Introducing the Napa Force-Balance Vertical Seismometer

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The Napa design is the third in a series of FBV seismometers, starting with the Inyo and later the Yuma. It is designed to be relatively inexpensive and able to be constructed and operated by any advanced amateur seismologist who has access to a reasonably well-equipped metalworking shop.

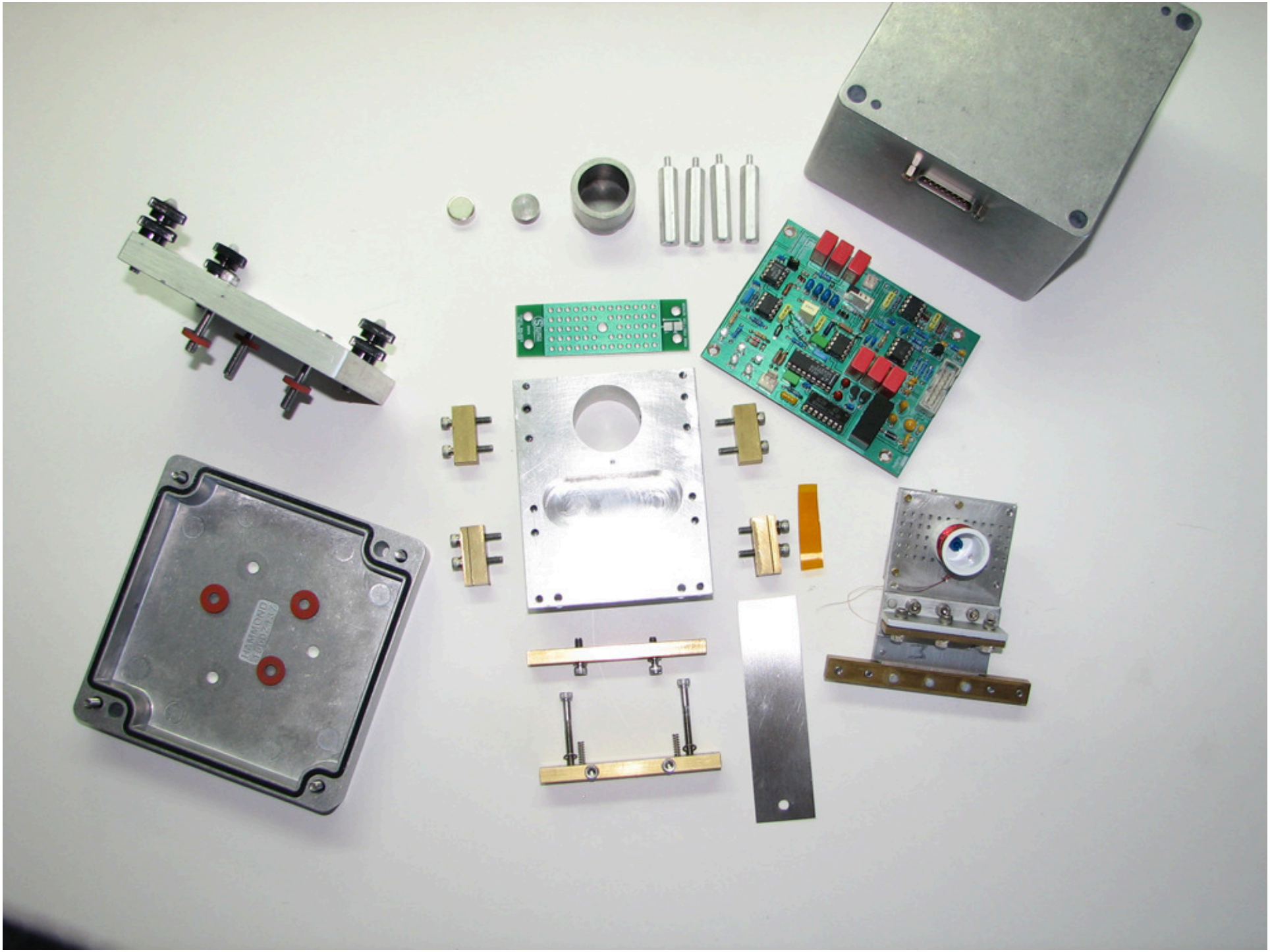
Smallest of the three designs, having a mass of about 60g, the Napa incorporates a self contained pressure case, making use of a standard Hammond waterproof aluminum box employing a simplified "warpless" base design.

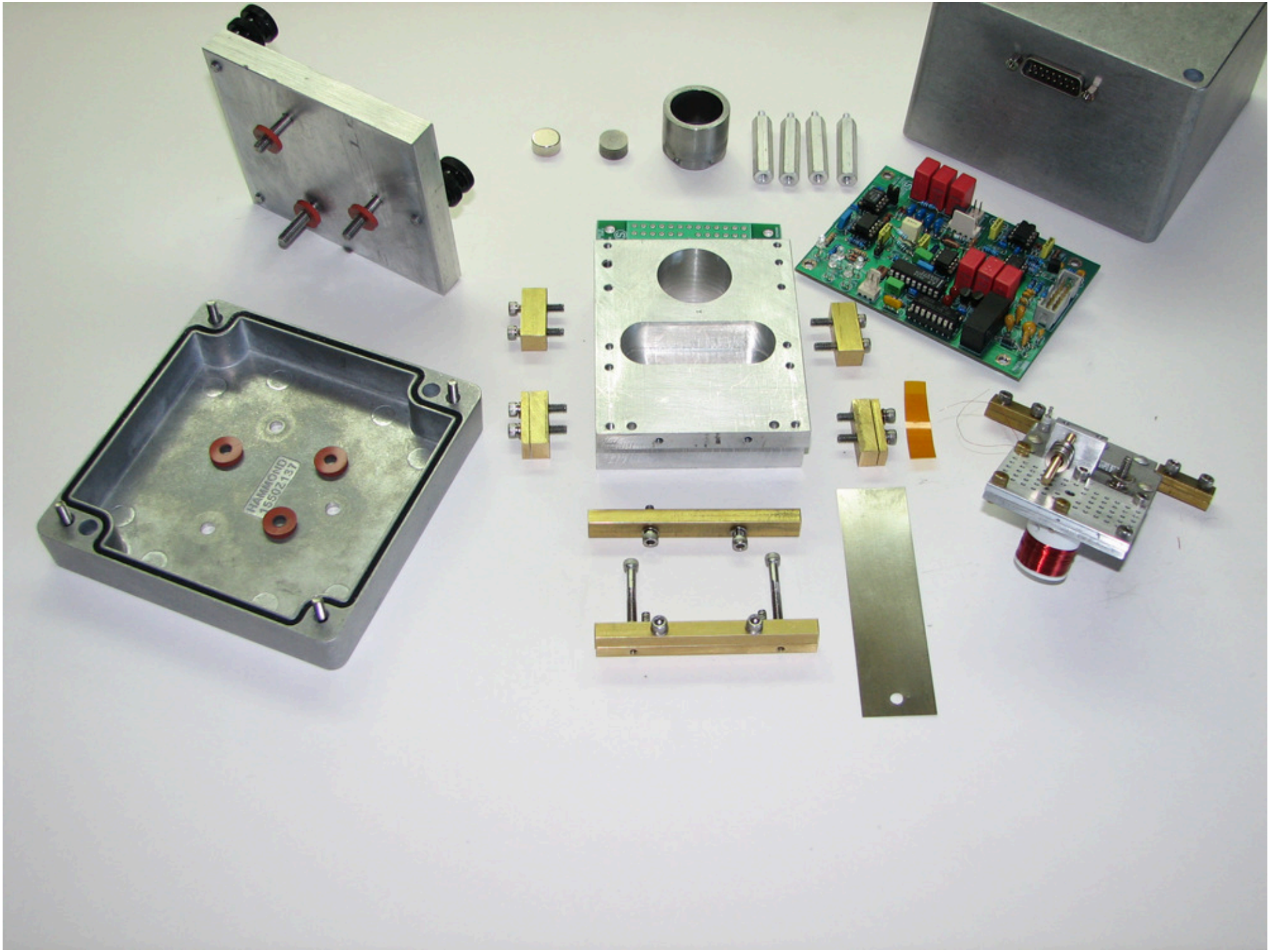
Like the earlier designs, its velocity response has a 2-pole low-frequency corner at 50 seconds and a 1-pole high-frequency corner at 30 Hz.

In order to allow the use of a less expensive 16-bit digitizer, the Napa provides two output signals. The high-gain output has a mid-band generator constant of 25,000 V/m/s, which will clip at a peak velocity of 400 µm/s, giving a sensitivity of 12.2 nm/s per count when used with a ±10V, 16-bit A/D. A low-gain output signal continues to provide useful data to a second A/D channel for any large or nearby quakes which exceed the 400 µm/s clipping velocity. The low-gain output has a generator constant which is lower by a factor of 50, giving 500 V/m/s or 600 nm/s per count, and clips at a peak velocity of 2 cm/s.

Instrument internal noise is designed to be sufficiently low so that it will always be below the local site noise encountered at any amateur installation. In fact, early tests suggest that the instrument self-noise PSD is below the NLNM out to 25 seconds period, rising to around -180dB vs $1m^2/sec^4$ per Hz at 50 seconds period. At 1mHz, the instrument PSD measures slightly below -150dB.

The Napa employs a stainless-steel leaf spring, having a thermoelastic coefficient of about -240ppm/°C. This means that for best performance, it must be well insulated so as to have a long thermal time constant from the ambient temperature. Although its steady-state temperature coefficient approaches zero, the instrument will respond to the rate of temperature change by an estimated 41 µm/s per °C per hour.

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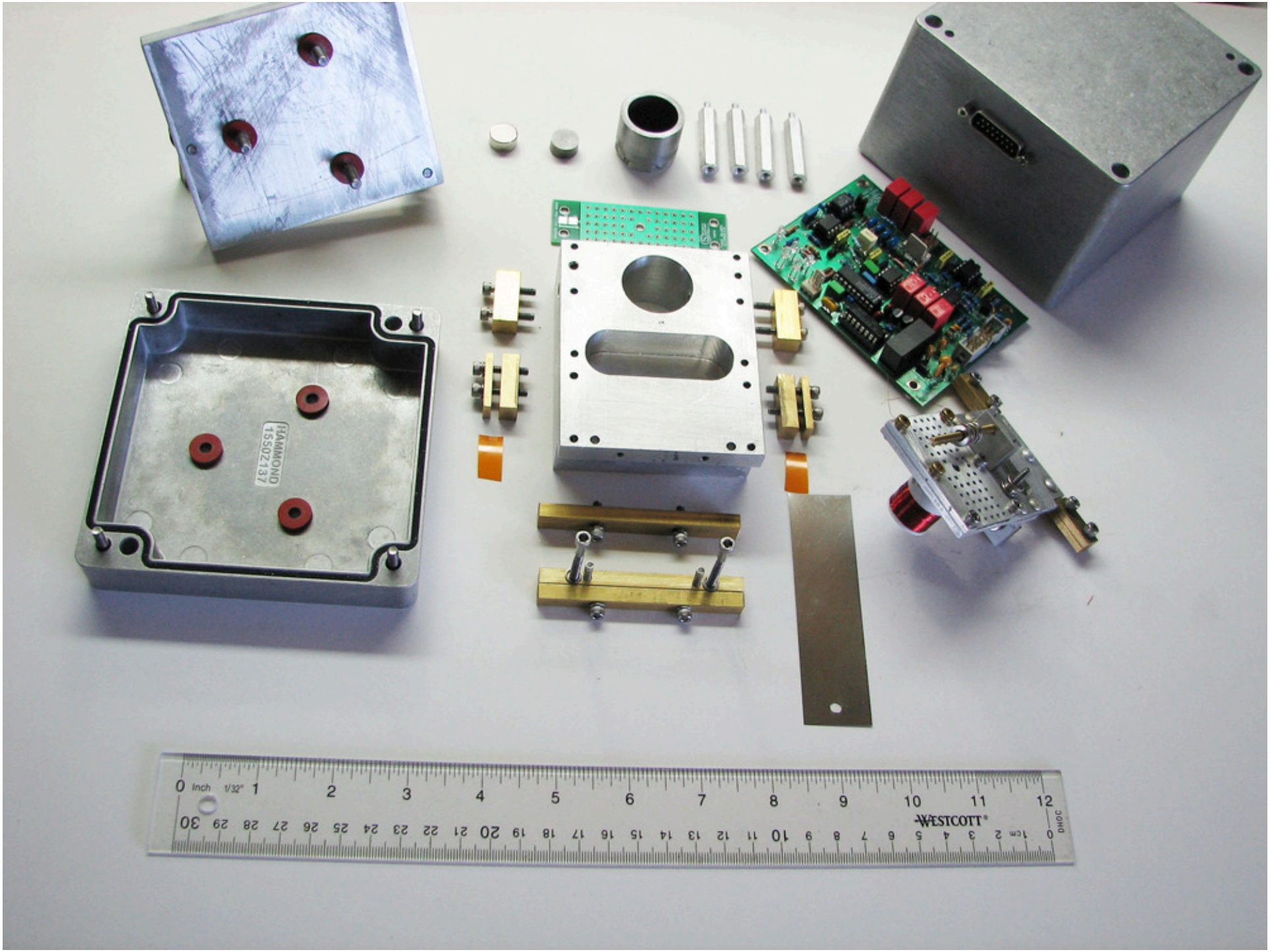
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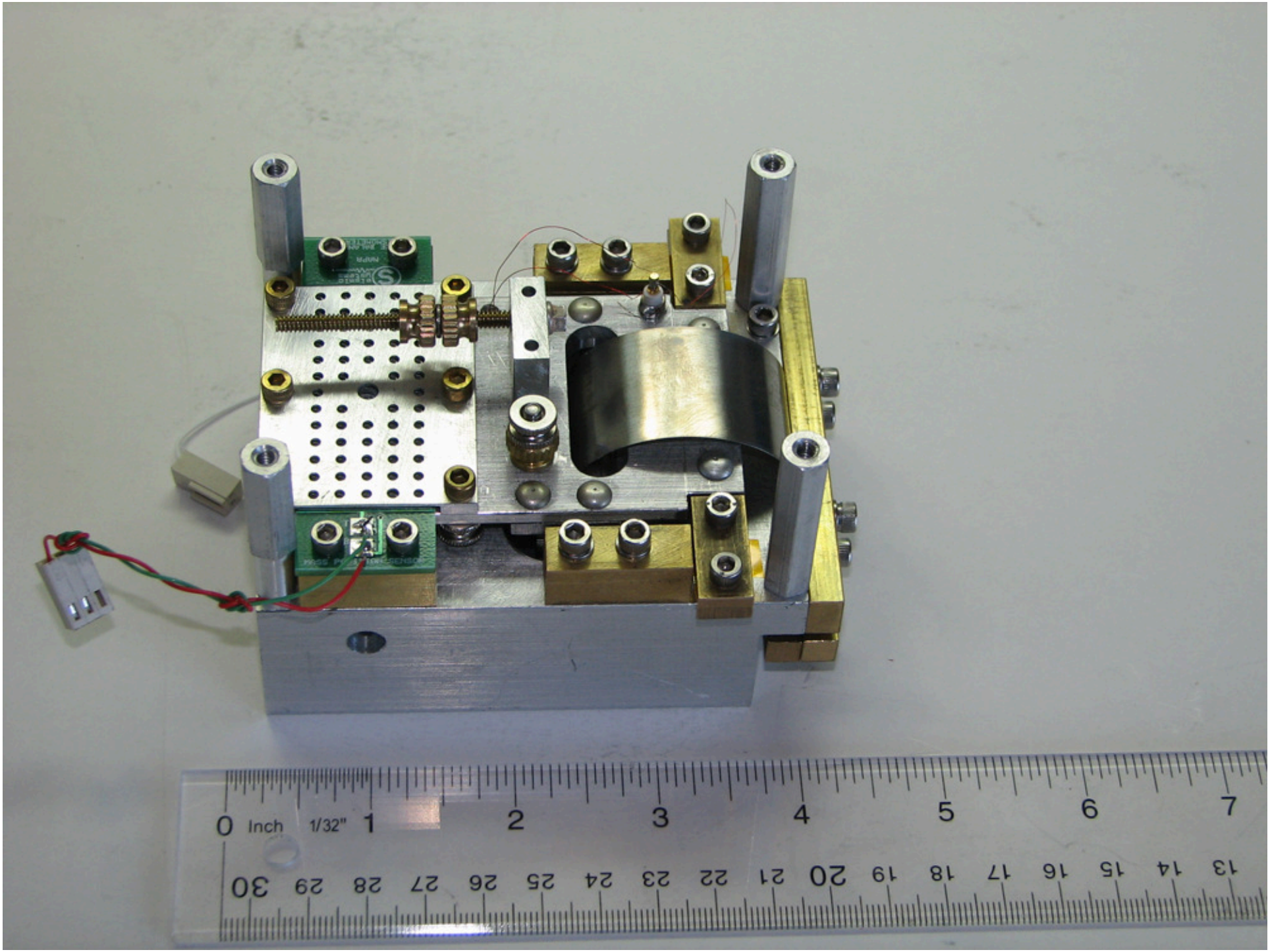
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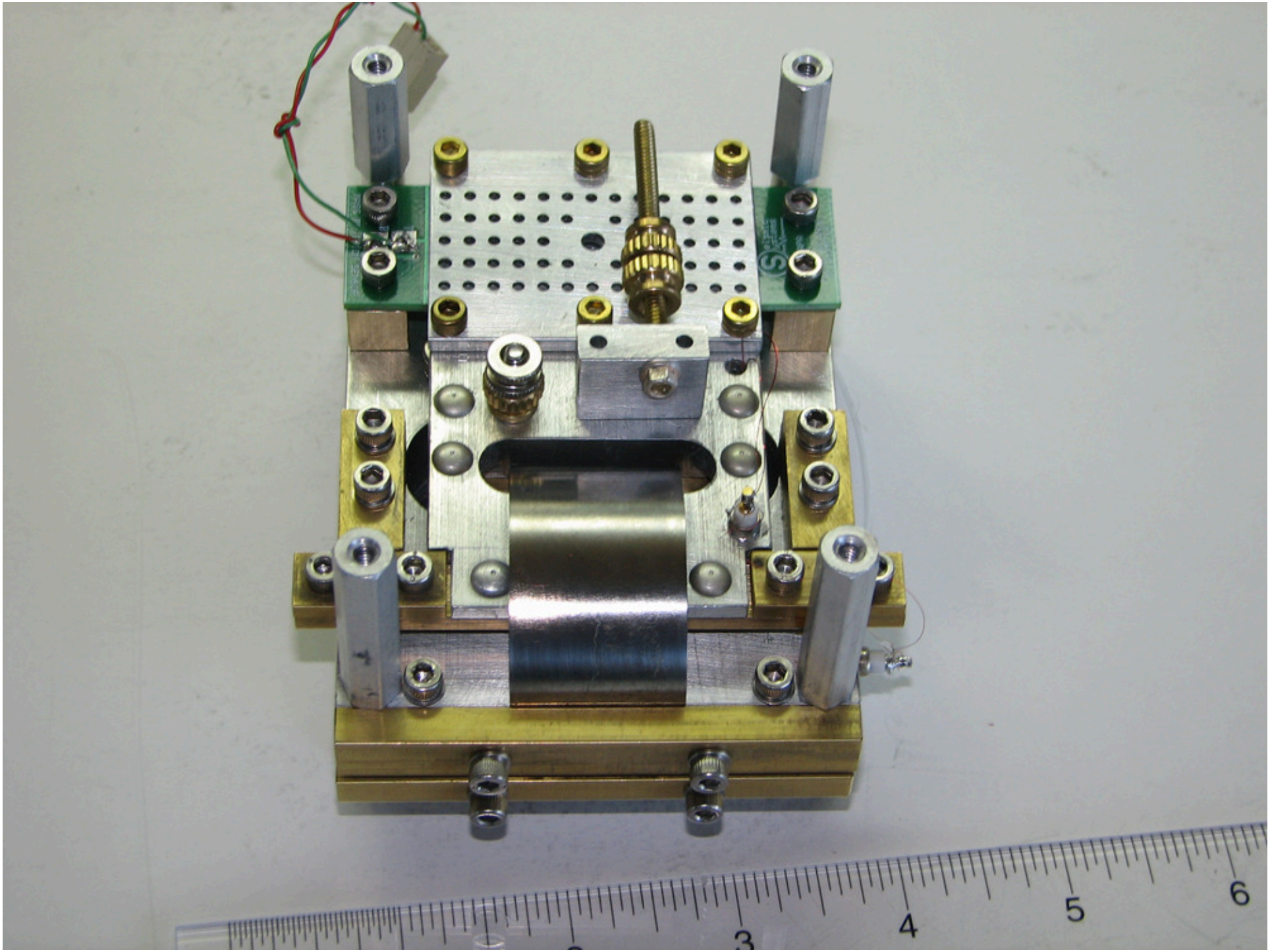
30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13


3
4
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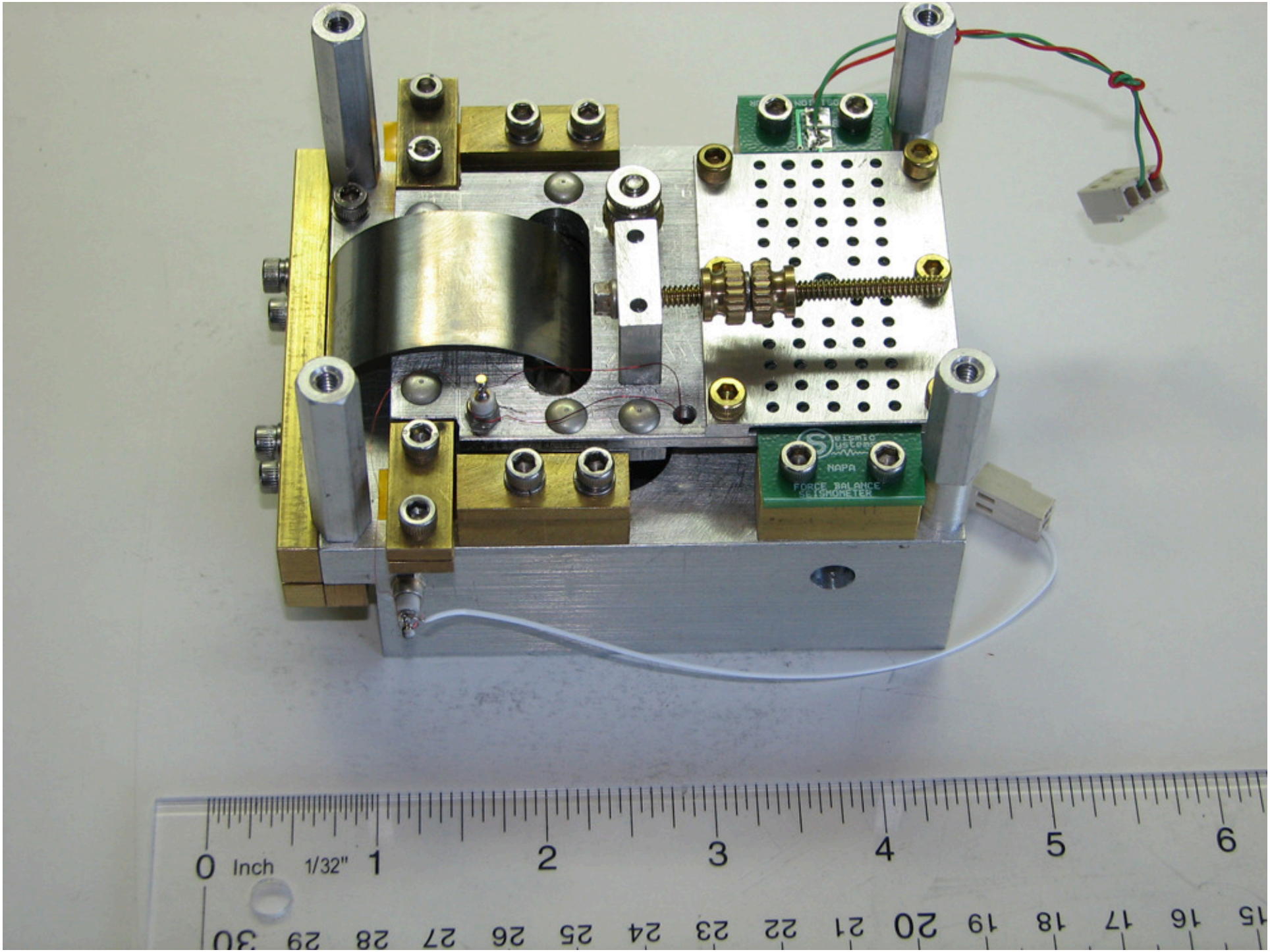
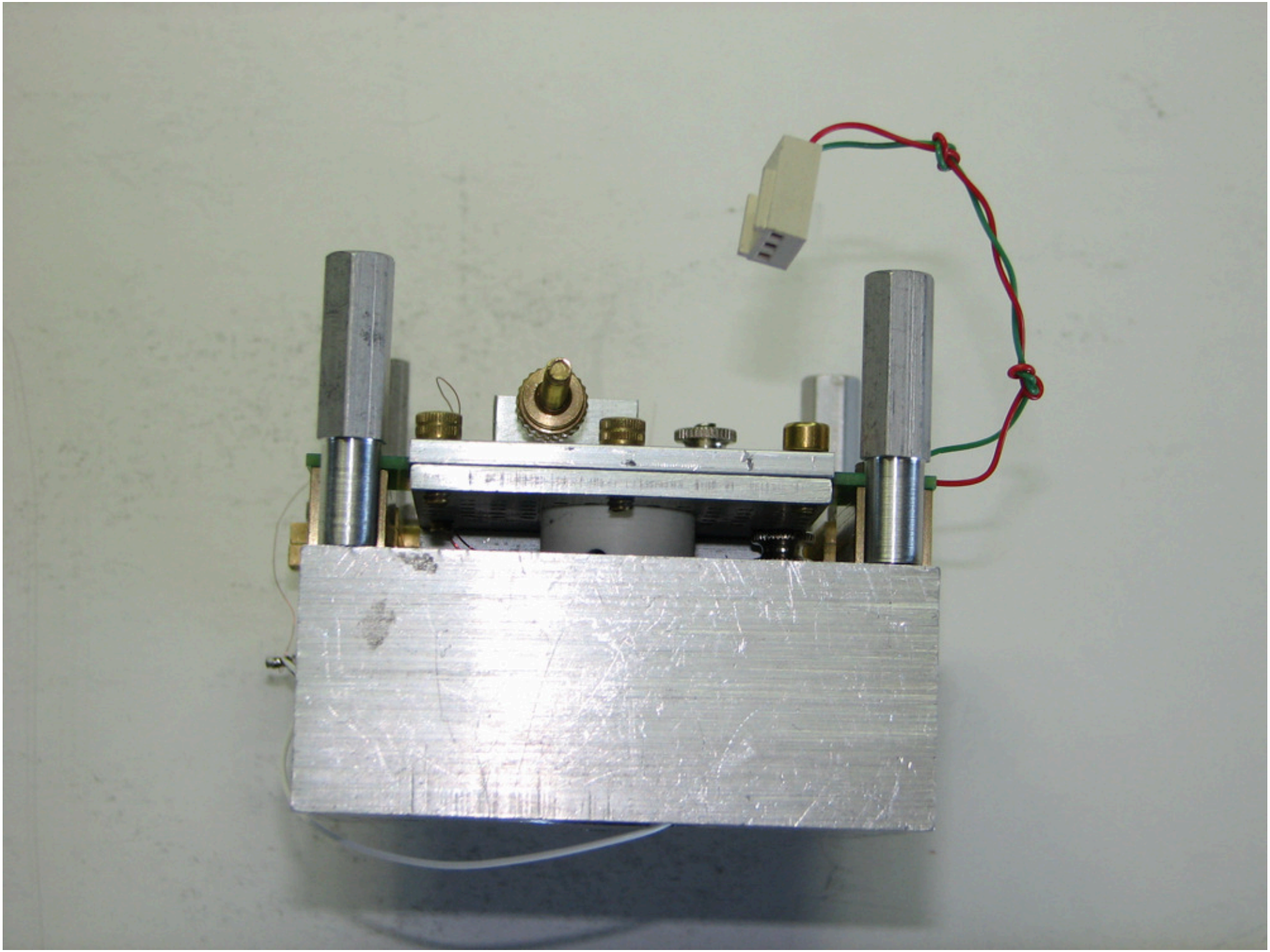
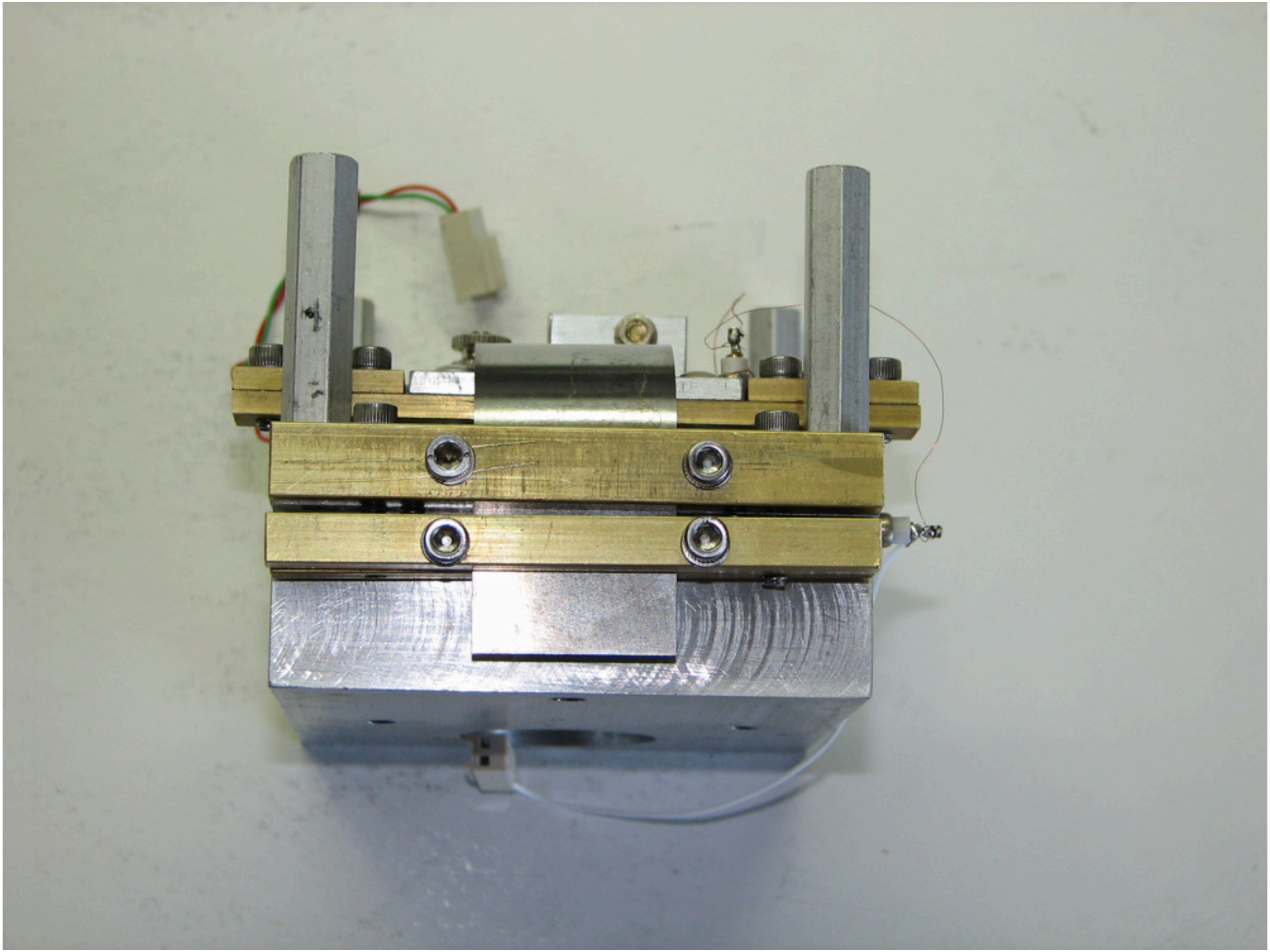
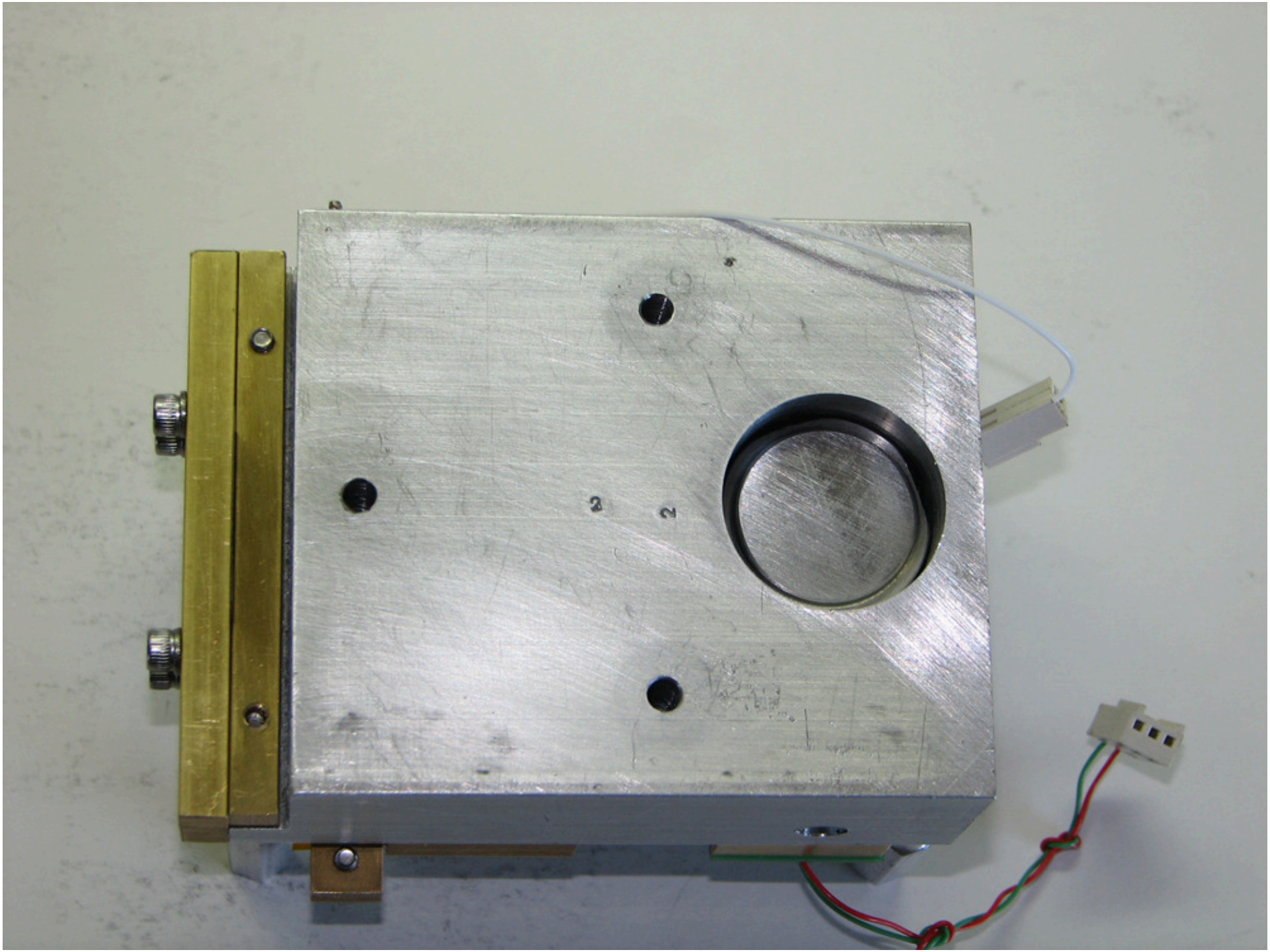
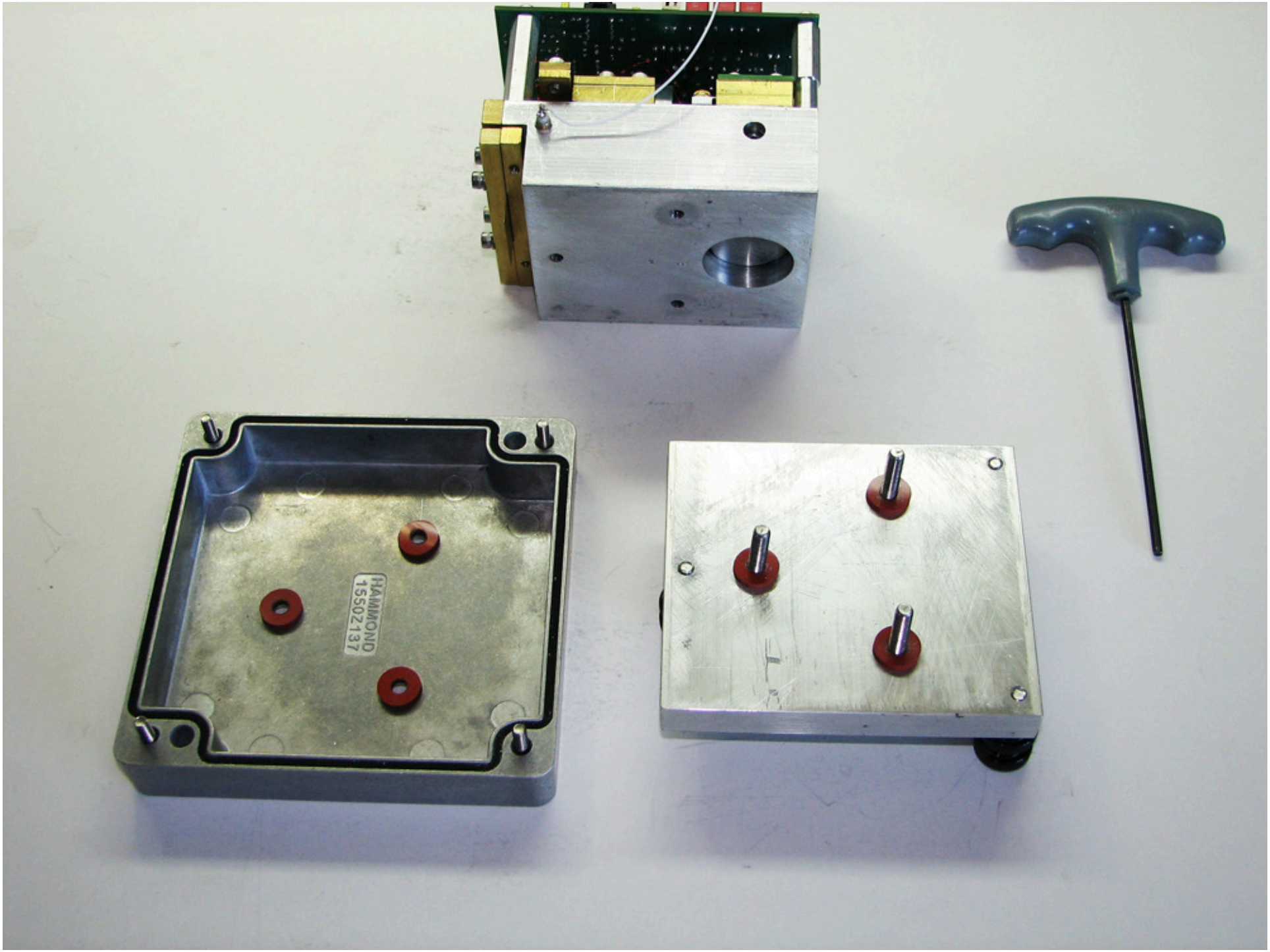
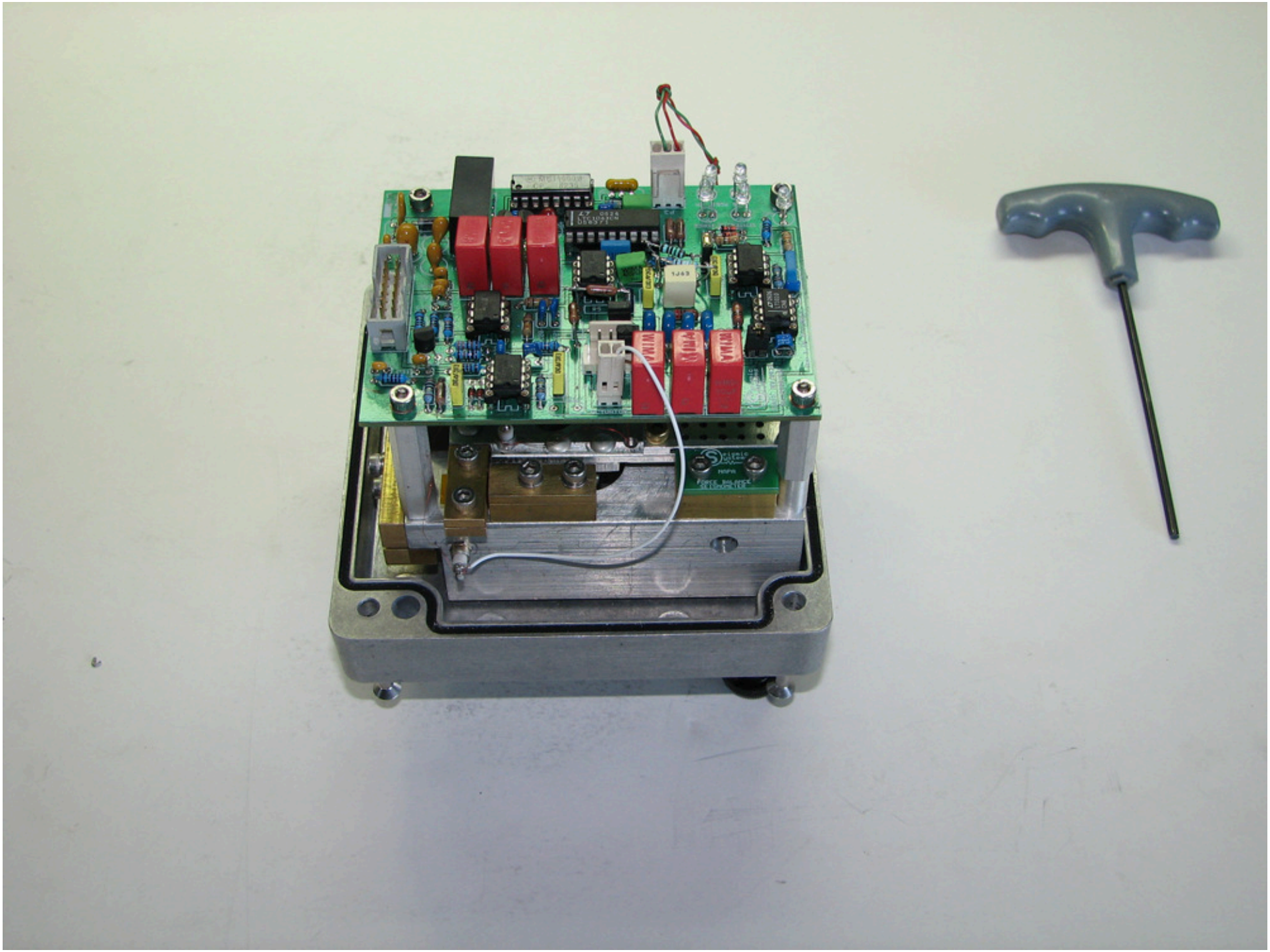

Seismic Systems
NAPA
FORCE BALANCE
SEISMOMETER
0 Inch 1/32" 1 2 3 4 5 6
30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15

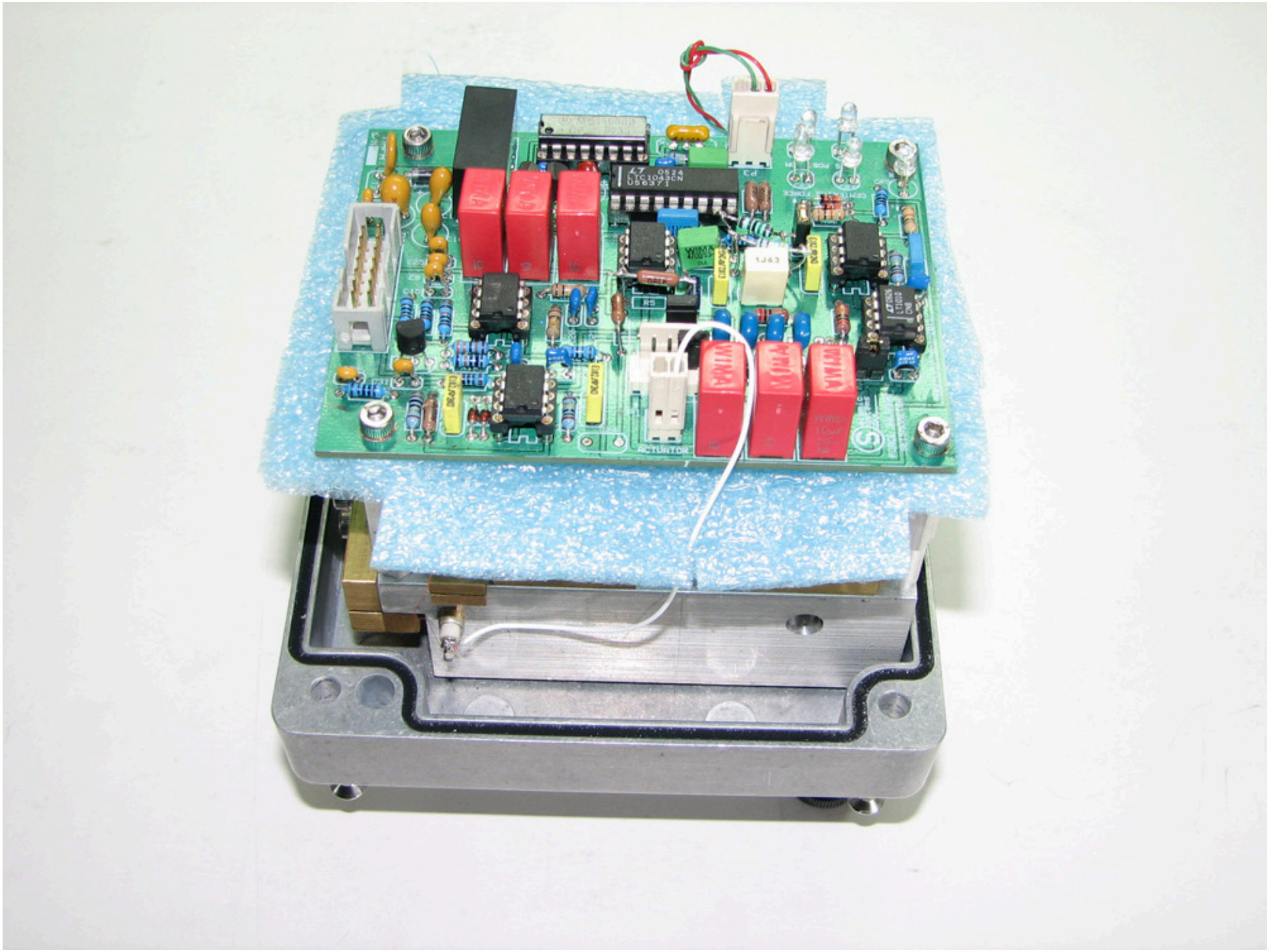







HAMMOND
1550Z137

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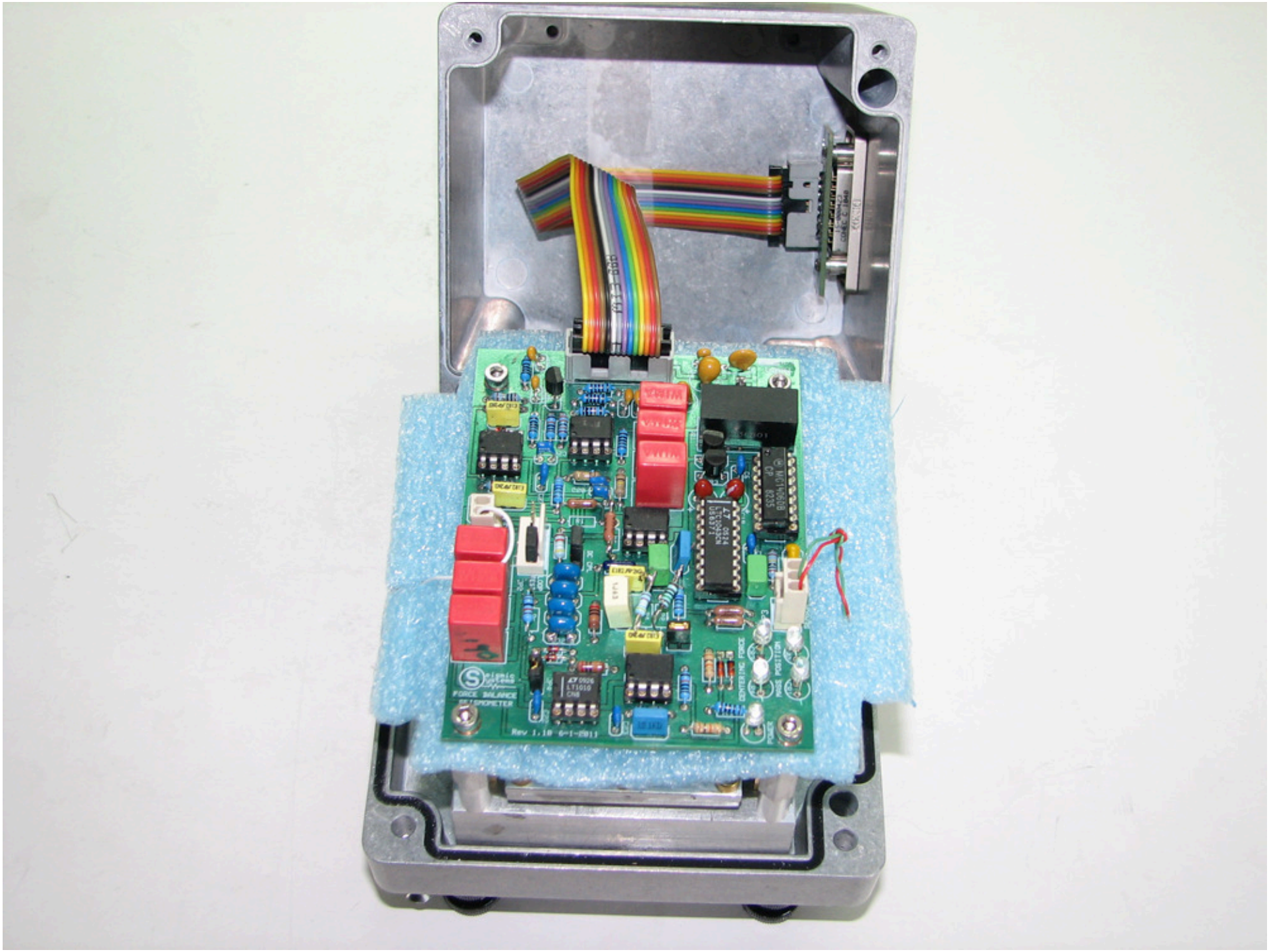
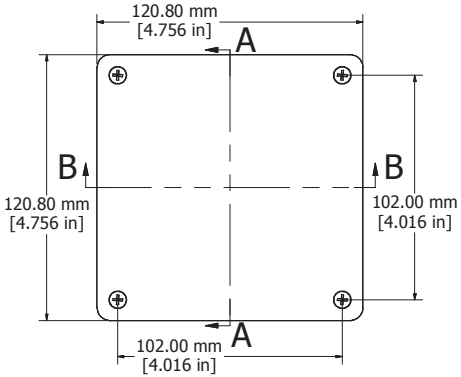
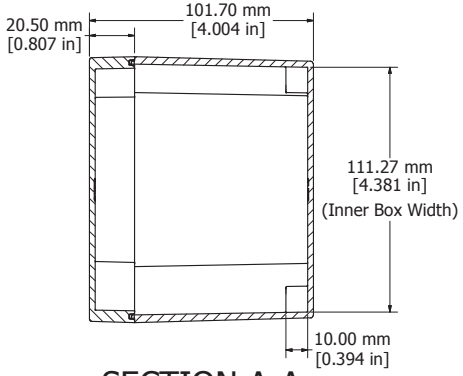
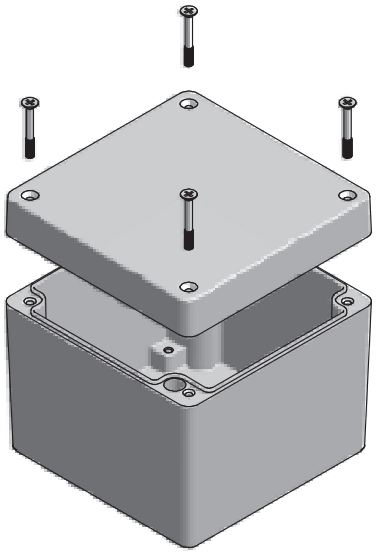

Rev 1.10 6-1-2011

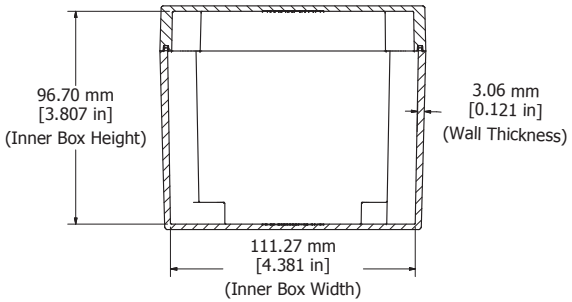


ASSEMBLY

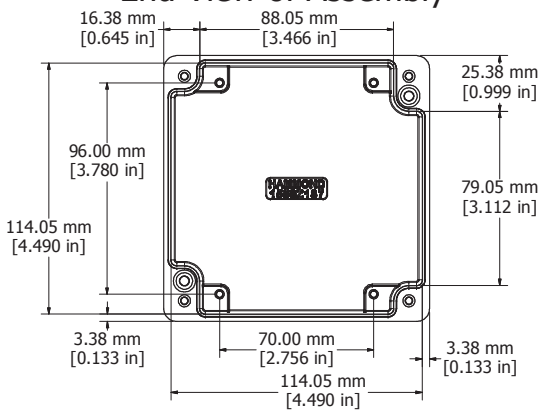


SECTION A-A
End View of Assembly

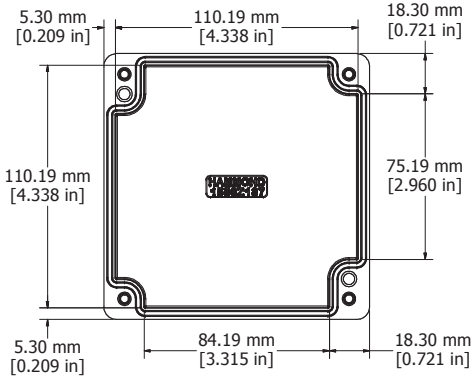




SECTION B-B
End View of Assembly



Top View Looking Inside Box



View Looking Inside Lid

Enclosures can be Factory Modified (Milling, Drilling, Printing etc.)
Contact Factory mjm@hammondmfg.com for quotes
Solid models of this enclosure available in STEP or IGES.

NOTES
Purchased assembly includes enclosure, M4x30 lid screws
Gasket - Pre-formed Silicone Rubber
Cover screws should be torqued to 5-7.5 lbf.in (50-75 cN.m)

1550Z137	
PART NUMBERS	
Unfinished	1550Z137
Black Textured Powder Paint - RAL 9011	1550Z137BK

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1550Z137

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