplished with a single connection to the ECal module and minimal operator interaction. This results in faster and more repeatable calibrations, and less wear on the connectors—and on you. Calibrations for non-insertable devices are equally convenient and straightforward.

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ECal modules and available options^{A, B}

Connector type ¹	Frequency Range	ECal module Model Number	Available Options
7 mm	30 kHz to 6 GHz ²	HP 85091A	1BN, 1BP, 910, UK6
7 mm	1 GHz to 18 GHz	HP 85060B	001, 1BN, 1BP, 910, UK6
Type-N	30 kHz to 6 GHz ²	HP 85092A	00F, 00M, 00A, 1BN, 1BP, 910, UK6
Type-N	1 GHz to 18 GHz	HP 85064B	001, 00F, 00M, 00A, 1BN, 1BP, 910, UK6
3.5 mm	30 kHz to 6 GHz ²	HP 85093A	00F, 00M, 00A, 1BN, 1BP, 910, UK6
3.5 mm	1 GHz to 26.5 GHz	HP 85062B	001, 00F, 00M, 00A, 1BN, 1BP, 910, UK6

Options

Option	Description
001	Adds a 30 kHz to 6 GHz RF module ²
00F	Replace f/m connectors on ECal module(s) with f/f connectors
00M	Replace f/m connectors on ECal module(s) with m/m connectors
00A	Adds male-to-male and female-to-female adapters (also adds a 5/16" 90 N-cm [8 in-lb] torque wrench to 3.5 mm modules)
1BN	Mil-STD 45662 calibration certificate
1BP	Mil-STD 45662 calibration certificate with measured data
910	Add an extra operating and service manual
UK6	Commercial calibration certificate with measured data



HP 85097A PC interface kit

Ordering information

Select an ECal module based on the connector type required and the frequency range of your HP vector network analyzer (refer to table at right).

Order an HP 85097A PC interface module with control software to drive all HP ECal modules. If you will be using the HP 85097A to control an older HP 85060 series module with serial number below 800, the module will require a slight modification by an HP service center.

PC requirements

The HP 85097A requires a customer-supplied PC meeting the following minimum requirements:

- Windows ® 95, Windows NT ® 4.0 or later operating system
- 486 or later CPU
- 32 MB of RAM
- 10 MB available hard-disk space
- One of the following HP-IB interface cards:
HP 82340A/B, 82341C/D, National AT-GPIB/TNT, National AT-GPIB/TNT (plug-and-play) or National PCI-GPIB

¹ For ECal modules with sexed (m-f) connectors, the standard modules have one female and one male connector.

² RF ECal modules are specified to operate from 300 kHz to 6 GHz, with typical performance down to 30 kHz.

^A HP 85060 series modules cover a frequency range of 1 GHz to either 18 or 26.5 GHz. The upper frequency is limited by the connector cutoff frequency. Each module is supplied with a torque wrench and foam-padded wood storage box.

^B HP 85090 series modules cover a frequency range of 30 kHz to 6 GHz. Each module is supplied with a torque wrench and foam-padded wood storage box.

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ECal module specifications and characteristics

Specifications describe product performance covered by the product warranty over a temperature range of 0° C to +55° C.

Characteristics describe performance that is useful in the application of the product, but not warranted. Typical values describe non-warranted performance that most units will exhibit. **Characteristics and typical values are shown in italics.**

	HP 85091A ¹	HP 85092A ¹	HP 85093A ¹	HP 85060B	HP 85062B	HP 85064B
Frequency range						
Standard	30 kHz - 6 GHz	30 kHz - 6 GHz	30 kHz - 6 GHz	1 - 18 GHz	1 - 26.5 GHz	1 - 18 GHz
Option 001^{1,2}	N/A	N/A	N/A	30 kHz - 18 GHz	30 kHz - 26.5 GHz	30 kHz - 18 GHz
Maximum power	+20 dBm	+20 dBm	+20 dBm	+20 dBm	+20 dBm	+20 dBm
Minimum power	-45 dBm	-45 dBm	-45 dBm	-45 dBm	-45 dBm	-45 dBm
Connectors						
Standard	7 mm	Type-N (m-f)	3.5 mm (m-f) ³	7 mm	3.5 mm (m-f)	Type-N (m-f)
Option 00F	N/A	Type-N (f-f)	3.5 mm (f-f)	N/A	3.5 mm (f-f)	Type-N (f-f)
Option 00M	N/A	Type-N (m-m)	3.5 mm (m-m)	N/A	3.5 mm (m-m)	Type-N (m-m)

Measurement port specifications⁴ (Residual e-terms)

7 mm ECal modules

RF ECal module

HP 85091A	Frequency range			
	30 kHz to 300 kHz (typical)	300 kHz to 300 MHz	300 MHz to 3 GHz	3 GHz to 6 GHz
Directivity (dB)	-52	-52	-56	-55
Source match (dB)	-45	-45	-45	-42
Reflection tracking (±dB)	.05	.038	.038	.068
Transmission tracking (±dB)	0.14	.060	0.055	0.085
Load match (dB)	-41	-48	-47	-46

Microwave ECal module

HP 85060B	Frequency range (GHz)		
	1 to 2	2 to 8	8 to 18
Directivity (dB)	-50	-49	-46
Source match (dB)	-46	-45	-40
Reflection tracking (±dB)	.032	.046	.065
Transmission tracking (±dB)	.043	.050	0.14
Load match (dB)	-46	-44	-40
Option 001	Add RF ECal Module (30 kHz to 6 GHz)	See HP 85091A specifications	

¹ Performance is specified from 300 kHz to 6 GHz and typical from 30 kHz to 300 kHz.

² Option 001 adds an RF ECal module (30 kHz - 6 GHz)

³ 3.5 mm modules have precision slotless connectors that guarantee the best calibration accuracy is transferred to your system.

⁴ Specifications include the effects of the following environmental conditions: sine vibration, random vibration, storage survival, operating temperature stability, shock and humidity.

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Type-N ECal modules

RF ECal module

HP 85092A	Frequency range			
	30 kHz to 300 kHz (typical)	300 kHz to 300 MHz	300 MHz to 3 GHz	3 GHz to 6 GHz
Directivity (dB)	-52	-52	-54	-52
Source match (dB)	-45	-45	-45	-42
Reflection tracking (\pm dB)	0.05	0.037	0.037	0.068
Transmission tracking (\pm dB)	0.14	0.060	0.055	0.090
Load match (dB)	-41	-48	-47	-44

Microwave ECal module

HP 85064B	Frequency range (GHz)		
	1 to 2	2 to 8	8 to 18
Directivity (dB)	-50	-49	-46
Source match (dB)	-46	-45	-40
Reflection tracking (\pm dB)	0.034	0.046	0.065
Transmission tracking (\pm)	0.043	0.050	0.14
Load match (dB)	-46	-44	-40
Option 001	Add RF ECal Module (30 kHz to 6 GHz)	See HP 85092A specifications	

3.5 mm ECal modules³

RF ECal module

HP 85093A	Frequency range			
	30 kHz to 300 kHz (typical)	300 kHz to 300 MHz	300 MHz to 3 GHz	3 GHz to 6 GHz
Directivity (dB)	-52	-50	-52	-50.5
Source match (dB)	-45	-45	-43	-40
Reflection tracking (\pm dB)	0.05	0.043	0.043	0.055
Transmission tracking (\pm dB)	0.14	0.050	0.045	0.085
Load match (dB)	-41	-48	-47	-44

Microwave ECal module

HP 85062B	Frequency range (GHz)			
	1 to 2	2 to 8	8 to 20	20 to 26.5
Directivity (dB)	-48	-49	-46	-44
Source match (dB)	-45	-43	-40	-37
Reflection tracking (\pm dB)	0.041	0.041	0.064	0.088
Transmission tracking (\pm dB)	0.048	0.068	0.13	0.17
Load match (dB)	-45	-43	-40	-38
Option 001	Add RF ECal Module (30 kHz to 6 GHz)	See HP 85093A specifications		

³3.5 mm modules have precision slotless connectors that guarantee the best calibration accuracy is transferred to your system.