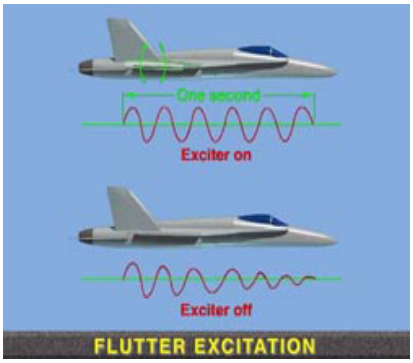
MB Win475, Multi-DUT

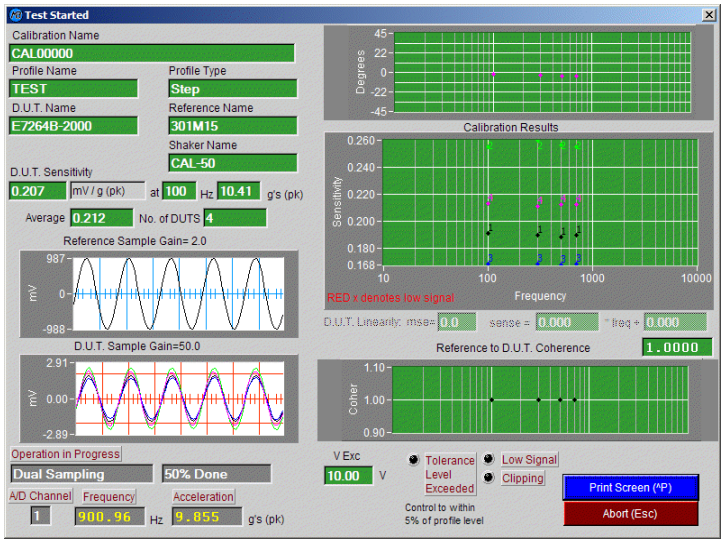
Simultaneously Calibrate 4 Accelerometers



To increase the productivity of calibrating accelerometers, MB Dynamics offers the MB Win475 Multi-DUT Option. One optional version automatically performs frequency-response calibrations on up to four IEPE (ICP), charge or capacitive sensors. Another version performs frequency-response, as well as static, calibrations on up to four piezoresistive (PR) sensors.

Features to calibrate multiple IEPE, charge or capacitive accelerometers

- Step sine frequency response calibration
- Simultaneously measures magnitude and phase of each DUT using FFT technology
- Calibrates up to 4 accelerometers at once
- Transducer mass ≤ 20 grams, each
- Freq. response: 1 Hz to 4,000 Hz with CAL 50
- Calibrate up to 40 g's pk with CAL 50
- Calibrate up to 15mm p-p with CAL 50 exciter (25mm between stops)
- Model 407-MULT Signal Conditioner provides independent software auto-ranging gains/Ch.
- Measures nominal sensitivity at 100 or 159 Hz
- Archives with record flagged as to single or Multiple-DUT calibration
- Visually identifies out-of-tolerance transducers
- Run-time display of all accelerometer results
- Freq. response: 0.5 to 2,000 Hz with CAL RED
- Calibrate up to 60 g's pk with CAL RED
- Calibrate up to 28mm p-p with CAL RED (38mm between stops)
- Model 407-MULT also provides DC excitation voltage for capacitive devices



Win475 Run-time display of 4 DUTs at 900 Hz & 10 g's. Note different accelerometer sensitivities. Phase and coherence are identical so only one point is visible.

Model 407-MULT 4-Channel Signal Conditioner sitting on top of Model 405 Signal Conditioner, all channels with software auto-ranging gains.

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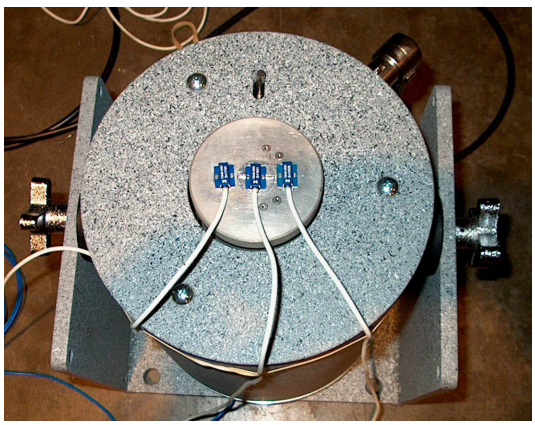
Features to calibrate & characterize performance of multiple piezoresistive (PR) accelerometers

❖ **Static or DC measurements**	❖ **Dynamic or frequency-dependent measurements**
o Perform bridge shunt calibration o Measure ZMO, 0-g offset voltage, zero offset error o Measure input and output resistance of transducer	Same Features on previous page, IEPE & charge devices

Specification for Static or DC Measurements	Value
Bridge excitation voltage, VDC	2 – 15, continuously variable, software-selectable
Zero Measurand Output (ZMO), zero-g offset voltage, or zero offset error	Measured, stored and reported automatically
DC voltage measurement	0.005% from using PCI DMM; no operator adjustment of DMM
Shunt calibration: a) Number of shunt resistors b) Shunt placement c) Shunt resistor values and tolerances d) Input and output resistances, error e) Checks for opens and shorts f) 4-wire vs. 2-wire measurement	 a) Up to 9 user-supplied internal to Model 407 Signal Conditioner, socketed connections; 1 user-supplied external, easy access; software automatically sequences through selected resistors; both data and settings stored in database for future retrieval b) Any arm, user-selected via mouse click c) Unlimited range; user-supplied d) Measured automatically, < 0.1% e) Automatic; values are obvious in input/output resistances f) 4-wire results in improved accuracy; directly measuring voltage and current then computing resistance eliminates errors due to fixturing and interface resistance

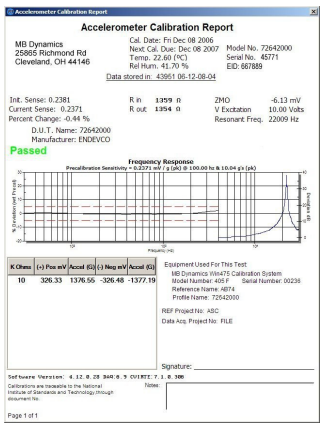
The Table below shows the additional uncertainty due to any one or more of the four DUTs not being back-to-back with the REF, what MB calls the "Multi-DUT Non-Coincident" uncertainty. System Transfer Uncertainty and Reference Accelerometer Uncertainty are per the Win475 Data Sheet. Frequencies in the Table are the NIST-traceable frequencies for the REF in a ***Win475-Basic*** system, the only frequencies at which MB recommends calibrations. Expanded System Uncertainty = square root of the sum of the squares of the other 3 uncertainties at the 95% level.

NIST Trace-able Frequencies	System Transfer Uncertainty	Reference Accel Uncertainty	Non-Coincident Uncertainty	Expanded System Uncertainty
5 Hz	± 0.25%	± 2.0%	± 2.0%	± 2.9%
100 Hz	± 0.25%	± 1.0%	± 2.0%	± 2.3%
159 Hz	± 0.25%	± 1.0%	± 2.0%	± 2.3%
300 Hz	± 0.25%	± 1.0%	± 2.0%	± 2.3%
700 Hz	± 0.25%	± 1.0%	± 2.0%	± 2.3%
1,000 Hz	± 0.25%	± 1.0%	± 2.0%	± 2.3%
2,000 Hz	± 0.25%	± 2.5%	± 2.0%	± 3.3%
3,000 Hz	± 0.25%	± 2.5%	± 3.0%	± 4.0%
4,000 Hz	± 0.25%	± 2.5%	± 3.0%	± 4.0%



CAL 50 exciter with 3 PR DUTs mounted

Sample Report for each PR DUT


Accelerometer Calibration Report

MB Dynamics
25865 Richmond Rd
Cleveland, OH 44146

Cal. Date: Fri Dec 08 2006
Next Cal. Due: Dec 08 2007
Temp. 22.66 (°C)
Rel Hum. 41.70 %
Model No. 72642000
Serial No. 45771
EID: 667889

Data stored in: 43961 06-12-08-04

Int. Sense: 0.2381
Current Sense: 0.2371
Percent Change: -0.44 %
R in 1359 Ω
R out 1354 Ω
ZMO -6.13 mV
V Excitation 10.00 Volts
Resonant Freq. 22009 Hz

D.U.T. Name: 72642000
Manufacturer: ENDEVCO

Passed

Frequency Response

K Ohms	(+) Pos mV	Accel (G)	(-) Neg mV	Accel (G)
10	326.33	1376.56	-326.48	-1377.19

Equipment Used For This Test:
MB Dynamics Win475 Calibration System
Model Number: 405 F
Serial Number: 00236
Reference Name: AB74
Profile Name: 72642000
REF Project No: ABC
Data Acq. Project No: FILE

Signature:

Notes:

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