Remote Measurements & Research Company
214 Euclid Av.
Seattle WA 98122
michael@rmrco.com

CALIBRATION RESULTS

Instrument	Radiometer Analog to Digital Interface (RAD)
Serial Number	222
ID	1802
SPP	38213F3 (in 1507 cal)
PIR	38137F3 (in 1507 cal)
Lead Tech	J. Reynolds
Calibration Start Time	20180227
Calibration End Time	20180302
Location	RMRCO Seattle
Calibration Type	Electronic gain and ADC conversion. System setup and burn in.
Results	Attached sheets.
After calibration	Shipped as new to Customer.

DISCUSSION:

This RAD was submitted for calibration after ¿ two years. Special emphasis was given to evaluating any drift in the calibration.

CALIBRATION COMPARISONS /

Two calibrations were made and compared to the 1507 calibration. Cal 1802-A was made to the RAD as it came in the door. This cal was basically as the previous except slight zero drift ('o' and 'O'); The preamplifiers were zeroed and the cal was re-done. The final calibration is 1802-B.

	cal1507	cal1802A	cal1802B
L :	10.00		
PSP k :	8e-6		
PIR K :	4e-6		
A :	222		
V :	4096	4095	4095
C 0 :	33286	33274	33274
C 1 :	-6.991e-05	-6.622e-05	-6.622e-05
C 2 :	9.374e-02	9.528e-02	9.528e-02
C 3 :	-3.194e+01	-3.398e+01	-3.398e+01
D 0 :	33115	33274	33122
D 1 :	-4.330e-05	-6.622e-05	-4.222e-05
D 2 :	7.241e-02	9.528e-02	-7.334e-02
D 3 :	-2.818e+01	-3.398e+01	-2.929e+01
g :	118.64	118.65	118.79
o :	-0.07	-2.14	0.09
G :	823.09	824.60	825.23
O :	-5.52	-2.29	1.72

```
Program a1_radcal.m v3   Runtime:2018-02-21 (052) 16:00:08.0
Calibration date: 180221
SN: 222
Calpath: /Users/rmr/Dropbox/instruments/RAD/RAD_CALIBRATION/222_whoi/1802
PLOT FILE NAME: radcalplot_222_1802
Reference voltage = 4095.0 millivolts (TP16)
PSPCAL
      -1.0,   -121.14
      -0.5,    -61.38
      -0.1,    -13.52
       0.0,     -2.18
       0.1,     10.17
       0.2,     21.48
       0.5,     56.69
       1.0,    116.49
       2.0,    235.31
       4.0,    472.19
       8.0,    947.12
PIRCAL
      -2.0,  -1654.21
      -1.0,   -825.23
      -0.8,   -662.97
      -0.4,   -326.04
      -0.2,   -166.72
       0.0,     -4.56
       0.2,    163.41
       0.4,    326.42
       0.6,    492.11
       1.0,    820.77
Reference Rcase=33210.0
Reference Rdome=33050.0
caseR
      5600,   590.600
     10000,   947.100
     15600,  1307.000
     20000,  1537.000
     25600,  1780.000
     30000,  1940.000
domeR
      5600,   590.600
     10000,   947.100
     15600,  1307.000
     20000,  1537.000
     25600,  1780.000
     30000,  1940.000

==== CASE TEMPERATURE ========
Case Rref = 33210, Rref based on measurements of v_t = 33274. %Error = -0.2
Case fit : -6.622e-05  9.528e-02 -3.398e+01

CASE THERMISTOR MILLIVOLTS
      Meas        ADC    ADC-Corrected
```

590.6	590.5	591.3
947.1	942.4	945.4
1307.0	1286.5	1307.5
1537.0	1498.1	1538.0
1780.0	1714.9	1780.2
1940.0	1854.3	1939.3

CASE THERMISTOR OHMS

CalR	Meas	ADC	ADC-corrected
5600	5597	5596	5605
10000	9992	9927	9968
15600	15569	15213	15577
20000	19955	19158	19975
25600	25535	23928	25541
30000	29897	27483	29876

CASE THERMISTOR DEG C

CalR	Meas	ADC	ADC-correc
39.96	39.98	39.98	39.94
25.00	25.02	25.18	25.08
14.28	14.33	14.87	14.32
8.58	8.63	9.56	8.61
3.08	3.13	4.56	3.13
-0.37	-0.30	1.52	-0.28

==== DOME TEMPERATURE ========
Dome Rref = 33050, Rref based on measurements of v_t = 33274. %Error = -0.7
Dome fit : -6.622e-05, 9.528e-02, -3.398e+01

DOME THERMISTOR MILLIVOLTS

Meas	ADC	ADC-Corrected
590.6	590.5	591.3
947.1	942.4	945.4
1307.0	1286.5	1307.5
1537.0	1498.1	1538.0
1780.0	1714.9	1780.2
1940.0	1854.3	1939.3

DOME THERMISTOR OHMS

CalR	Meas	ADC	ADC-corrected
5600	5570	5569	5578
10000	9944	9880	9920
15600	15494	15139	15502
20000	19858	19066	19878
25600	25412	23813	25418
30000	29753	27351	29732

DOME THERMISTOR DEG C

CalR	Meas	ADC	ADC-correc
39.96	40.11	40.11	40.07
25.00	25.14	25.30	25.20
14.28	14.44	14.99	14.43

```
      8.58       8.74       9.67       8.72
      3.08       3.24       4.67       3.23
     -0.37      -0.19       1.63      -0.18

==== PSP THERMOPILE CIRCUIT ========
PSP Calibration Gain (g) = 118.65,  Offset (o) = -2.1 millivolts

==== PIR THERMOPILE CIRCUIT ========
PIR Calibration Gain (g) = 824.60,  Offset (o) = -2.3 millivolts

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RAD SETUP COMMANDS
L : 10
k : MISSINGe-6
K : MISSINGe-6
A : 22
180221                  1507                180222
V : 4095 4096 4095
C 0 : 33274 33246 33274
C 1 : -6.622e-05 -6.991e-05 -6.622e-05
C 2 : 9.528e-02 9.374e-02 9.528e-02
C 3 : -3.398e+01 -3.194e+01 -3.398e+01
D 0 : 33274 33115 33122
D 1 : -6.622e-05 -4.330e-05 -4.222e-05
D 2 : 9.528e-02 7.241e-02 -7.334e-02
D 3 : -3.398e+01 -2.818e+01 -2.929e+01
g : 118.65 118.64 118.79
o : -2.14 -0.07 0.09
G : 824.60 823.09 825.23
O : -2.29 -5.52 1.72
```
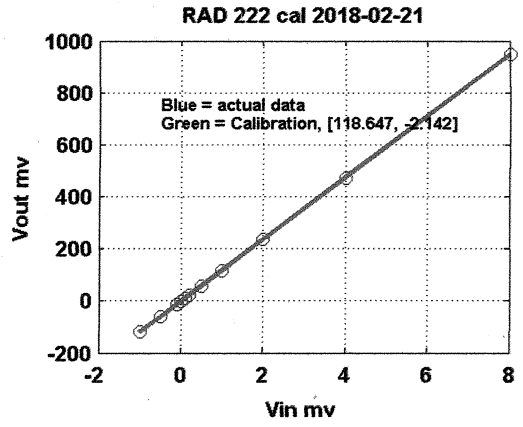
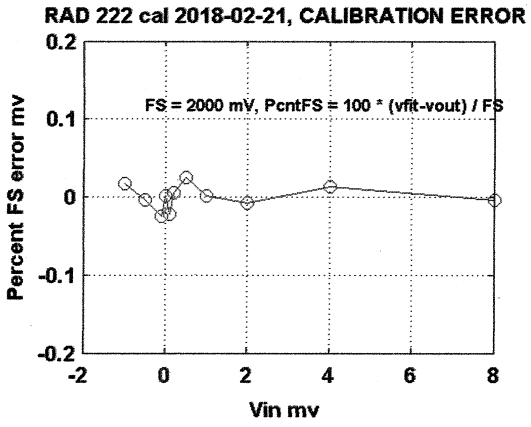
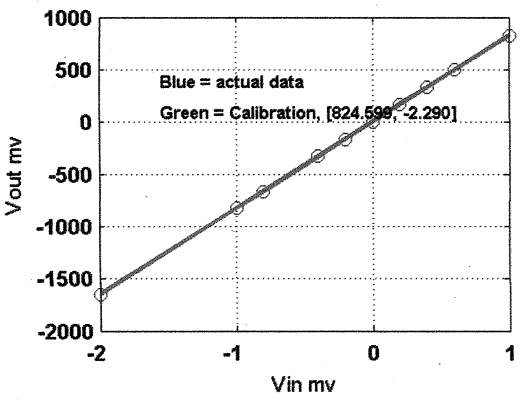
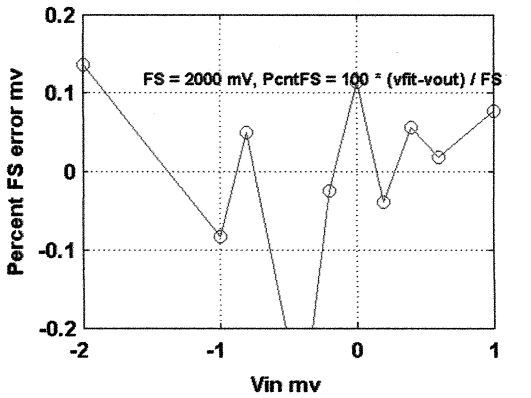


RAD 222 cal 2018-02-21
Blue = actual data
Green = Calibration, [118.647, -2.142]
Vout mv
Vin mv
1000
800
600
400
200
0
-200
-2
0
2
4
6
8


RAD 222 cal 2018-02-21, CALIBRATION ERROR
FS = 2000 mV, PcntFS = 100 * (vfit-vout) / FS
Percent FS error mv
Vin mv
0.2
0.1
0
-0.1
-0.2
-2
0
2
4
6
8


Blue = actual data
Green = Calibration, [824.598, -2.290]
Vout mv
Vin mv
1000
500
0
-500
-1000
-1500
-2000
-2
-1
0
1


FS = 2000 mV, PcntFS = 100 * (vfit-vout) / FS
Percent FS error mv
Vin mv
0.2
0.1
0
-0.1
-0.2
-2
-1
0
1