CALIBRATION REPORT
Portable Radiation Package

SERIAL NUMBER 05

DataSet Configuration: 0101
Document date: February 8, 2001

Configuration File:

```
PRP CALIBRATION INFORMATION FILE -- created: 2001-02-07 (038) 13:25:02
LAST EDIT: new file
CALIBRATION NAME: 0101
DATA POINT OF CONTACT: R. M. Reynolds
POC ADDRESS: 490D; Brookhaven National lab; Upton NY 11973; USA
POC EMAIL: reynolds@bnl.gov
PRP SERIAL NUMBER: 05
FILE NAME: p05_calinfo_0101.txt
DOCUMENTS: Cal05_0101.pdf
HEAD SERIAL NUMBER: 461
HEAD CALIBRATION ID: 0101
DATALOGGER SERIAL NUMBER: dl00_6
DATALOGGER CALIBRATION ID: 0101
PSP SERIAL NUMBER: 31282F3
PSP CALIBRATION ID: orig
PIR SERIAL NUMBER: 30169F3
PIR THERMOPILE CALIBRATION ID: 0101
PIR TEMPERATURE CALIBRATION ID: 0101
COMMENTS: Test case
```

BROOKHAVEN NATIONAL LABORATORY

Bldg 490d, Upton NY 11973 — 631-344-7836 — reynolds@bnl.gov

PRP INFO FILE

```
SETUP FOR PROCESSING PRP CALIBRATIONS: 07-Feb-2001 16:18:53
PRP S/N: 05,   Calibration identifier: 0101
Configuration file: hd:instruments:prp:prpcal:prp:05:0101:INFO_05_0101.txt
PRP CALIBRATION
PRP CALIBRATION INFORMATION FILE -- created: 2001-02-07 (038) 13:25:02
LAST EDIT: new file
CALIBRATION NAME: 0101
DATA POINT OF CONTACT: R. M. Reynolds
POC ADDRESS: 490D; Brookhaven National lab; Upton NY 11973; USA
POC EMAIL: reynolds@bnl.gov
PRP SERIAL NUMBER: 05
FILE NAME: p05_calinfo_0101.txt
DOCUMENTS: Cal05_0101.pdf
HEAD SERIAL NUMBER: 461
HEAD CALIBRATION ID: 0101
DATALOGGER SERIAL NUMBER: dl00_6
DATALOGGER CALIBRATION ID: 0101
PSP SERIAL NUMBER: 31282F3
PSP CALIBRATION ID: orig
PIR SERIAL NUMBER: 30169F3
PIR THERMOPILE CALIBRATION ID: 0101
PIR TEMPERATURE CALIBRATION ID: 0101
COMMENTS: Test case
-----------------------
CALIBRATION INFO FOR HEAD 461:
# This file            : 461.CAL
# Data valid from date : 01/11/2001
# MFRSR system owner   : UNIV. OF MIAMI
# YESDAS system password: Langley!
# Supervisor password  :  Irradiance!
# System Datalogger ID : $0000 (Hex), 0 (Dec)
# Instrument Head ID   : $0A70 (Hex), 2672 (Dec)
# Instrument Head S/N  : 461
--------------------
DATALOGGER CALIBRATION: ProcLoggerCal (version 101)  Run date: 07-Feb-2001 16:23:32
DATALOGGER S/N DL2000_6, PREAMP 6  (Minnett PRP05)
  CALIBRATION DATE: 010122
  TECHNICIAN: EDWARDS
  VOLTAGE REFERENCE: VOLT-A-VIDER (cal: ???)\
  USE PRECISION VREF CIRCUIT

-----------------

----------
CALIBRATION INFO FOR HEAD 461:
# This file            : 461.CAL
# Data valid from date : 01/11/2001
# MFRSR system owner   : UNIV. OF MIAMI
# YESDAS system password: Langley!
# Supervisor password  :  Irradiance!
# System Datalogger ID : $0000 (Hex), 0 (Dec)
# Instrument Head ID   : $0A70 (Hex), 2672 (Dec)
# Instrument Head S/N  : 461
```

```
----------
DATALOGGER CALIBRATION: ProcLoggerCal (version 101)  Run date: 07-Feb-2001 16:23:32
DATALOGGER S/N DL2000_6, PREAMP 6  (Minnett PRP05)
  CALIBRATION DATE: 010122
  TECHNICIAN: EDWARDS
  VOLTAGE REFERENCE: VOLT-A-VIDER (cal: ???)\
  USE PRECISION VREF CIRCUIT

----------
PSP CALIBRATION: S/N 31282F3
  Factory cal: 2000 8.51, 2001-01-23 8.39
8.39
  8.390
----------
PIR CALIBRATION - S/N: 30169F3
  New calibration 2001-01-23 4.08
4.08
  4.080
-----------------
PIR THERMISTOR CALIBRATION -- PART 2
Process times from file lacie:instruments:prp:prpcal:pir:30169F3:30169F3_Tcal_0101.dat
SAVE THE RESULTS TO FILE lacie:instruments:prp:prpcal:pir:30169F3:30169F3_Tcal_0101.mat
save lacie:instruments:prp:prpcal:pir:30169F3:30169F3_Tcal_0101.mat readme beta_case beta_dome rcav rcs
  beta_case and beta_dome are Steinhart-Hart coefficients
  tcase = steinharthart(beta_case,r) where r = thermistor resistance in ohms.
  tdome = steinharthart(beta_dome ...
  rcav and rcstd are the test resistances and the std dev for each test point.
  rdav and rdstd are ditto for the dome
  tav and tstd are the mean temperature and std dev for each test point as
     computed from the SBE834 temperature probe.
  tc_ysi and td_ysi are computed from the published YSI calibration table.
      (See function 'YSI44006.m'.)
  casefit and domefit are cubic fitted corrections to the YSI computed temperatures.
    If tcaseysi is a vector of case temperatures computed from the YSI44006.m function,
    then  tcase = tcase + polyval(casefit,tcaseysi);
     Ditto for the dome.
----------
COMPUTE PIR THERMISTOR COEFFICIENTS
Use calibrated coefficients for PIR case thermistor

Use calibrated coefficients for PIR doome thermistor
```

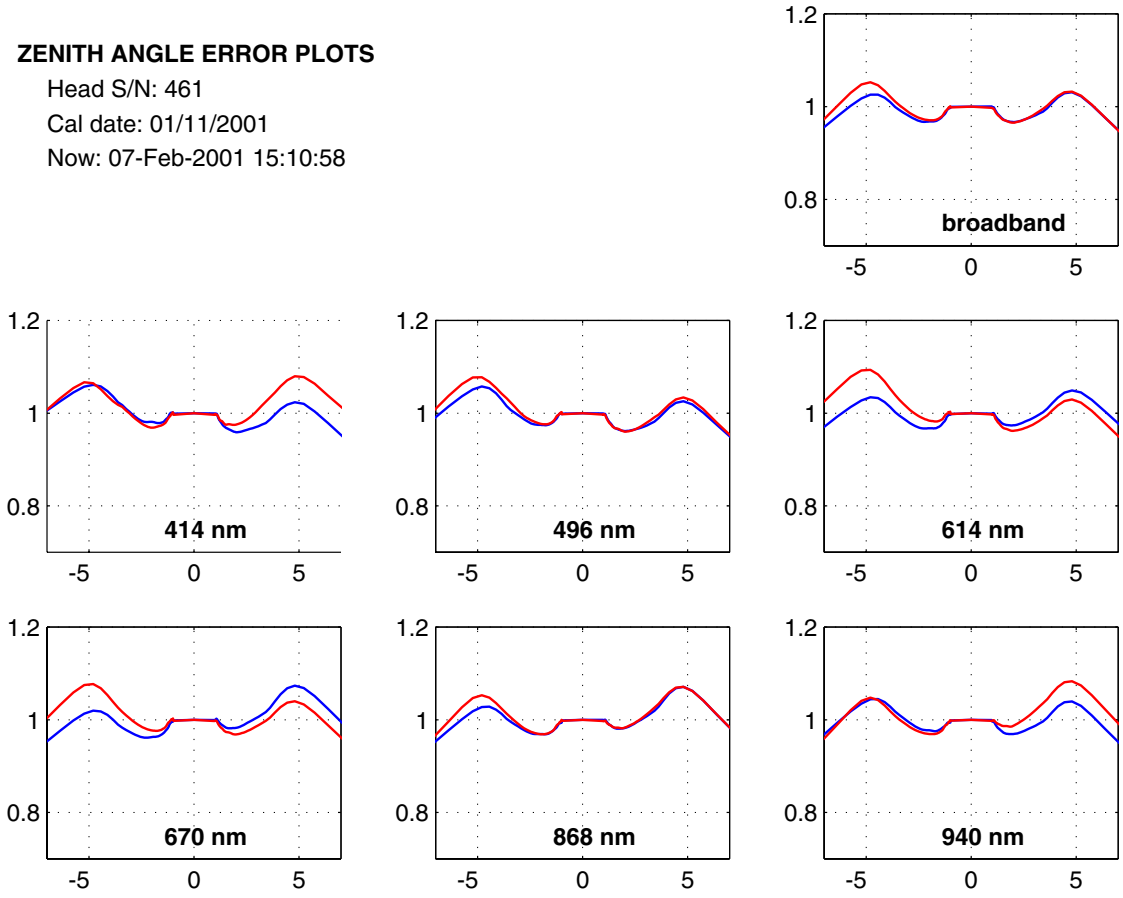


Figure 1: Zenith Angle Error

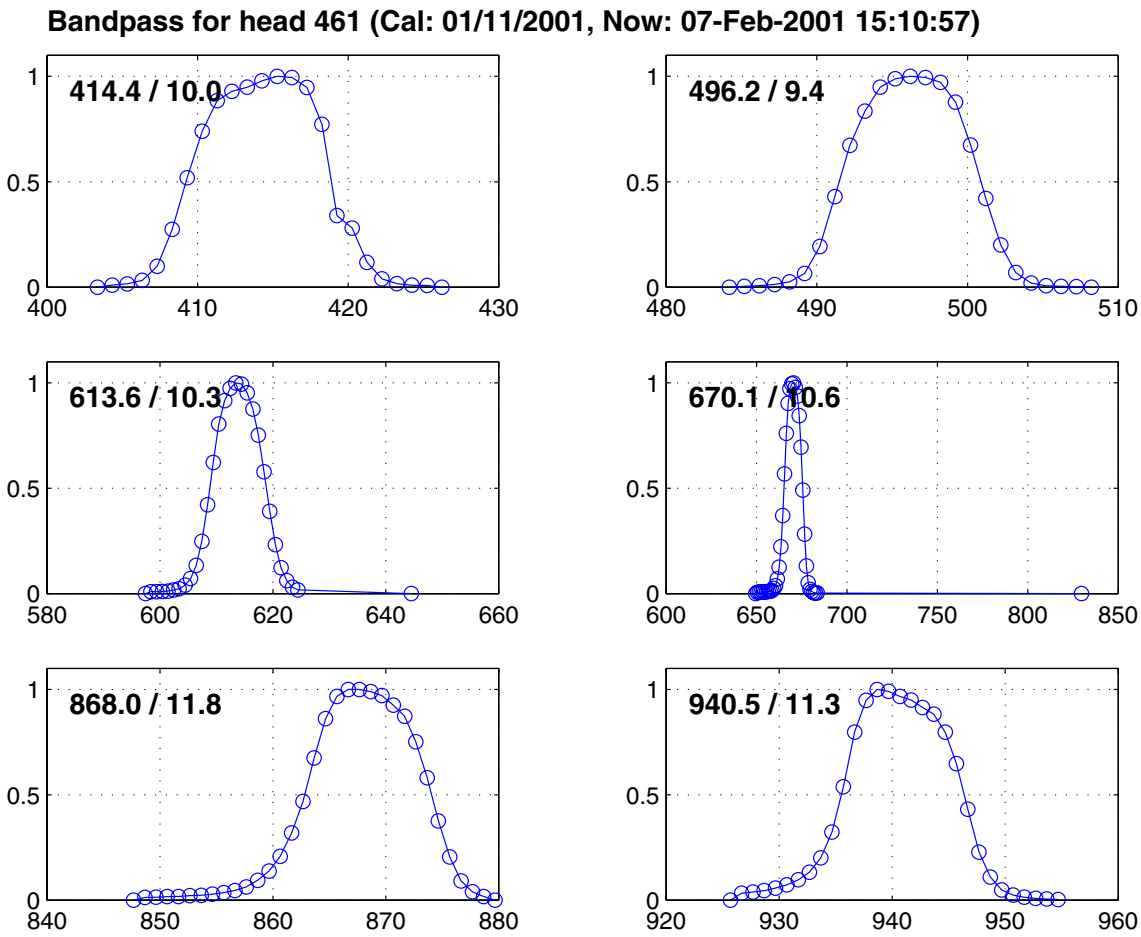


Figure 2: Zenith Angle Error

HEAD 461 TOA IRRADIANCES BASED ON ASTRONOMICAL SOLAR SPECTRUM

WAVELENGTH (nm)			IRRADIANCE (W/m^2/nm)		
LOWER	CENTER	UPPER	LOWER	MEAN	UPPER
403,	414,	426,	1.652,	1.739,	1.826
484,	496,	508,	1.850,	1.947,	2.045
597,	614,	644,	1.627,	1.713,	1.798
649,	670,	830,	1.457,	1.534,	1.611
848,	868,	880,	0.907,	0.954,	1.002
926,	941,	955,	0.779,	0.820,	0.861

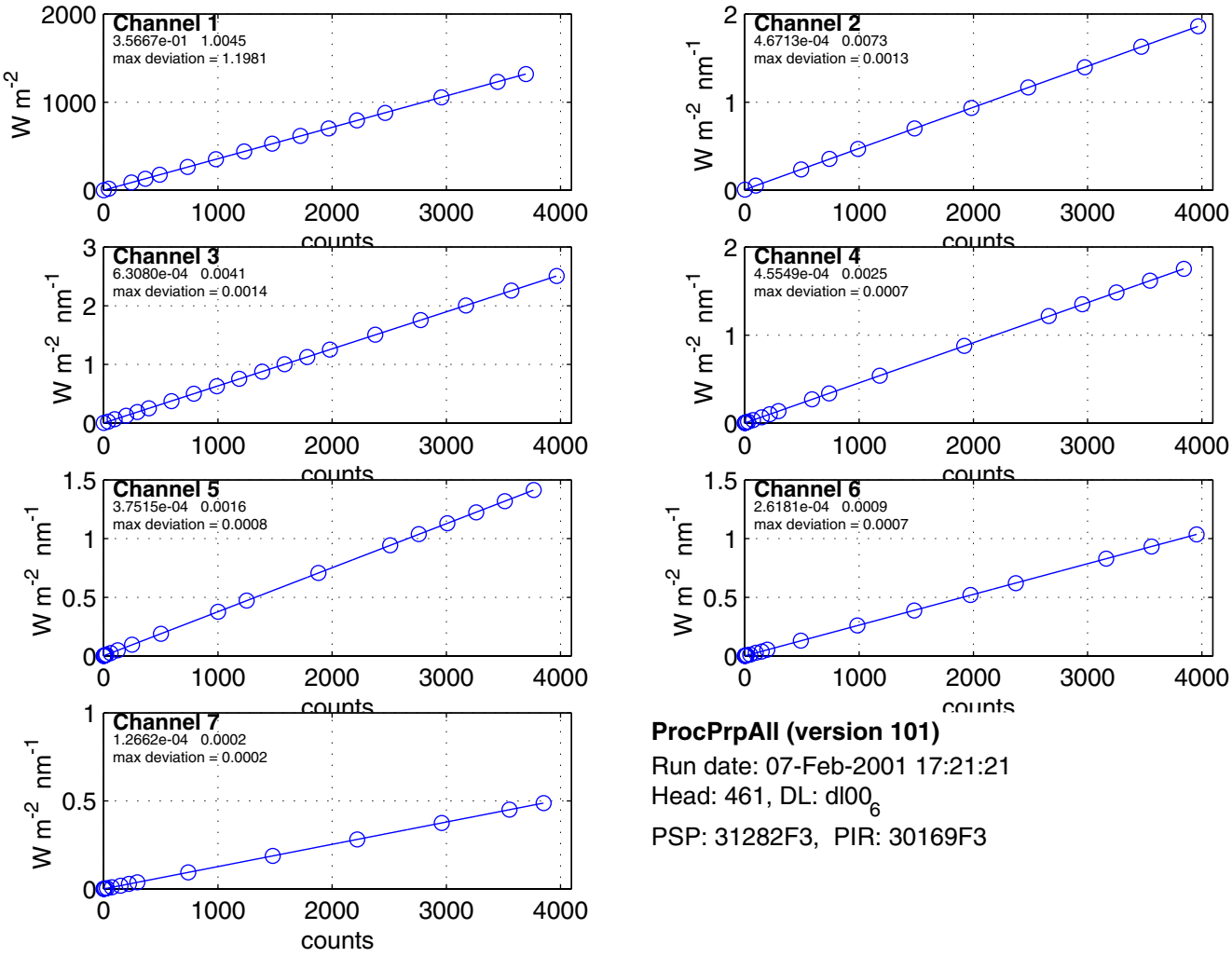


Figure 3: Head and Logger combined gains

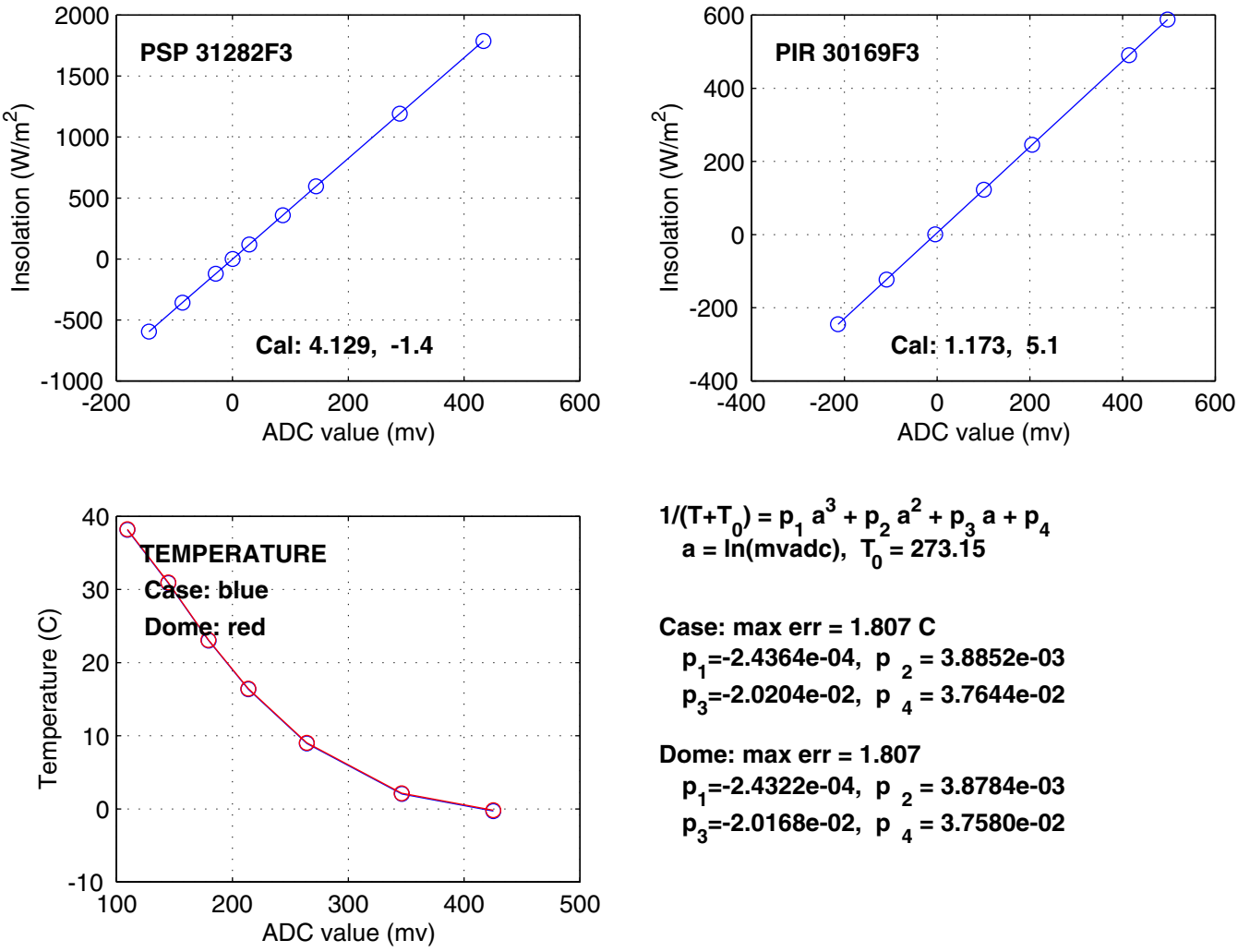


Figure 4: Head and Logger combined gains

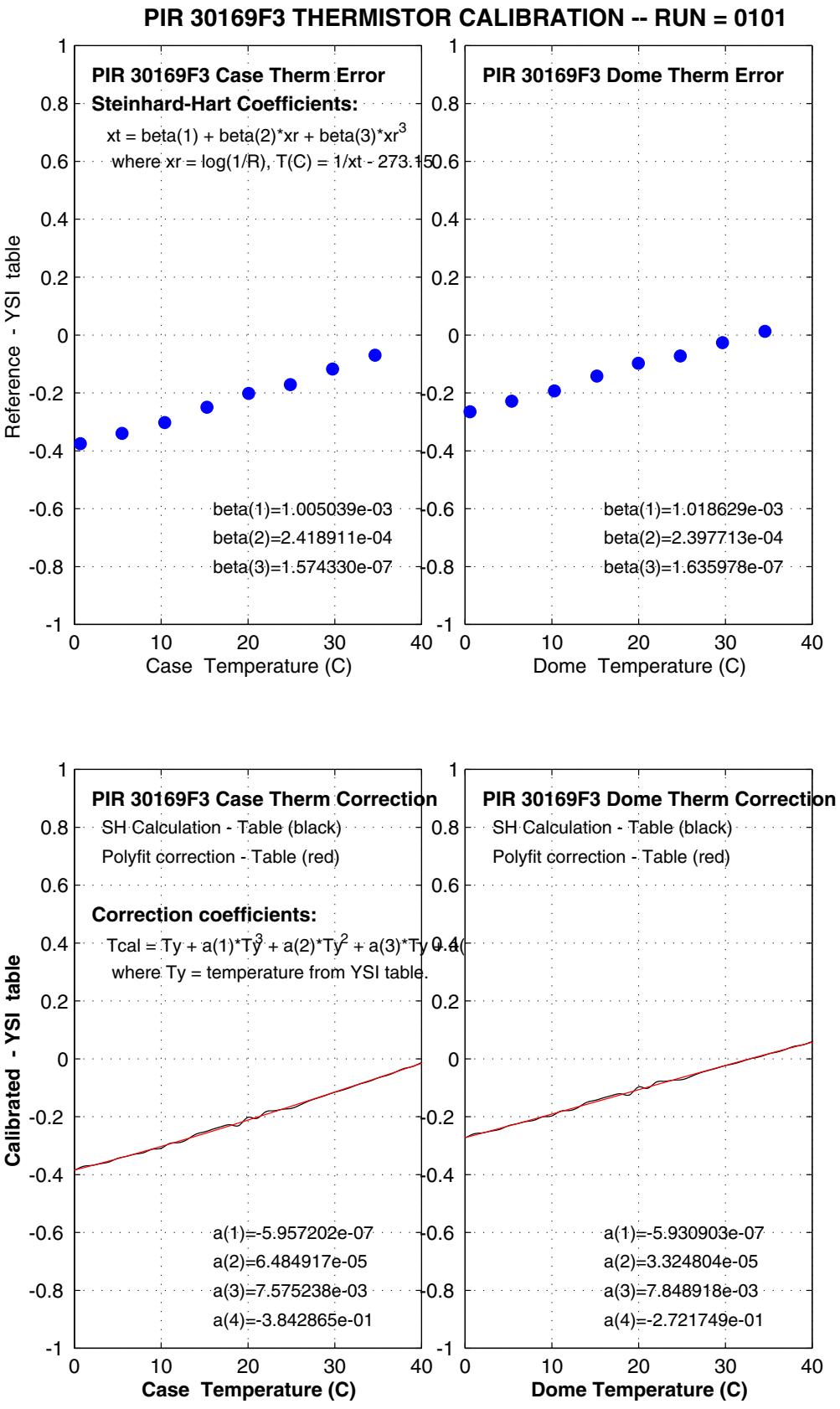
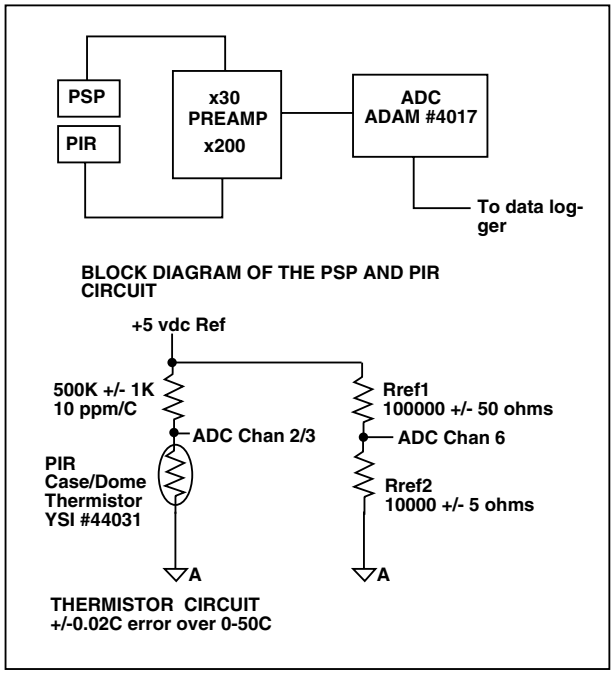


Figure 5: PIR Temperature calibration results.



TEST PLUG:

$R_{case} =$ _____ $T_{44031} =$ _____ Logger Temperature = _____

$R_{dome} =$ _____ $T_{44031} =$ _____ Logger Temperature = _____

```
COMPUTE VREF FROM R_REF AND R_THERM
PRP SN: 05        Cal ID: 0101
CASE - Rref = 499700.0
R_cal      v_T         V_REF (computed)
 6000      109.3    9216.4
 8000      144.7    9183.0
10000      179.5    9147.6
15000      213.8    7335.8
20000      264.3    6868.9
25000      346.3    7267.5
30000      425.3    7509.0

DOME - Rref = 499700.0
R_cal      v_T         V_REF (computed)
 6000      109.3    9213.0
 8000      144.6    9178.6
10000      179.4    9143.5
15000      213.7    7332.1
20000      264.2    6865.8
25000      346.1    7264.2
30000      425.1    7505.7
```

(File: hd:instruments:prp:prpcal:prp:05:0101:TcalVref_0101.dat)

```
% CALIBRATION FILE FOR PRPRX DATA COLLECTION SOFTWARE
% PSP CALIBRATION, PSP SN: 31282F3
4.1288     -1.3535
% PIR CALIBRATION, PIR SN: 30169F3
1.1728  5.1004
% TCASE FIT
-0.000243636    0.00388522     -0.0202043    0.0376439
% TDOME FIT
-0.000243219    0.00387844     -0.0201683    0.0375803
% K COEFFICIANT
4.0
% SIGMA
5.67e-8
% EPSILON
0.98
% BATTERY
0.030820 0.0
```

(File: hd:instruments:prp:prpcal:prp:05:0101:prprx_05_0101.txt)

LOGGER CALIBRATION FILE

```
% MFRSR: 00461
% PSP: 31282F3, COEFF: 8.39
% PIR: 30169F3, COEFF: 4.08
% Filename: DL2000_6.txt
DATALOGGER S/N DL2000_6, PREAMP 6  (Minneapolis PRP02)
  CALIBRATION DATE: 010122
  TECHNICIAN: EDWARDS
  VOLTAGE REFERENCE: VOLT-A-VIDER (cal: 7/00)
CHANNEL 1
0  0  0.0
10  46.05 1.02
50  243.32 1.18
75  366.74 0.86
100  489.59 1.40
150   736.84 0.90
200  983.10 1.08
250  1229.94 1.16
300  1476.47 1.38
350  1723.34 1.03
400  1970.03 1.02
450  2216.94 1.03
500  2463.53 0.99
600  2956.83 1.02
700  3450.21 0.96
750  3696.42 1.18
CHANNEL 2
0  0  0.0
10  96.12 1.21
50  493.60 0.79
75  741.48 0.89
100  989.61 1.20
150  1486.00 0.91
200  1981.87 1.24
250  2478.55 1.20
300  2975.12 0.91
350  3470.84 1.14
400  3967.69 1.03
CHANNEL 3
0  0  0.0
10  37.47 0.73
25  96.89 1.16
50  195.98 1.01
75  295.42 0.88
100  394.58 0.78
150  592.89 0.84
200  791.05 0.92
250  989.71 0.62
300  1188.12 0.76
350  1386.41 0.95
400  1584.70 0.79
450  1782.93 1.13
500  1981.26 1.08
600  2378.25 0.99
700  2774.96 0.84
800  3171.78 0.81
900  3568.65 0.80
1000  3965.28 0.96
CHANNEL 4
0  0  0.0
1  1.00 0.85
5  13.27 1.12
10  28.23 0.92
25  72.17 1.14
50  146.02 1.11
75  220.02 1.16
100  294.13 1.17
200  589.67 1.20
250  737.47 1.11
400  1181.29 1.20
650  1920.61 0.74
900  2659.37 1.18
1000  2954.87 1.31
1100  3251.00 1.14
1200  3546.37 1.25
1300  3841.94 1.26
CHANNEL 5
0  0  0.0
1  0.86 0.86
5  10.48 1.27
10  22.96 1.16
25  60.96 1.17
50  123.56 1.31
100  248.53 1.16
200  499.97 1.01
400  1002.28 1.02
500  1252.80 1.02
750  1880.69 1.18
1000  2508.50 1.21
1100  2759.49 1.13
1200  3010.69 0.96
1300  3261.52 1.10
1400  3512.68 1.05
```

```
1500  3763.78 1.03
CHANNEL 6
0  0  0.0
1  0.20 0.4
5  7.38 1.09
10  17.12 1.20
25  47.10 0.98
50  96.48 1.09
75  145.93 1.20
100  195.28 1.02
250  491.97 1.20
500  986.79 1.04
750  1481.71 1.21
1000  1976.15 0.95
1200  2372.04 0.81
1600  3163.31 0.84
1800  3559.00 0.93
2000  3954.79 0.73
CHANNEL 7
0  0  0.0
1  1.08 0.83
5  12.96 1.04
10  28.00 1.06
25  72.34 1.07
50  146.81 0.76
75  220.75 1.11
100  294.77 1.03
250  739.00 1.11
500  1480.16 0.85
750  2221.17 0.80
1000  2961.65 0.98
1200  3554.37 0.90
1300  3850.89 0.82
PSP
-5  -144.07 0.03
-3  -86.27 0.11
-1  -28.60 0.02
0  0.39 0.02
1  29.24 0.02
3  86.95 0.02
5  144.68 0.02
10  289.03 0.02
15  433.30 0.02
PIR
-1  -213.52 0.11
-.5  -109.25 0.09
0  -3.82 0.12
0.5  100.25 0.13
1.0  204.85 0.14
2.0  413.70 0.10
2.4  496.92 0.09
CASE 499700 ohms reference
6000   109.35 0.02
8000  144.7 0.01
10000   179.47 0.02
15000  213.79 0.01
20000  264.34 0.00
25000  346.27 0.01
30000  425.28 0.00
DOME 499700 ohms reference resistor
6000  109.31 0.01
8000  144.63 0.01
10000  179.39 0.02
15000   213.68 0.01
20000  264.22 0.01
25000  346.11 0.01
30000  425.09 0.02
VREF RESISTORS - chan 6
99960 9993
END
```