

CALIBRATION REPORT
Portable Radiation Package

SERIAL NUMBER 02

DataSet Configuration: 0101
Document date: April 2, 2001

Configuration File:

PRP CALIBRATION INFORMATION FILE -- Mon, Apr 2, 2001
LAST EDIT: Mon, Apr 2, 2001
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: dl00_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: 0010
COMMENTS: Revised file structure and matlab
This is the calibration of P02 with the preamp that was replaced on 2001-1-11.
Use this calibration for Ka-01-02 and after.



PRP INFO FILE

SETUP FOR PROCESSING PRP CALIBRATIONS: 02-Apr-2001 17:18:30
PRP S/N: 02, Calibration identifier: 0101
Configuration file: hd:instruments:prp:prpcal:prp:02:0101:INFO_02_0101.txt
PRP CALIBRATION
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Use this calibration for Ka-01-02 and after.

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

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
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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

PIR THERMISTOR CALIBRATION -- PART 2

Process times from file hd:instruments:prp:prpcal:pir:32387F3:Tcal_0010:32387F3_Tcal_0010.dat

Process times from pirSN = 32387F3

SAVE THE RESULTS TO FILE hd:instruments:prp:prpcal:pir:32387F3:Tcal_0010:32387F3_Tcal_0010.mat

save hd:instruments:prp:prpcal:pir:32387F3:Tcal_0010:32387F3_Tcal_0010.mat read_me beta_case beta_dome

beta_case and beta_dome are Steinhart-Hart coefficients

tcase = steinhart(hart(beta_case,r) where r = thermistor resistance in ohms.

tdome = steinhart(hart(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

ZENITH ANGLE ERROR PLOTS

Head S/N: 432

Cal date: 10/05/1998

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

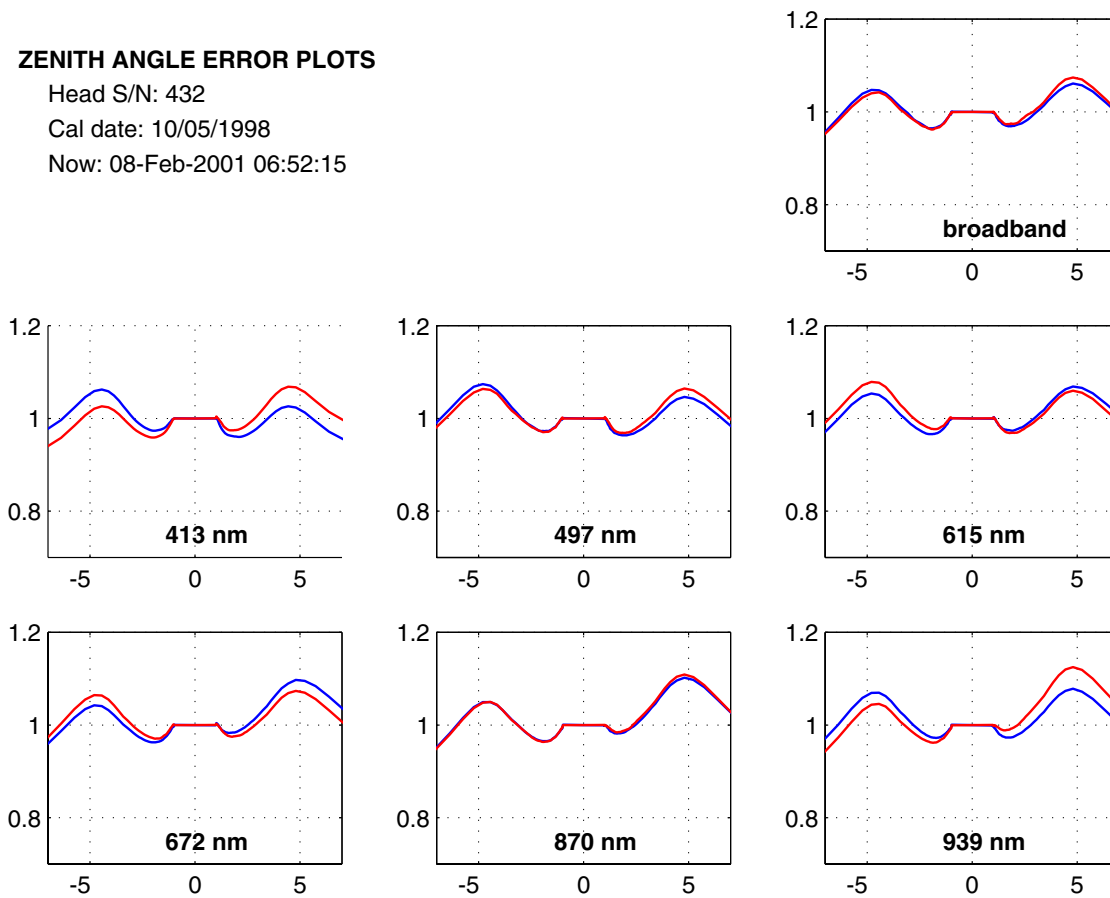


Figure 1: Zenith Angle Error

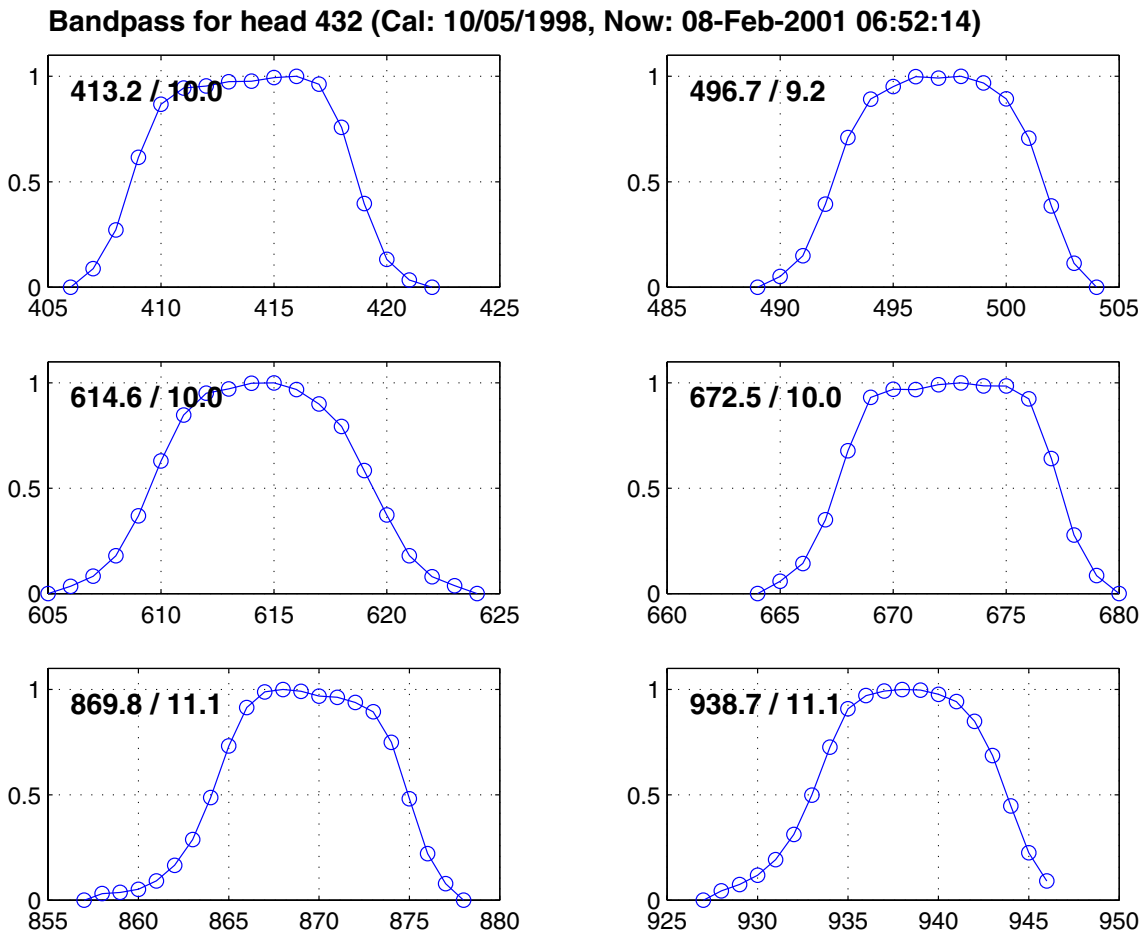


Figure 2: Zenith Angle Error

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

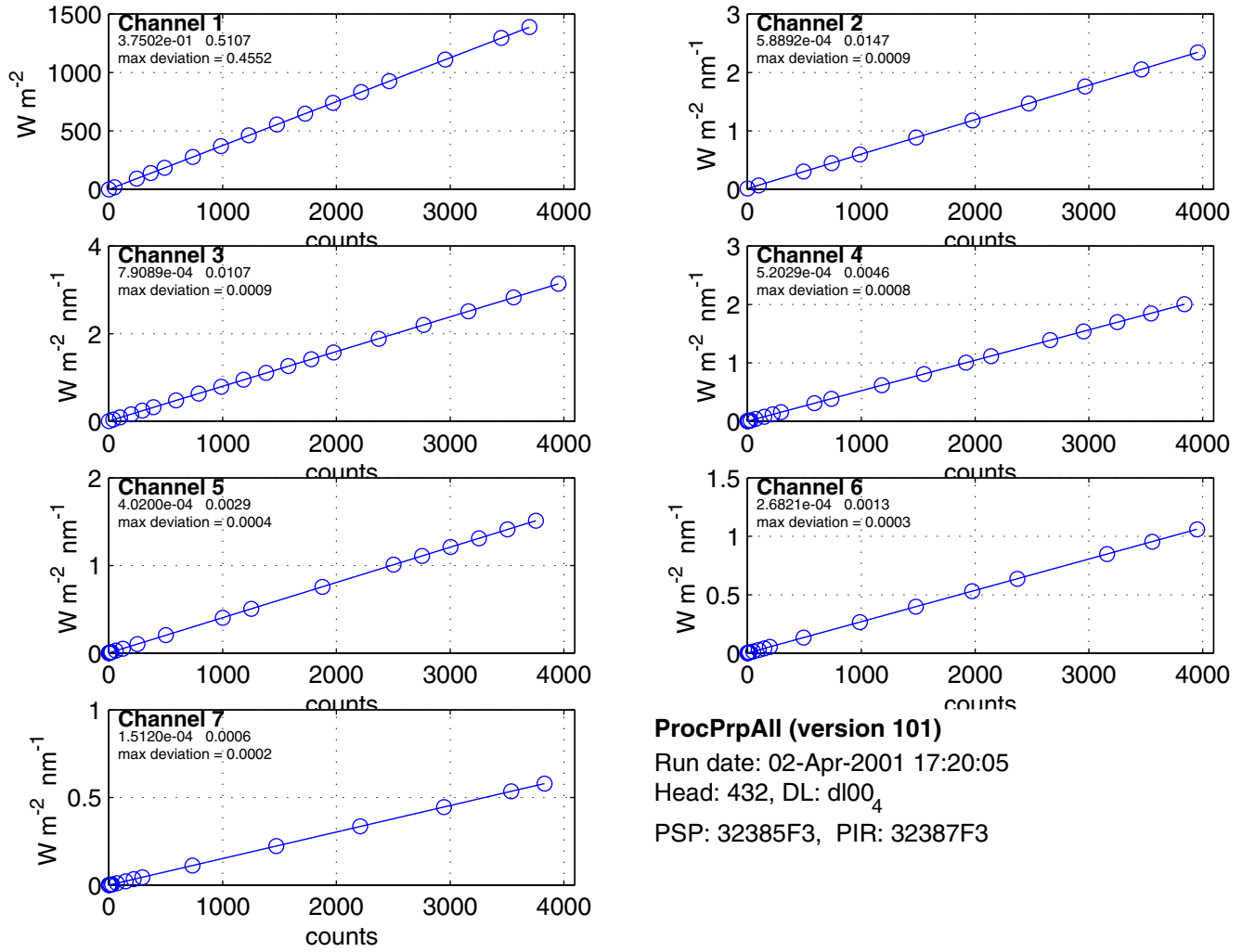
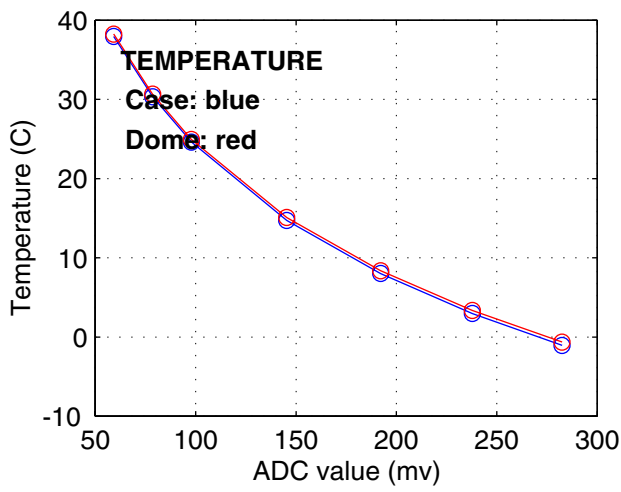
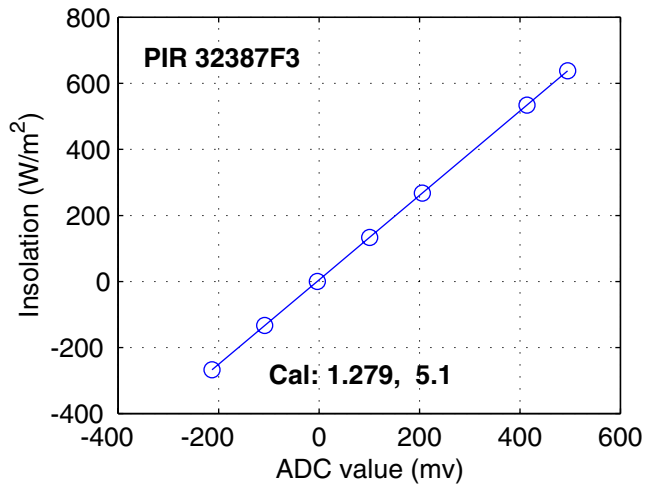
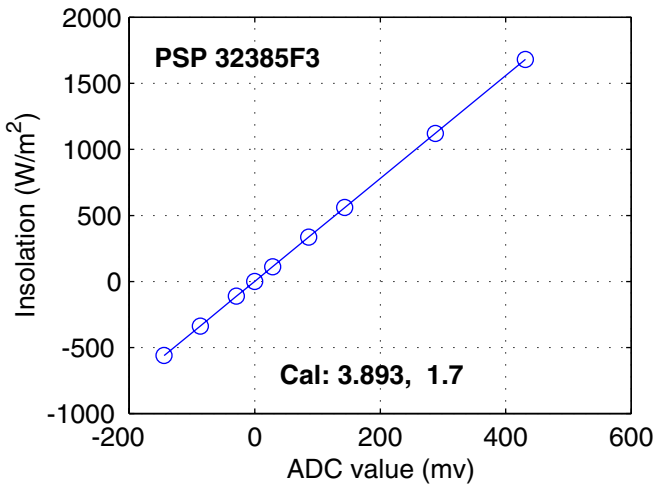


Figure 3: Head and Logger combined gains



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

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

Case: max err = 0.006 C

$$p_1 = 2.0121 \times 10^{-6}, p_2 = -2.0393 \times 10^{-5}$$

$$p_3 = 3.4907 \times 10^{-4}, p_4 = 1.9927 \times 10^{-3}$$

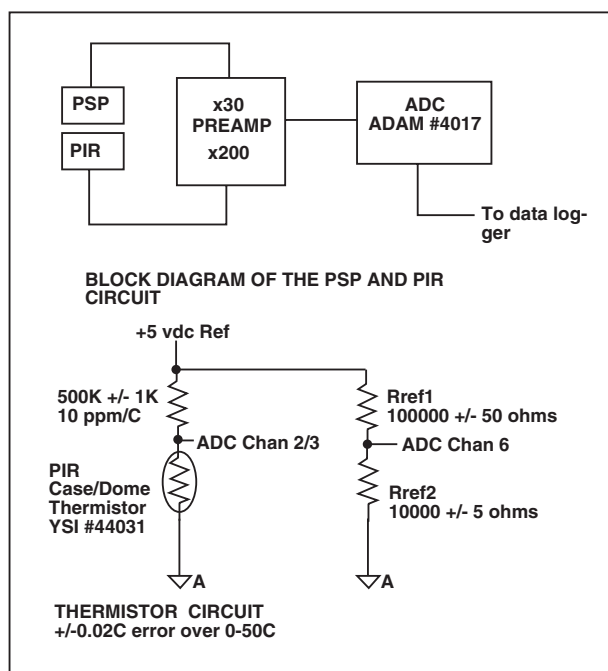
Dome: max err = 0.007

$$p_1 = 1.8359 \times 10^{-6}, p_2 = -1.7795 \times 10^{-5}$$

$$p_3 = 3.3470 \times 10^{-4}, p_4 = 2.0173 \times 10^{-3}$$

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: 0101

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:02:0101:TcalVref_0101.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
2.01208e-06  -2.03927e-05  0.000349075  0.0019927
% TDOME FIT
1.83593e-06  -1.77952e-05  0.0003347  0.0020173
% K COEFFICIENT
4.0
% SIGMA
5.67e-8
% EPSILON
0.98
% BATTERY
0.030820  0.0
```

(File: hd:instruments:prp:prpcal:prp:02:0101:prprx_02_0101.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	1 28.38 .03
0 0.00 0.00	3 85.94 .02
1 0.90 .30	5 143.54 .03
5 8.85 .46	10 287.58 .04
10 18.67 .48	15 431.51 .04
25 48.30 .63	PIR
50 97.81 .40	-1 -213.16 .17
75 147.04 .45	-0.5 -108.39 .20
100 196.46 .59	0 -3.66 .21
250 493.00 .00	0.5 100.66 .26
500 987.02 .39	1 205.35 .23
750 1481.25 .61	2 413.72 .62
1000 1975.17 .58	2.4 494.69 1.54
1200 2370.75 .53	CASE 499400 ohms ref
1600 3161.00 .43	6000 59.19 .01
1800 3556.25 .44	8000 78.62 .01
2000 3951.57 .59	10000 97.89 .01
CHANNEL 7	15000 145.42 .01
0 0.00 0.00	20000 192.08 .02
1 1.84 .47	25000 237.78 .02
5 13.88 .34	30000 282.54 .07
10 28.52 .59	DOME 499400 ohms ref
25 72.88 .33	6000 59.14 .01
50 146.48 .59	8000 78.59 .01
75 220.00 .48	10000 97.85 .01
100 293.92 .28	15000 145.39 .02
250 736.00 .00	20000 192.05 .01
500 1472.93 .37	25000 237.75 .02
750 2210.04 .36	30000 282.54 .03
1000 2947.13 .46	VREF RESISTORS - chan 6 4017
1200 3536.75 .44	99950 9995
1300 3831.57 .51	END
PSP	