

CALIBRATION REPORT
Portable Radiation Package

SERIAL NUMBER 02

DataSet Configuration: 0101a
Document date: April 27, 2001

Configuration File:

PRP CALIBRATION INFORMATION FILE -- Mon, Apr 2, 2001
LAST EDIT: Fri 2001-Apr-27
CALIBRATION NAME: 0010
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: 02
FILE NAME: INFO_02_0101.txt
DOCUMENTS: Cal02_0101.pdf
HEAD SERIAL NUMBER: 432
HEAD CALIBRATION ID: 9904
DATALOGGER SERIAL NUMBER: d100_4
DATALOGGER CALIBRATION ID: 0104
PSP SERIAL NUMBER: 32385F3
PSP CALIBRATION ID: orig
PIR SERIAL NUMBER: 32387F3
PIR THERMOPILE CALIBRATION ID: orig
PIR TEMPERATURE CALIBRATION ID: USE YSI CAL DATA
COMMENTS: Revised file structure and matlab
This is the calibration of P02 with the preamp that was replaced on 2001-1-11.
Version 0101a uses the YSI thermistor tables.



PRP INFO FILE

CALIBRATION INFO FOR HEAD 432:

This file : 432.CAL
Data valid from date : 10/05/1998
MFRSR system owner : PNL / S/O 240
YESDAS system password: Langley!
Supervisor password : Irradiance!
System Datalogger ID : \$0000 (Hex), 0 (Dec)
Instrument Head ID : \$091E (Hex), 2334 (Dec)
Instrument Head S/N : 432

DATALOGGER CALIBRATION: ProcLoggerCal (version 101) Run date: 02-Apr-2001 17:19:43
DATALOGGER S/N DL2000_4 (PRP02)
CALIBRATION DATE: 20010329
TECHNICIAN: EDWARDS
VOLTAGE REFERENCE: VOLT-A-VIDER 103264
USE PRECISION VREF CIRCUIT

PSP CALIBRATION: S/N 32385F3
Factory calibration: 1998-02-12
8.92
8.920

PIR CALIBRATION - S/N: 32387F3
Factory calibration: 1998-01-13
3.75
3.750

USE YSI TEMPERATURE TABLES

COMPUTE PIR THERMISTOR COEFFICIENTS
Use default YSI coefficients for PIR case thermistor

Use default YSI coefficients for PIR dome thermistor

ZENITH ANGLE ERROR PLOTS

Head S/N: 432

Cal date: 10/05/1998

Now: 08-Feb-2001 06:52:15

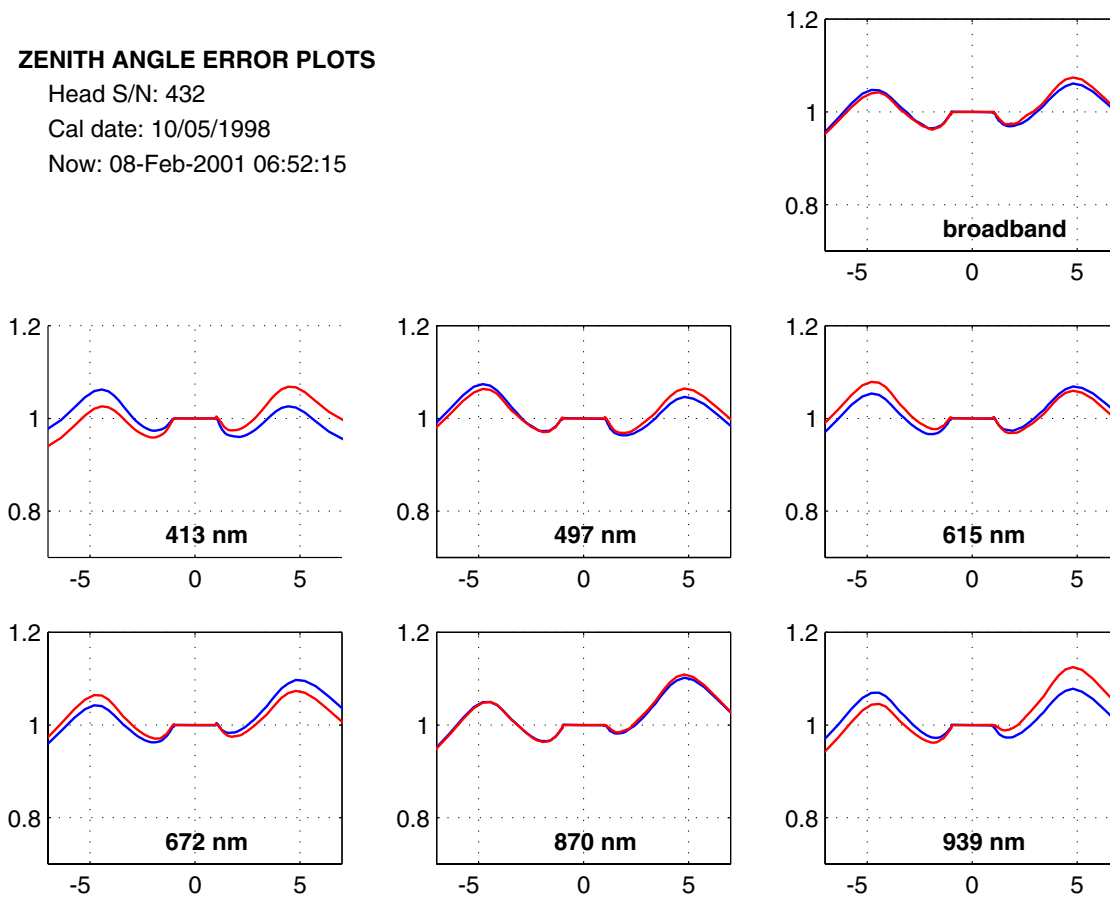


Figure 1: Zenith Angle Error

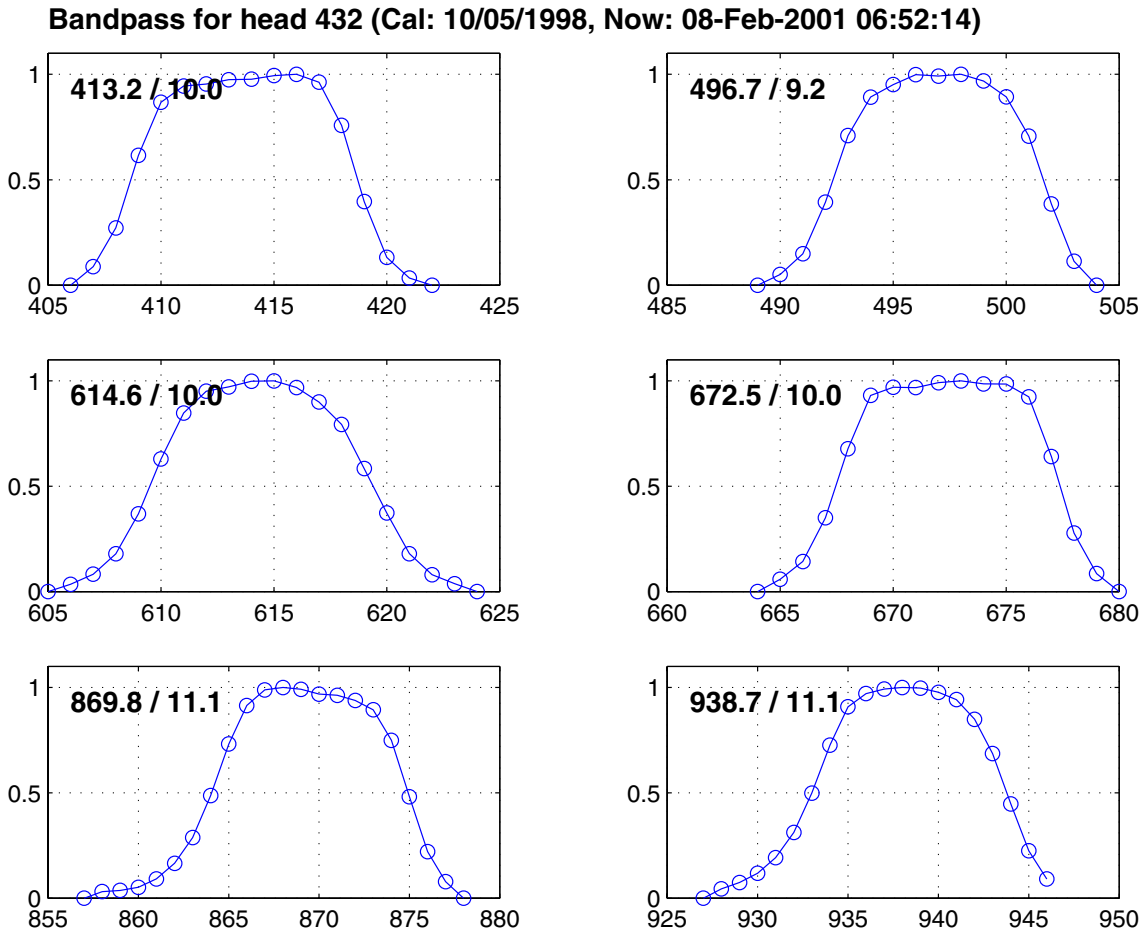


Figure 2: Zenith Angle Error

HEAD 432 TOA IRRADIANCES BASED ON ASTRONOMICAL SOLAR SPECTRUM

WAVELENGTH (nm)			IRRADIANCE (W/m ² /nm)		
LOWER	CENTER	UPPER	LOWER	MEAN	UPPER
406,	414,	422,	1.651,	1.738,	1.825
489,	497,	504,	1.846,	1.944,	2.041
605,	614,	624,	1.624,	1.709,	1.795
664,	672,	680,	1.450,	1.526,	1.602
857,	869,	878,	0.903,	0.950,	0.998
927,	938,	947,	0.783,	0.824,	0.865

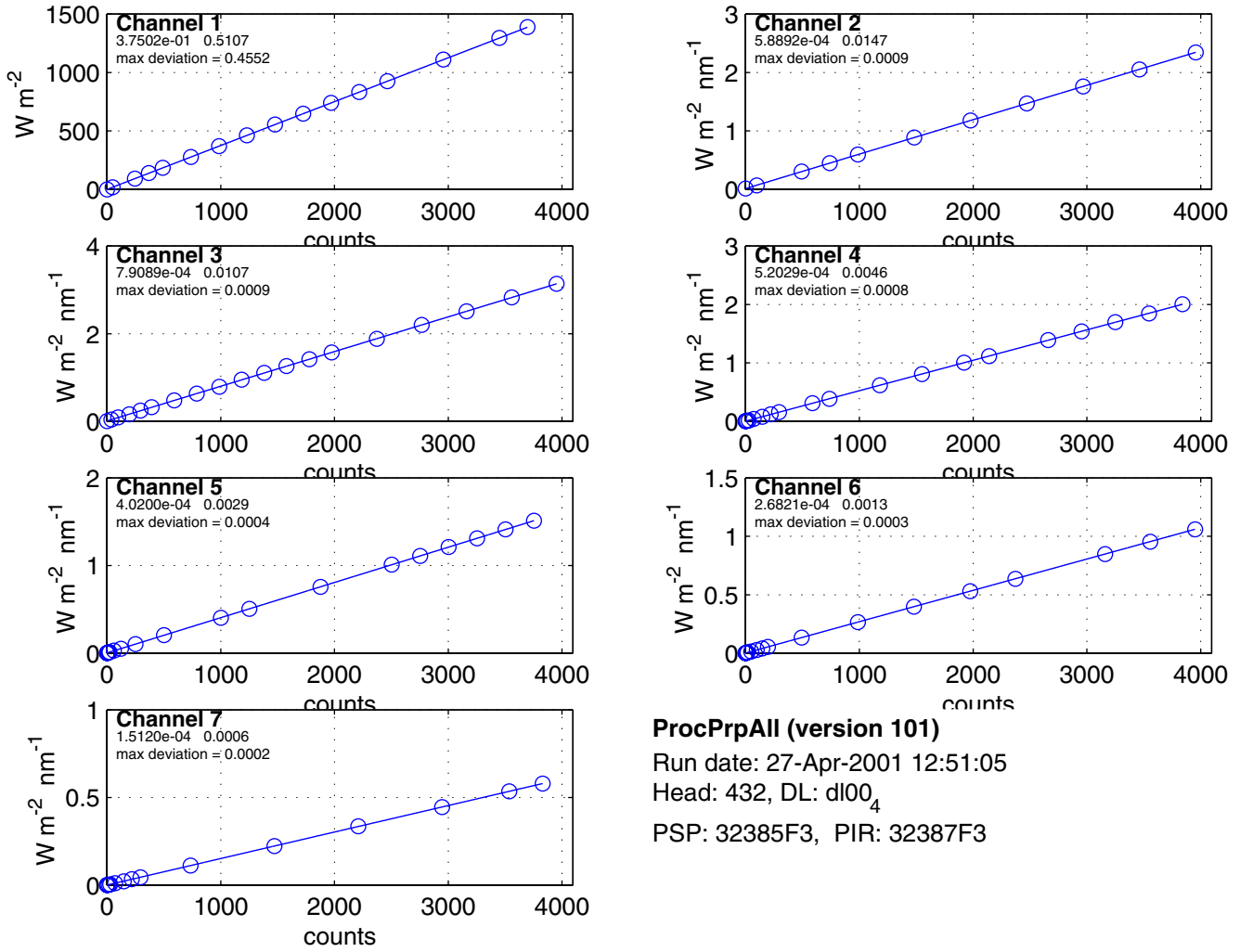
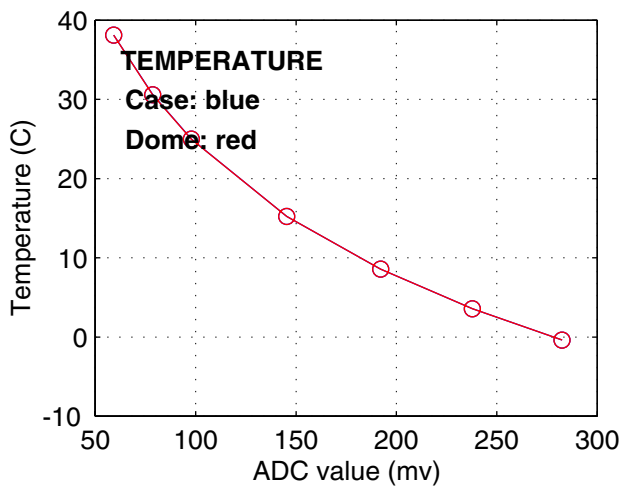
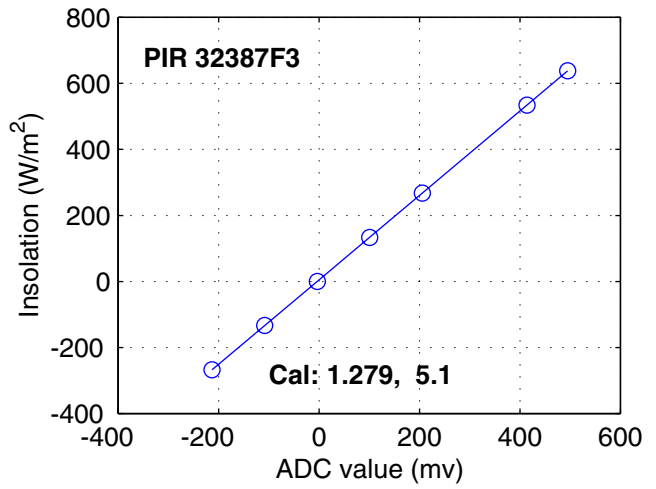
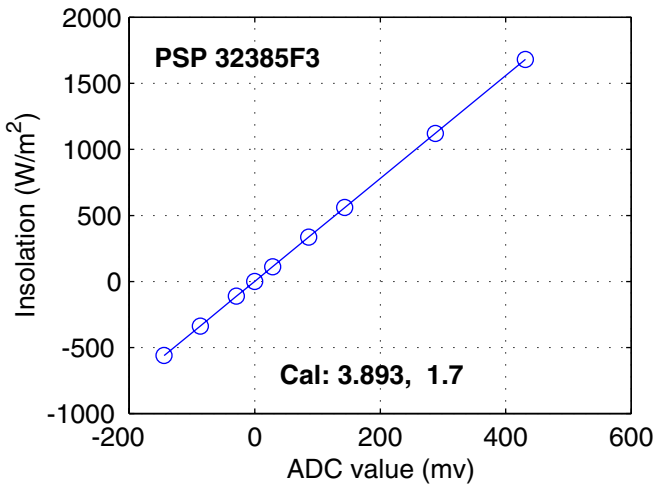


Figure 3: Head and Logger combined gains



$$1/(T+T_0) = p_1 a^3 + p_2 a^2 + p_3 a + p_4$$

$a = \ln(\text{mvadc}), T_0 = 273.15$

Case: max err = 0.012 C

$$p_1 = 1.9135e-06, p_2 = -1.8975e-05$$

$$p_3 = 3.3760e-04, p_4 = 2.0210e-03$$

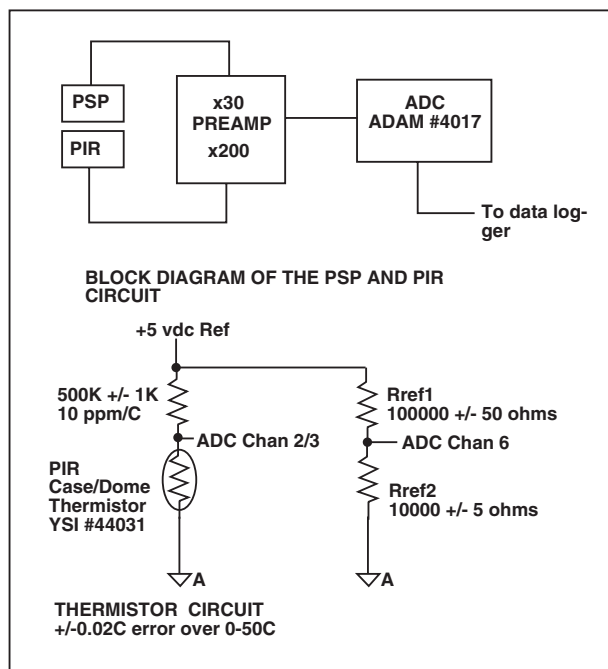
Dome: max err = 0.011

$$p_1 = 1.7501e-06, p_2 = -1.6516e-05$$

$$p_3 = 3.2523e-04, p_4 = 2.0418e-03$$

Figure 4: Head and Logger combined gains

No PIR thermistor calibration for instrument 32387F3.
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TEST PLUG:

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

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

COMPUTE VREF FROM R_REF AND R_THERM

PRP SN: 02 Cal ID: 0101a

CASE - Rref = 499400.0

R_cal	v_T	V_REF (computed)
6000	59.2	4985.8
8000	78.6	4986.5
10000	97.9	4986.5
15000	145.4	4986.9
20000	192.1	4988.3
25000	237.8	4987.7
30000	282.5	4985.9

DOME - Rref = 499400.0

R_cal	v_T	V_REF (computed)
6000	59.1	4981.6
8000	78.6	4984.6
10000	97.8	4984.5
15000	145.4	4985.9
20000	192.1	4987.5
25000	237.8	4987.0
30000	282.5	4985.9

(File: hd:instruments:prp:prpcal:prp:02:0101a:TcalVref_0101a.dat)

```
% CALIBRATION FILE FOR PRPRX DATA COLLECTION SOFTWARE
% PSP CALIBRATION, PSP SN: 32385F3
3.893      1.6683
% PIR CALIBRATION, PIR SN: 32387F3
1.2795  5.0902
% TCASE FIT
1.91355e-06  -1.89754e-05  0.000337596  0.00202098
% TDOME FIT
1.75008e-06  -1.65162e-05  0.00032523  0.00204183
% K COEFFICIENT
4.0
% SIGMA
5.67e-8
% EPSILON
0.98
% BATTERY
0.030820  0.0
```

(File: hd:instruments:prp:prpcal:prp:02:0101a:prprx_02_0101a.txt)

LOGGER CALIBRATION FILE

%MFRSR: 432	200 789.20 .65
%PSP: 32385F3, COEFF: 8.92"	250 987.29 .55
%PIR: 32387F3, COEFF: 3.75"	300 1184.77 .43
%PREAMP: 1	350 1382.63 .49
DATALOGGER S/N DL2000_4 (PRP02)	400 1580.09 .29
CALIBRATION DATE: 20010329	450 1777.85 .37
TECHNICIAN: EDWARDS	500 1975.52 .51
VOLTAGE REFERENCE: VOLT-A-VIDER 103264	600 2370.84 .37
	700 2766.21 .51
CHANNEL 1	800 3161.57 .51
0 0.00 .00	900 3556.92 .50
10 48.22 .52	1000 3952.13 .34
50 245.31 .55	CHANNEL 4
75 368.70 .47	0 0.00 0.00
100 491.92 .27	1 1.77 .53
150 738.44 .71	5 13.59 .57
200 985.12 .43	10 28.26 .62
250 1231.80 .41	25 72.46 .51
300 1478.15 .46	50 146.19 .49
350 1724.78 .42	75 220.26 .51
400 1971.20 .50	100 294.04 .37
450 2218.00 .42	200 589.65 .49
500 2464.61 .50	250 737.29 .62
600 2957.80 .41	400 1180.46 .66
700 3450.96 .20	525 1549.95 .38
750 3697.44 .58	650 1919.32 .55
CHANNEL 2	725 2141.05 .38
0 0.00 .00	900 2658.29 .46
10 97.45 .51	1000 2953.83 .39
50 493.17 .39	1100 3248.97 .33
75 740.61 .50	1200 3544.70 .47
100 987.92 .56	1300 3840.08 .41
150 1482.60 .50	CHANNEL 5
200 1977.85 .37	0 0.00 0.00
250 2472.59 .50	1 1.45 .67
300 2966.90 .50	5 11.58 .50
350 3461.87 .46	10 23.96 .20
400 3956.59 .50	25 61.62 .54
CHANNEL 3	50 124.17 .48
0 0.00 .00	100 249.38 .50
10 38.35 .49	200 499.71 .46
25 97.83 .38	400 1000.77 .42
50 196.65 .49	500 1251.21 .48
75 295.48 .51	750 1877.35 .49
100 394.08 .64	1000 2503.71 .53
150 591.79 .41	1100 2753.96 .36

1200	3004.43	.50	-5	-144.44	.03
1300	3254.79	.41	-3	-86.84	.04
1400	3505.41	.59	-1	-29.22	.04
1500	3755.88	.34	0	-0.37	.06
CHANNEL 6					
0	0.00	0.00	1	28.38	.03
1	0.90	.30	3	85.94	.02
5	8.85	.46	5	143.54	.03
10	18.67	.48	10	287.58	.04
25	48.30	.63	15	431.51	.04
50	97.81	.40	PIR		
75	147.04	.45	-1	-213.16	.17
100	196.46	.59	-0.5	-108.39	.20
250	493.00	.00	0	-3.66	.21
500	987.02	.39	0.5	100.66	.26
750	1481.25	.61	1	205.35	.23
1000	1975.17	.58	2	413.72	.62
1200	2370.75	.53	2.4	494.69	1.54
1600	3161.00	.43	CASE 499400 ohms ref		
1800	3556.25	.44	6000	59.19	.01
2000	3951.57	.59	8000	78.62	.01
CHANNEL 7					
0	0.00	0.00	10000	97.89	.01
1	1.84	.47	15000	145.42	.01
5	13.88	.34	20000	192.08	.02
10	28.52	.59	25000	237.78	.02
25	72.88	.33	30000	282.54	.07
50	146.48	.59	DOME 499400 ohms ref		
75	220.00	.48	6000	59.14	.01
100	293.92	.28	8000	78.59	.01
250	736.00	.00	10000	97.85	.01
500	1472.93	.37	15000	145.39	.02
750	2210.04	.36	20000	192.05	.01
1000	2947.13	.46	25000	237.75	.02
1200	3536.75	.44	30000	282.54	.03
1300	3831.57	.51	VREF RESISTORS - chan 6 4017		
PSP					
99950 9995					
END					