

CALIBRATION REPORT  
Portable Radiation Package

SERIAL NUMBER 03

DataSet Configuration: n99  
Document date: February 8, 2001

**Configuration File:**

PRP CALIBRATION INFORMATION FILE -- created: 2001-02-08 (039) 11:18:32  
LAST EDIT: new file  
CALIBRATION NAME: n99  
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: 03  
FILE NAME: INFO\_03\_n99.txt  
DOCUMENTS: Cal03\_n99.pdf  
HEAD SERIAL NUMBER: 428  
HEAD CALIBRATION ID: 9902  
DATALOGGER SERIAL NUMBER: dl99\_1  
DATALOGGER CALIBRATION ID: 9908  
PSP SERIAL NUMBER: 32436F3  
PSP CALIBRATION ID: orig  
PIR SERIAL NUMBER: 32316F3  
PIR THERMOPILE CALIBRATION ID: orig  
PIR TEMPERATURE CALIBRATION ID: none - use YSI table  
COMMENTS: Revised with new folder tree and file names



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

## PRP INFO FILE

SETUP FOR PROCESSING PRP CALIBRATIONS: 08-Feb-2001 11:22:33  
PRP S/N: 03, Calibration identifier: n99  
Configuration file: hd:instruments:prp:prpcal:prp:03:n99:INFO\_03\_n99.txt  
PRP CALIBRATION  
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LAST EDIT: new file  
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PIR SERIAL NUMBER: 32316F3  
PIR THERMOPILE CALIBRATION ID: orig  
PIR TEMPERATURE CALIBRATION ID: none - use YSI table  
COMMENTS: Revised with new folder tree and file names

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CALIBRATION INFO FOR HEAD 428:

# This file : 428.CAL  
# Data valid from date : 10/13/1998  
# MFRSR system owner : BROOKHAVEN - REYNOLDS / SO 413  
# YESDAS system password: Langley!  
# Supervisor password : Irradiance!  
# System Datalogger ID : \$0000 (Hex), 0 (Dec)  
# Instrument Head ID : \$E904 (Hex), 59652 (Dec)  
# Instrument Head S/N : 428

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DATALOGGER CALIBRATION: ProcLoggerCal (version 101) Run date: 08-Feb-2001 11:23:58  
DATALOGGER S/N DL99\_1, PREAMP 3 (Minnett)  
CALIBRATION DATE: 990819  
TECHNICIAN: EDWARDS  
VOLTAGE REFERENCE: VOLT-A-VIDER (cal: ???)\  
NO PRECISION VREF CIRCUIT IN THIS UNIT

-----  
CALIBRATION INFO FOR HEAD 428:

# This file : 428.CAL  
# Data valid from date : 10/13/1998  
# MFRSR system owner : BROOKHAVEN - REYNOLDS / SO 413  
# YESDAS system password: Langley!  
# Supervisor password : Irradiance!  
# System Datalogger ID : \$0000 (Hex), 0 (Dec)  
# Instrument Head ID : \$E904 (Hex), 59652 (Dec)  
# Instrument Head S/N : 428

-----  
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DATALOGGER S/N DL99\_1, PREAMP 3 (Minnett)  
CALIBRATION DATE: 990819  
TECHNICIAN: EDWARDS  
VOLTAGE REFERENCE: VOLT-A-VIDER (cal: ???)\  
NO PRECISION VREF CIRCUIT IN THIS UNIT

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PSP CALIBRATION: S/N 32436F3  
Factory calibration: 1998-02-12  
9.04  
9.040

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PIR CALIBRATION - S/N: 32316F3  
Factory calibration: 1998-01-13  
3.82  
3.820

USE YSI TEMPERATURE TABLES

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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: 428

Cal date: 10/13/1998

Now: 08-Feb-2001 11:23:14

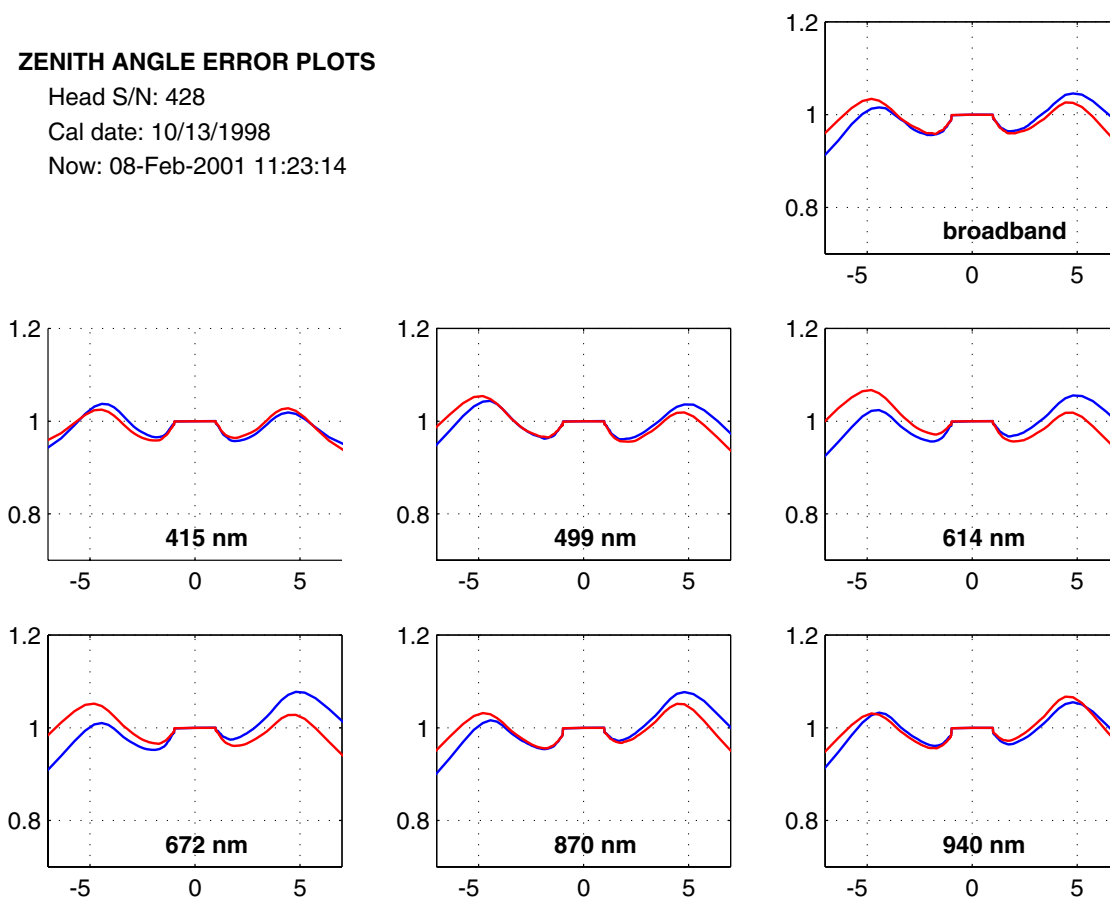


Figure 1: Zenith Angle Error

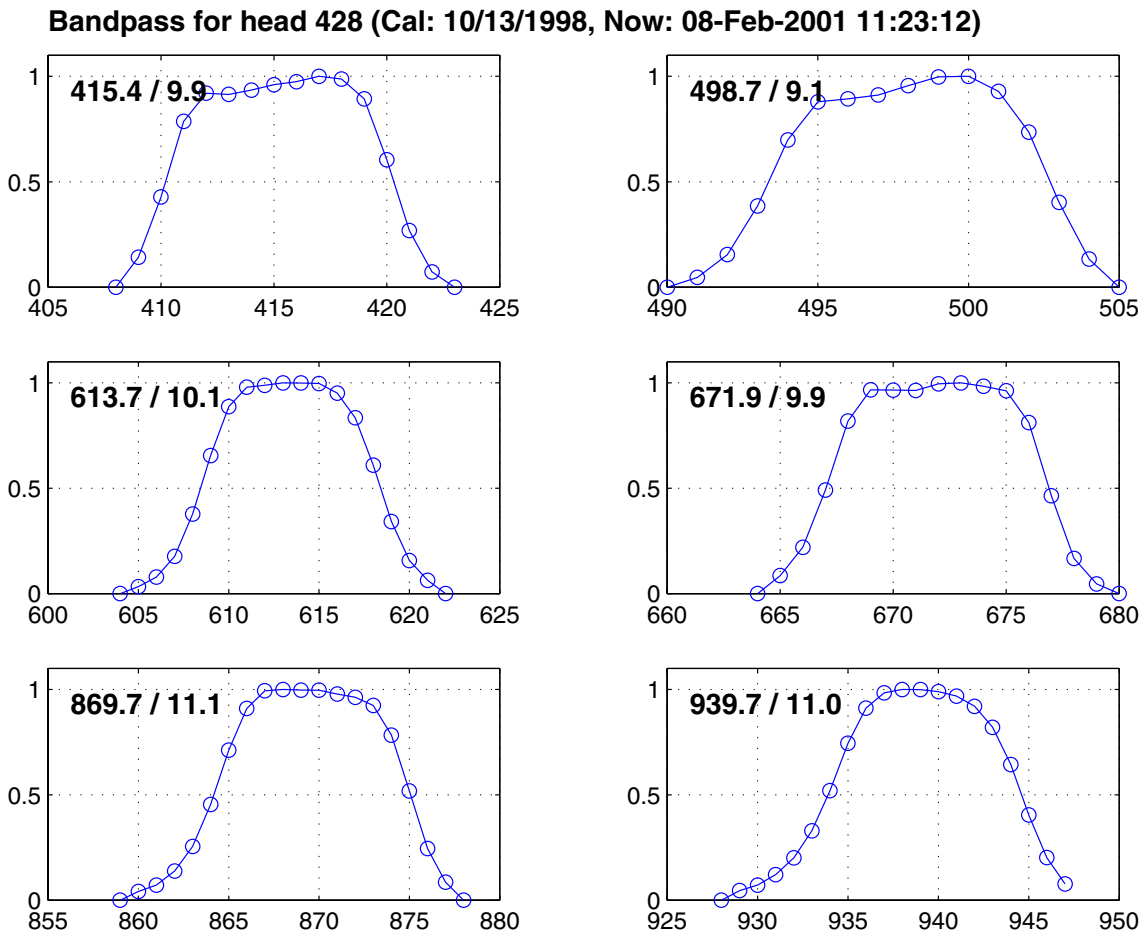


Figure 2: Zenith Angle Error

HEAD 428 TOA IRRADIANCES BASED ON ASTRONOMICAL SOLAR SPECTRUM

WAVELENGTH (nm)			IRRADIANCE (W/m <sup>2</sup> /nm)		
LOWER	CENTER	UPPER	LOWER	MEAN	UPPER
408,	415,	423,	1.651,	1.738,	1.825
490,	498,	505,	1.839,	1.936,	2.033
604,	613,	622,	1.627,	1.713,	1.798
664,	672,	680,	1.451,	1.527,	1.604
859,	869,	878,	0.902,	0.949,	0.997
928,	939,	948,	0.781,	0.822,	0.863

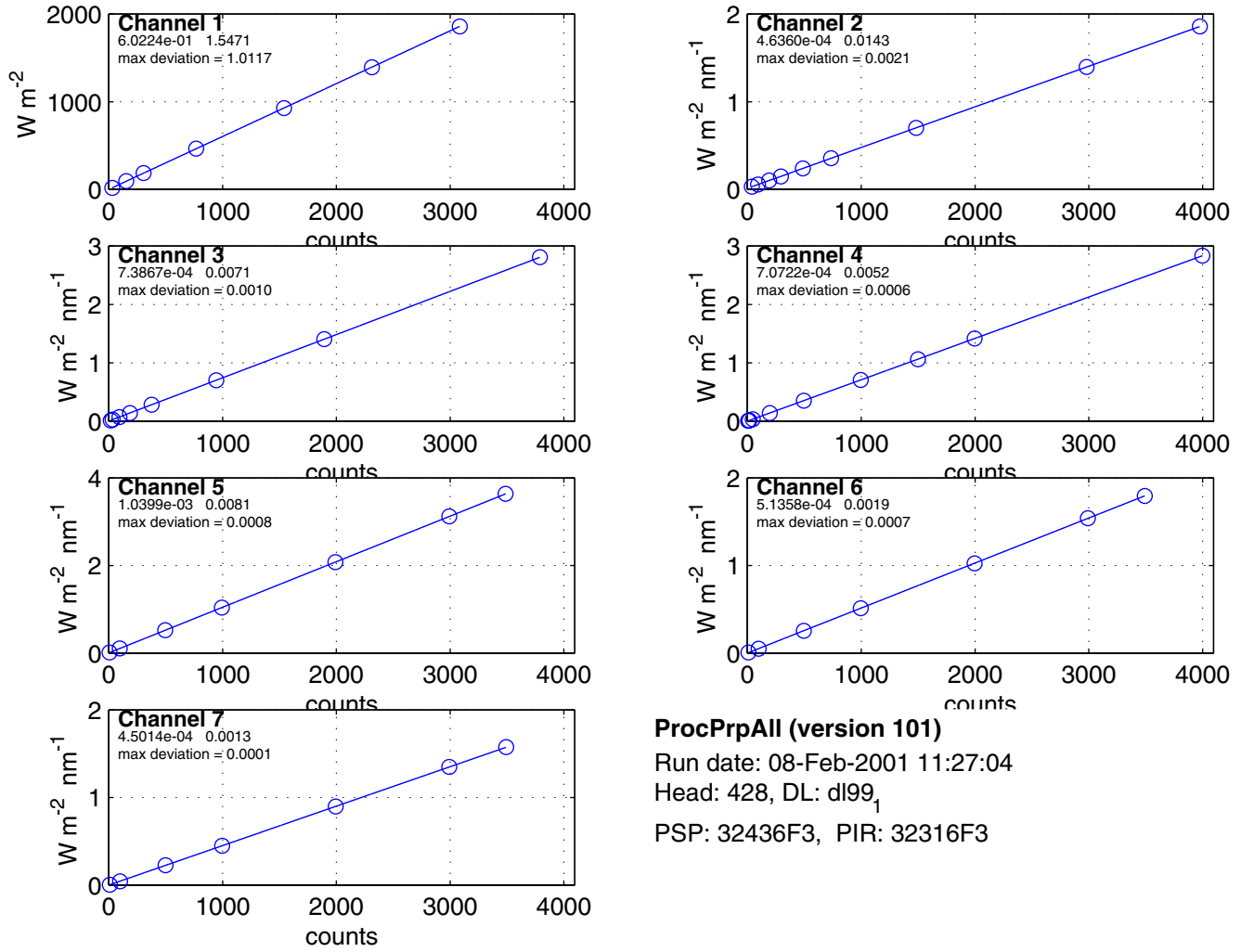
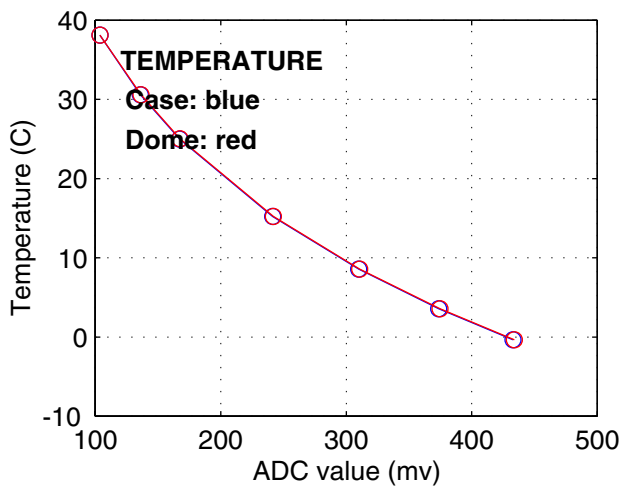
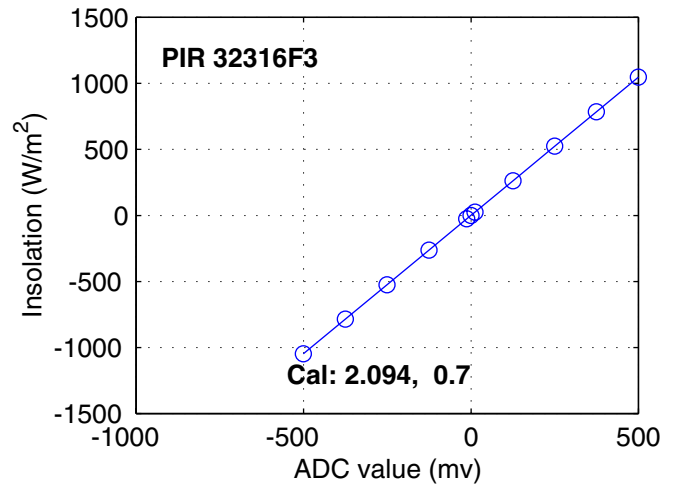
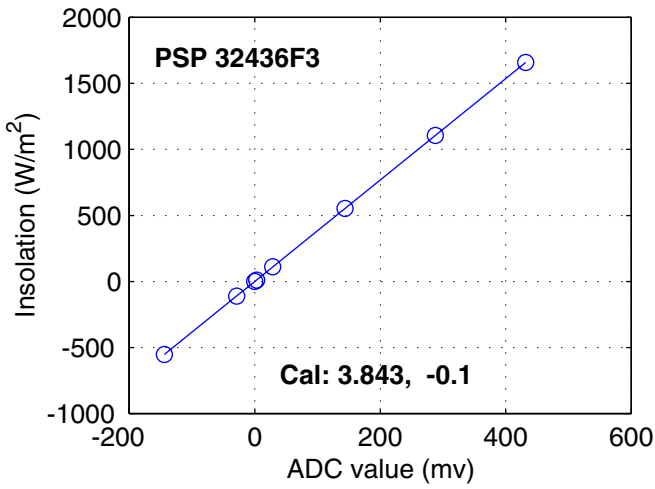


Figure 3: Head and Logger combined gains



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

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

Case: max err = 0.019 C

$$p_1 = 8.5556e-06, p_2 = -1.1272e-04$$

$$p_3 = 7.8383e-04, p_4 = 1.1474e-03$$

Dome: max err = 0.025

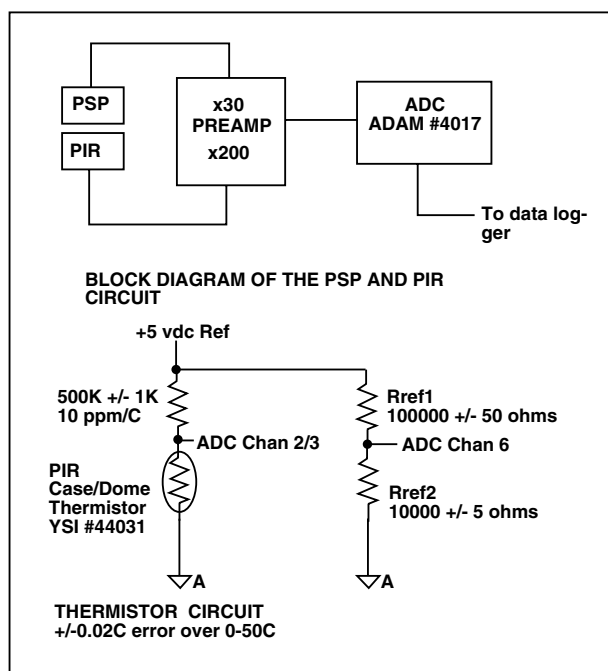
$$p_1 = 7.1490e-06, p_2 = -8.9356e-05$$

$$p_3 = 6.5471e-04, p_4 = 1.3840e-03$$

Figure 4: Head and Logger combined gains

No PIR thermistor calibration for instrument 32316F3.  
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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: 03            Cal ID: n99

CASE - Rref = 270000.0

R_cal	v_T	V_REF (computed)
6000	103.7	4768.8
8000	136.0	4726.7
10000	167.3	4684.4
15000	241.3	4584.9
20000	309.9	4494.3
25000	373.6	4409.0
30000	432.9	4329.2

DOME - Rref = 270000.0

R_cal	v_T	V_REF (computed)
6000	103.7	4768.8
8000	136.4	4739.6
10000	167.7	4695.6
15000	241.9	4596.9
20000	310.8	4505.9
25000	374.6	4420.2
30000	434.0	4340.2

(File: hd:instruments:prp:prpcal:prp:03:n99:TcalVref\_n99.dat)

```
% CALIBRATION FILE FOR PRPRX DATA COLLECTION SOFTWARE
% PSP CALIBRATION, PSP SN: 32436F3
3.8429      -0.07327
% PIR CALIBRATION, PIR SN: 32316F3
2.0937  0.70806
% TCASE FIT
8.55561e-06  -0.000112718      0.00078383      0.0011474
% TDOME FIT
7.14899e-06  -8.93557e-05      0.000654712      0.00138401
% K COEFFICIENT
4.0
% SIGMA
5.67e-8
% EPSILON
0.98
% BATTERY
0.030820  0.0
```

(File: hd:instruments:prp:prpcal:prp:03:n99:prprx\_03\_n99.txt)

## LOGGER CALIBRATION FILE

```

DATALOGGER S/N DL99_1, PREAMP 3 (Minnetonka) 2000 1992 6
CALIBRATION DATE: 990819 3000 2991 6
TECHNICIAN: EDWARDS 3500 3489 6
VOLTAGE REFERENCE: VOLT-A-VIDER (cal: CHANNEL 6
CHANNEL 1
10 9 3
10 30 5 100 98 3
50 152 6 500 496 4
100 305 6 1000 997 3
250 769 5 2000 1995 3
500 1541 6 3000 2992 3
750 2311 6 3500 3491 4
1000 3084 6 CHANNEL 7
CHANNEL 2
10 9 3
5 39 16 100 99 3
10 92 14 500 498 3
20 190 13 1000 997 3
30 293 15 2000 1995 3
50 488 15 3000 2993 2
75 736 15 3500 3492 3
150 1482 16 PSP, Preamp: 3 (990517 recalibration)
300 2979 15 -5 -143.91 .04
400 3974 14 -1 -28.78 .03
CHANNEL 3
0 .03 .03
5 16 5 .1 2.91 .03
10 34 6 1 28.80 .03
25 92 7 5 143.93 .03
50 185 6 10 287.90 .04
100 376 6 15 431.78 .12
250 945 7 PIR, Preamp: 3
500 1893 5 -4 -500.60 .12
1000 3789 6 -3 -375.48 .10
CHANNEL 4
-2 -250.38 .09
5 6 4 -1 -125.34 .12
10 17 5 -0.1 -12.79 .13
25 47 5 0 -0.16 .10
100 196 5 0.1 12.24 .15
250 496 5 1 124.73 .08
500 997 5 2 249.73 .08
750 1498 5 3 374.64 .11
1000 1997 5 4 499.69 .09
2000 3999 5 CASE
CHANNEL 5
6000 103.67 .02
10 6 5 8000 136.02 .00
100 96 6 10000 167.30 .00
500 495 6 15000 241.31 .02
1000 993 7 20000 309.95 .00

```

25000 373.64 .02  
30000 432.92 .00  
DOME  
6000 103.67 .00  
8000 136.39 .01  
10000 167.70 .01

15000 241.94 .01  
20000 310.75 .03  
25000 374.59 .08  
30000 434.02 .04  
END