

CALIBRATION REPORT
Portable Radiation Package

SERIAL NUMBER 07

DataSet Configuration: mri00
Document date: February 9, 2001

Configuration File:

PRP CALIBRATION INFORMATION FILE -- created: 2001-02-09 (040) 05:52:25
LAST EDIT: new file
CALIBRATION NAME: mri00
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: 07
FILE NAME: INFO_07_mri00.txt
DOCUMENTS: Cal07_mri00.pdf
HEAD SERIAL NUMBER: 469
HEAD CALIBRATION ID: 0004
DATALOGGER SERIAL NUMBER: dl00_3
DATALOGGER CALIBRATION ID: 001114
PSP SERIAL NUMBER: 32934f3
PSP CALIBRATION ID: orig
PIR SERIAL NUMBER: 32936f3
PIR THERMOPILE CALIBRATION ID: orig
PIR TEMPERATURE CALIBRATION ID: YsiTable
COMMENTS: Mirai system, shipped in April 2000



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

PRP INFO FILE

SETUP FOR PROCESSING PRP CALIBRATIONS: 09-Feb-2001 06:04:08
PRP S/N: 07, Calibration identifier: mri00
Configuration file: hd:instruments:prp:prpcal:prp:07:mri00:INFO_07_mri00.txt
PRP CALIBRATION
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CALIBRATION INFO FOR HEAD 469:

This file : 469.CAL
Data valid from date : 03/10/2000
MFRSR system owner : BROOKHAVEN / S/O 680
YESDAS system password: Langley!
Supervisor password : Irradiance!
System Datalogger ID : \$0000 (Hex), 0 (Dec)
Instrument Head ID : \$5E9D (Hex), 24221 (Dec)
Instrument Head S/N : 469

DATALOGGER CALIBRATION: ProcLoggerCal (version 101) Run date: 09-Feb-2001 06:13:01
DATALOGGER S/N DL2000_3, PREAMP 7
CAL DATE: 20000404 (Preamp #10 20001114)
TECHNICIAN: EDWARDS
VOLTAGE REFERENCE: VOLT-A-VIDER
NO PRECISION VREF CIRCUIT IN THIS UNIT

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PSP CALIBRATION: S/N 32934F3
Factory calibration: Jan 2000 approx
8.54
8.540

PIR CALIBRATION - S/N: 32936F3
Received from Eppley Labs 2000-3-10 approx
3.91
3.910

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: 469

Cal date: 03/10/2000

Now: 09-Feb-2001 06:04:36

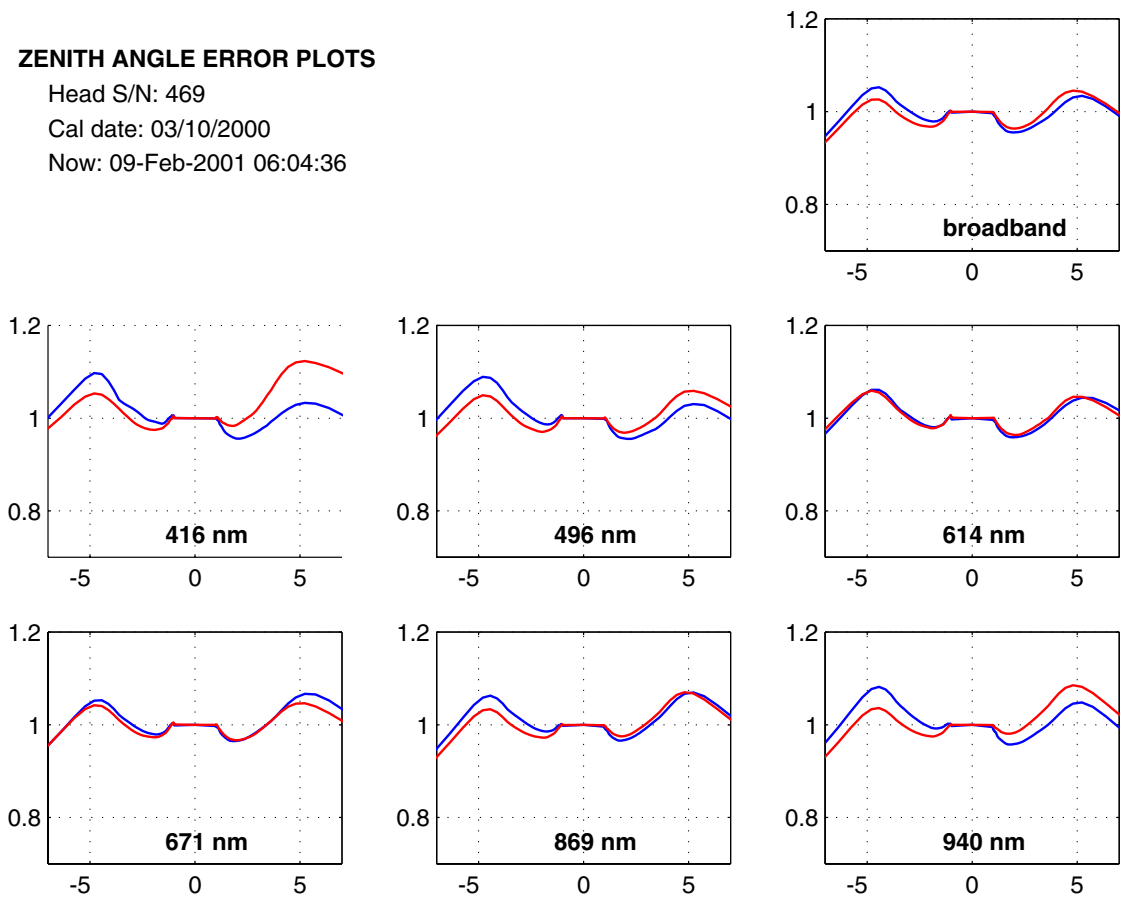


Figure 1: Zenith Angle Error

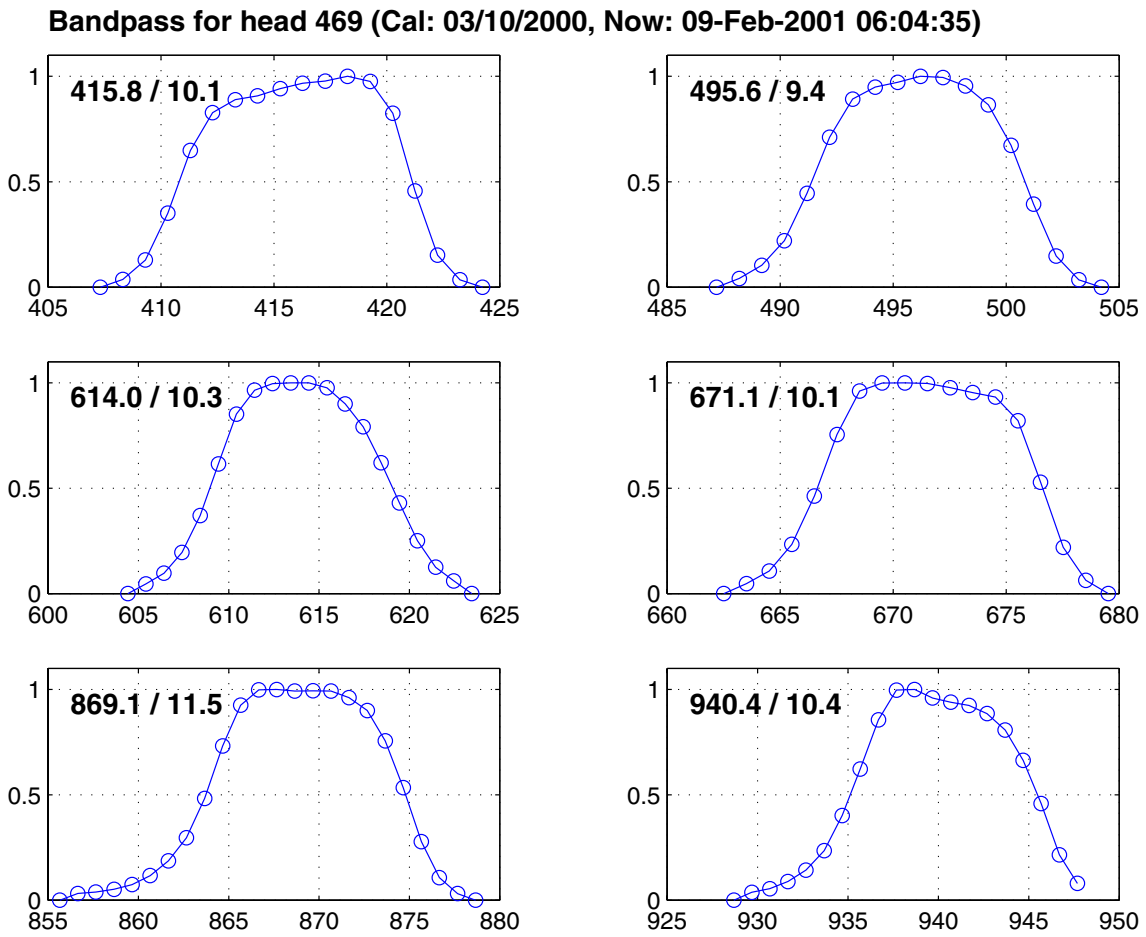


Figure 2: Zenith Angle Error

HEAD 469 TOA IRRADIANCES BASED ON ASTRONOMICAL SOLAR SPECTRUM

WAVELENGTH (nm)			IRRADIANCE ($W/m^2/nm$)		
LOWER	CENTER	UPPER	LOWER	MEAN	UPPER
407,	416,	424,	1.653,	1.740,	1.827
487,	496,	504,	1.851,	1.948,	2.046
604,	614,	623,	1.626,	1.712,	1.797
662,	671,	680,	1.453,	1.529,	1.606
856,	869,	879,	0.904,	0.951,	0.999
929,	940,	949,	0.780,	0.821,	0.862

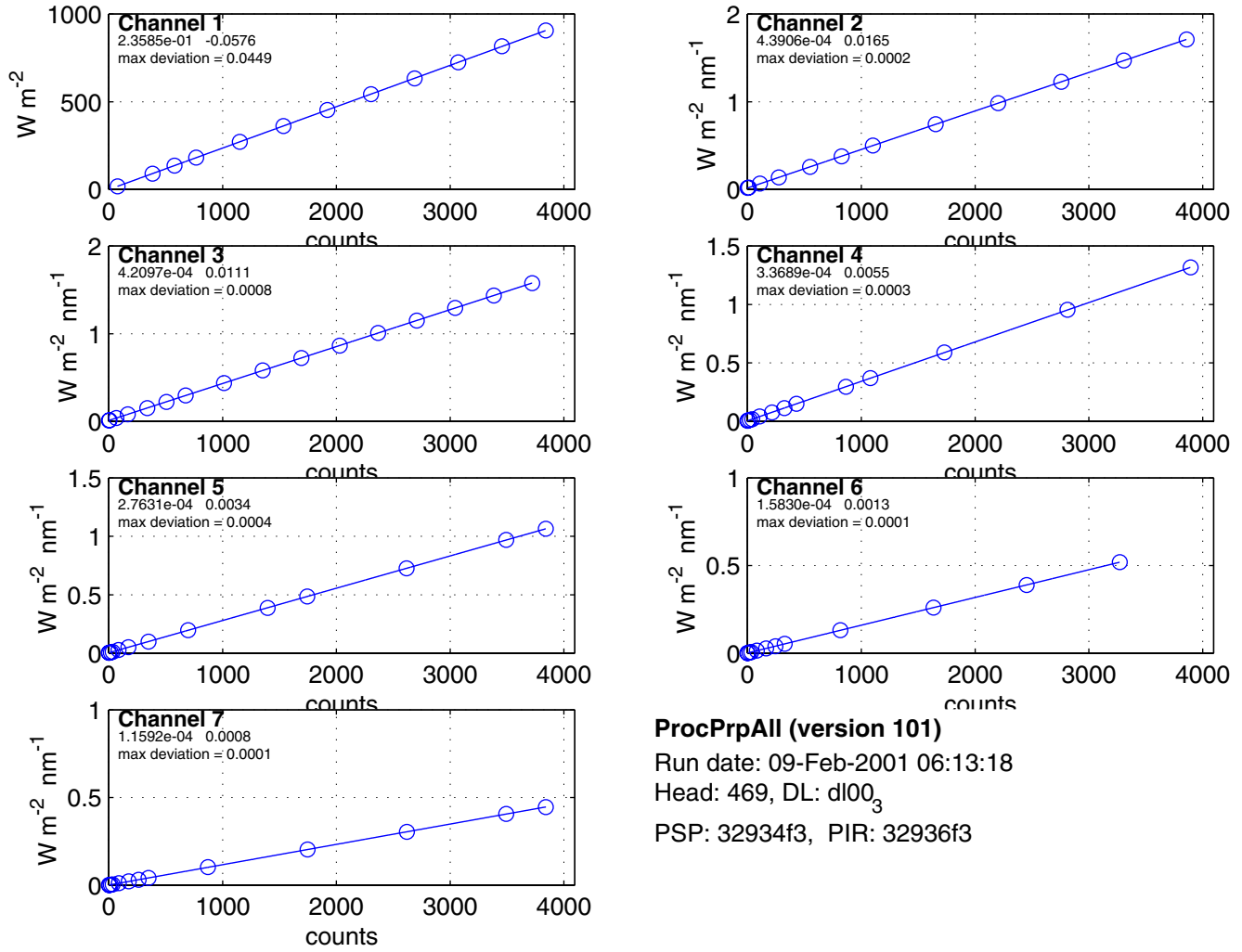
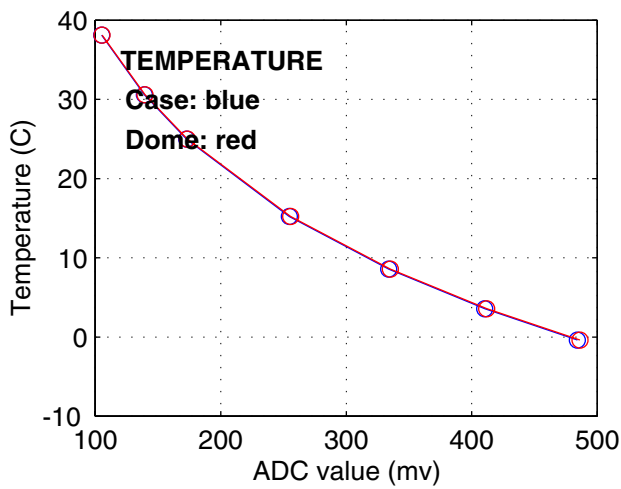
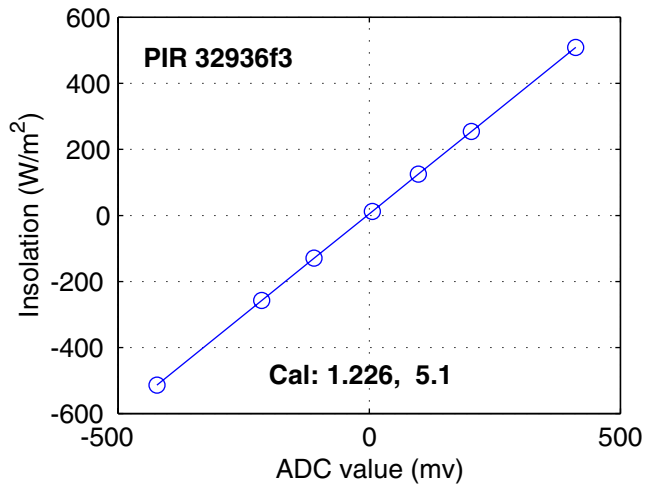
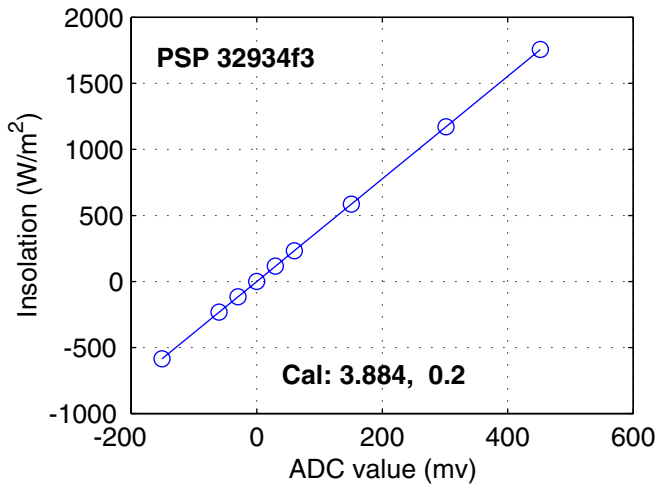


Figure 3: Head and Logger combined gains



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

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

Case: max err = 0.012 C

$$p_1 = 3.2499\text{e-}06, p_2 = -4.0372\text{e-}05$$

$$p_3 = 4.4603\text{e-}04, p_4 = 1.6833\text{e-}03$$

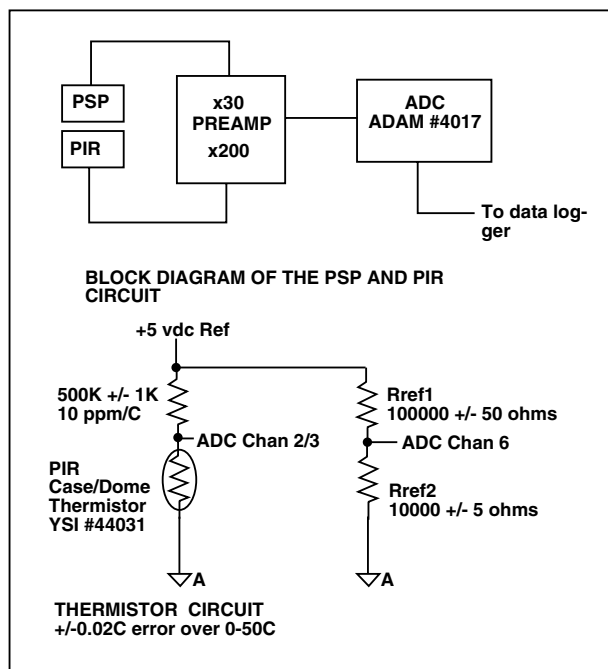
Dome: max err = 0.011

$$p_1 = 3.2993\text{e-}06, p_2 = -4.1215\text{e-}05$$

$$p_3 = 4.5074\text{e-}04, p_4 = 1.6735\text{e-}03$$

Figure 4: Head and Logger combined gains

No PIR thermistor calibration for instrument 32936f3.
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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: 07 Cal ID: mri00

CASE - Rref = 270000.0

R_cal	v_T	V_REF (computed)
6000	105.1	4835.5
8000	139.2	4836.5
10000	172.7	4835.9
15000	254.6	4838.0
20000	333.9	4840.8
25000	410.4	4842.1
30000	484.3	4843.1

DOME - Rref = 270000.0

R_cal	v_T	V_REF (computed)
6000	105.6	4855.8
8000	139.8	4856.3
10000	173.4	4855.5
15000	255.7	4857.7
20000	335.2	4860.1
25000	412.0	4861.4
30000	486.2	4862.2

(File: hd:instruments:prp:prpcal:prp:07:mri00:TcalVref_mri00.dat)

```
% CALIBRATION FILE FOR PRPRX DATA COLLECTION SOFTWARE
% PSP CALIBRATION, PSP SN: 32934f3
3.8839      0.18794
% PIR CALIBRATION, PIR SN: 32936f3
1.2265  5.081
% TCASE FIT
3.24994e-06  -4.03719e-05  0.000446033  0.00168335
% TDOME FIT
3.29933e-06  -4.12154e-05  0.000450742  0.00167355
% K COEFFICIENT
4.0
% SIGMA
5.67e-8
% EPSILON
0.98
% BATTERY
0.030820  0.0
```

(File: hd:instruments:prp:prpcal:prp:07:mri00:prprx_07_mri00.txt)

LOGGER CALIBRATION FILE

% MFRSR: 00469	350 2367.93 0.26
% PSP: 32934F3, COEFF: 8.54	400 2706.36 0.49
% PIR: 32936F3, COEFF: 3.91	450 3044.93 0.26
DATALOGGER S/N DL2000_3, PREAMP 7	500 3383.74 0.44
CAL DATE: 20000404 (Preamp #10 20001114)	550 3721.92 0.27
TECHNICIAN: EDWARDS	CHANNEL 4
VOLTAGE REFERENCE: VOLT-A-VIDER	0 0 0.0
CHANNEL 1	1 3.59 0.50
0 0 0.0	5 20.84 0.37
10 76.86 0.35	10 42.50 0.51
50 383.91 0.30	25 107.39 0.50
75 575.86 0.36	50 215.93 0.25
100 767.95 0.22	75 323.79 0.41
150 1151.85 0.36	100 431.88 0.32
200 1535.79 0.42	200 864.66 0.48
250 1919.77 0.43	250 1080.93 0.26
300 2303.83 0.38	400 1729.97 0.18
350 2688.0 0.00	650 2811.83 0.38
400 3071.83 0.38	900 3893.46 0.38
450 3455.79 0.42	CHANNEL 5
500 3839.57 0.51	0 0 0.0
CHANNEL 2	1 1.93 0.26
0 0 0.0	5 15.86 0.35
1 10.86 0.35	10 33.14 0.35
10 109.87 0.34	25 85.87 0.34
25 275.00 0.00	50 173.00 0.00
50 550.80 0.50	100 347.96 0.19
75 826.28 0.46	200 697.00 0.00
100 1101.97 0.18	400 1395.94 0.24
150 1653.0 0.27	500 1745.03 0.17
200 2204.61 0.50	750 2618.84 0.37
250 2755.88 0.33	1000 3492.00 0.00
300 3306.93 0.26	1100 3841.45 0.51
350 3857.91 0.29	CHANNEL 6
CHANNEL 3	0 0 0.0
0 0 0.0	1 2.67 0.48
1 4.92 0.28	5 15.83 0.38
10 65.88 0.33	10 31.91 0.29
25 167.66 0.48	25 81.00 0.00
50 336.95 0.21	50 163.00 0.00
75 505.98 0.14	75 244.91 0.30
100 675.03 0.17	100 326.34 0.48
150 1013.85 0.36	250 816.94 0.24
200 1352.27 0.45	500 1634.96 0.19
250 1690.94 0.24	750 2452.90 0.30
300 2029.31 0.47	1000 3270.97 0.18

CHANNEL 7	-1 -214 0
0 0 0.0	-.5 -110 0
1 2.79 0.42	0 6 0
5 16.93 0.27	+1.5 98 0
10 34.04 0.20	1.0 203 0
25 86.74 0.44	2.0 411 0
50 173.97 0.16	CASE
75 261.15 0.37	6000 105.12 0.00
100 348.85 0.36	8000 139.18 0.01
250 872.92 0.28	10000 172.71 0.01
500 1746.71 0.46	15000 254.63 0.01
750 2620.00 0.00	20000 333.85 0.01
1000 3494.00 0.00	25000 410.35 0.01
1100 3843.00 0.00	30000 484.31 0.01
PSP (Preamp#10 w 1.6 Kohm gain R)	DOME
-5 -151 0	6000 105.56 0.01
-2 -60 0	8000 139.75 0.01
-1 -30.0 0	10000 173.41 0.01
0 0 0	15000 255.67 0.01
+1 29.8 0	20000 335.18 0.01
2 60 0	25000 411.98 0.01
5 150.7 0	30000 486.22 0.01
10 301.8 0	END
15 452.0 0	
PIR (249 ohm gain R)	
-2 -423 0	