GIADA FS MODEL

REPORT ON
IN FLIGHT ACTIVE PAYLOAD CHECKOUT N. 6 (PC6)
performed on
15/16/17-09-2007 and 24-09-2007

PREPARED	APPROVED	AUTHORIZED
GIADA TEAM L. COLANGELI, P. PALUMBO, A. ARONICA INAF – Osservatorio Astronomico di Capodimonte, Napoli (I) Università Parthenope, Napoli (I)	GIADA PI L. COLANGELI	GIADA PI L. COLANGELI

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REV	DOCUMENT CHANGE ORDER	DATE	CHANGES DESCRIPTION	PREPARED
0	-	29-07-2008	First issue	GIADA Team

1. SCOPE AND APPLICABILITY

The Active Payload Checkout n. 6 (PC6) test is the second of five Active Payload checkouts to be carried out before any major activity during the Rosetta Cruise Phase. Payload Checkouts 0-3 and 5 were passive, while Payload Checkout 4 was active. PC6 consists of two phases. The 1st phase is a passive test (GD01) similar to the previous Passive Payload Checkouts n. 0-3 and 5, the 2nd phase is an active test (GD02 and GD03) performing and checking new procedures.

The passive test (GD01) was executed on 15-16 September 2007 by switching on Main and Redundant I/Fs in sequence and executing similar procedures for the two cases. The active test was executed on 17 September 2007 (GD02) and on 24 September 2007 (GD03).

This document reports the results obtained on GIADA experiment during PC6.

This report is applicable to GIADA FS model on board the Rosetta S/C. The data were retrieved from DDS by means of the PI Workstation located at INAF - Osservatorio Astronomico di Capodimonte in Naples.

GIADA IWS software configuration is GES v. 4.2.2 plus RSOC Converter v. 1.1.2. GIADA in flight software configuration is 2.3 plus three additional patches (one more patch is used to update the context file).

2. REFERENCES

2.1 APPLICABLE DOCUMENT

AD1	RO-EST-RS-3001/EID A	ROSETTA Experiment Interface Document – Part A
AD2	RO-EST-RS-3009/EIDB	ROSETTA GIADA Experiment Interface Document – Part B
AD3	RO-ESC-PL-5000 – last issue	Flight Control Procedure
AD4	GIA-GAL-MA-007 Issue 4	GIADA Flight Spare Experiment User Manual last version

2.2 REFERENCE DOCUMENT

	None.	

3. DEFINITIONS AND ABBREVIATIONS

3.1 ABBREVIATIONS

CAL	Calibration
CF	Context File
CREP	Cover REPort
CT	Configuration Table
DDS	Data Disposition System
EGSE	Electrical Ground Support Equipment
EQM	Electrical Qualification Model
ESA	European Space Agency
FCP	Flight Control Procedure
FS	Flight Spare
GDS	Grain Detection System
GES	GIADA EGSE SW
GIADA	Grain Impact Analyser and Dust Accumulator
HK	House Keeping
I/F	InterFace
INAF-OAC	INAF - Osservatorio Astronomico di Capodimonte – Napoli (I)
IRQ	Interrupt ReQuest
IS	Impact Sensor
IWS	Instrument Work-Station
MBS	Micro Balance System
ME	Main Electronics
MTL	Mission TimeLine
MON	Monitor
OBCP	On-Board Control Procedure
PC	Payload Checkout
PI	Principal Investigator
PS	GIADA Power Supply
PZT	(IS) Piezoelectric Sensor
RED	Redundant
REV	Revision
RMOC	Rosetta Mission Operation Centre
RSOC	Rosetta Science Operation Centre
S/C	(Rosetta) Spacecraft
S/S	(GIADA) Sub-system (e.g. IS or GDS or MBS)
SCI	Scientific
SSC	Source Sequence Count
SSMM	Solid State Mass Memory on-board of Rosetta Spacecraft
SW	Software
TC	TeleCommand
TM	Telemetry
UM	User Manual
UTC	Coordinated Universal Time
VC0	Virtual Channel 0 (Real Time TM packets)
VC1	Virtual Channel 1 (TM packets coming from Mass Memory)

4. DESCRIPTION OF ACTIVITIES

The Active Payload Checkout n. 6 (PC6) was performed on 15/16/17-09-2007 and 24-09-2007 according to the timelines reported in Section 13. Test performed on 15/16-09-2007 (named GD01 in ESA documents) is the passive test routinely executed in every payload checkout, while tests performed on 17-09-2007 (GD02) and 24-09-2007 (GD03) represent the active part of PC6 and were executed in order to test and validate respectively some new settings by patching CT in RAM and CF in NVRAM. Commands were previously loaded in the Rosetta S/C and sent to GIADA via MTL.

Starting with PC2, some new FCPs have been used during the passive test, together with other FCPs already validated in the previous GIADA Commissioning phases. No new command was added/modified since then, so the two timelines used for Main and Red I/F in GD01 (see below) are similar to the timelines used during PC2, PC4 and PC5.

Timelines GD02 and GD03 concerning the active test of PC6 are the same used during PC4 activity when all expected steps were correctly executed, but the TC for patching the CF in NVRAM that was refused by GIADA due to inconsistent memory address as defined in the TC. After PC4 execution the wrong memory address was corrected and the relevant sequence AGDS006A (GIADA Patch of CF in NVRAM) was updated accordingly. GD02 and GD02 operations were tested with the EQM on May 31 2007 (see the relevant document RO-GIA-OACUPA-RP-102-D1_EQM_Test_31May2007_Data_Interpretation_070716); the EQM test was successful and the GO was given for GIADA PC6 test. Active test performed during PC4 was executed in the same way during PC6 activity but with the procedure AGDS006A updated.

The plan of activities referred to as passive part of PC6 foresaw the following steps for the Main Interface (for the values of parameters see timelines in Section 13.1):

Sequence	**Timeline GD01 – Main Interface**

AGDS001A	VGD0001B = "nom. Branch" [ENG] \ # GIADA on Main IF
	VGD0001A = "YES" [ENG]) # Context exists

AGDS002A	Patch CT v. flight 1
AGDS003A	Patch SW v.2.3
AGDS035A	Go to Cover Mode
AGDF090A	Open cover
AGDS065A	Go to Safe mode
AGDS110A	Go to Normal mode (science enabled)
AGDS038A	Set **GDS L/R** receiver thresholds to **1.60/1.18 V**
AGDS037A	Set IS Off
AGDS036A	Set IS **PZTA/B/C/D/E** threshold to **0.05/0.05/0.15/0.05/0.20 V** **Range** = **L** – **Gain** = **H/H/H/H/H**
AGDS037A	Set IS On
AGDS120A	Calibrate GDS – IS – MBS at 5 min intervals
AGDF100A	Self-interference test
AGDF055A	MBS # 1-2-3-4-5 heating
AGDF060A	GIADA Switch-off (with Cover close operation in the Power-off OBCP)

followed by similar steps for the Red I/F (for the values of parameters see timelines in Section 13.2):

Sequence	**Timeline GD01 – Redundant Interface**

AGDS001A	VGD0001B = "red. branch" [ENG] \ # GIADA on Red IF
	VGD0001A = "YES" [ENG]) # Context exists

AGDS002A	Patch CT v. flight 1
AGDS003A	Patch SW v.2.3
AGDS035A	Go to Cover Mode
AGDF090A	Open cover
AGDS065A	Go to Safe mode
AGDS110A	Go to Normal mode (science enabled)
AGDS038A	Set **GDS L/R** receiver thresholds to **1.60/1.18 V**
AGDS037A	Set IS Off
AGDS036A	Set IS **PZTA/B/C/D/E** threshold to **0.05/0.05/0.15/0.05/0.20 V** **Range** = **L** – **Gain** = **H/H/H/H/H**
AGDS037A	Set IS On
AGDS120A	Calibrate GDS – IS – MBS at 5 min intervals
AGDF100A	Self-interference test
AGDF055A	MBS # 1-2-3-4-5 heating
AGDF060A	GIADA Switch-off (with Cover close operation in the Power-off OBCP)

Settings of Thresholds and Parameters are reported in bold.

The two plans of activities referred to as active part of PC6 are reported below (for the values of parameters see timelines in Sections 13.3 and 13.4):

Sequence	**Timeline GD02 – Main Interface**

AGDS001A	VGD0001B = "nom. branch" [ENG] \ # GIADA on Main IF
	VGD0001A = "YES" [ENG]) # Context exists

AGDS002A	Patch CT v. flight 1
AGDS003A	Patch SW v.2.3
AGDS035A	Go to Cover Mode
AGDF090A	Open cover
AGDS065A	Go to Safe mode
AGDS004A	GD Patch CT in RAM
AGDS006A	GD Patch CF in NVRAM
AGDS110A	Go to Normal mode (science enabled)
AGDS038A	Set **GDS L/R** receiver thresholds to **1.60/1.18 V**
AGDS037A	Set IS Off
AGDS036A	Set IS **PZTA/B/C/D/E** threshold to **0.05/0.05/0.15/0.05/0.20 V** **Range** = **L** – **Gain** = **H/H/H/H/H**
AGDS037A	Set IS On
AGDS120A	Calibrate GDS – IS – MBS at 5 min intervals
AGDF100A	Self-interference test
AGDF060A	GIADA Switch-off (with Cover close operation in the Power-off OBCP)

Sequence	**Timeline GD03 – Main Interface**

AGDS001A	VGD0001B = "nom. branch" [ENG] \ # GIADA on Main IF
	VGD0001A = "YES" [ENG]) # Context exists

AGDS003A	Patch SW v.2.3
AGDS035A	Go to Cover Mode
AGDF090A	Open cover
AGDS065A	Go to Safe mode
AGDS110A	Go to Normal mode (science enabled)
AGDS038A	Set **GDS L/R** receiver thresholds to **1.60/1.18 V**
AGDS037A	Set IS Off
AGDS036A	Set IS **PZTA/B/C/D/E** threshold to **0.05/0.05/0.15/0.05/0.20 V** **Range** = **L** – **Gain** = **H/H/H/H/H**
AGDS037A	Set IS On
AGDS120A	Calibrate GDS – IS – MBS at 5 min intervals
AGDF100A	Self-interference test
AGDF060A	GIADA Switch-off (with Cover close operation in the Power-off OBCP)

Updated FCPs are reported in bold-italic in the previous lists; settings of Thresholds and Parameters are instead reported in bold.

The data were off-line elaborated on the PI IWS at INAF-OAC in Naples.

5. SUMMARY OF DATA ANALYSIS

The full sets of plots about Housekeeping and Science data are reported in Sections 7, 9 and 10 respectively for passive test (GD01) and active test (GD02 and GD03) on the Main I/F and in Section 8 for passive test (GD01) on the Red I/F.

Here following the main findings are summarised.

5.1 GENERAL CONSIDERATIONS

Passive test started on "Sat Sep 15 2007 15:01:14.32262", when the first TM packet was received from GIADA switched on the Main interface; the last TM packet on the Main interface was received on "Sun Sep 16 2007 02:38:03.332900". Passive test on the Redundant interface started on "Sun Sep 16 2007 03:01:14.40186" (1st packet received) and ended on "Sun Sep 16 2007 14:38:03.840824" (last packet received).

The active test relating to GD02 was only performed on the Main I/F; it started on "Mon Sep 17 2007 07:01:14.58676" (1st packet received) and ended on "Mon Sep 17 2007 09:38:03.790871" (last packet received).

The active test relating to GD03 was only performed on the Main I/F as well; it started on "Mon Sep 24 2007 07:01:14.169614" (1st packet received) and ended on "Mon Sep 24 2007 09:38:03.905714" (last packet received).

The first expected packet **(Connection Test Report, service 17,2) was not received** in the time window of any test, probably because the DDS has marked it with a wrong UTC time, being an unsynchronised time tag (bad time quality) TM report. As understood after iteration with RMOC people, this is a nominal situation for unsynchronised TM packets that are not received in real time; in this condition the DDS system cannot distinguish for how long the packet was stored in SSMM.

Except for the mentioned "lost event", no packet was lost, neither HK nor SCI TM; this means that **SSMM memory allocated to GIADA (1 Mbytes) is not saturated.** About HK TM see Figure 7.1-10 and Figure 7.1-11 for Main I/F (GD01), Figure 8.1-10 and Figure 8.1-11 for Red I/F (GD01), Figure 9.1-10 and Figure 9.1-11 for Main I/F (GD02), Figure 10.1-10 and Figure 10.1-11 for Main I/F (GD03). About SCI TM the previous considerations were deduced from TCTM report file residing in the log directory of GES.

At the 3rd IS power-on both on Main I/F (Sun Sep 16 2007 01:15:02) and Red I/F (Sun Sep 16 2007 13:15:01) for passive test and for GD02 (Mon Sep 17 2007 09:15:01) and GD03 (Mon Sep 24 2007 09:15:00) for active test, the event ***"Hardware error in IS event detection circuitry. No IRQ received."*** was received (see TCTM report file residing in the log directory of GES). This is a false message produced by the ME of GIADA when the IS electronics is powered-on. This is a known problem (see relevant Remark in GIADA UM [**AD 4**]).

All expected steps were correctly executed with the exception of some warnings:

1. Inconsistent Packet Data Field (TC Packet Type/Subtype = 20,1) occurred on Sun Sep 16 2007 01:33:02.324372 during GD01 execution on Main I/F;
2. Inconsistent Packet Data Field (TC Packet Type/Subtype = 20,1) occurred on Sun Sep 16 2007 13:33:01.328389 during GD01 execution on Red I/F;
3. Inconsistent Packet Data Field (TC Packet Type/Subtype = 6,5) occurred on Mon Sep 17 2007 07:40:10.352073 during GD02 execution on Main I/F.

Warnings 1. and 2. are expected and the behaviour of instrument is nominal. They are related to the TC (20,1) "Enable Science Packet Generation" ingested in the two procedures AGDS110A (Go to Normal mode) and AGDF055A (MBS heating) that are executed during the test GD01 (see the relevant timelines in Section 13.1 and Section 13.2). When GIADA performs the heating of MBSs, the TC (20,1) does not produce any change as the Science Packets have been already enabled during the execution of the procedure AGDS110A so that a warning is generated.

Warning 3. was not expected and refers to the **TC ZGD00004 DumpMemory executed during GD02 at 2007-09-17 07:40:10 that failed due to a wrong address**. The reason of this failure is clear. During PC4 the TC ZGDX0618 (Giada Patch Context File in NVRAM) was refused by the instrument due to a wrong definition of the "START_ADDRESS" value for NVRAM location of CF (it was set to 0000 0008 <8 dec> while the correct value should have been set to 1000 0008 hex <268435464 dec>). This problem was traced by ESA in the anomaly report ROS_SC-117, issued on 8-12-2006, and it was agreed, for the future, to test this and any new TC on EQM before using it on the flying unit. After PC4 the patch command ZGDX0618 was corrected both in the database and in the sequences (RO-GIA-OACUPA-DCR-005_modification_TC_to_patch_NVRAM_CF_07Mar17) and was tested with the EQM on May 31 2007; the EQM test was successful and the GO was given for GIADA PC6 test. Unfortunately the DumpMemory TC ZGD00004 for the NVRAM, also wrong since the beginning, was not tested on the EQM so it remained incorrect and generated a warning during GD02. Despite of this TC failure, GD02 was considered successful for GIADA and the GO was given for check GD03. This last test confirmed that NVRAM context file was updated as required; the relevant dump was only intended as a check if a problem would have occurred. Finally, after PC6, a FOP DCR ("CS_D_PIHRSO_D_GD_NVRAM_CF___00006") was raised in order to correct also the address of the NVRAM DumpMemory TC ZGD00004 and to change the two sequences GD-SEQ-006 and GD-SEQ-007 where the dump command was wrong.

Moreover the DCR "RO-GIA-OACUPA-DCR-006_deletion_sequence_GD-FCP-080_07Mar17" was sent to ESA in order to delete the Sequence GD-FCP-080 (AGDF080A – "Wait in Normal Mode for Sun sluing ops") not used anymore.

Note that the Patch Status has changed his value from 7 to 1 during GD02 test on Mon Sep 17 2007 07:37:03, due to TC patching of the CF in NVRAM. This was expected.

Despite the fact that the limits for the parameters of power consumption were modified by means of "RO-GIA-OACUPA-DCR-007_parameter_limits_variation_2007Aug23", some lower soft Out Of Limits (OOL) were triggered at GIADA power on during GD01 (on the Main I/F) and GD03 respectively:

1. NGDD0087 - Current on +15V line → 29.29686 mA occurred on Sat Sep 15 2007 15:01:14
2. NGDD0087 - Current on +15V line → 28,86284 mA occurred on Mon Sep 24 2007 07:01:14

All the limits defined for power consumption (see Table 5.2-1 for the actual settings) are mainly based on laboratory extensive testing of the instrument. Some dependence of temperature on power supply unit (and perhaps also on the rest of the instrument) was expected and in fact, looking at the history of in-flight data, one could see that, every time PS temperature goes below about 6 degC, current on +15V line goes below 30 mA in Safe mode, i.e. below the lower soft limit (see Figure 11.4-1). A general study of the available data to derive how much these temperature effects impact on power consumption will be performed in the future in order to implement "a fine tuning" of the relevant limits.

During PC6 activity the S/C performed a series of raster scans, moving continuously in the XZ plane around the Y axis direction. The changes of S/C attitude were required by the ALICE team due to their Scientific Operations and implied a variation of the Sun Aspect Angle with S/C +X axis near the zero value (see Figure 12.1-1, Figure 12.1-2, Figure 12.1-3 and Figure 12.1-4 for the Sun Aspect Angle variation during PC6 activity of GIADA). The change of attitude was registered by some sensors of GIADA. Figure 7.5-7 and Figure 8.5-7 show the frequency behaviour for MBS 1 during GD01 on Main I/F and Red I/F respectively; MBS 1 was pointing towards the Sun during PC6 and its frequency variations, of about 20-30 Hz, reproduce exactly the fluctuation of the Sun Aspect Angle. Similarly the external temperature sensor (Frangibolt) registered slight thermal fluctuations corresponding to the S/C attitude variation (see Figure 7.1-2, Figure 7.1-3, Figure 7.1-5 and Figure 7.1-7 for GD01 on Main I/F; Figure 8.1-2, Figure 8.1-3, Figure 8.1-5 and Figure 8.1-7 for GD01 on Red I/F; Figure 9.1-2, Figure 9.1-3, Figure 9.1-5 and Figure 9.1-7 for GD02).

The behaviour of the cover during the different open-close operations was monitored by the **"Cover Reports" (CREP)**. About these see Figure 7.2-1 and Figure 7.2-2 for Main–open and Main–close respectively (passive test), Figure 8.2-1 and Figure 8.2-2 for Red–open and Red–close respectively (passive test), Figure 9.2-1 and Figure 9.2-2 for Main–open and Main–close respectively (active test GD02), Figure 10.2-1 and Figure 10.2-2 for Main–open and Main–close respectively (active test GD03). The reports testify a **nominal behaviour** of the open-close operations.

An anomaly happened on ALICE during PC6 was related to GIADA and it is discussed here following:

ALICE was triggered into safe mode by data distributed erroneously by S/C via Service 19 during one of the flat field scan (AL07). Alice reported a value of 61166 (hex value 0xEEEE) by "Dust Alert" data from GIADA via Service 19 at 2007-09-15T15:39:36.590, which was during GD01 when GIADA IS was switched off bringing to the value of EEEE hex in the dust flux; this value is nominal and indicates that the dust flux information is not available as reported in GIADA FS UM (**AD4**), Sections 3.2.6 and 2.8.3.1.8. The value of 61166 is above the Alice safety limit (0-600) and it was passed to ALICE during GD01, forcing the instrument into a safe mode for a duration of 600 sec. before resuming activities. This resulted in a lost scan for AL. This issue was reported in the ALICE Anomaly Report ROS_SC-140 opened on the ALICE-GIADA S19; afterwards the ALICE team requested to disable Service 19 distribution from RN/GD to AL. The issue, however, was generated by a wrong use of information provided by GIADA that was correctly working at the time.

Only as reminder one should know this: Service 19 provides the mechanism to allow information furnished by one on-board unit to be distributed to one or more other onboard units. GIADA will provide an indication of the Dust Flux, that can be used by other payloads to close their covers in case of an excessive dust flux. This information will be provided in the field "Dust Flux" of the default HK packet. If the dust flux information can not be provided (for instance when IS switched off), it will be indicated by a value of 'EEEE'HEX (information "Not available").

Some PC6 general information:

Scenario period	17/09/07 to 01/10/07
Scenario duration	14 days
Sun distance	1.3 AU to 1.23 AU
Earth distance	0.38 AU
Propagation delay	~3 min.
Sun-SpaceCraft-Earth angle	34.17 deg. to 28.81 deg.

5.2 GIADA STATUS

The **current consumption** and **power supply temperatures** (Main on passive test: Figure 7.1-9; Red on passive test: Figure 8.1-9; Main on active test GD02: Figure 9.1-9, Main on active test GD03: Figure 10.1-9) are in line with nominal evolution of operative modes (Main on passive test: Figure 7.1-8; Red on passive test: Figure 8.1-8; Main on active test GD02: Figure 9.1-8; Main on active test GD03: Figure 10.1-8).

Power values must be compared with soft and hard limits reported in GIADA FS UM (**AD4**) and summarised in Table 5.2-1.

As reported in GIADA FS UM (**AD4**), the Soft and Hard Alarm Limits for Power consumption in Table 5.2-1 for parameters NGDD0086, NGDD0087 and/or NGDD0088 refer to the different GIADA operating modes. The Soft Alarm Limits in Normal and Flux Modes refer to nominal conditions, i.e. with all sub-systems switched ON. This means that when GIADA is in Normal Mode, but not with all sub-systems ON (or in Flux with MBS OFF), the lower Soft Alarm Limits indicated in the Table can be overcome. In order to avoid flood of Out Of Limits (OOL) alarms, it has been decided (July 2006) to refer the Hard Alarm Limits to the extreme instrument status for each mode (e.g., in normal mode, with all subsystems off – lower – or at maximum power consumption - upper). Other configurations not related to real GIADA failure may still give OOL, related to operation in non nominal temperature conditions, although such conditions have never been experienced so far.

In general, all **functional parameters** measured during the PC6 test behave as expected, with the exception of some OOLs reported in the previous section 5.1

In previous in flight tests different values of **current on the 5 V line** between Main (1050 mA) and Red (< 1000 mA) I/Fs were measured. A deeper analysis of the causes of this effect has evidenced a ***wrong digitalization of the CAL factors*** in the conversion tables of the PI EGSE SW. This problem has been fixed starting from the analysis of the PC2 data, so that the inconsistency between Main (Figure 7.1-8) and Redundant (Figure 8.1-8) I/Fs has been removed and the measured values of current on the 5 V line are now only slightly different: Main ≈ 1100 mA, Red ≈ 1080 mA.

QUANTITY	NAME	LNAME	SOFT ALARM LIMITS		HARD ALARM LIMITS	
			Lower	Higher	Lower	Higher
+5V Power Consumption ([1])	NGDD0086	Current +5V	110 mA	150 mA	80 mA	180 mA
+15V Power Consumption ([1])	NGDD0087	Current +15V	30 mA	60 mA	20 mA	70 mA
-15V Power Consumption ([1])	NGDD0088	Current -15V	50 mA	90 mA	40 mA	100 mA
+5V Power Consumption ([2])	NGDD0086	Current +5V	110 mA	150 mA	80 mA	180 mA
+15V Power Consumption ([2])	NGDD0087	Current +15V	30 mA	600 mA	20 mA	700 mA
-15V Power Consumption ([2])	NGDD0088	Current -15V	50 mA	600 mA	40 mA	700 mA
+5V Power Consumption ([3])	NGDD0086	Current +5V	110 mA	1600 mA	80 mA	1800 mA
+15V Power Consumption ([3])	NGDD0087	Current +15V	30 mA	550 mA	20 mA	600 mA
-15V Power Consumption ([3])	NGDD0088	Current -15V	50 mA	350 mA	40 mA	400 mA
+5V Power Consumption ([4])	NGDD0086	Current +5V	110 mA	170 mA	80 mA	1500 mA
+15V Power Consumption ([4])	NGDD0087	Current +15V	30 mA	200 mA	20 mA	220 mA
-15V Power Consumption ([4])	NGDD0088	Current -15V	50 mA	135 mA	40 mA	155 mA

Table 5.2-1. Hard and Soft limits for GIADA FS power consumption

([1]) Safe mode ([2]) Cover mode ([3]) Normal mode ([4]) Flux mode

All **Temperatures** behave as expected (Main on passive test: Figure 7.1-2, Figure 7.1-3, Figure 7.1-4; Red on passive test: Figure 8.1-2, Figure 8.1-3, Figure 8.1-4; Main on active test GD02: Figure 9.1-2, Figure 9.1-3, Figure 9.1-4; Main on active test GD03: Figure 10.1-2, Figure 10.1-3, Figure 10.1-4). The peaks visible at the beginning and at the end of Frangibolt and IS temperature profiles are features due to the temporary increasing of power consumption at Power-on of the motor heaters (see Figure 7.1-5 and Figure 7.1-7 for Main on passive test; Figure 8.1-5 and Figure 8.1-7 for Red on passive test; Figure 9.1-5 and Figure 9.1-7 for Main on active test GD02; Figure 10.1-5 and Figure 10.1-7 for Main on active test GD03). The only "anomalous" behaviour is referring to the Frangibolt temperature sensor that shows a fluctuation due to the change of the S/C attitude as already explained in the previous section 5.1.

The trend of the IS Temperature is more noisy with the Main than with the Red I/F (Main on passive test: Figure 7.4-4; Red on passive test: Figure 8.4-4; Main on active test GD02: Figure 9.4-4; Main on active test GD03: Figure 10.4-4).

In previous in flight tests the behaviour of the **GDS Laser 1 Monitor vs. Temperature** presented an *offset* between Main and Red measurements. This effect was simply due to a ***wrong digitalization of the CAL factors*** in the conversion tables of the PI EGSE SW and was fixed for the analysis of the PC4 data (see Figure 7.3-5, Figure 8.3-5, Figure 9.3-5, Figure 10.3-5 and Figure 11.1-1).

The detection **Thresholds** applied on GDS are shown in Figure 7.3-2 (Main on passive test), Figure 8.3-2 (Red on passive test), Figure 9.3-2 (Main on active test GD02) and Figure 10.3-2 (Main on active test GD03), while those applied to PZT3 and PZT5 of IS are shown in Figure 7.4-2 and Figure 7.4-3 (Main on passive test), Figure 8.4-2 and Figure 8.4-3 (Red on passive test), Figure 9.4-2 and Figure 9.4-3 (Main on active test GD02), Figure 10.4-2 and Figure 10.4-3 (Main on active test GD03). Moreover, Range and Gain for IS are set as shown in Table 5.2-2.

RANGE	GAIN				
	PZTA	PZTB	PZTC	PZTD	PZTE
Low	High	High	High	High	High

Table 5.2-2. IS Range and Gain configuration

About **scientific data** we notice the following points.

During PC6 the Sun was not in the GDS detectors FoV, so that saturation of GDS output did NOT occur. Therefore, it is possible to evaluate the effect of internal stray-light. The **GDS CAL data** show for the **GDS Left side** an output level of about **0.7-0.9 V** and for the **GDS Right side** a level around **0.19 V** (Main on passive test: Figure 7.3-10; Red on passive test: Figure 8.3-10; Main on active test GD02: Figure 9.3-10; Main on active test GD03 Figure 10.3-10). These values are compatible with previous measurements.

Since there is NO saturation, some **GDS scientific events** are detected. On the Main I/F (passive test) 99 events are detected on the GDS Left detector and 24 on the GDS Right detector (Figure 7.3-9); on the Red I/F (passive test) 58 events are detected on the GDS Left detector and 28 on the GDS Right detector (Figure 8.3-9); on the Main I/F (active test GD02) 307 events are detected on the GDS Left detector and 4 on the GDS Right detector (Figure 9.3-9); on the Main I/F (active test GD03) 85 events are detected on the GDS Left detector and 3 on the GDS Right detector (Figure 10.3-9). Most of them happen at GIADA Power-on either are at the saturation limit of 6.9 V and do not occur in coincidence with other GIADA transitions.

The "**Dust Monitor**" presents the following results: 39 single detections and 6 double detections on the Main I/F – passive test (Figure 7.4-12); 21 single detections and 6 double detections on the Red I/F – passive test (Figure 8.4-12); 27 single detections and 6 double detections on the Main I/F – active test GD02 (Figure 9.4-12); 21 single detections and 6 double detections on the Main I/F – active test GD03 (Figure 10.4-12). During PC2 test hundreds of single detections occurred; these were related to the detections by the PZT-E (or 5) at 0.15 V level. After Payload Checkout n. 2 the detection threshold on the PZT-E (or 5) were increased from 0.15 V to 0.20 V, so that the single detections are considerably reduced since then.

It must be recalled that the Dust Monitor counts IS events even when the Scientific TM is not enabled. One IS event is marked when one (the first) PZT signal crosses the threshold (with the filtering). So it is possible to have Dust Monitor > 0 even if **no IS event** has been **detected** simultaneously by ALL the PZTs.

An analysis of the occurrence of the **IS scientific events** for the Main and Red I/Fs is reported in Section 5.2.1 for the Main I/F – passive test (Figure 7.4-6), in Section 5.2.2 for the Red I/F – passive test (Figure 8.4-6), in Section 5.2.3 for the Main I/F – active test GD02 (Figure 9.4-6) and in Section 5.2.4 for the Main I/F – active test GD03 (Figure 10.4-6).

The last IS CAL (8 steps rather than 4) are performed at 9.6 V amplitude instead of 10 V as the others. This is linked to the different setting of the calibrations. Thus, the IS outputs of the stimuli are lower than in the former cases (see Main I/F on passive test: from Figure 7.4-19 to Figure 7.4-23; Red I/F on passive test: from Figure 8.4-19 to Figure 8.4-23; Main I/F on active test GD02: from Figure 9.4-19 to Figure 9.4-23; Main I/F on active test GD03: from Figure 10.4-19 to Figure 10.4-23).

The frequency level of all MBS, but MBS 1, has not changed with respect to PC5 test. MBS 1 has increased its frequencies by an amount of 20-30 Hz (Figure 11.3-7). The frequency – temperature behaviour is not changed since previous in-flight tests: see Figure 11.3-1 for MBS 1, Figure 11.3-2 and Figure 11.3-8 for MBS 2, Figure 11.3-3 and Figure 11.3-9 for MBS 3, Figure 11.3-4 and Figure 11.3-10 for MBS 4 and Figure 11.3-5 and Figure 11.3-12 for MBS 5.

5.2.1 Analysis of IS SCI events on the Main I/F (passive test)

Here following is an analysis of the IS SCI events detected on the Main I/F (passive test).

IS Events detected by Channel A (Figure 7.4-7)
- 8 events detected at IS_Event_Time = 148506071.16, 148522576.09, 148524567.54, 148524569.32, 148526370.30, 148526370.31, 148526436.28, 148527030.31 s
- 6 events detected by Ch-A are also detected by Ch-B
- 4 events detected by Ch-A are also detected by Ch-C
- 5 events detected by Ch-A are also detected by Ch-D
- no event detected by Ch-A is also detected by Ch-E

IS Events detected by Channel B (Figure 7.4-8)
- 6 events detected at IS_Event_Time = 148506071.16, 148524569.32, 148526370.30, 148526370.31, 148526436.28, 148527030.31 s
- all events detected by Ch-B are also detected by Ch-A
- 4 events detected by Ch-B are also detected by Ch-C
- all events detected by Ch-B but 1 are also detected by Ch-D
- no event detected by Ch-B is also detected by Ch-E

IS Events detected by Channel C (Figure 7.4-9)
- 4 events detected at IS_Event_Time = 148524569.32, 148526370.30, 148526436.28, 148527030.31 s
- all events detected by Ch-C are also detected by Ch-A
- all events detected by Ch-C are also detected by Ch-B
- all events detected by Ch-C are also detected by Ch-D
- no event detected by Ch-C is also detected by Ch-E

IS Events detected by Channel D (Figure 7.4-10)
- 5 events detected at IS_Event_Time = 148524569.32, 148526370.30, 148526370.31, 148526436.28, 148527030.31 s
- all events detected by Ch-D are also detected by Ch-A
- all events detected by Ch-D are also detected by Ch-B
- all events detected by Ch-D but 1 are also detected by Ch-C
- no event detected by Ch-D is also detected by Ch-E

IS Events detected by Channel E (Figure 7.4-11)
- no event detected

Conclusions:
- 4 events are simultaneously detected by Ch-A-B-C-D, but not by Ch-E, at IS_Event_Time = 148524569.32, 148526370.30, 148526436.28, 148527030.31 s
- 5 events are simultaneously detected by Ch-A-B-D, but not by Ch-C-E, at IS_Event_Time = 148524569.32, 148526370.30, 148526370.31, 148526436.28, 148527030.31 s
- 6 events are simultaneously detected by Ch-A-B, but not by Ch-C-D-E, at IS_Event_Time = 148506071.16, 148524569.32, 148526370.30, 148526370.31, 148526436.28, 148527030.31 s

- 2 events are only detected by Ch-A at IS_Event_Time = 148522576.09, 148524567.54 s
- no event detected by Ch-E

The 8 events detected by Channels A-B-C-D are summarized in Table 5.2-3. Six of them (highlighted in yellow) occur in coincidence with other GIADA transitions (switching on/off of the GDS lasers). The other two do not seem correlated to any other GIADA event and cannot be easily identified.

IS	Time	Event
A, B	148506071.16	
A	148522576.09	
A	148524567.54	Laser OFF
A, B, C, D	148524569.32	Laser OFF
A, B, C, D	148526370.30	Laser Power ON
A, B, D	148526370.31	Laser Power ON
A, B, C, D	148526436.28	Laser ON
A, B, C, D	148527030.31	Laser OFF

Table 5.2-3. IS SCI Events from PZTs A-B-C-D

5.2.2 Analysis of IS SCI events on the Redundant I/F (passive test)

Here following is an analysis of the IS SCI events detected on the Redundant I/F (passive test).

IS Events detected by Channel A (Figure 8.4-7)
- 5 events detected at IS_Event_Time = 148567769.40, 148569569.29, 148569569.30, 148569635.27, 148570229.30 s
- no event detected by Ch-A is also detected by Ch-B-C-D-E

IS Events detected by Channel B (Figure 8.4-8)
- no event detected

IS Events detected by Channel C (Figure 8.4-9)
- no event detected

IS Events detected by Channel D (Figure 8.4-10)
- no event detected

IS Events detected by Channel E (Figure 8.4-11)
- no event detected

Conclusions:
- all the 5 events are only detected by Ch-A at IS_Event_Time = 148567769.40, 148569569.29, 148569569.30, 148569635.27, 148570229.30 s
- no event detected by Ch-B-C-D-E

The 5 events detected by Channel A are summarized in Table 5.2-4. All events occur in coincidence with other GIADA transitions (switching on/off of the GDS lasers).

IS	Time	Event
A	148567769.40	Laser OFF
A	148569569.29	Laser Power ON
A	148569569.30	Laser Power ON
A	148569635.27	Laser ON
A	148570229.30	Laser OFF

Table 5.2-4. IS SCI Events from PZT A

5.2.3 Analysis of IS SCI events on the Main I/F (active test GD02)

Here following is an analysis of the IS SCI events detected on the Main I/F (active test GD02).

IS Events detected by Channel A (Figure 9.4-7)
- 5 events detected at IS_Event_Time = 148639696.23, 148639769.32, 148641569.30, 148641569.31, 148641635.28 s
- all events detected by Ch-A but 1 are also detected by Ch-B
- 3 events detected by Ch-A are also detected by Ch-C
- all events detected by Ch-A but 1 are also detected by Ch-D
- no event detected by Ch-A is also detected by Ch-E

IS Events detected by Channel B (Figure 9.4-8)
- 4 events detected at IS_Event_Time = 148639769.32, 148641569.30, 148641569.31, 148641635.28 s
- all events detected by Ch-B are also detected by Ch-A
- all events detected by Ch-B but 1 are also detected by Ch-C
- all events detected by Ch-B are the same detected by Ch-D
- no event detected by Ch-B is also detected by Ch-E

IS Events detected by Channel C (Figure 9.4-9)
- 3 events detected at IS_Event_Time = 148639769.32, 148641569.30, 148641635.28 s
- all events detected by Ch-C are also detected by Ch-A
- all events detected by Ch-C are also detected by Ch-B
- all events detected by Ch-C are also detected by Ch-D
- no event detected by Ch-C is also detected by Ch-E

IS Events detected by Channel D (Figure 9.4-10)
- 4 events detected at IS_Event_Time = 148639769.32, 148641569.30, 148641569.31, 148641635.28 s
- all events detected by Ch-D are also detected by Ch-A
- all events detected by Ch-D are the same detected by Ch-B
- all events detected by Ch-D but 1 are also detected by Ch-C
- no event detected by Ch-D is also detected by Ch-E

IS Events detected by Channel E (Figure 9.4-11)
- no event detected

Conclusions:
- Ch-B and Ch-D detect the same (four) events
- 3 events are simultaneously detected by Ch-A-B-C-D, but not by Ch-E, at IS_Event_Time = 148639769.32, 148641569.30, 148641635.28 s
- 4 events are simultaneously detected by Ch-A-B-D, but not by Ch-C-E, at IS_Event_Time = 148639769.32, 148641569.30, 148641569.31, 148641635.28 s
- 1 event is only detected by Ch-A at IS_Event_Time = 148639696.23 s
- no event detected by Ch-E

The 5 events detected by Channels A-B-C-D are summarized in Table 5.2-5. Four of them (highlighted in yellow) occur in coincidence with other GIADA transitions (switching on/off of the GDS lasers). The other one (only detected by Ch-A) does not seem correlated to any other GIADA event and cannot be easily identified.

IS	Time	Event
A	148639696.23	
A, B, C, D	148639769.32	Laser OFF
A, B, C, D	148641569.30	Laser Power ON
A, B, D	148641569.31	Laser Power ON
A, B, C, D	148641635.28	Laser ON

Table 5.2-5. IS SCI Events from PZTs A-B-C-D

5.2.4 Analysis of IS SCI events on the Main I/F (active test GD03)

Here following is an analysis of the IS SCI events detected on the Main I/F (active test GD03).

IS Events detected by Channel A (Figure 10.4-7)
- 4 events detected at IS_Event_Time = 149244568.31, 149246368.28, 149246368.29, 149246434.30 s
- all events detected by Ch-A are the same detected by Ch-B
- all events detected by Ch-A but 1 are also detected by Ch-C
- all events detected by Ch-A but 1 are also detected by Ch-D
- no event detected by Ch-A is also detected by Ch-E

IS Events detected by Channel B (Figure 10.4-8)
- 4 events detected at IS_Event_Time = 149244568.31, 149246368.28, 149246368.29, 149246434.30 s
- all events detected by Ch-B are the same detected by Ch-A
- all events detected by Ch-B but 1 are also detected by Ch-C
- all events detected by Ch-B but 1 are also detected by Ch-D
- no event detected by Ch-B is also detected by Ch-E

IS Events detected by Channel C (Figure 10.4-9)
- 3 events detected at IS_Event_Time = 149244568.31, 149246368.28, 149246434.30 s
- all events detected by Ch-C are also detected by Ch-A
- all events detected by Ch-C are also detected by Ch-B
- all events detected by Ch-C are the same detected by Ch-D
- no event detected by Ch-C is also detected by Ch-E

IS Events detected by Channel D (Figure 10.4-10)
- 3 events detected at IS_Event_Time = 149244568.31, 149246368.28, 149246434.30 s
- all events detected by Ch-D are also detected by Ch-A
- all events detected by Ch-D are also detected by Ch-B
- all events detected by Ch-D are the same detected by Ch-C
- no event detected by Ch-D is also detected by Ch-E

IS Events detected by Channel E (Figure 10.4-11)
- no event detected

Conclusions:
- Ch-A and Ch-B detect the same (four) events
- Ch-C and Ch-D detect the same (three) events
- 3 events are simultaneously detected by Ch-A-B-C-D, but not by Ch-E, at IS_Event_Time = 149244568.31, 149246368.28, 149246434.30 s
- 4 event are simultaneously detected by Ch-A-B, but not by Ch-C -D-E, at IS_Event_Time = 149244568.31, 149246368.28, 149246368.29, 149246434.30 s
- no event detected by Ch-E

The 4 events detected by Channels A-B-C-D are summarized in Table 5.2-6. All events occur in coincidence with other GIADA transitions (switching on/off of the GDS lasers).

IS	Time	Event
A, B, C, D	149244568.31	Laser OFF
A, B, C, D	149246368.28	Laser Power ON
A, B	149246368.29	Laser Power ON
A, B, C, D	149246434.30	Laser ON

Table 5.2-6. IS SCI Events from PZTs A-B-C-D

6. CONCLUSIONS

According to the above data elaboration and results, the following conclusions can be drawn about the Active Payload Checkout 6:

- **No loss of science TM** was observed and no flood of ghost events was produced by GIADA.
- The not synchronised TM report (i.e., Connection report 17,2 which is the first packet produced by GIADA after the switch-on) had a wrong UTC time and this can result in absence of this packet in the time window of the test. **This issue has been understood**: if the packet is received on VC0, the delay of the time stamping is about some seconds, because the RMOC is able to calculate quite accurately when the packet was generated on-board. When the packet is received on VC1, the Mission Control Centre is not able to calculate the generation time since the packet could have been generated many days before.
- At the 3rd IS power-on both on Main and Red I/Fs, the event "*Hardware error in IS event detection circuitry. No IRQ received*" was received. This is a known problem that may happen @ IS power-on.
- All operations were correctly executed, all functional parameters measured during the PC6 test behaved as expected, but the **TC ZGD00004 DumpMemory** executed during GD02 at 2007-09-17 07:40:10 that **failed due to a wrong address**. The reason of this failure was clarified and anyway this TC failure was not considered a problem for GIADA operations.
- During the active test GD02 the patch status has changed his value from 7 to 1 due to TC patching of the CF in NVRAM. This behaviour is expected and normal.
- Despite the fact that the limits for the parameters of power consumption were recently modified, some lower soft OOLs (related to the current on +15V line) were triggered at GIADA power-on during GD01 (on the Main I/F) and GD03. This behaviour is normal and can occur every time PS temperature goes below about 6 degC at GIADA power-on.
- During PC6 activity the S/C changed its attitude, moving continuously in the XZ plane around the Y axis direction and implying a variation of the Sun Aspect Angle with S/C +X axis near the zero value. The variation of S/C attitude was accurately traced by some sensors of GIADA: MBS 1 and temperature sensor of the Frangibolt.
- The internal (Impact Sensor, Laser and Power Supply) and external (Frangibolt and MBS's) temperatures were in the nominal range, as well as the current consumption during all the phases of the test. The GIADA cover operations followed the **nominal behaviour**.
- The GDS was not saturated, so that GDS CAL data gave information about internal stray-light levels, that are similar to those measured in previous on-ground and in-flight tests.
- The GDS produced some scientific "ghost events". Most of them happen at GIADA Power-on either are at the saturation level.
- The IS produced some "ghost events" detected by one or more PZTs when a PZT signal crosses its threshold; most of them occurred in coincidence with other GIADA transitions. The results of the IS calibration are the same as measured during the other tests.
- As a consequence, the "Dust Monitor" measured some (ghost) detections.
- MBS frequency and frequency-temperature trends are as in previous tests. MBS 1 has increased his frequency by an amount of 20-30 Hz with respect to PC5 test.

7. PC6 DATA ANALYSIS – MAIN INTERFACE (GD01)

7.1 GIADA STATUS

Figure 7.1-1. HK Status of GIADA and S/S vs. time - Main

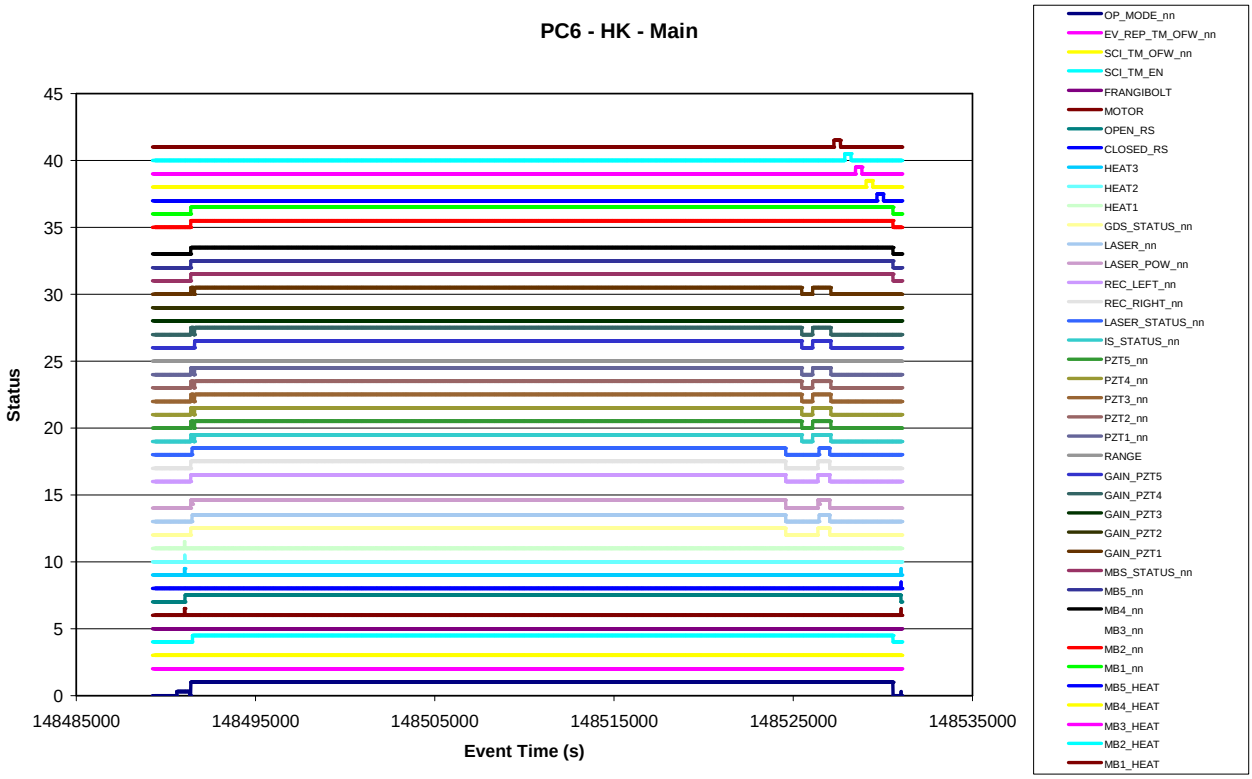


Figure 7.1-2. Evolution of all temperatures vs. time - HK, HK-SCI, SCI - Main

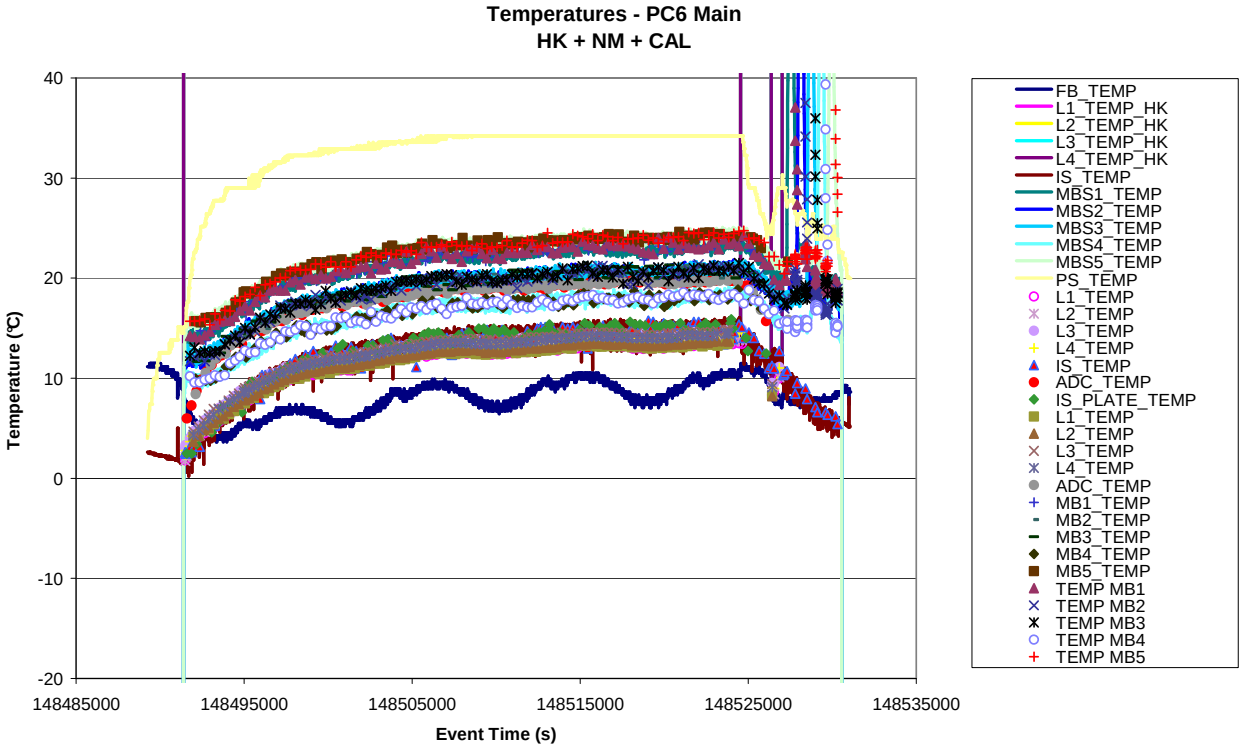


Figure 7.1-3. Evolution of temperatures of system elements vs. time - HK, HK-SCI, SCI - Main

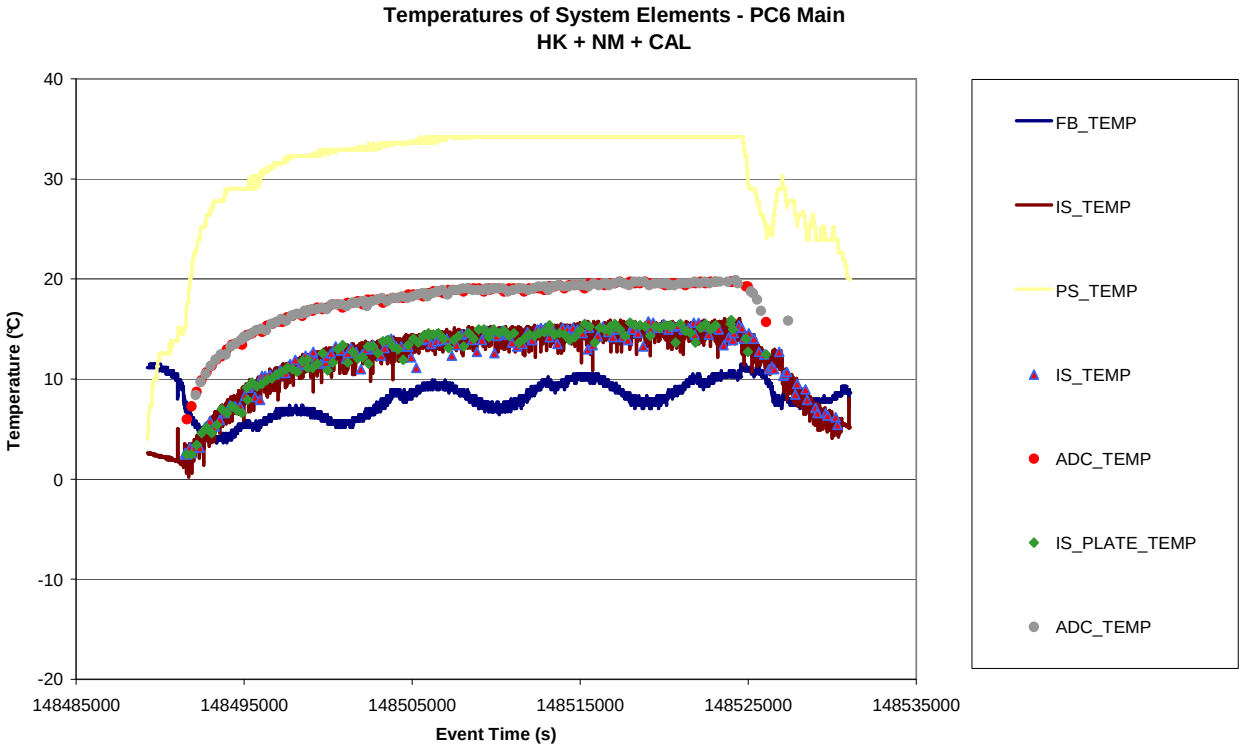


Figure 7.1-4. Evolution of temperatures of sub-systems vs. time - HK, HK-SCI, SCI - Main

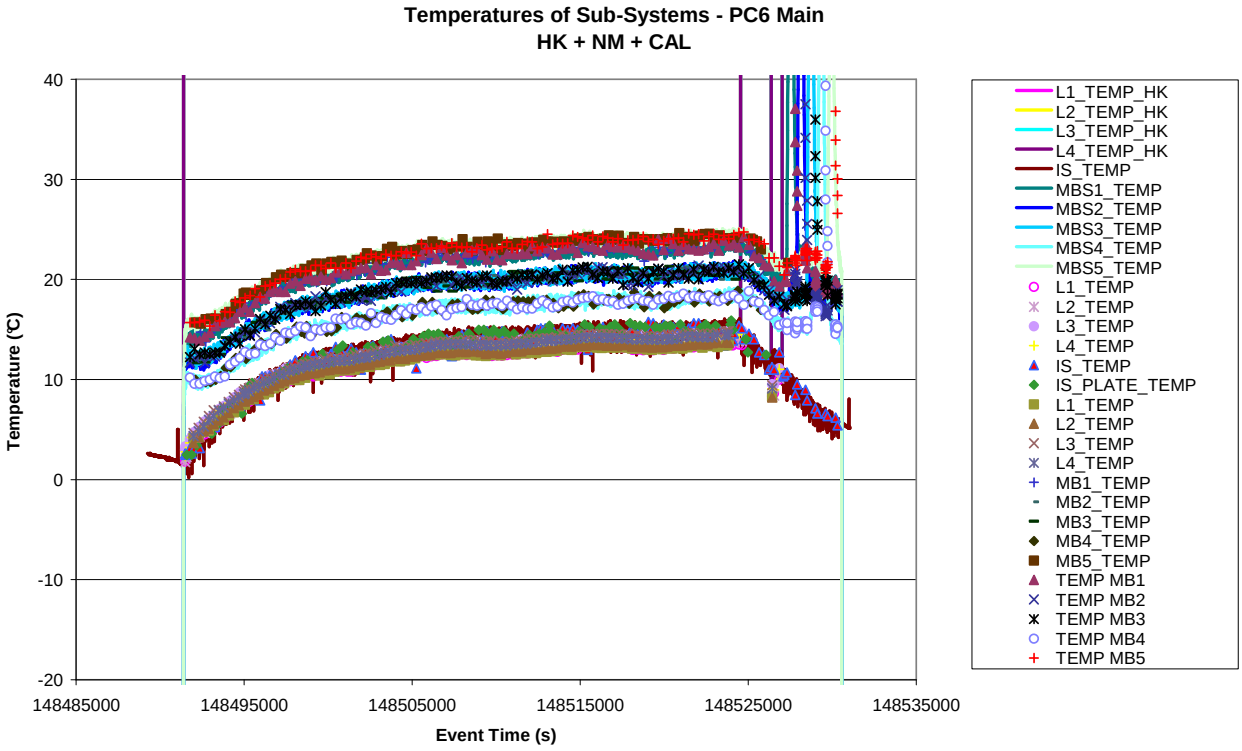


Figure 7.1-5. HK Status versus Temperatures of system elements - Main

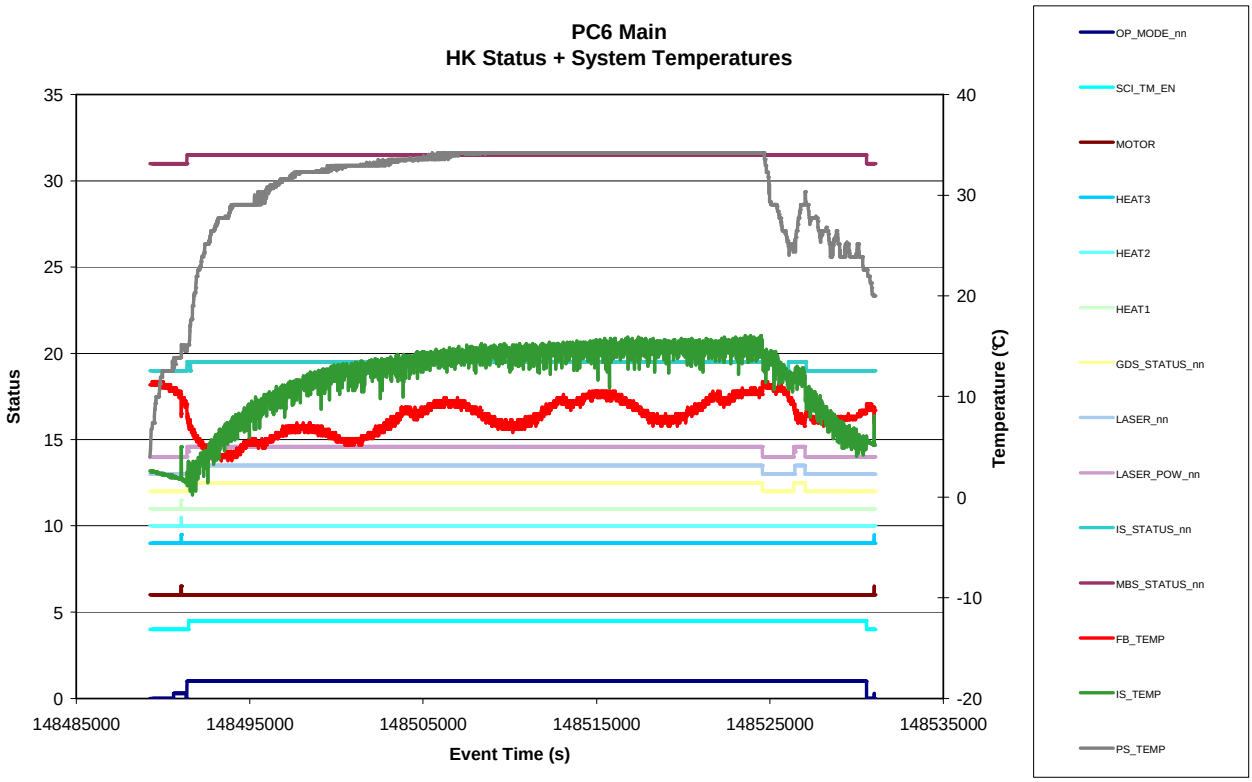


Figure 7.1-6. Operation Status vs. time - Main

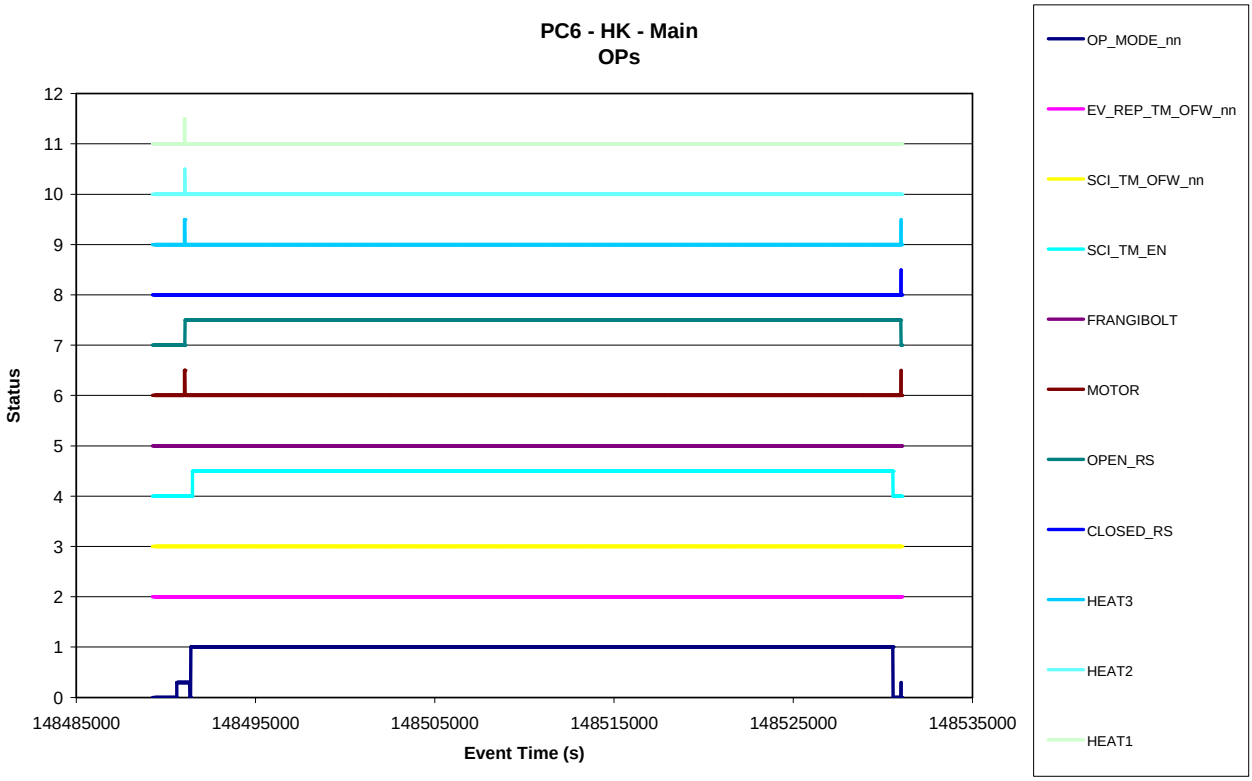


Figure 7.1-7. Operation Status versus Temperatures of system elements - Main

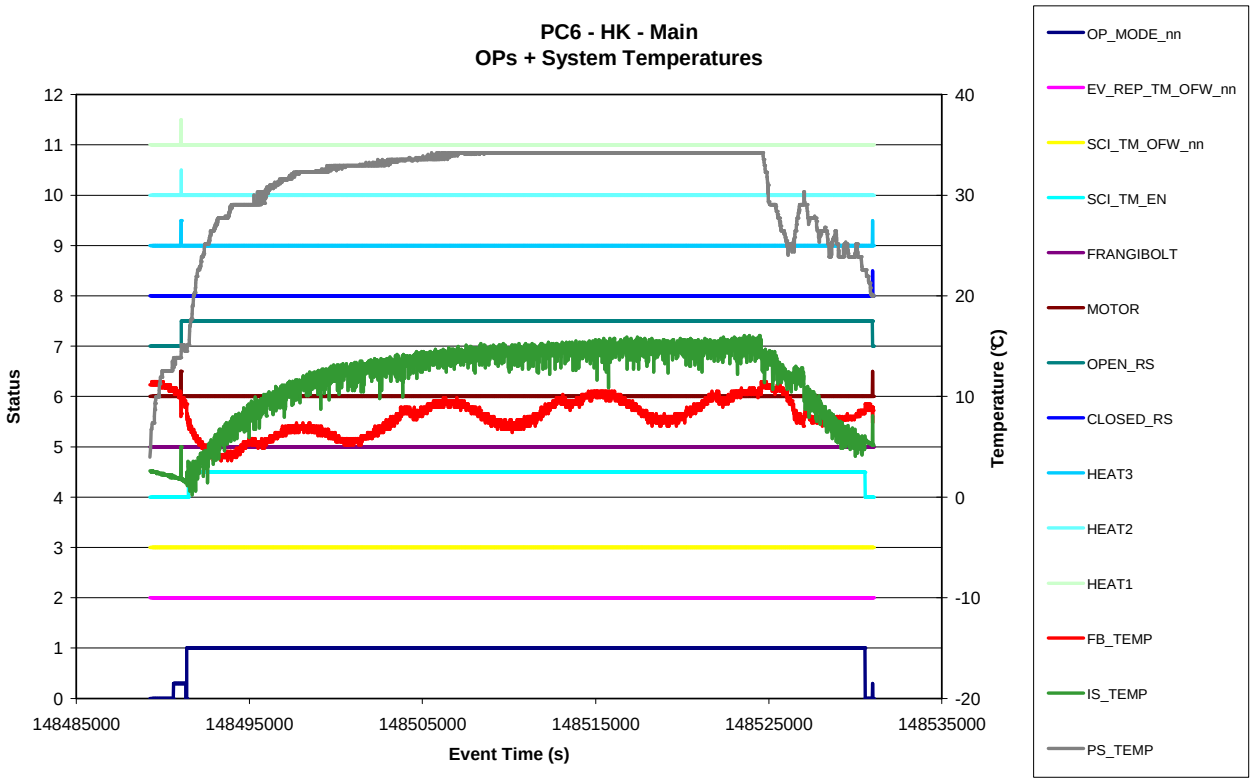


Figure 7.1-8. Power behaviour - Main

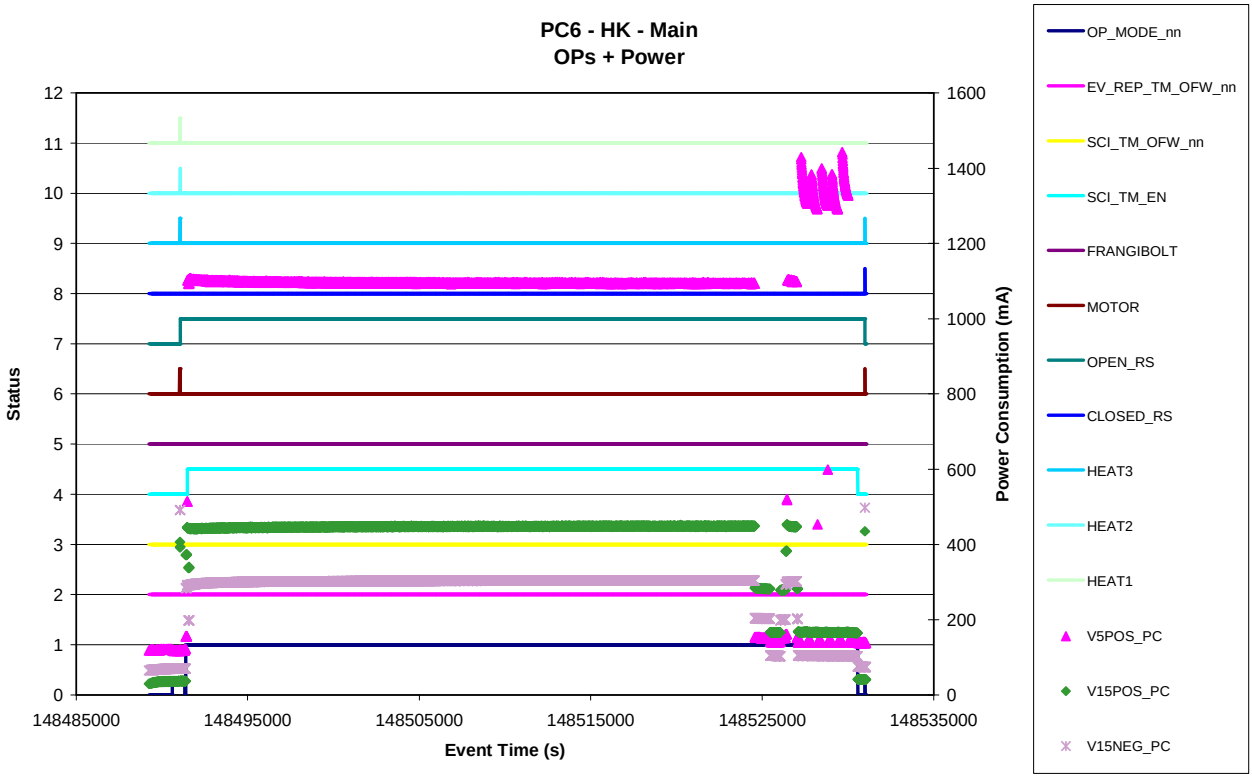


Figure 7.1-9. Power and PS temperature behaviour - Main

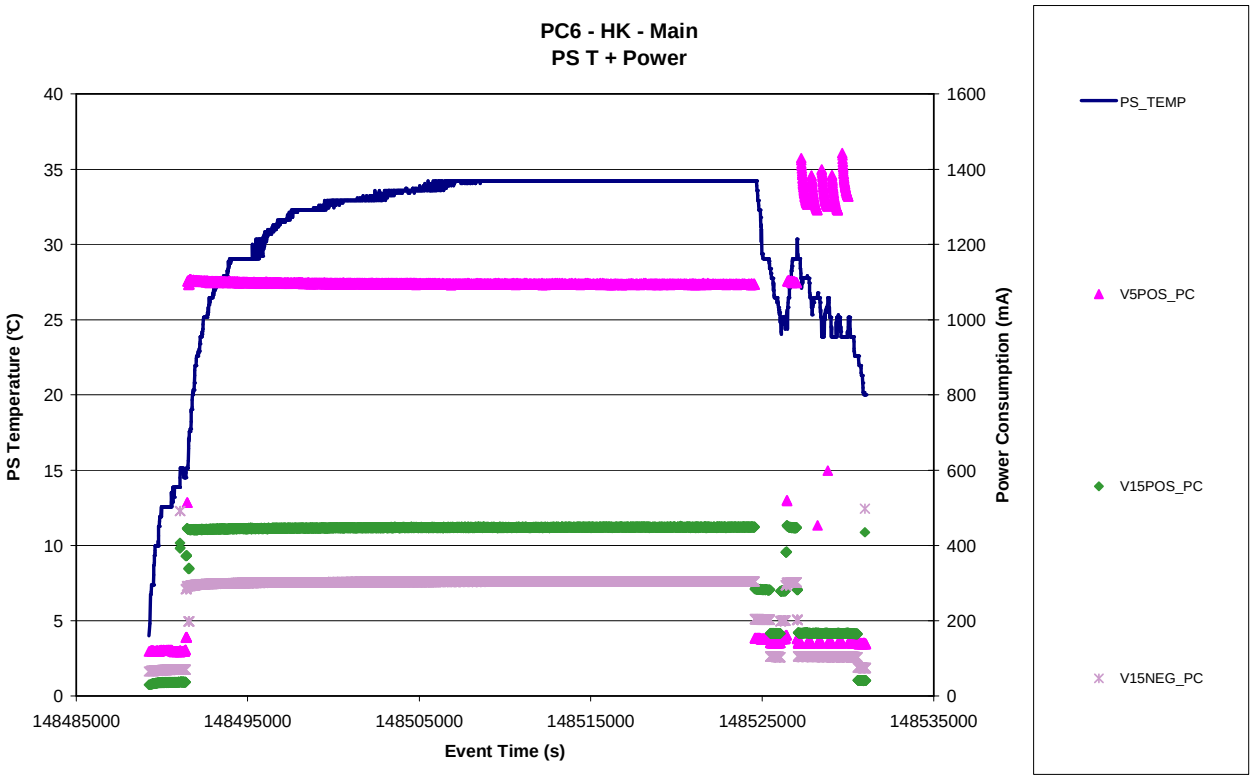


Figure 7.1-10. Source Sequence Count (SSC) of HK Telemetry vs. Time - Main

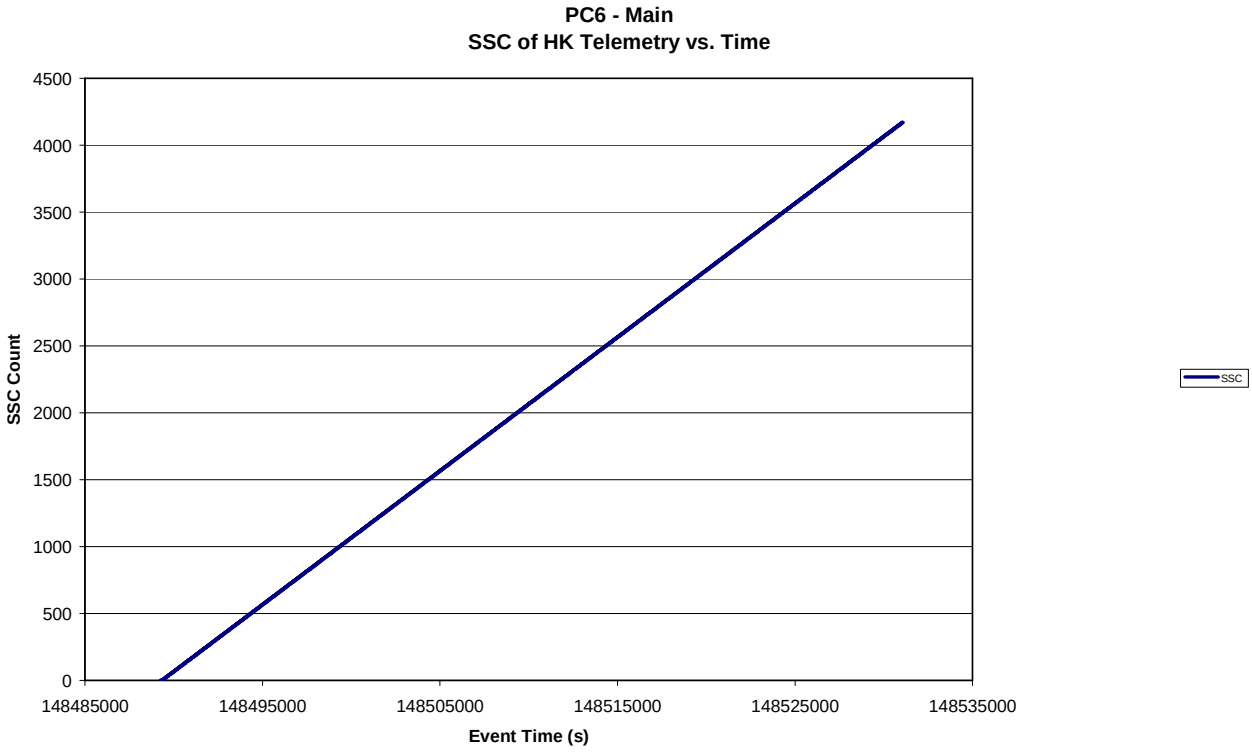


Figure 7.1-11. Source Sequence Count (SSC) of HK Telemetry vs. Number - Main

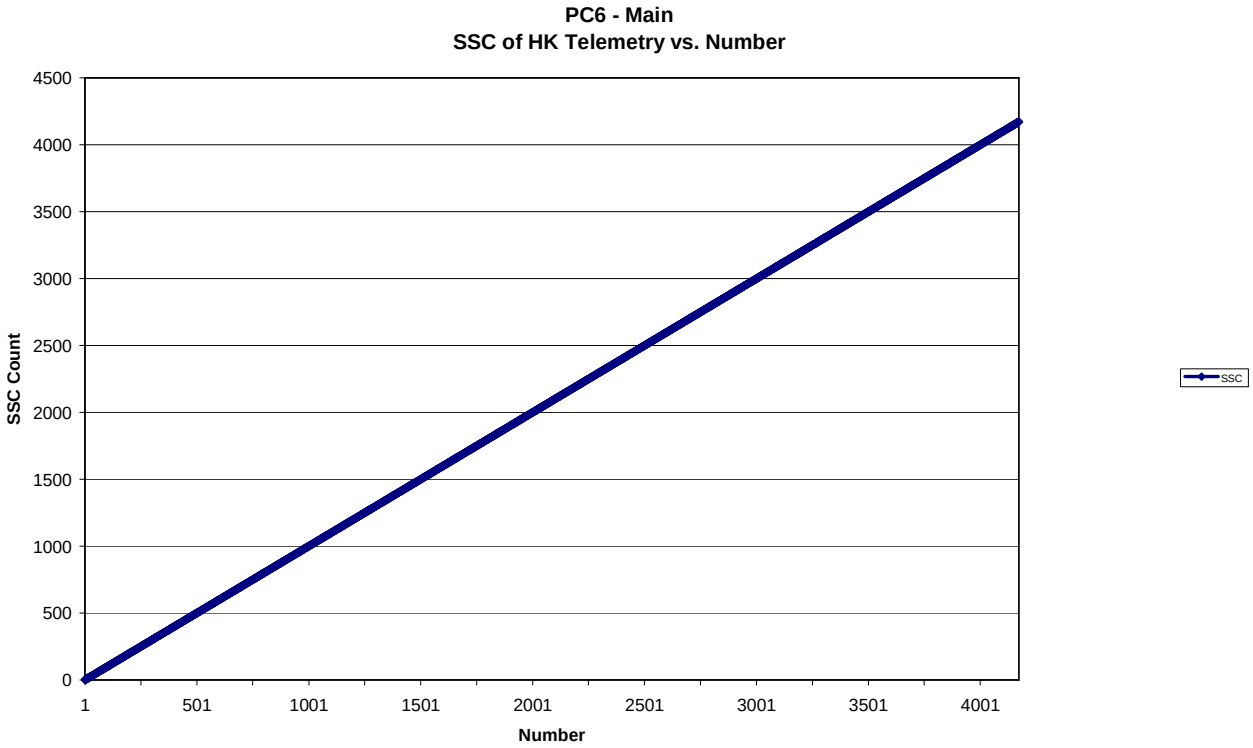


Figure 7.1-12. Source Sequence Count (SSC) of SCI Telemetry vs. Time - Main

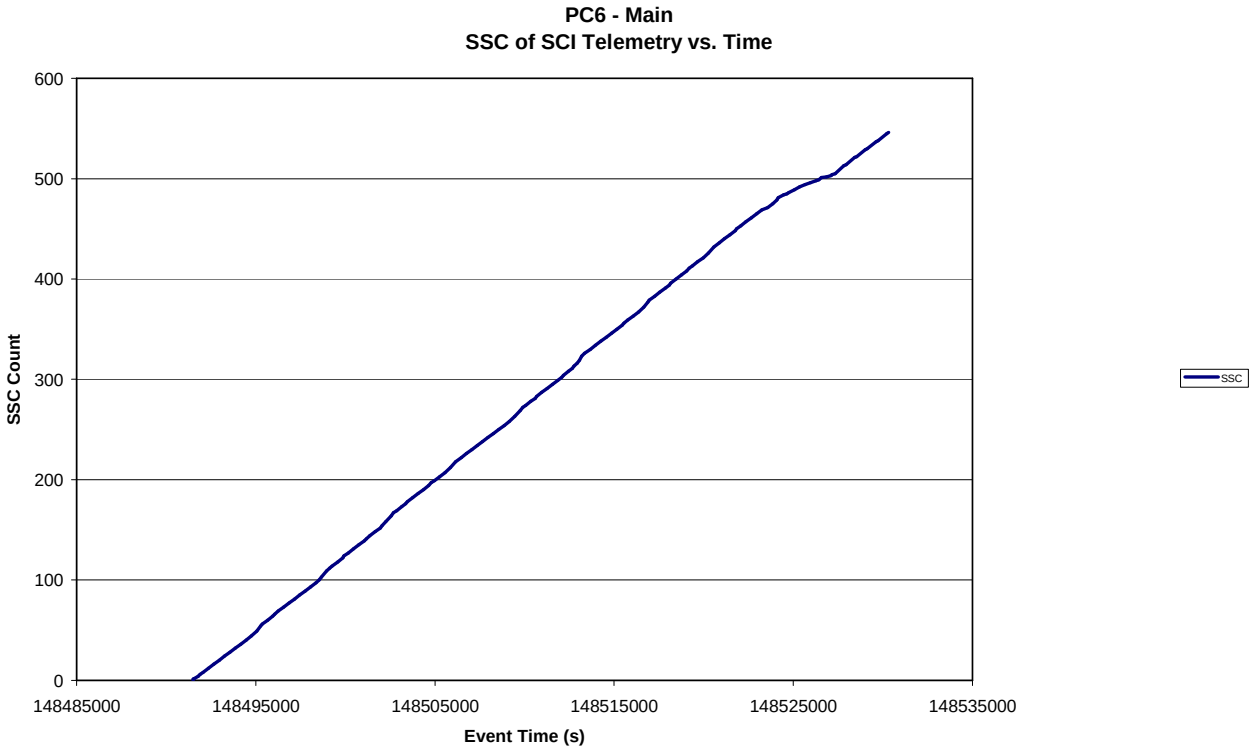
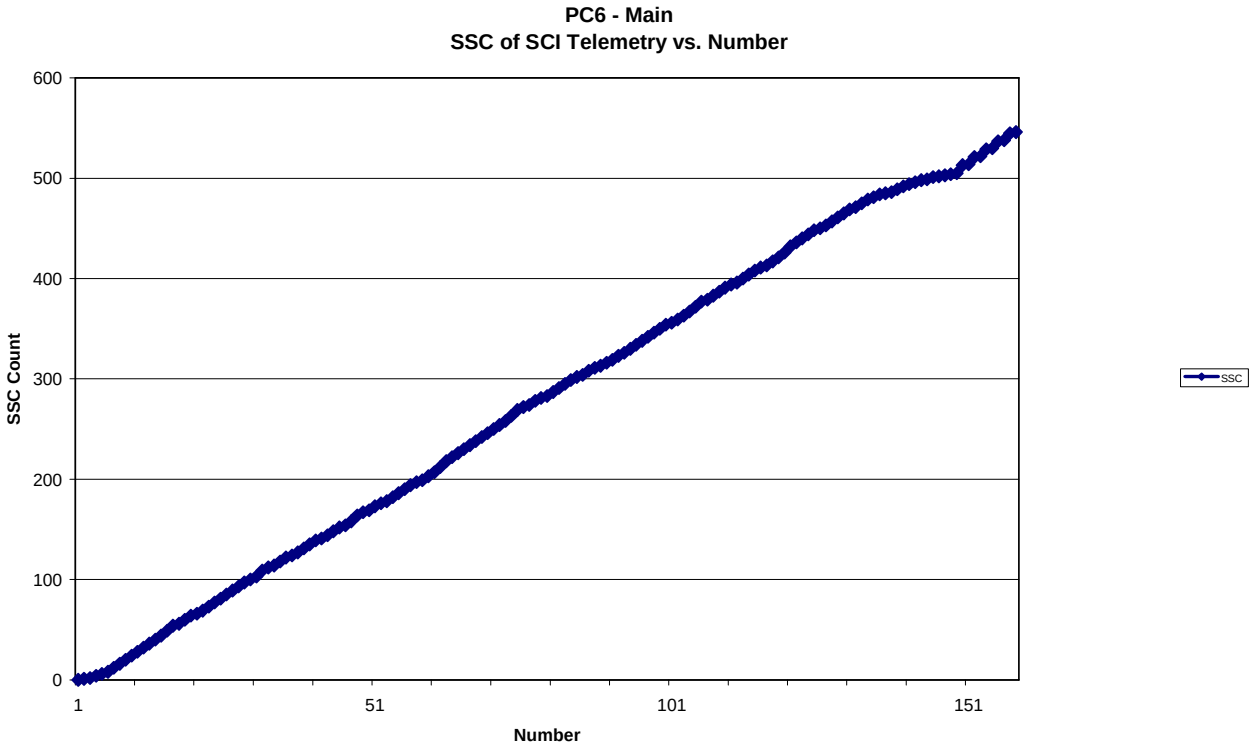


Figure 7.1-13. Source Sequence Count (SSC) of SCI Telemetry vs. Number - Main

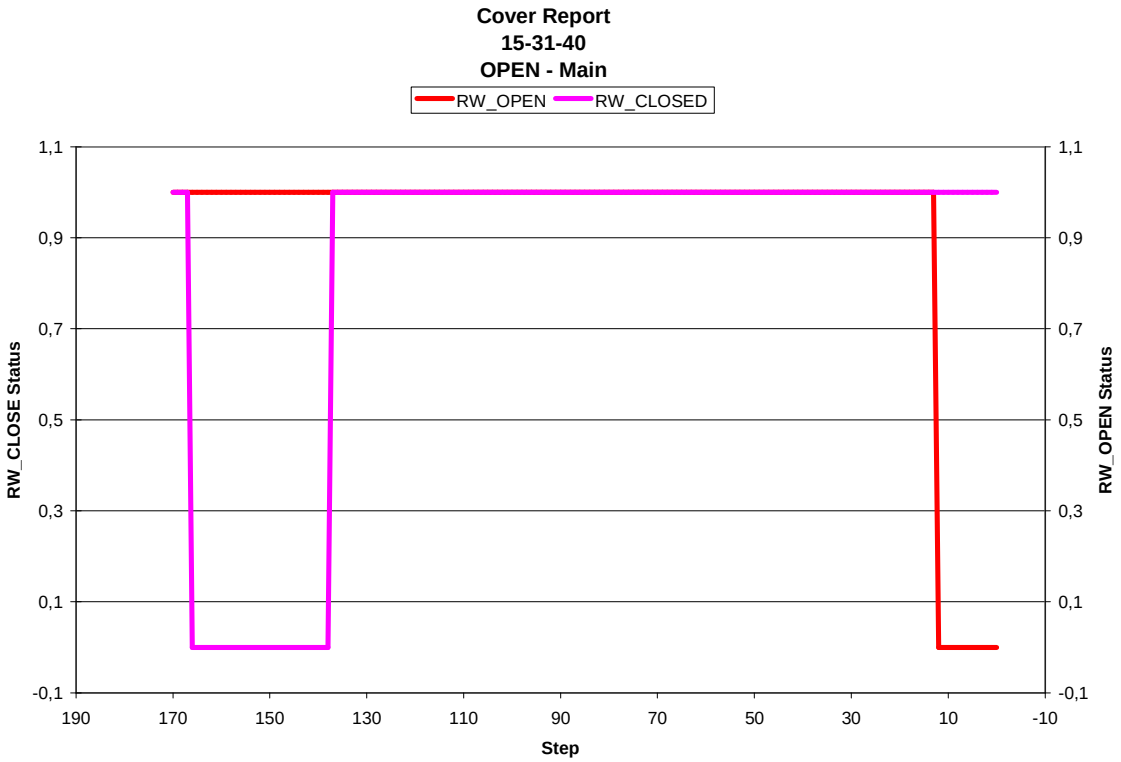


7.2 COVER REPORTS

7.2.1 Open Cover

HEADER_START
CREATION_TIME=2007-09-15T15:31:40Z
USER=AA0000
HEADER_END
//
// Generated by 'GIADA_EGSE_SW '
//
MOVEMENT DIRECTION: To open
BEGIN TIME OF OPERATION: 148491056.000000
END TIME OF OPERATION: 148491072.000000

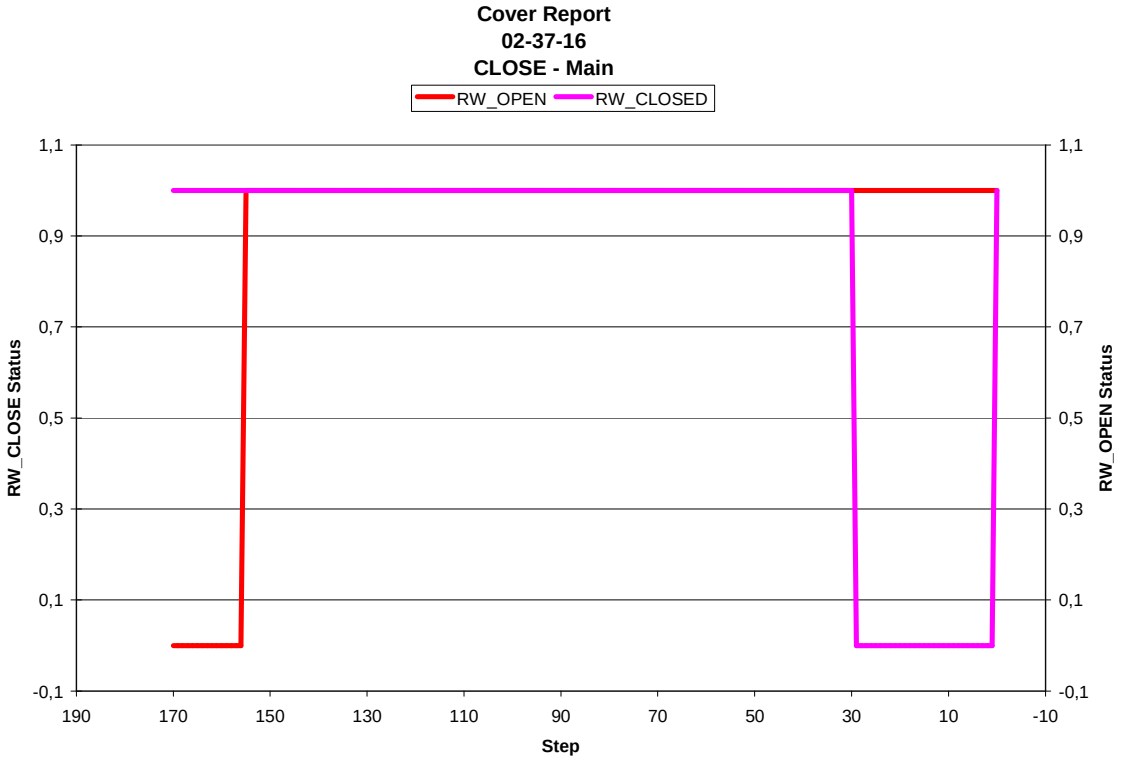
Figure 7.2-1 Cover Report – Open - Main



7.2.2 Close Cover

HEADER_START
CREATION_TIME=2007-09-16T02:37:16Z
USER=AA0000
HEADER_END
//
// Generated by 'GIADA_EGSE_SW '
//
MOVEMENT DIRECTION: To close
BEGIN TIME OF OPERATION: 148530992.000000
END TIME OF OPERATION: 148531008.000000

Figure 7.2-2 Cover Report – Close - Main



7.3 GRAIN DETECTION SYSTEM (GDS)

7.3.1 GDS – Status

Figure 7.3-1. GDS Operation Status vs. time - Main

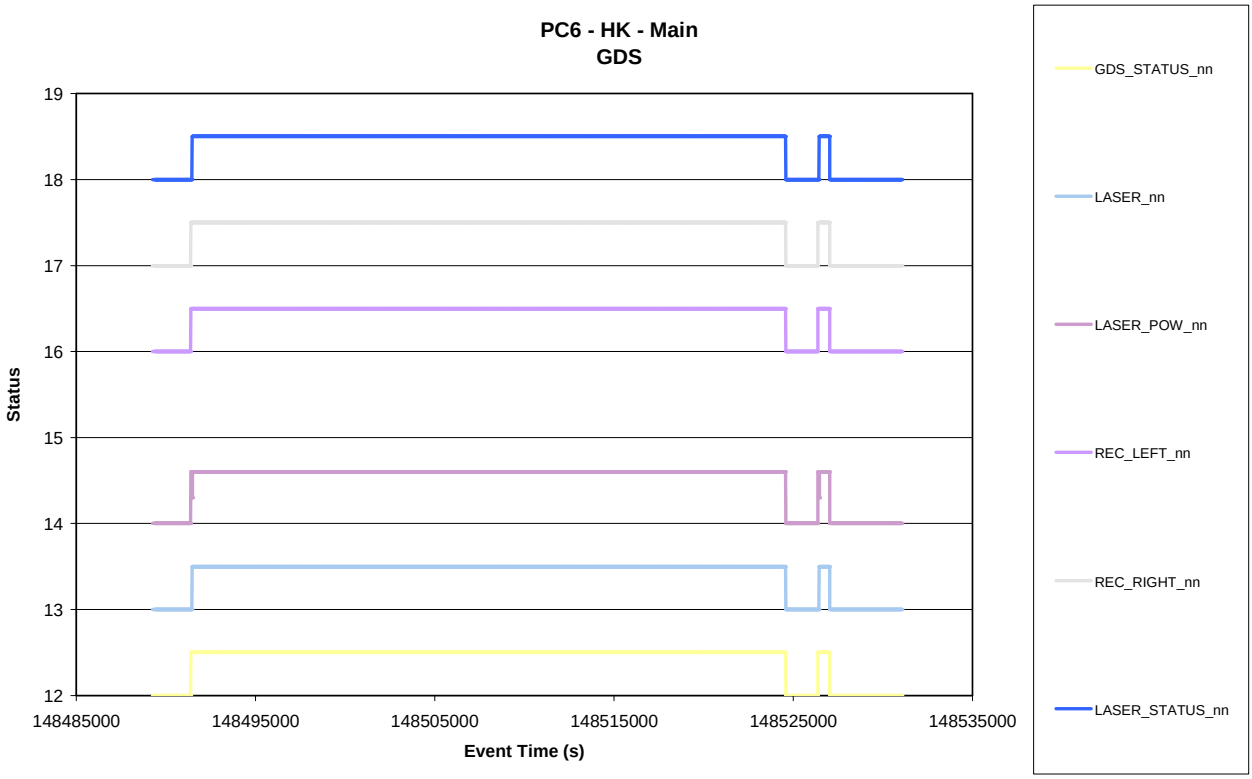


Figure 7.3-2. GDS Thresholds change vs. time - Main

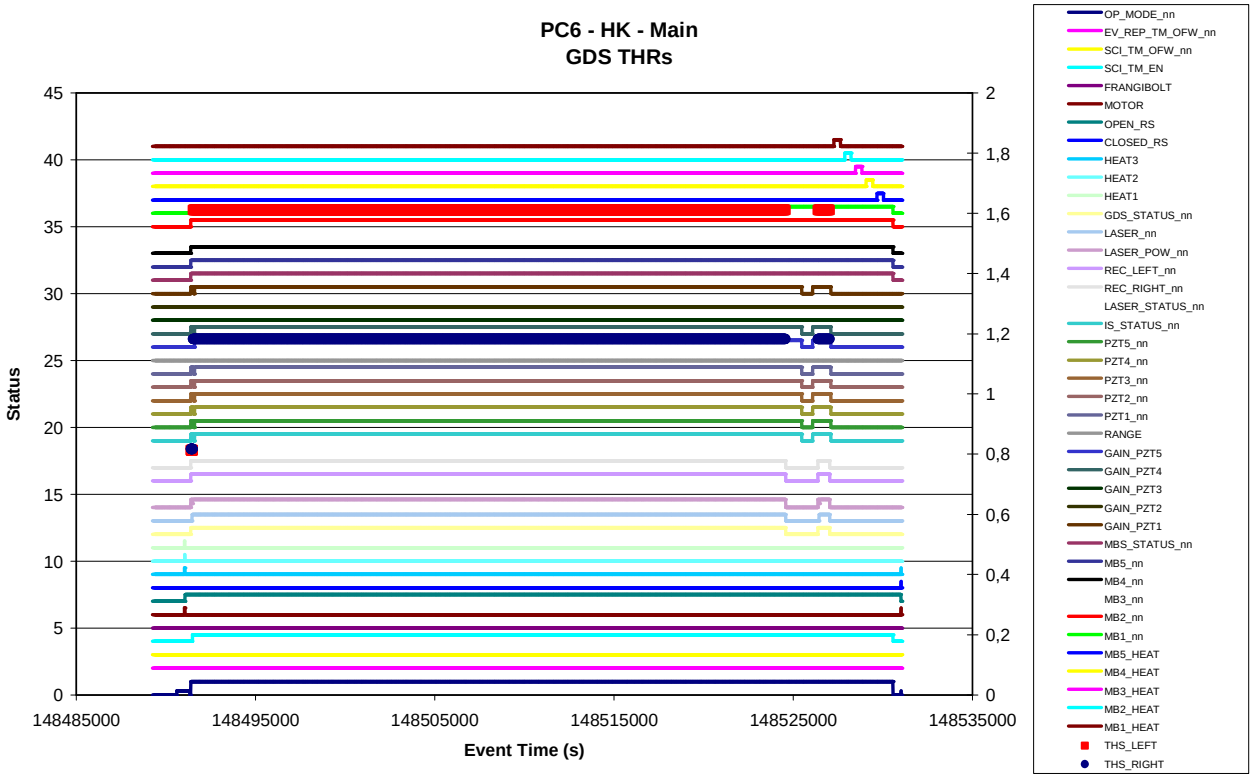


Figure 7.3-3. GDS Laser Temperatures vs. time (HK, HK-SCI, SCI) - Main

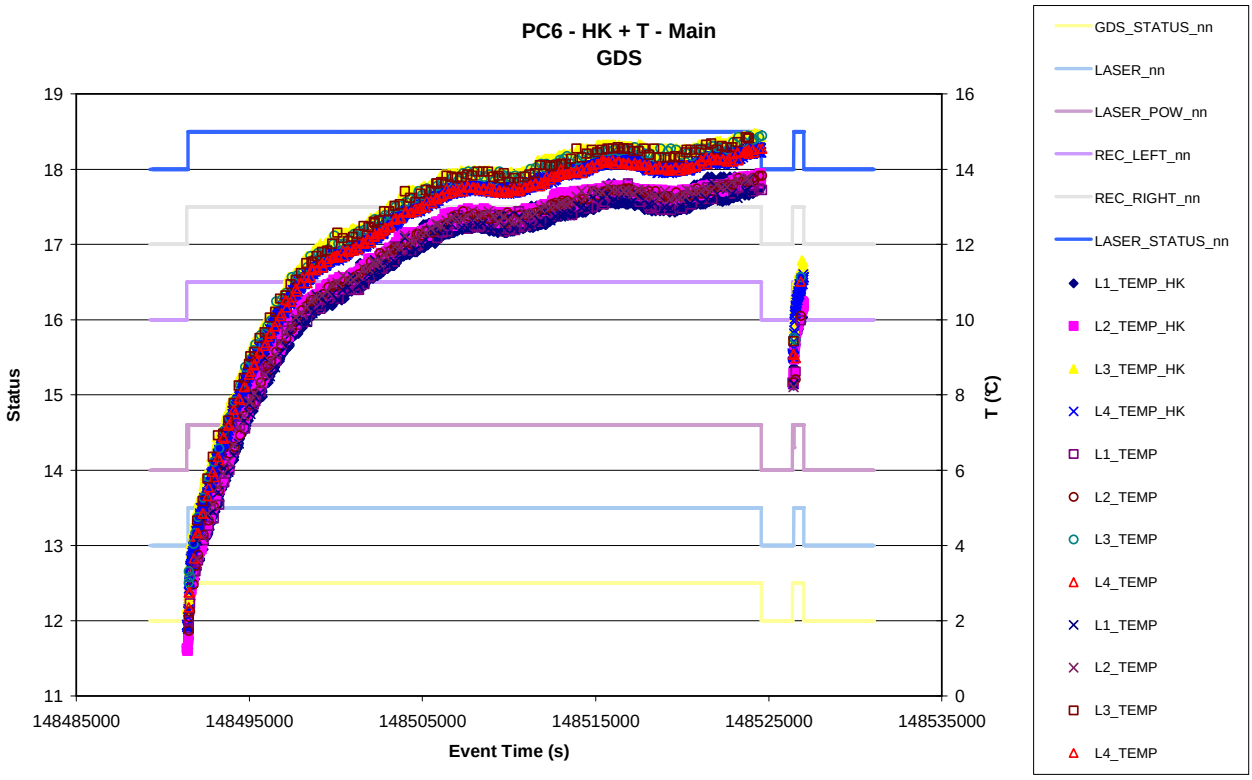


Figure 7.3-4. GDS Laser Monitor vs. time (HK, HK-SCI, SCI) - Main

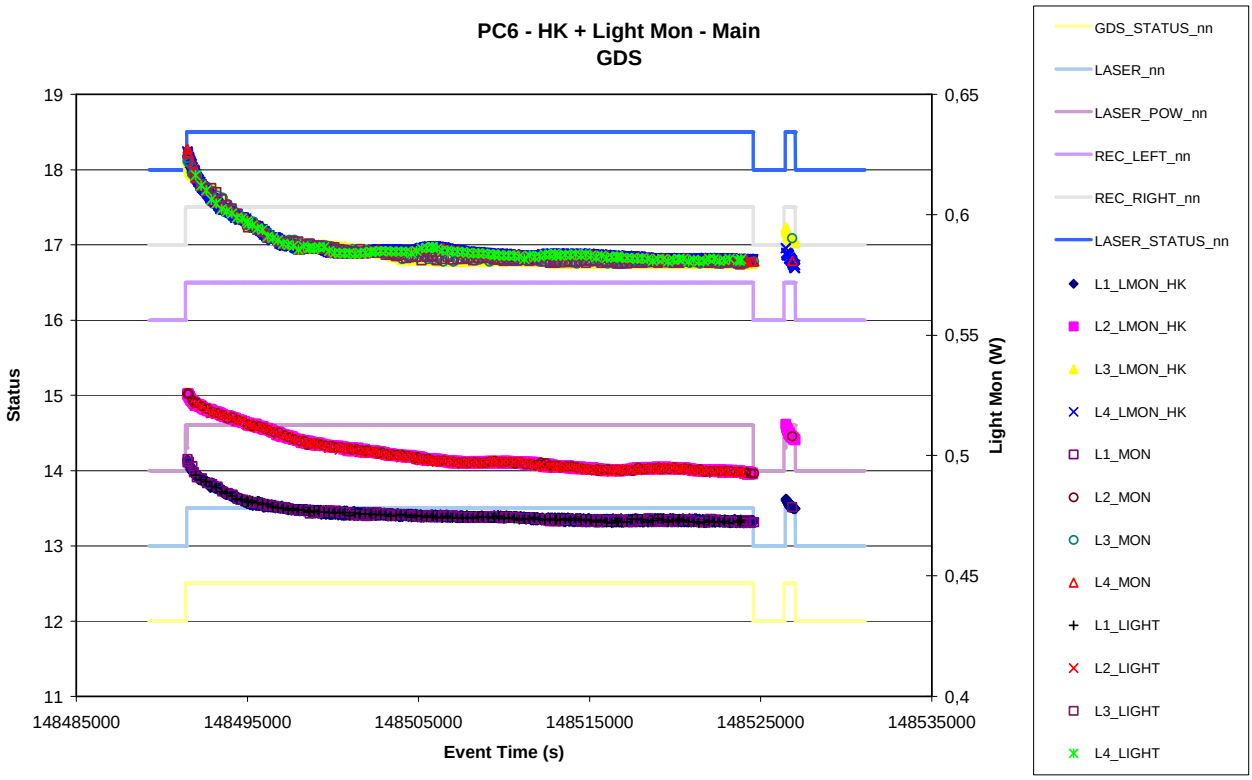


Figure 7.3-5. Laser 1 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main

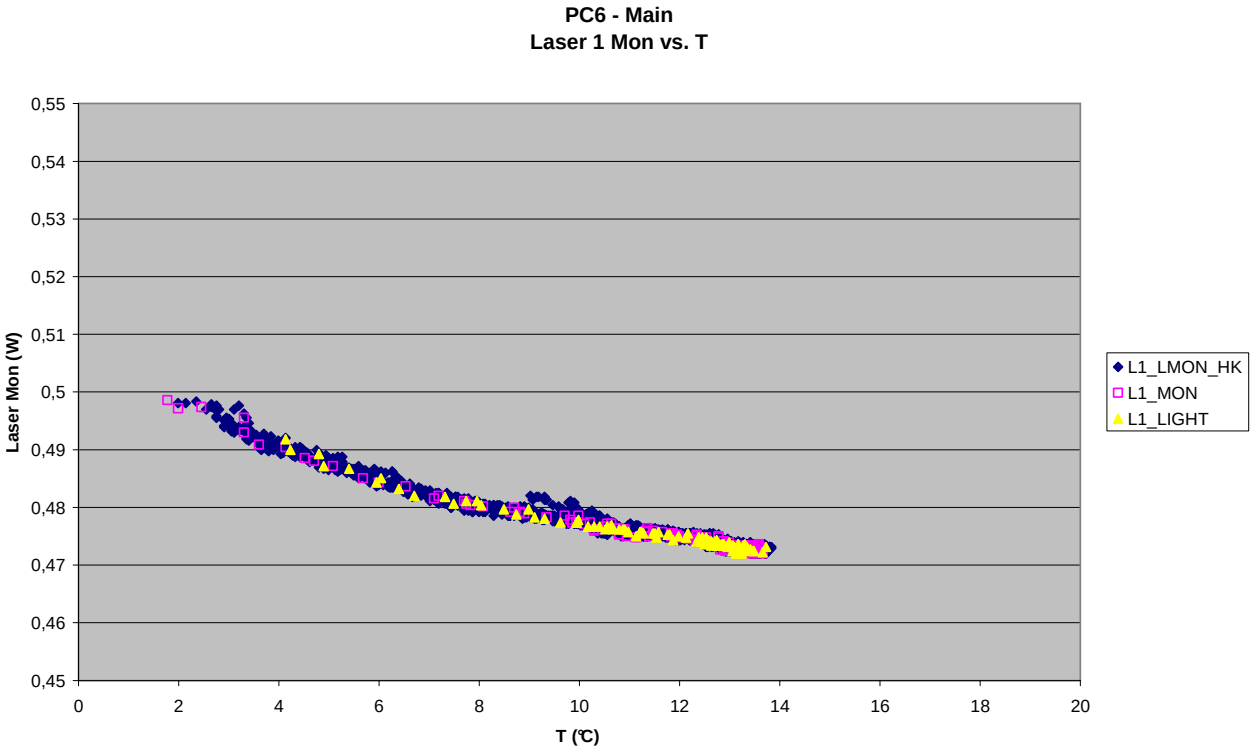


Figure 7.3-6. Laser 2 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main

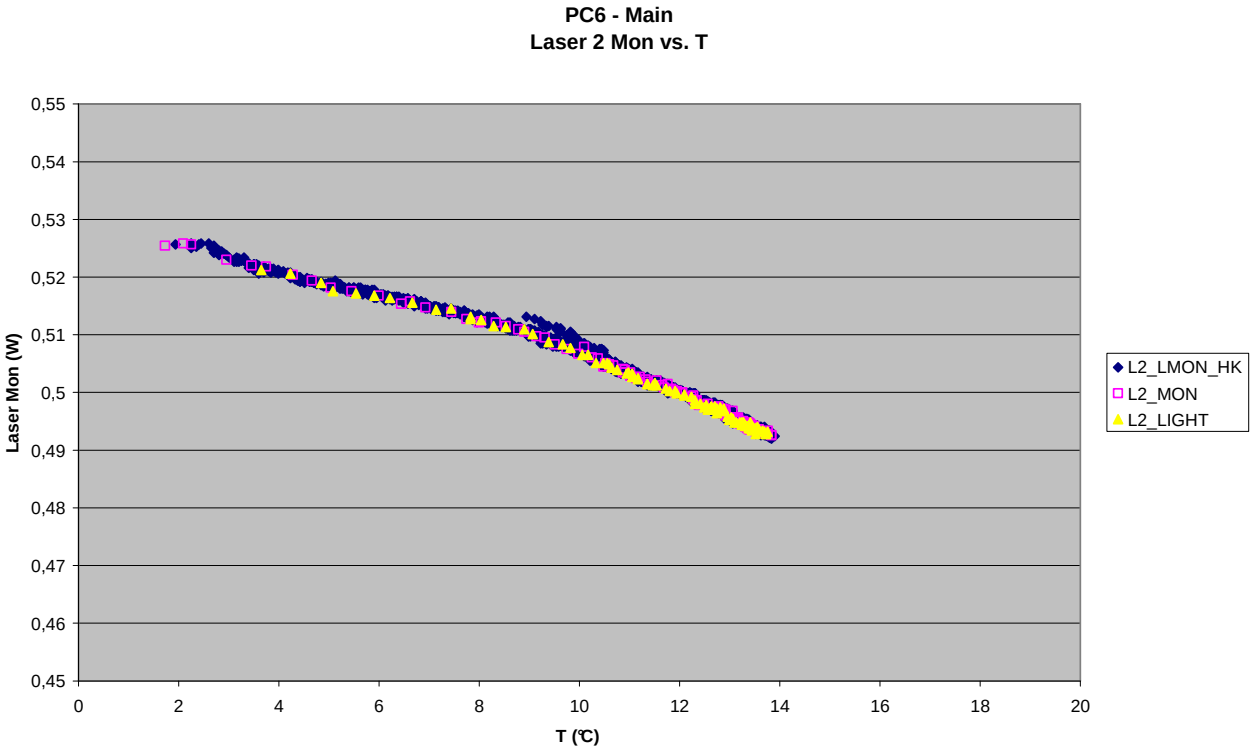


Figure 7.3-7. Laser 3 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main

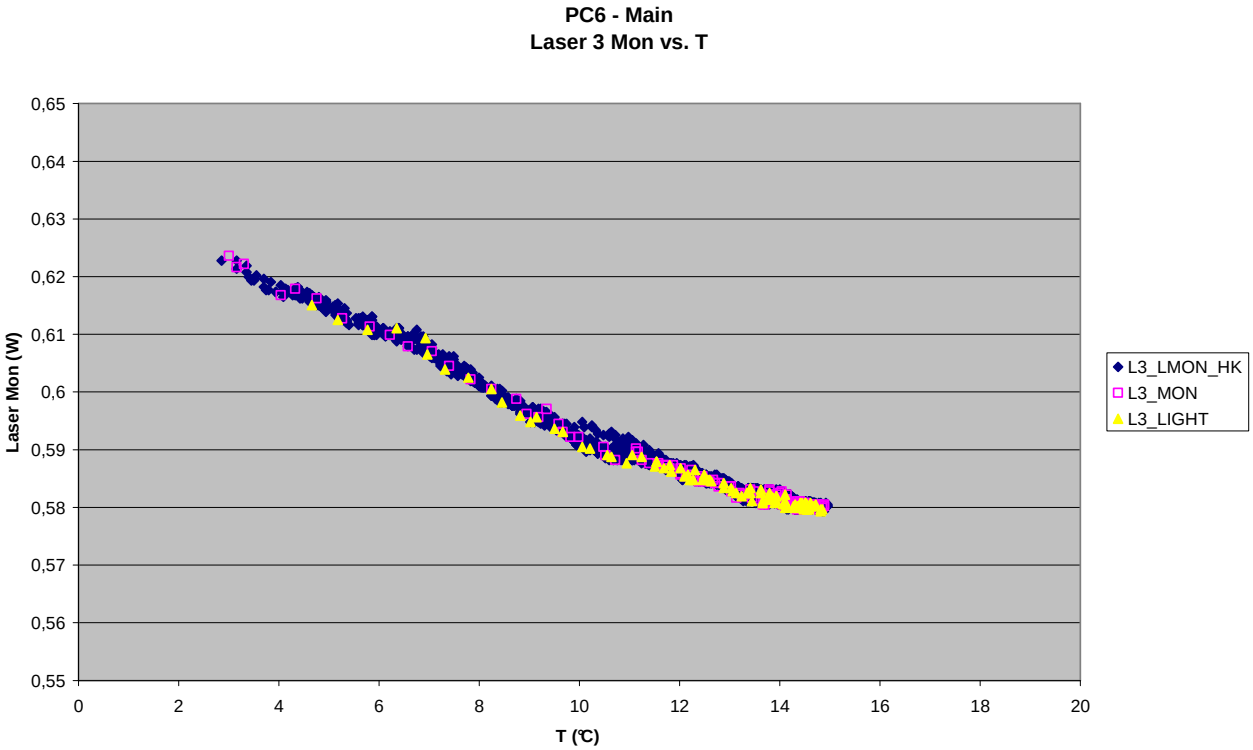
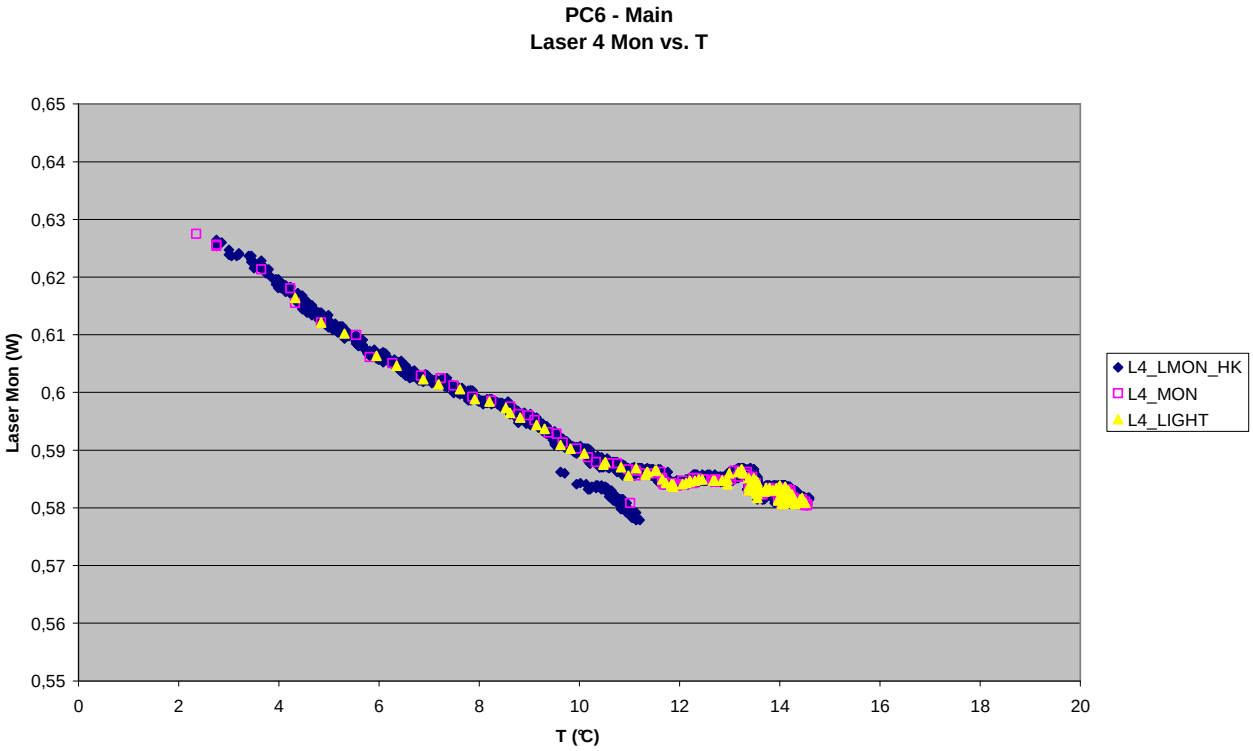


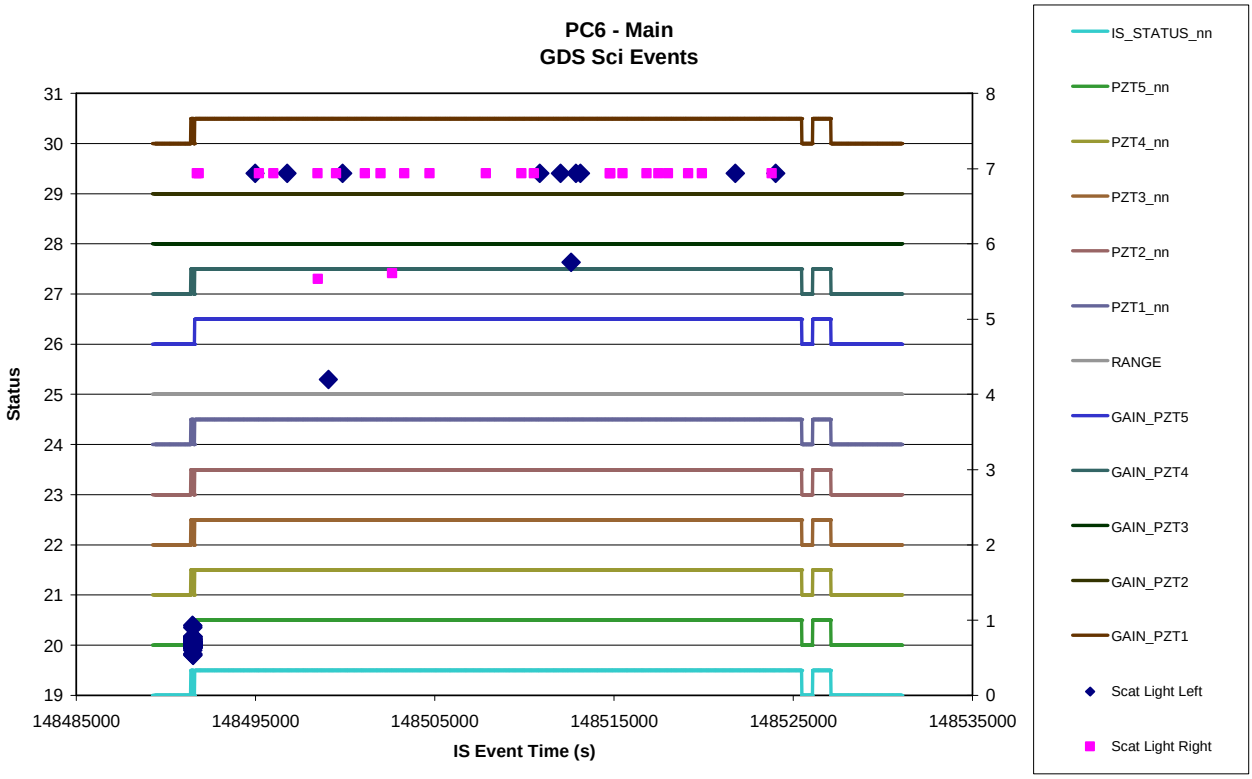
Figure 7.3-8. Laser 4 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main



7.3.2 GDS – Behaviour

7.3.2.1 Science Events

Figure 7.3-9. GDS Left and Right SCI events vs. time - Main

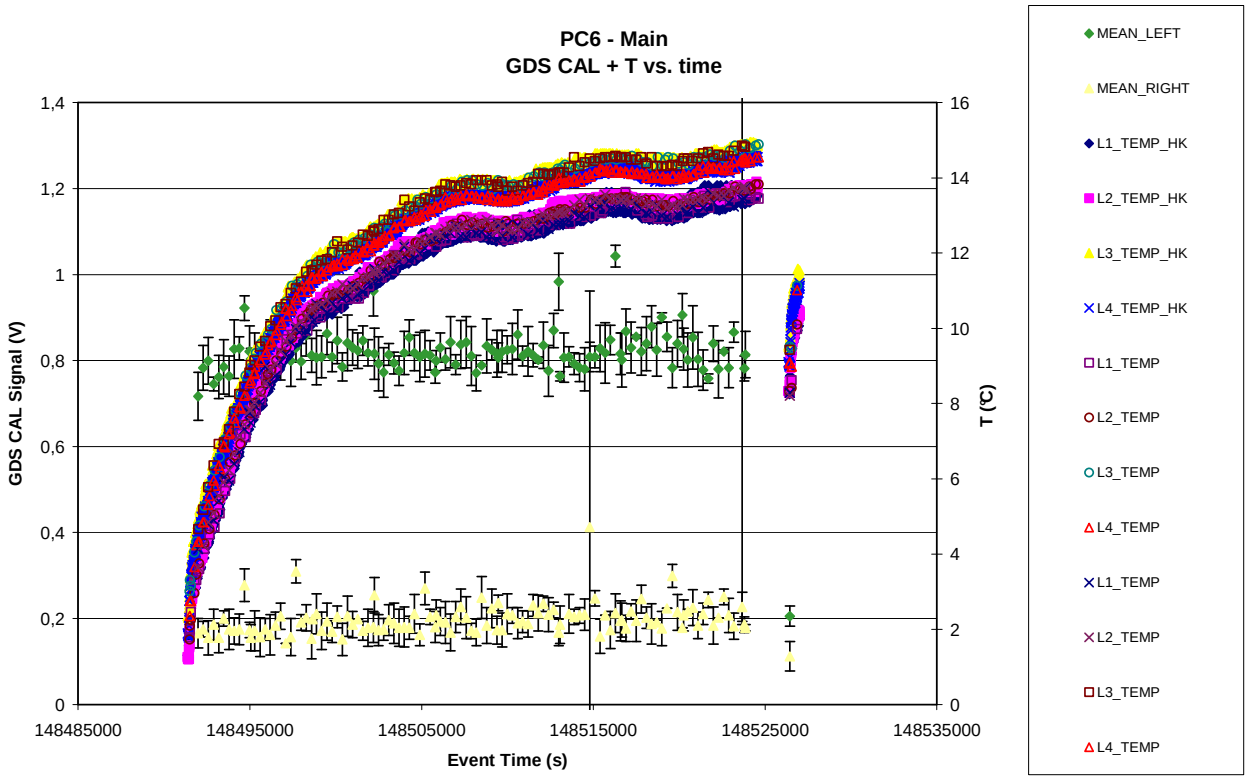


7.3.2.2 Event Rates

Not applicable

7.3.2.3 CAL

Figure 7.3-10. Evolution of GDS CAL Left and Right signals (and T) vs. time (Main)



7.4 IMPACT SENSOR (IS)

7.4.1 IS – Status

Figure 7.4-1. IS Operation Status vs. time - Main

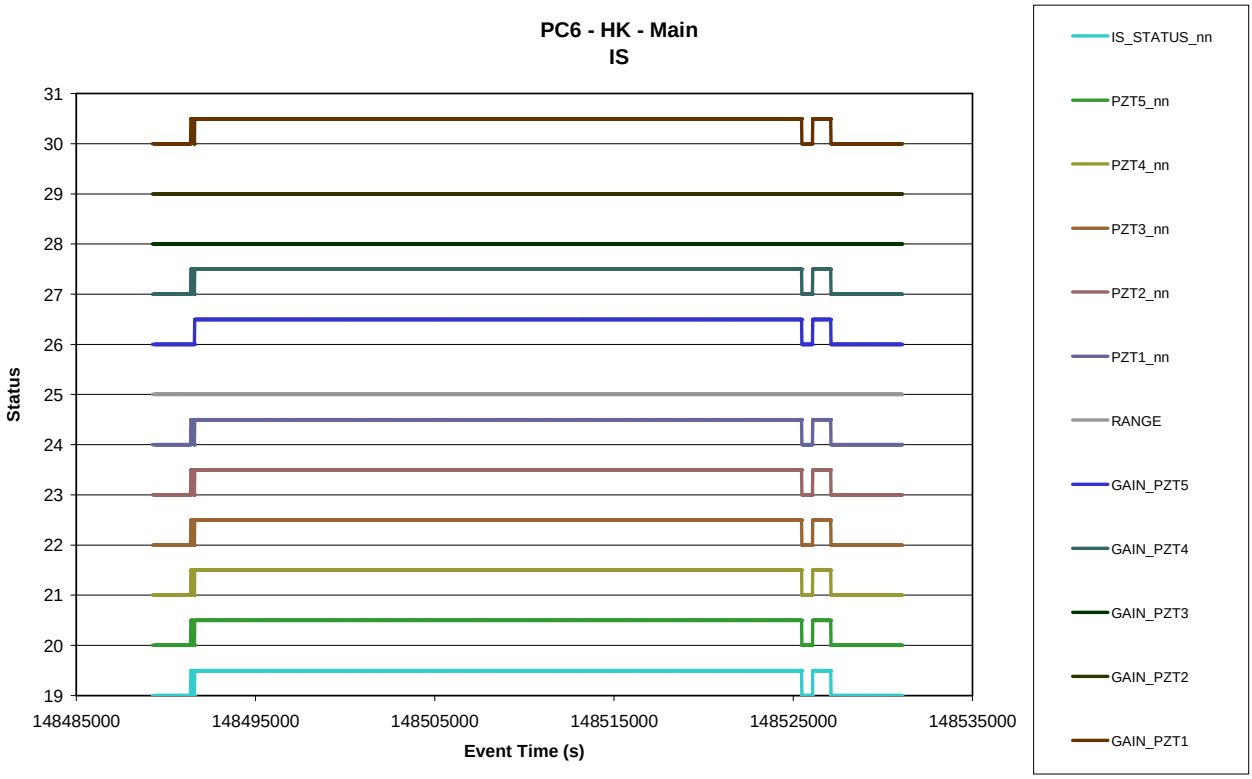


Figure 7.4-2. IS PZT 3 Thresholds change vs. time - Main

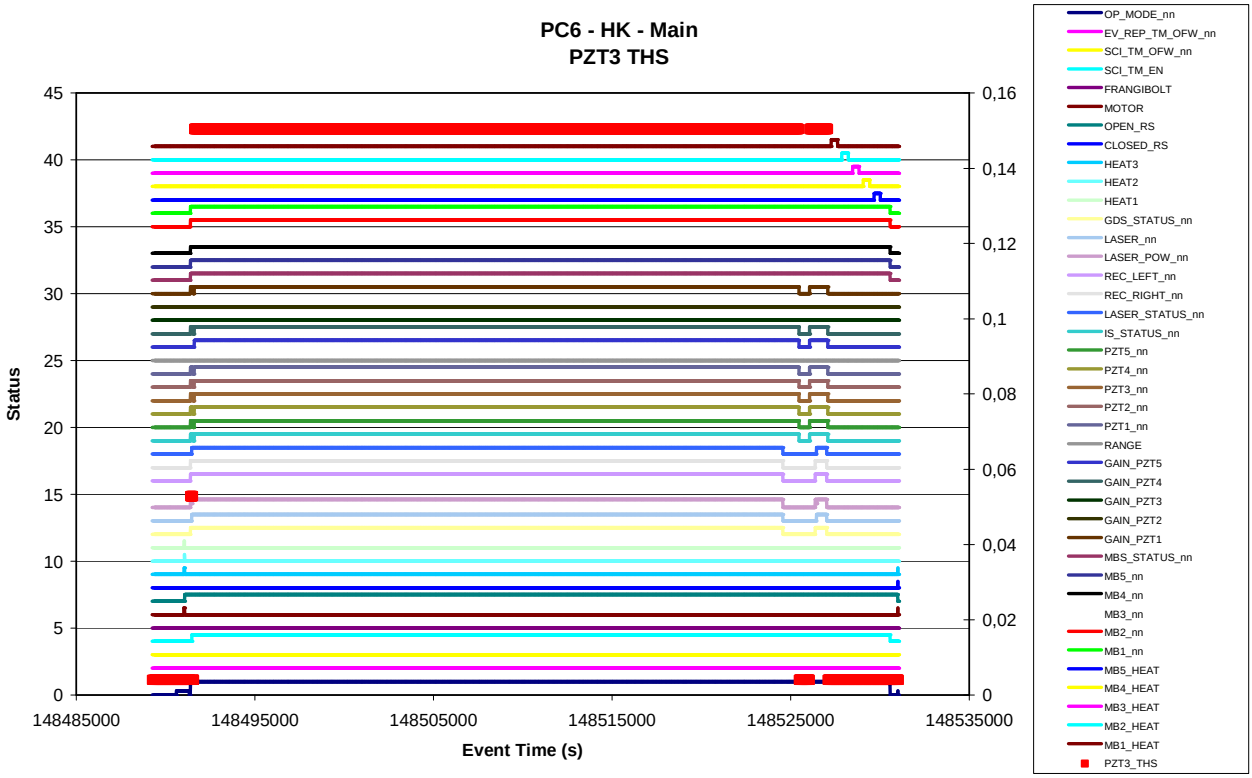


Figure 7.4-3. IS PZT 5 Thresholds change vs. time - Main

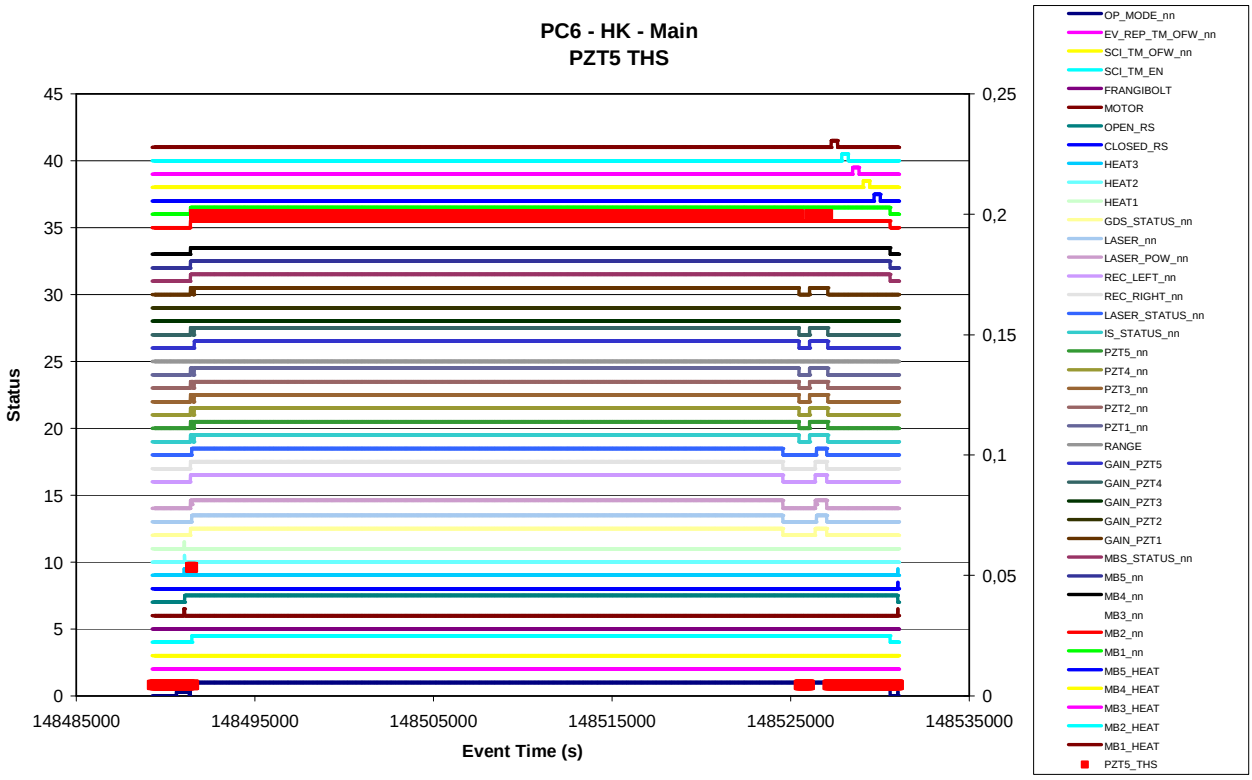
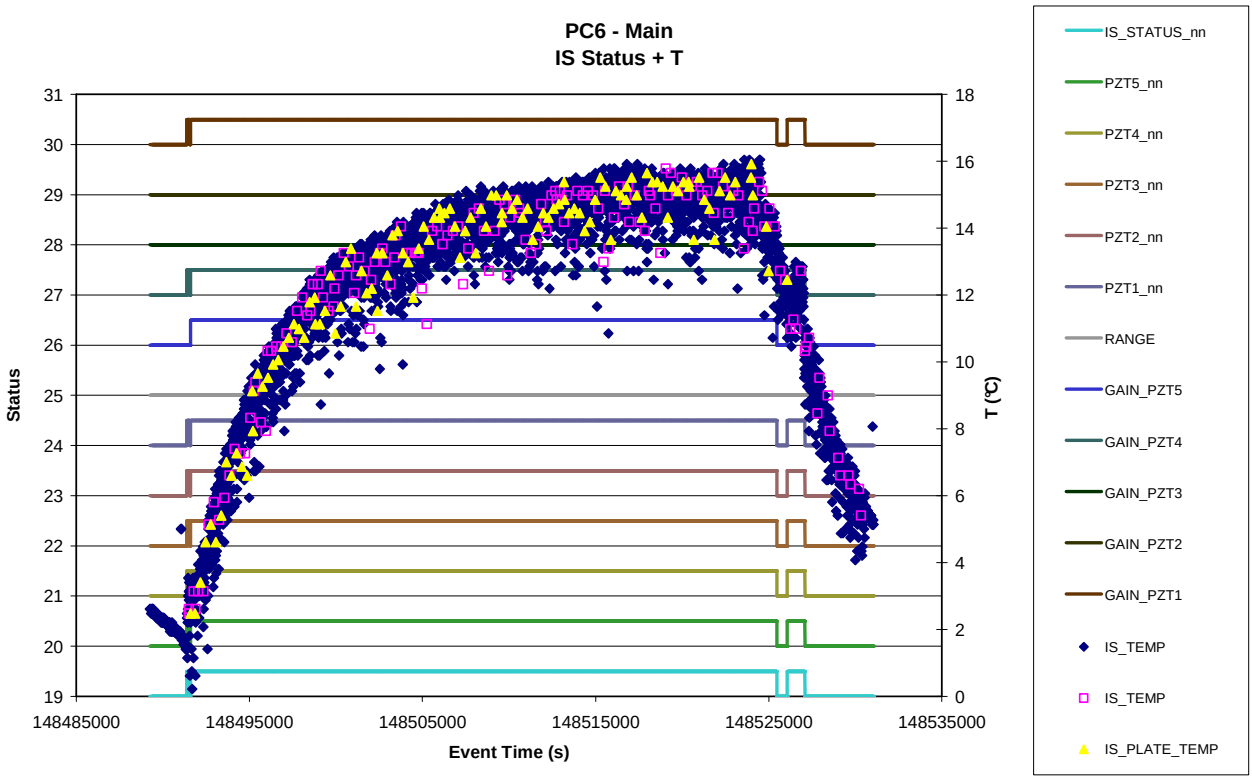


Figure 7.4-4. IS Temperature vs. time (HK, HK-SCI, SCI) - Main



7.4.2 IS – Behaviour

7.4.2.1 Science Events

Figure 7.4-5. All PZT Events (det and non-det) vs. time - Main

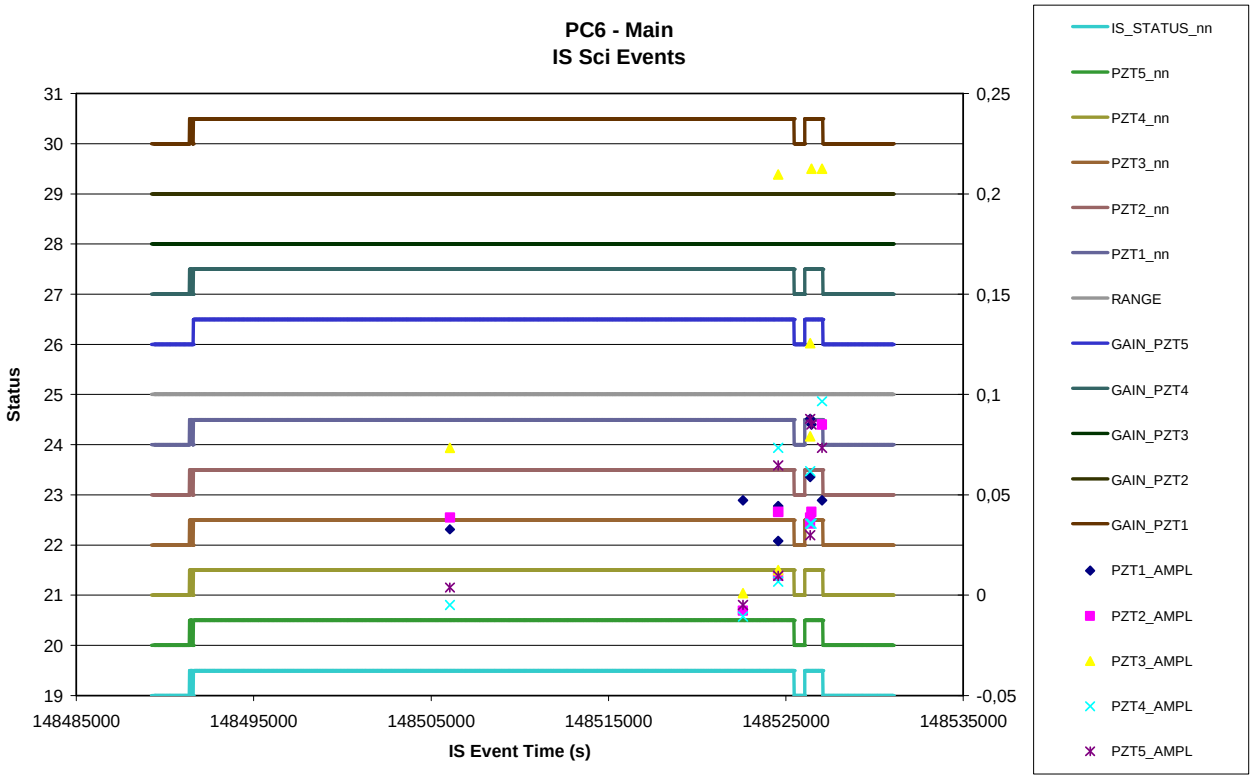


Figure 7.4-6. PZT 1-2-3-4-5 Detected Events vs. time - Main

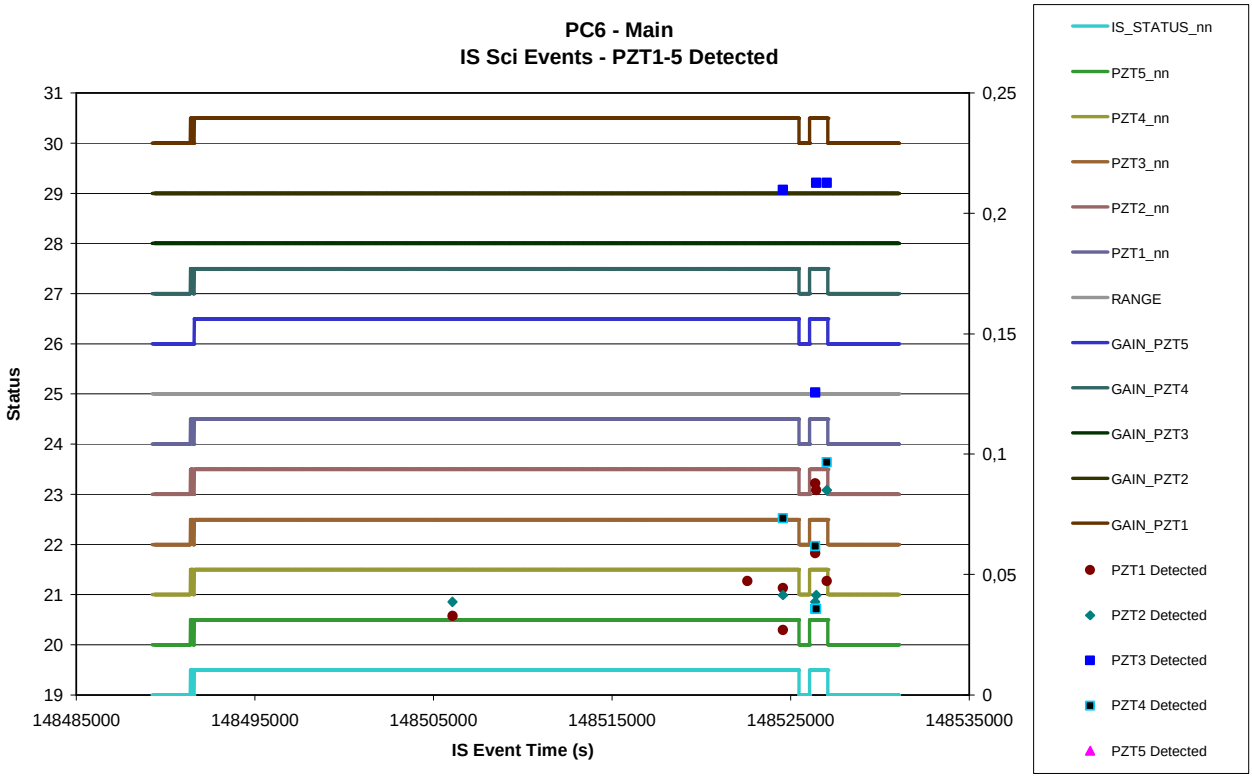


Figure 7.4-7. PZT 1 Detected Events vs. time - Main

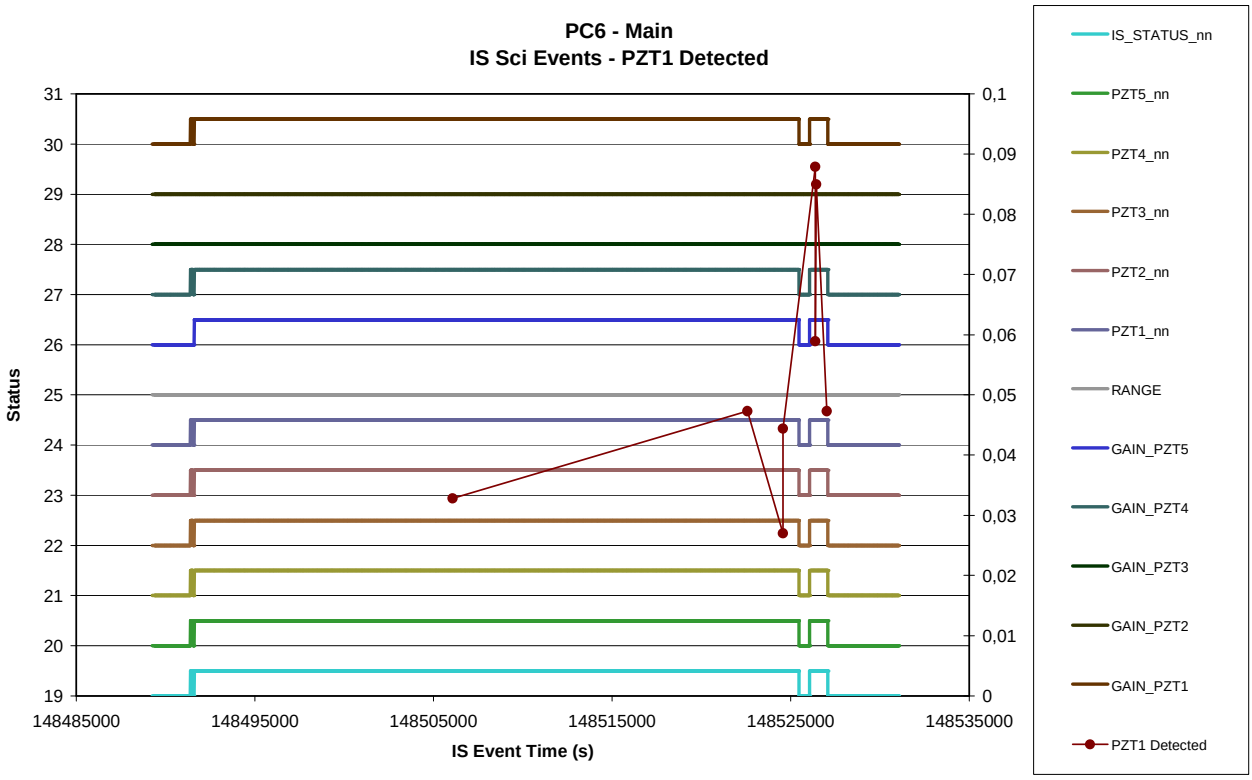


Figure 7.4-8. PZT 2 Detected Events vs. time - Main

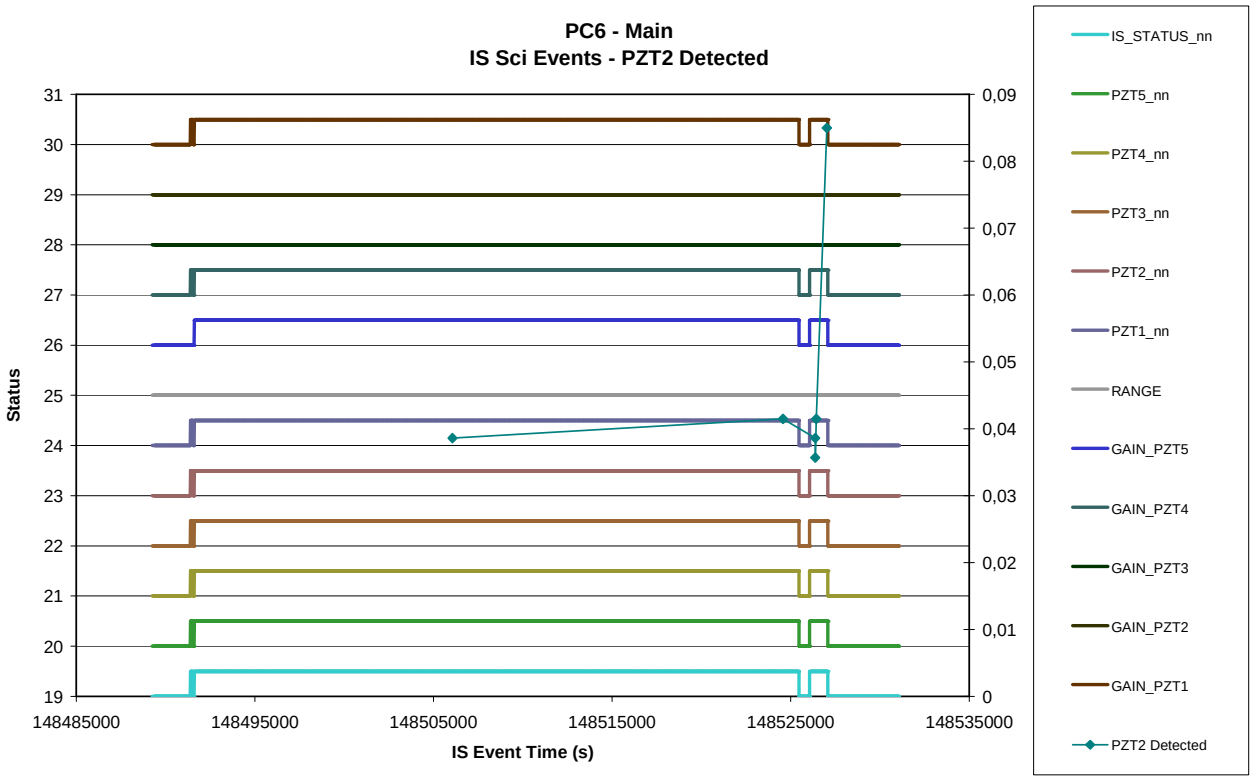


Figure 7.4-9. PZT 3 Detected Events vs. time - Main

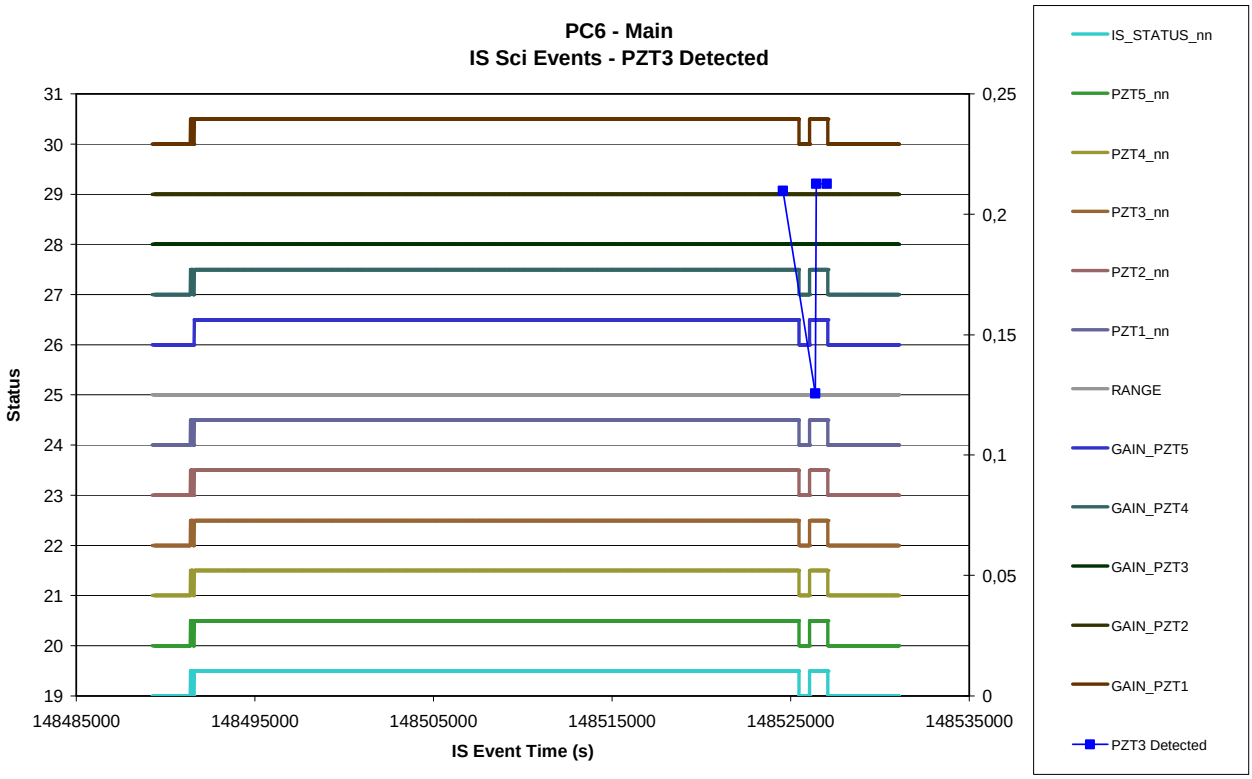


Figure 7.4-10. PZT 4 Detected Events vs. time - Main

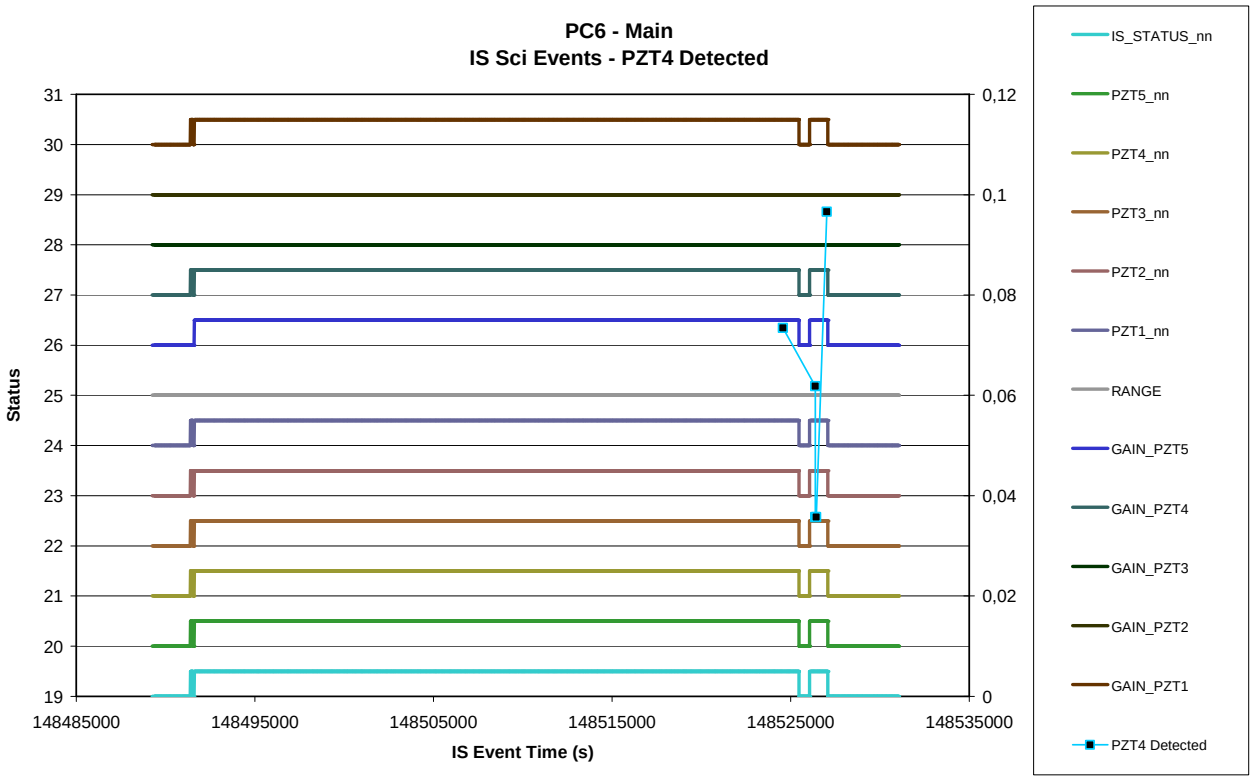


Figure 7.4-11. PZT 5 Detected Events vs. time - Main

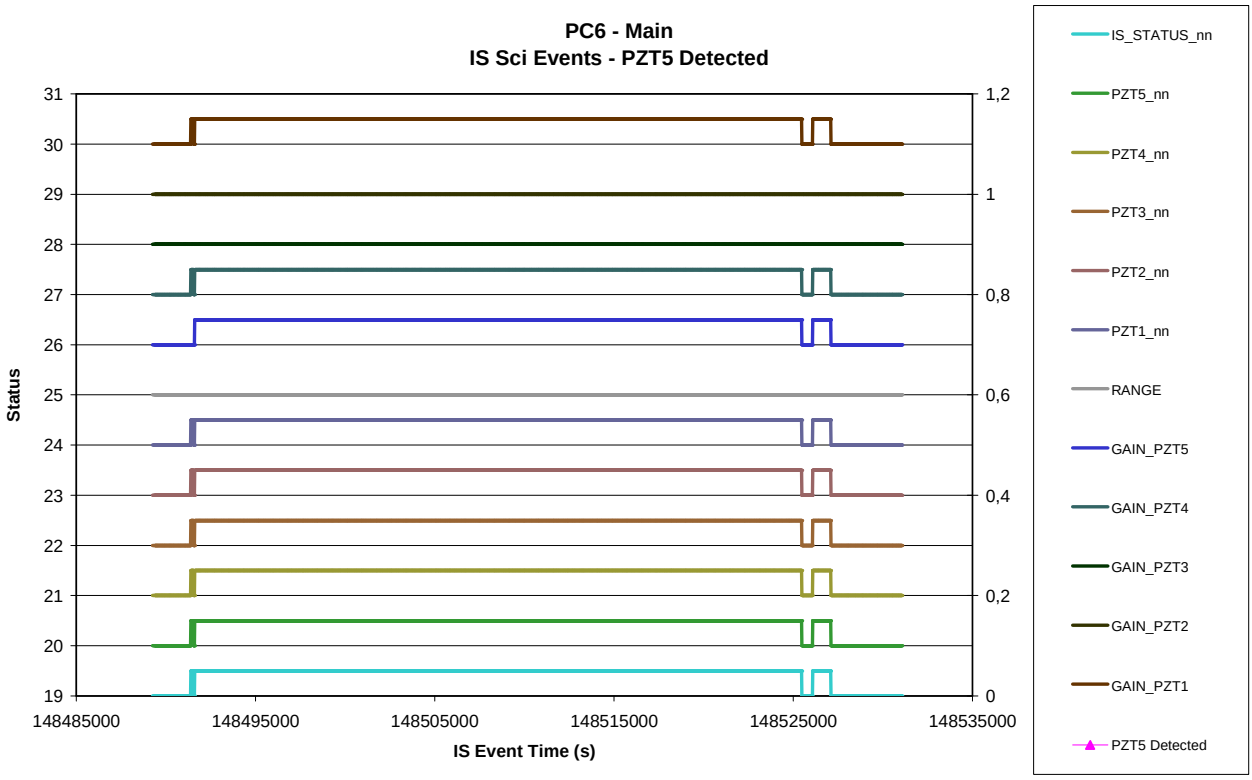
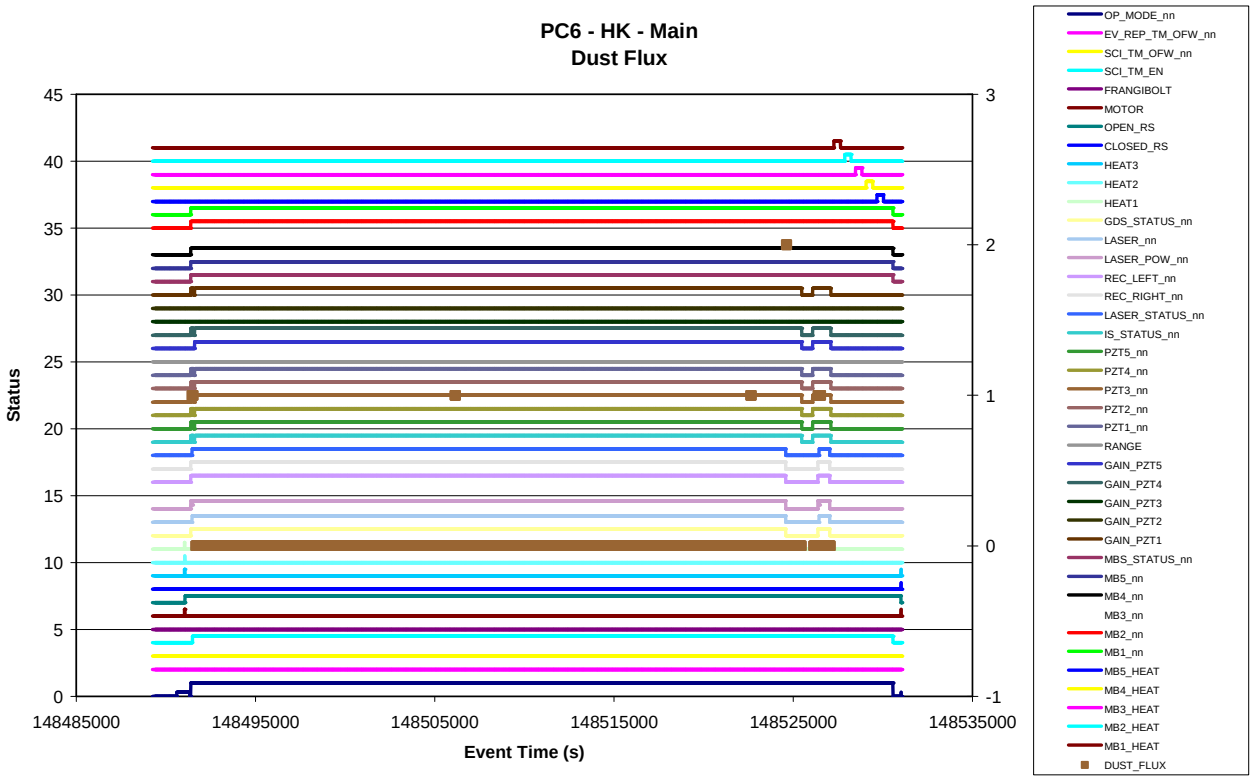


Figure 7.4-12. Dust Flux vs. time - Main



7.4.2.2 Event Rates

Not applicable

7.4.2.3 CAL

Figure 7.4-13. PZT 1 Mean and St Dev. CAL vs. time - Main

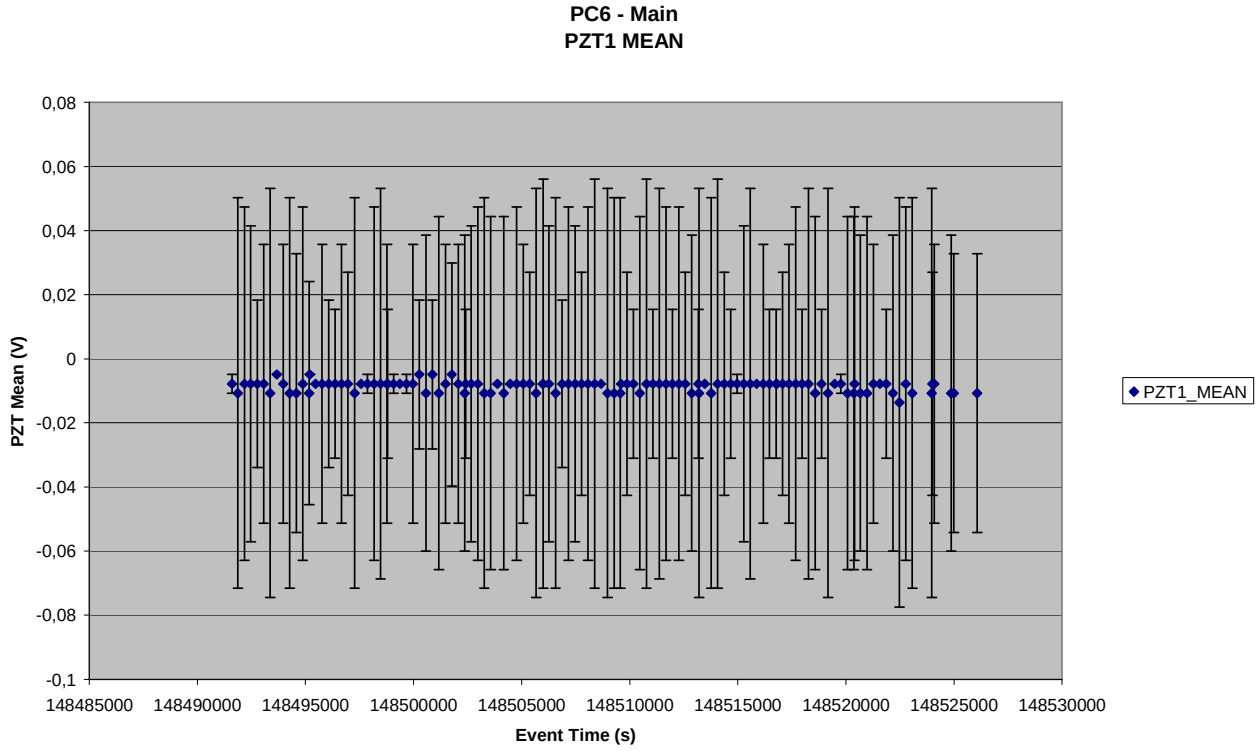


Figure 7.4-14. PZT 2 Mean and St Dev. CAL vs. time - Main

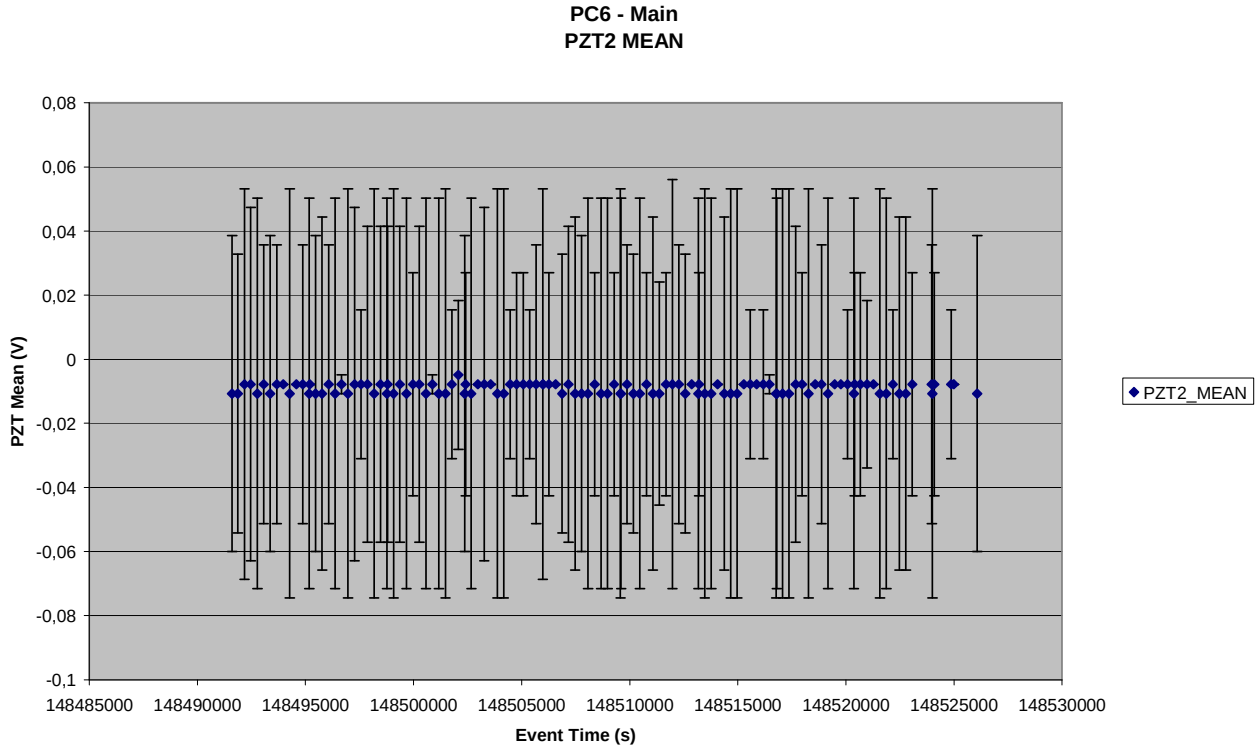


Figure 7.4-15. PZT 3 Mean and St Dev. CAL vs. time - Main

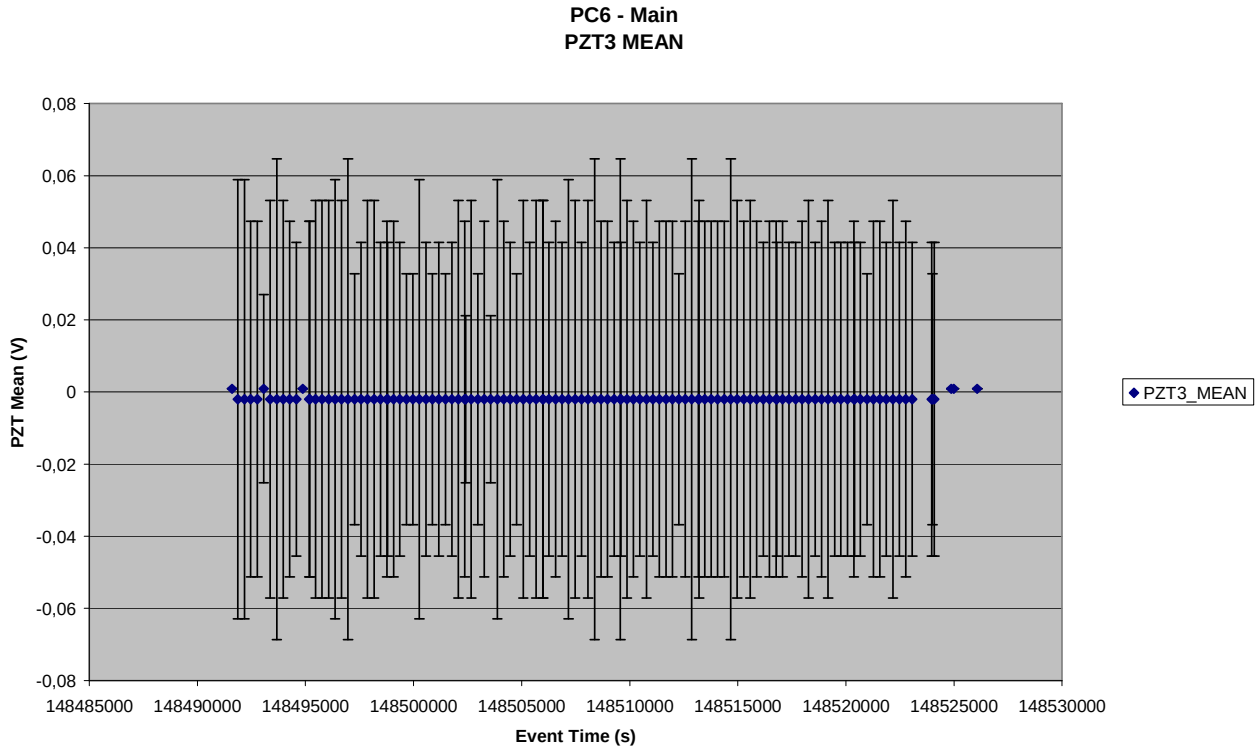


Figure 7.4-16. PZT 4 Mean and St Dev. CAL vs. time - Main

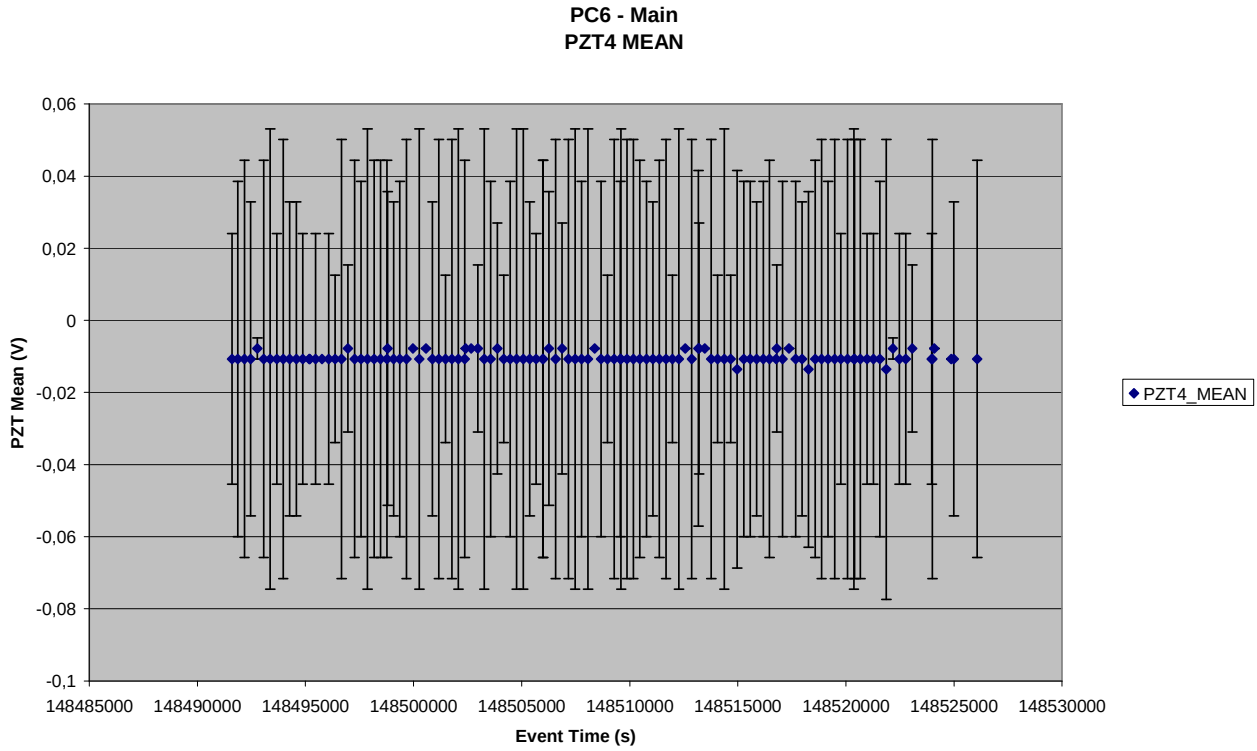


Figure 7.4-17. PZT 5 Mean and St Dev. CAL vs. time - Main

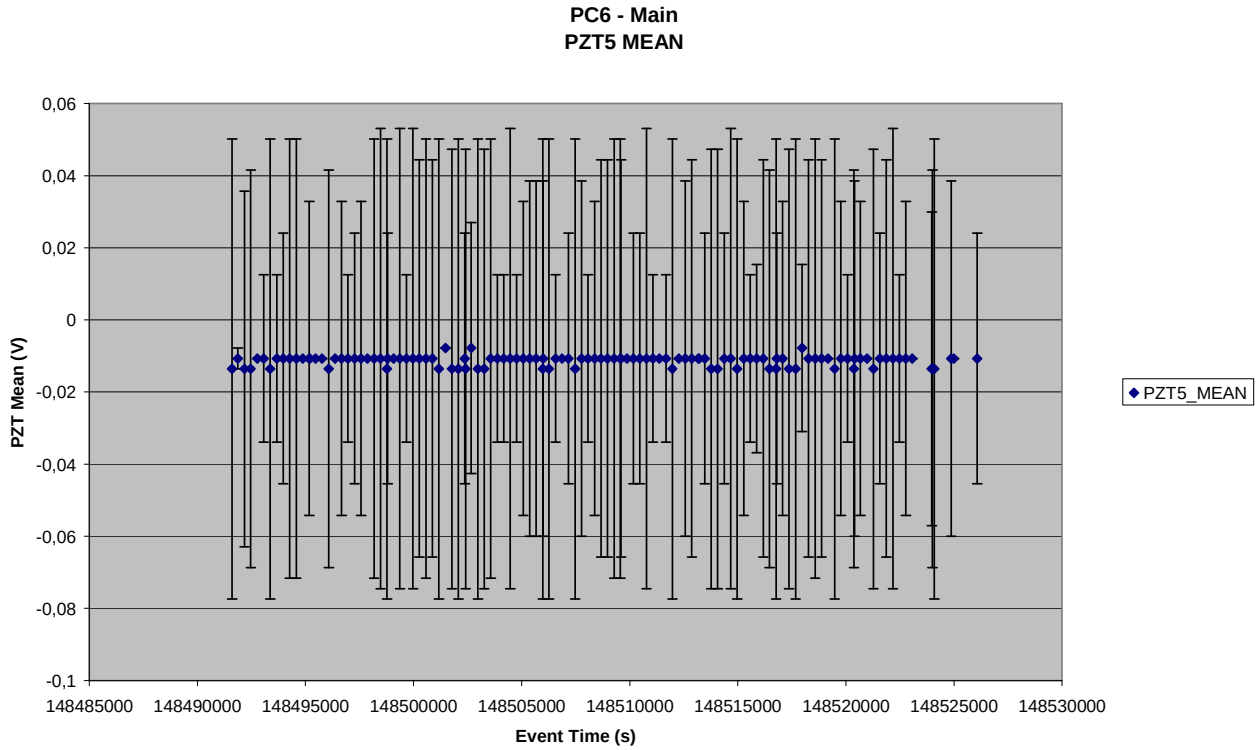


Figure 7.4-18. Reference Voltages for IS calibration vs. time - Main

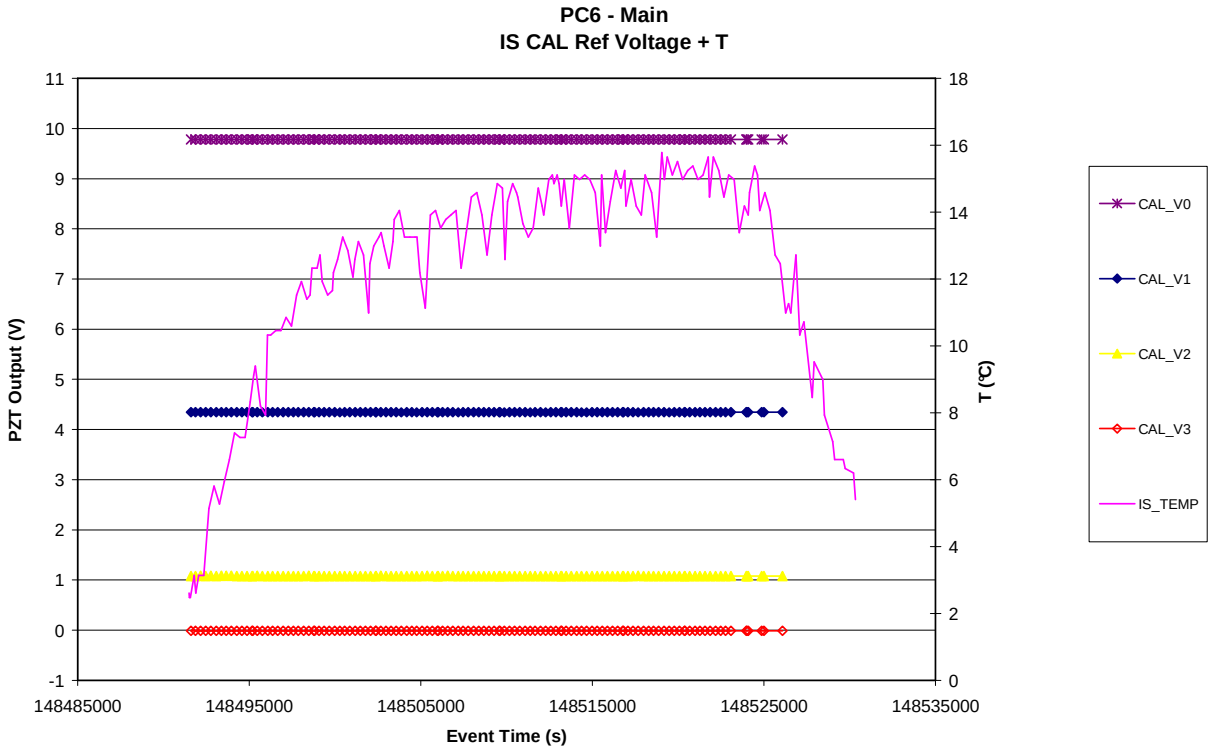


Figure 7.4-19. PZT 1 CAL Signal vs. time - Main

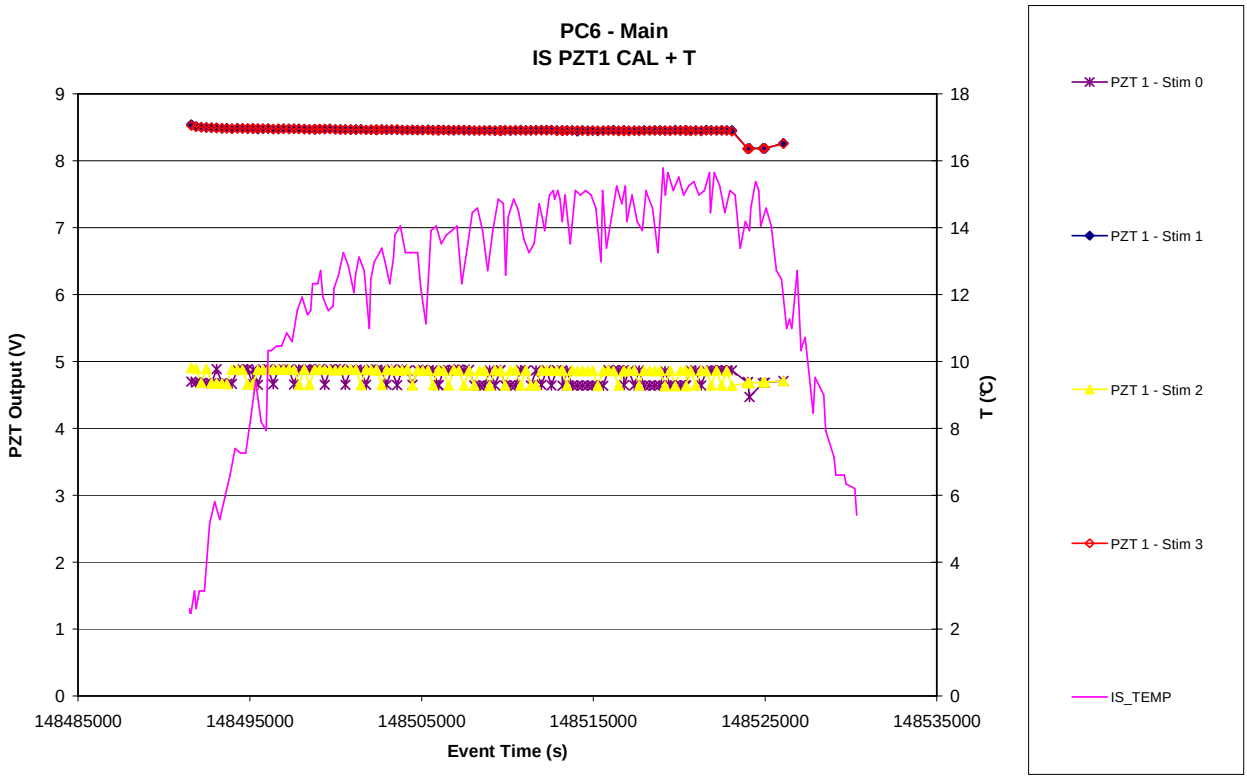


Figure 7.4-20. PZT 2 CAL Signal vs. time - Main

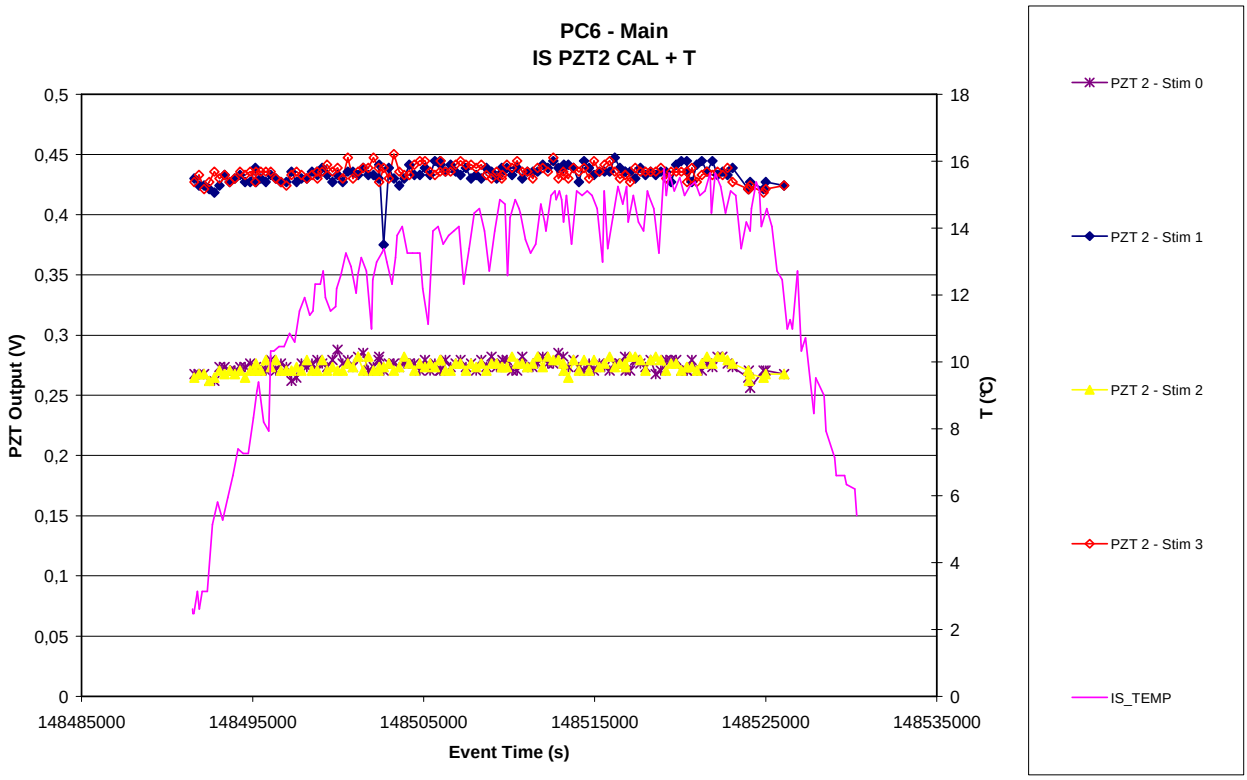


Figure 7.4-21. PZT 3 CAL Signal vs. time - Main

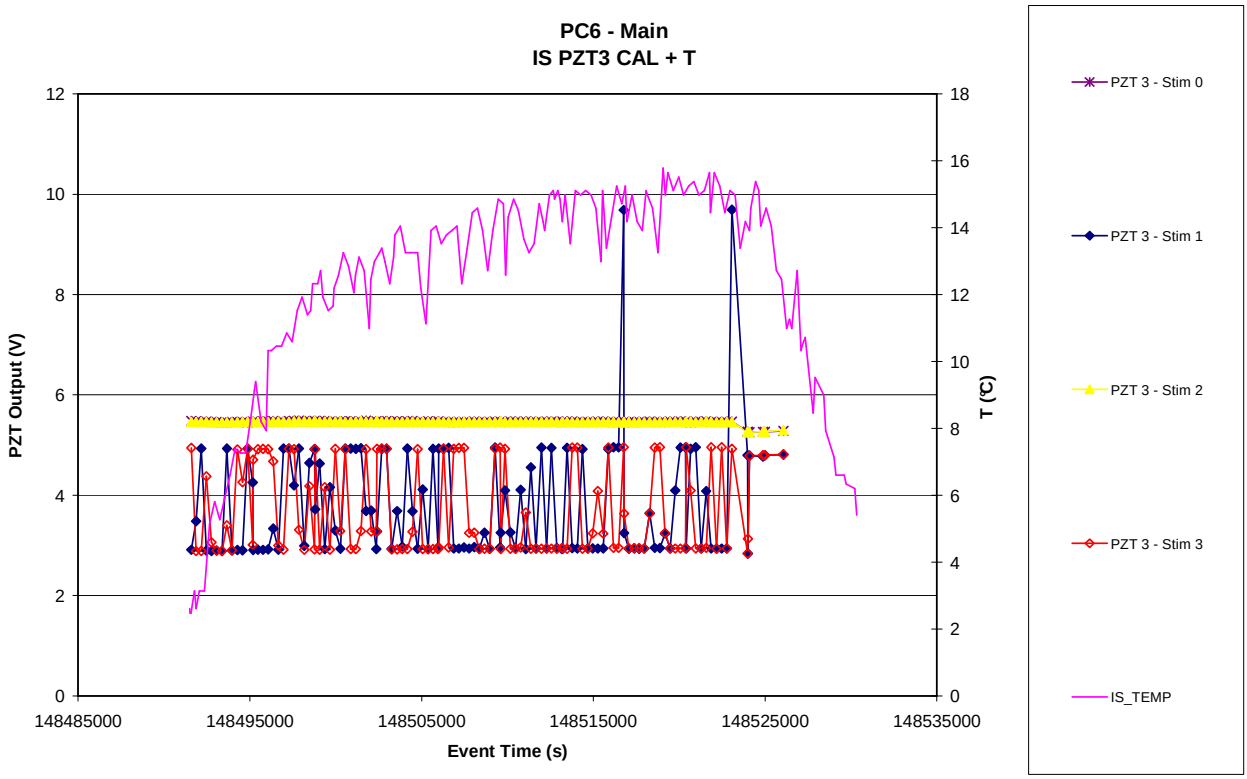


Figure 7.4-22. PZT 4 CAL Signal vs. time - Main

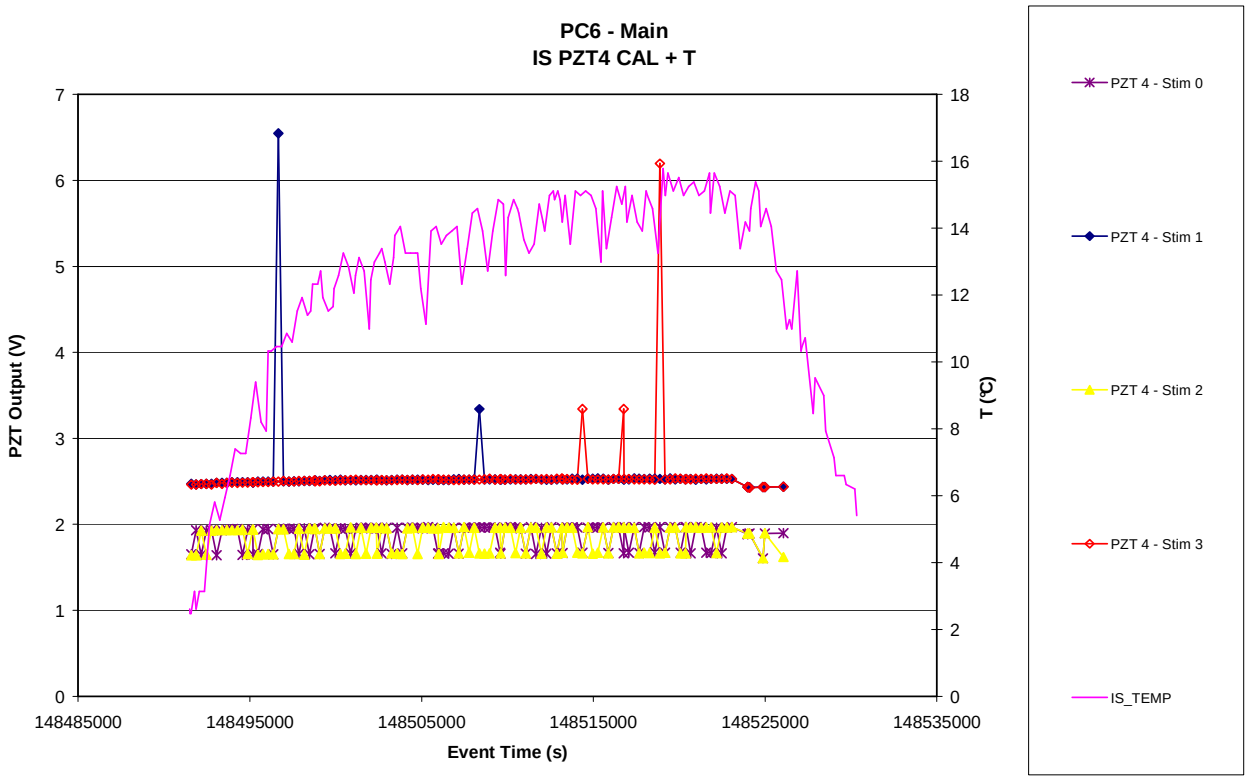


Figure 7.4-23. PZT 5 CAL Signal vs. time - Main

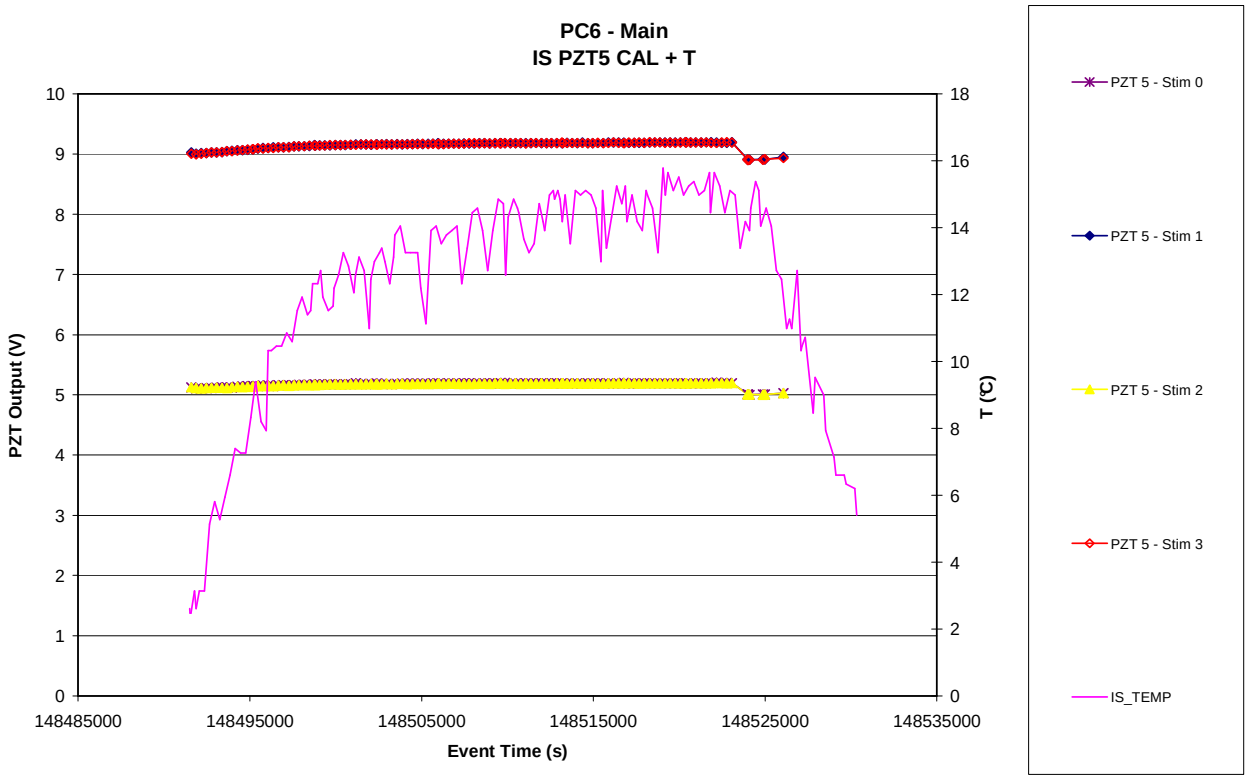


Figure 7.4-24. PZT 1 CAL Time delay vs. time - Main

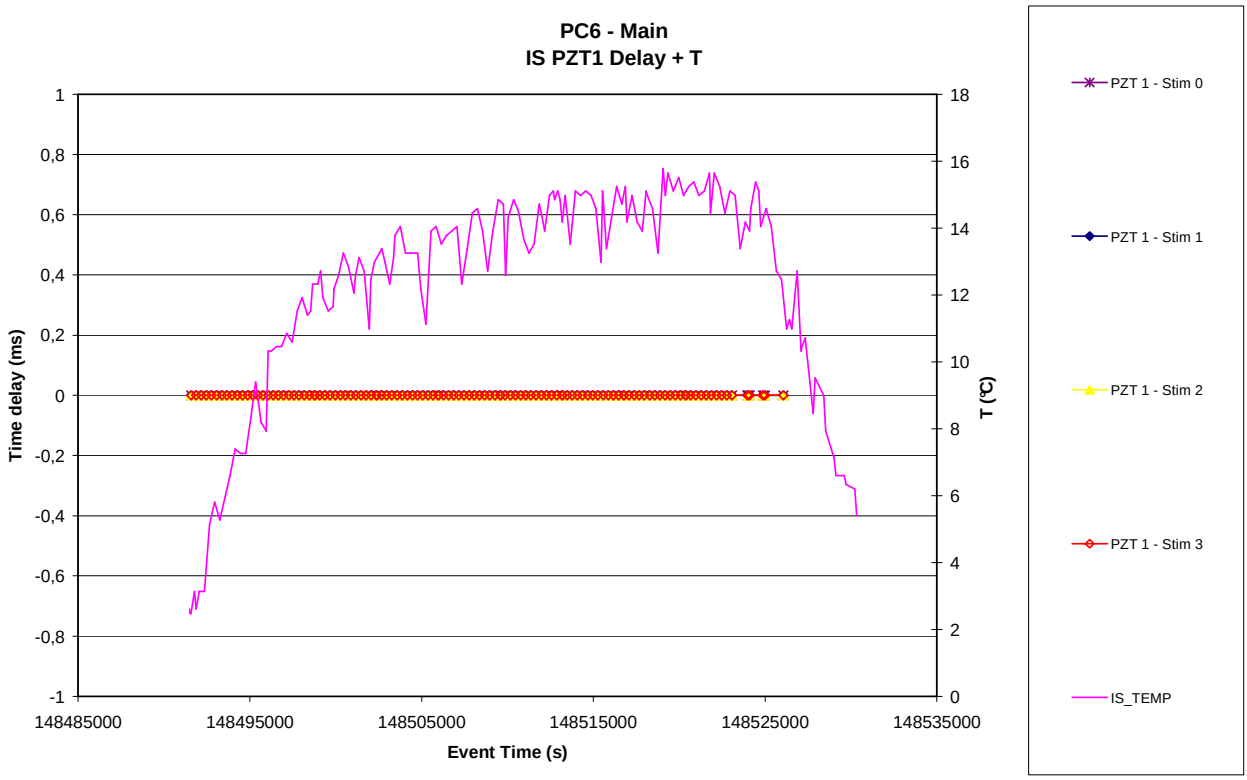


Figure 7.4-25. PZT 2 CAL Time delay vs. time - Main

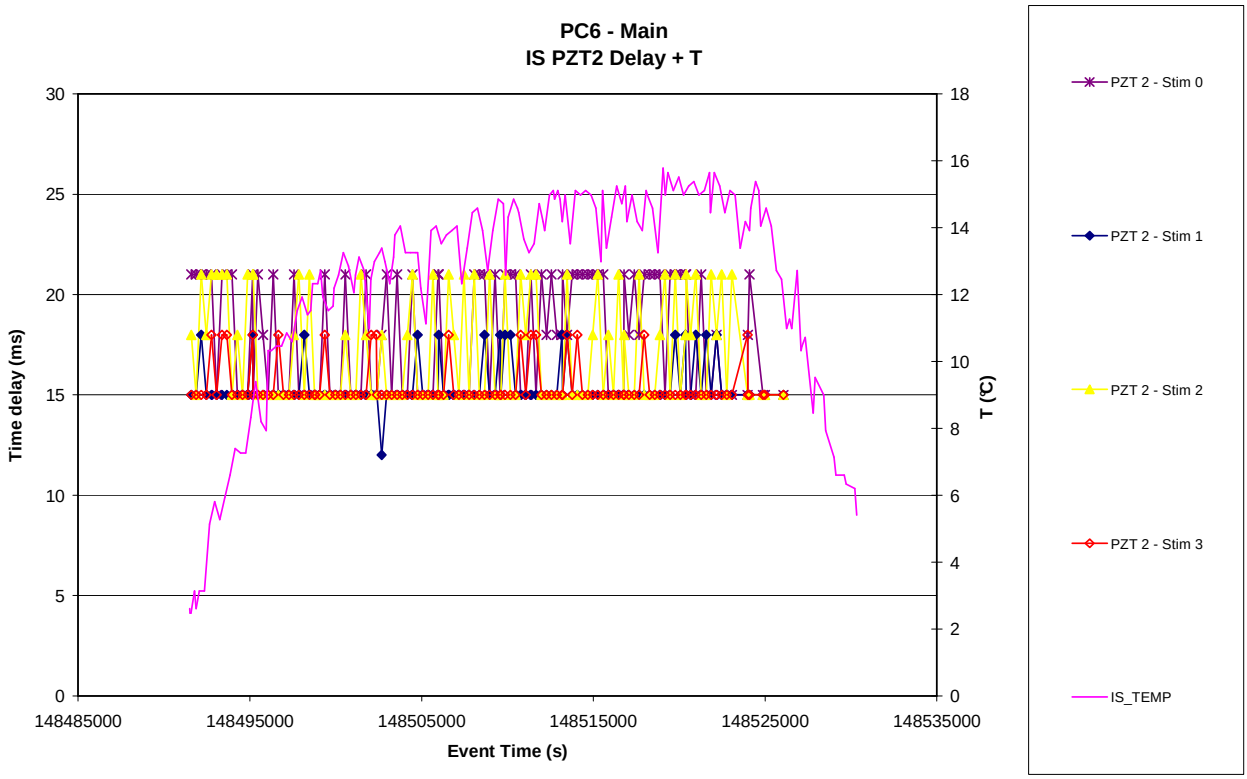


Figure 7.4-26. PZT 3 CAL Time delay vs. time - Main

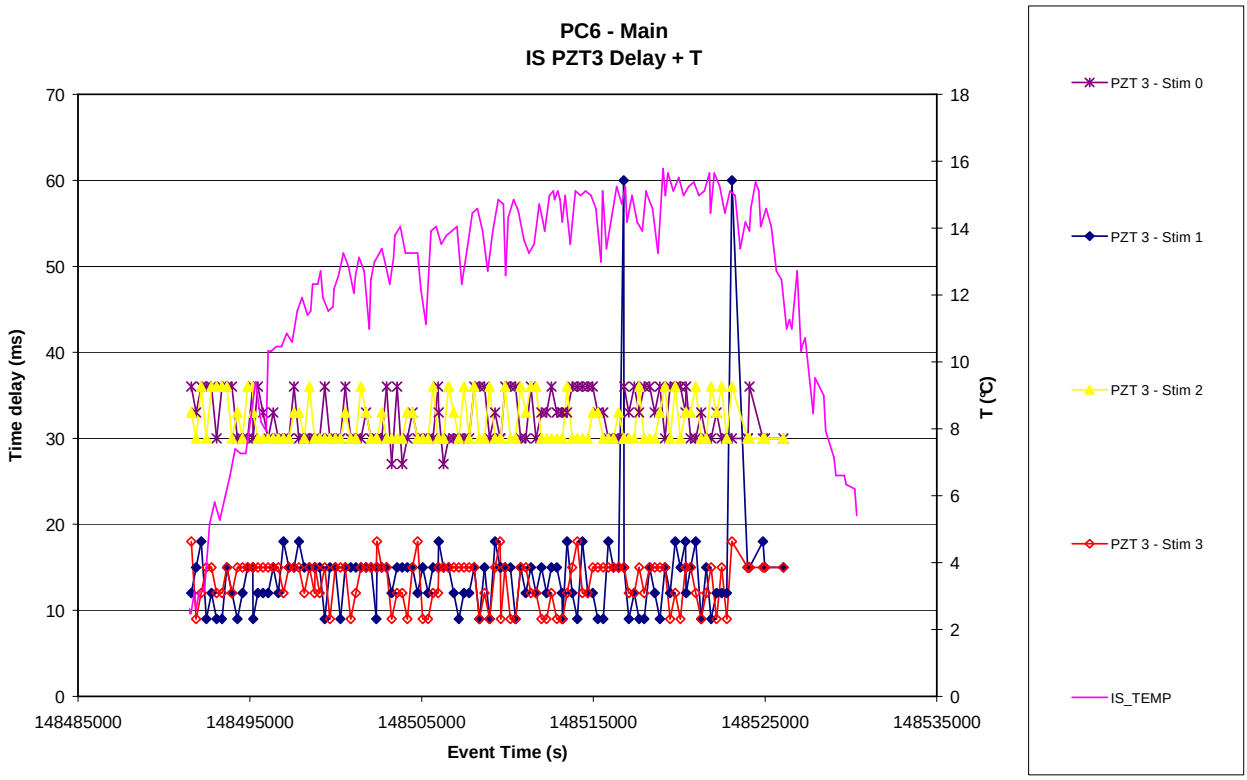


Figure 7.4-27. PZT 4 CAL Time delay vs. time - Main

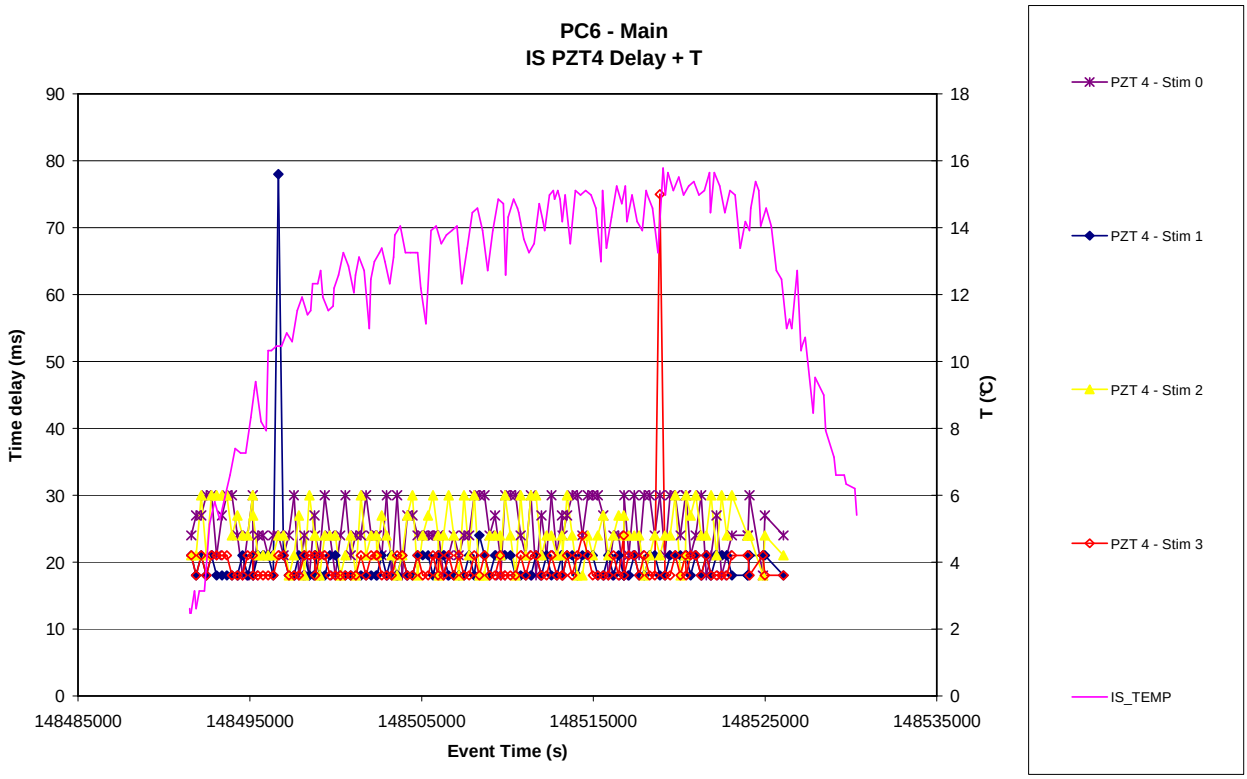


Figure 7.4-28. PZT 5 CAL Time delay vs. time - Main

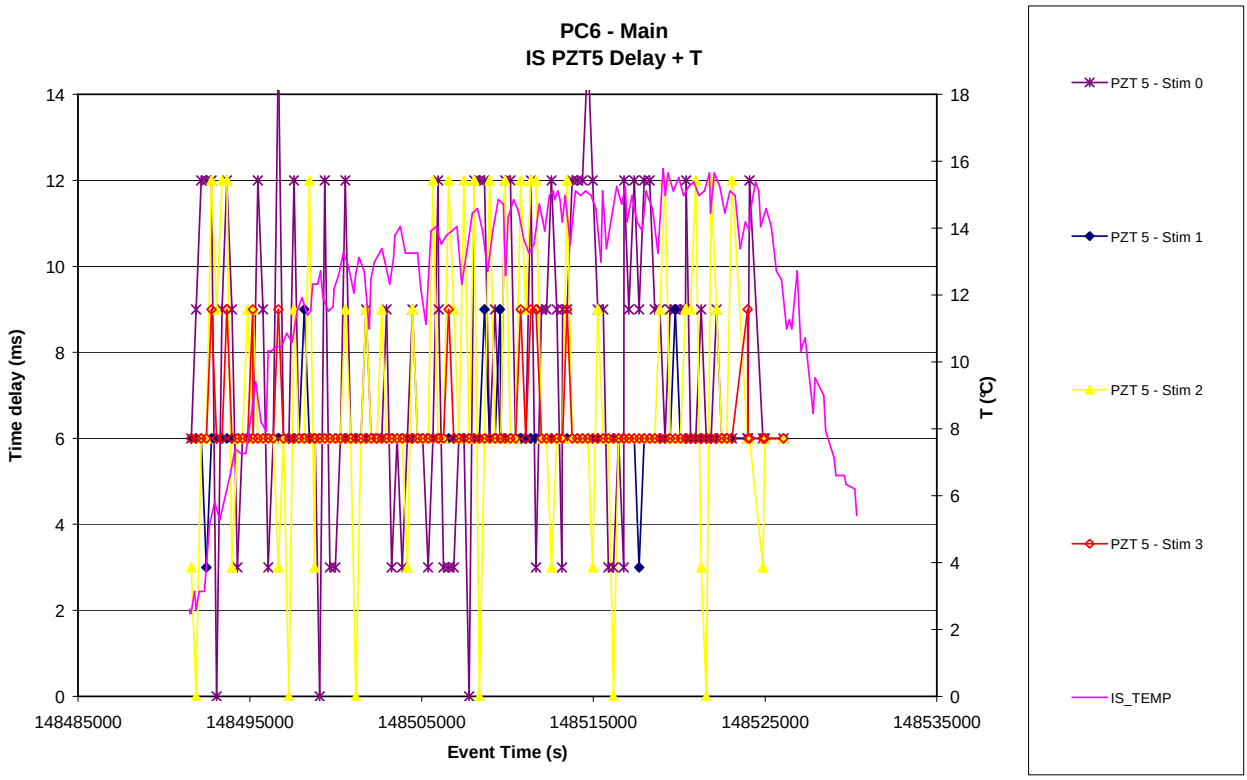


Figure 7.4-29. PZT 1 CAL Signal vs. stimulus – Main

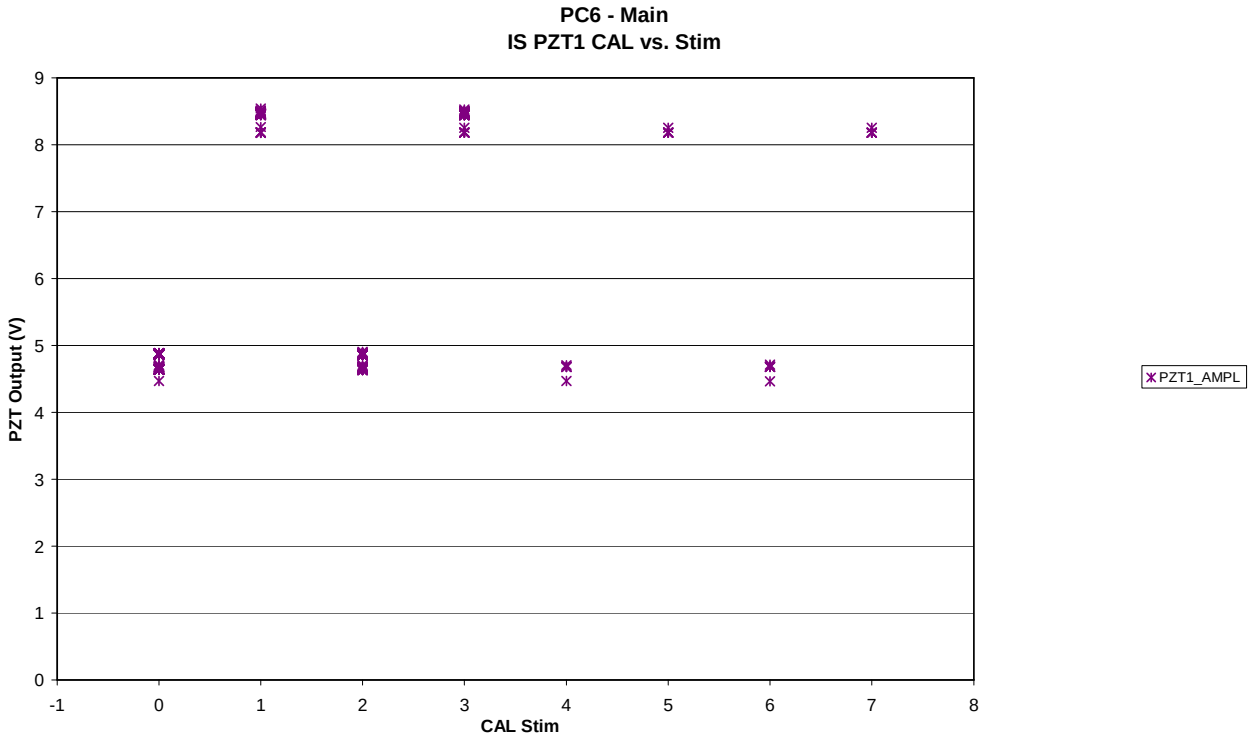


Figure 7.4-30. PZT 2 CAL Signal vs. stimulus – Main

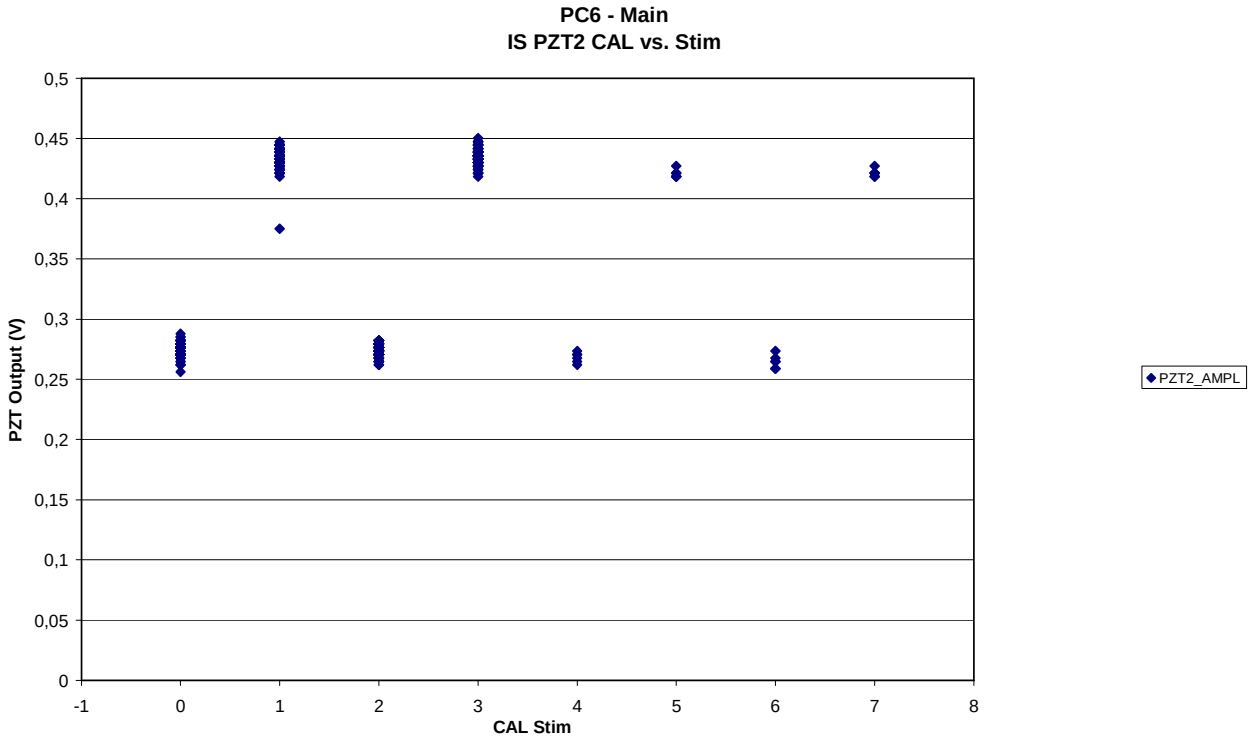


Figure 7.4-31. PZT 3 CAL Signal vs. stimulus – Main

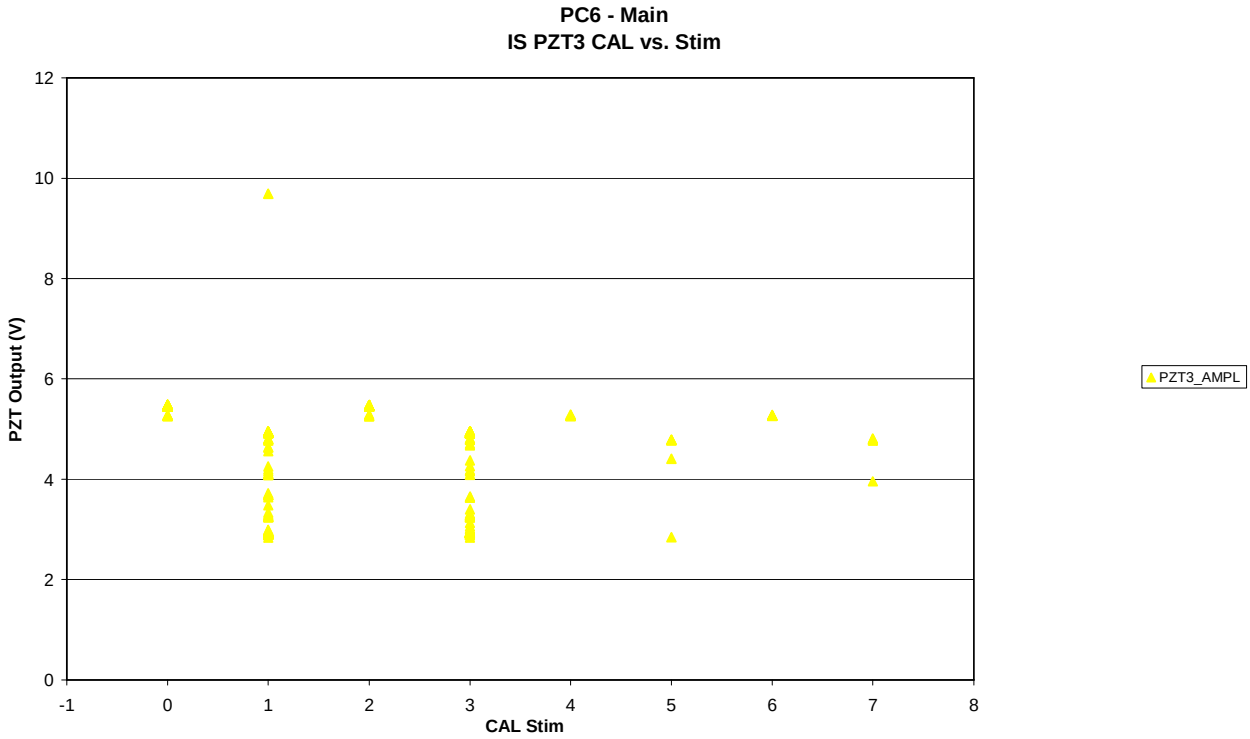


Figure 7.4-32. PZT 4 CAL Signal vs. stimulus – Main

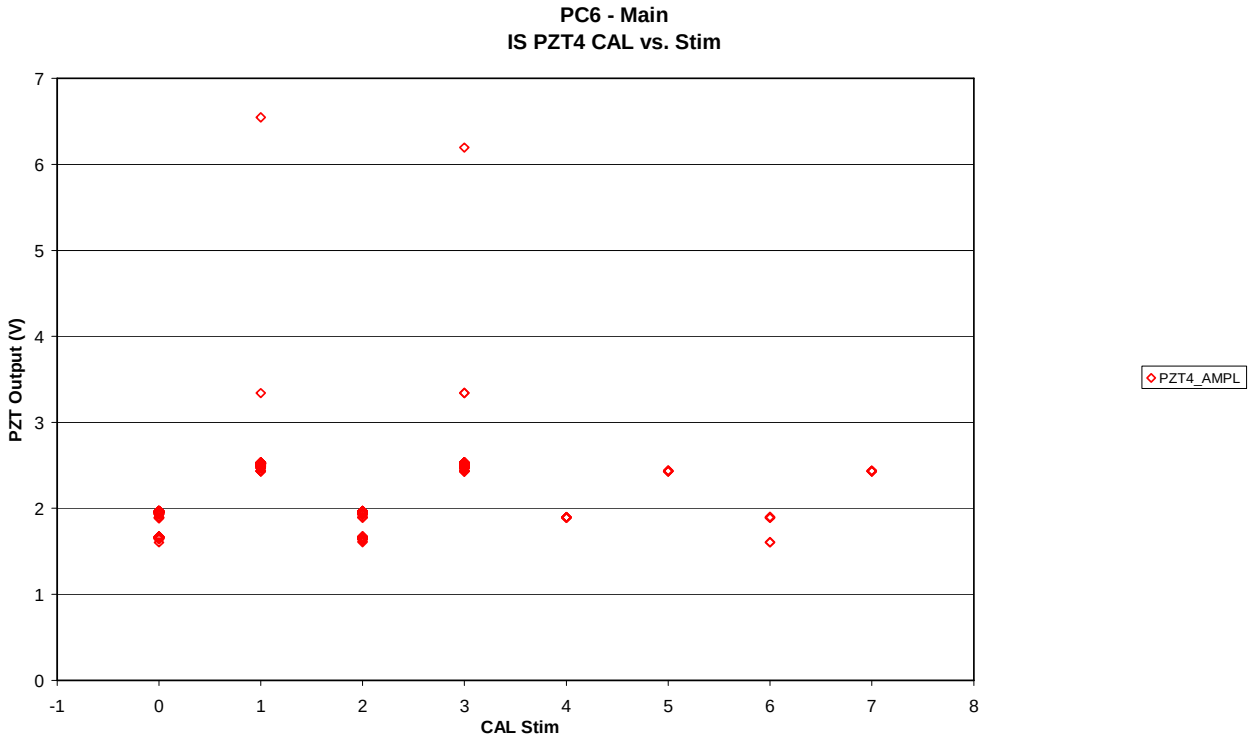


Figure 7.4-33. PZT 5 CAL Signal vs. stimulus – Main

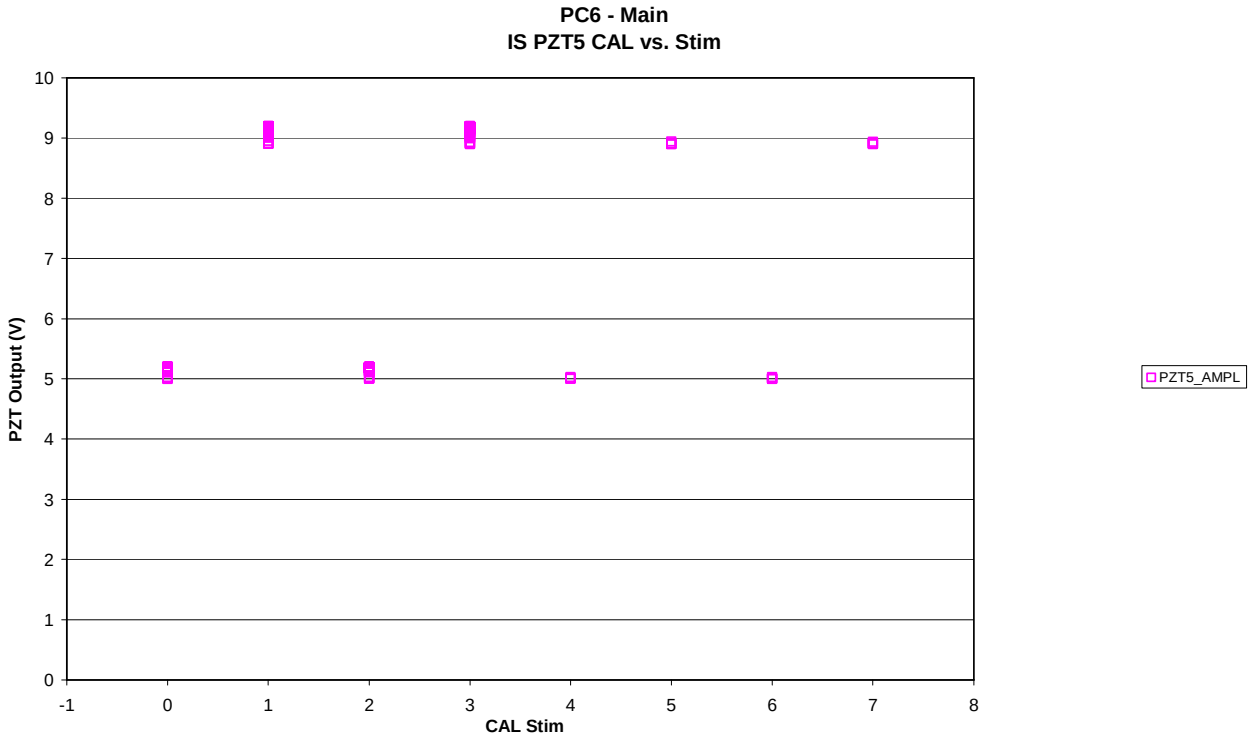


Figure 7.4-34. PZT 1 CAL Time delay vs. stimulus – Main

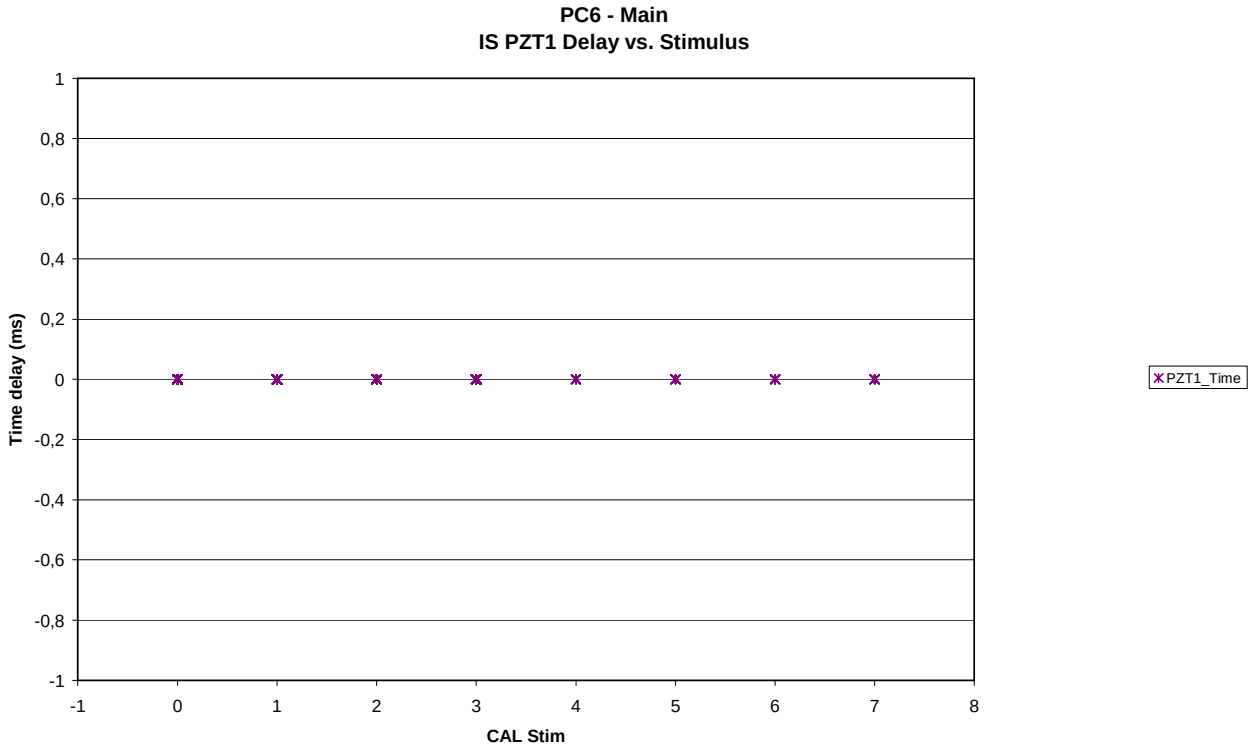


Figure 7.4-35. PZT 2 CAL Time delay vs. stimulus - Main

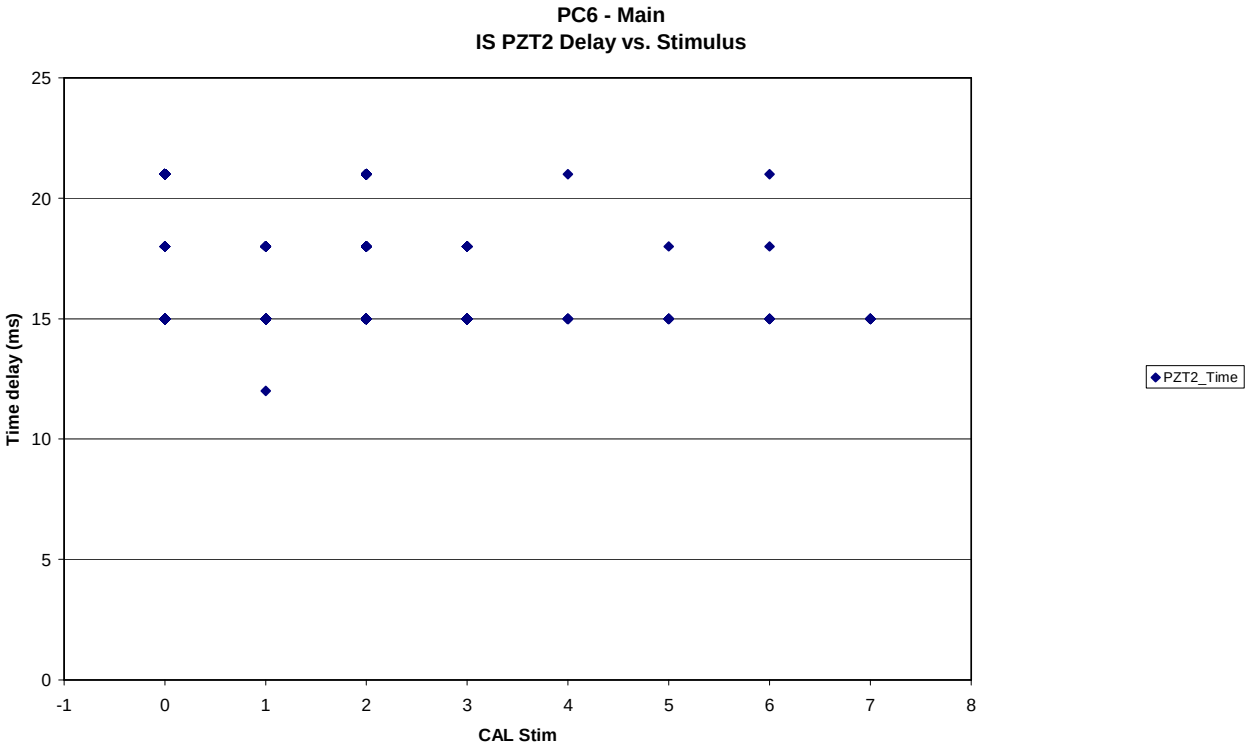


Figure 7.4-36. PZT 3 CAL Time delay vs. stimulus - Main

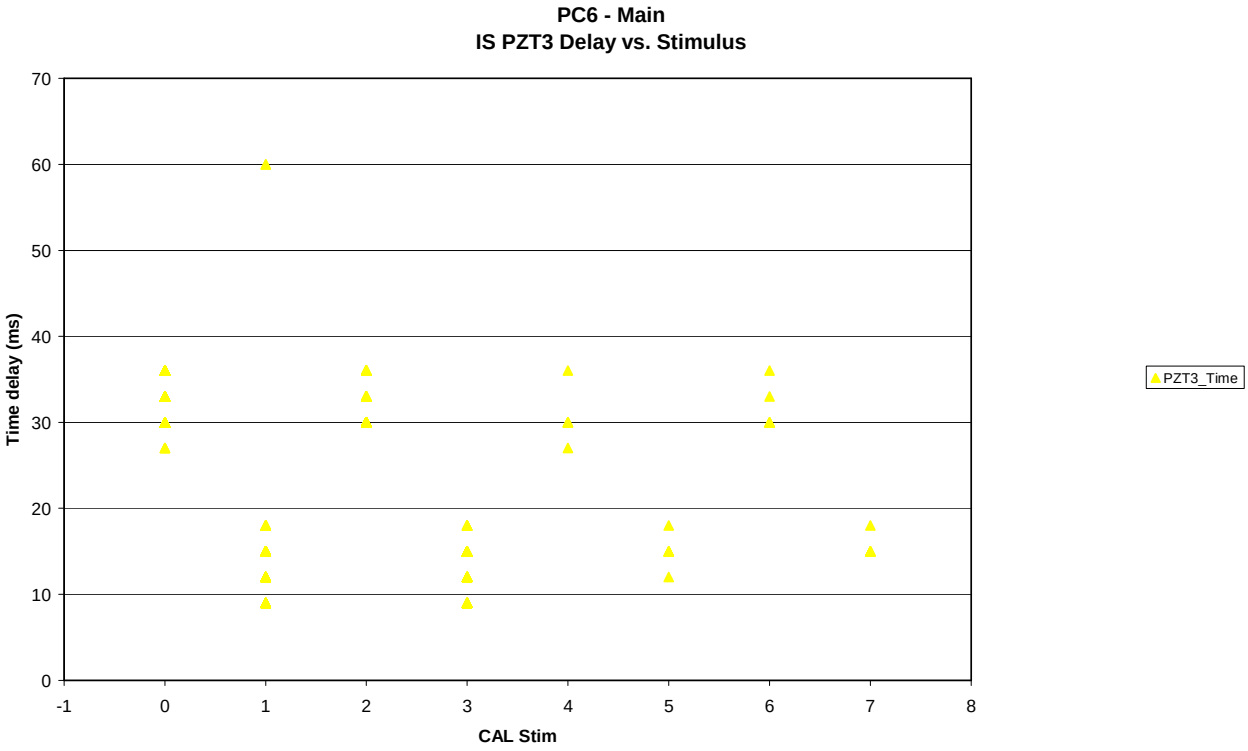


Figure 7.4-37. PZT 4 CAL Time delay vs. stimulus - Main

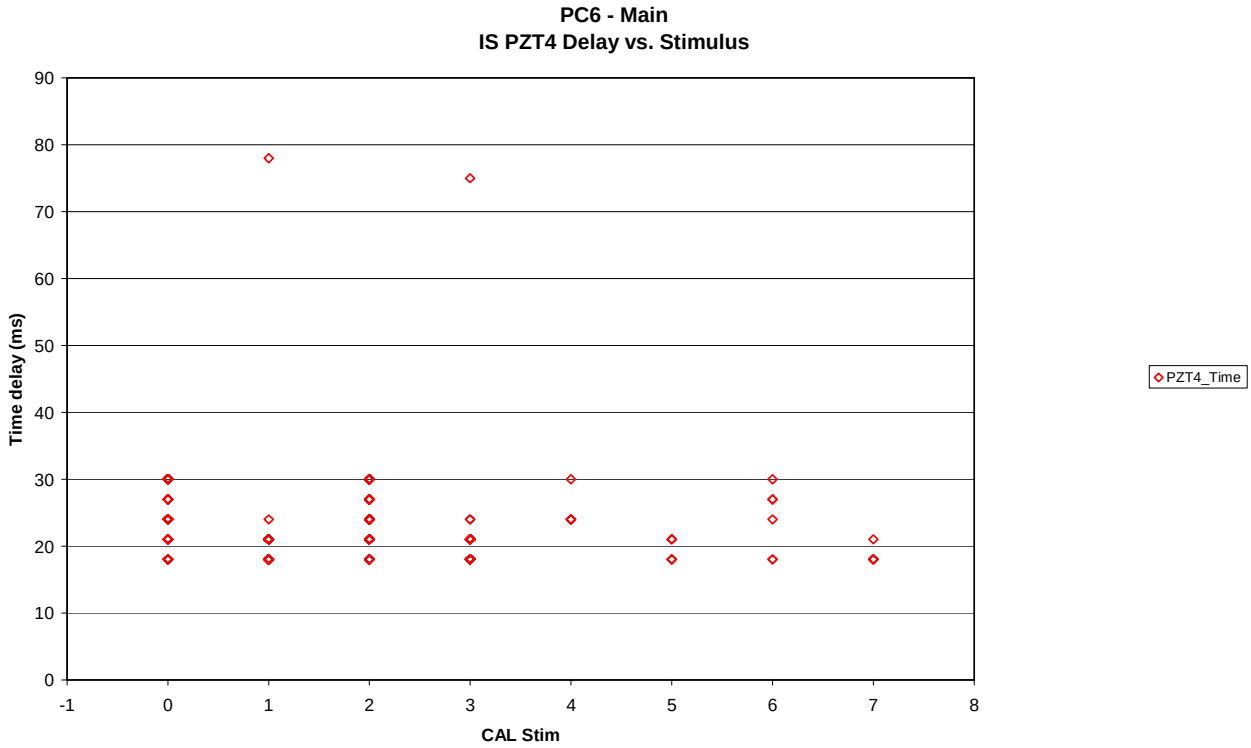
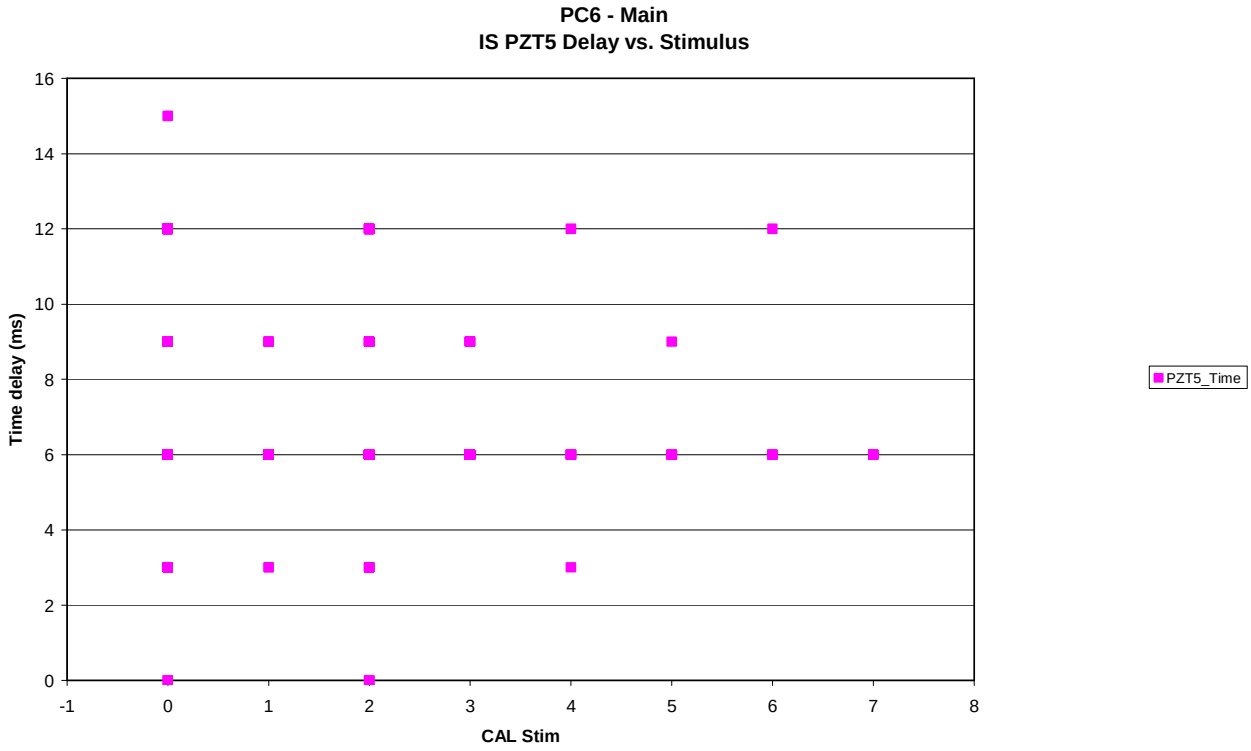


Figure 7.4-38. PZT 5 CAL Time delay vs. stimulus - Main



7.5 MICRO BALANCE SYSTEM (MBS)

7.5.1 MBS – Status

Figure 7.5-1. MBS Operation Status vs. time - Main

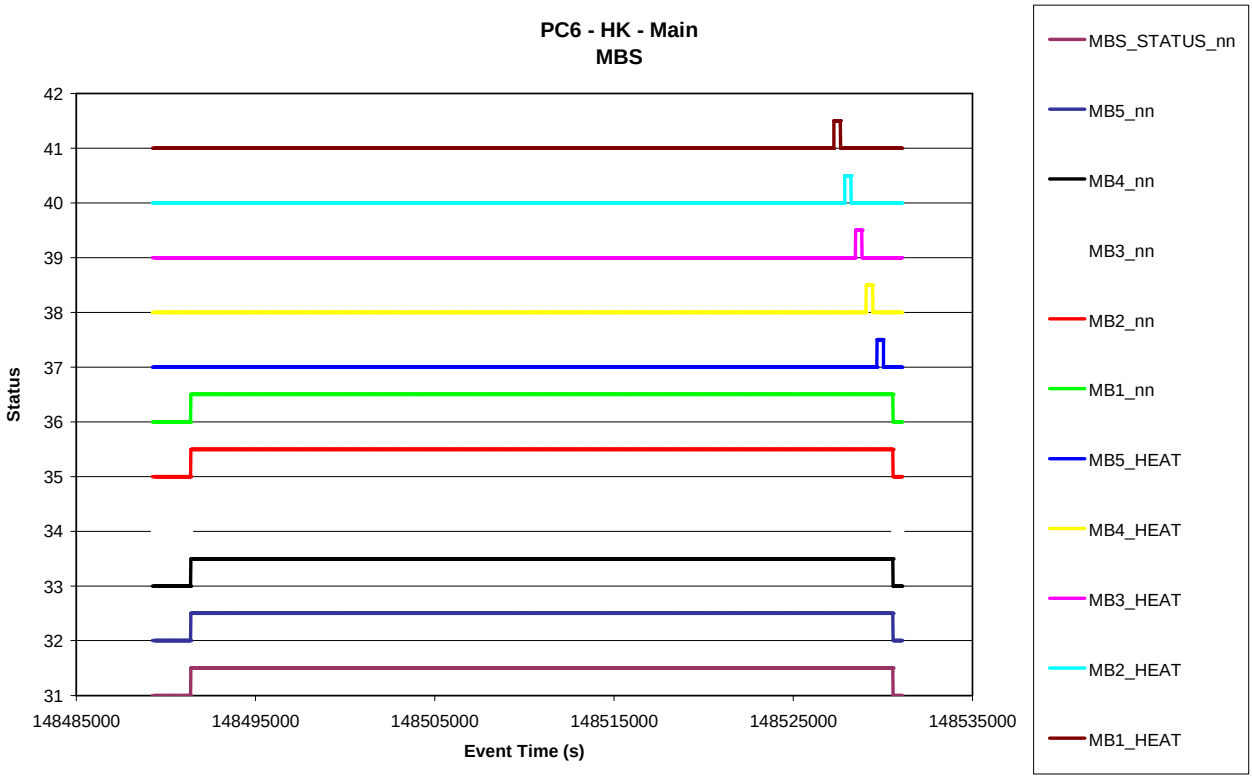


Figure 7.5-2. MBS 1 Temperature vs. time (HK, HK-SCI, SCI) – Main

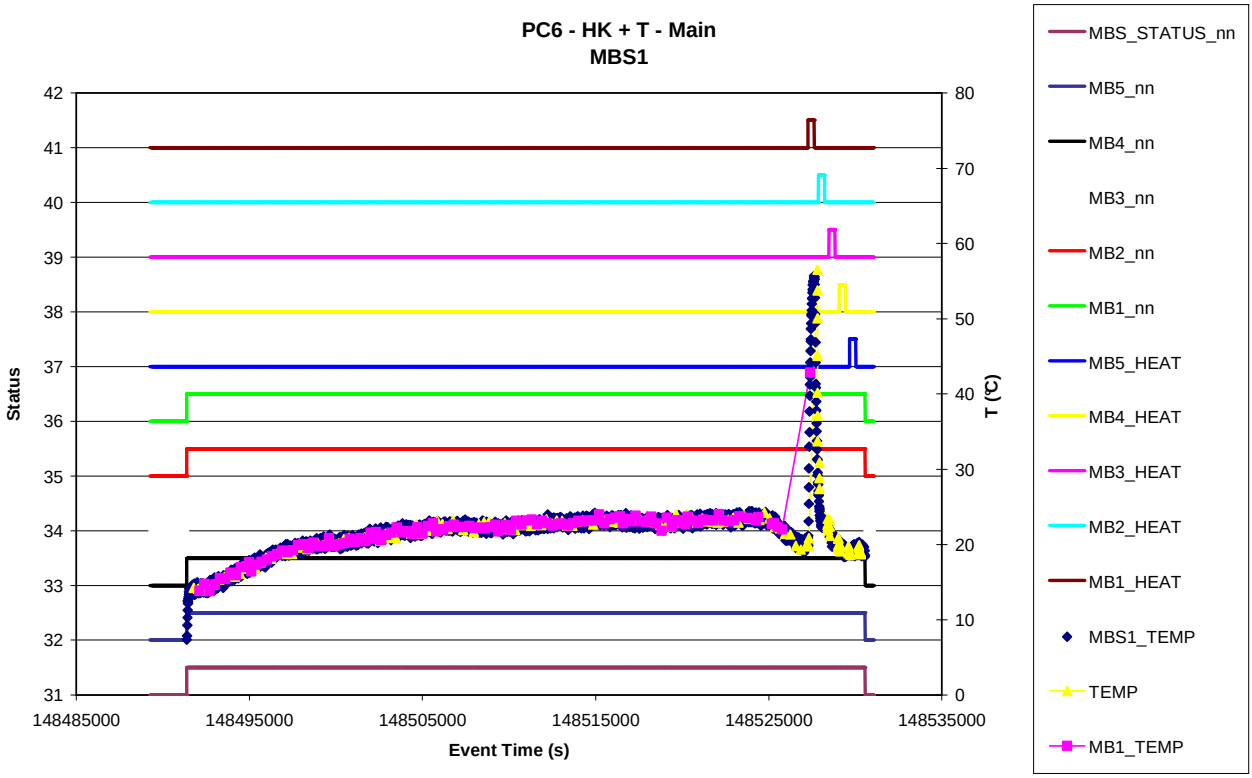


Figure 7.5-3. MBS 2 Temperature vs. time (HK, HK-SCI, SCI) - Main

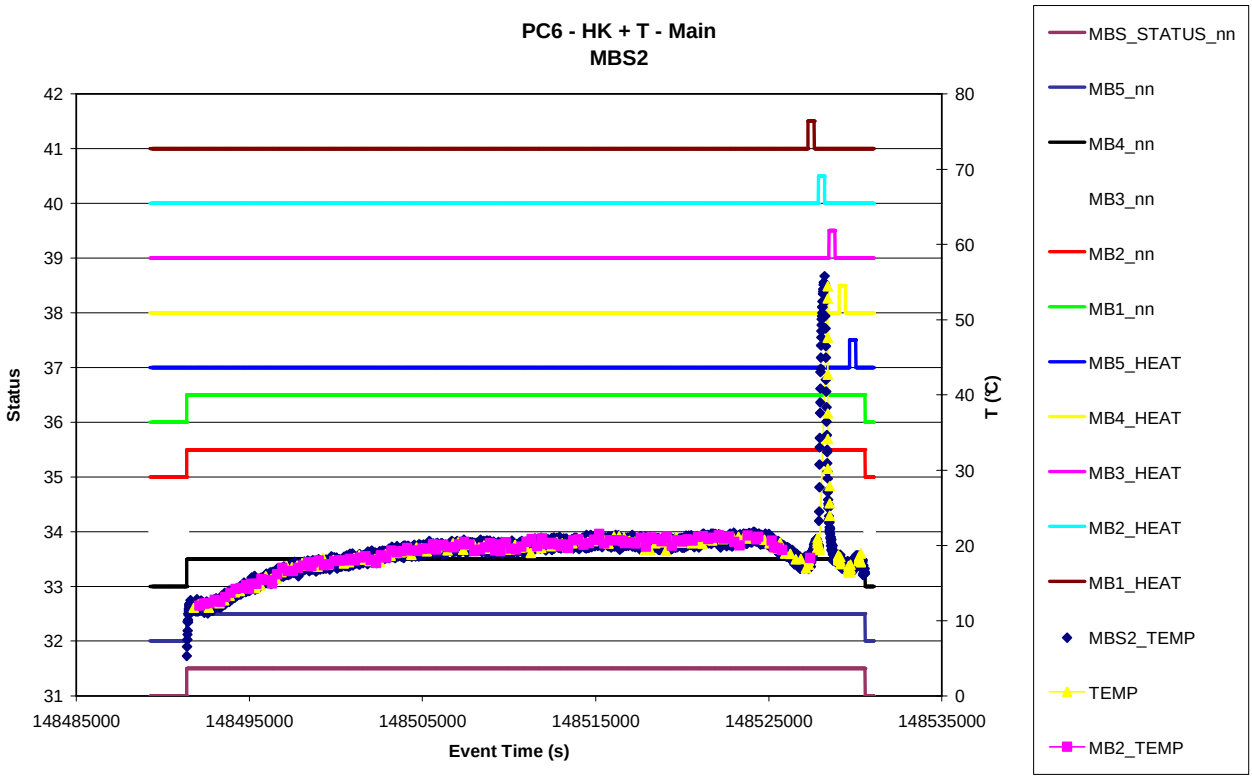


Figure 7.5-4. MBS 3 Temperature vs. time (HK, HK-SCI, SCI) - Main

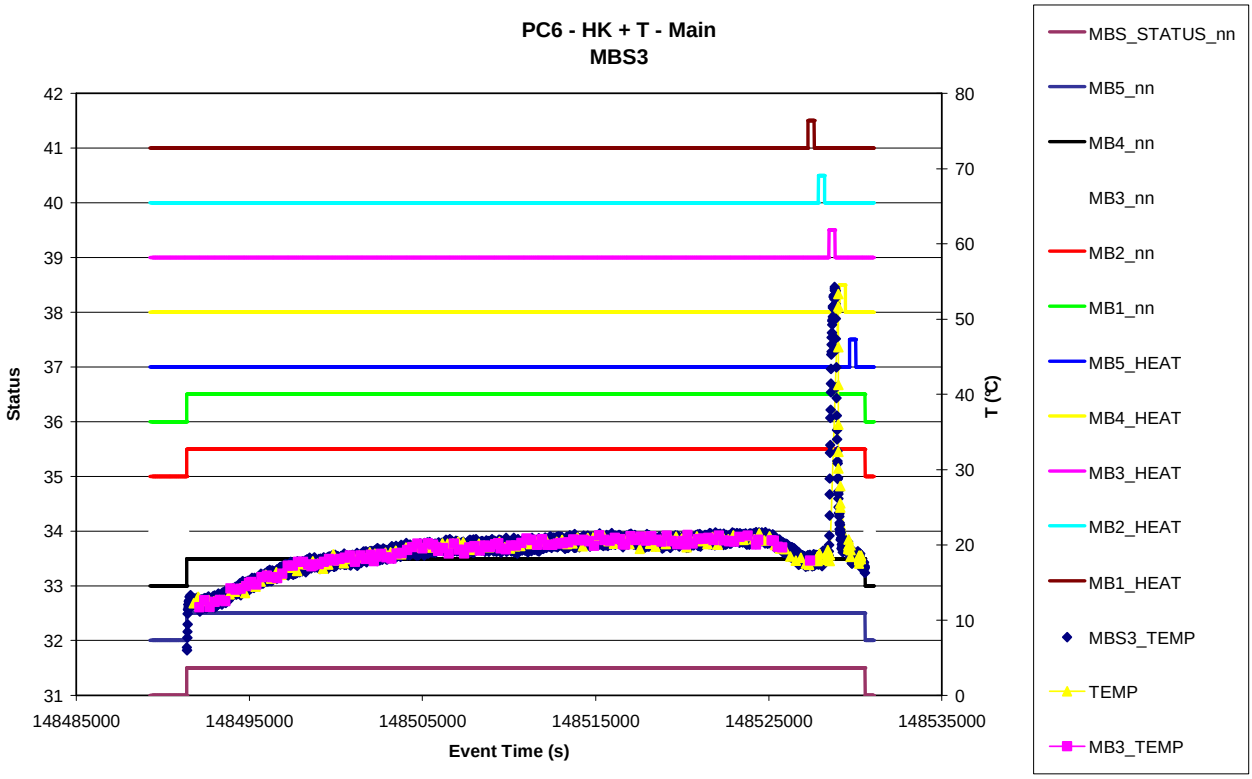


Figure 7.5-5. MBS 4 Temperature vs. time (HK, HK-SCI, SCI) - Main

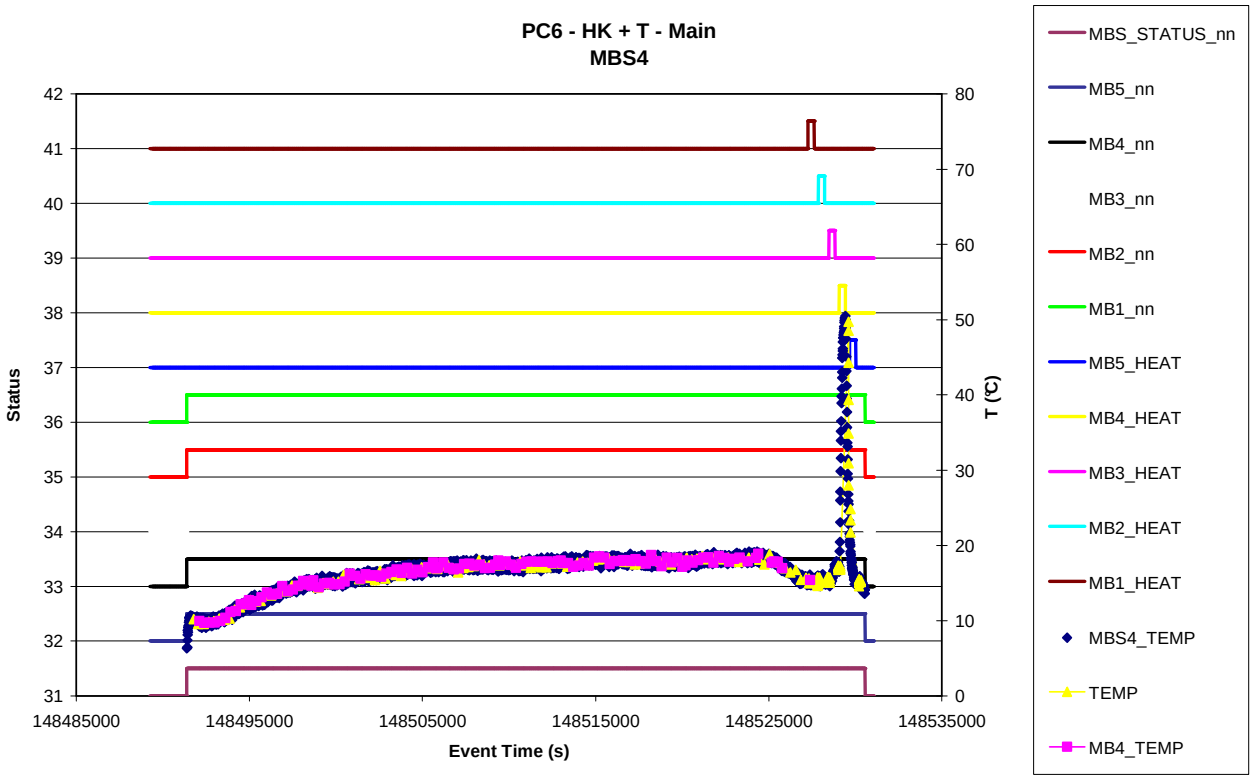
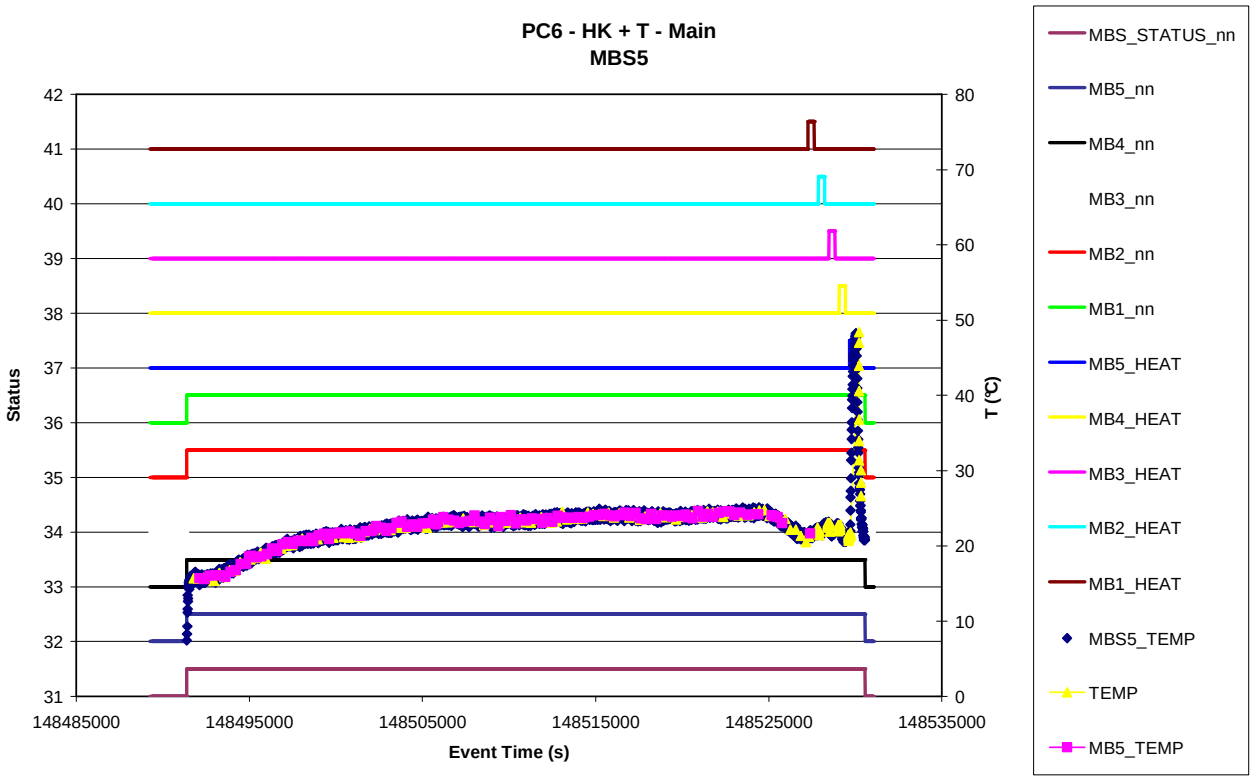


Figure 7.5-6. MBS 5 Temperature vs. time (HK, HK-SCI, SCI) - Main



7.5.2 MBS – Behaviour

7.5.2.1 Science Events (Normal + Heating)

Figure 7.5-7. MBS 1 Frequency and Temperature vs. time - Main

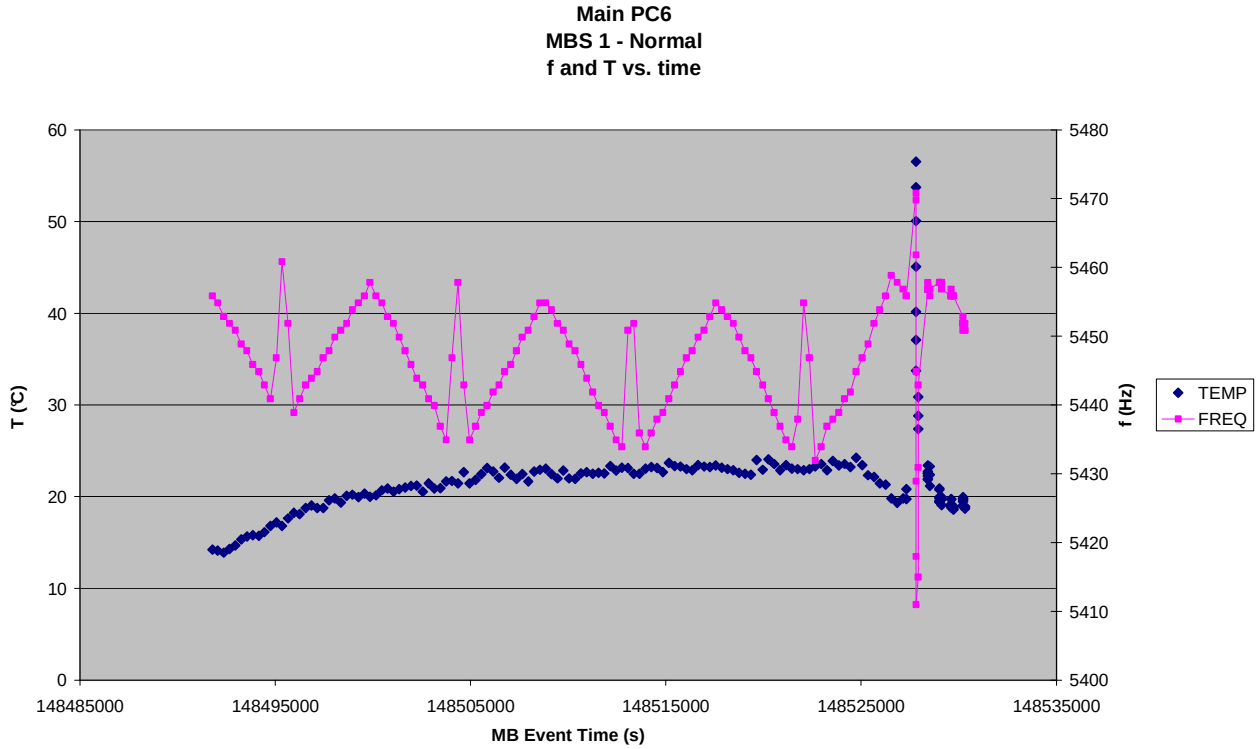


Figure 7.5-8. MBS 2 Frequency and Temperature vs. time - Main

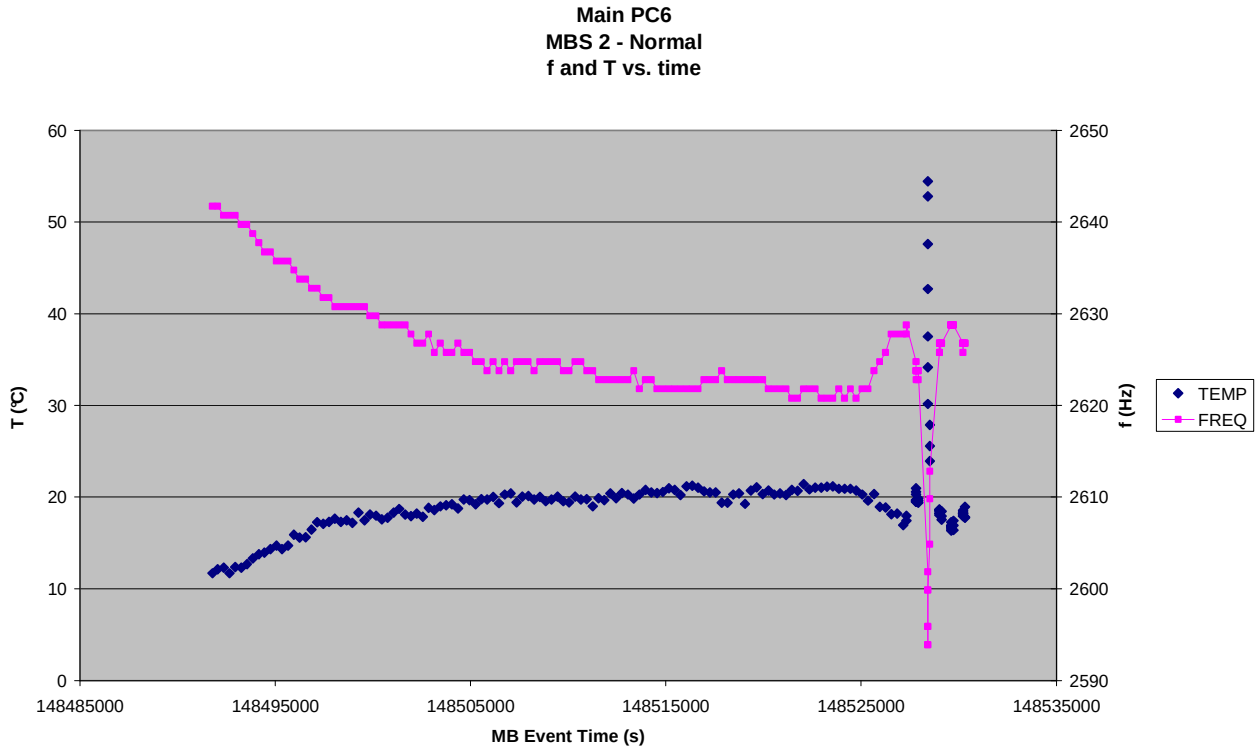


Figure 7.5-9. MBS 3 Frequency and Temperature vs. time - Main

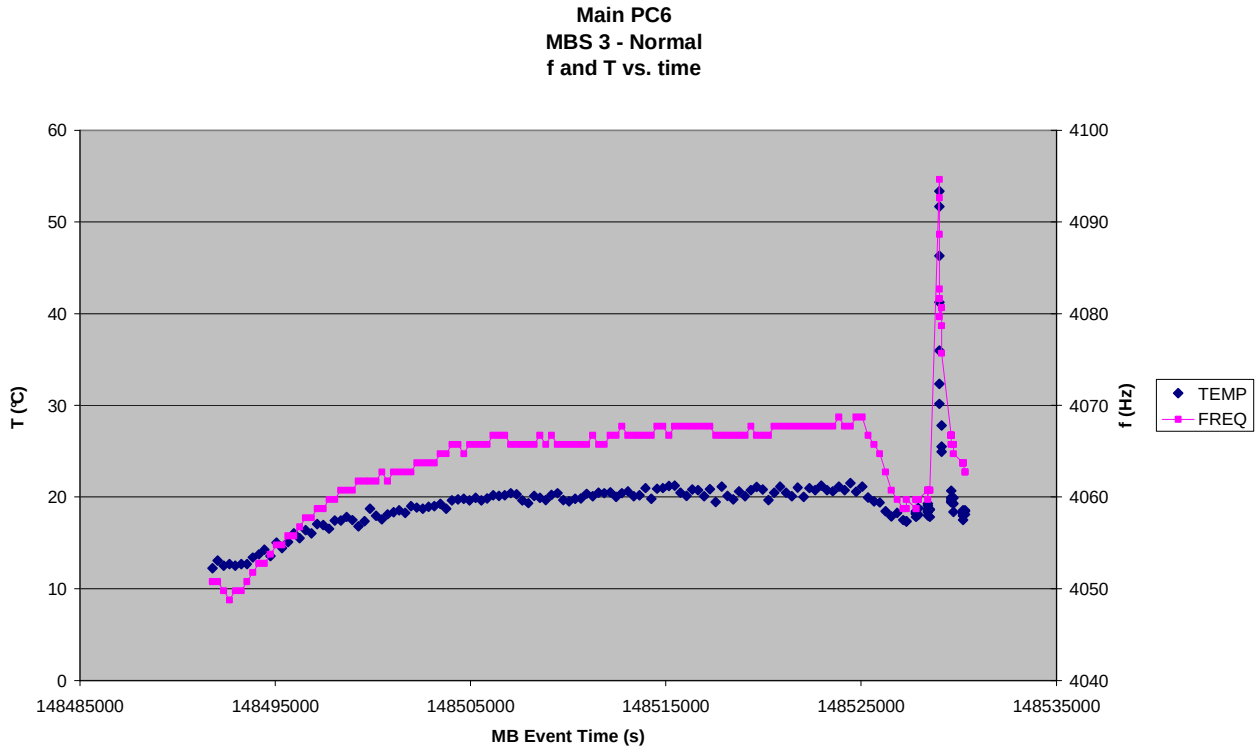


Figure 7.5-10. MBS 4 Frequency and Temperature vs. time - Main

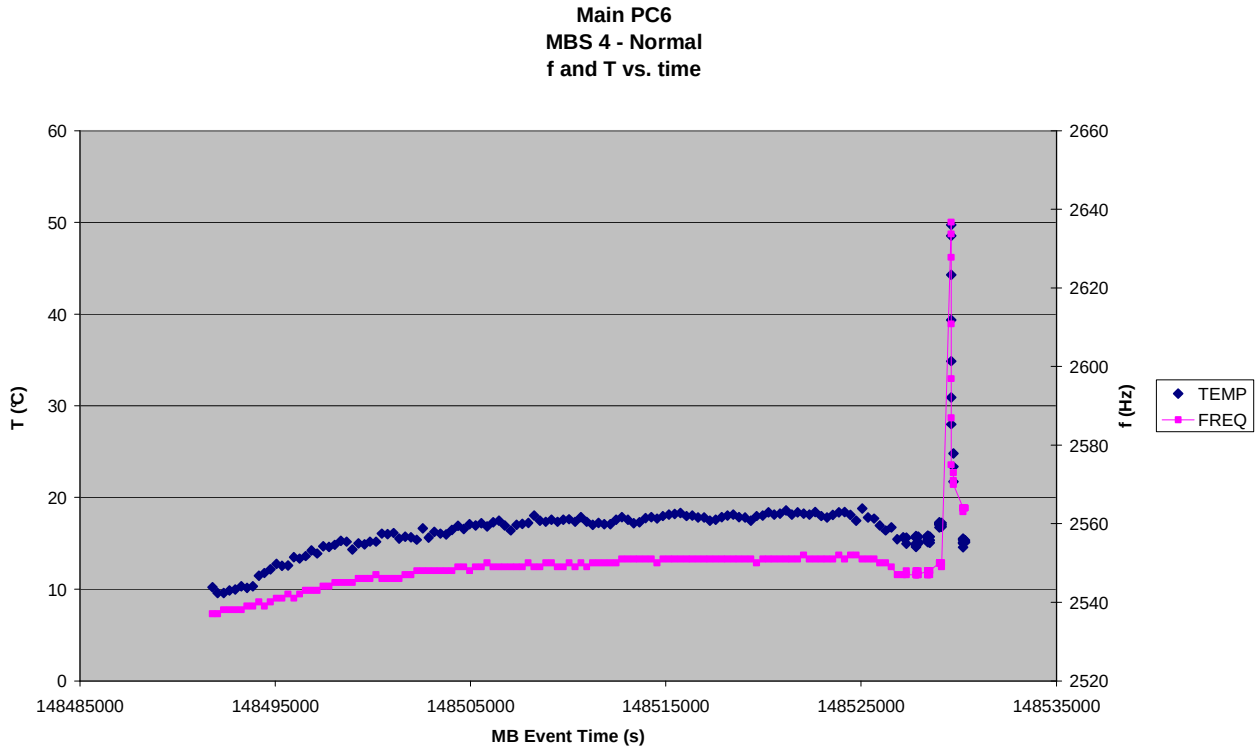


Figure 7.5-11. MBS 5 Frequency and Temperature vs. time - Main

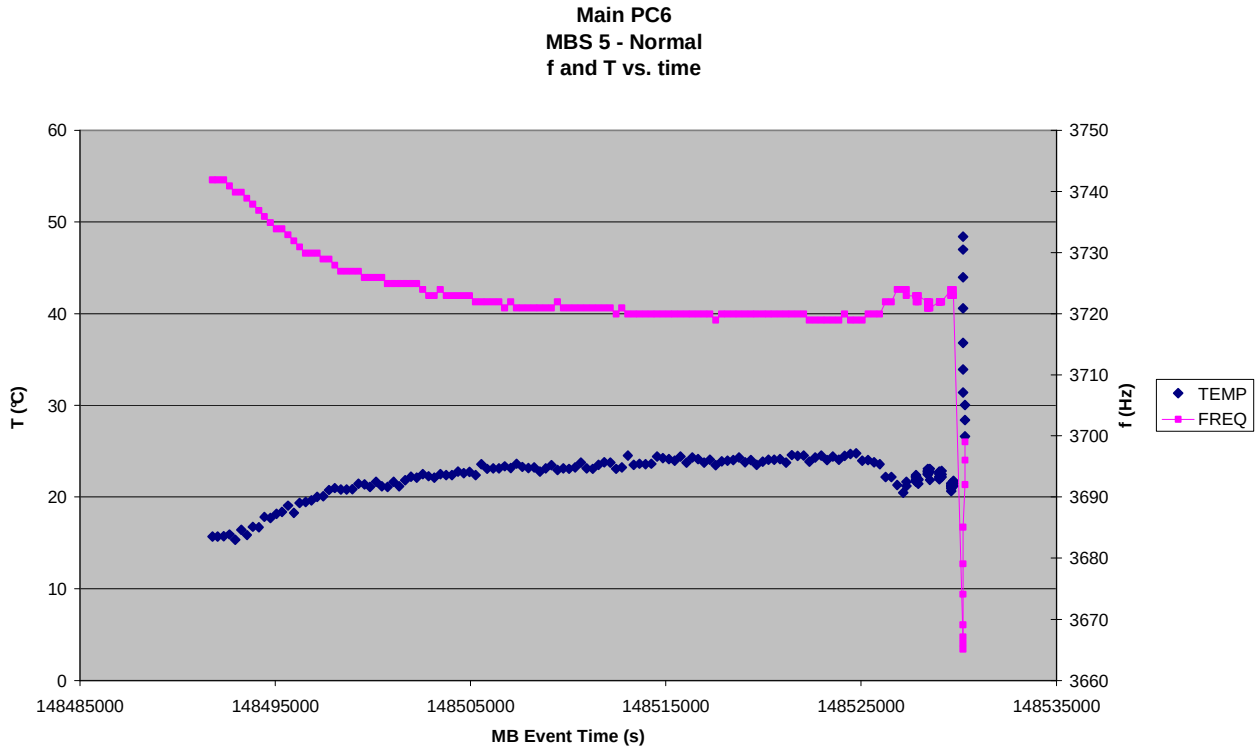


Figure 7.5-12. MBS 1 Frequency vs. Temperature - Main

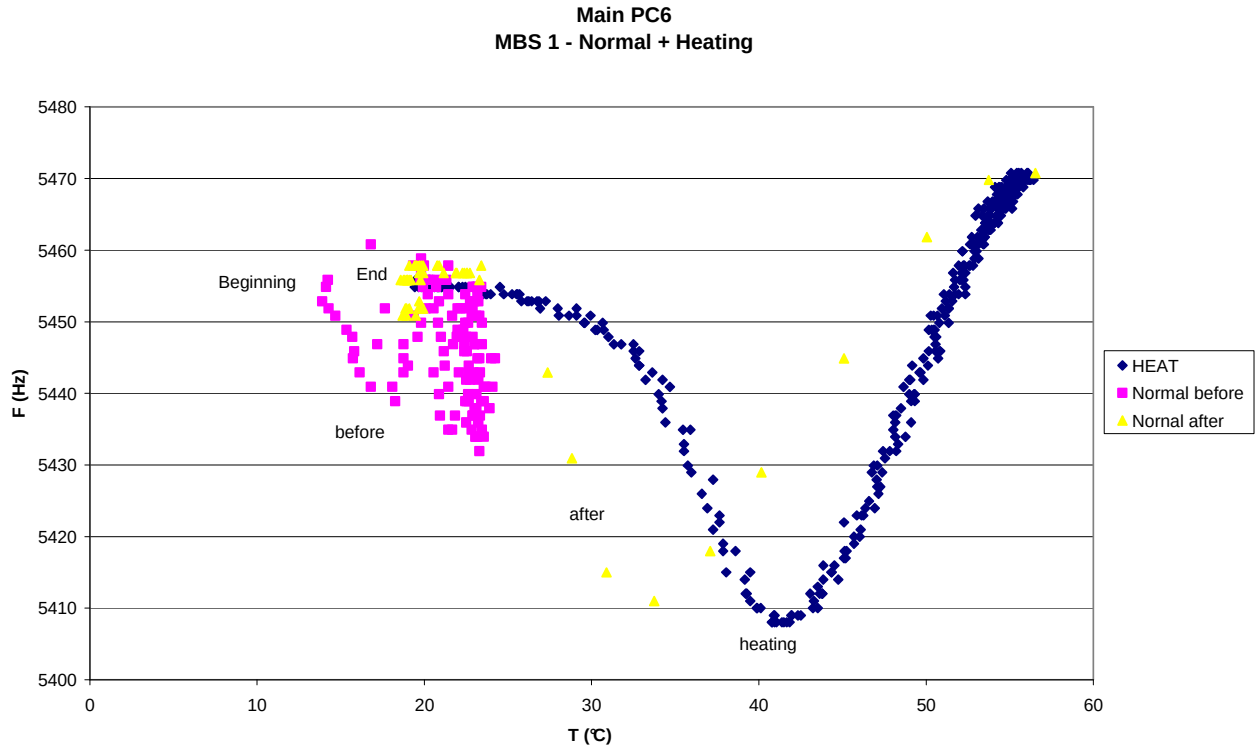


Figure 7.5-13. MBS 2 Frequency vs. Temperature - Main

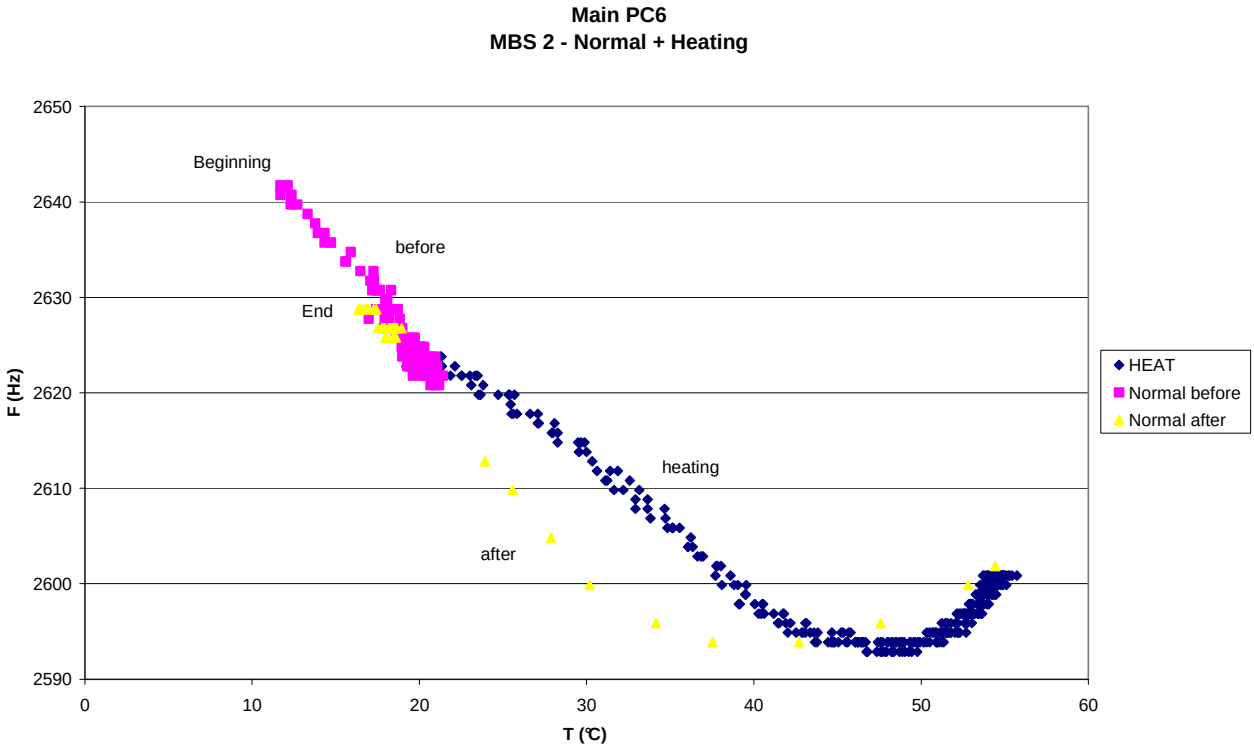


Figure 7.5-14. MBS 3 Frequency vs. Temperature - Main

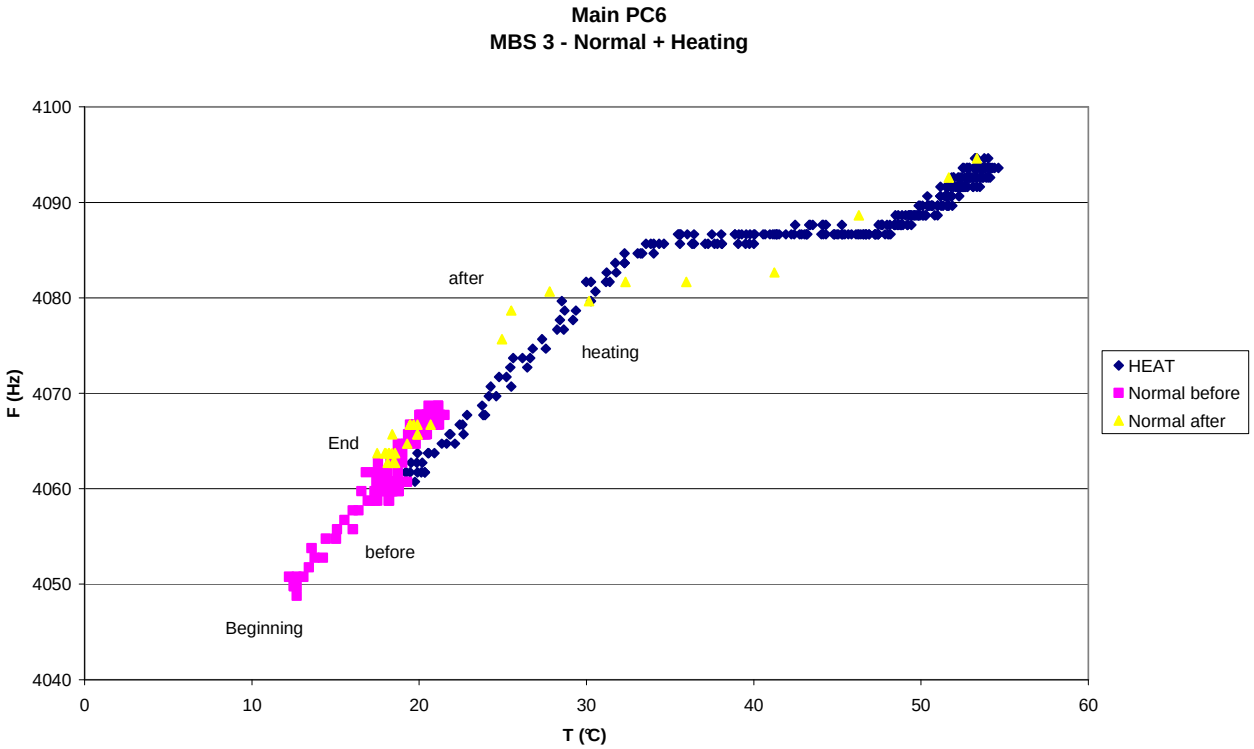


Figure 7.5-15. MBS 4 Frequency vs. Temperature - Main

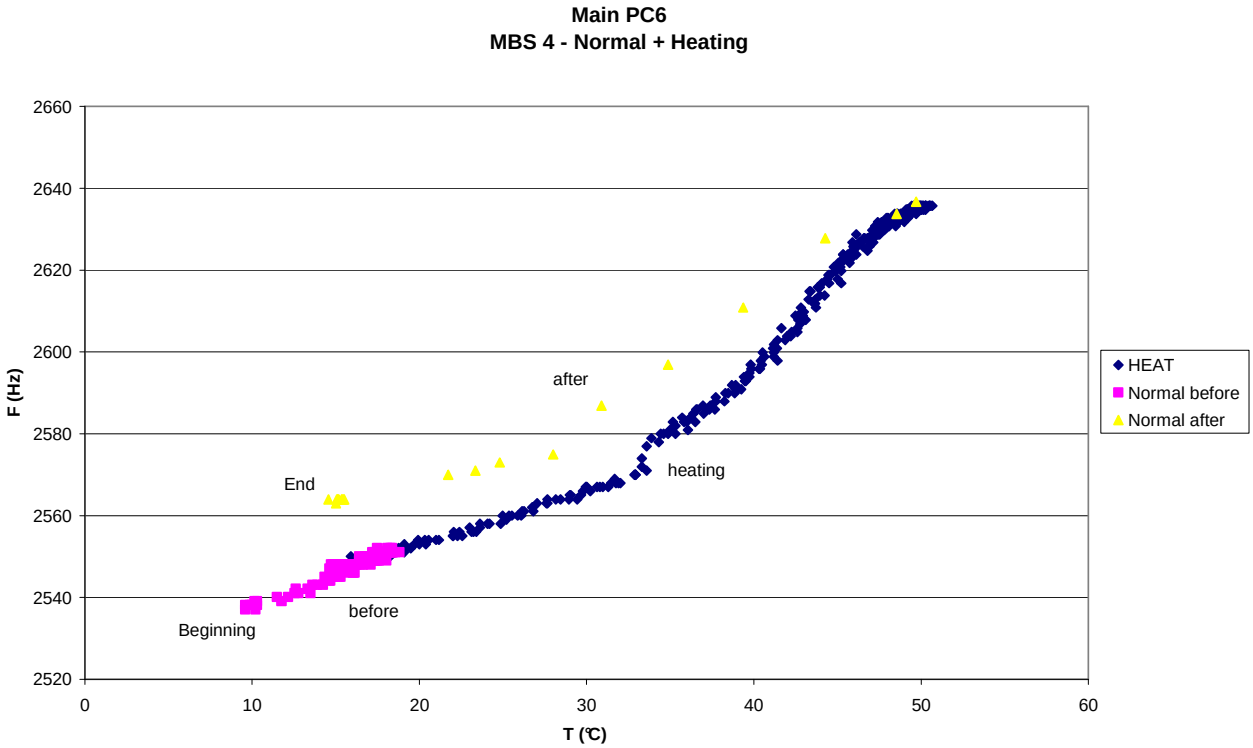
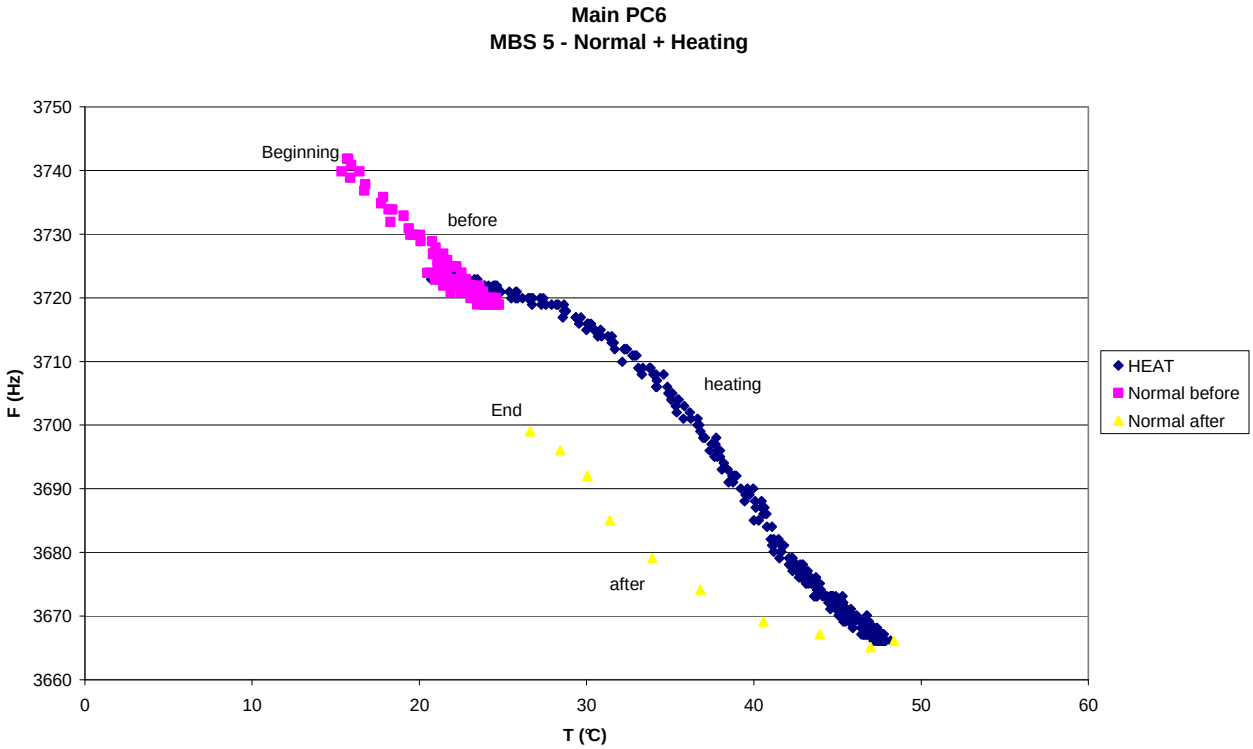


Figure 7.5-16. MBS 5 Frequency vs. Temperature - Main



8. PC6 DATA ANALYSIS – REDUNDANT INTERFACE (GD01)

8.1 GIADA STATUS

Figure 8.1-1. HK Status of GIADA and S/S vs. time - Red

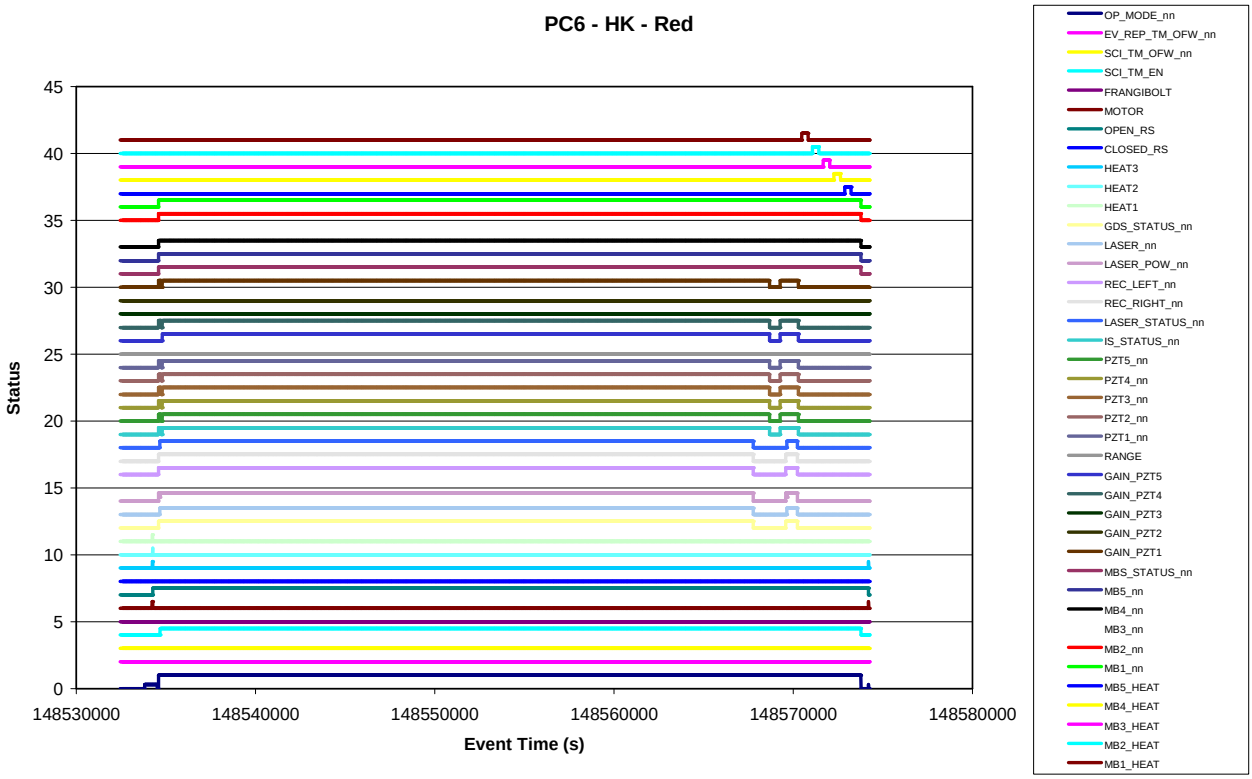


Figure 8.1-2. Evolution of all temperatures vs. time - HK, HK-SCI, SCI - Red

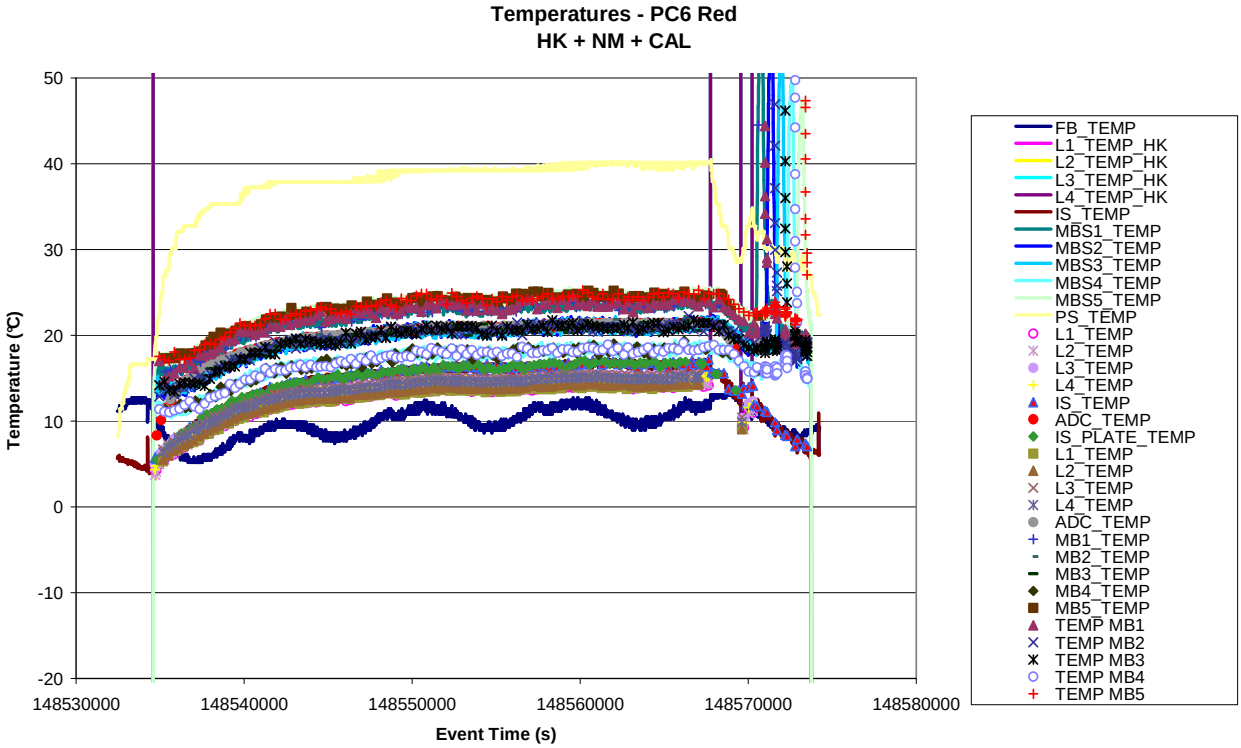


Figure 8.1-3. Evolution of temperatures of system elements vs. time - HK, HK-SCI, SCI - Red

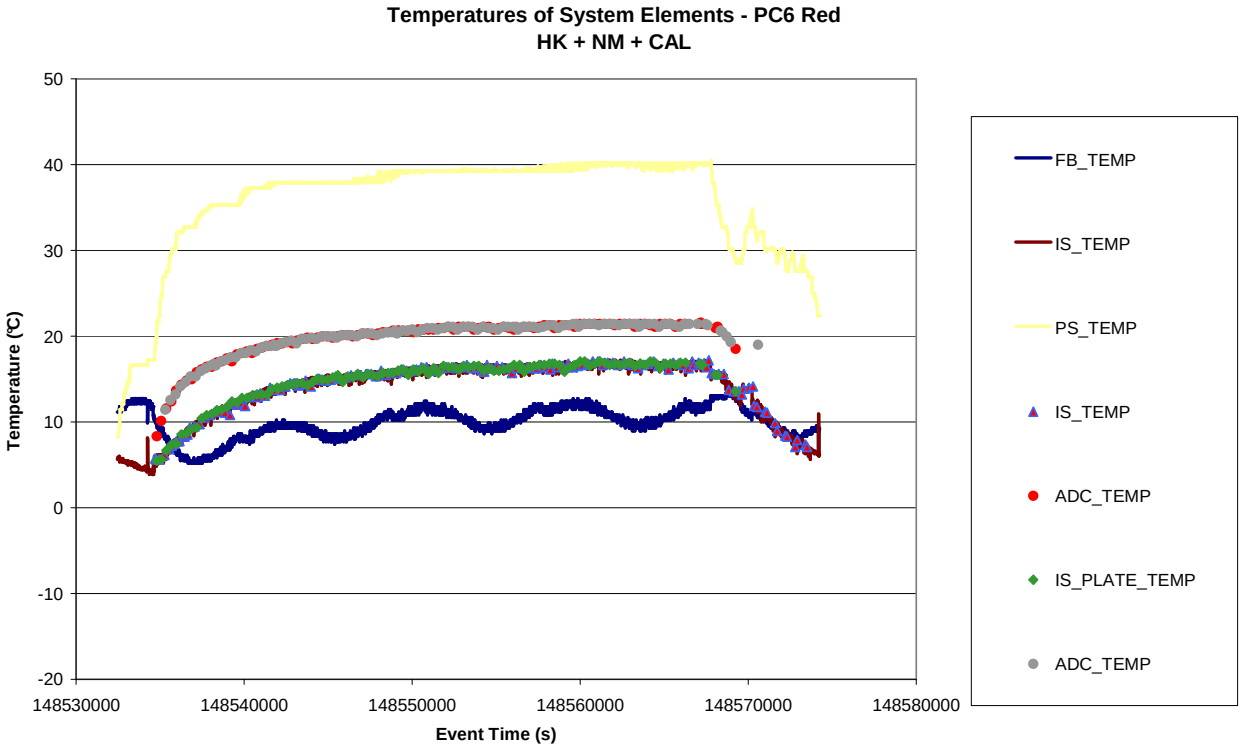


Figure 8.1-4. Evolution of temperatures of sub-systems vs. time - HK, HK-SCI, SCI - Red

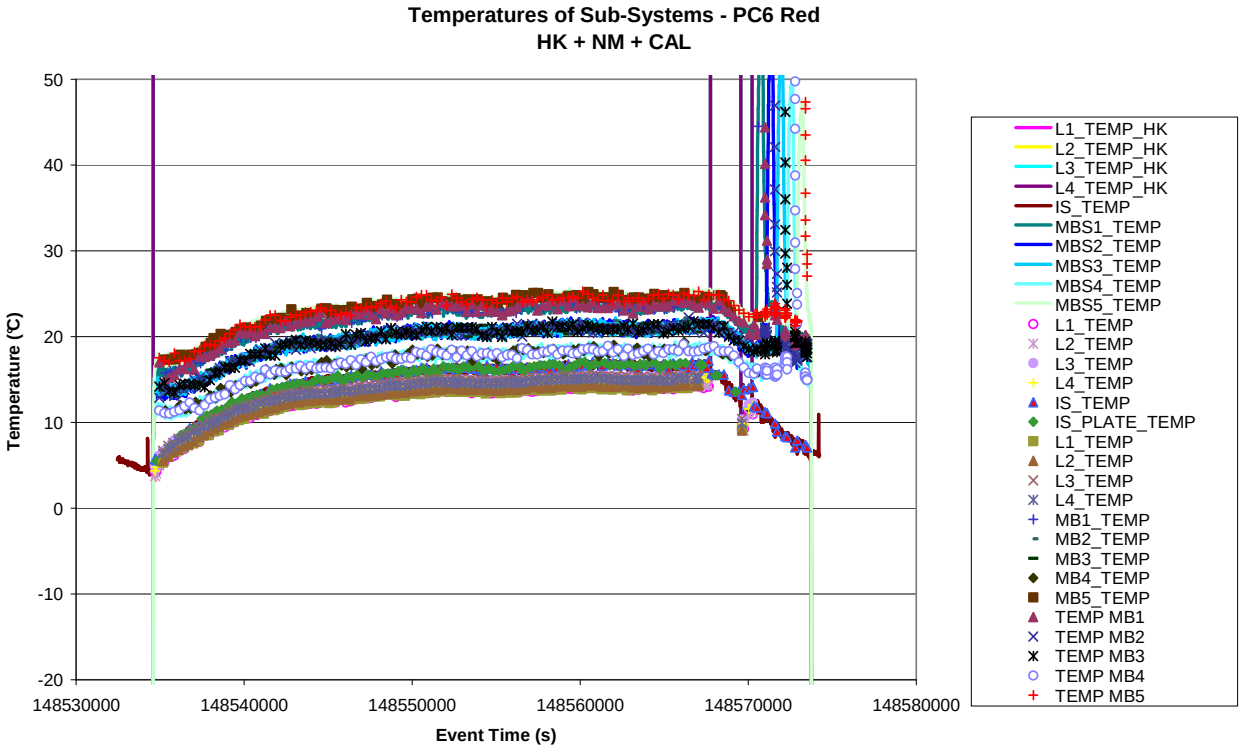


Figure 8.1-5. HK Status versus Temperatures of system elements - Red

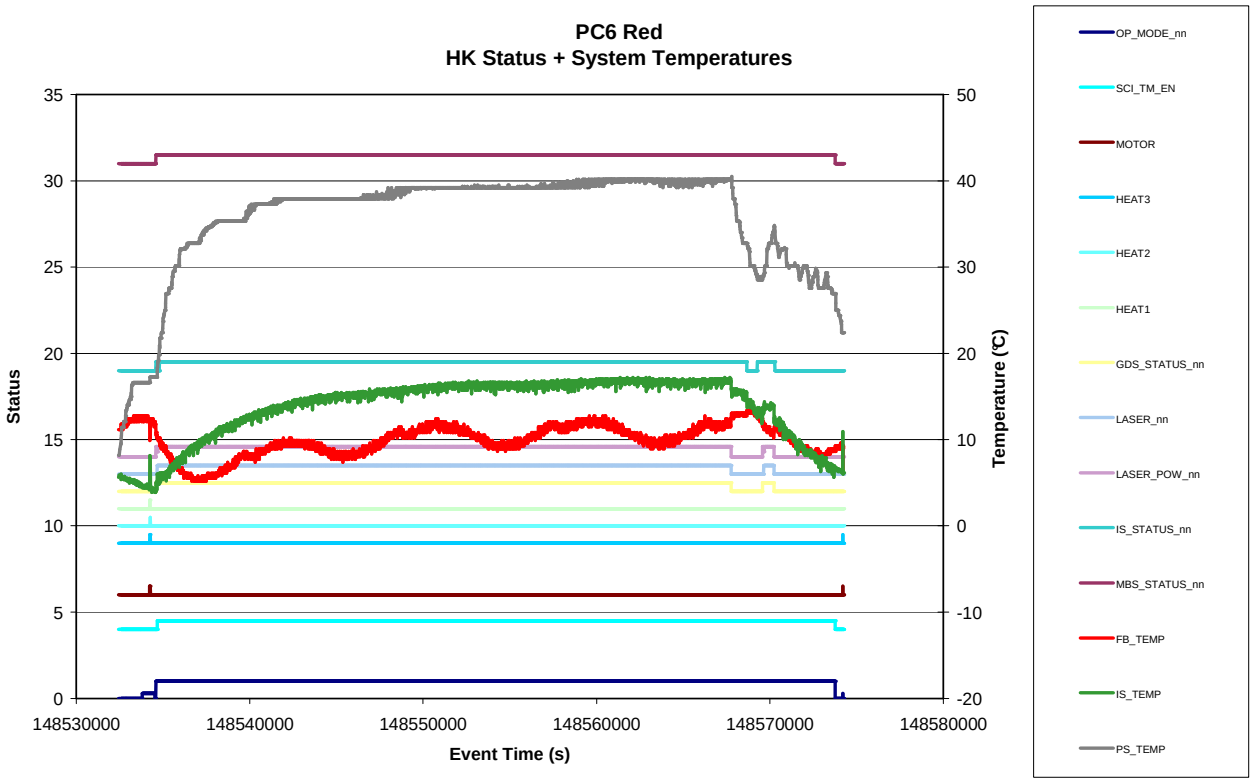


Figure 8.1-6. Operation Status vs. time - Red

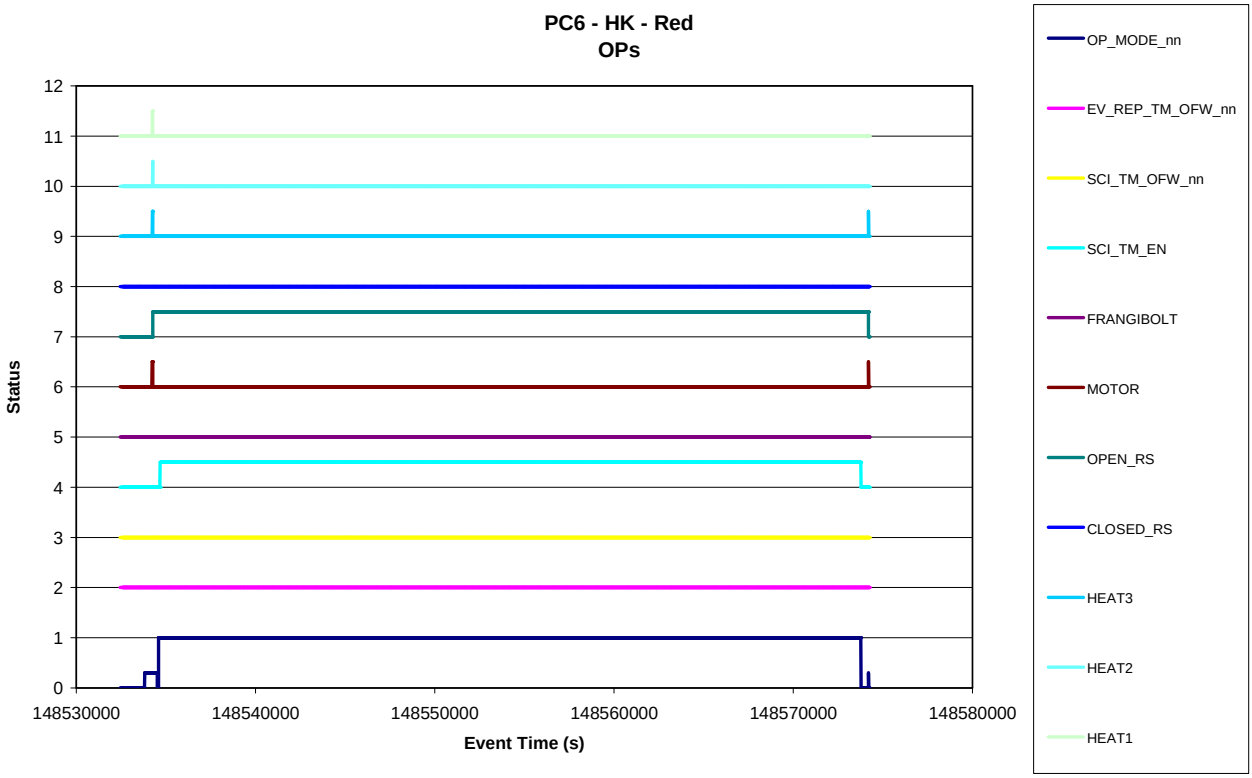


Figure 8.1-7. Operation Status versus Temperatures of system elements - Red

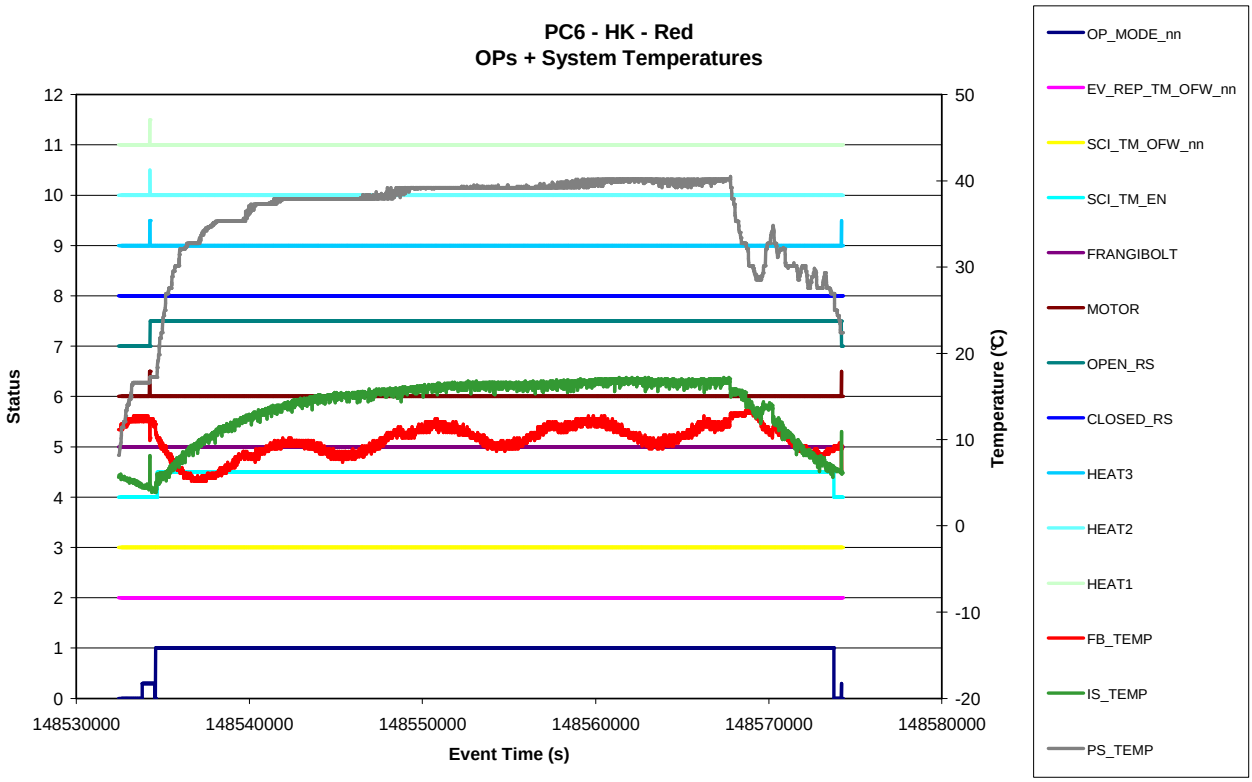


Figure 8.1-8. Power behaviour - Red

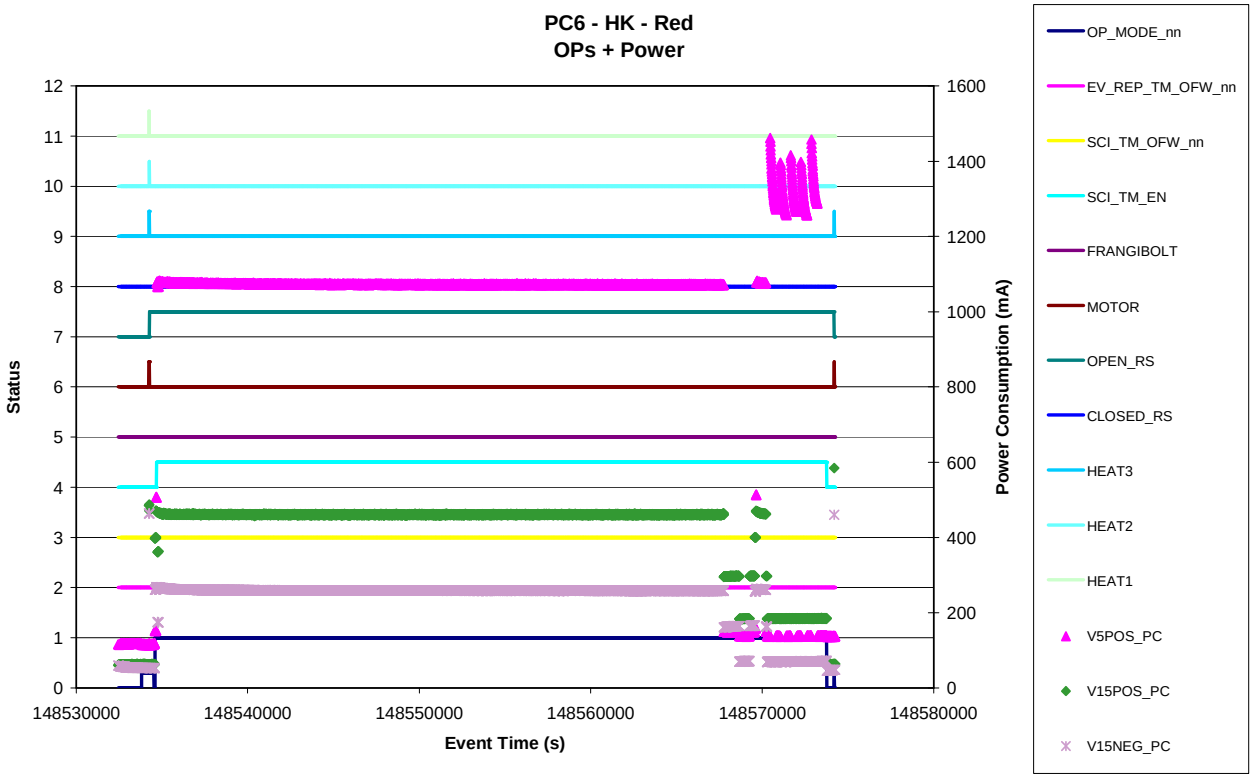


Figure 8.1-9. Power and PS temperature behaviour - Red

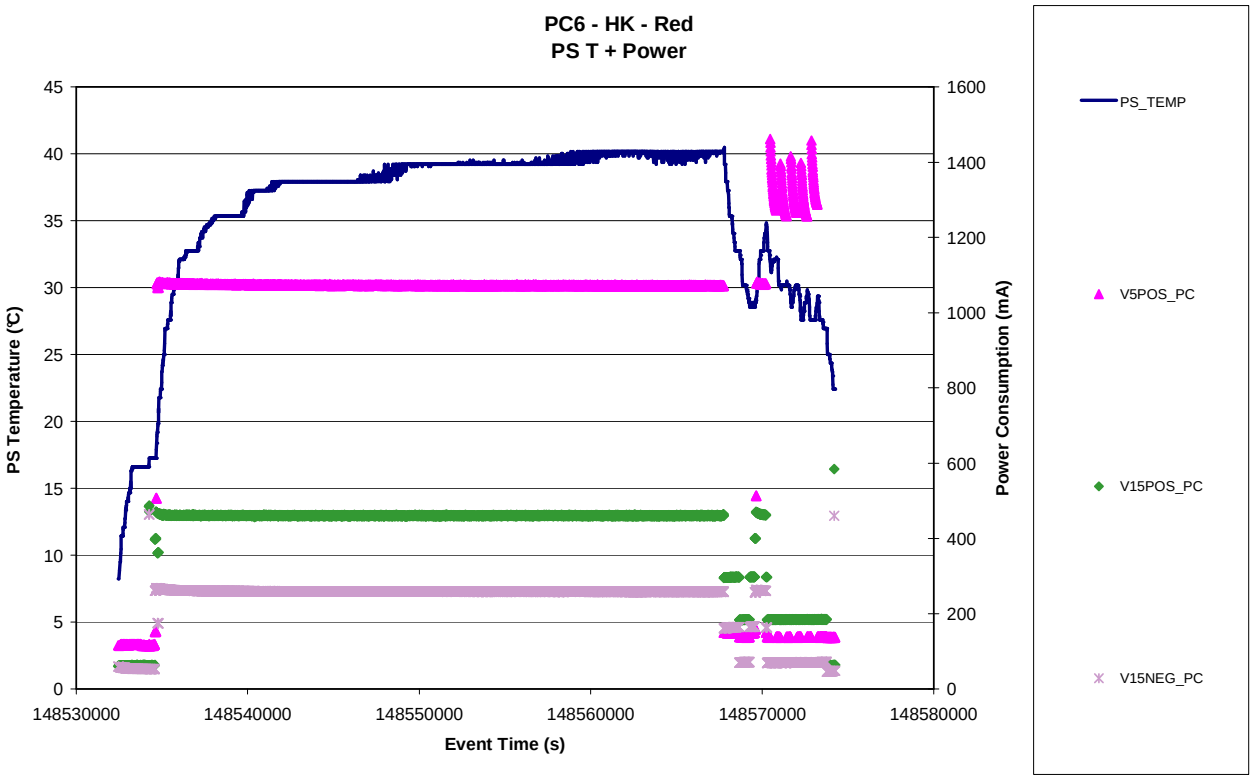


Figure 8.1-10. Source Sequence Count (SSC) of HK Telemetry vs. Time - Red

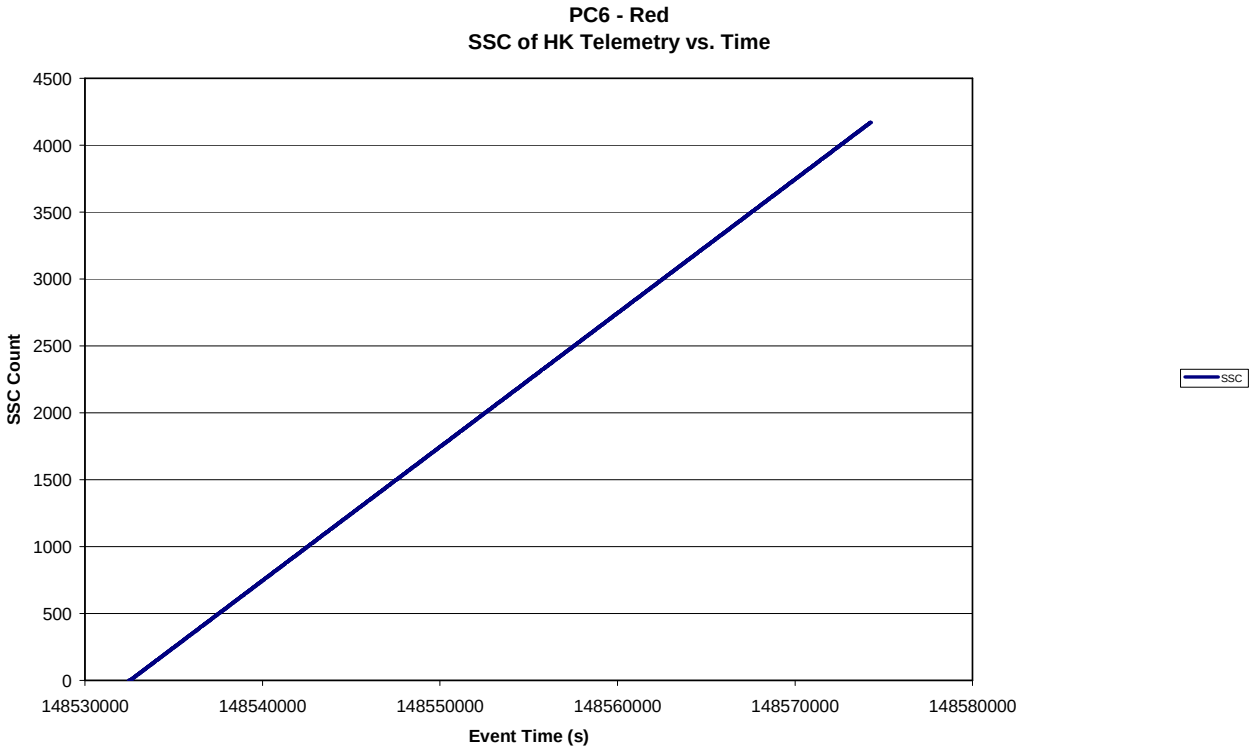


Figure 8.1-11. Source Sequence Count (SSC) of HK Telemetry vs. Number - Red

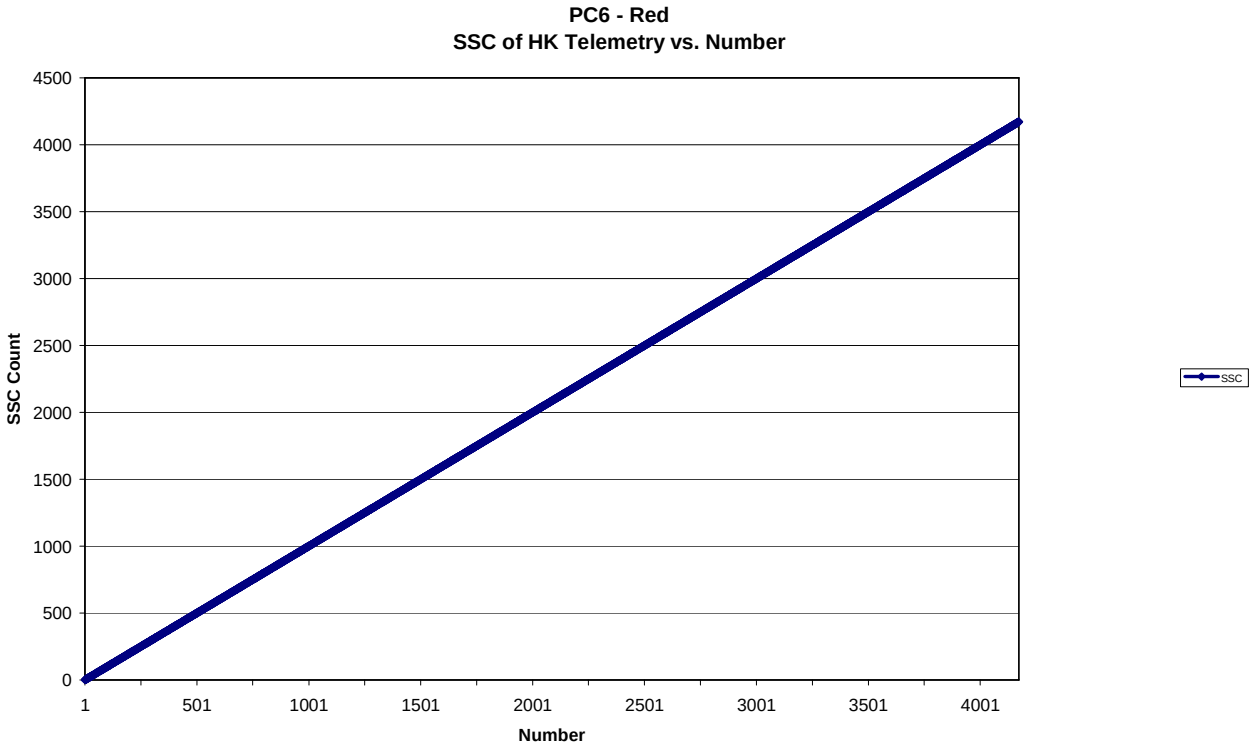


Figure 8.1-12. Source Sequence Count (SSC) of SCI Telemetry vs. Time - Red

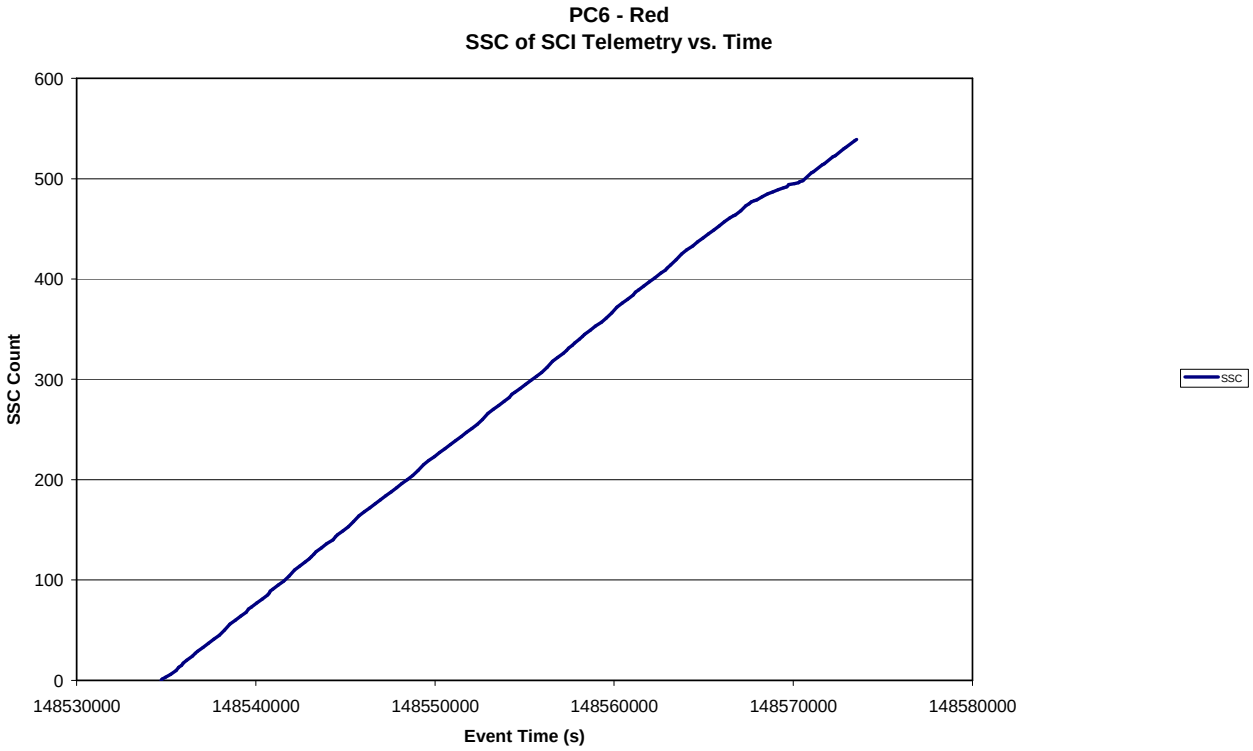
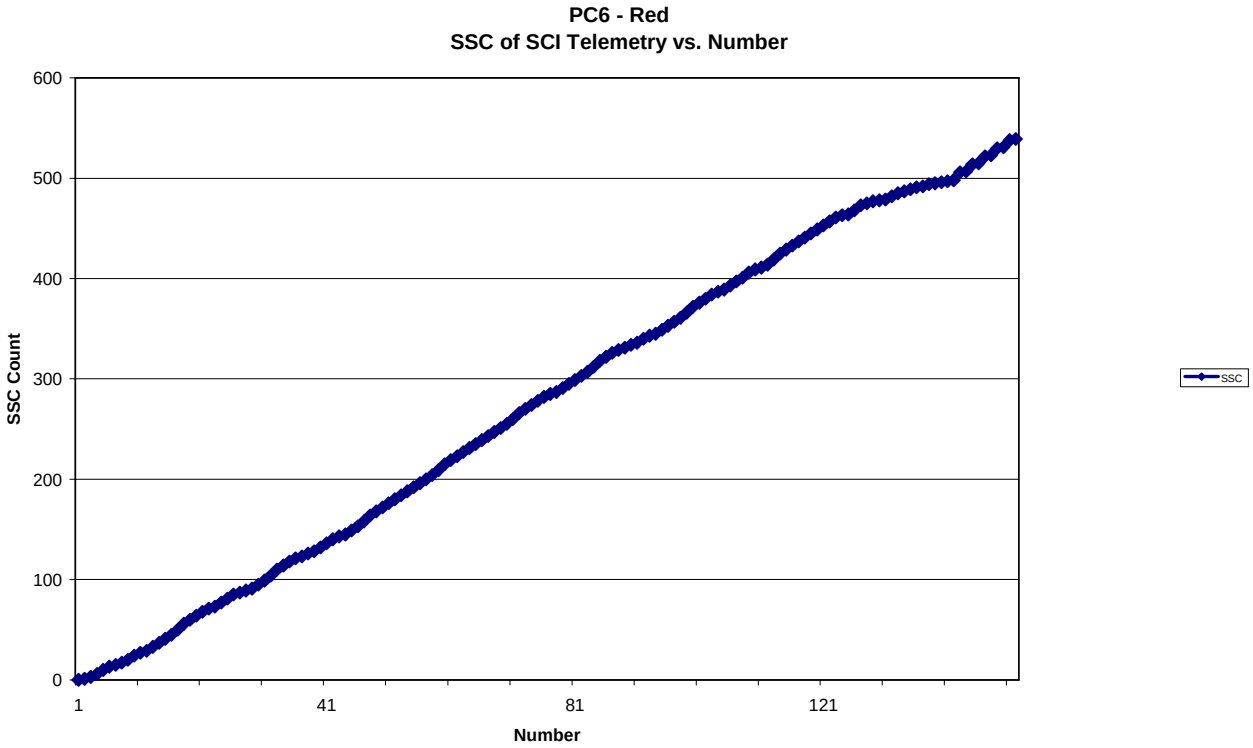


Figure 8.1-13. Source Sequence Count (SSC) of SCI Telemetry vs. Number - Red

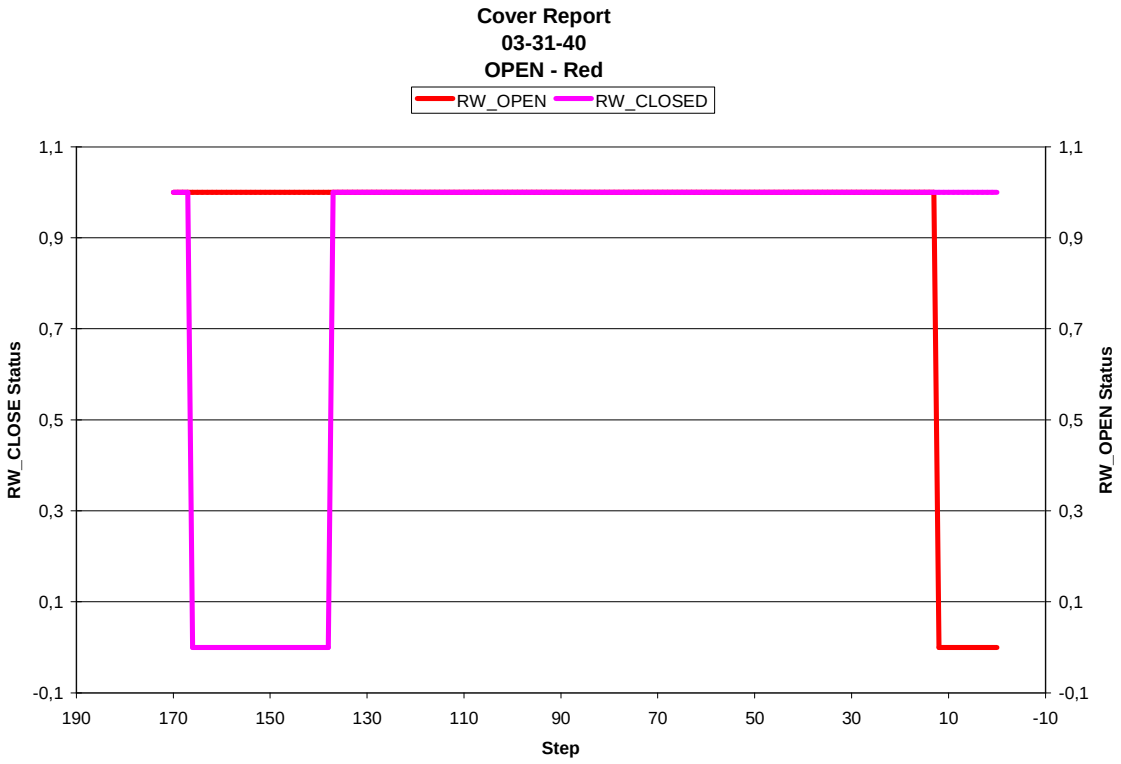


8.2 COVER REPORTS

8.2.1 Open Cover

HEADER_START
CREATION_TIME=2007-09-16T03:31:40Z
USER=AA0000
HEADER_END
//
// Generated by 'GIADA_EGSE_SW '
//
MOVEMENT DIRECTION: To open
BEGIN TIME OF OPERATION: 148534256.000000
END TIME OF OPERATION: 148534272.000000

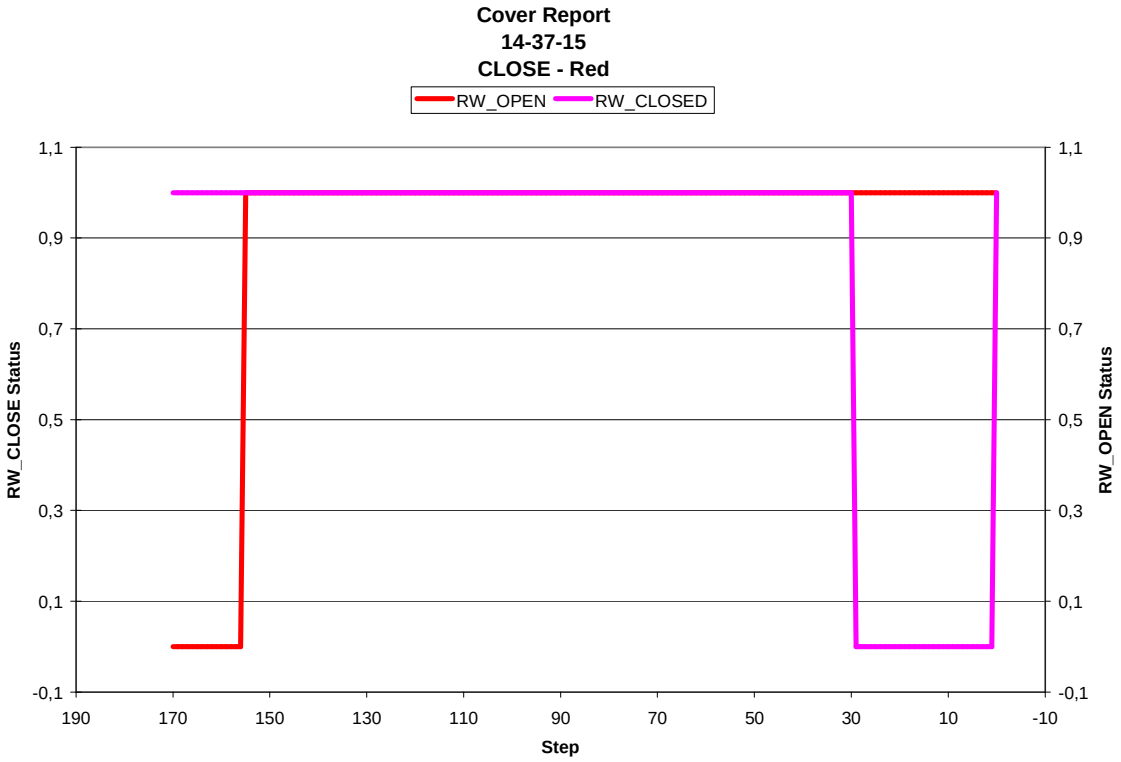
Figure 8.2-1 Cover Report – Open – Red



8.2.2 Close Cover

HEADER_START
CREATION_TIME=2007-09-16T14:37:15Z
USER=AA0000
HEADER_END
//
// Generated by 'GIADA_EGSE_SW '
//
MOVEMENT DIRECTION: To close
BEGIN TIME OF OPERATION: 148574192.000000
END TIME OF OPERATION: 148574208.000000

Figure 8.2-2 Cover Report – Close – Red



8.3 GRAIN DETECTION SYSTEM (GDS)

8.3.1 GDS – Status

Figure 8.3-1. GDS Operation Status vs. time - Red

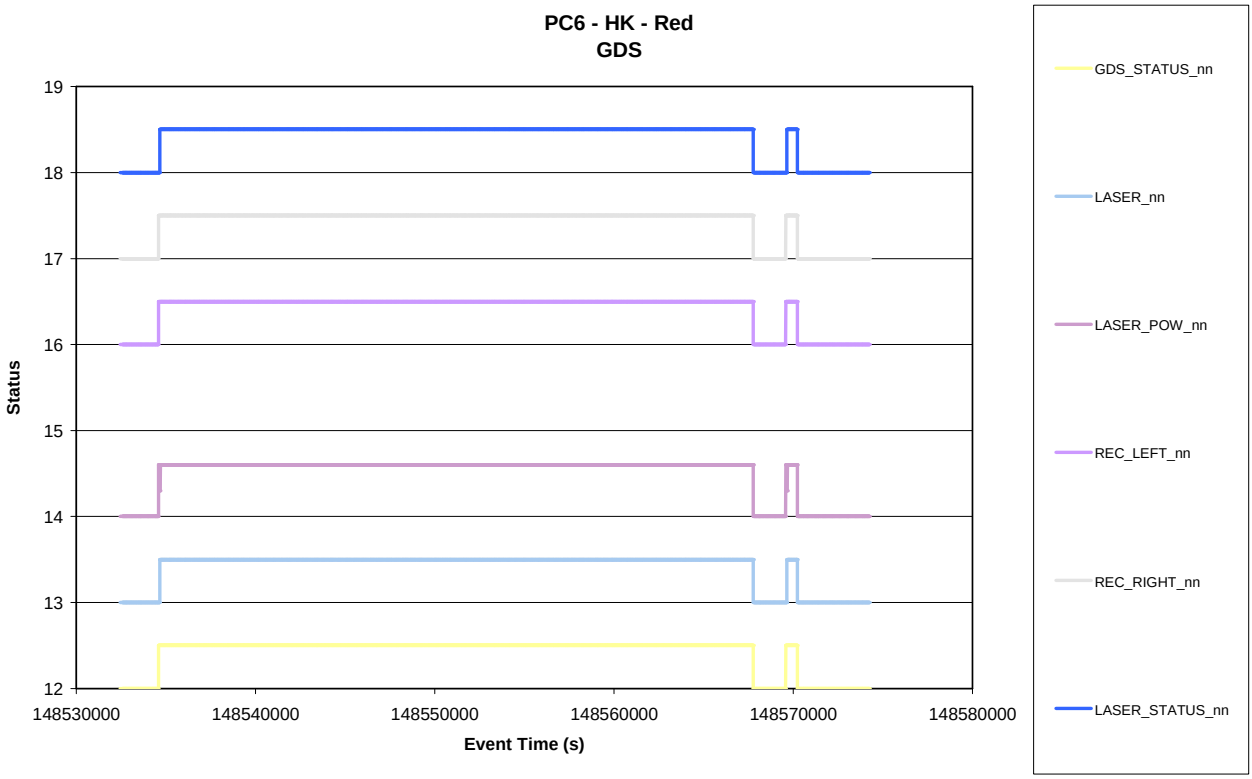


Figure 8.3-2. GDS Thresholds change vs. time - Red

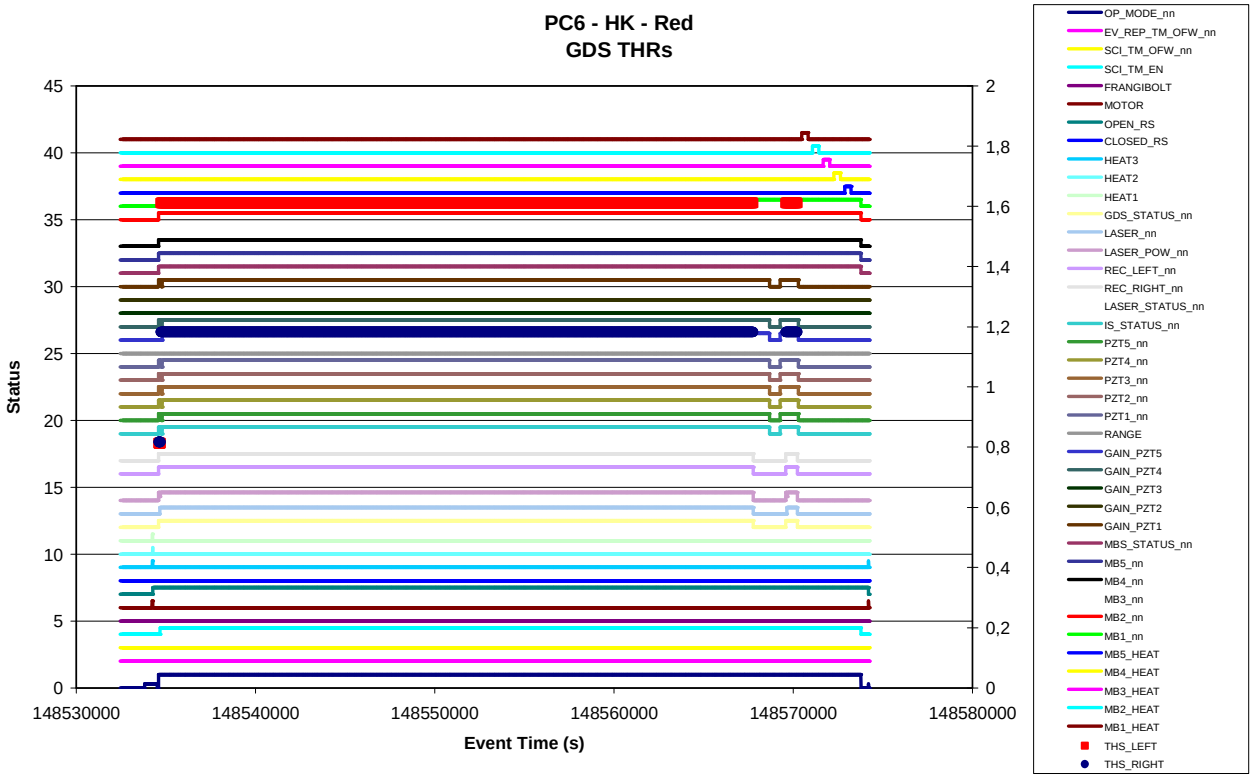


Figure 8.3-3. GDS Laser Temperatures vs. time (HK, HK-SCI, SCI) - Red

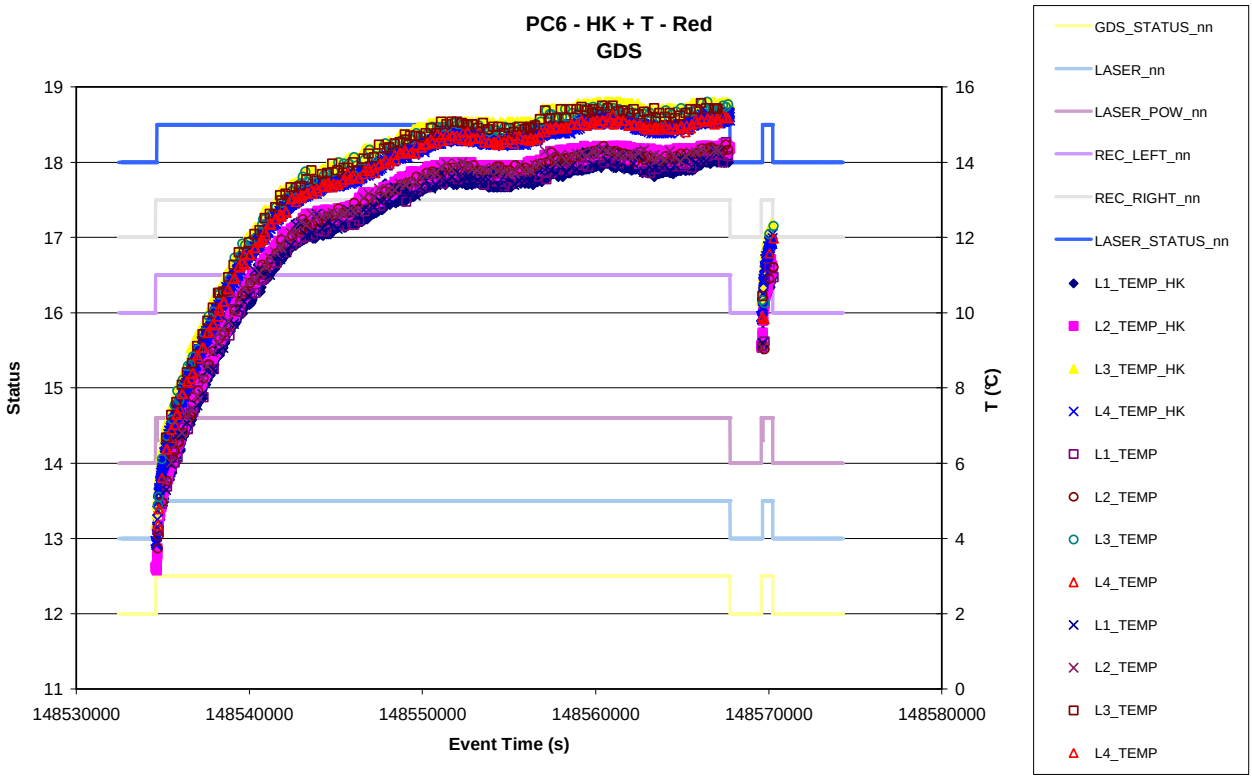


Figure 8.3-4. GDS Laser Monitor vs. time (HK, HK-SCI, SCI) - Red

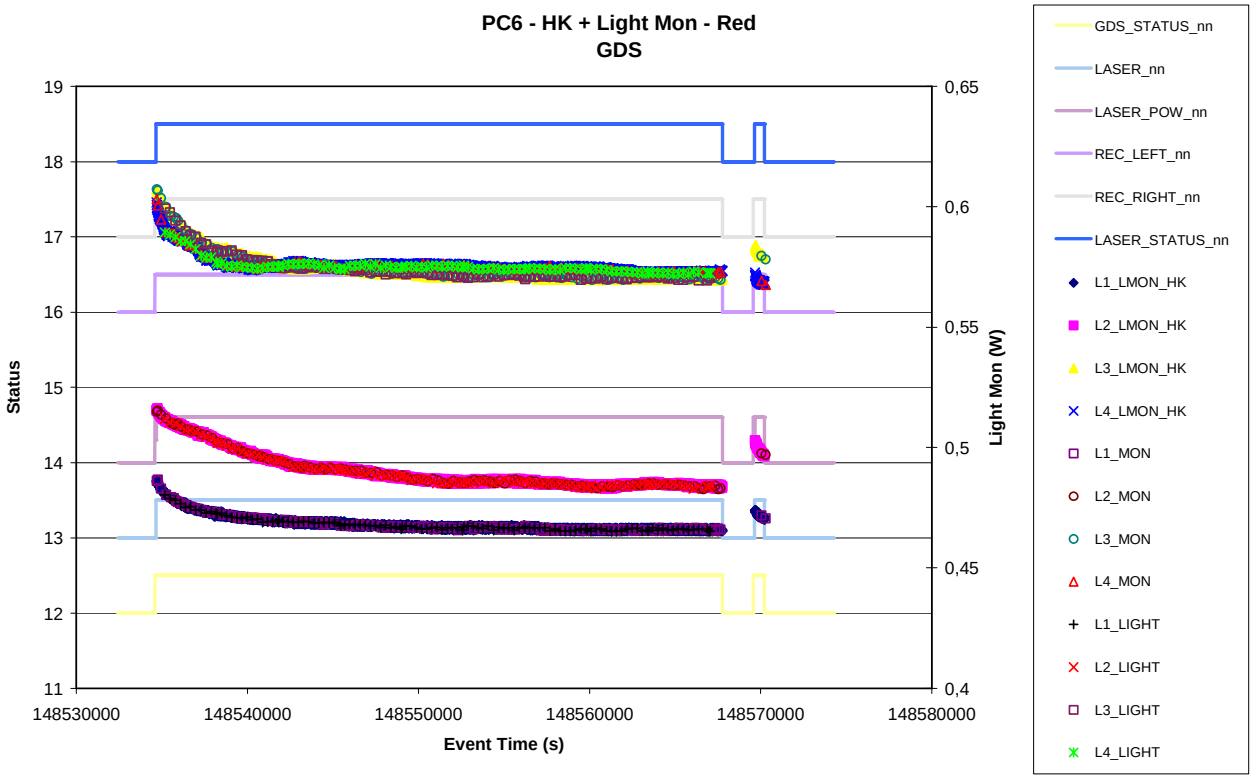


Figure 8.3-5. Laser 1 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Red

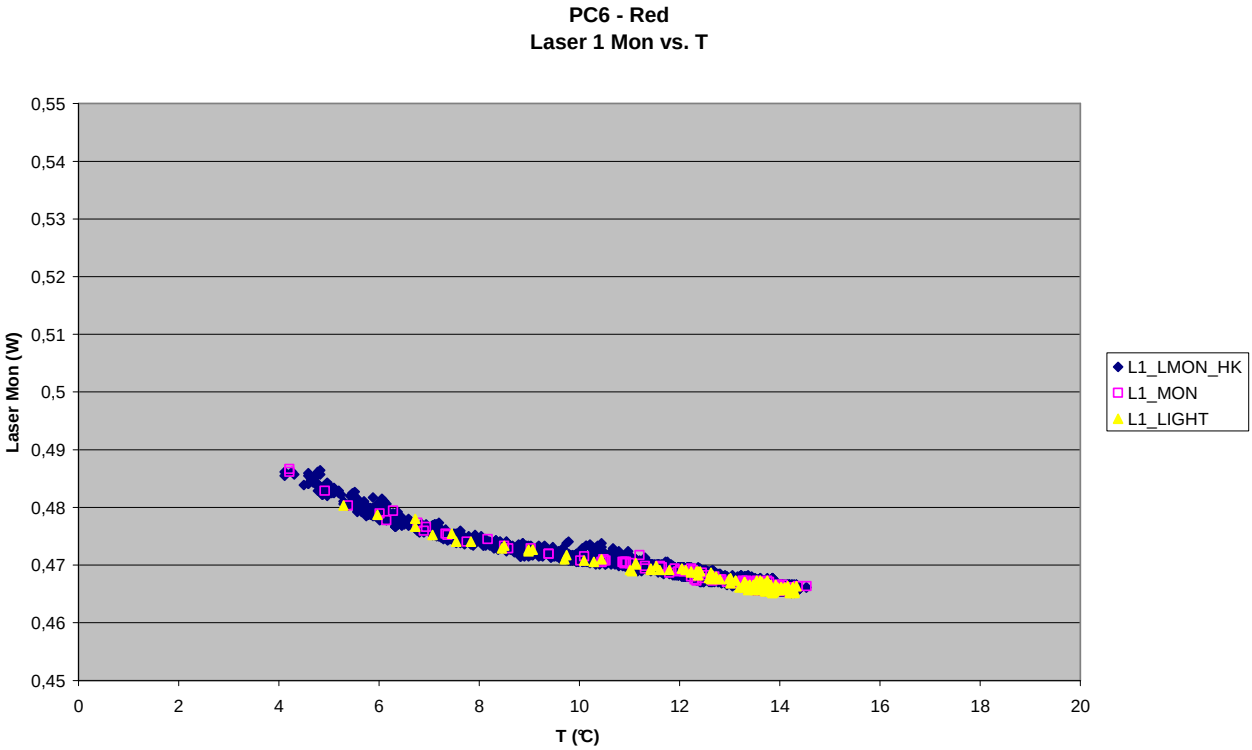


Figure 8.3-6. Laser 2 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Red

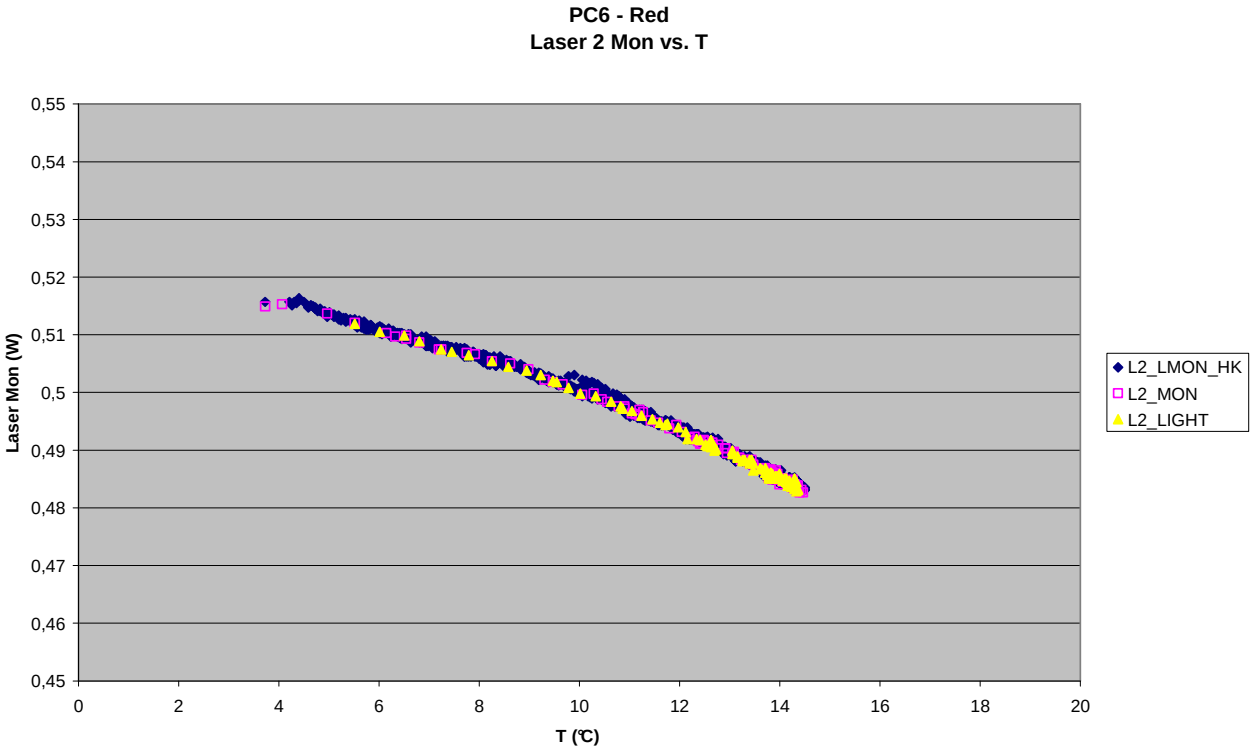


Figure 8.3-7. Laser 3 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Red

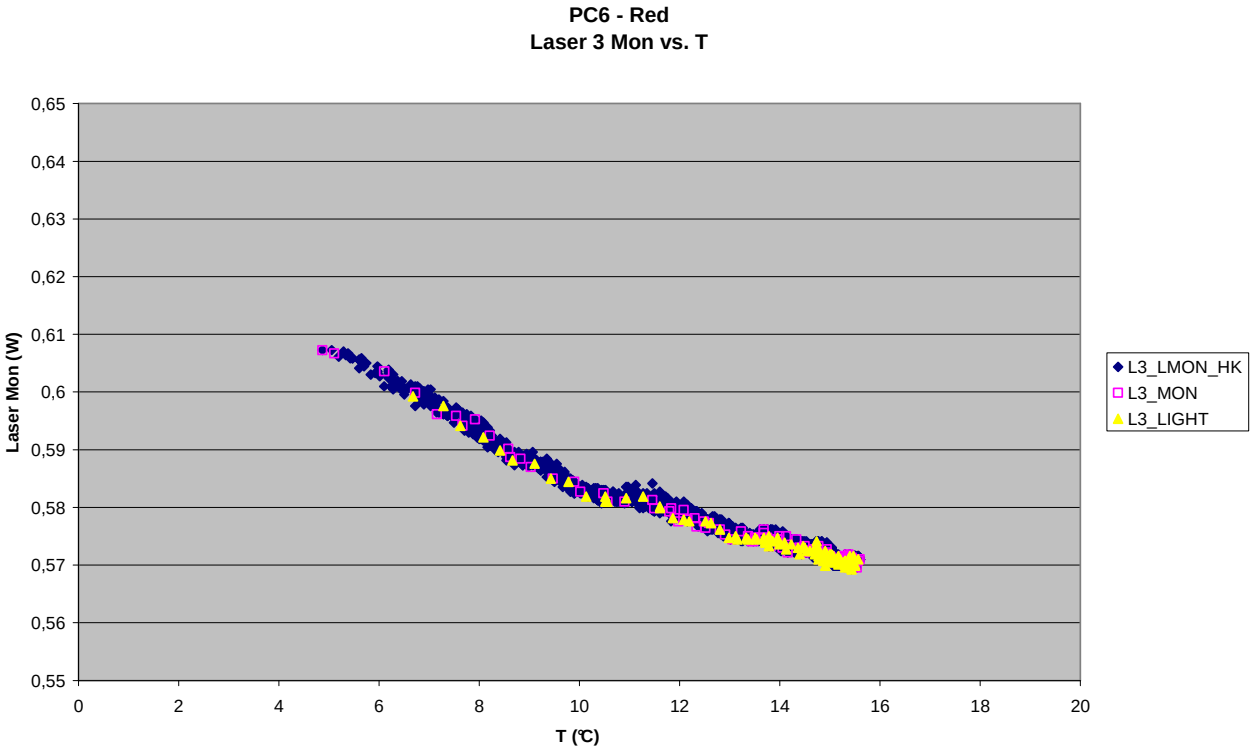
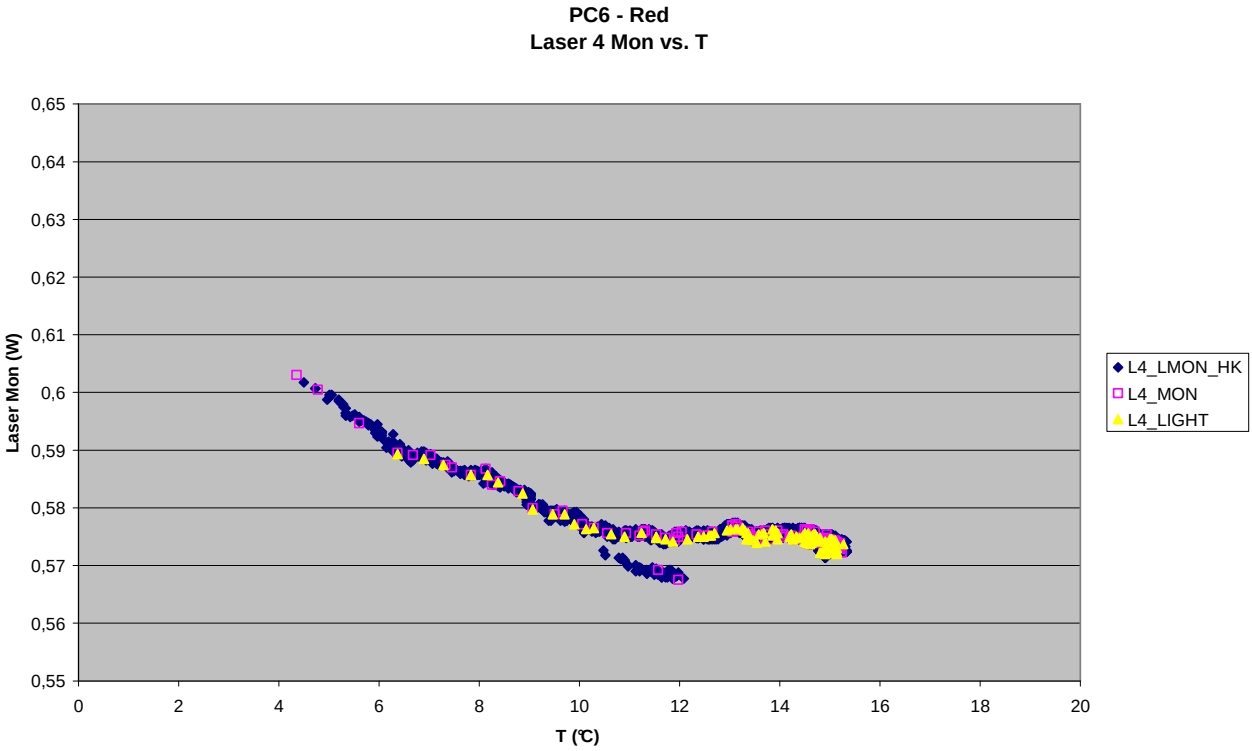


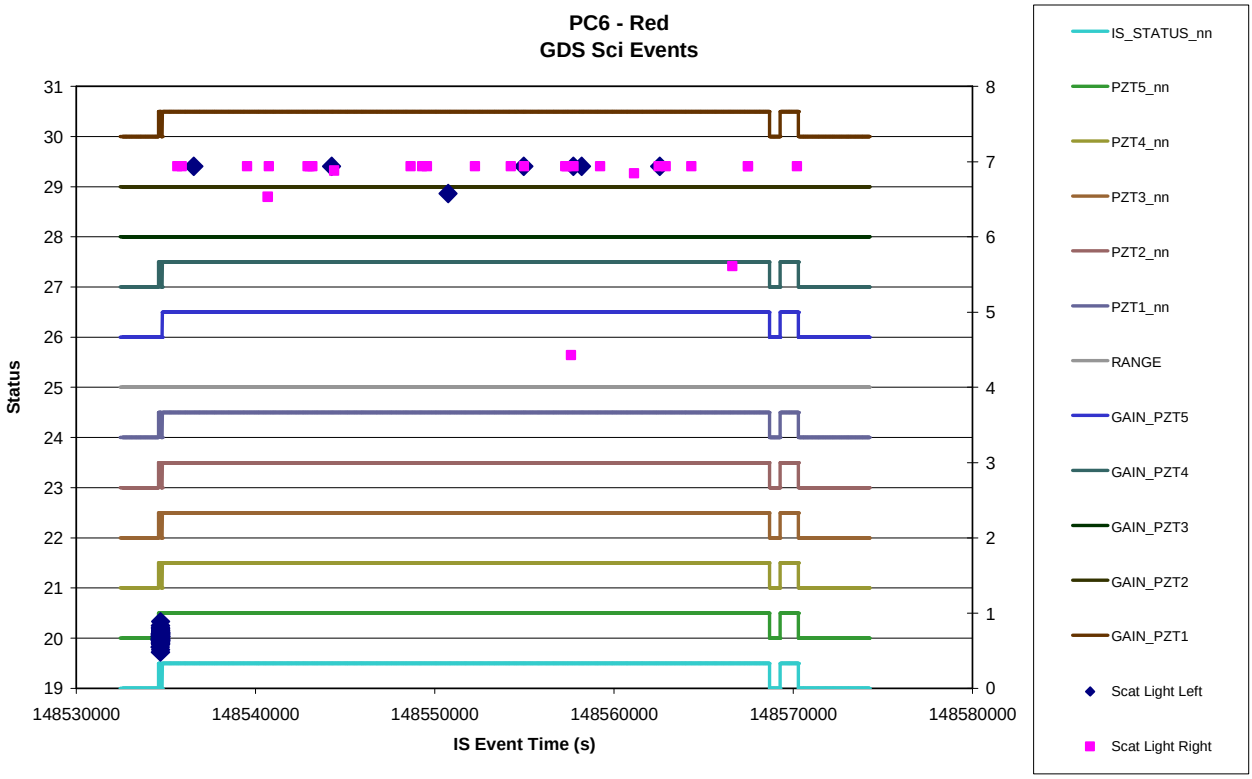
Figure 8.3-8. Laser 4 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Red



8.3.2 GDS – Behaviour

8.3.2.1 Science Events

Figure 8.3-9. GDS Left and Right SCI events vs. time – Red

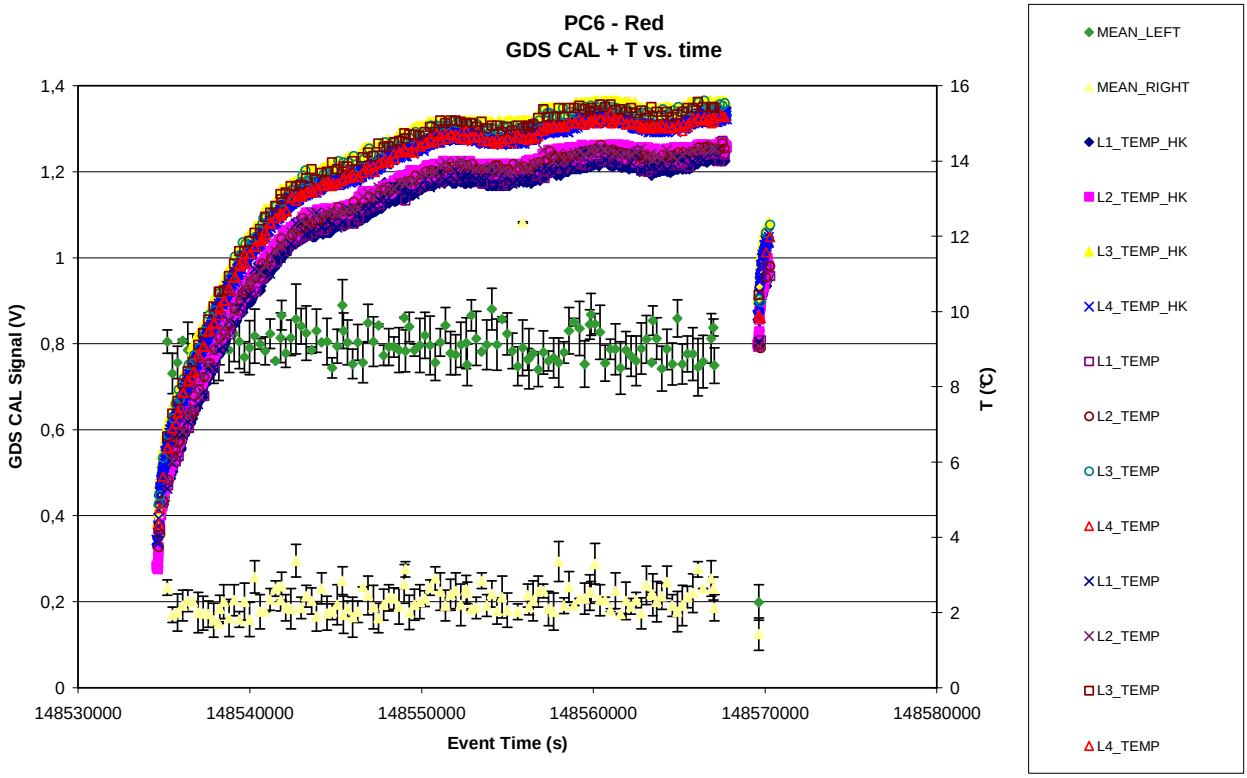


8.3.2.2 Event Rates

Not applicable

8.3.2.3 CAL

Figure 8.3-10. Evolution of GDS CAL Left and Right signals (and T) vs. time (Red)



8.4 IMPACT SENSOR (IS)

8.4.1 IS – Status

Figure 8.4-1. IS Operation Status vs. time - Red

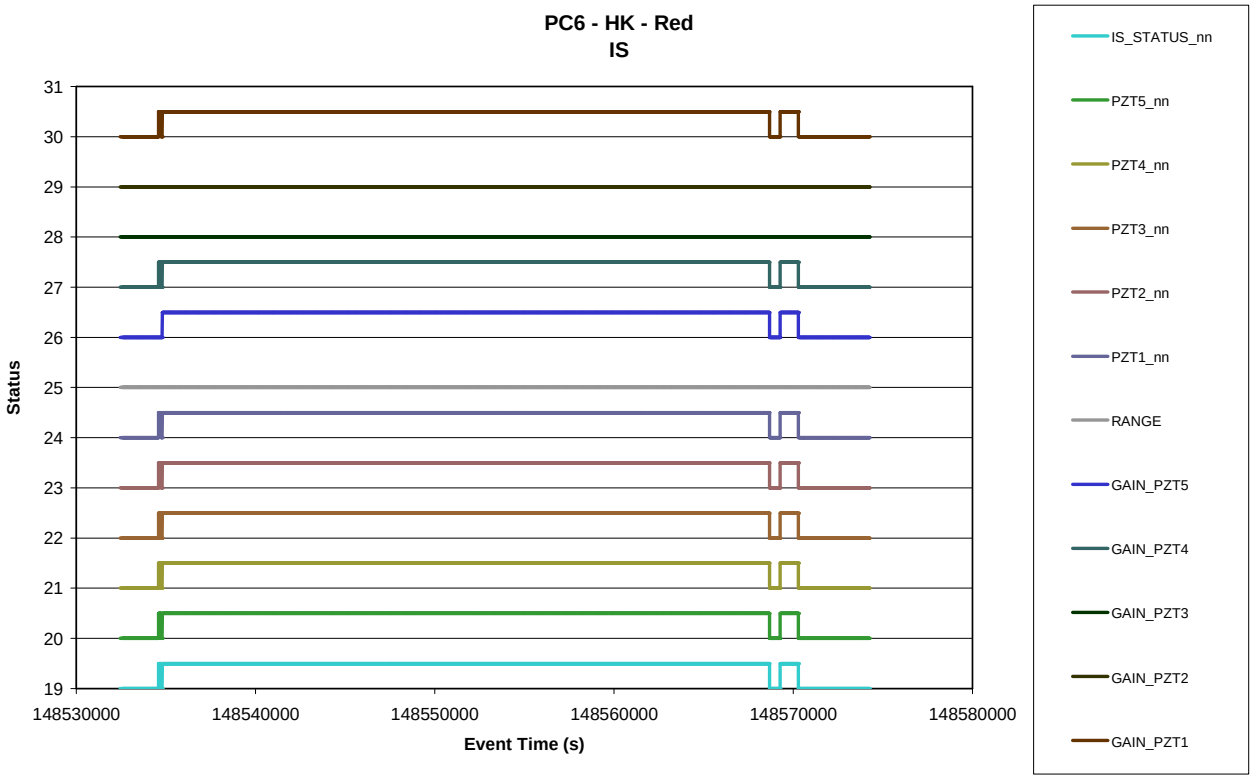


Figure 8.4-2. IS PZT 3 Thresholds change vs. time - Red

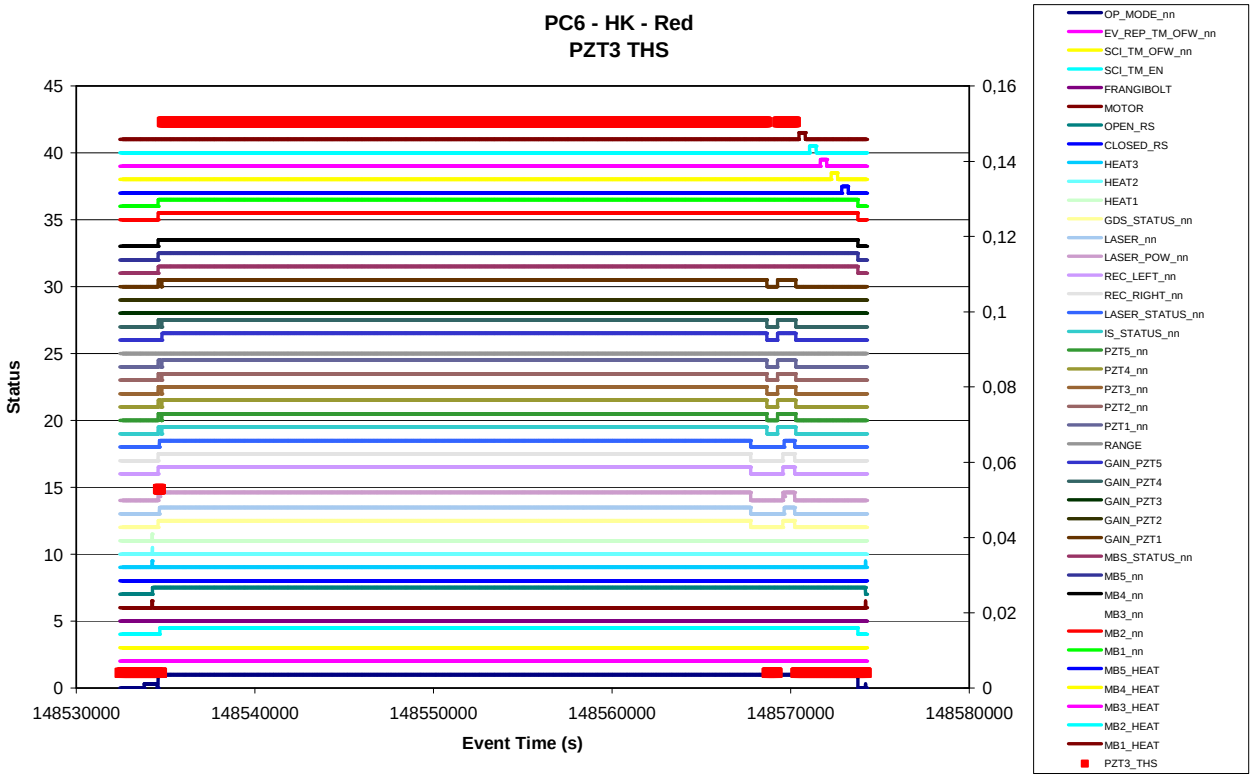


Figure 8.4-3. IS PZT 5 Thresholds change vs. time - Red

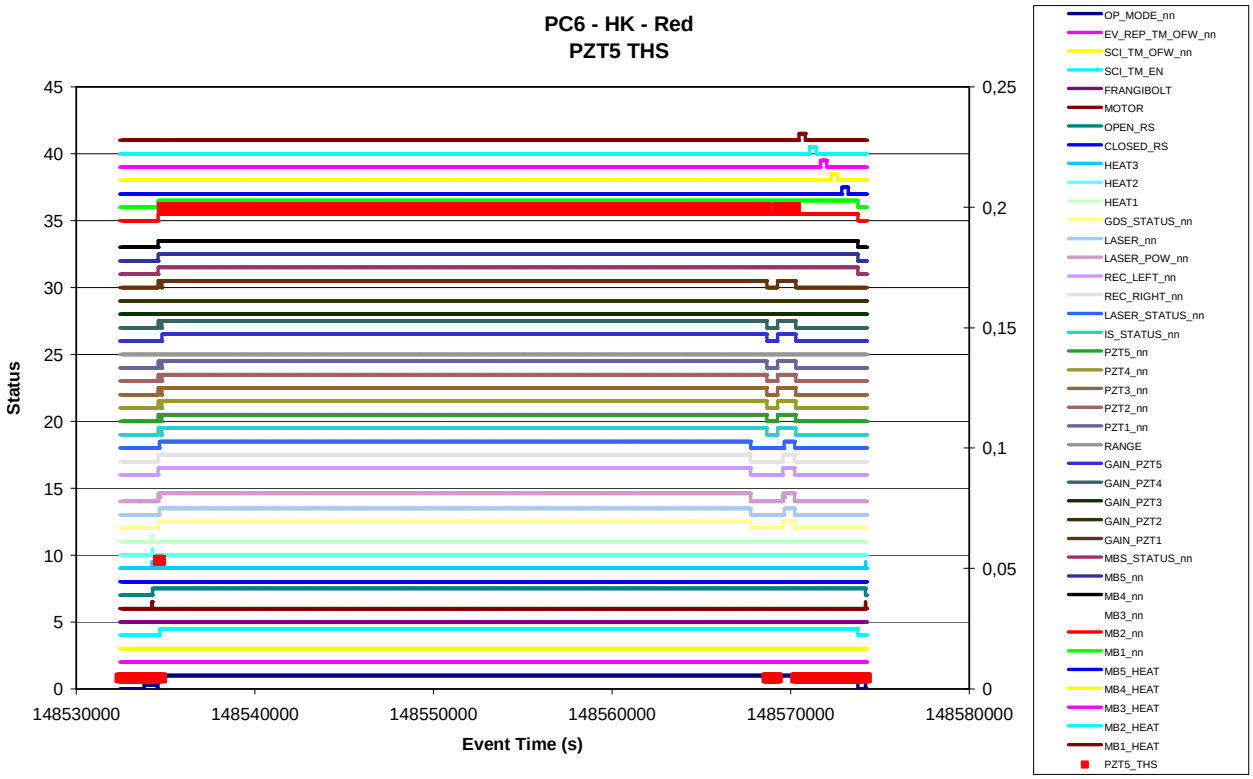
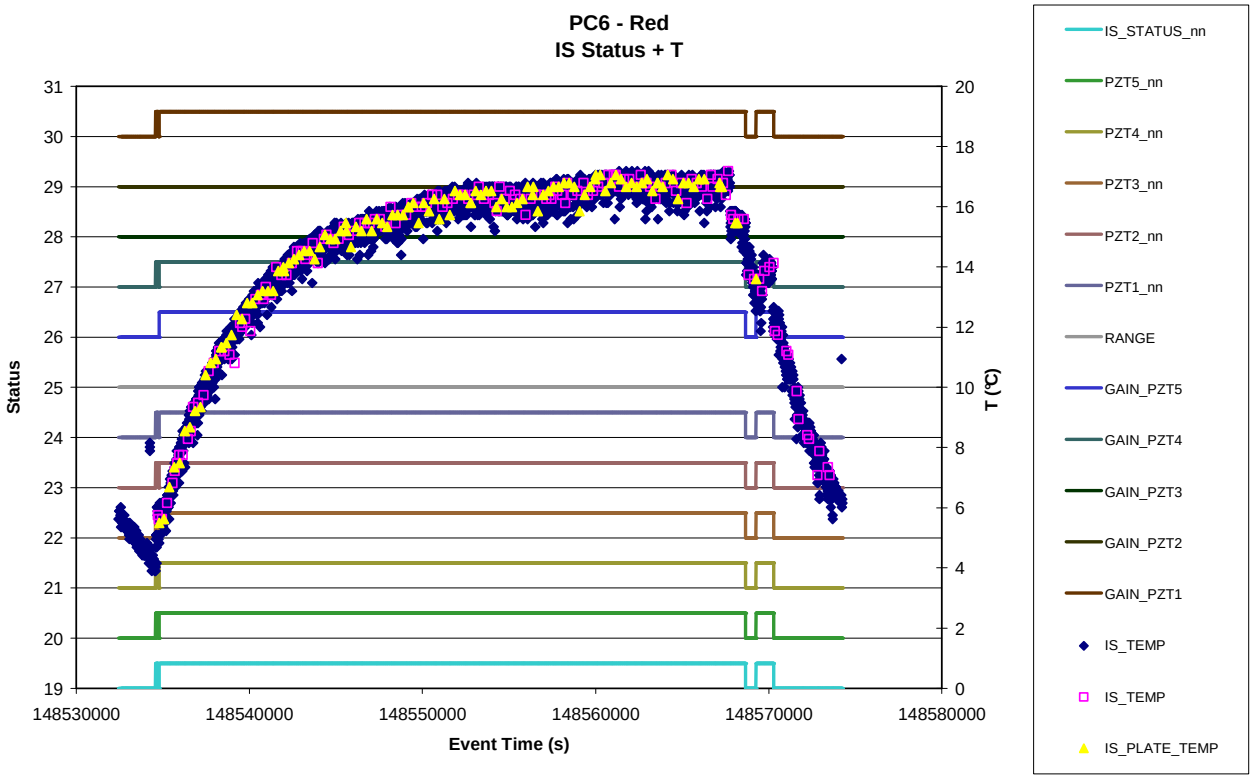


Figure 8.4-4. IS Temperature vs. time (HK, HK-SCI, SCI) - Red



8.4.2 IS – Behaviour

8.4.2.1 Science Events

Figure 8.4-5. All PZT (det. and non-det.) events vs. time - Red

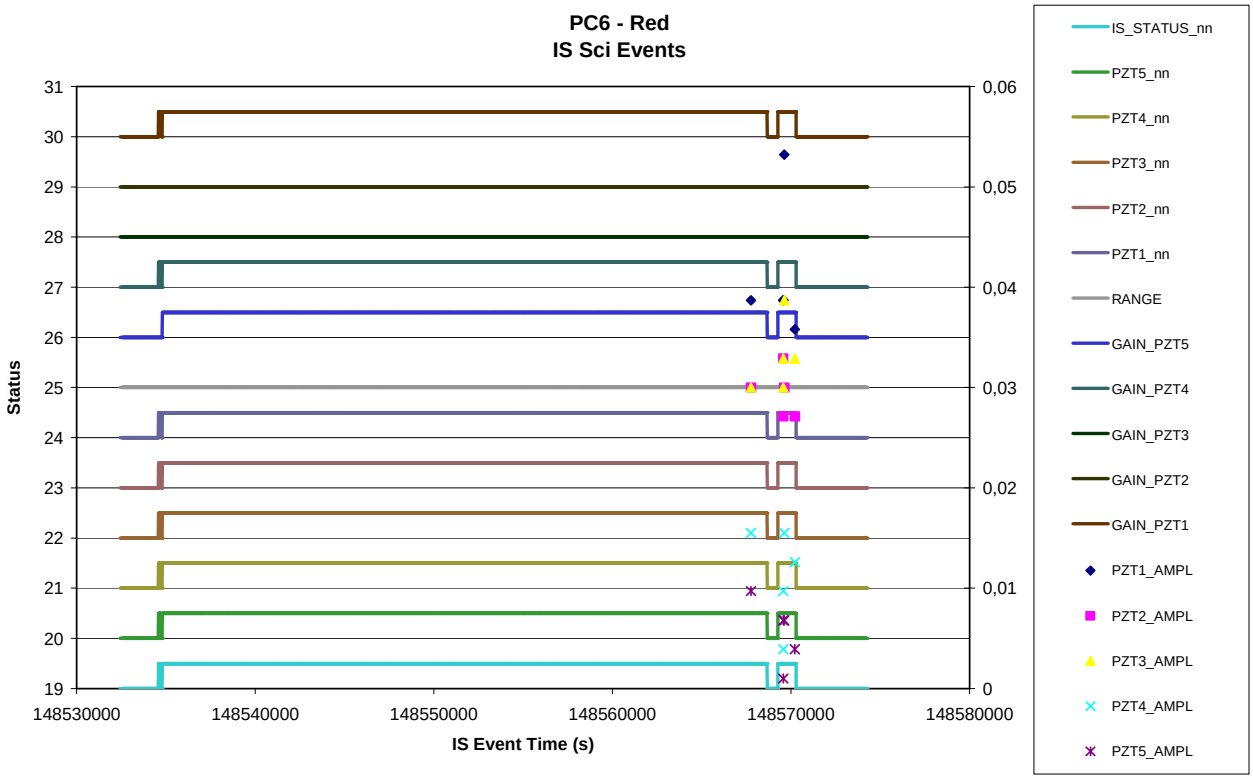


Figure 8.4-6. PZT 1-2-3-4-5 Detected Events vs. time - Red

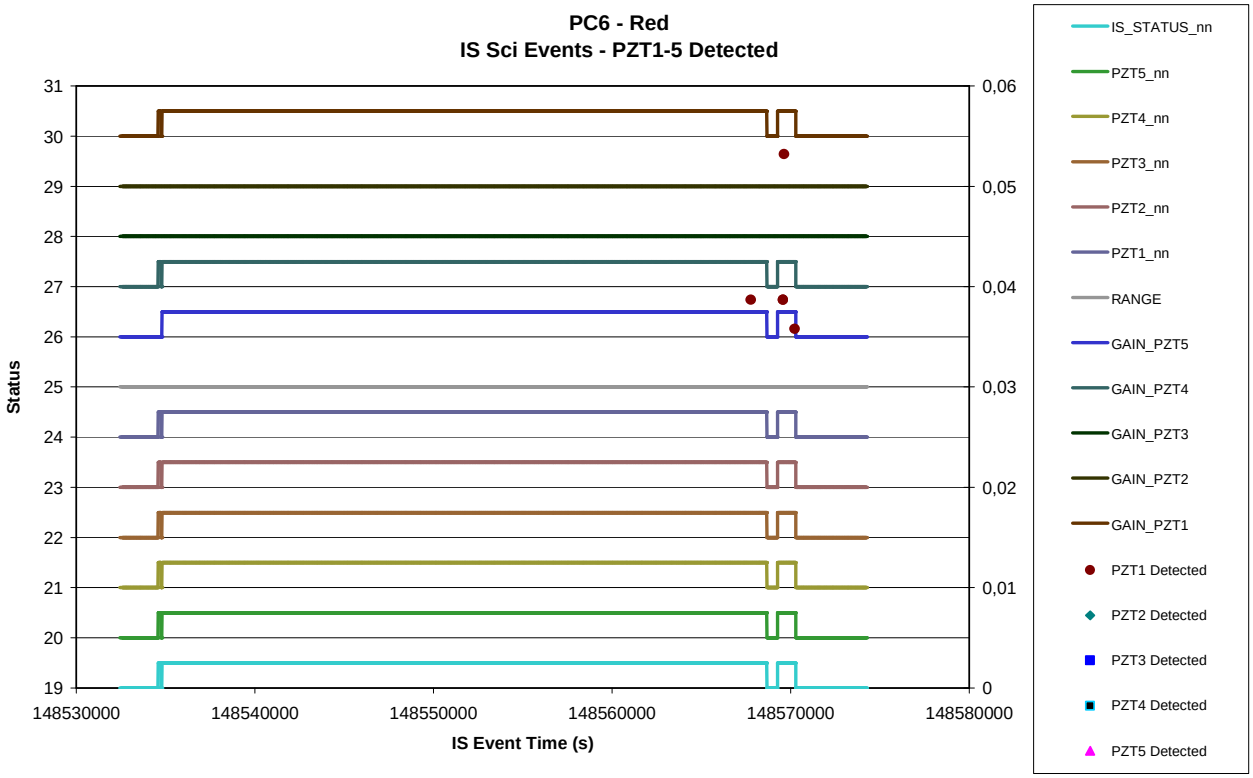


Figure 8.4-7. PZT 1 Detected Events vs. time - Red

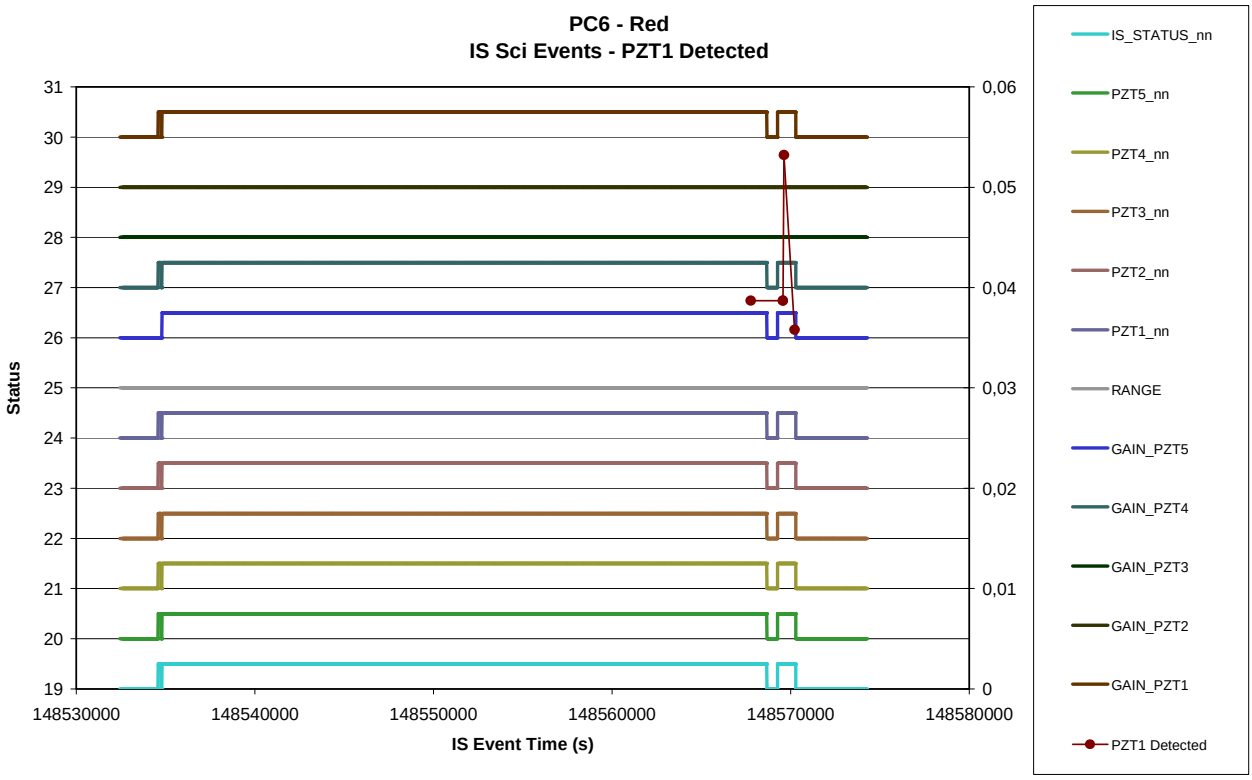


Figure 8.4-8. PZT 2 Detected Events vs. time - Red

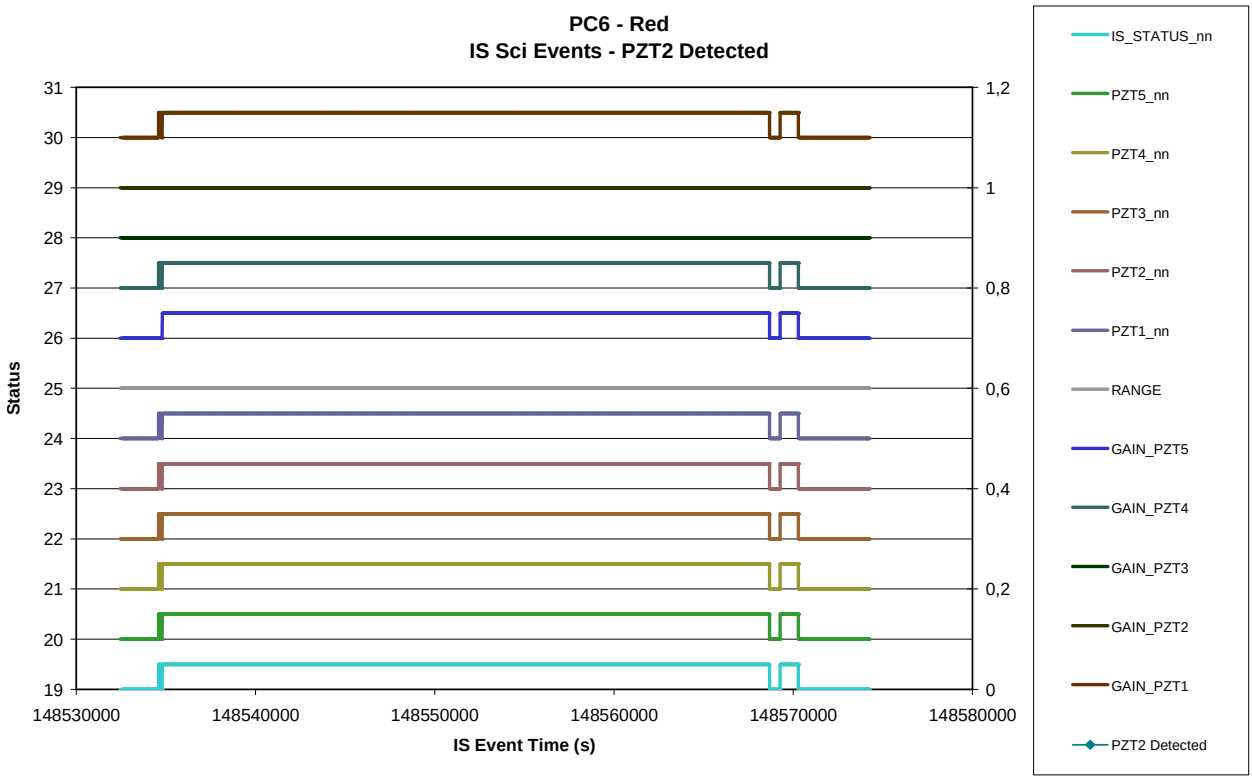


Figure 8.4-9. PZT 3 Detected Events vs. time - Red

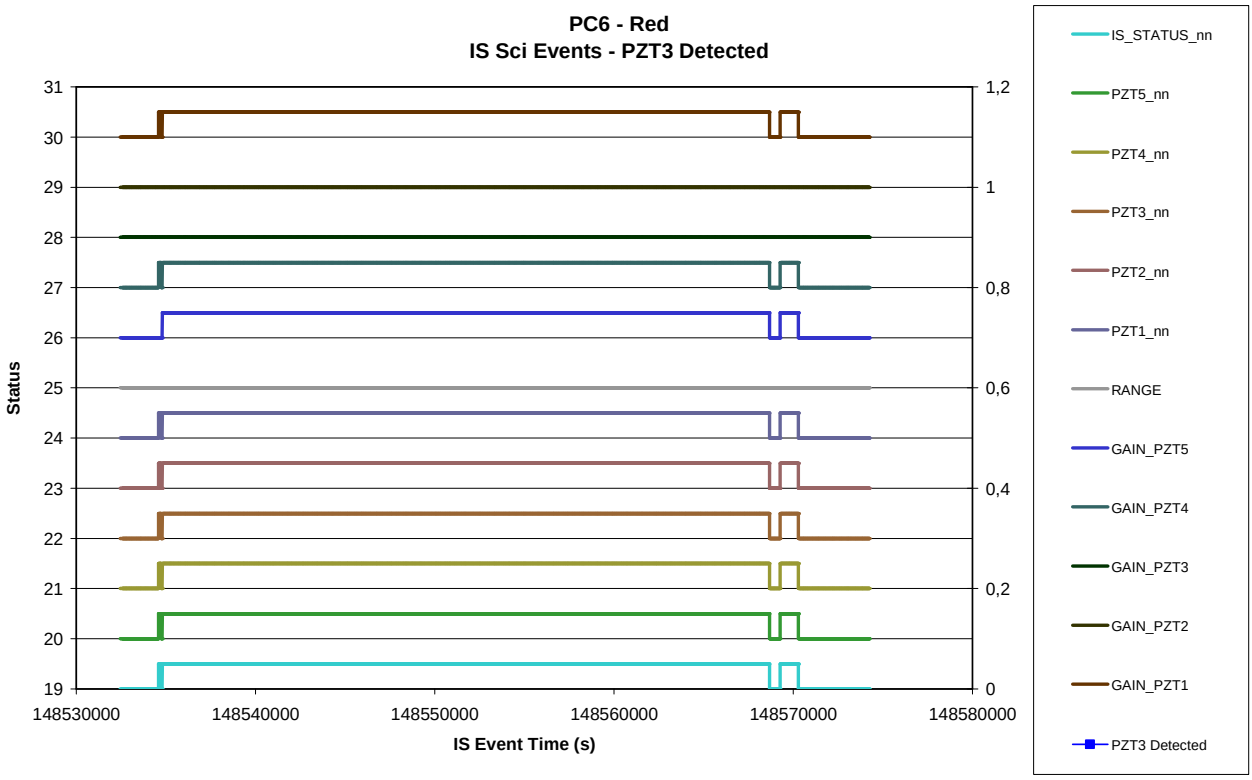


Figure 8.4-10. PZT 4 Detected Events vs. time - Red

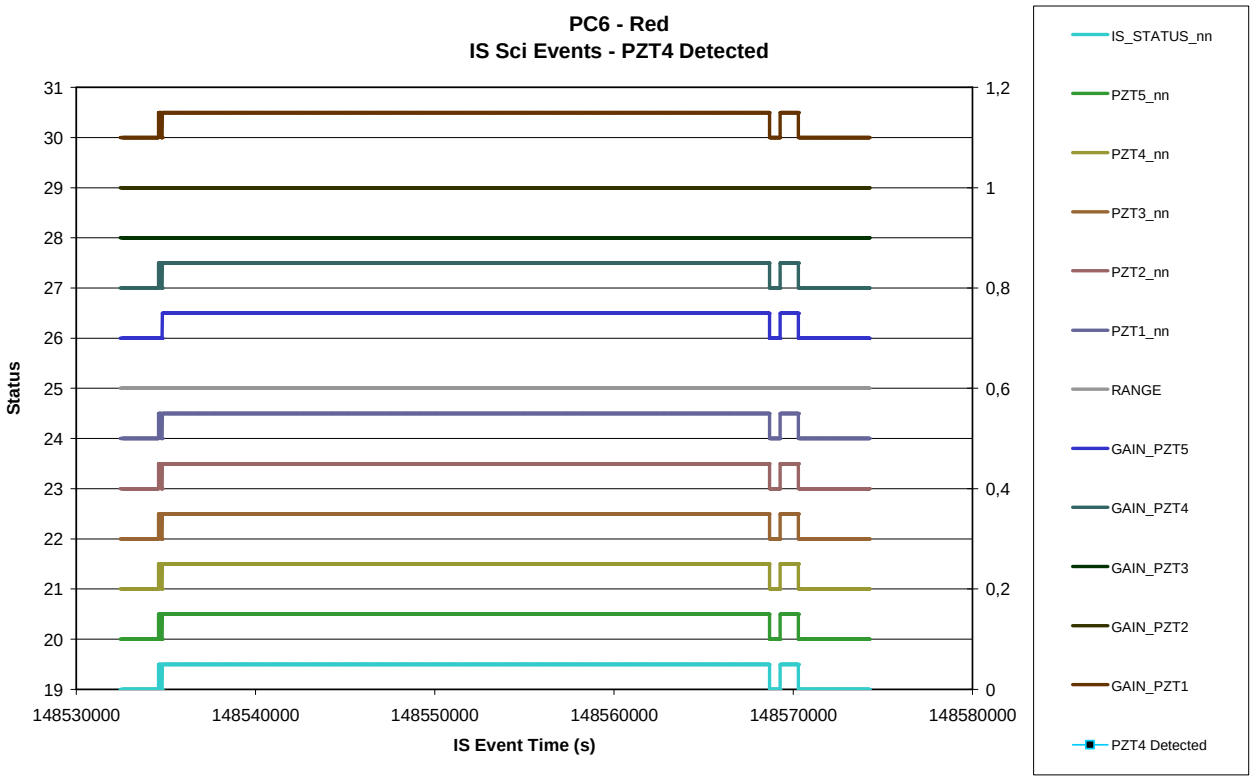


Figure 8.4-11. PZT 5 Detected Events vs. time - Red

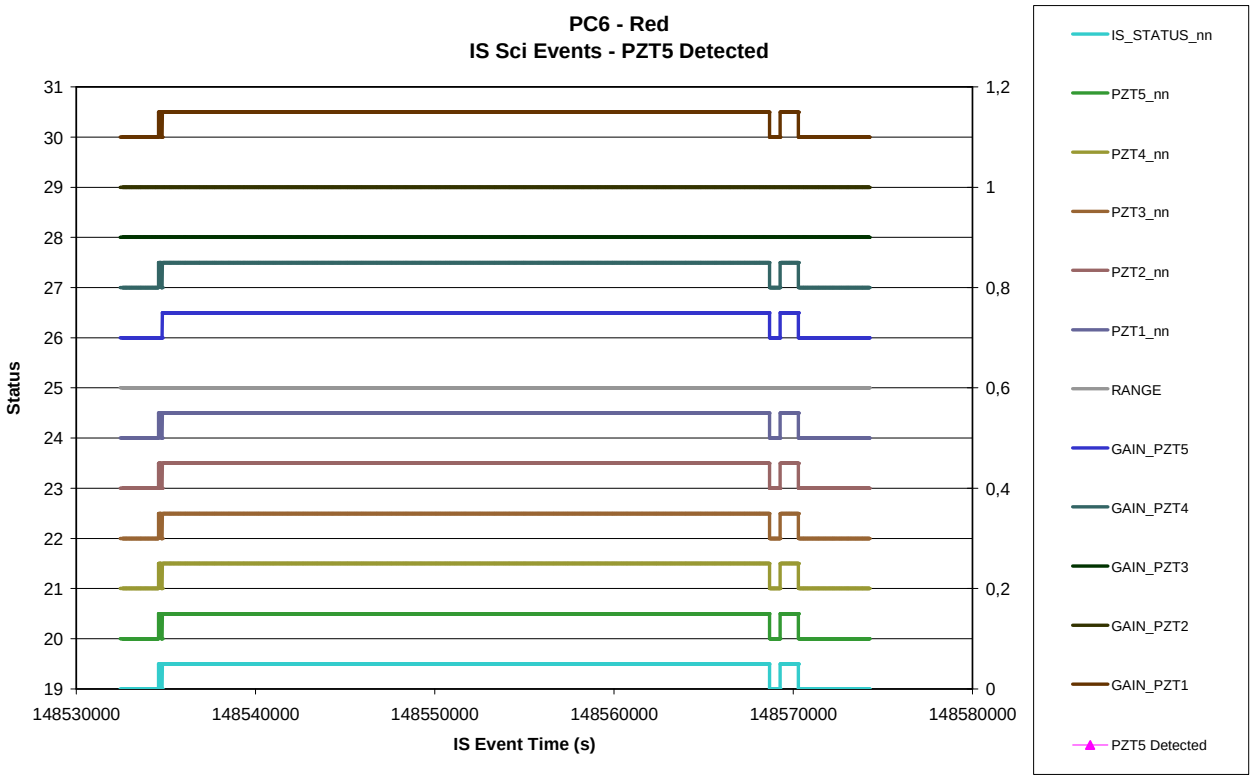
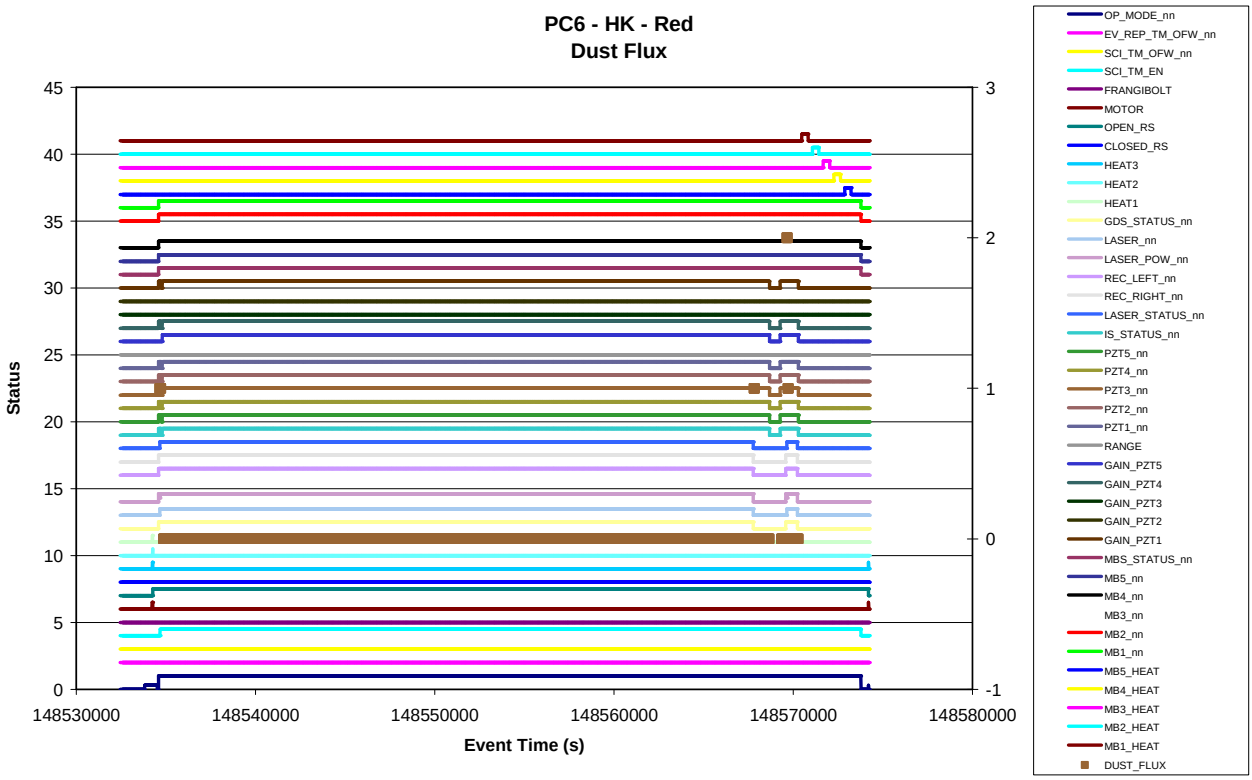


Figure 8.4-12. Dust Flux vs. time - Red



8.4.2.2 Event Rates

Not applicable

8.4.2.3 CAL

Figure 8.4-13. PZT 1 Mean and St Dev. CAL vs. time - Red

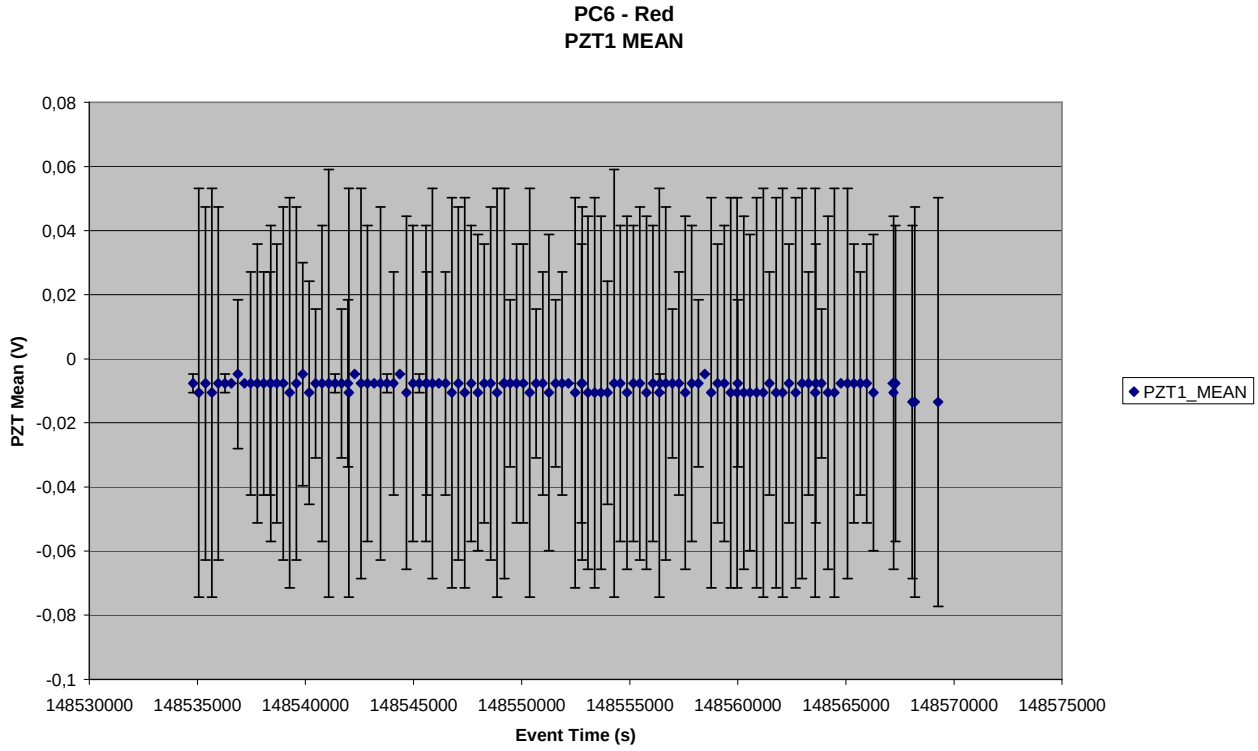


Figure 8.4-14. PZT 2 Mean and St Dev. CAL vs. time - Red

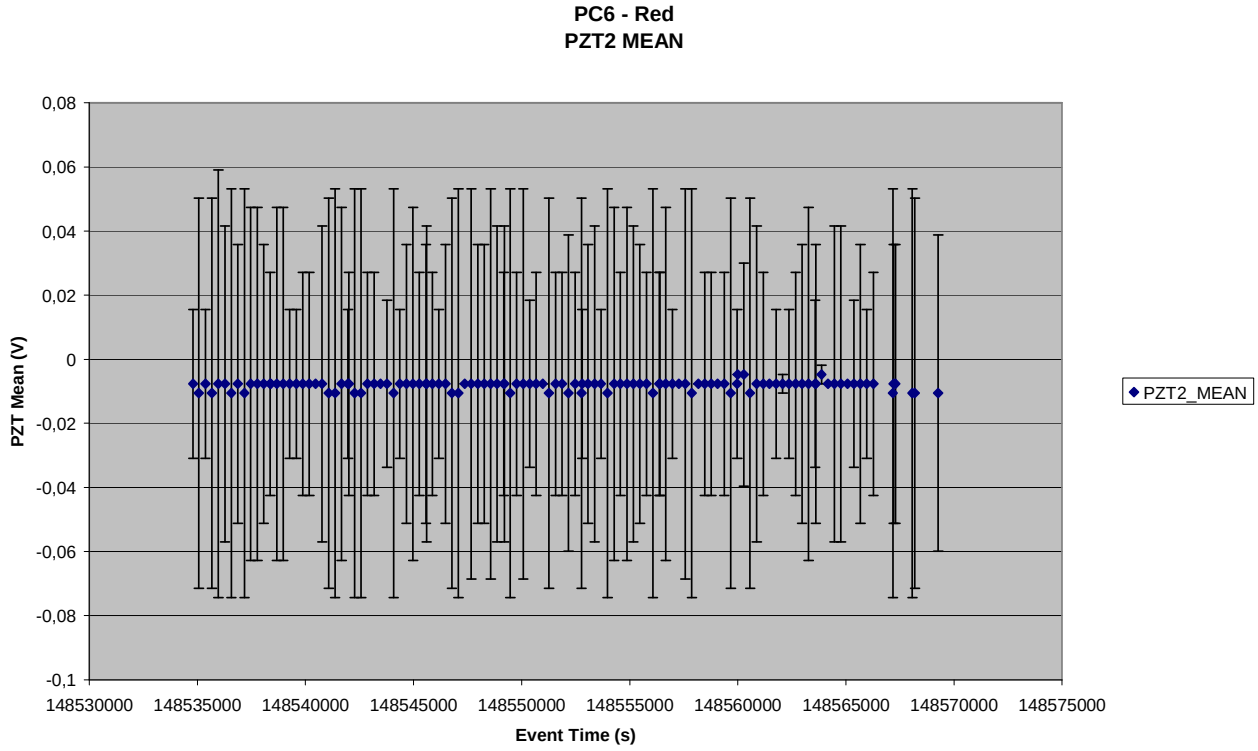


Figure 8.4-15. PZT 3 Mean and St Dev. CAL vs. time - Red

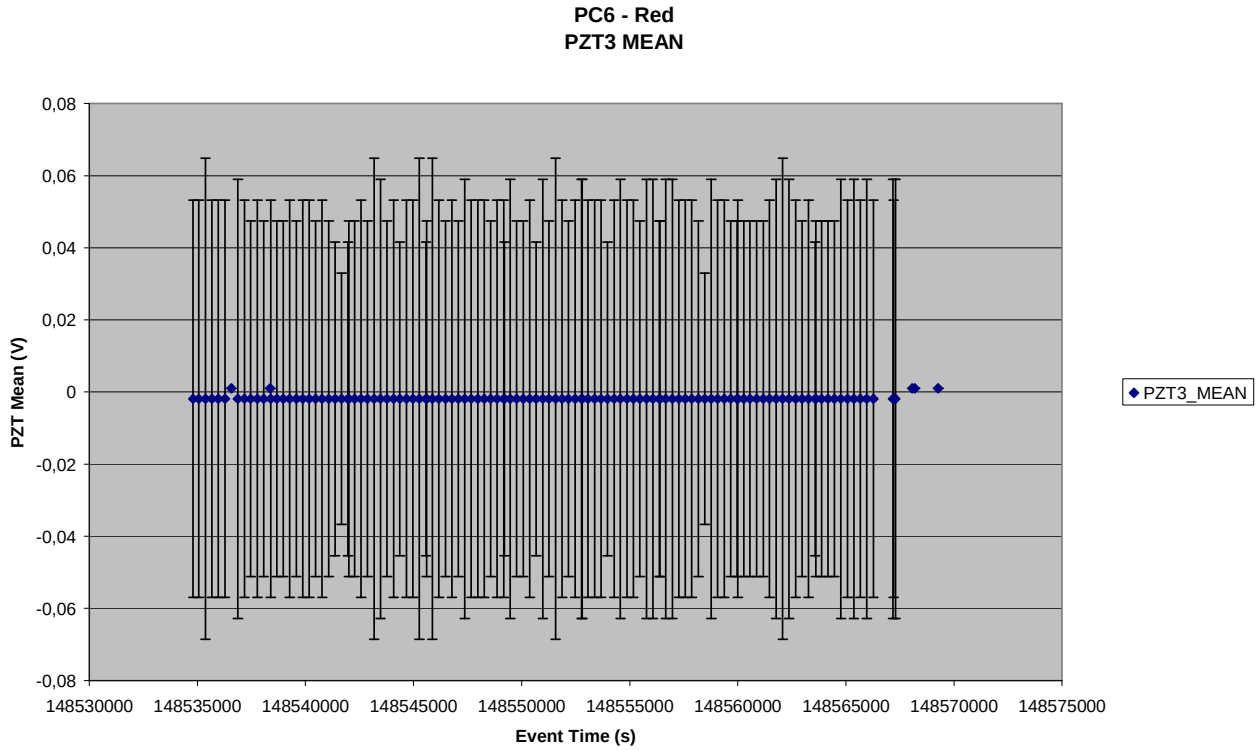


Figure 8.4-16. PZT 4 Mean and St Dev. CAL vs. time - Red

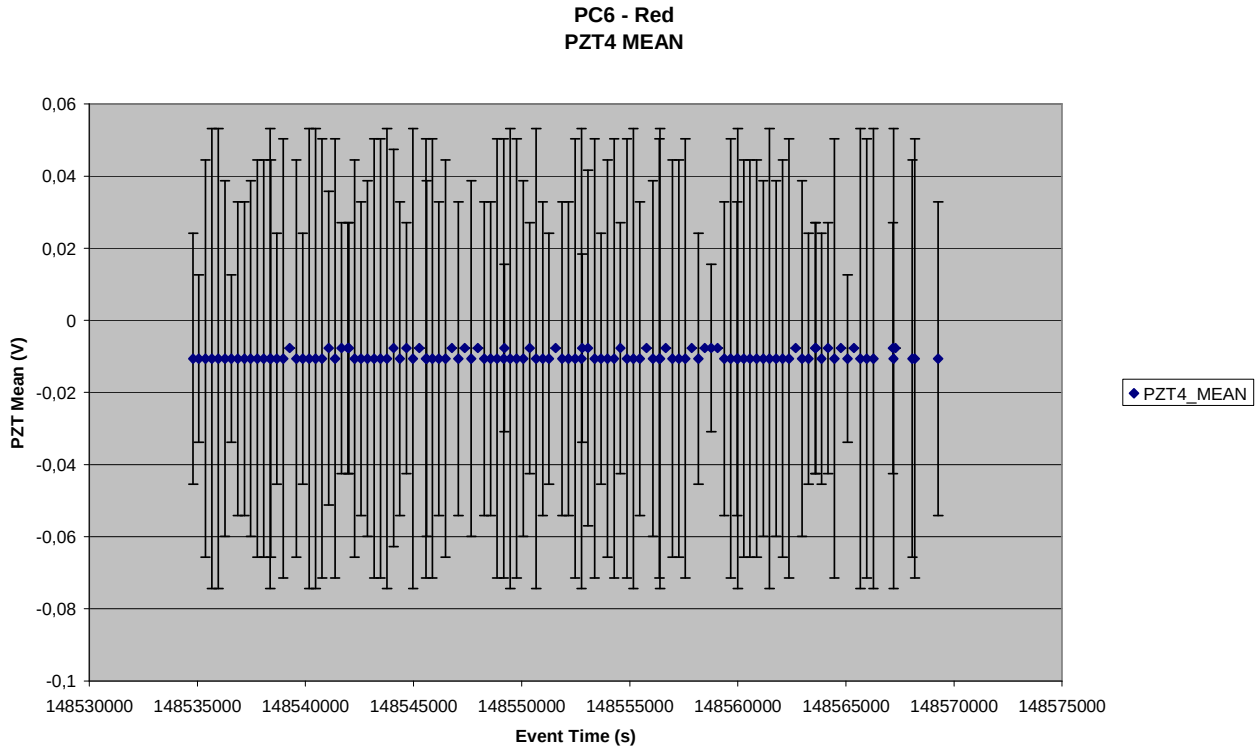


Figure 8.4-17. PZT 5 Mean and St Dev. CAL vs. time - Red

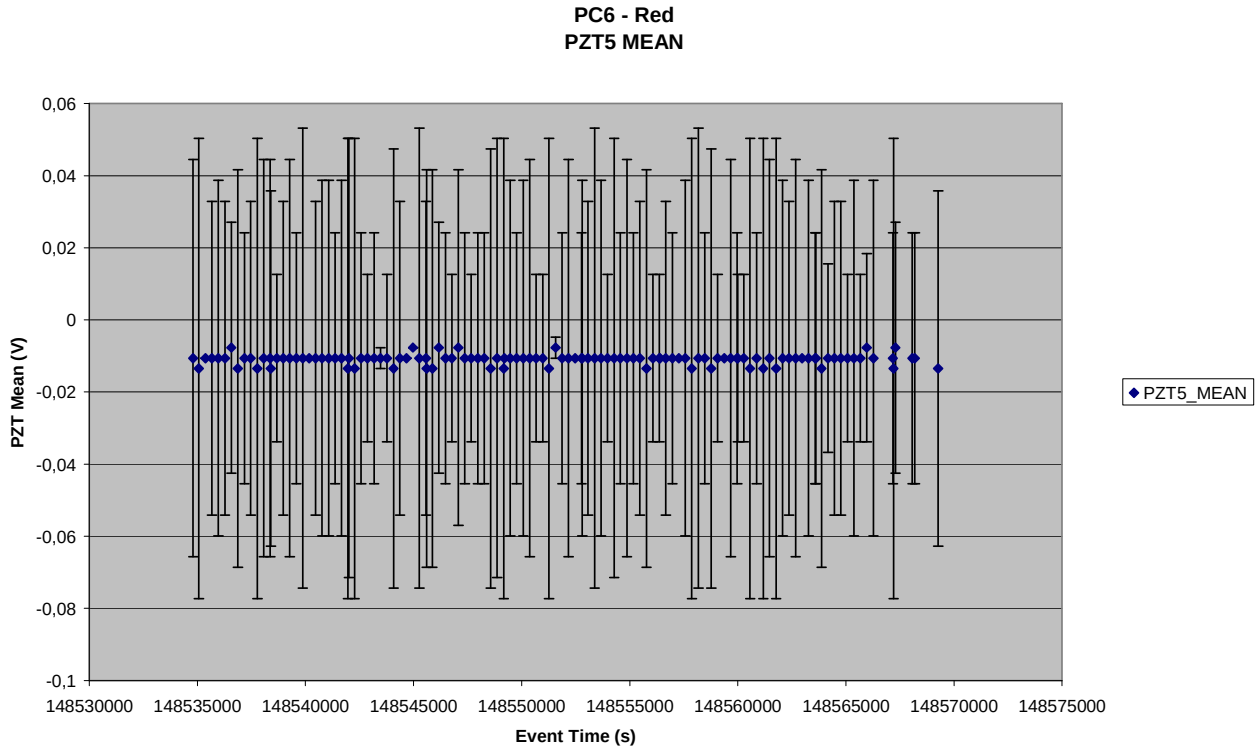


Figure 8.4-18. Reference Voltages for IS calibration vs. time - Red

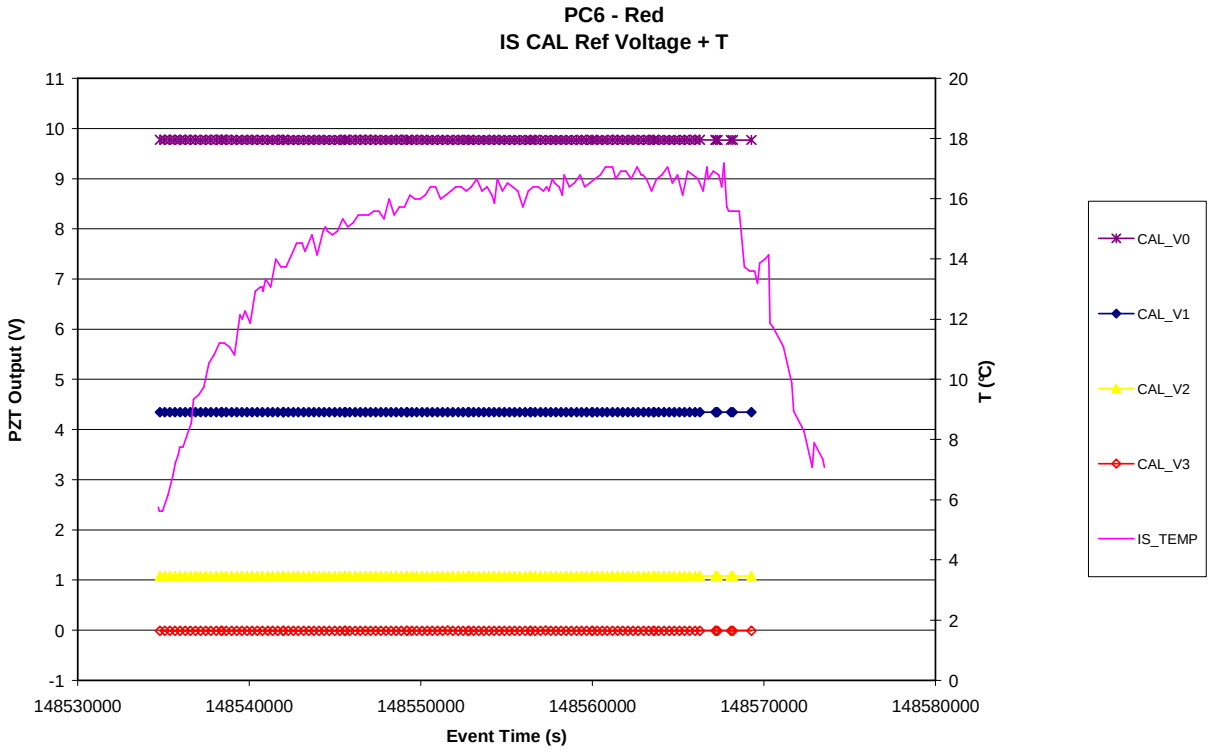


Figure 8.4-19. PZT 1 CAL Signal vs. time - Red

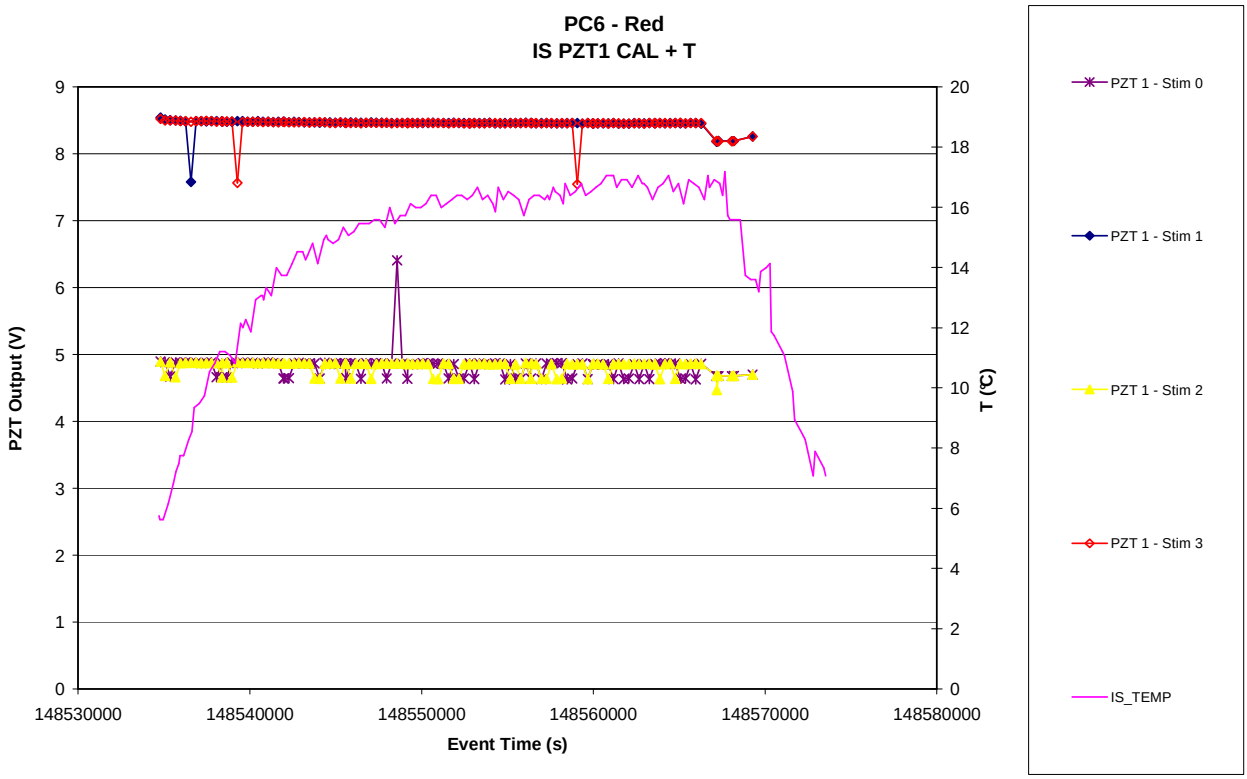


Figure 8.4-20. PZT 2 CAL Signal vs. time - Red

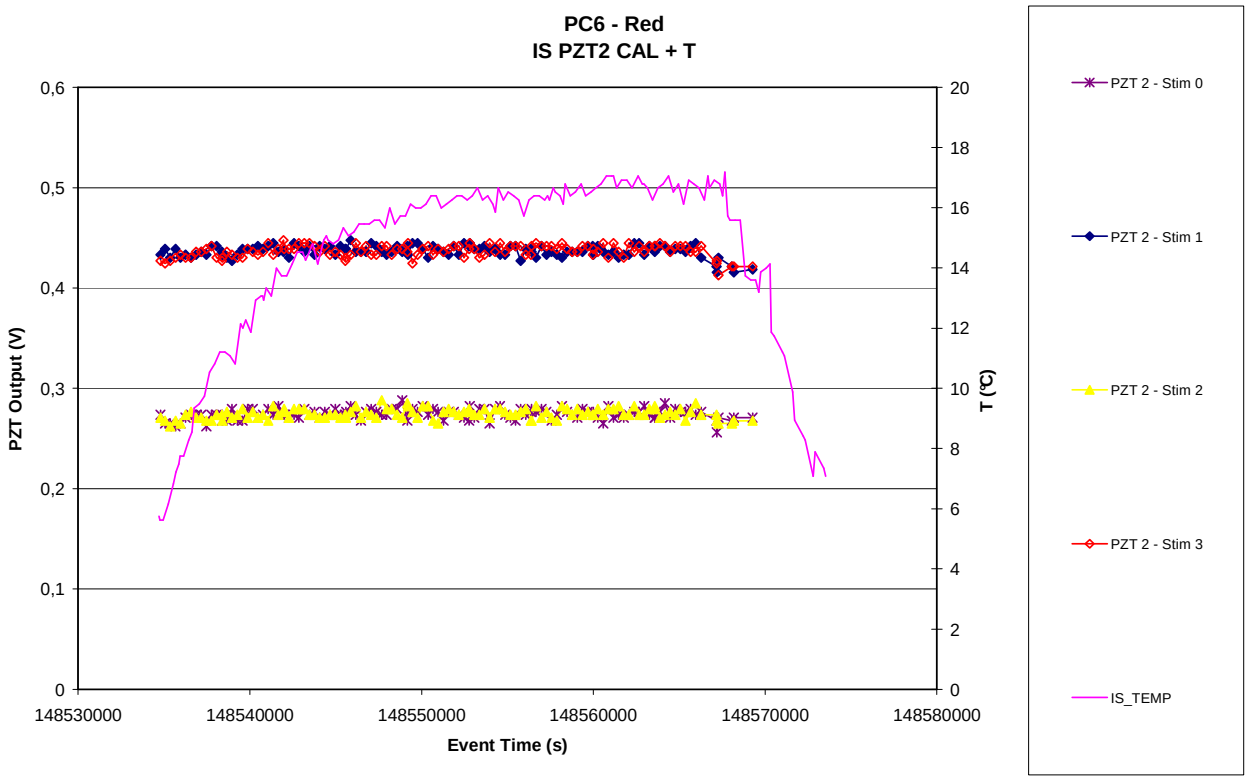


Figure 8.4-21. PZT 3 CAL Signal vs. time - Red

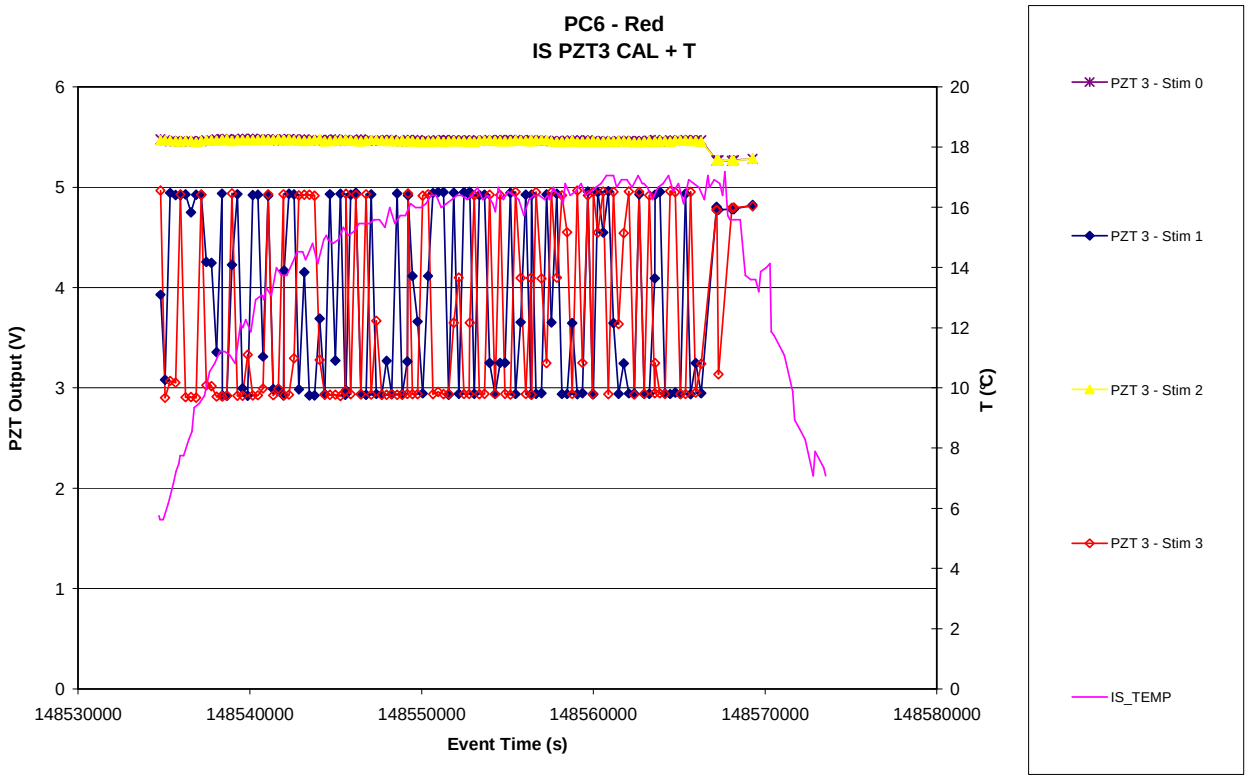


Figure 8.4-22. PZT 4 CAL Signal vs. time - Red

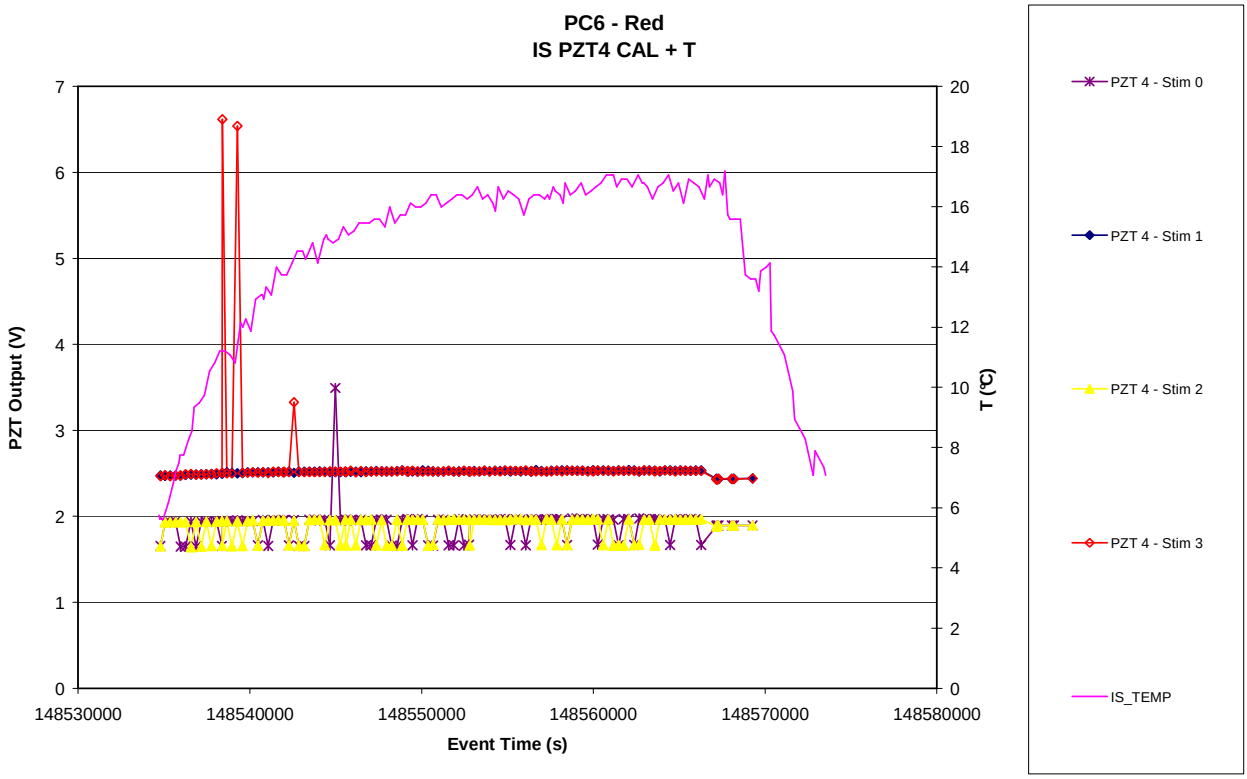


Figure 8.4-23. PZT 5 CAL Signal vs. time - Red

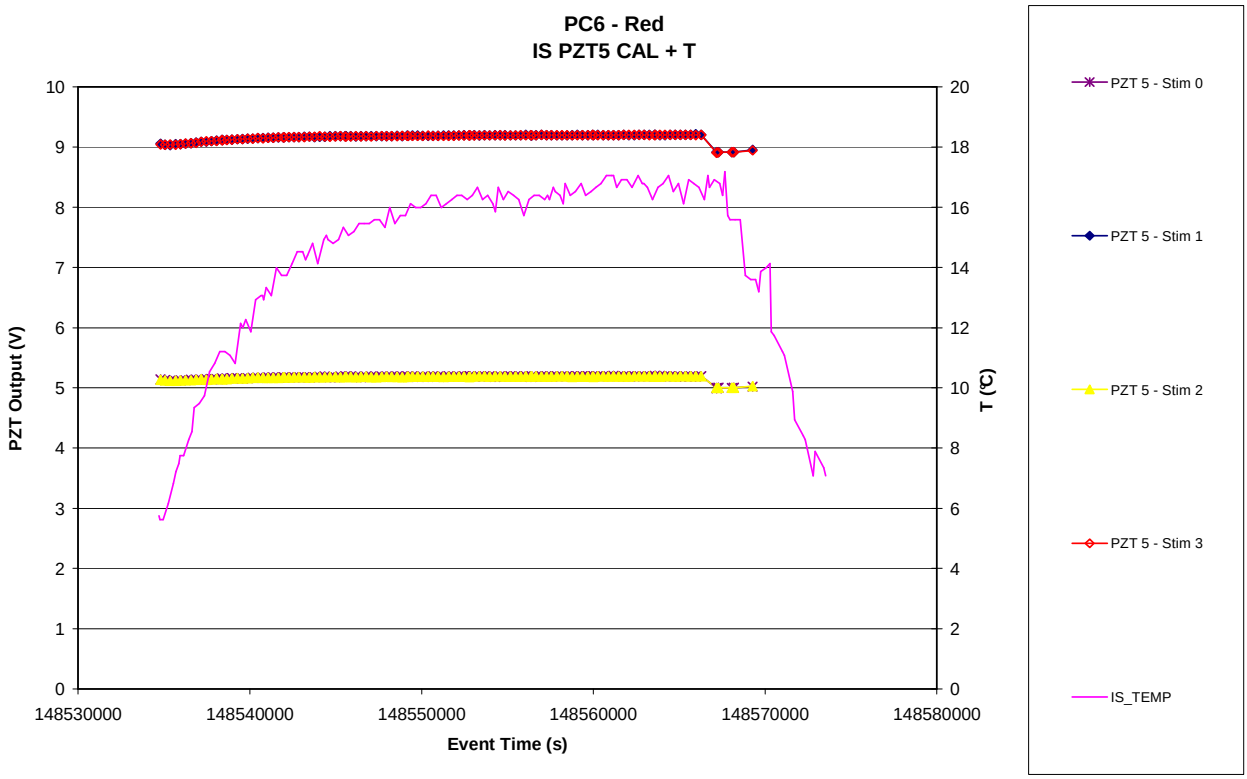


Figure 8.4-24. PZT 1 CAL Time delay vs. time - Red

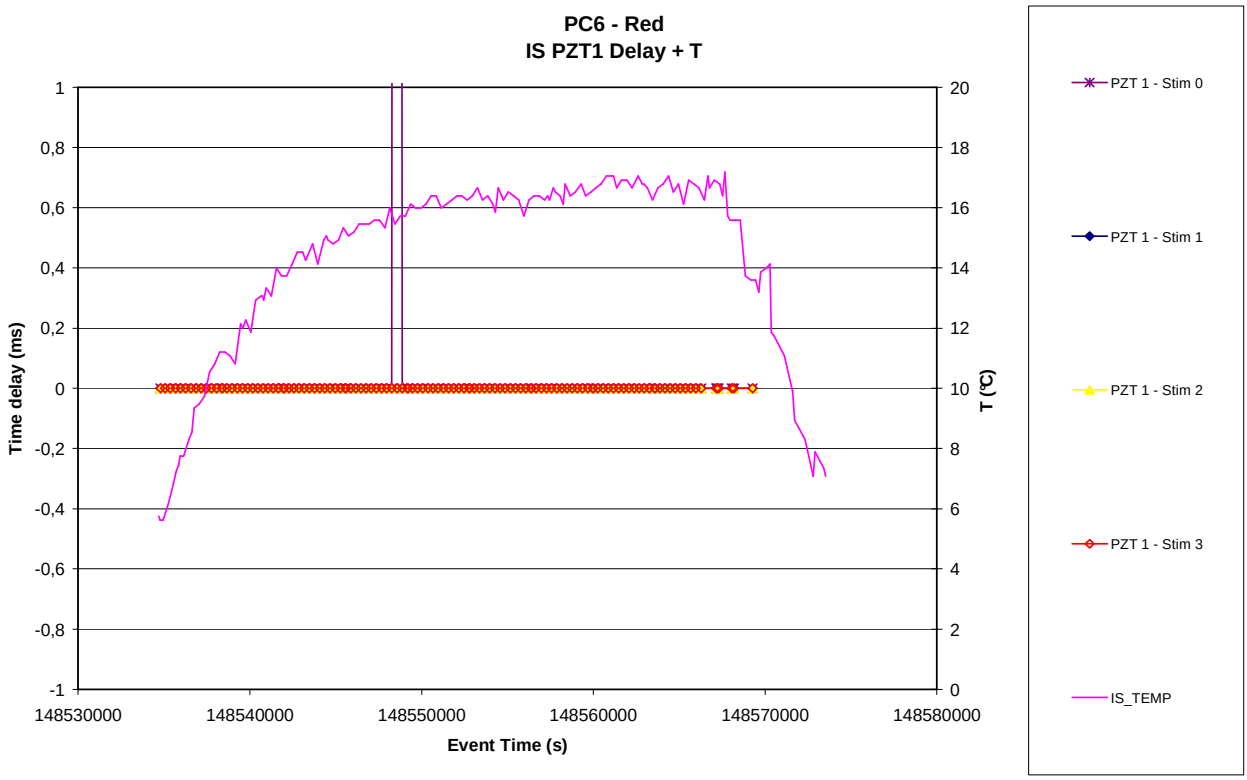


Figure 8.4-25. PZT 2 CAL Time delay vs. time - Red

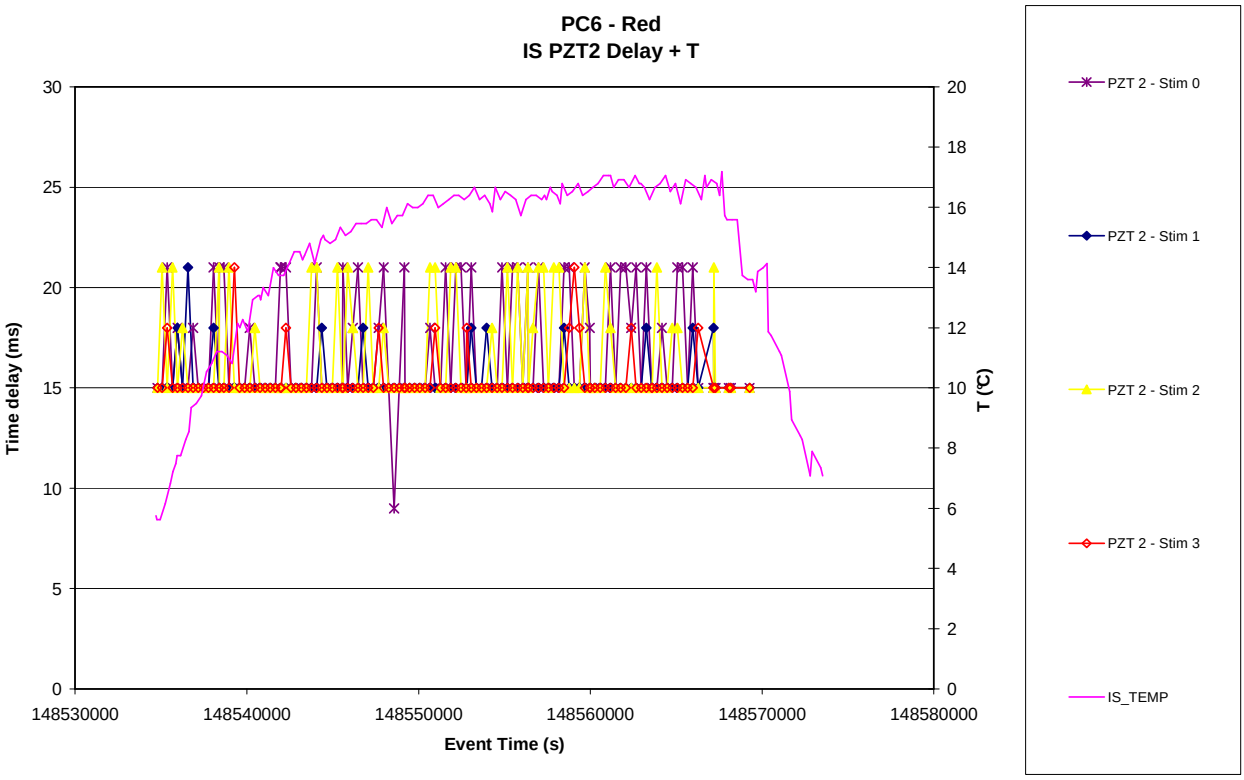


Figure 8.4-26. PZT 3 CAL Time delay vs. time - Red

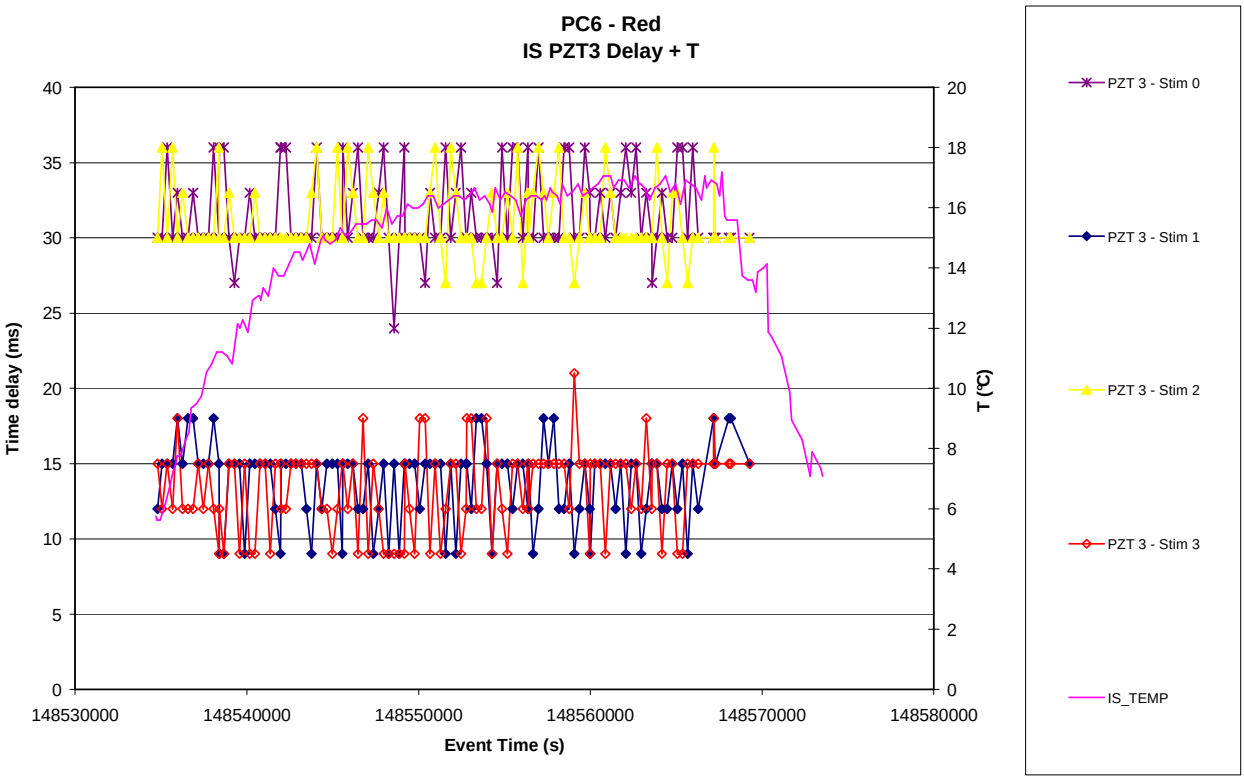


Figure 8.4-27. PZT 4 CAL Time delay vs. time - Red

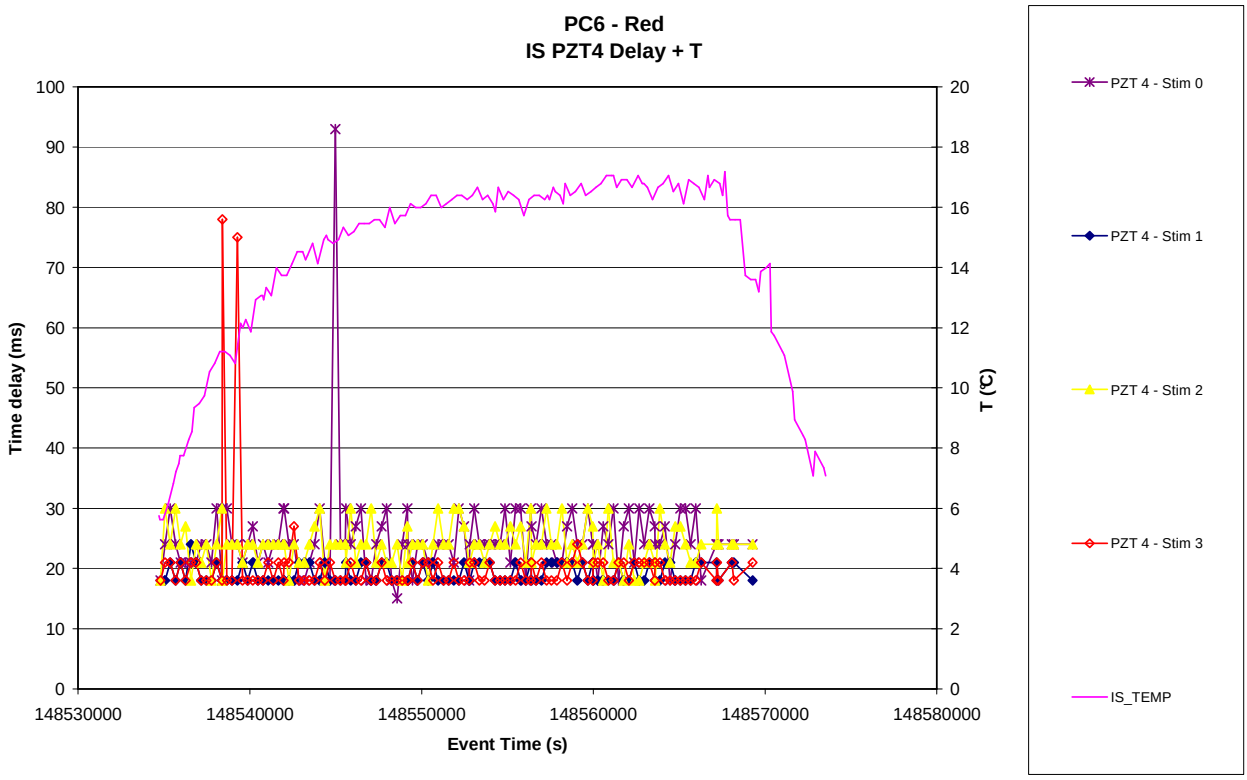


Figure 8.4-28. PZT 5 CAL Time delay vs. time - Red

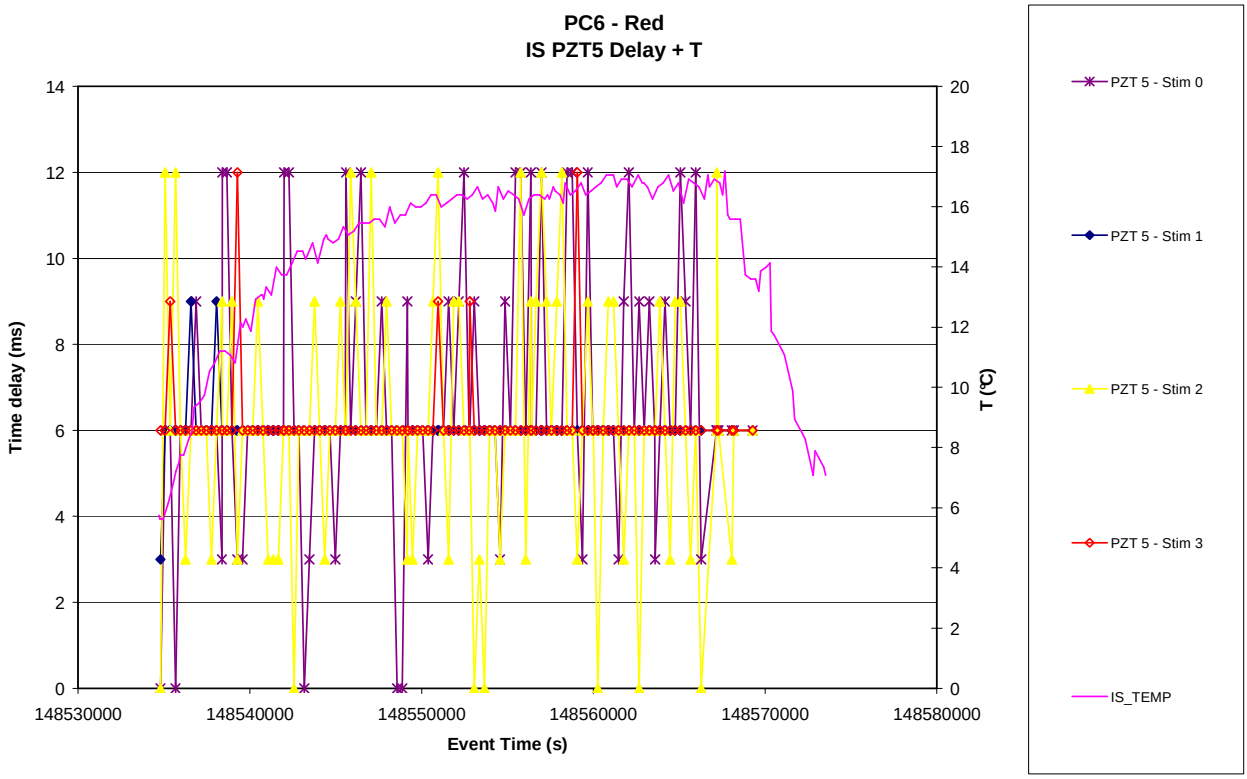


Figure 8.4-29. PZT 1 CAL Signal vs. stimulus – Red

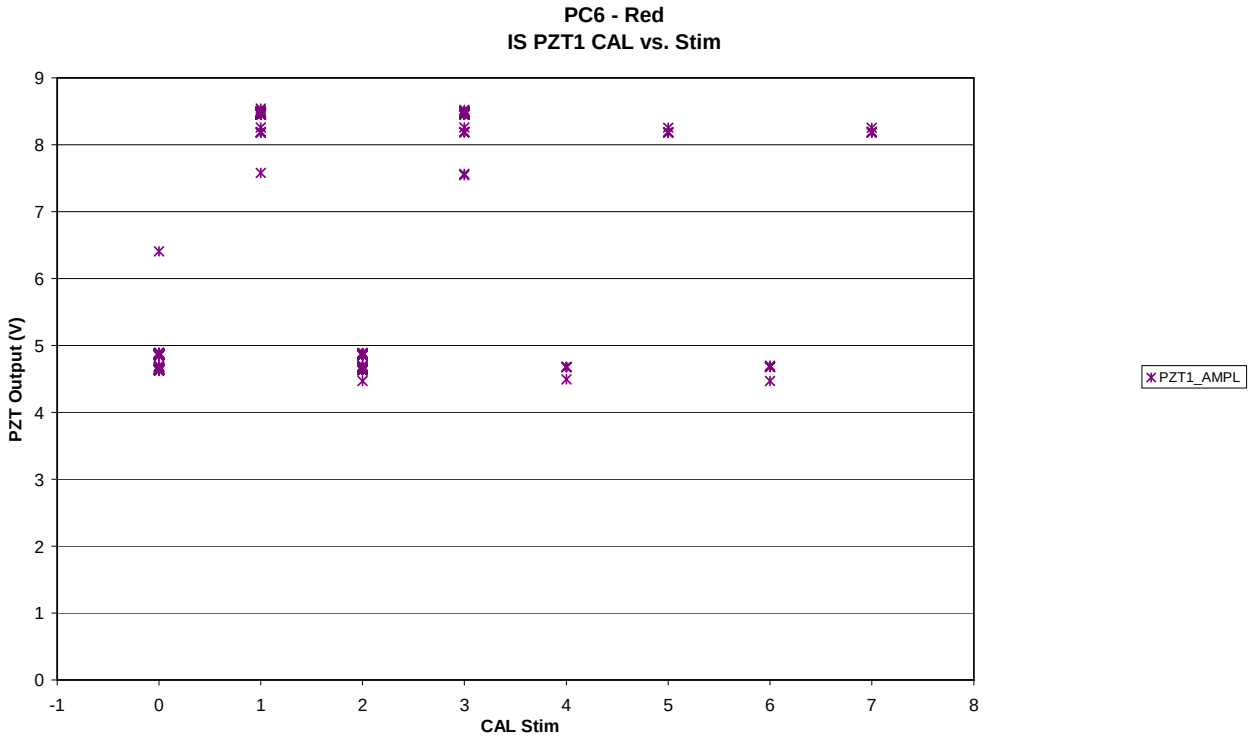


Figure 8.4-30. PZT 2 CAL Signal vs. stimulus – Red

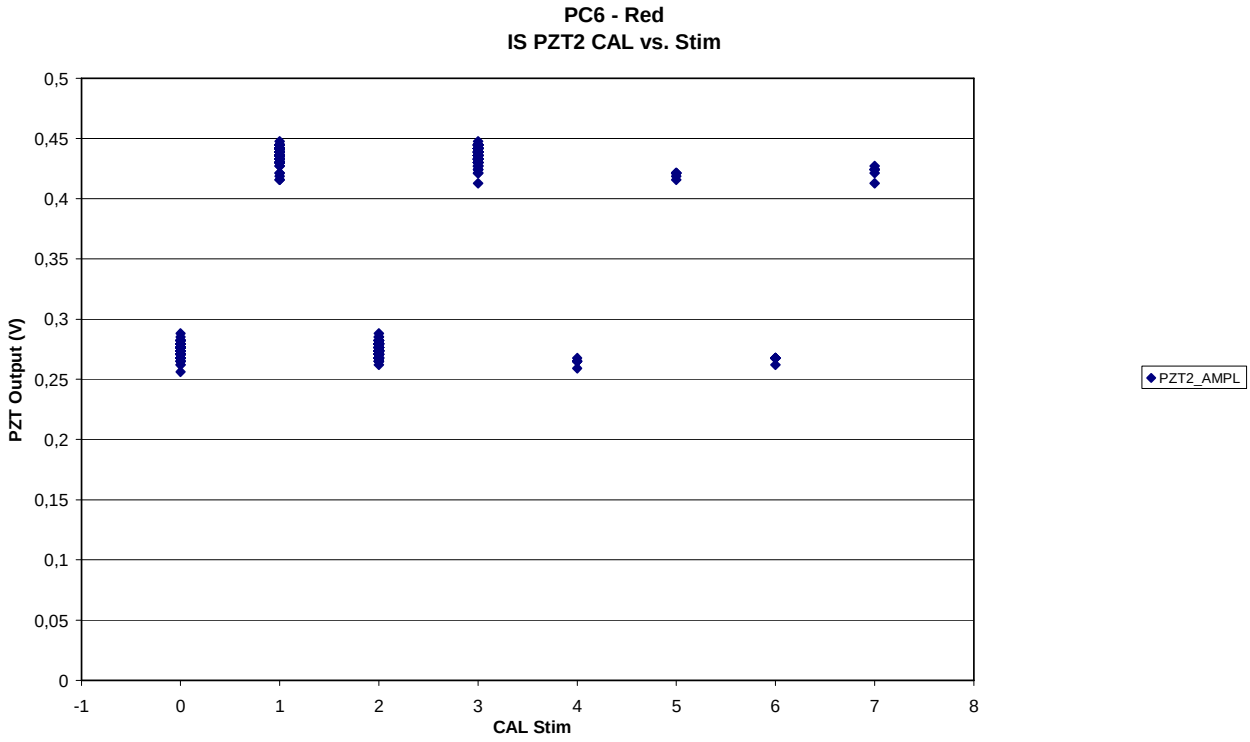


Figure 8.4-31. PZT 3 CAL Signal vs. stimulus – Red

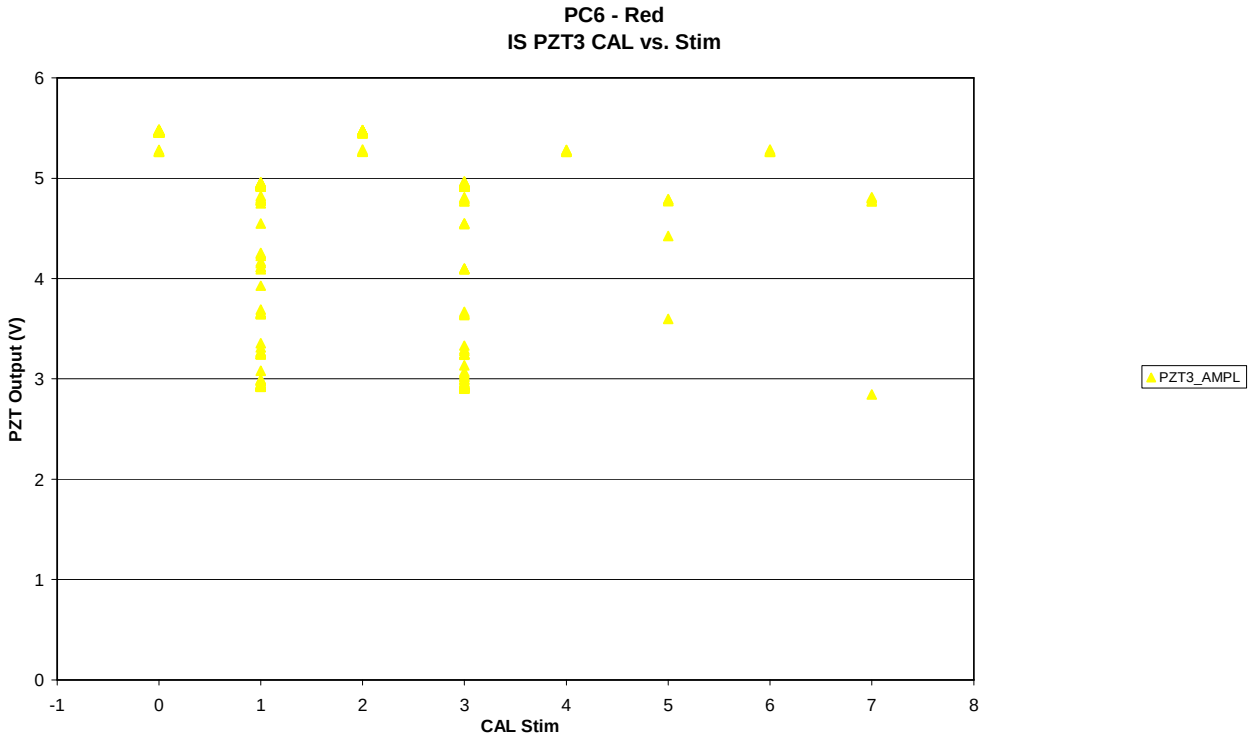


Figure 8.4-32. PZT 4 CAL Signal vs. stimulus – Red

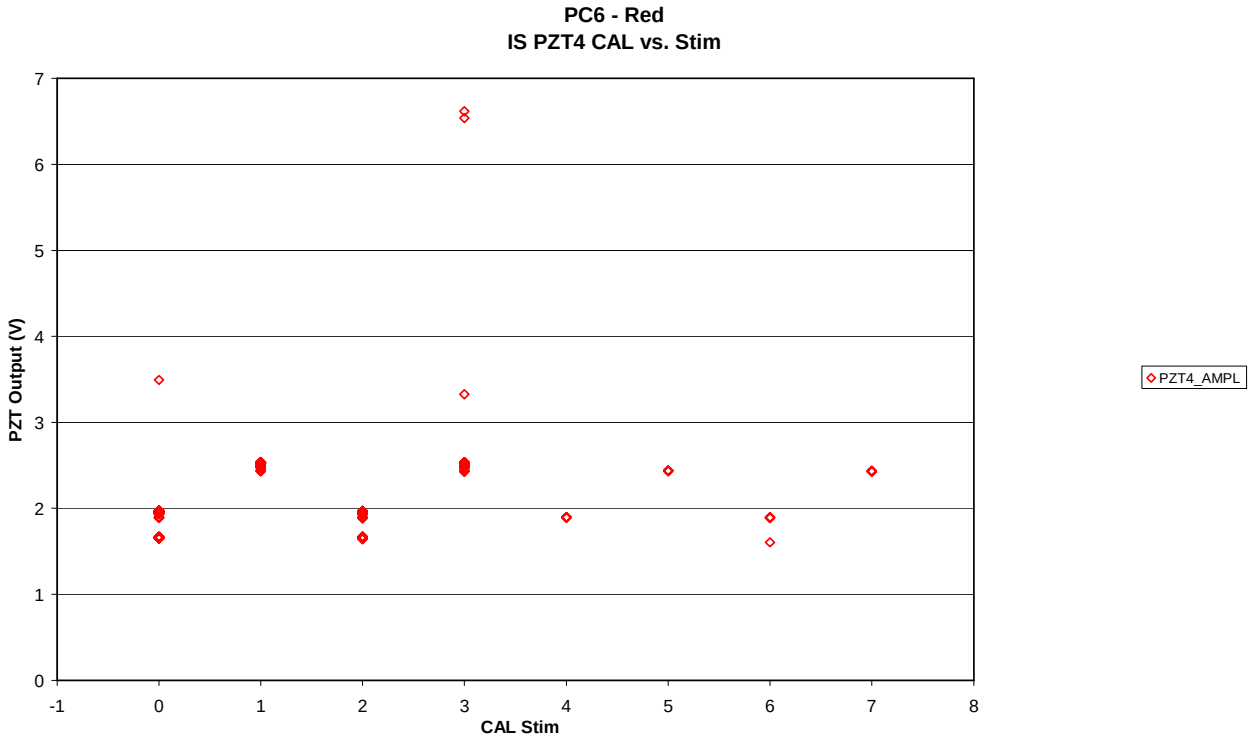


Figure 8.4-33. PZT 5 CAL Signal vs. stimulus – Red

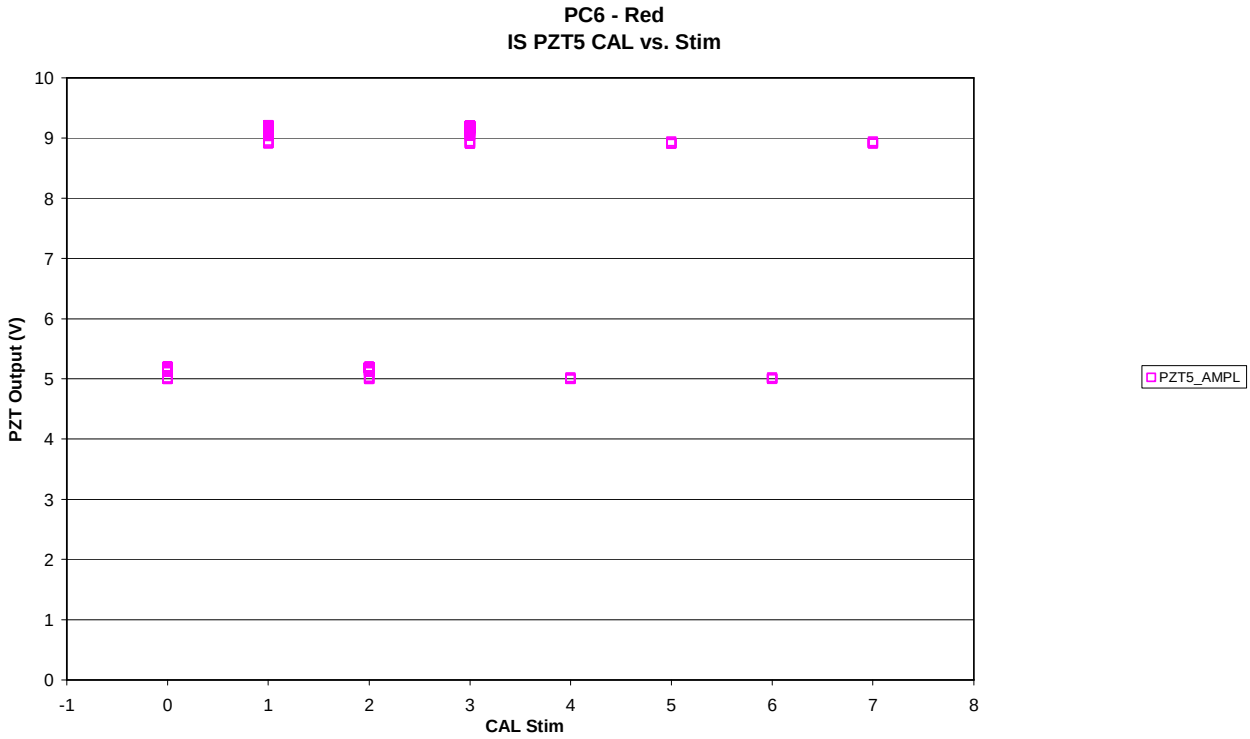


Figure 8.4-34. PZT 1 CAL Time delay vs. stimulus – Red

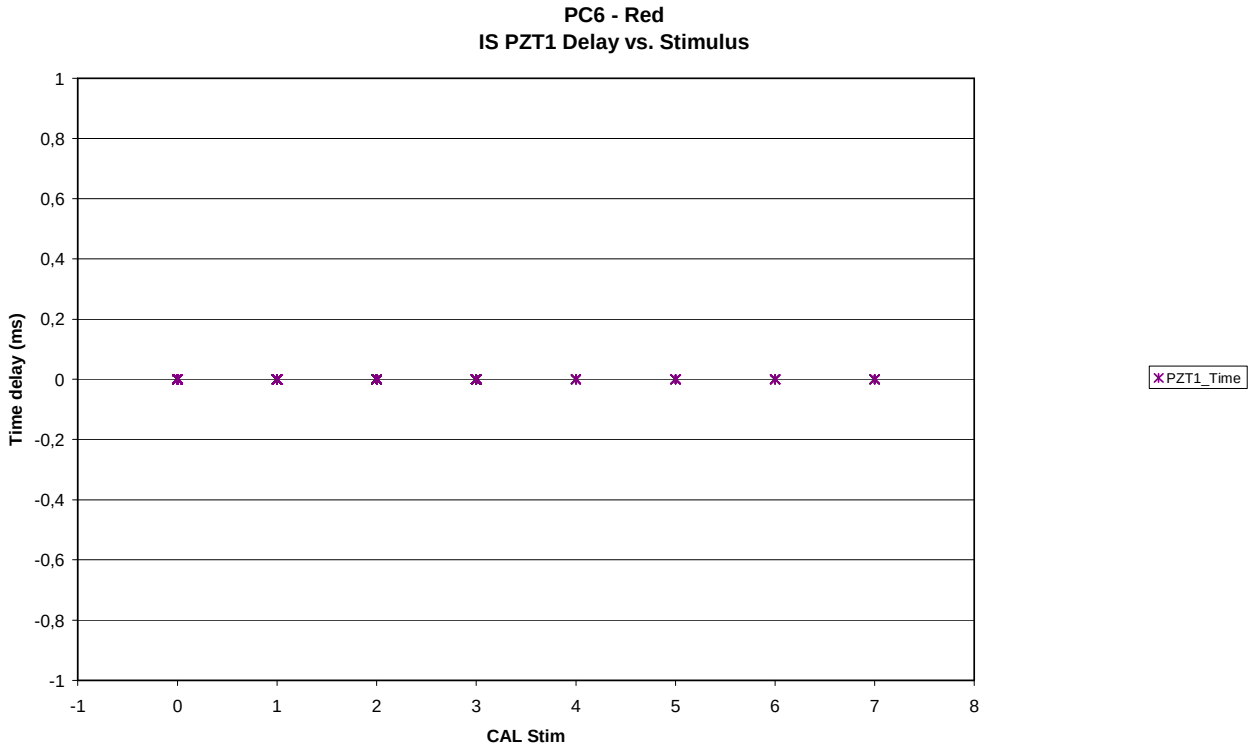


Figure 8.4-35. PZT 2 CAL Time delay vs. stimulus - Red

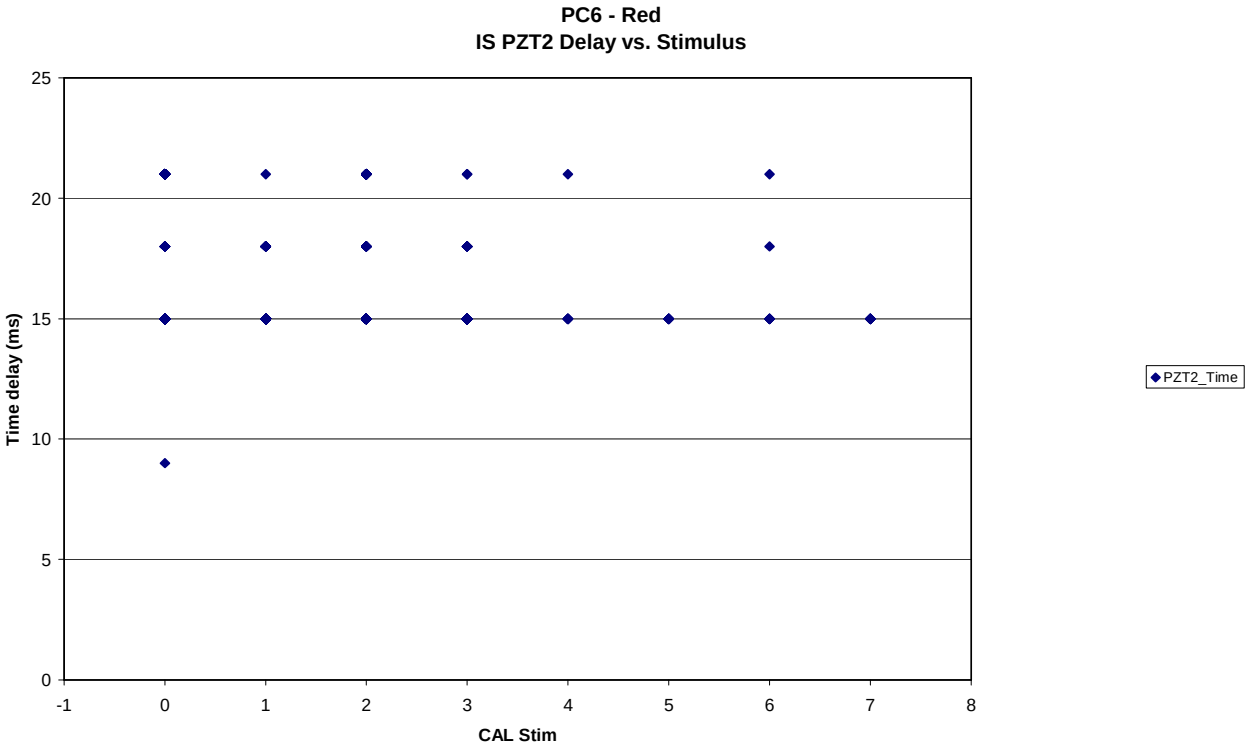


Figure 8.4-36. PZT 3 CAL Time delay vs. stimulus - Red

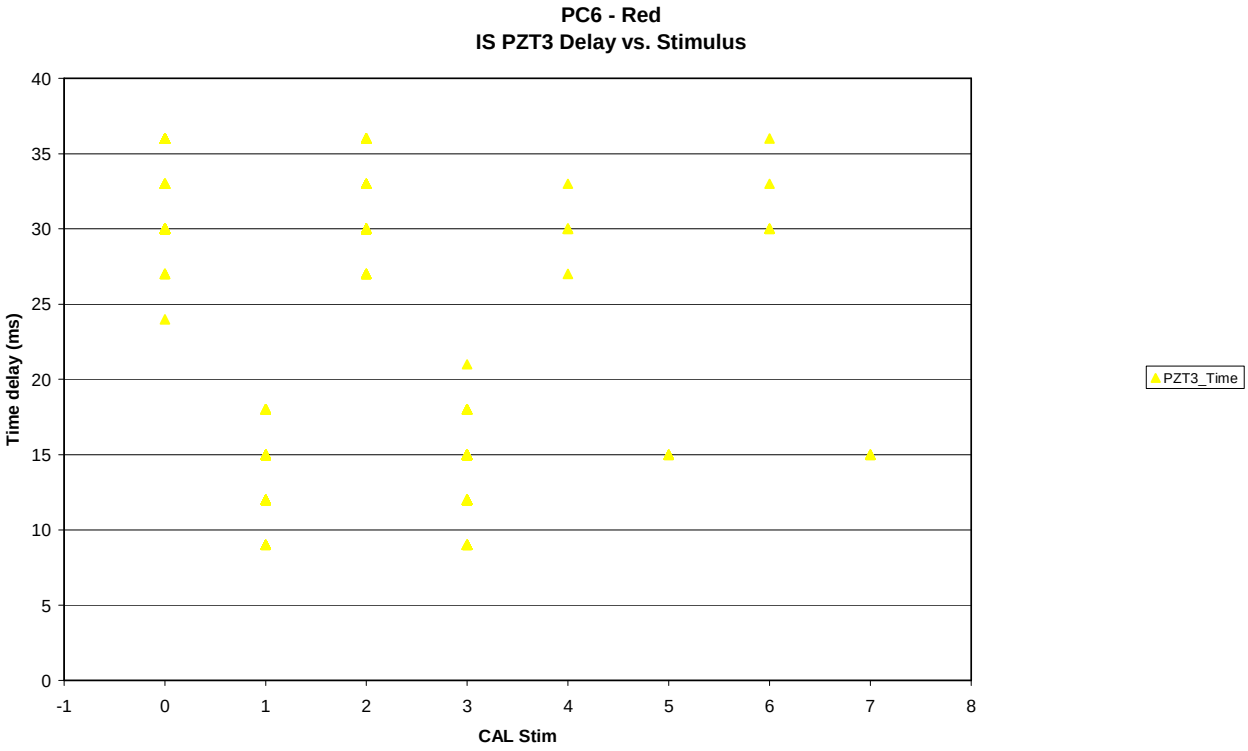


Figure 8.4-37. PZT 4 CAL Time delay vs. stimulus - Red

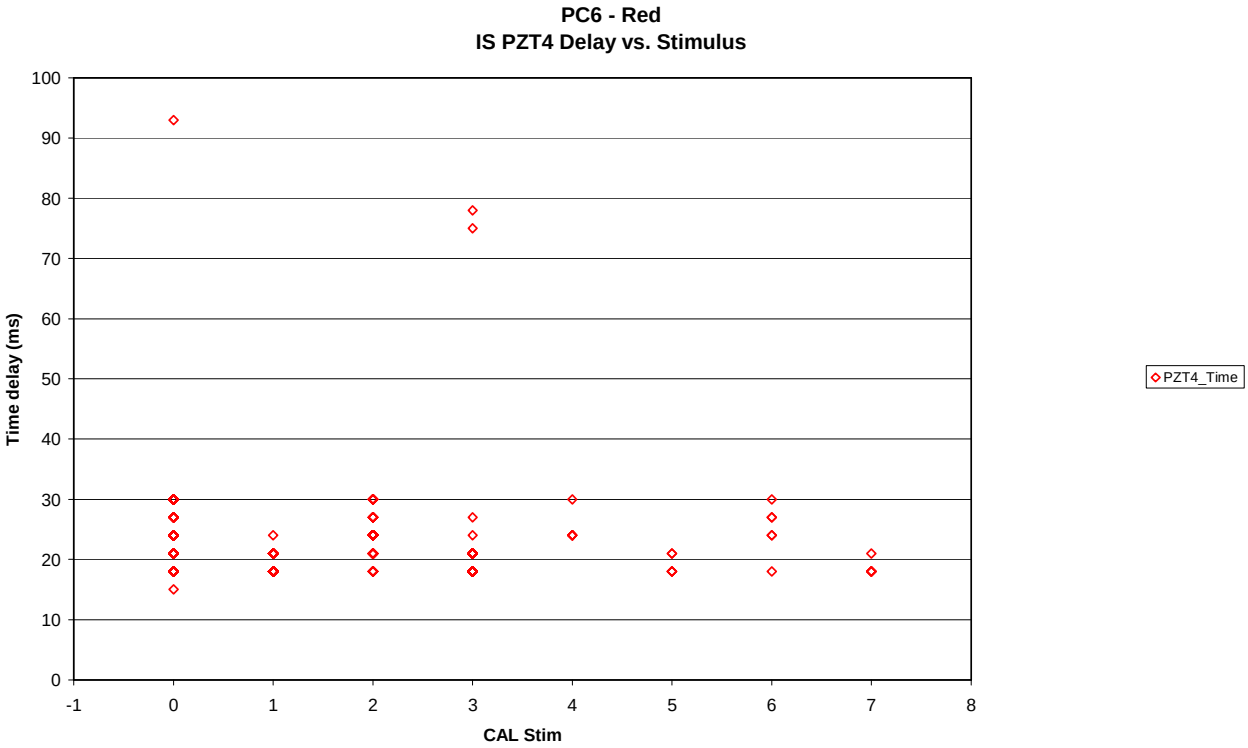
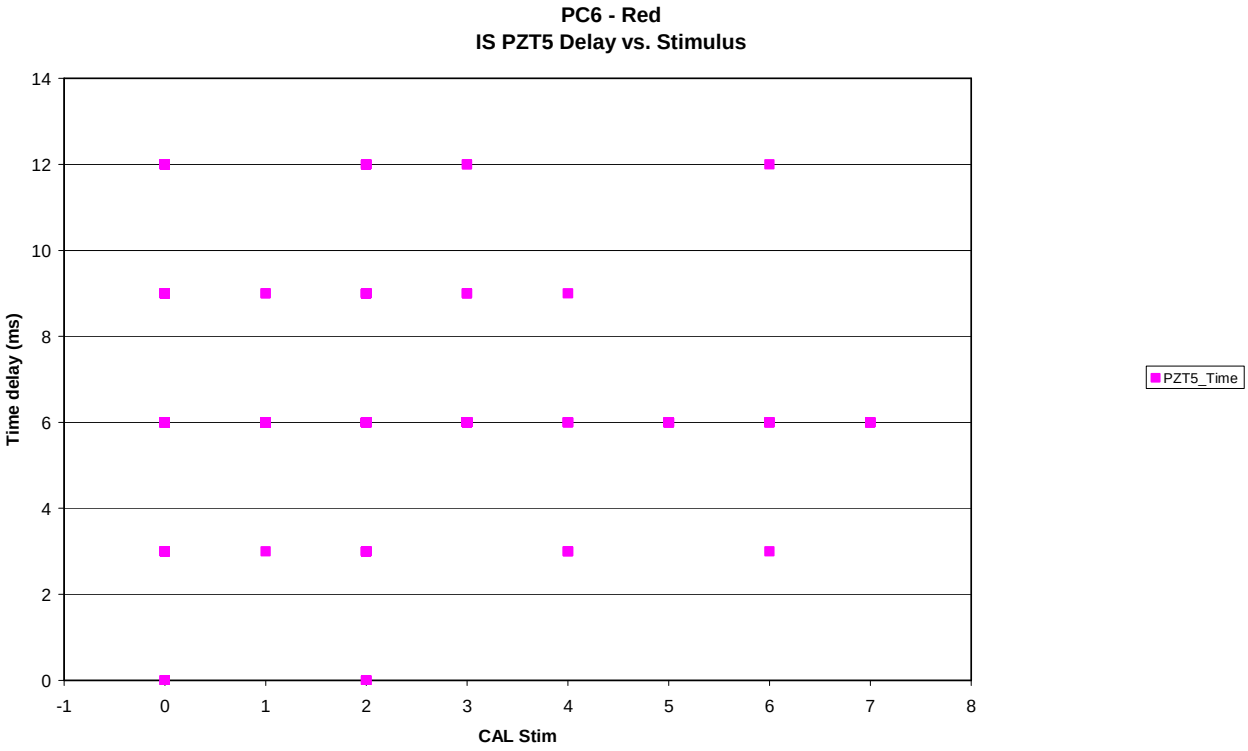


Figure 8.4-38. PZT 5 CAL Time delay vs. stimulus - Red



8.5 MICRO BALANCE SYSTEM (MBS)

8.5.1 MBS – Status

Figure 8.5-1. MBS Operation Status vs. time - Red

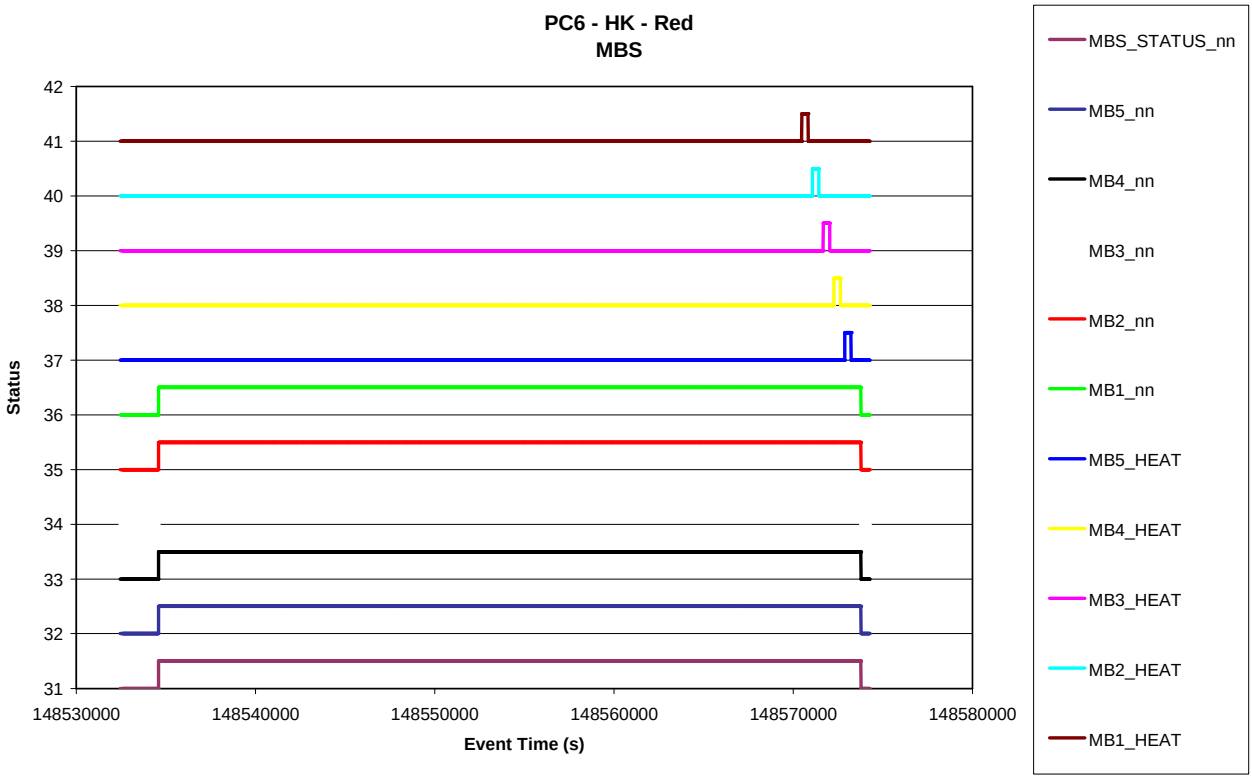


Figure 8.5-2. MBS 1 Temperature vs. time (HK, HK-SCI, SCI) – Red

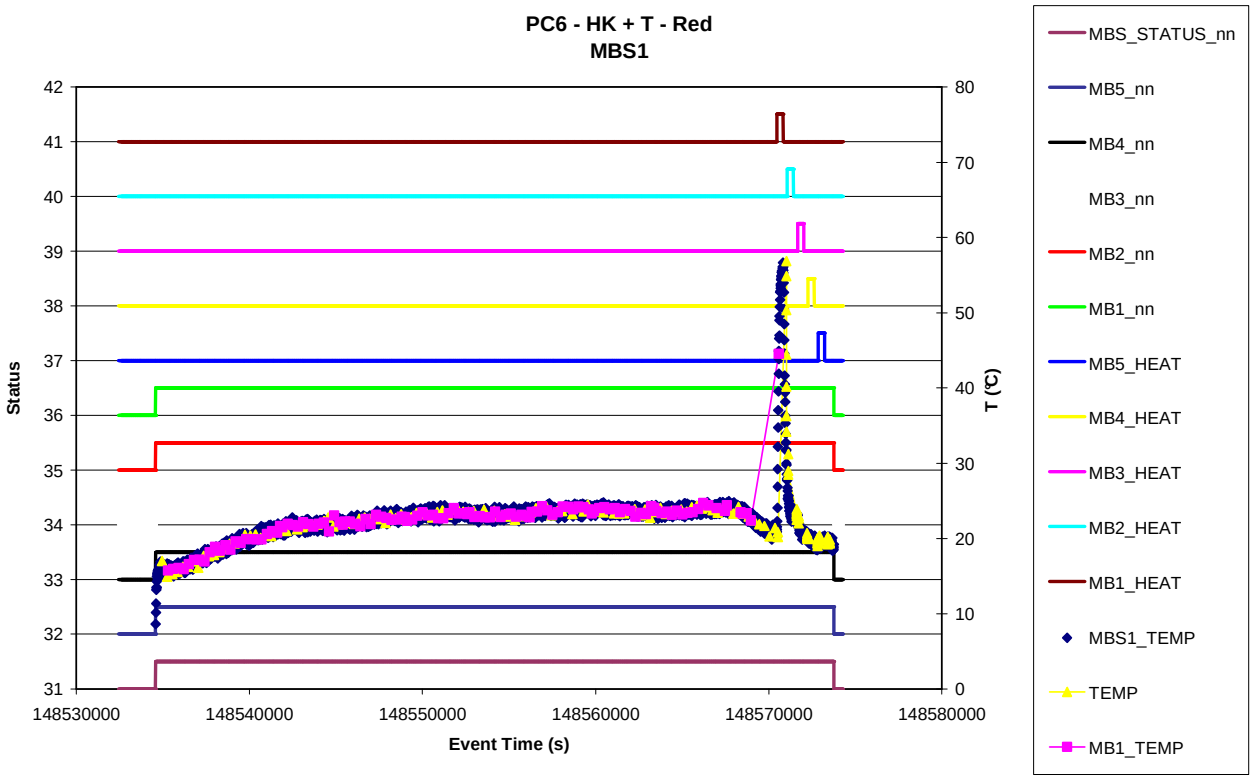


Figure 8.5-3. MBS 2 Temperature vs. time (HK, HK-SCI, SCI) - Red

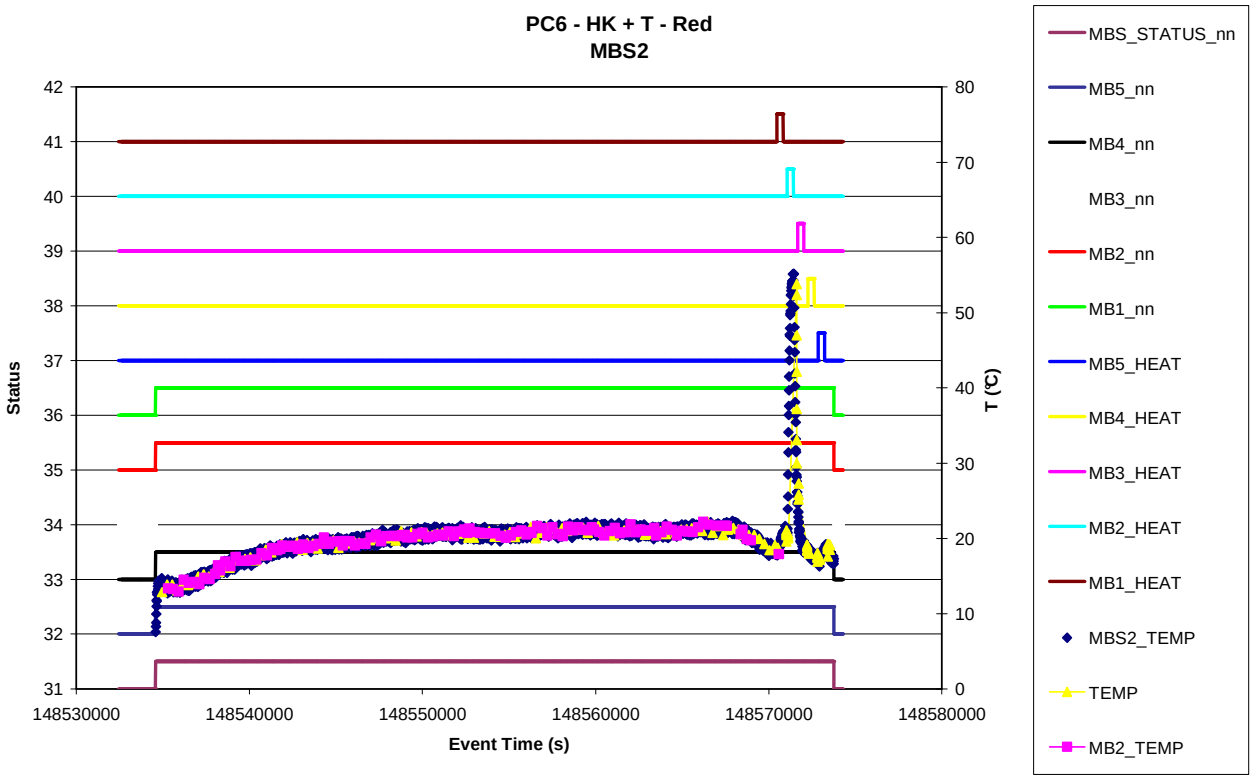


Figure 8.5-4. MBS 3 Temperature vs. time (HK, HK-SCI, SCI) - Red

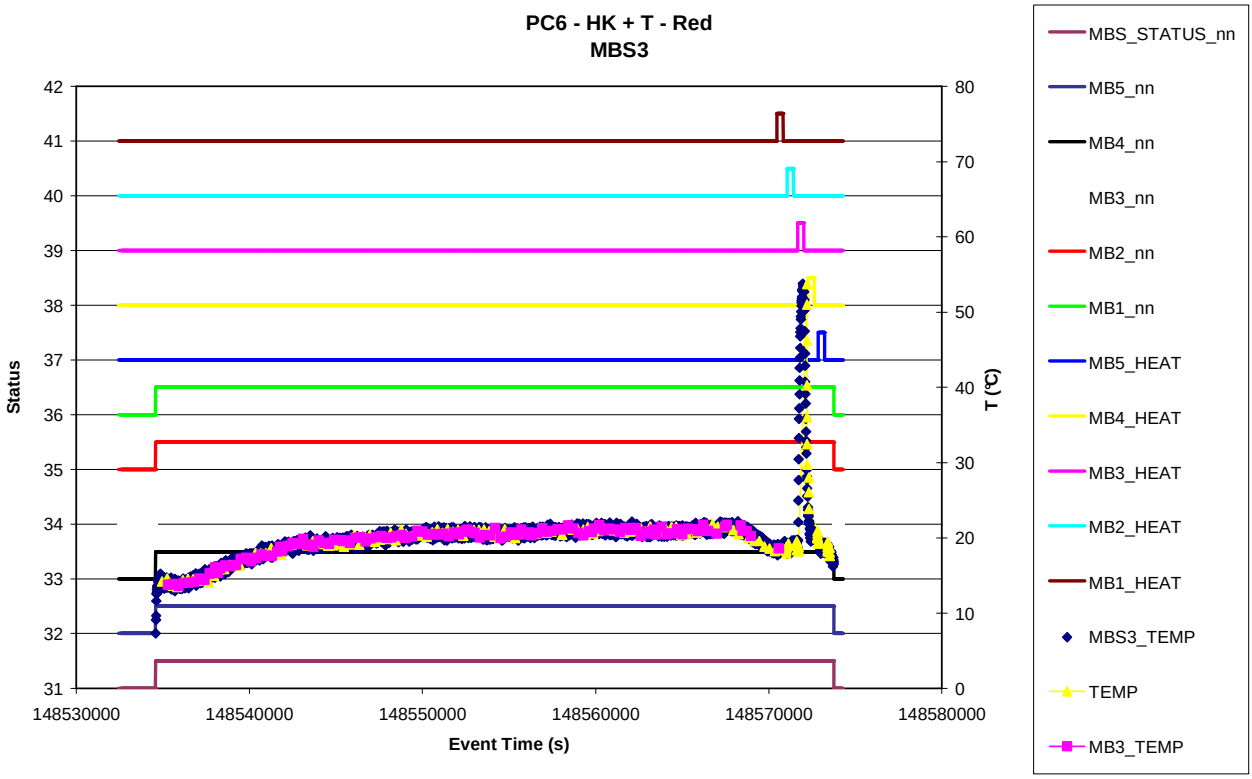


Figure 8.5-5. MBS 4 Temperature vs. time (HK, HK-SCI, SCI) - Red

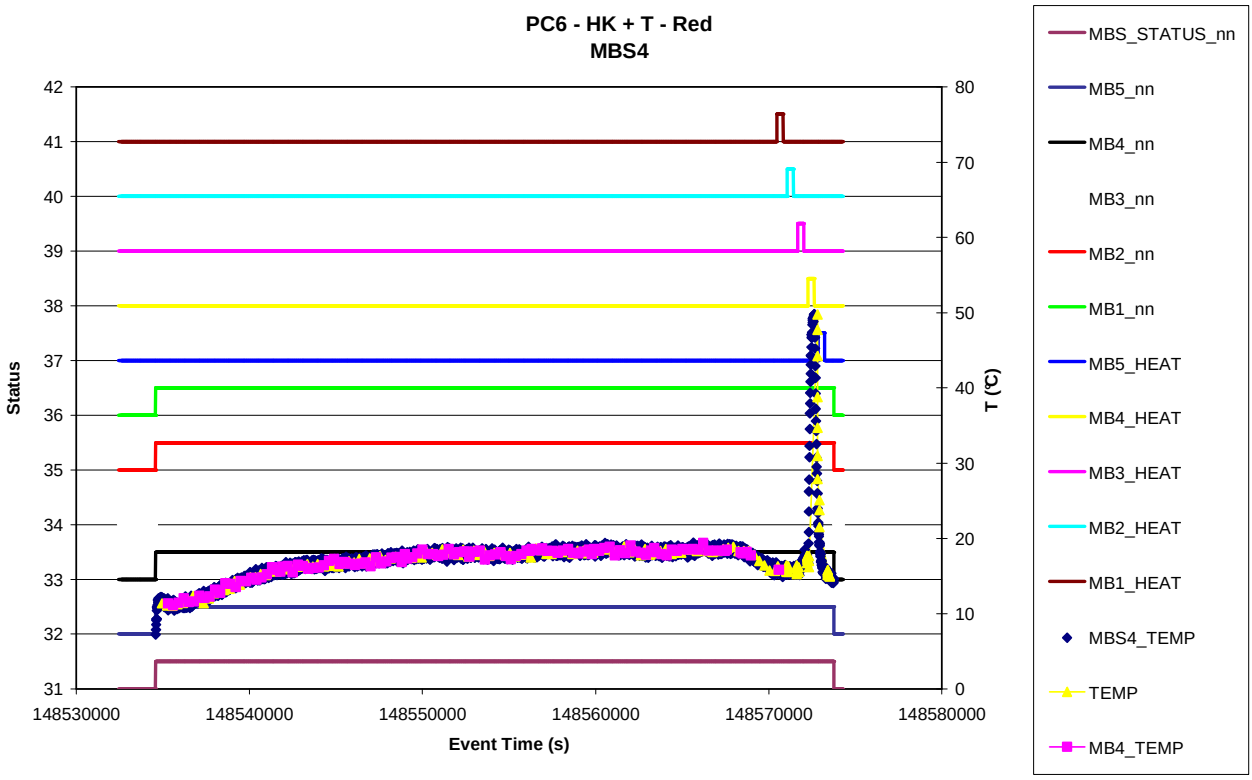
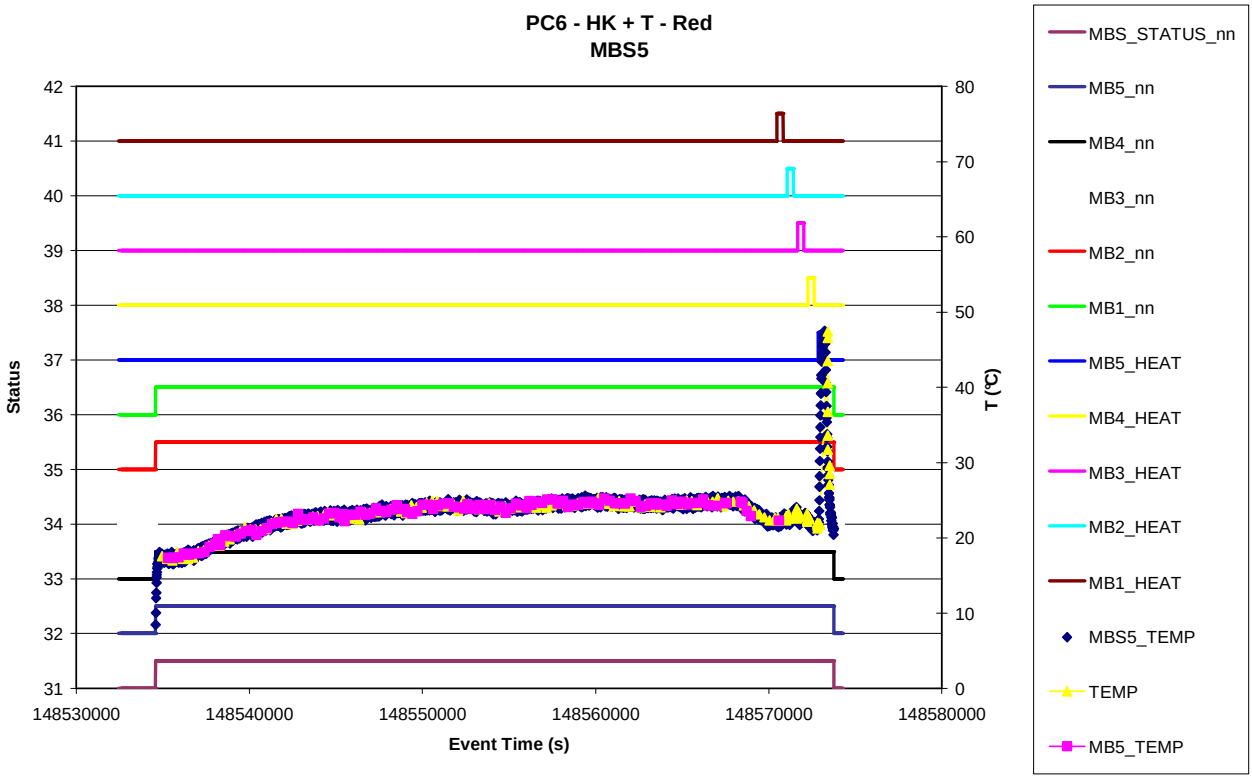


Figure 8.5-6. MBS 5 Temperature vs. time (HK, HK-SCI, SCI) - Red



8.5.2 MBS – Behaviour

8.5.2.1 Science Events (Normal + Heating)

Figure 8.5-7. MBS 1 Frequency and Temperature vs. time - Red

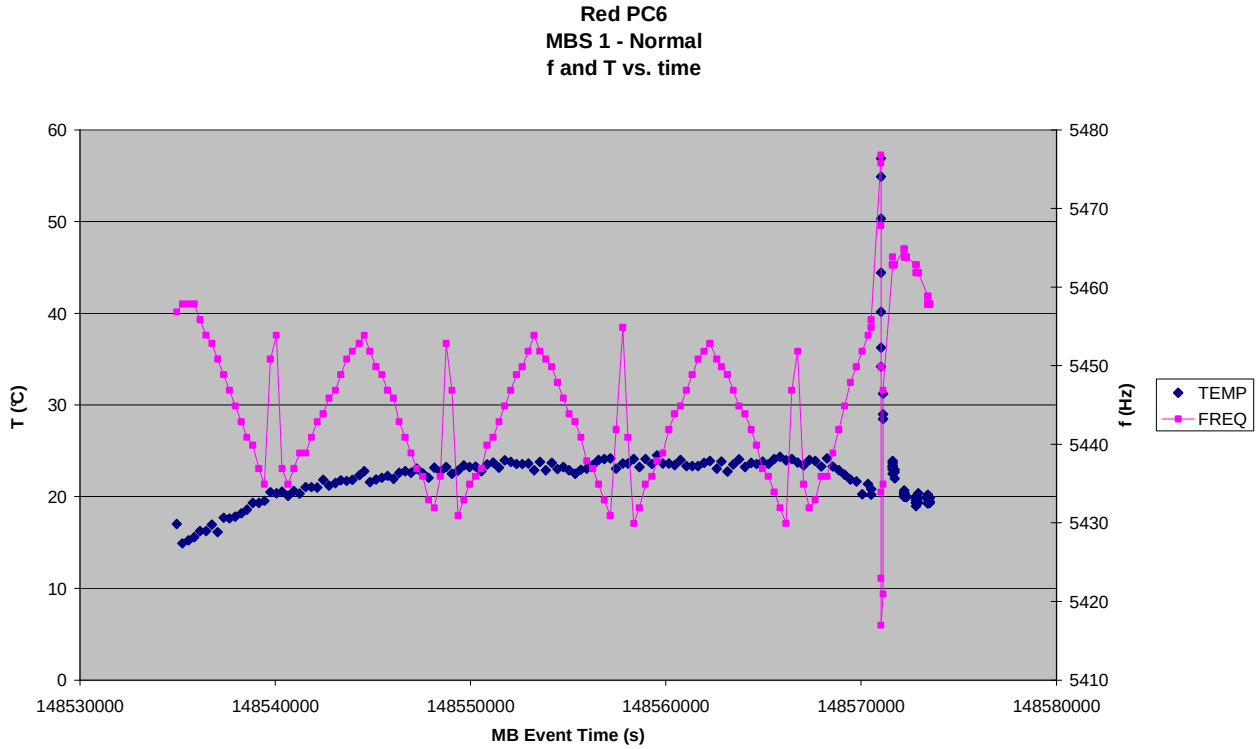


Figure 8.5-8. MBS 2 Frequency and Temperature vs. time - Red

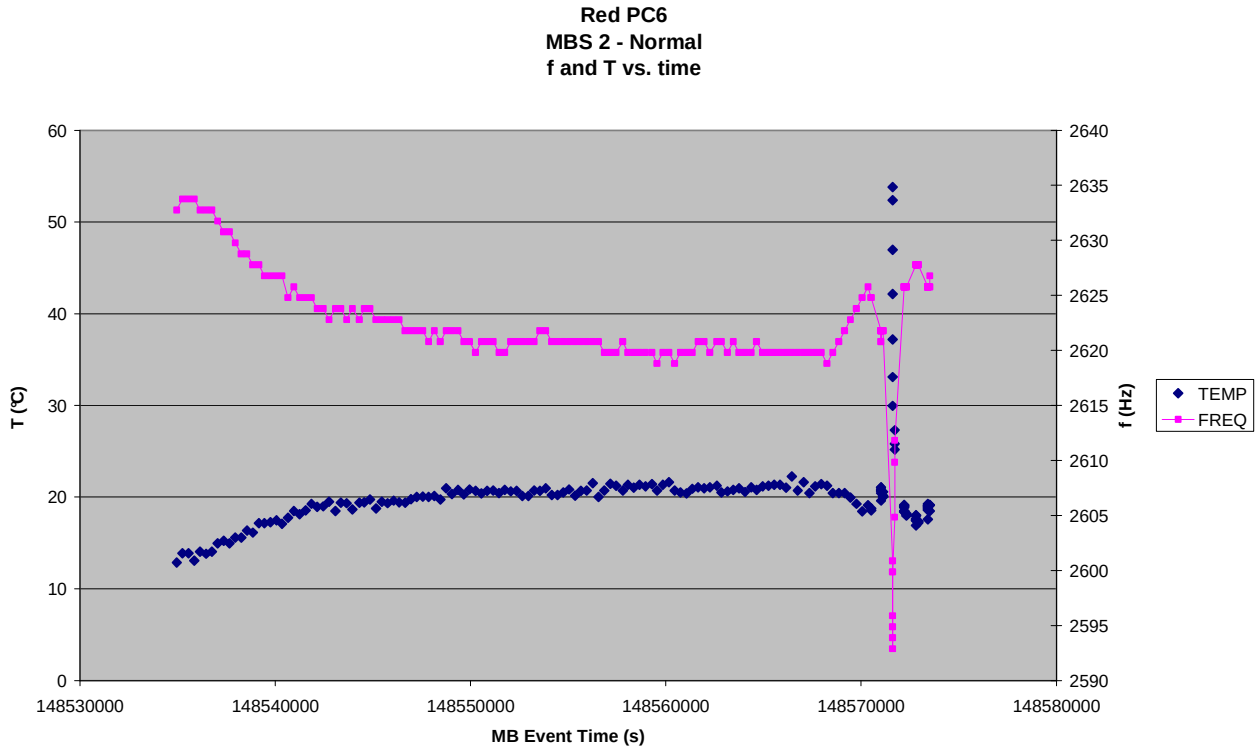


Figure 8.5-9. MBS 3 Frequency and Temperature vs. time - Red

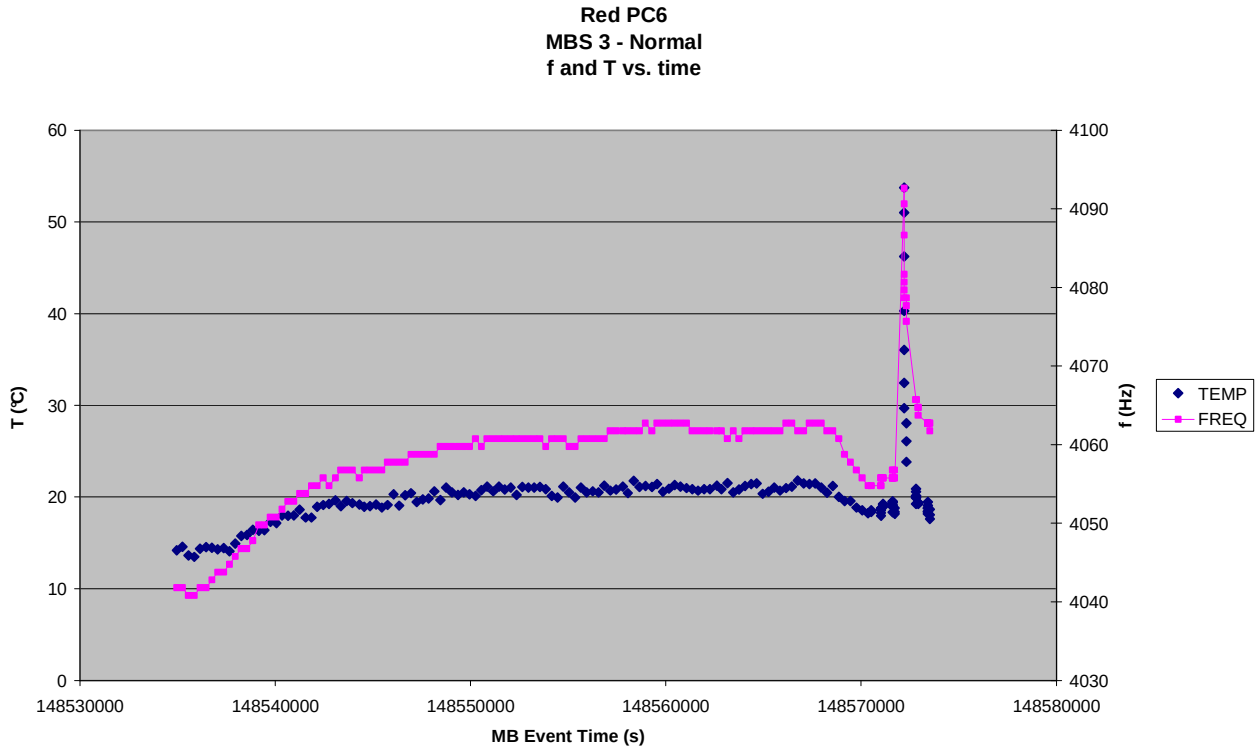


Figure 8.5-10. MBS 4 Frequency and Temperature vs. time - Red

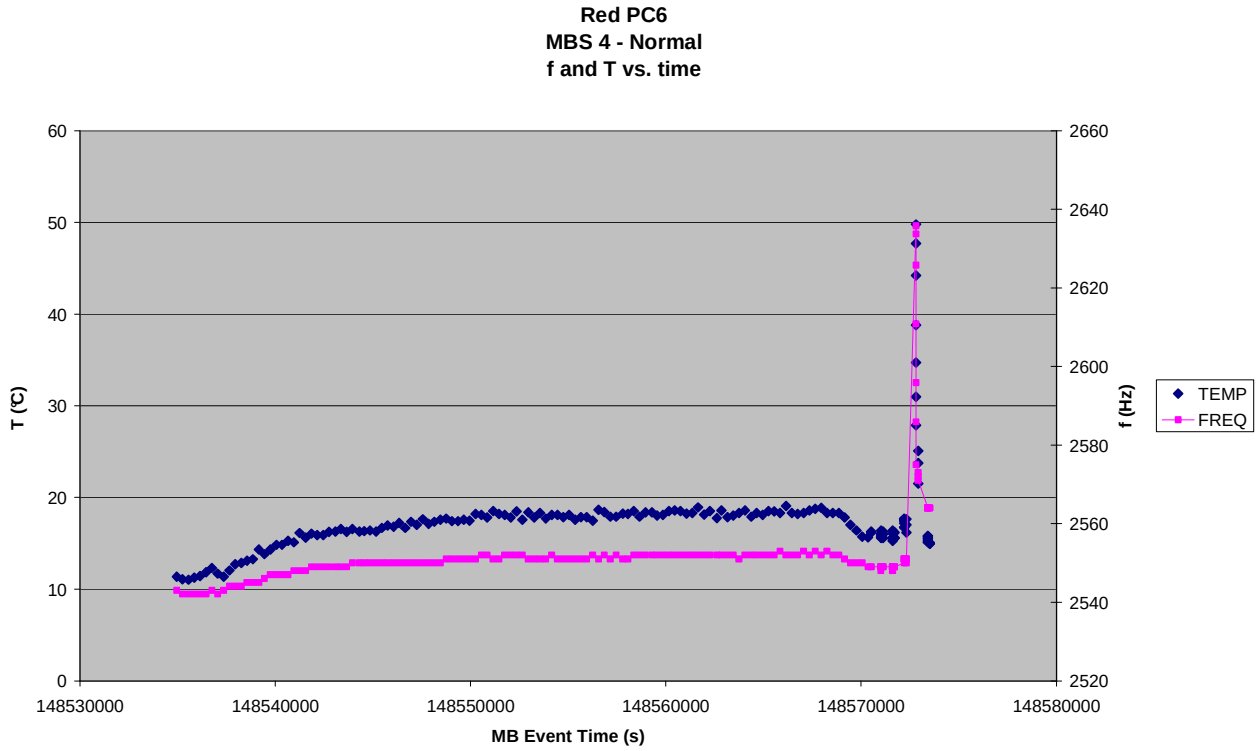


Figure 8.5-11. MBS 5 Frequency and Temperature vs. time - Red

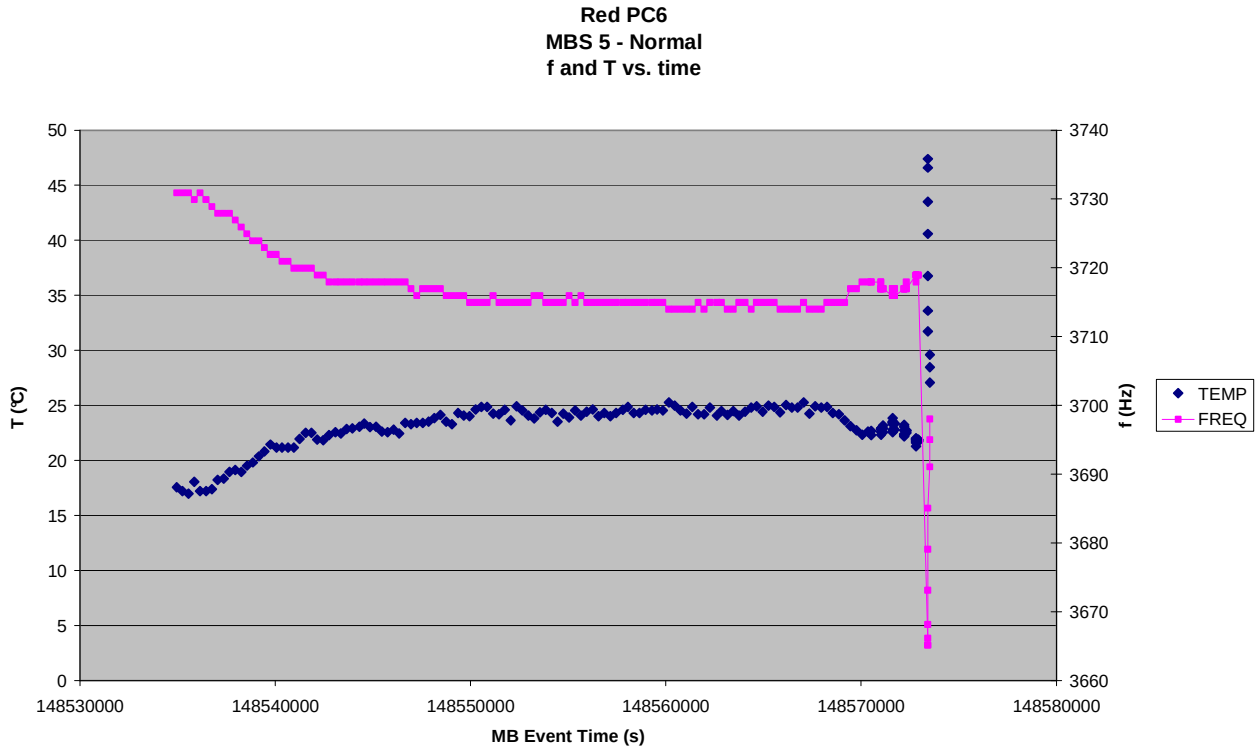


Figure 8.5-12. MBS 1 Frequency vs. Temperature - Red

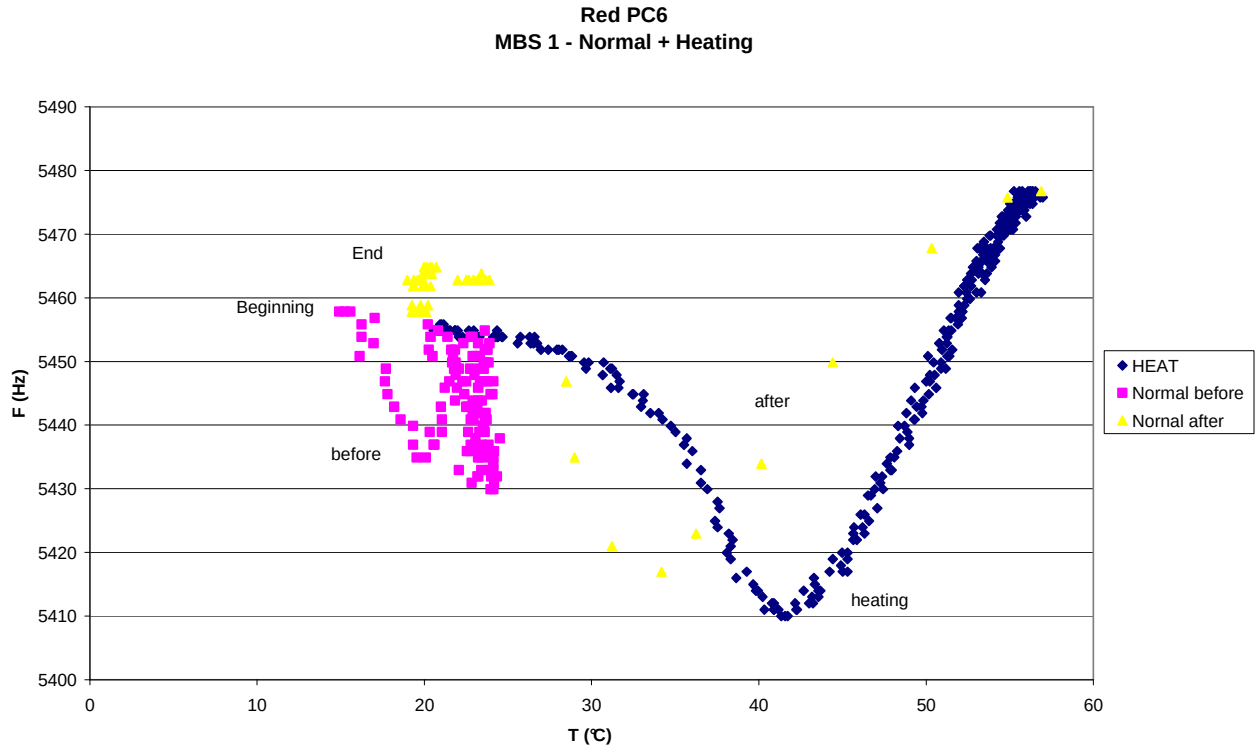


Figure 8.5-13. MBS 2 Frequency vs. Temperature - Red

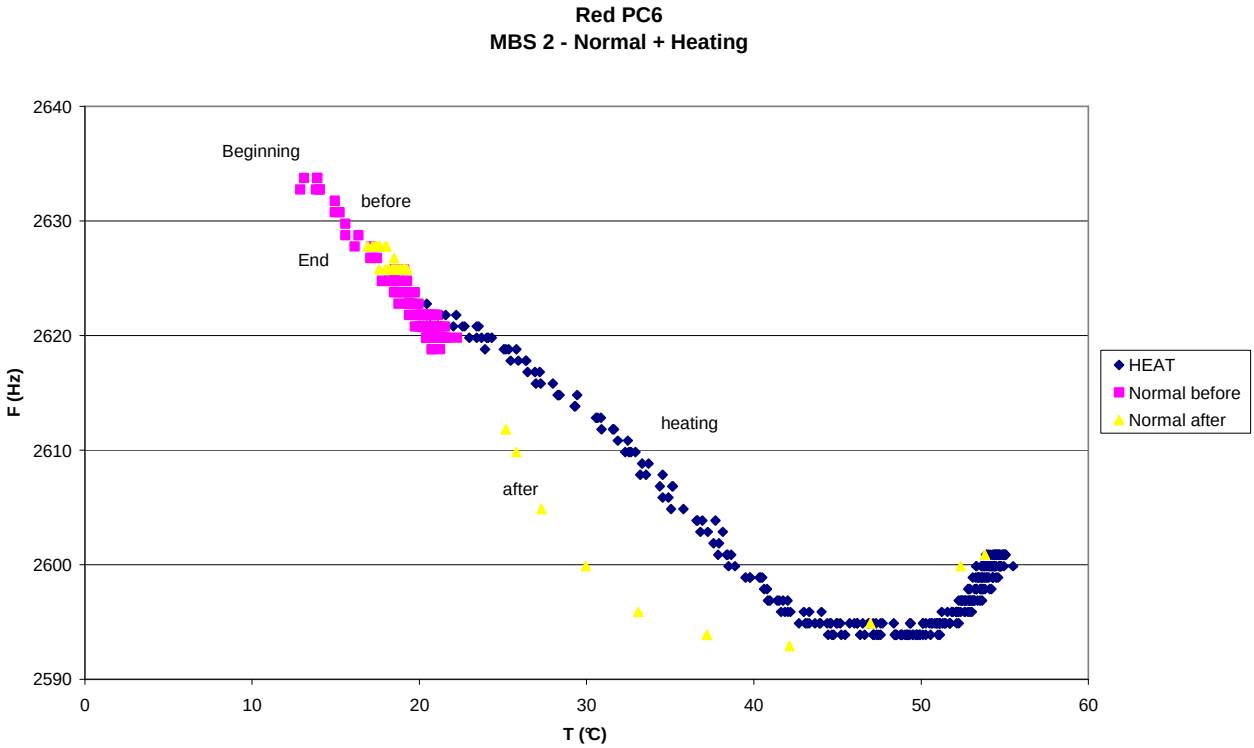


Figure 8.5-14. MBS 3 Frequency vs. Temperature - Red

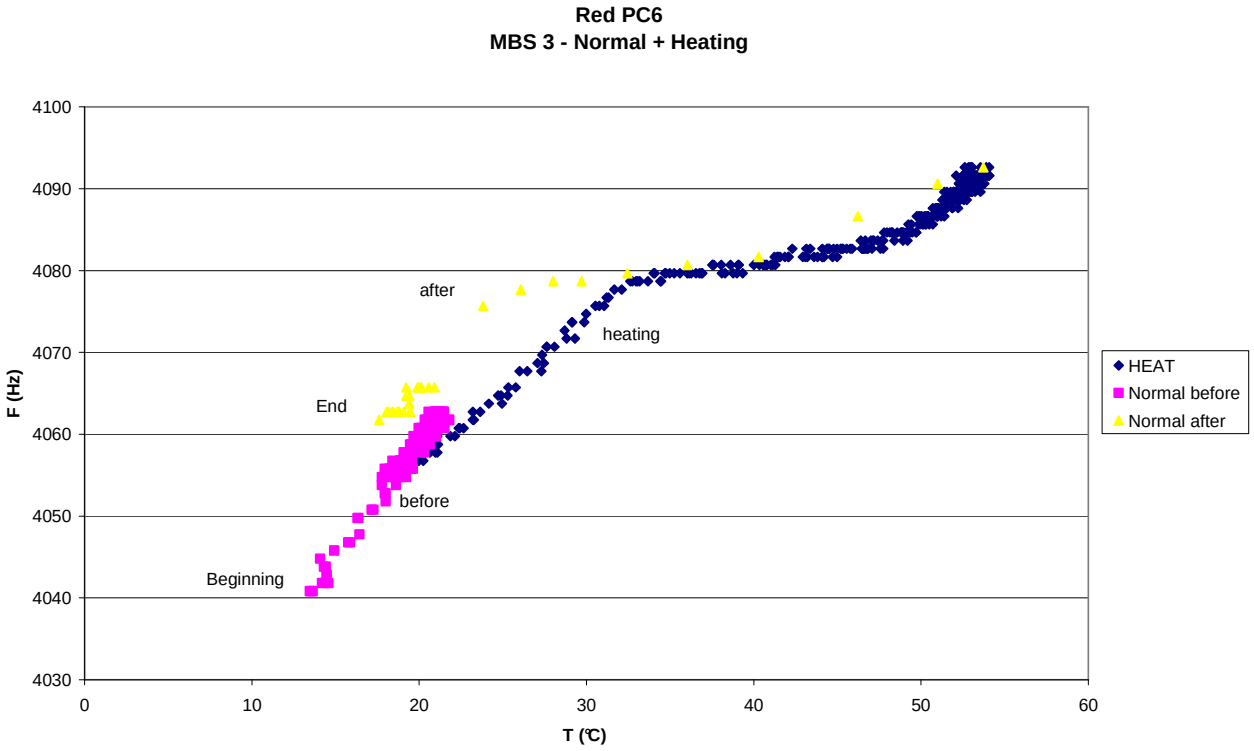


Figure 8.5-15. MBS 4 Frequency vs. Temperature - Red

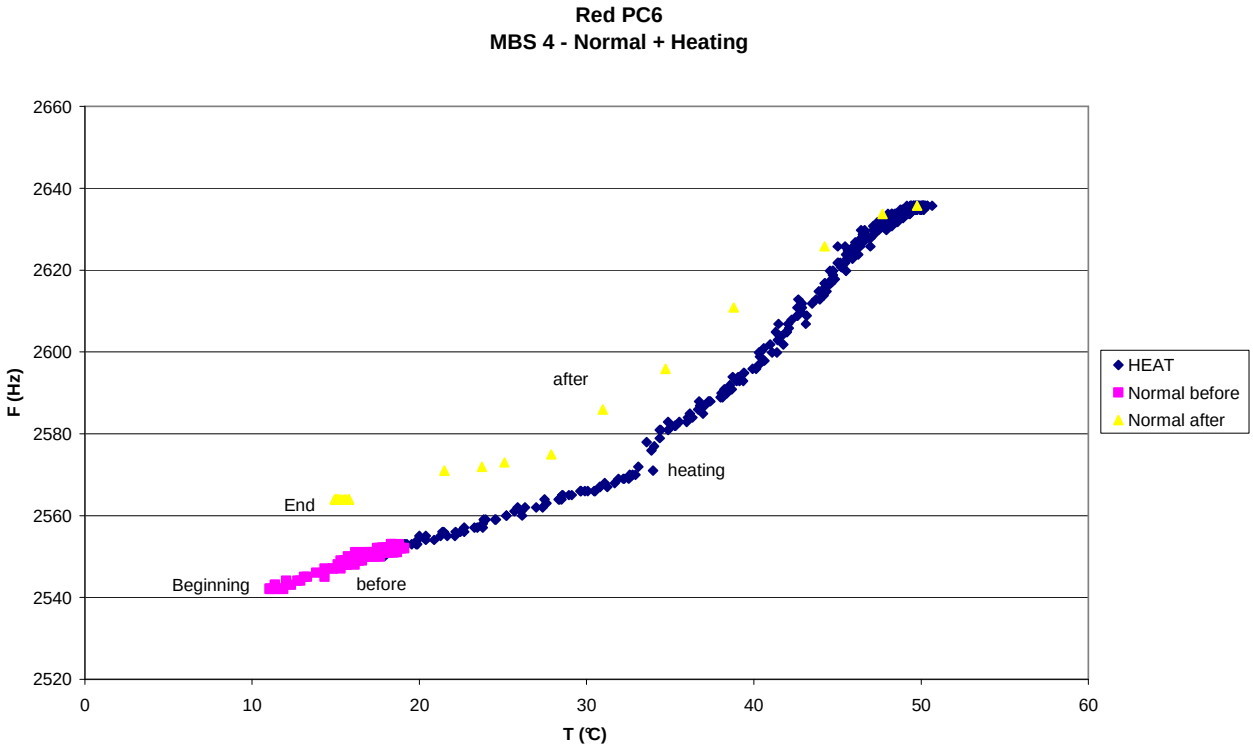
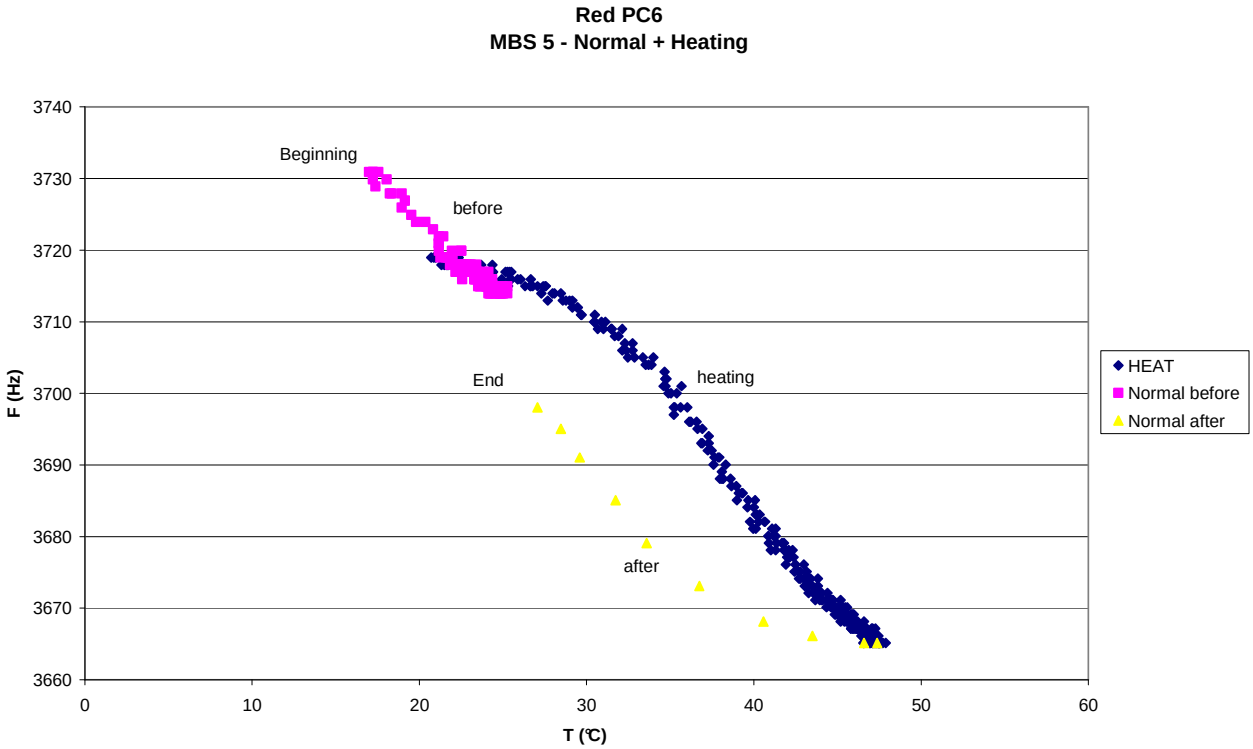


Figure 8.5-16. MBS 5 Frequency vs. Temperature - Red



9. PC6 DATA ANALYSIS – MAIN INTERFACE (GD02)

9.1 GIADA STATUS

Figure 9.1-1. HK Status of GIADA and S/S vs. time - Main

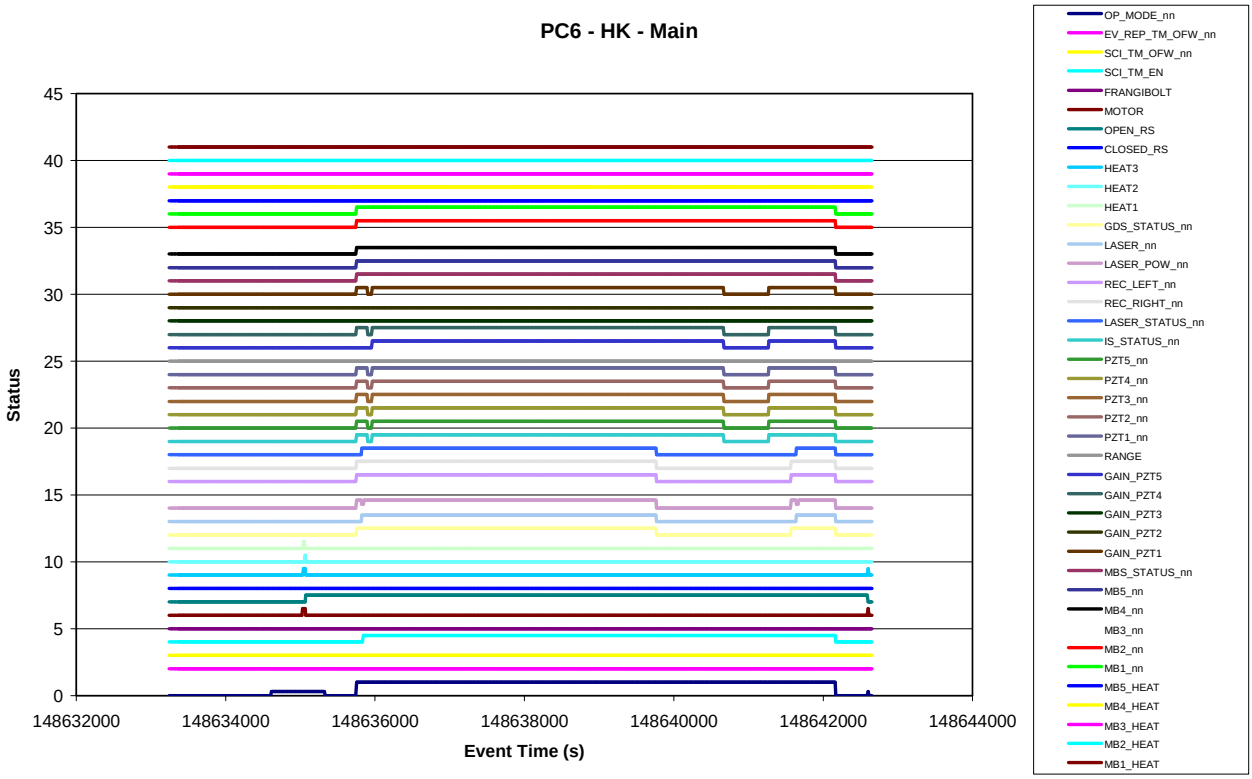


Figure 9.1-2. Evolution of all temperatures vs. time - HK, HK-SCI, SCI - Main

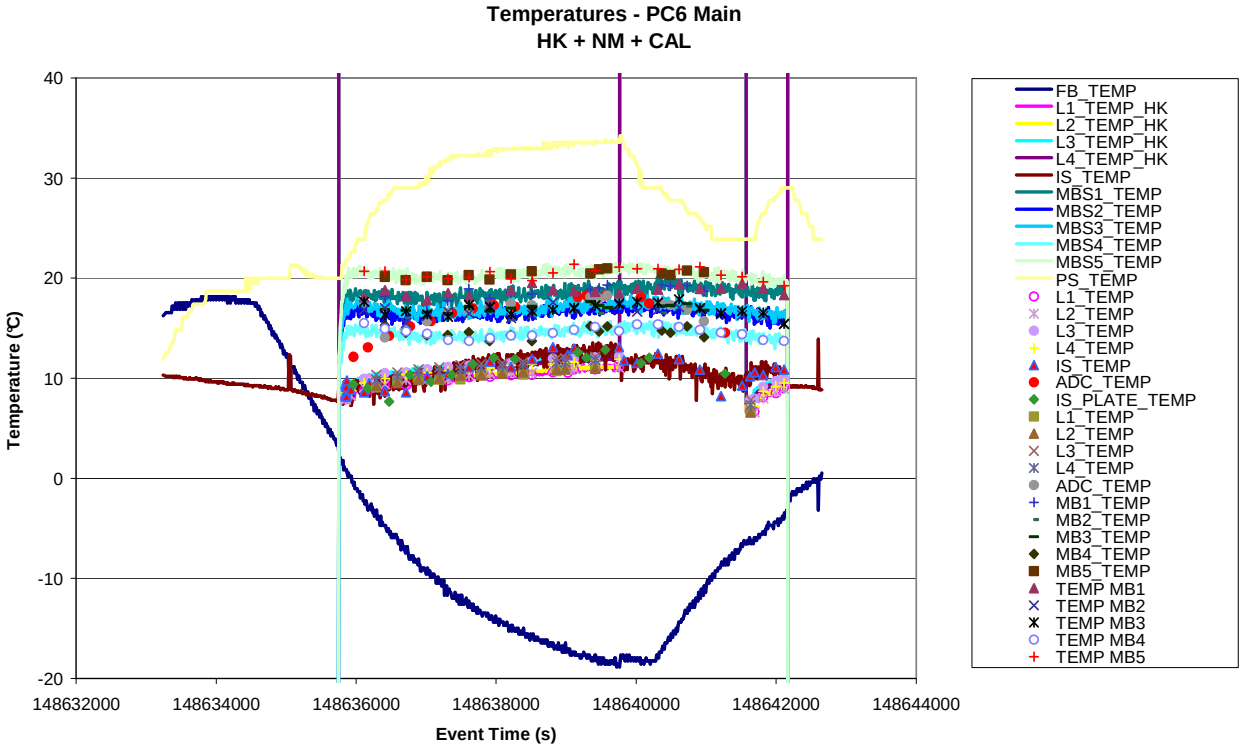


Figure 9.1-3. Evolution of temperatures of system elements vs. time - HK, HK-SCI, SCI - Main

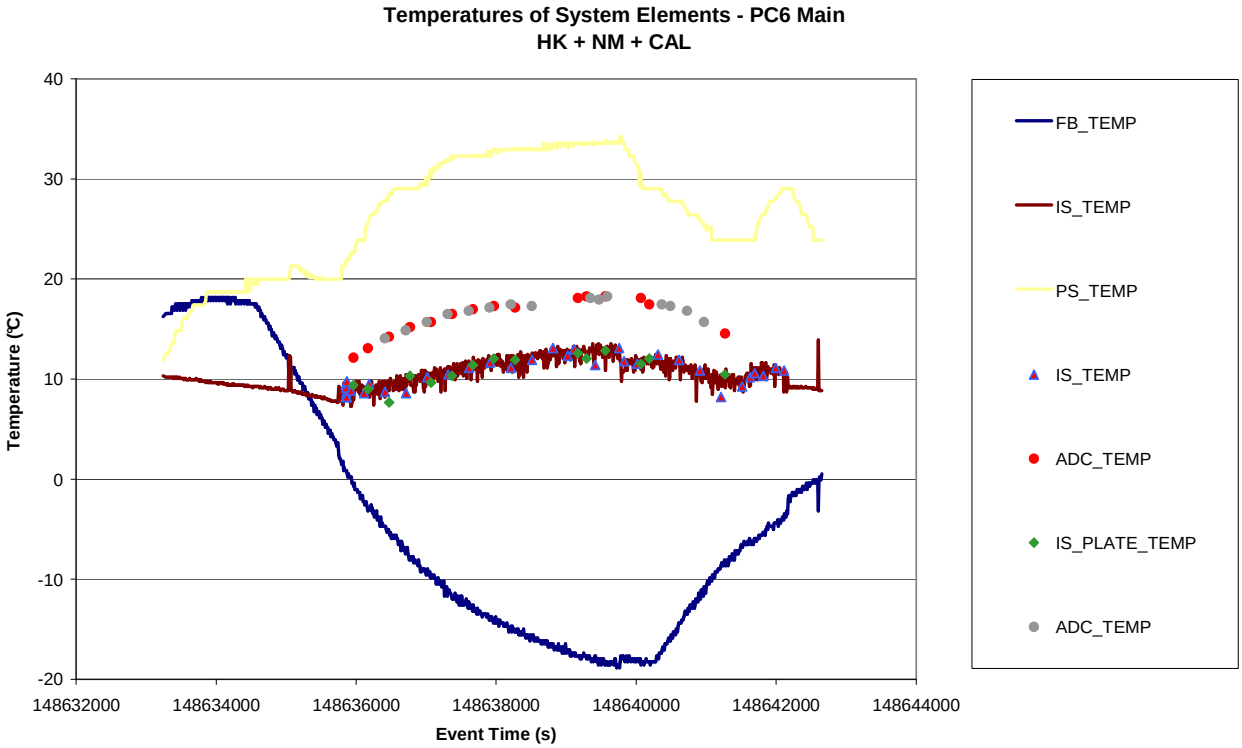


Figure 9.1-4. Evolution of temperatures of sub-systems vs. time - HK, HK-SCI, SCI - Main

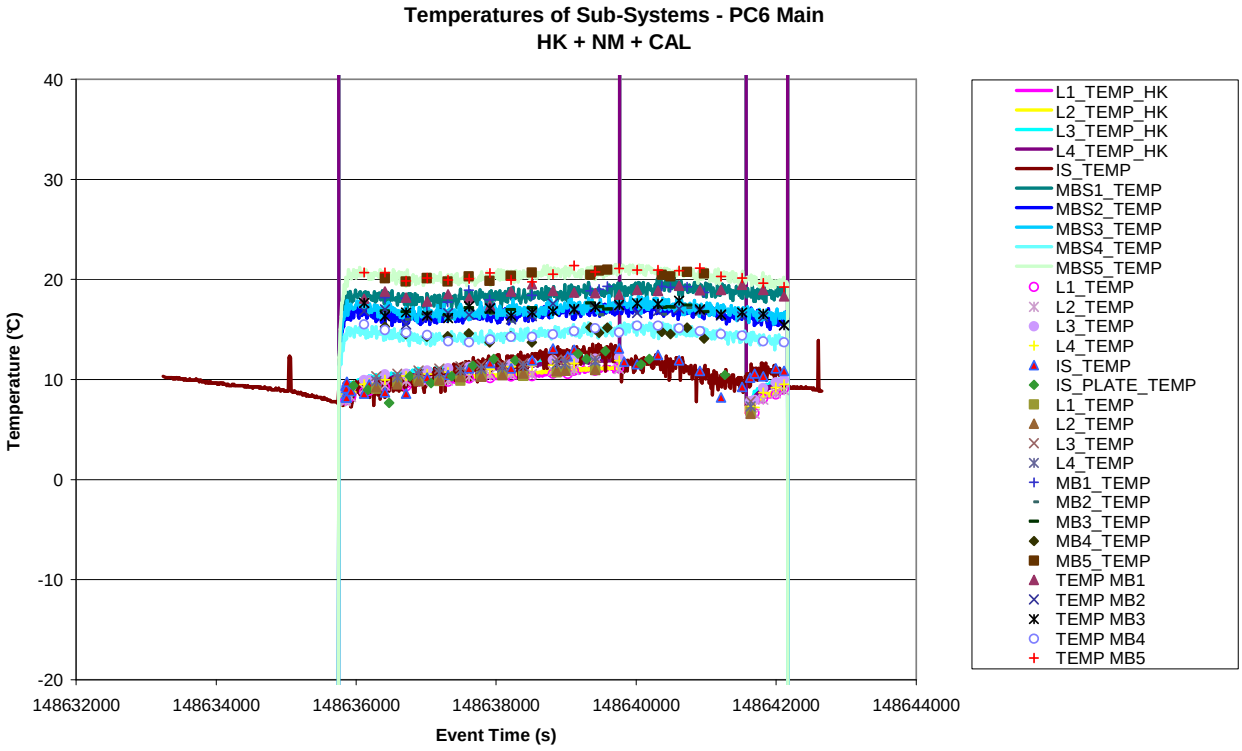


Figure 9.1-5. HK Status versus Temperatures of system elements - Main

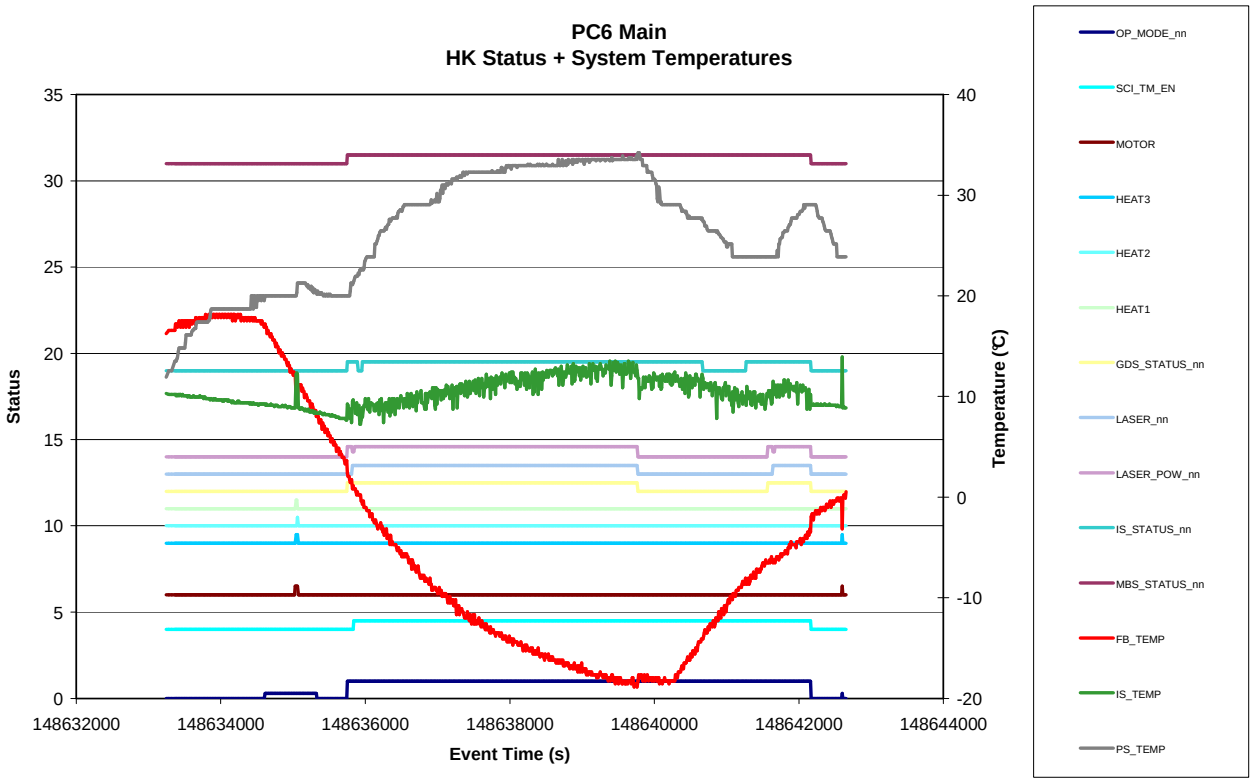


Figure 9.1-6. Operation Status vs. time - Main

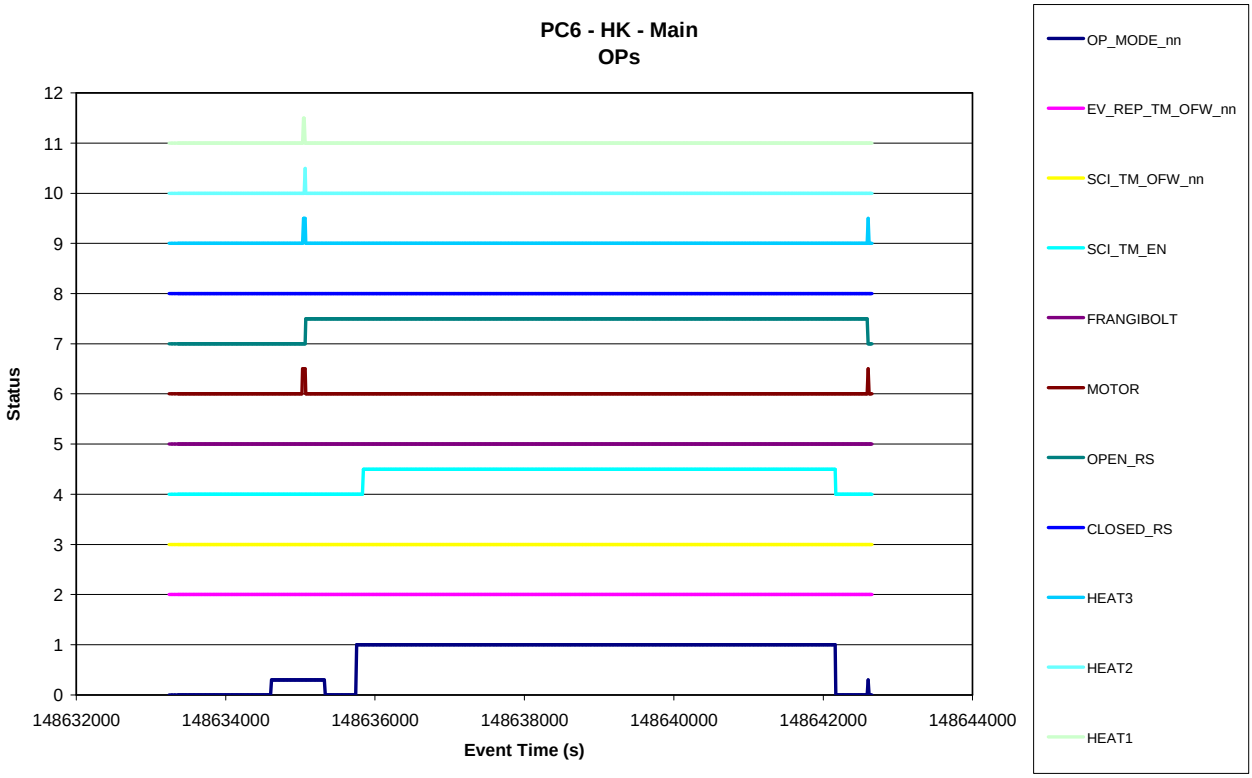


Figure 9.1-7. Operation Status versus Temperatures of system elements - Main

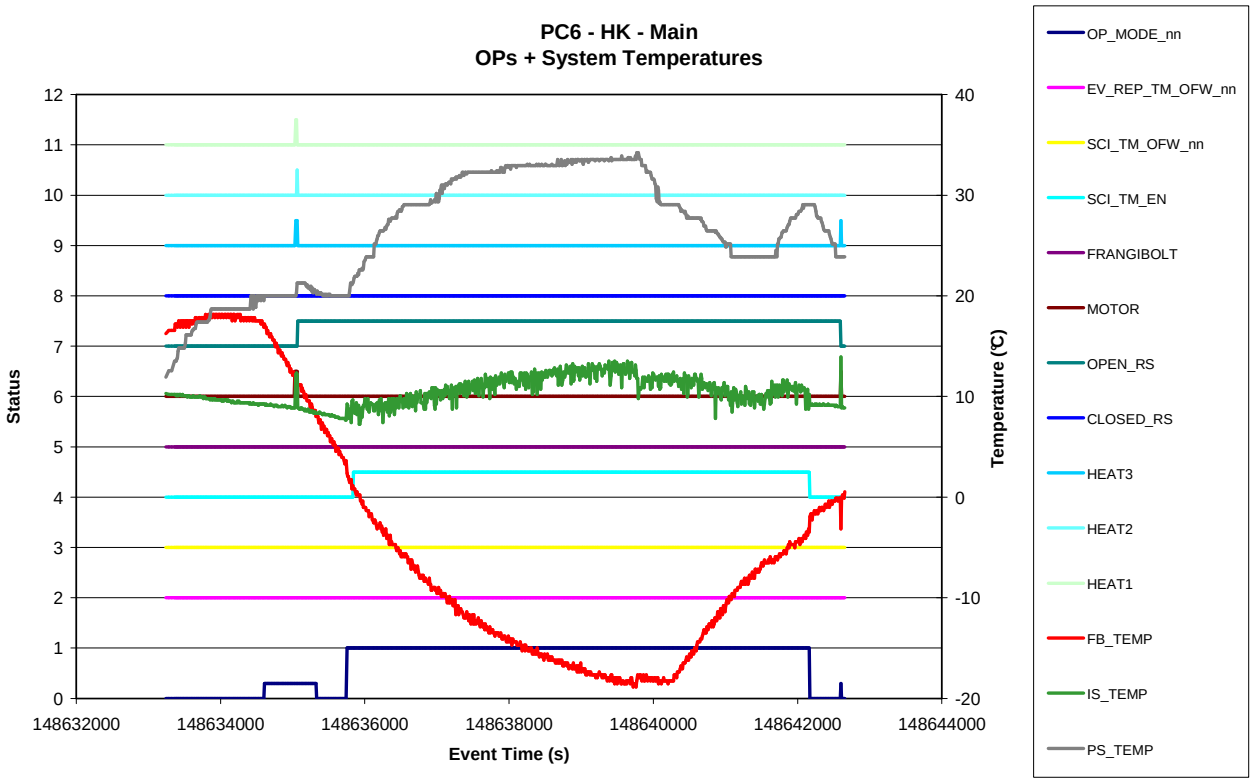


Figure 9.1-8. Power behaviour - Main

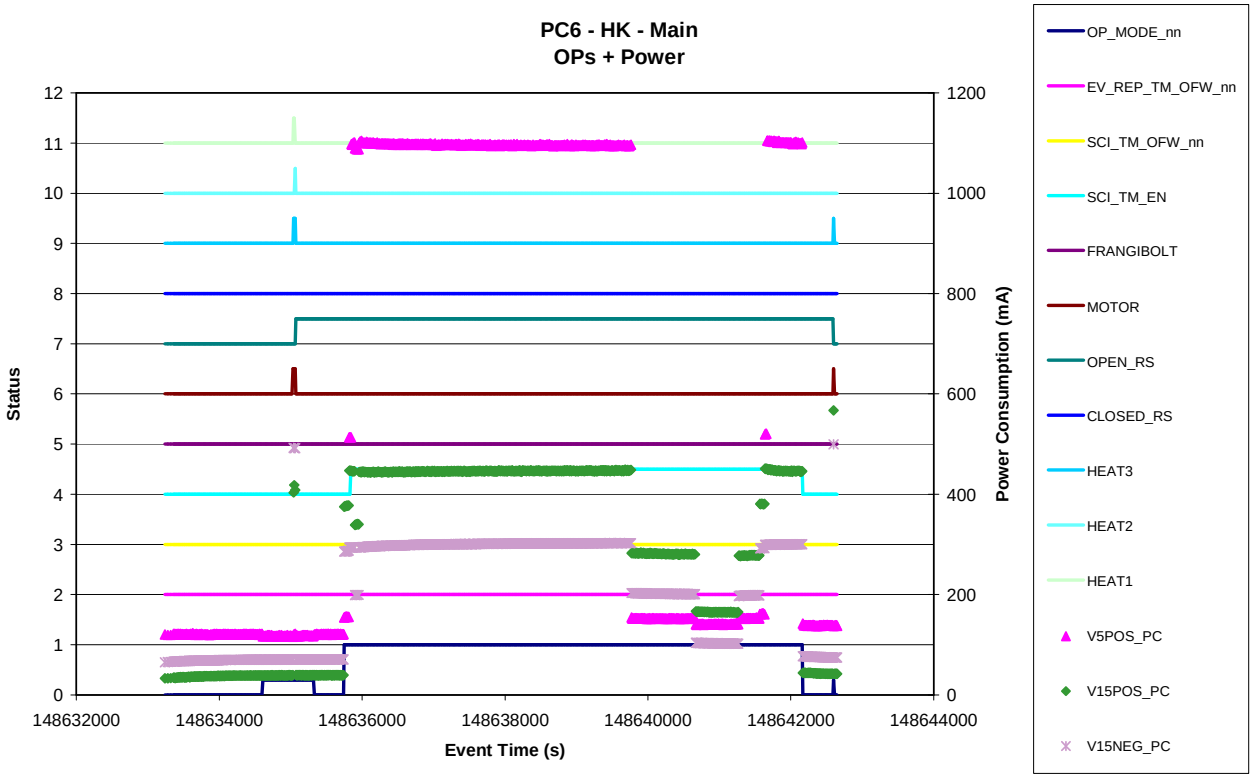


Figure 9.1-9. Power and PS temperature behaviour - Main

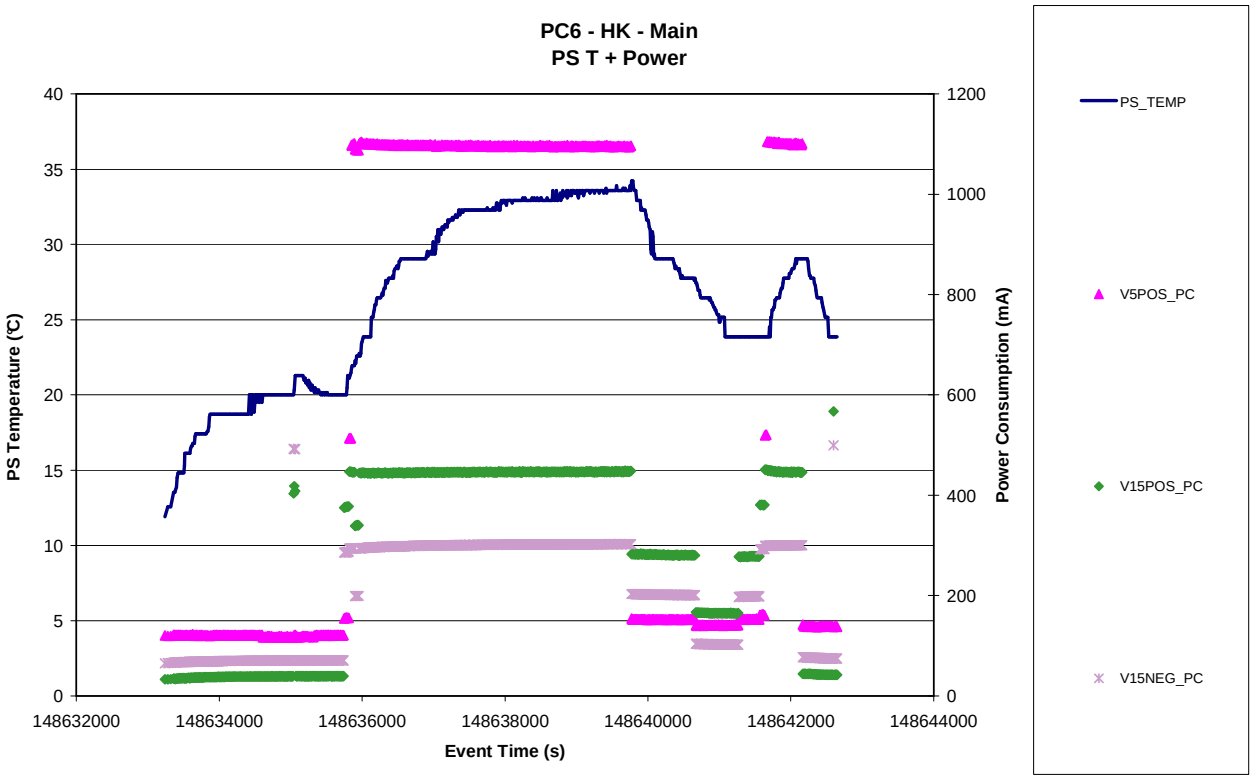


Figure 9.1-10. Source Sequence Count (SSC) of HK Telemetry vs. Time - Main

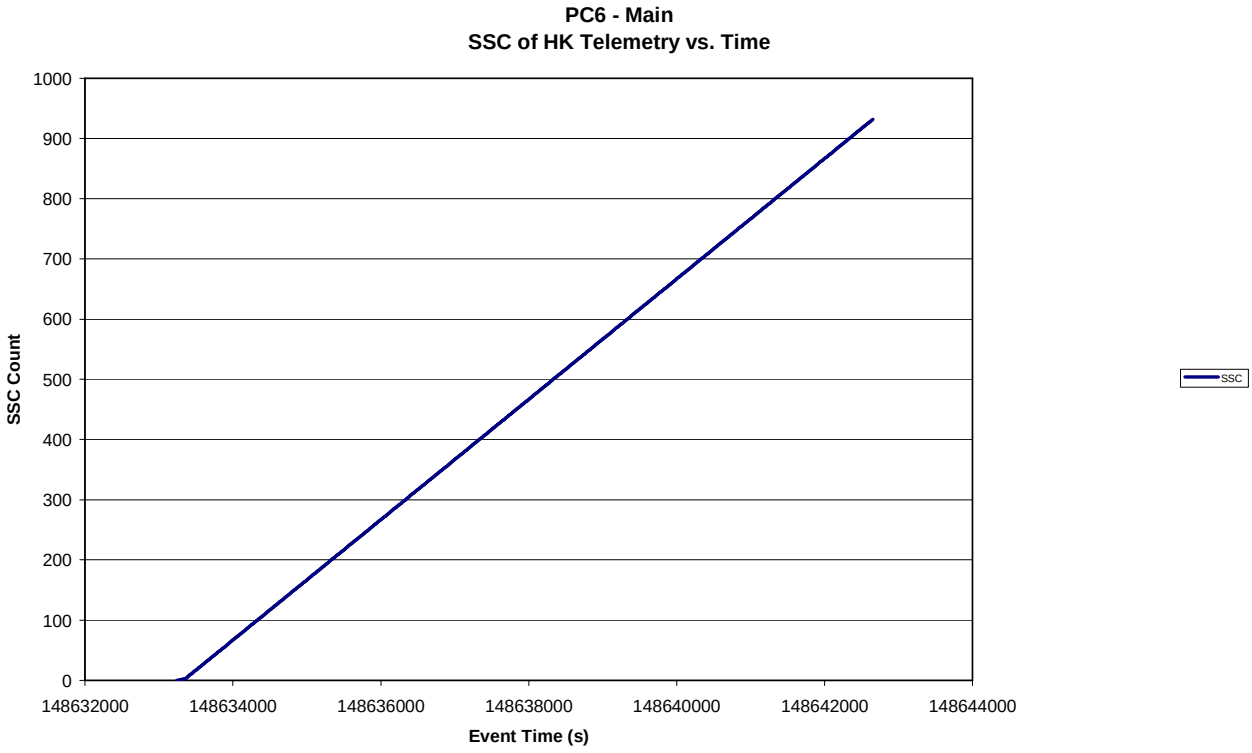


Figure 9.1-11. Source Sequence Count (SSC) of HK Telemetry vs. Number - Main

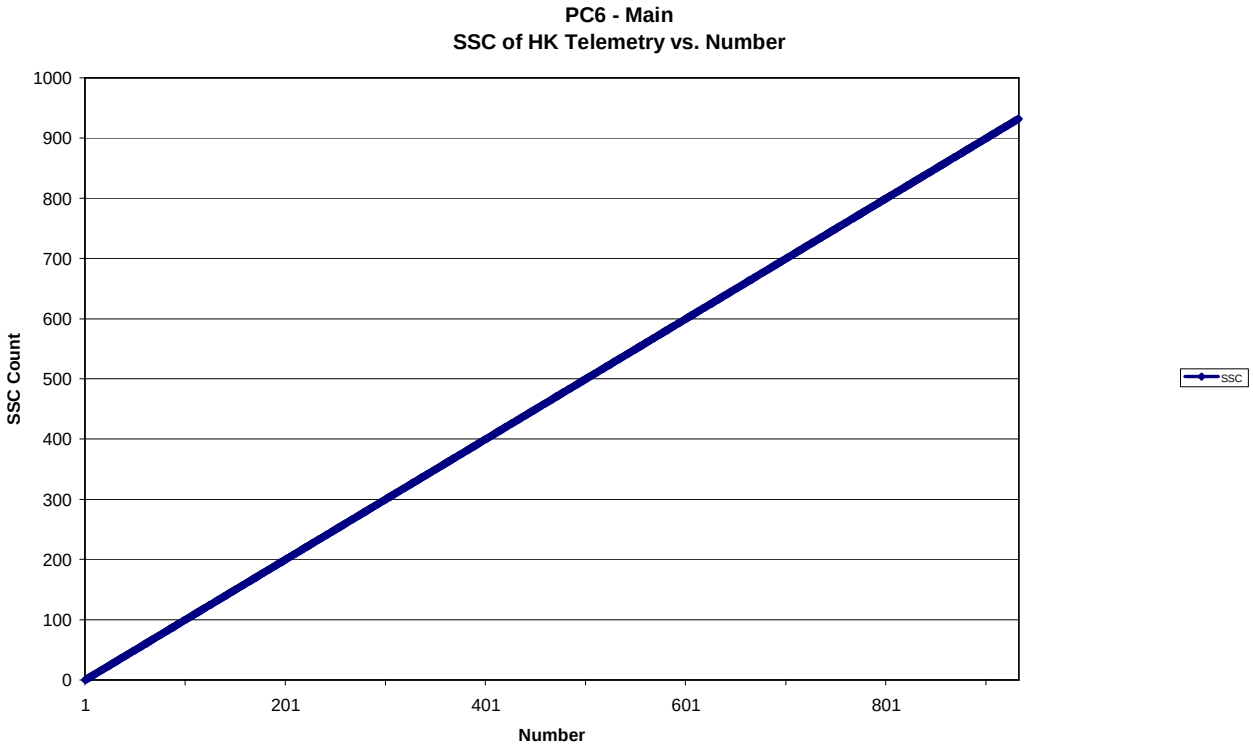


Figure 9.1-12. Source Sequence Count (SSC) of SCI Telemetry vs. Time - Main

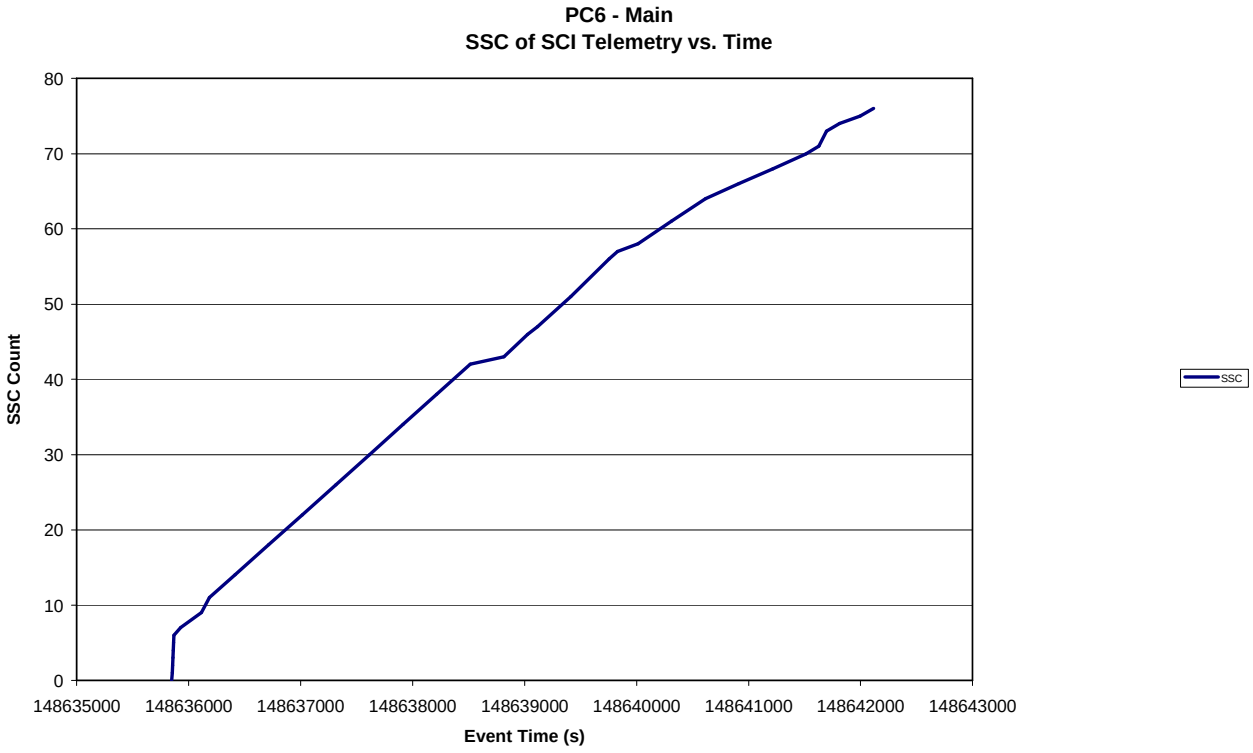
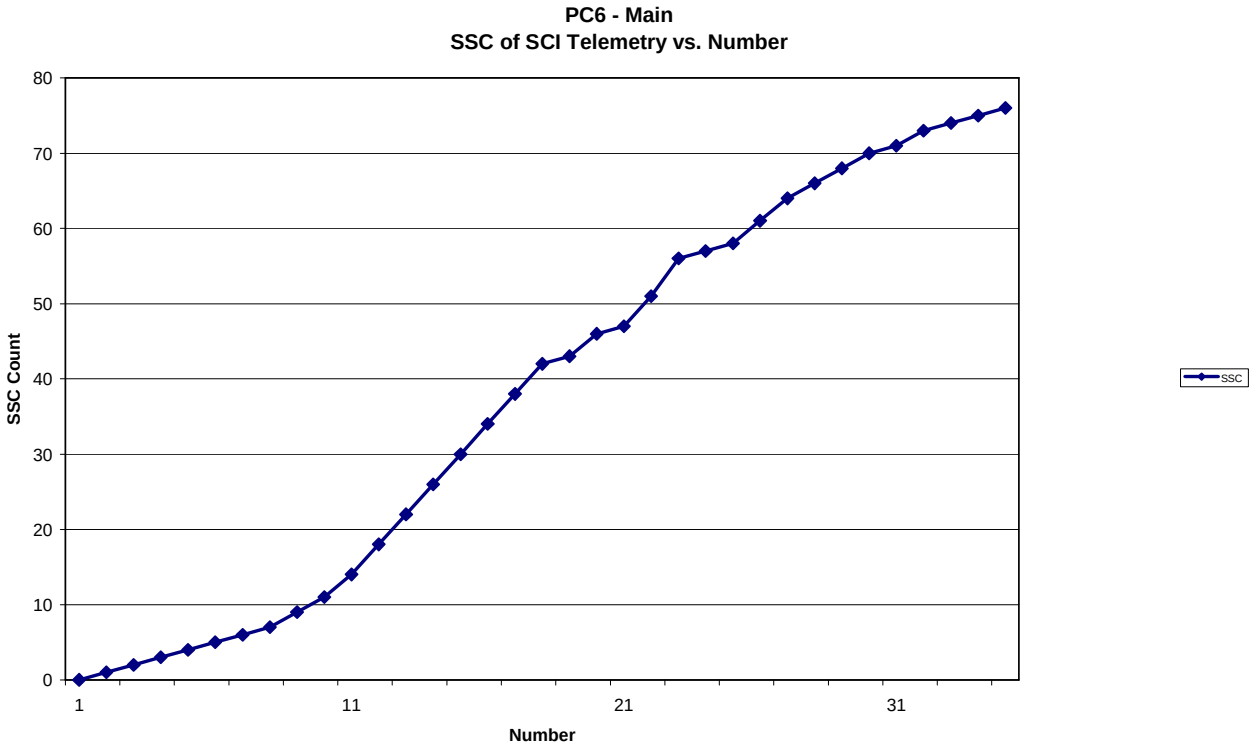


Figure 9.1-13. Source Sequence Count (SSC) of SCI Telemetry vs. Number - Main



9.2 COVER REPORTS

9.2.1 Open Cover

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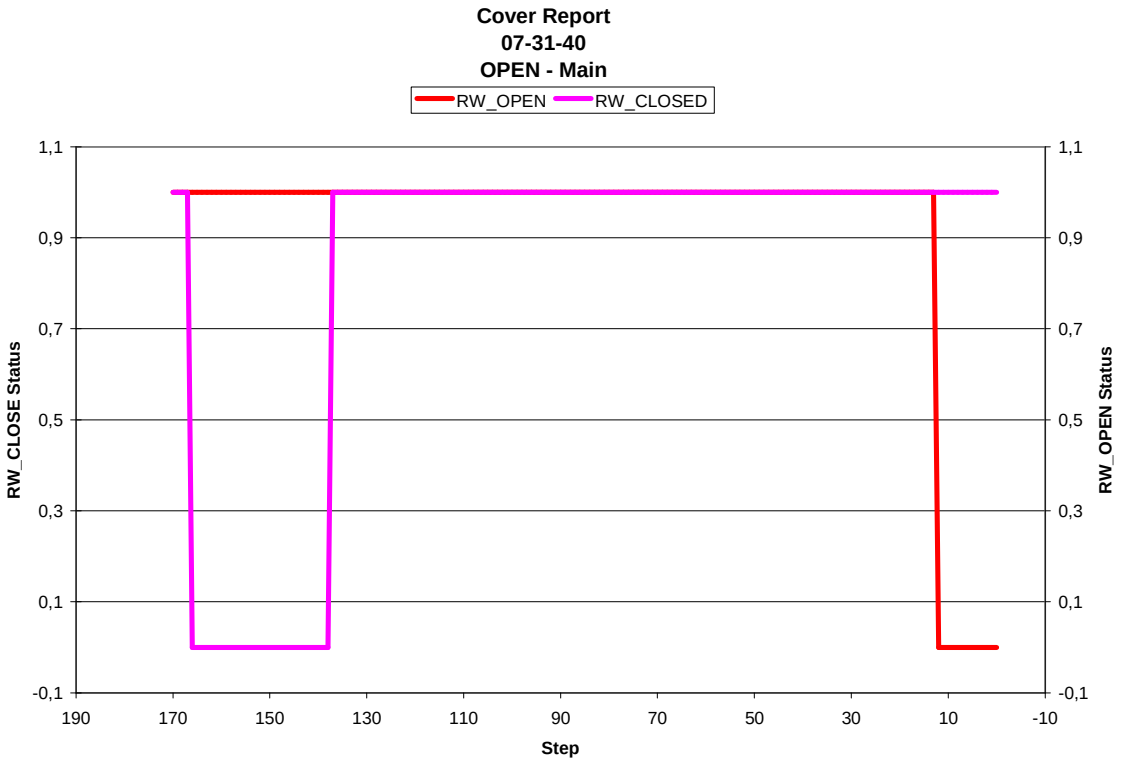
USER=AA0000
HEADER_END
//
// Generated by 'GIADA_EGSE_SW '
//
MOVEMENT DIRECTION: To open
BEGIN TIME OF OPERATION: 148635056.000000
END TIME OF OPERATION: 148635072.000000

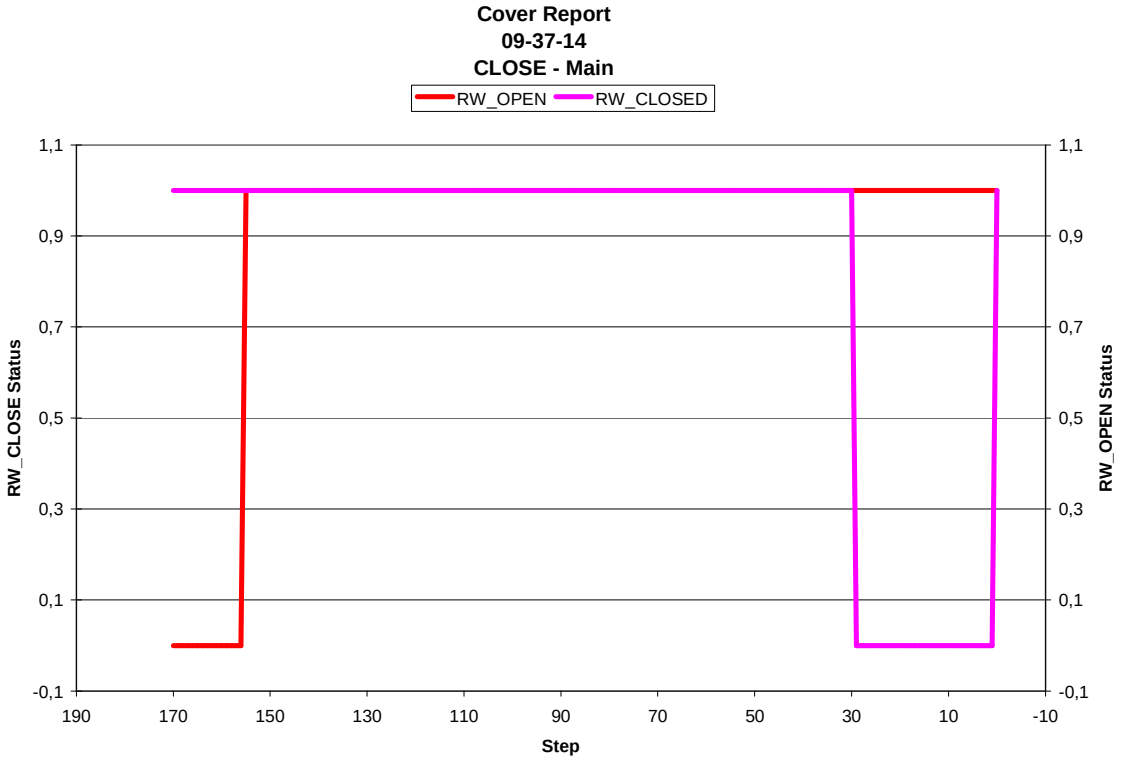
Figure 9.2-1 Cover Report – Open - Main



9.2.2 Close Cover

HEADER_START
CREATION_TIME=2007-09-17T09:37:14Z
USER=AA0000
HEADER_END
//
// Generated by 'GIADA_EGSE_SW '
//
MOVEMENT DIRECTION: To close
BEGIN TIME OF OPERATION: 148642592.000000
END TIME OF OPERATION: 148642608.000000

Figure 9.2-2 Cover Report – Close - Main



9.3 GRAIN DETECTION SYSTEM (GDS)

9.3.1 GDS – Status

Figure 9.3-1. GDS Operation Status vs. time - Main

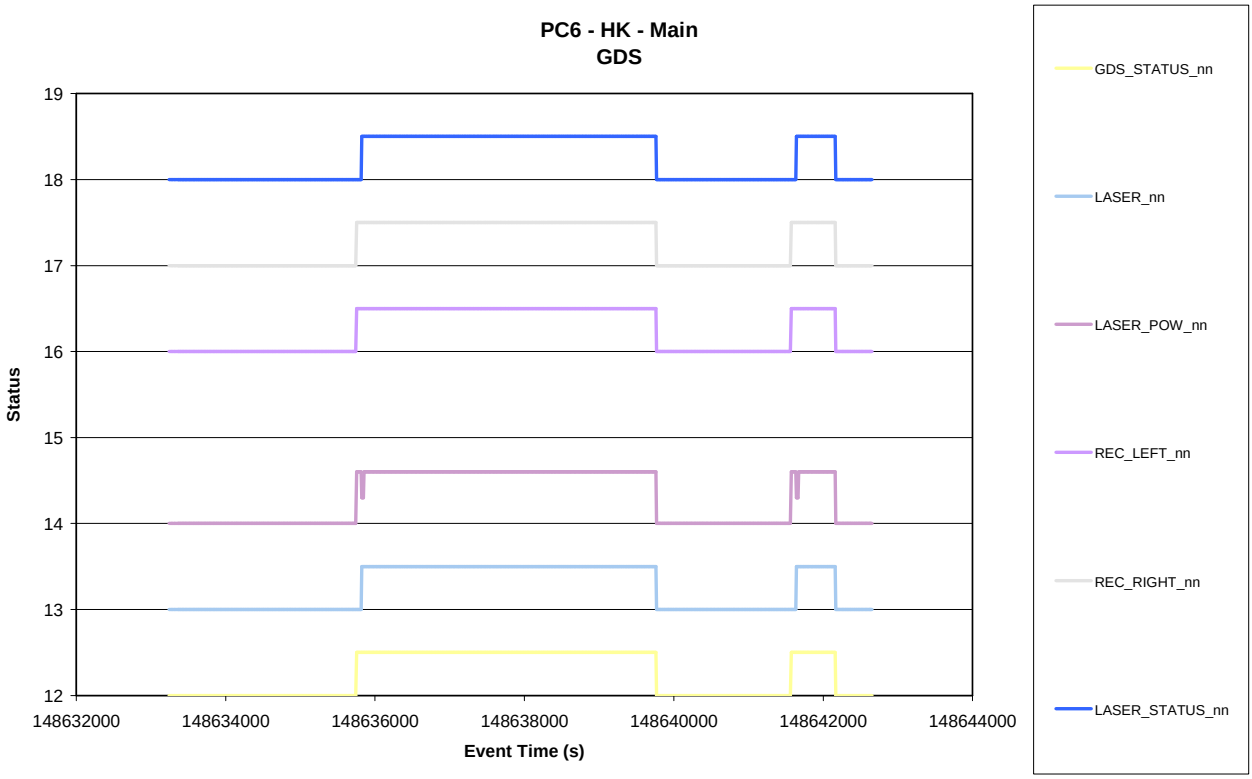


Figure 9.3-2. GDS Thresholds change vs. time - Main

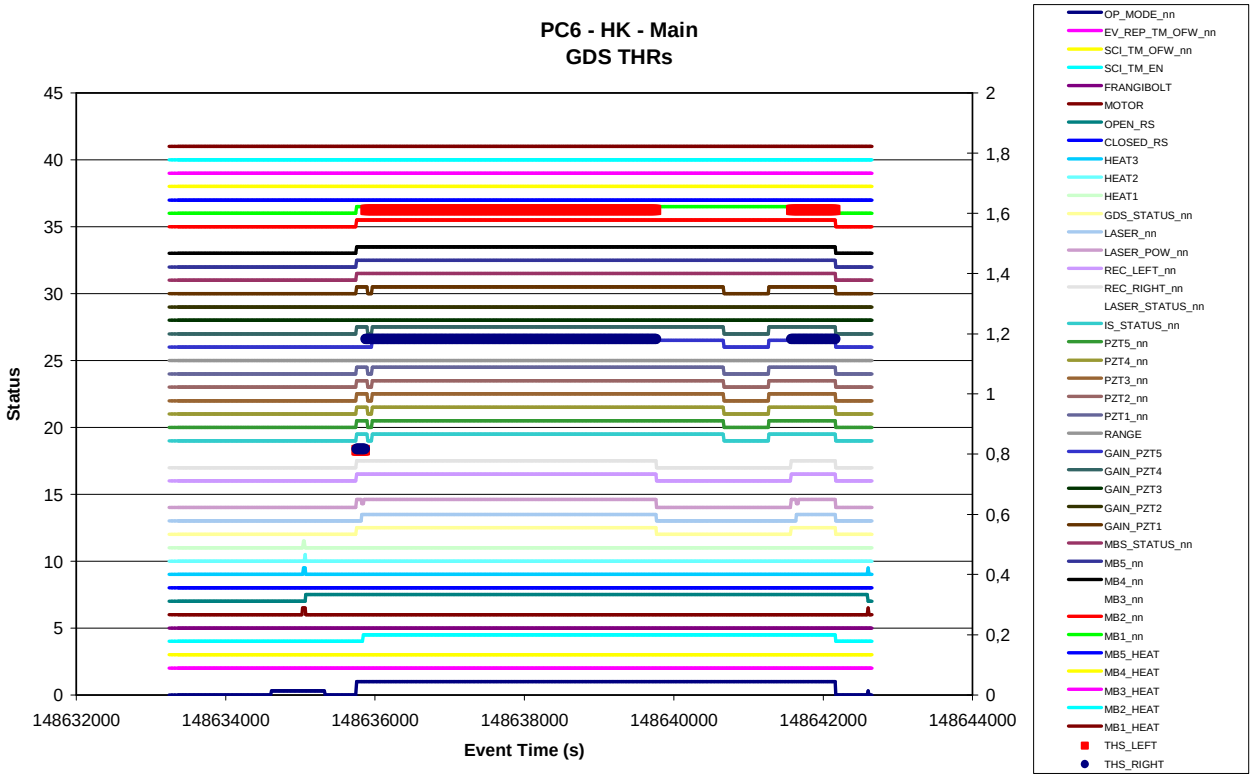


Figure 9.3-3. GDS Laser Temperatures vs. time (HK, HK-SCI, SCI) - Main

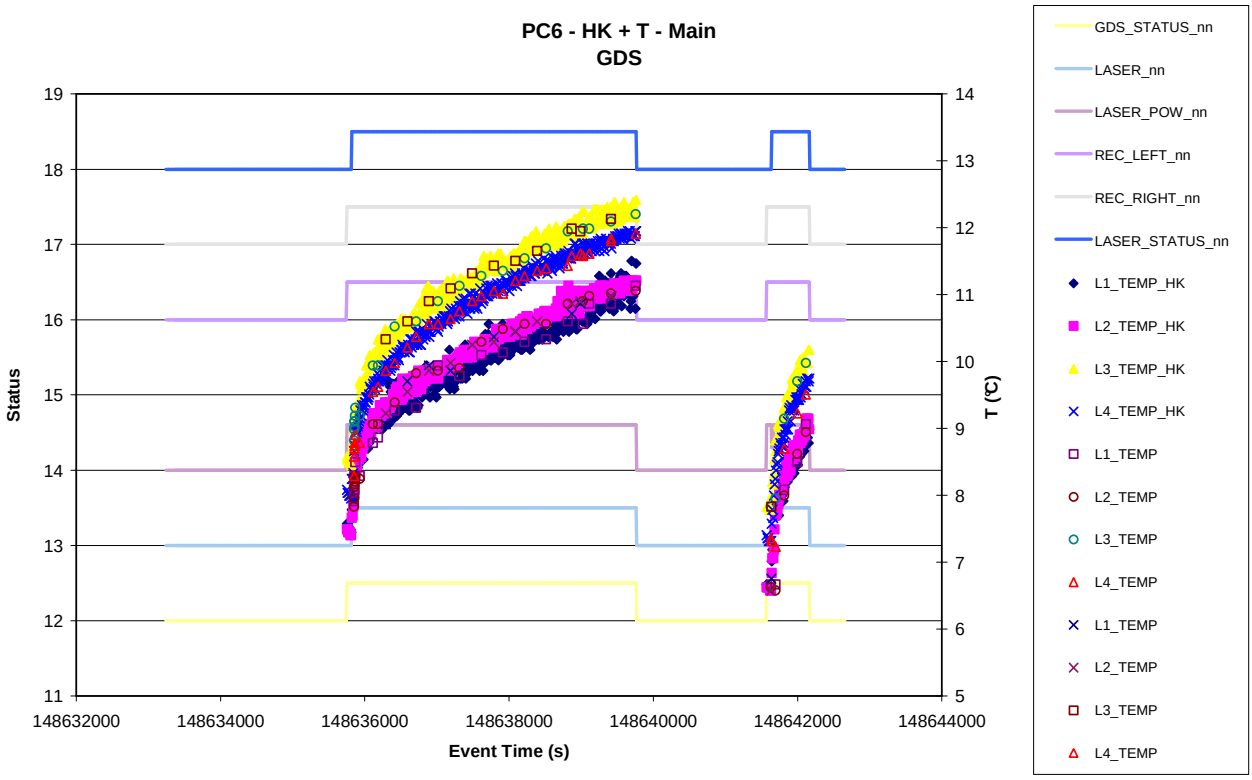


Figure 9.3-4. GDS Laser Monitor vs. time (HK, HK-SCI, SCI) - Main

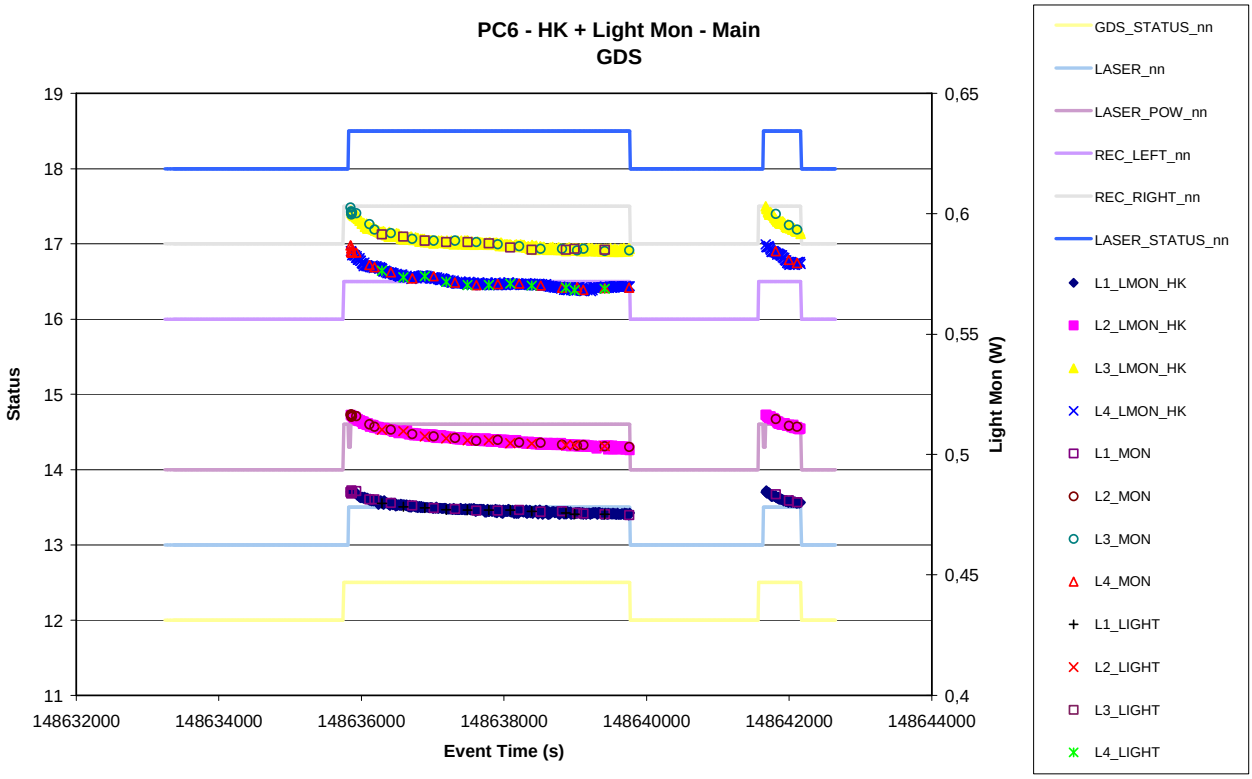


Figure 9.3-5. Laser 1 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main

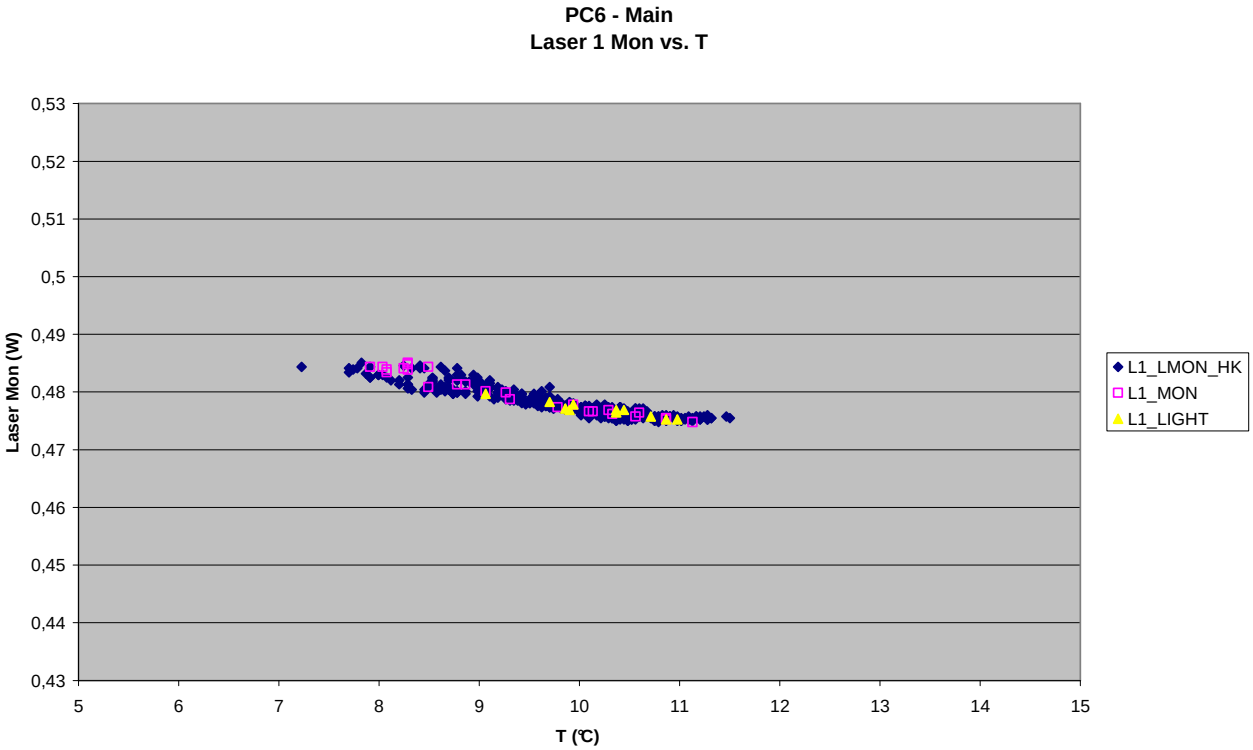


Figure 9.3-6. Laser 2 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main

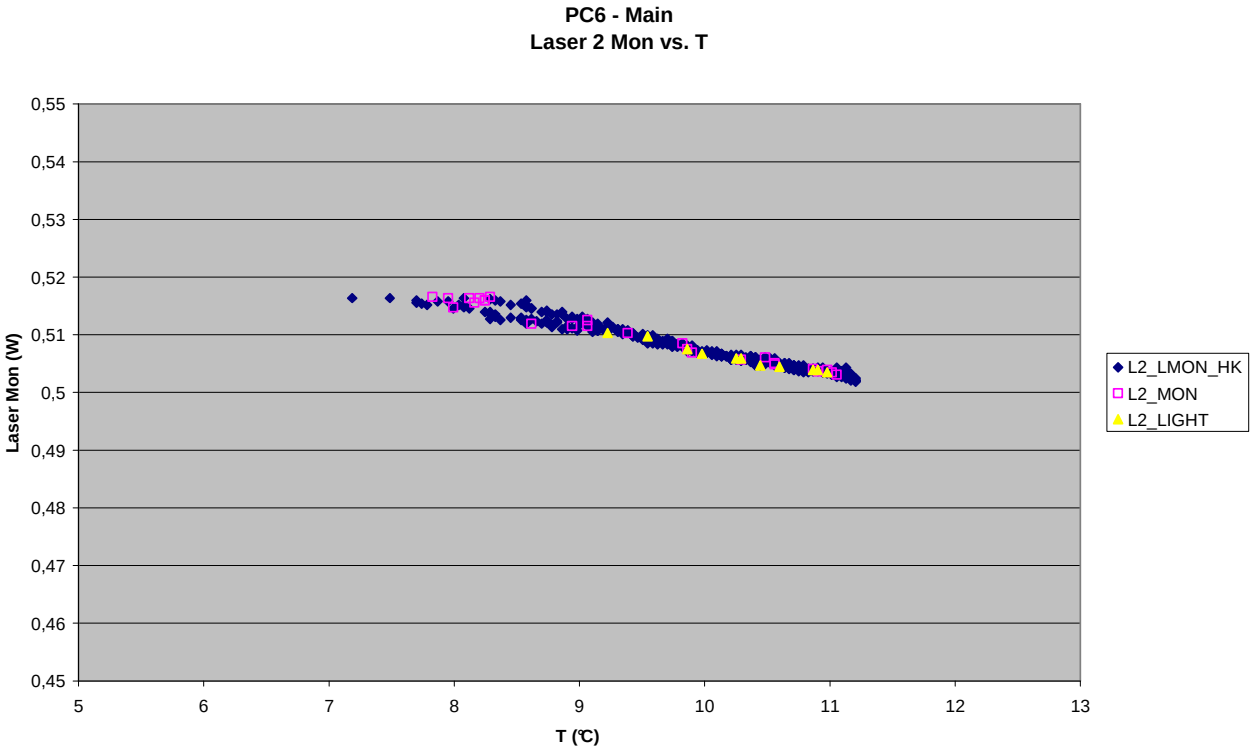


Figure 9.3-7. Laser 3 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main

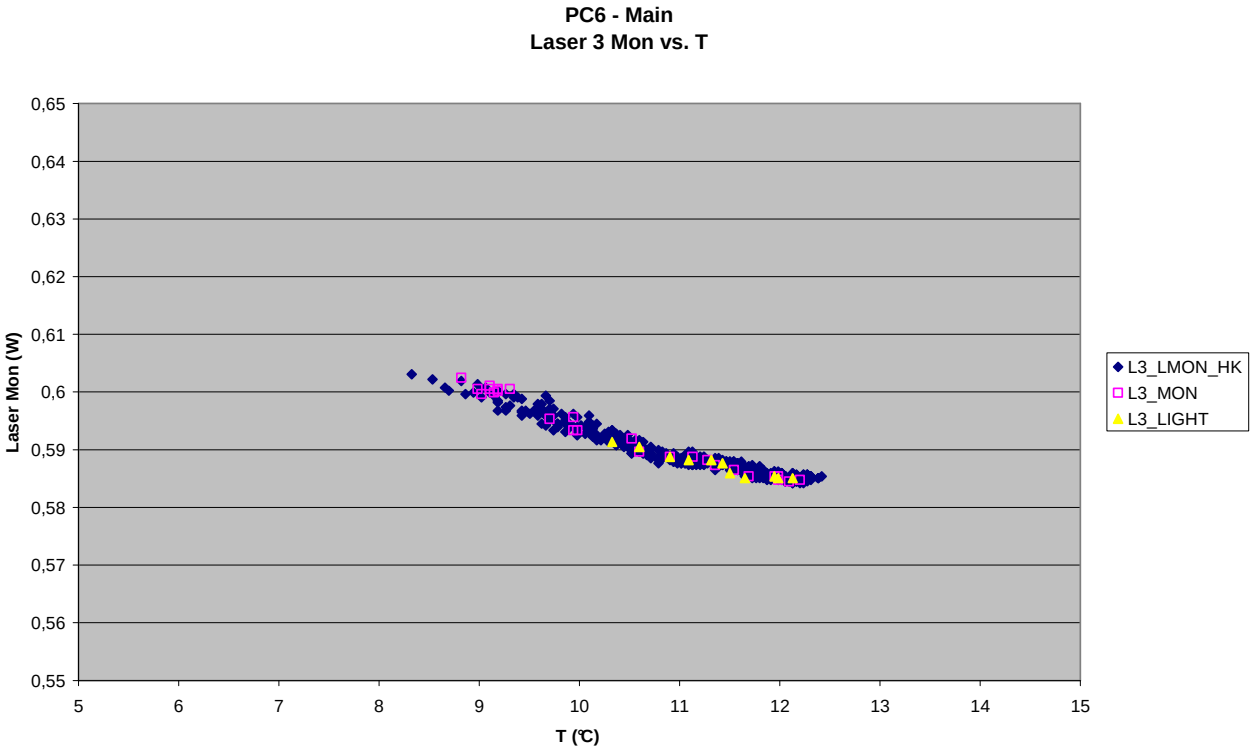
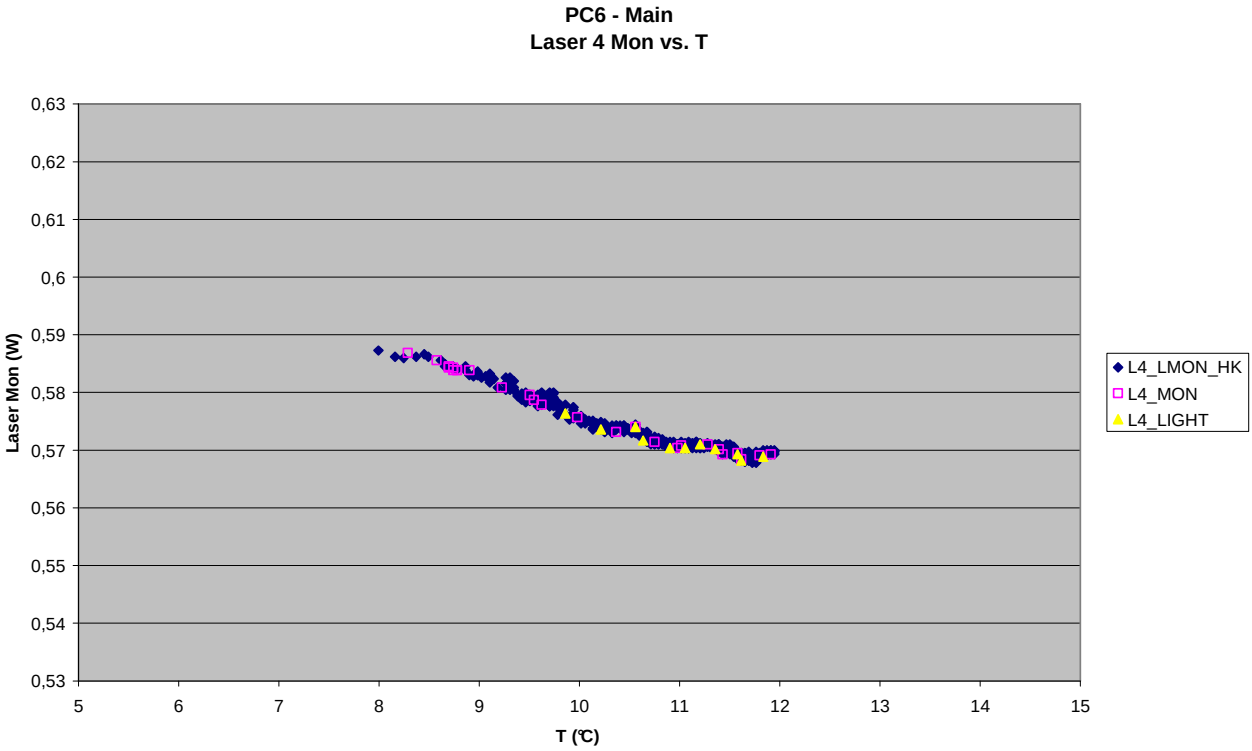


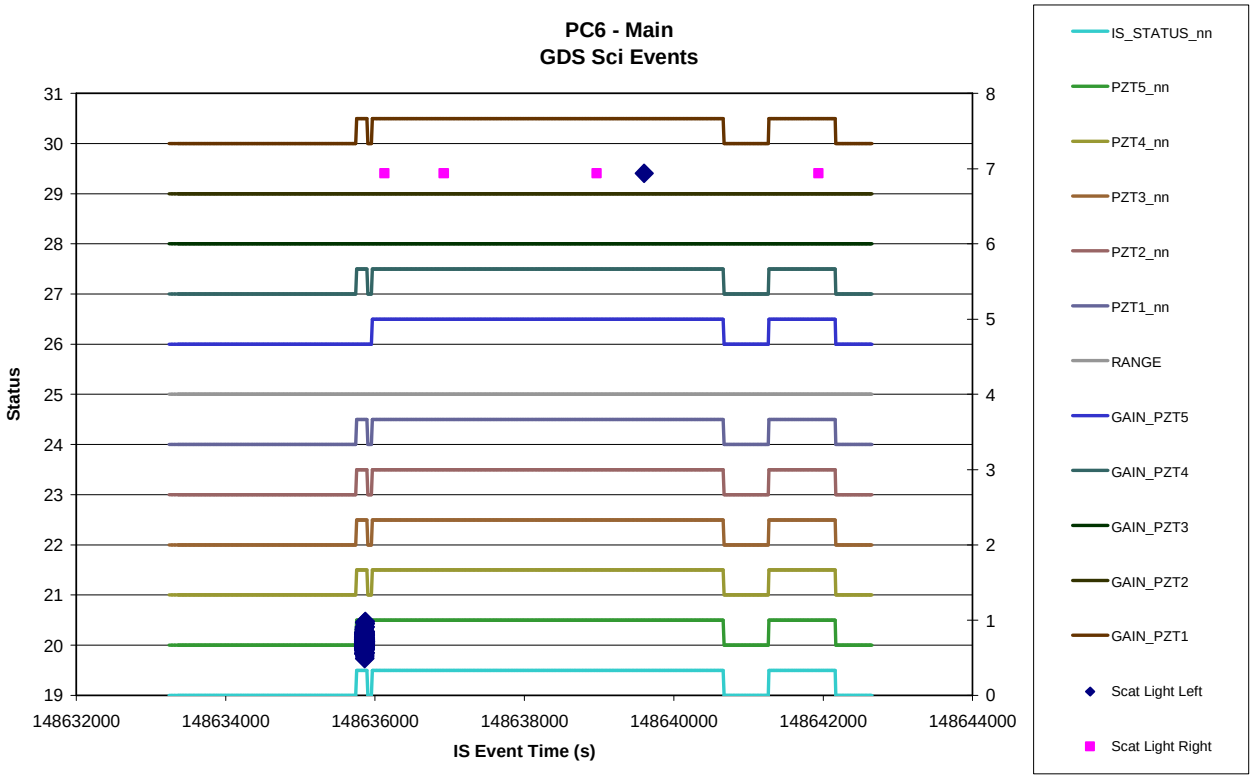
Figure 9.3-8. Laser 4 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main



9.3.2 GDS – Behaviour

9.3.2.1 Science Events

Figure 9.3-9. GDS Left and Right SCI events vs. time - Main

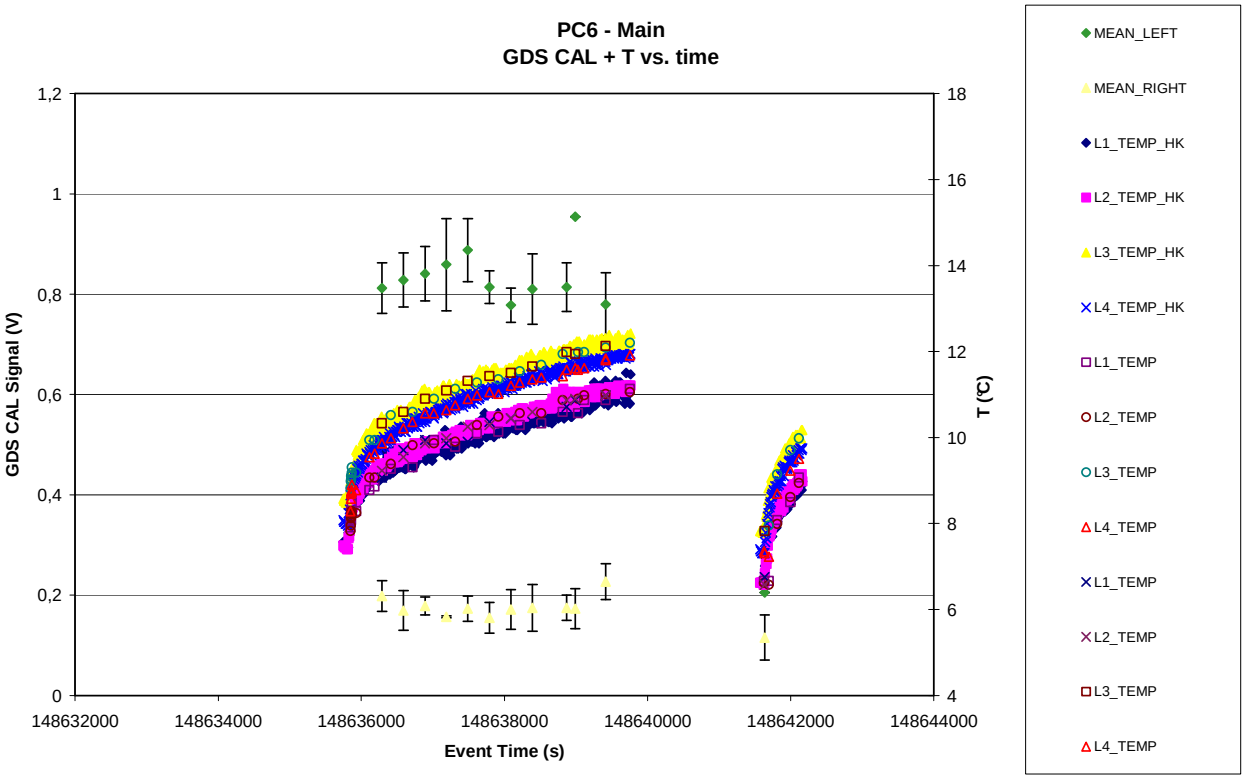


9.3.2.2 Event Rates

Not applicable

9.3.2.3 CAL

Figure 9.3-10. Evolution of GDS CAL Left and Right signals (and T) vs. time (Main)



9.4 IMPACT SENSOR (IS)

9.4.1 IS – Status

Figure 9.4-1. IS Operation Status vs. time - Main

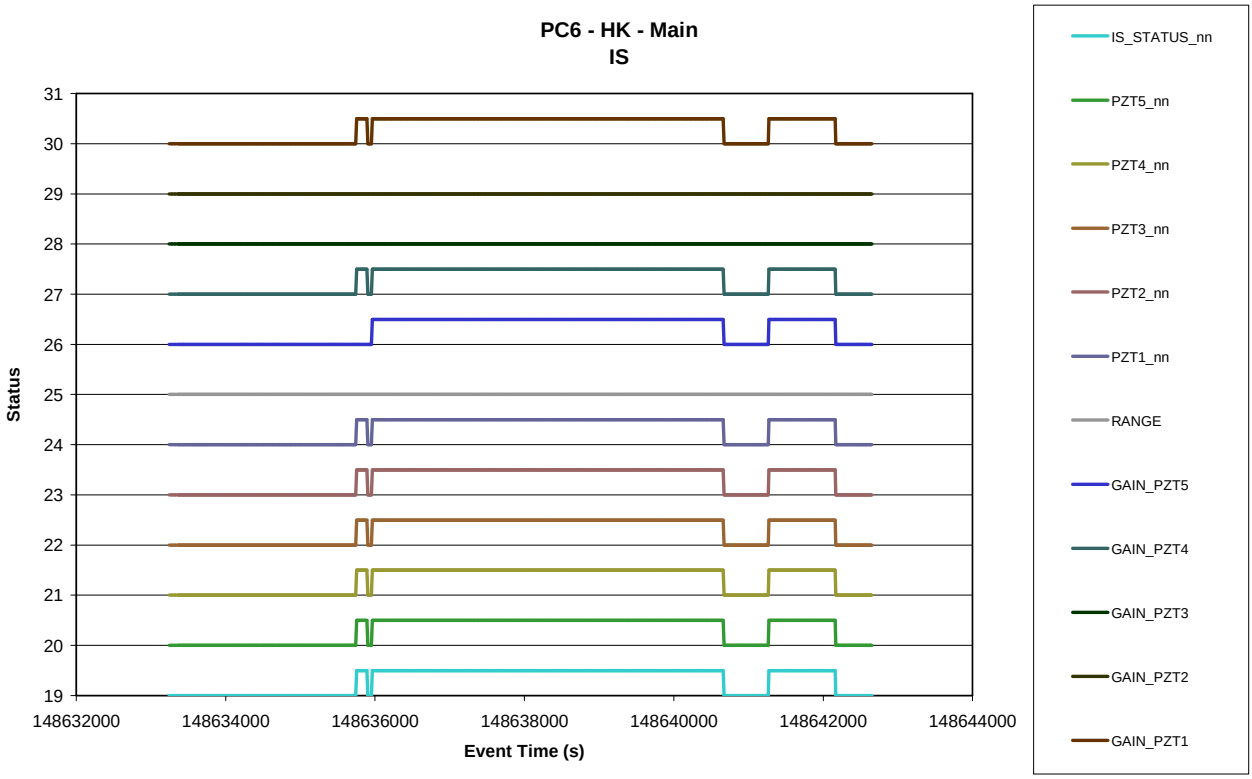


Figure 9.4-2. IS PZT 3 Thresholds change vs. time - Main

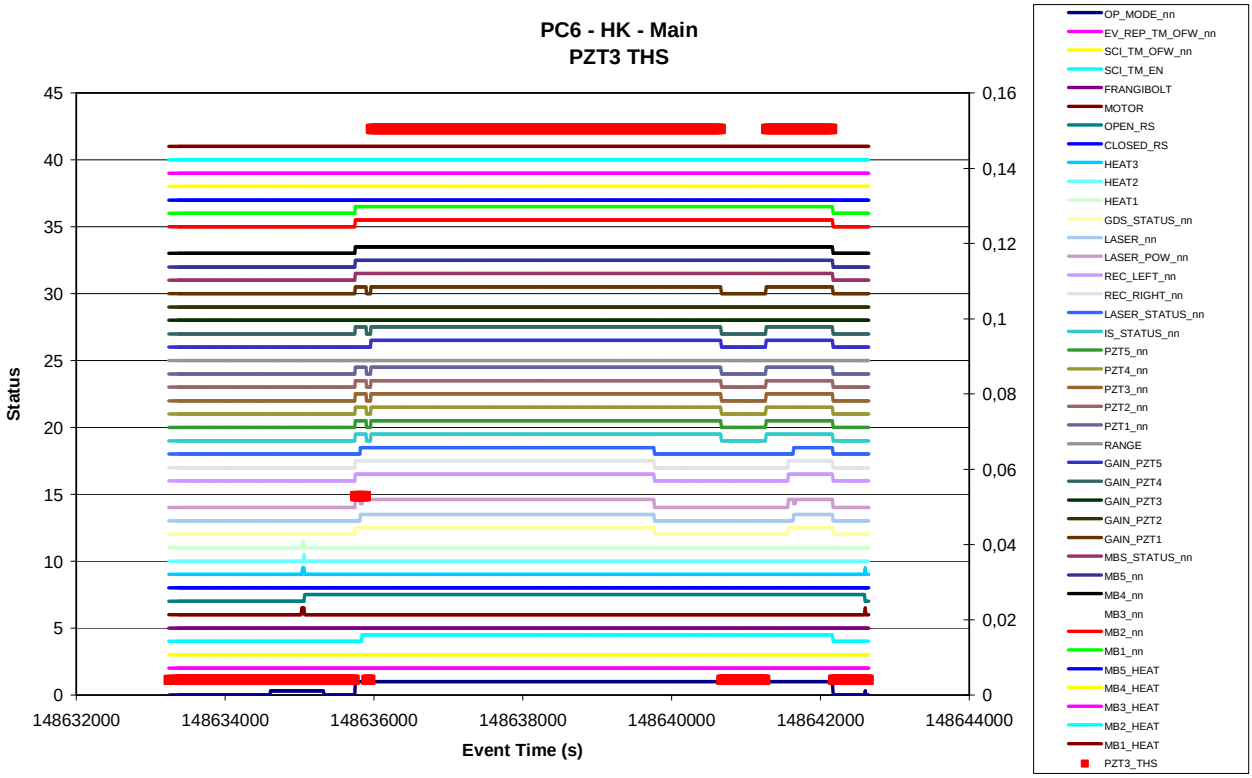


Figure 9.4-3. IS PZT 5 Thresholds change vs. time - Main

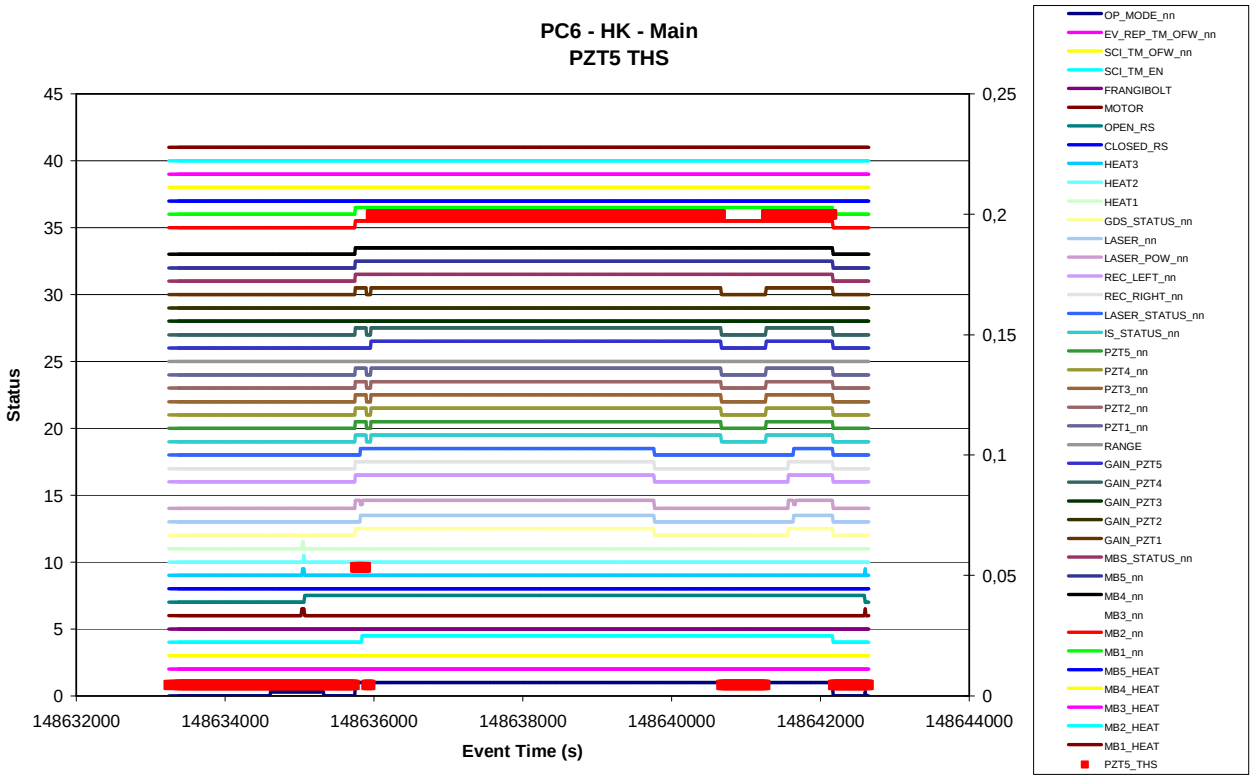
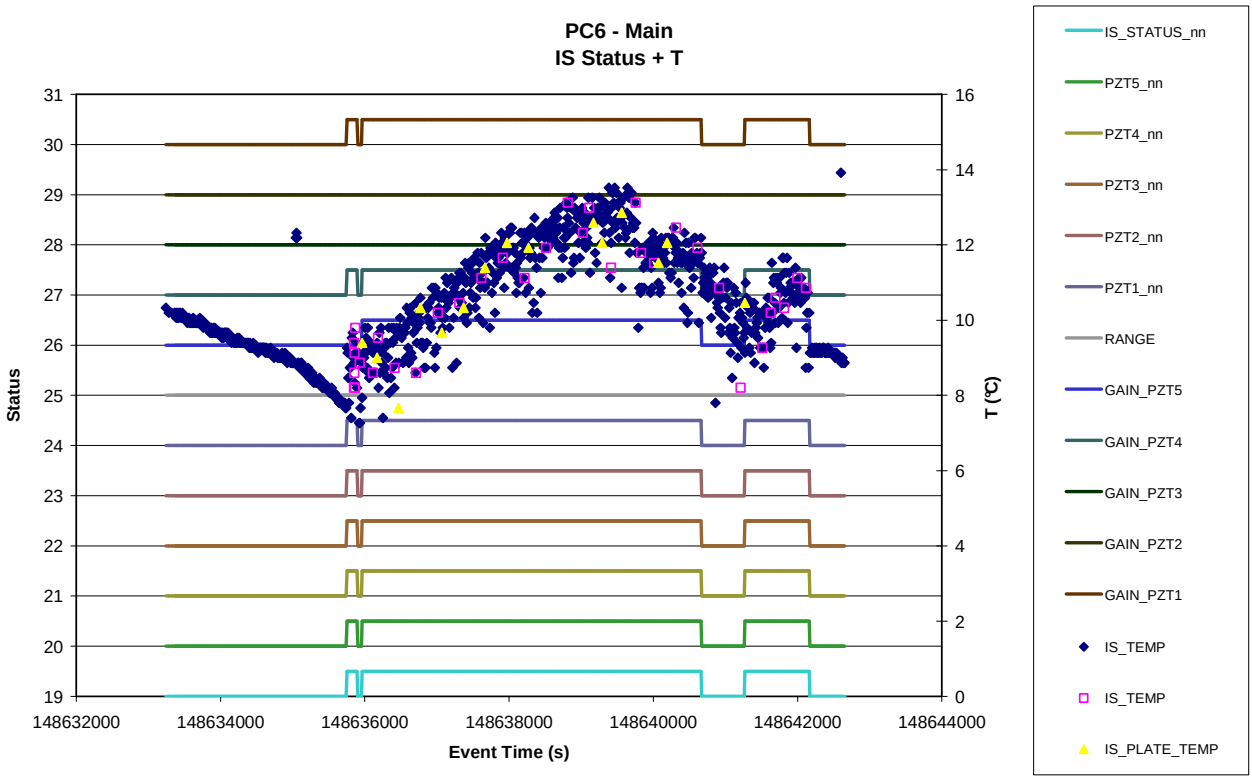


Figure 9.4-4. IS Temperature vs. time (HK, HK-SCI, SCI) - Main



9.4.2 IS – Behaviour

9.4.2.1 Science Events

Figure 9.4-5. All PZT Events (det and non-det) vs. time - Main

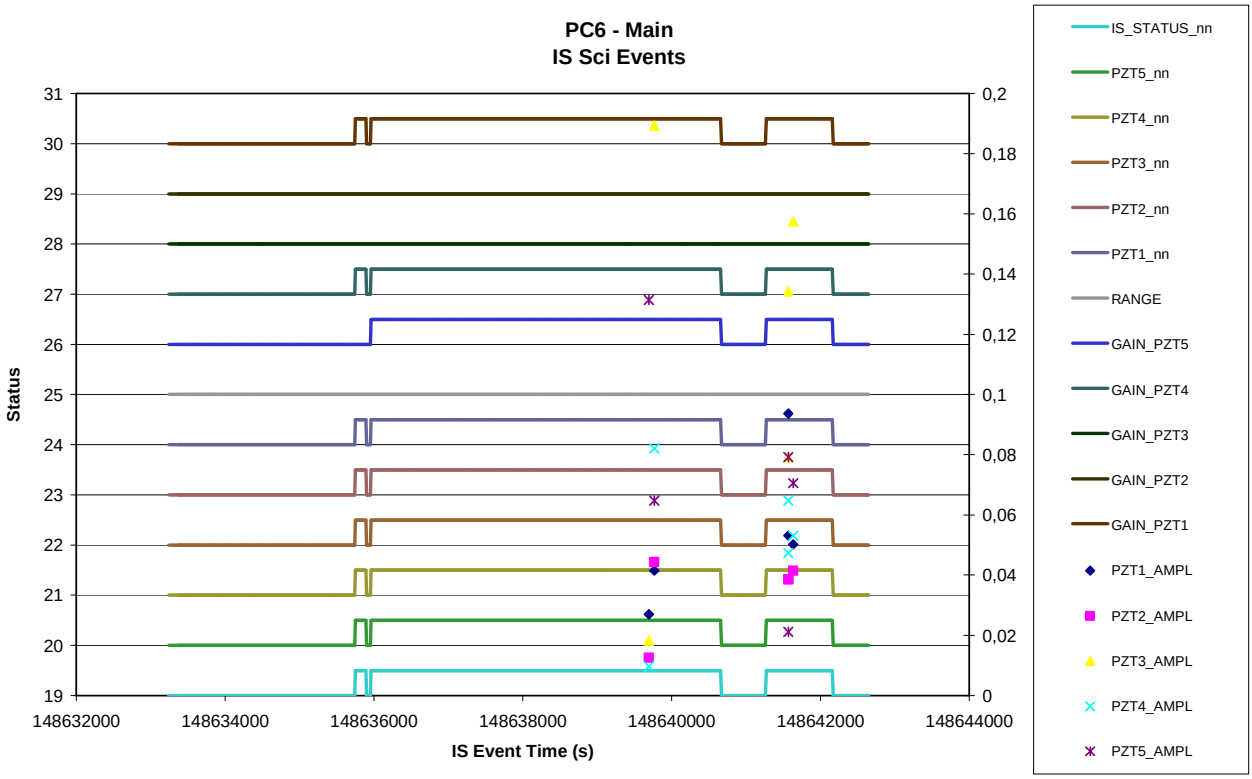


Figure 9.4-6. PZT 1-2-3-4-5 Detected Events vs. time - Main

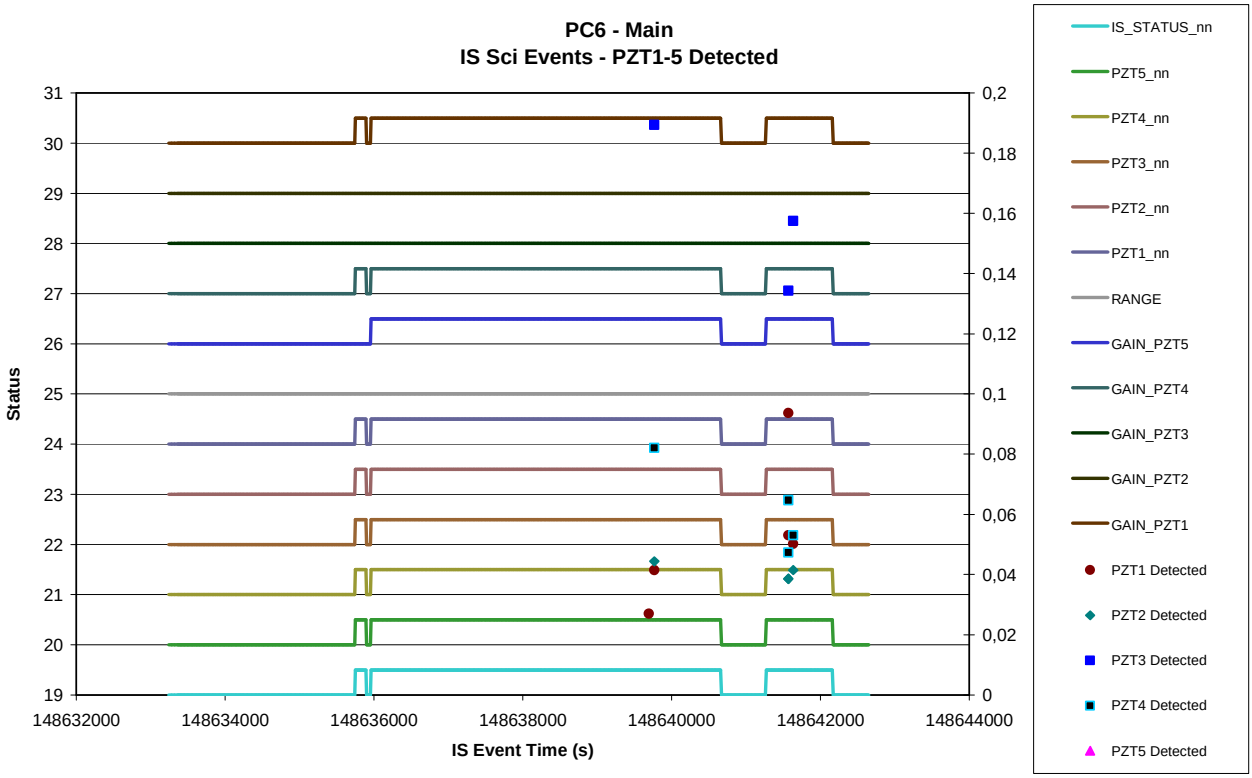


Figure 9.4-7. PZT 1 Detected Events vs. time - Main

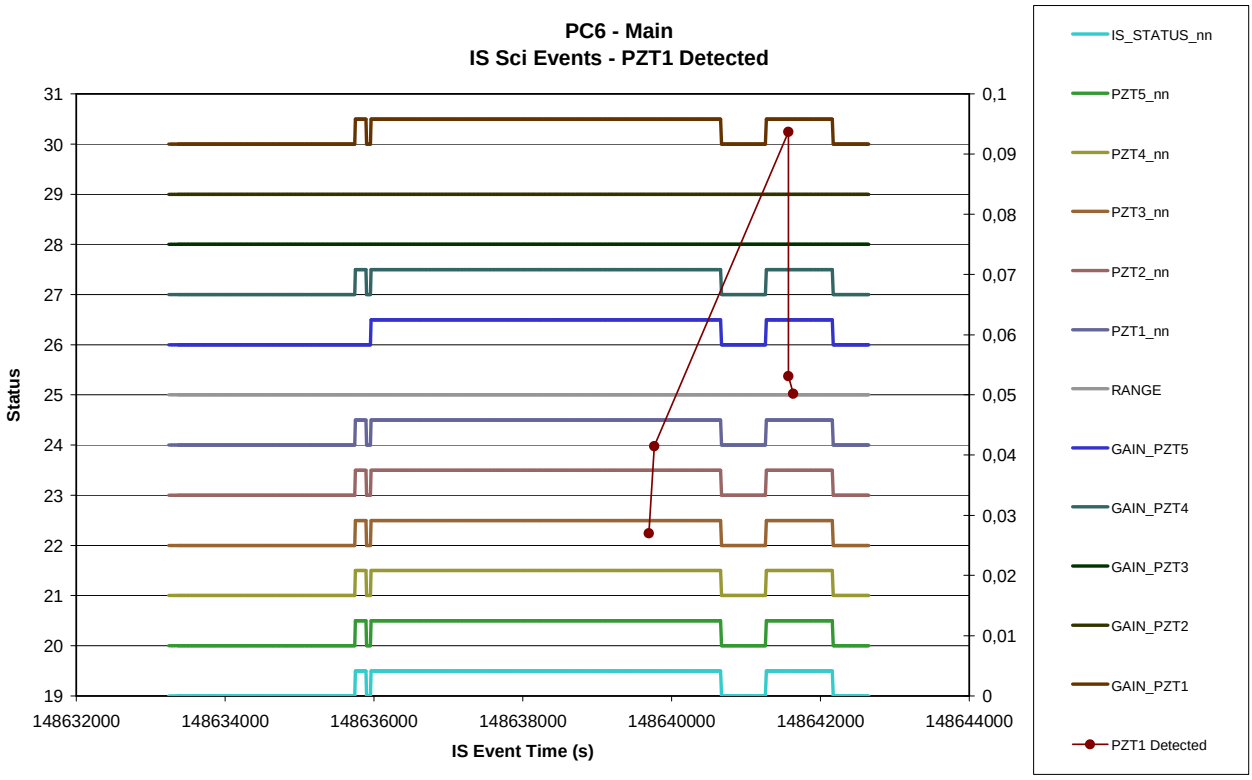


Figure 9.4-8. PZT 2 Detected Events vs. time - Main

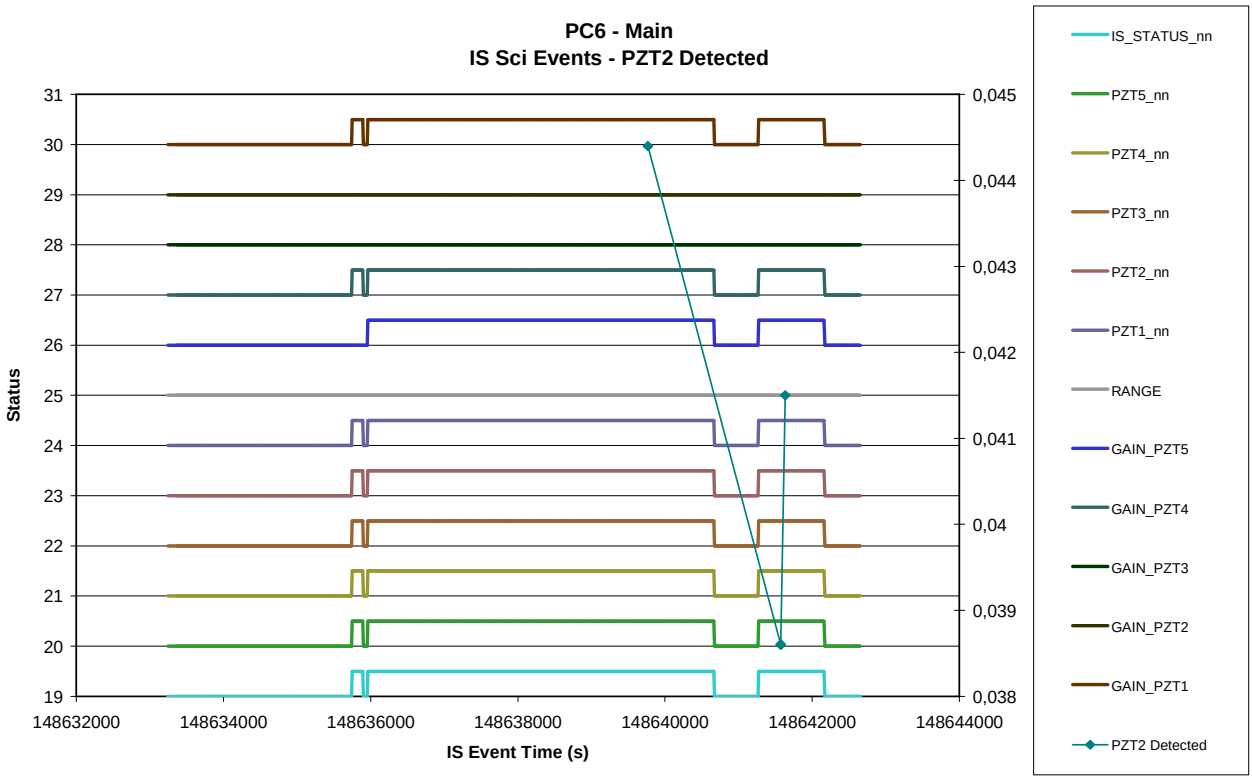


Figure 9.4-9. PZT 3 Detected Events vs. time - Main

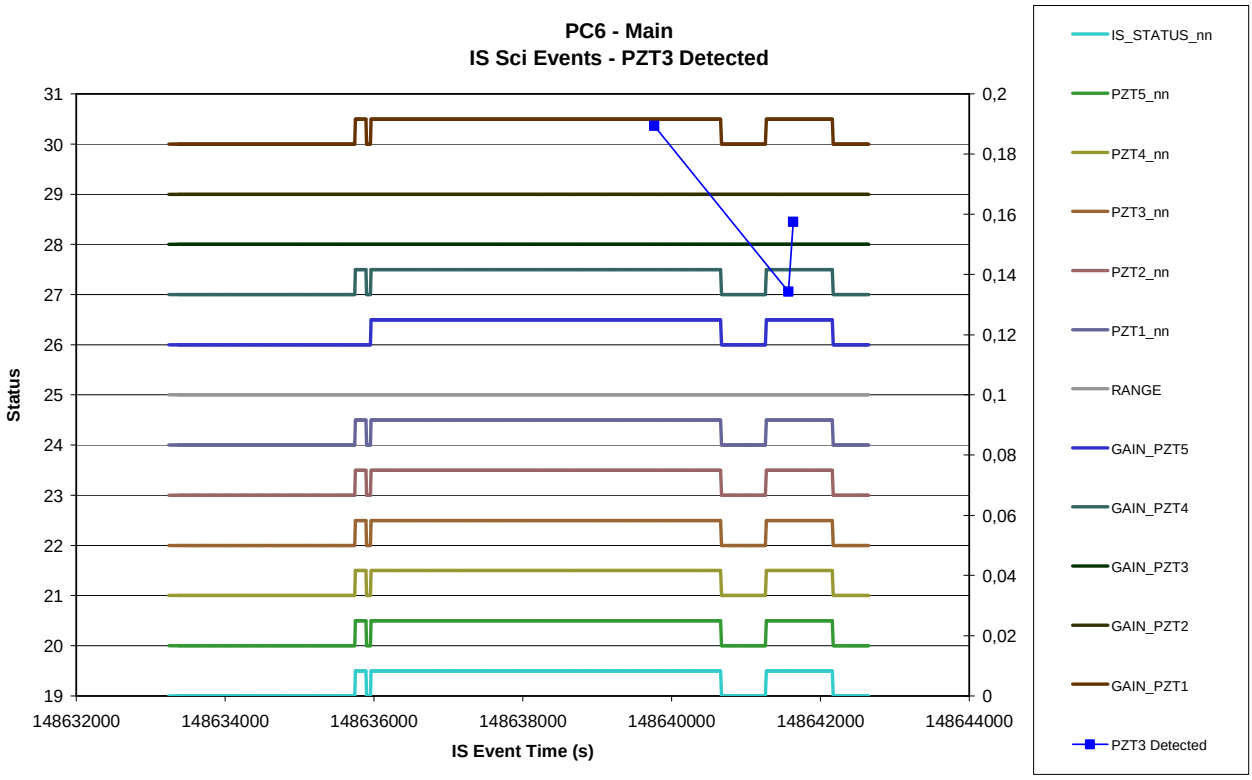


Figure 9.4-10. PZT 4 Detected Events vs. time - Main

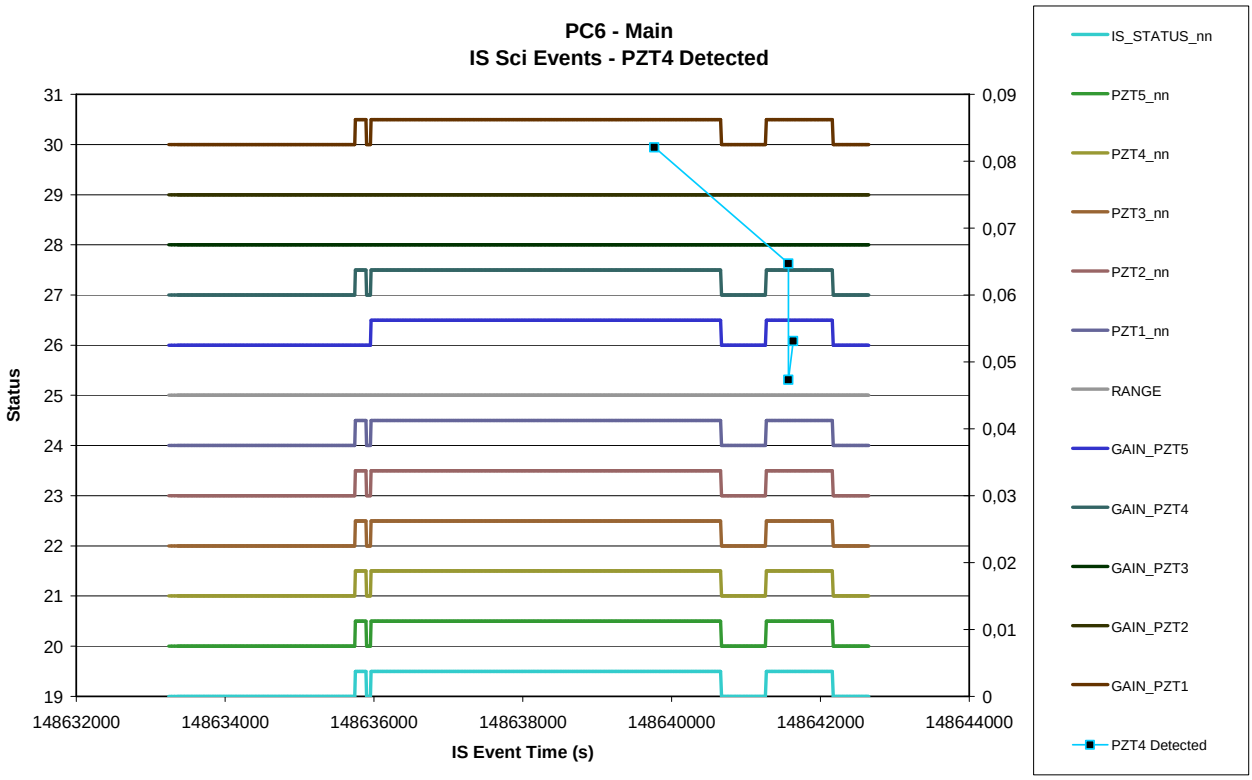


Figure 9.4-11. PZT 5 Detected Events vs. time - Main

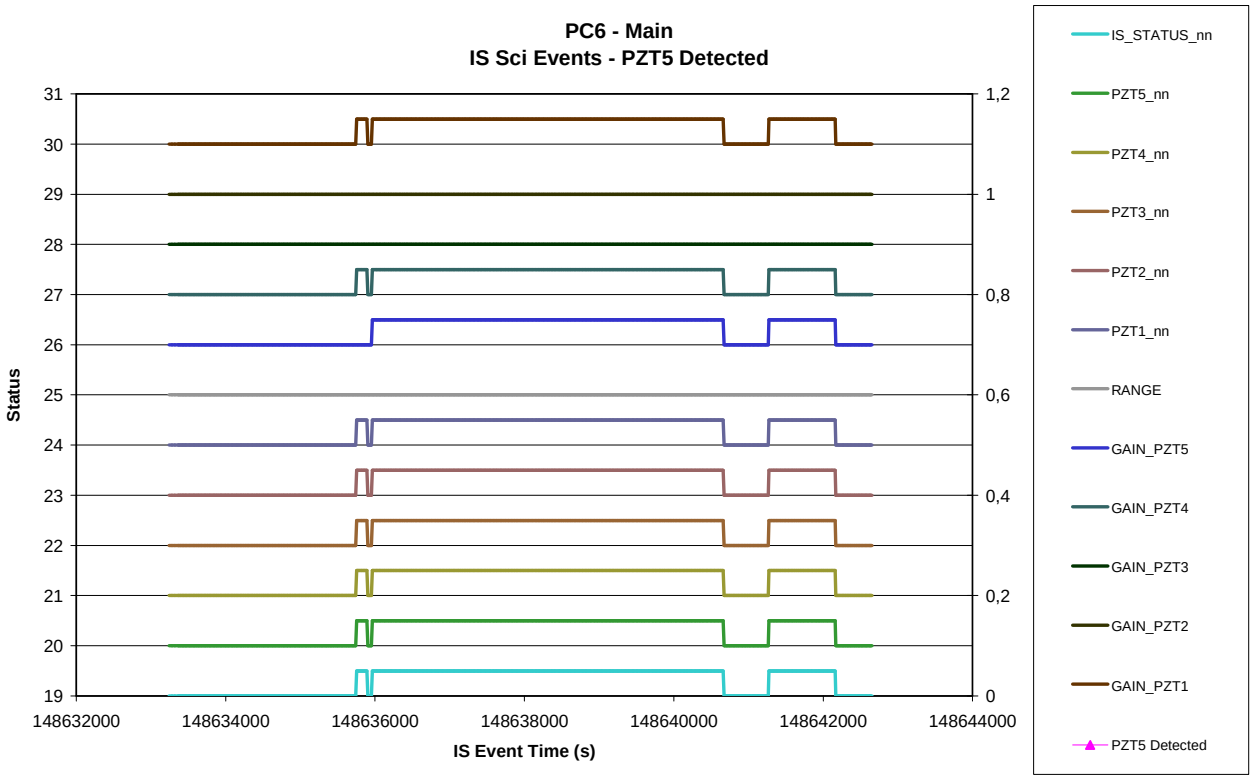
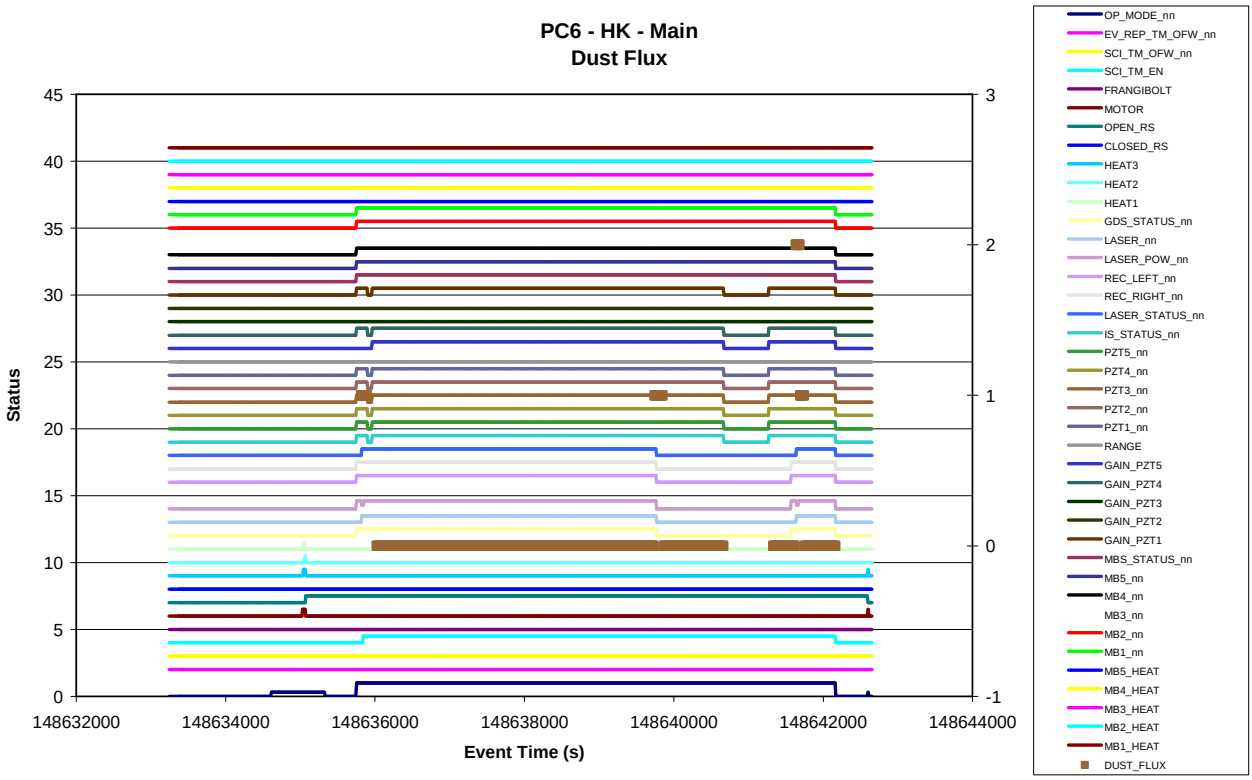


Figure 9.4-12. Dust Flux vs. time - Main



9.4.2.2 Event Rates

Not applicable

9.4.2.3 CAL

Figure 9.4-13. PZT 1 Mean and St Dev. CAL vs. time - Main

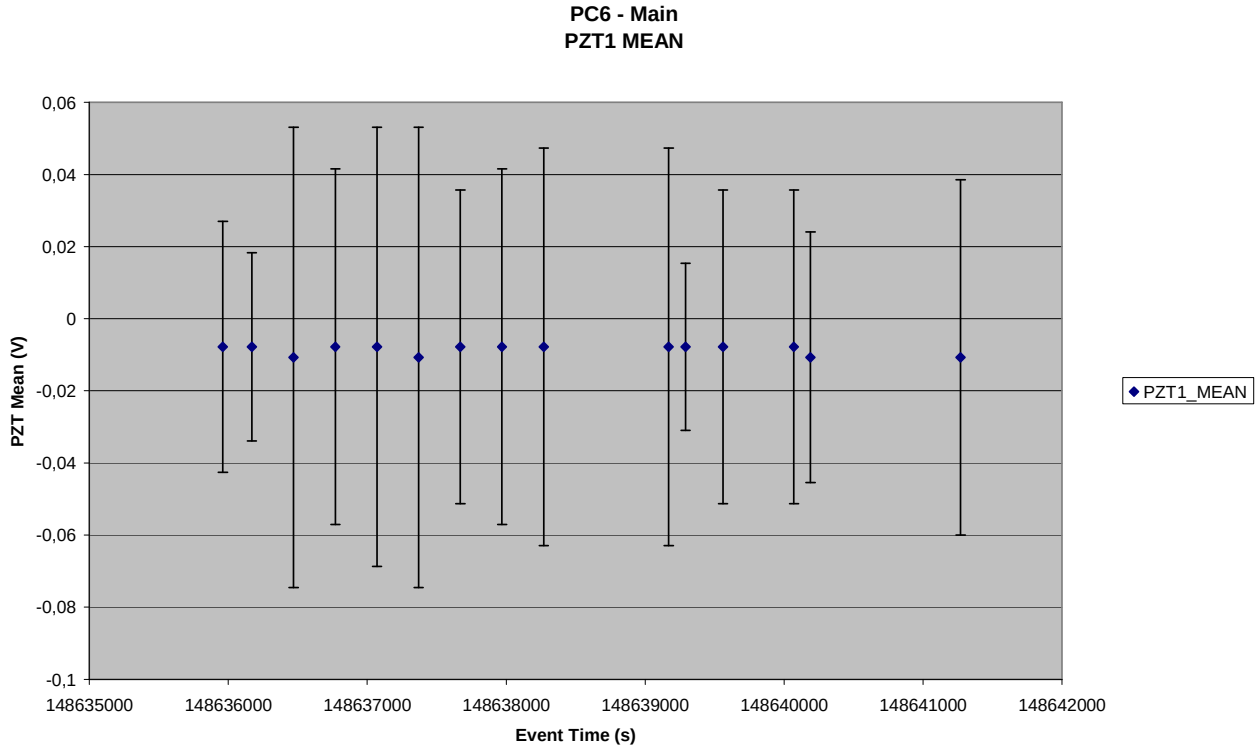


Figure 9.4-14. PZT 2 Mean and St Dev. CAL vs. time - Main

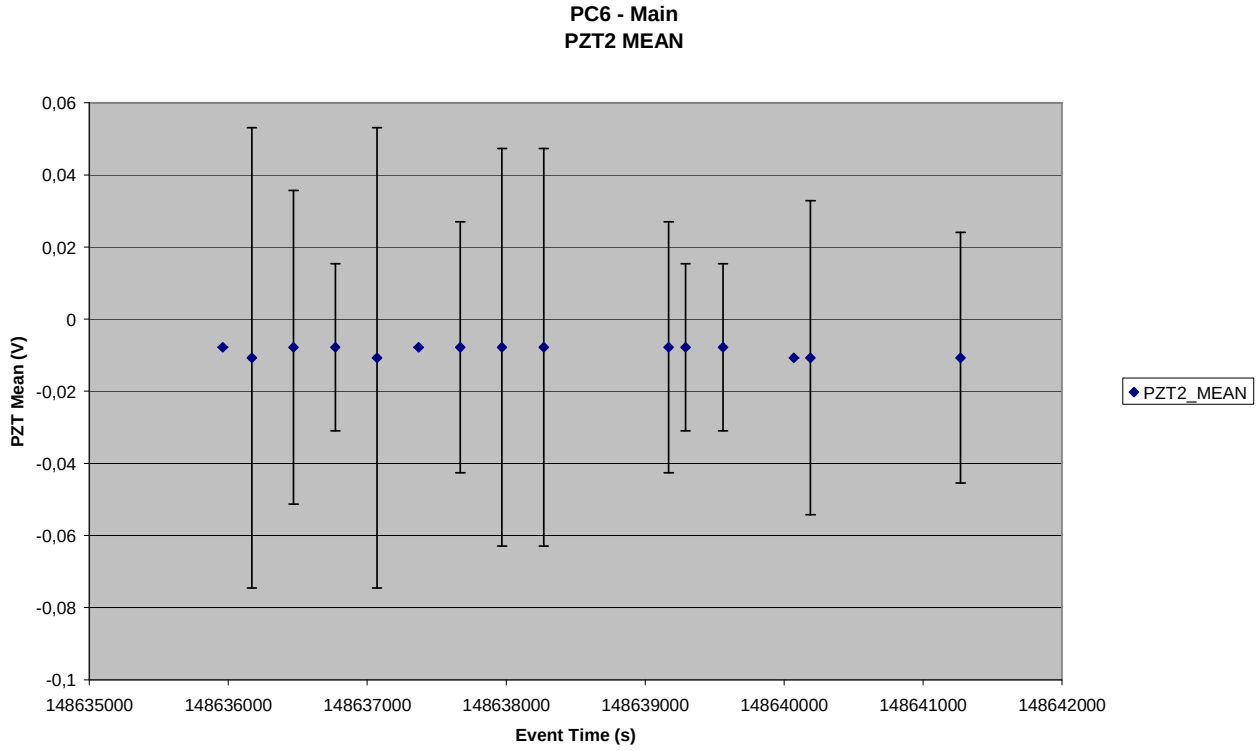


Figure 9.4-15. PZT 3 Mean and St Dev. CAL vs. time - Main

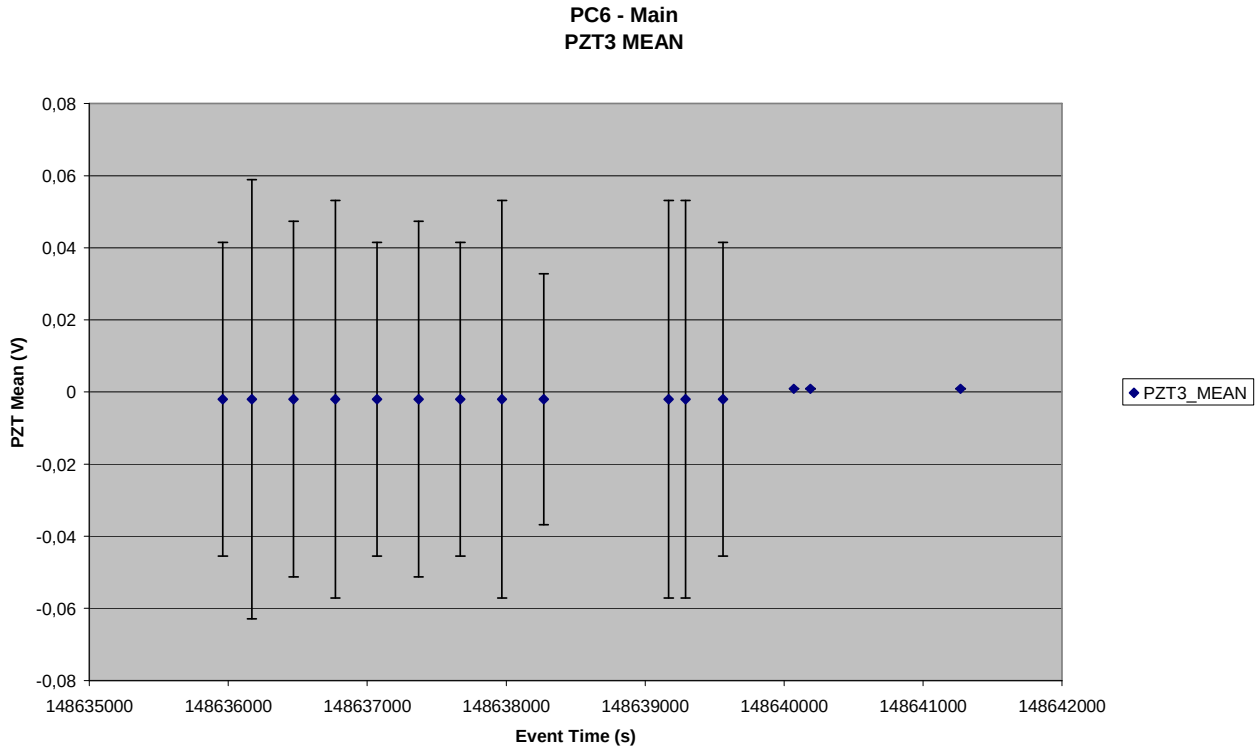


Figure 9.4-16. PZT 4 Mean and St Dev. CAL vs. time - Main

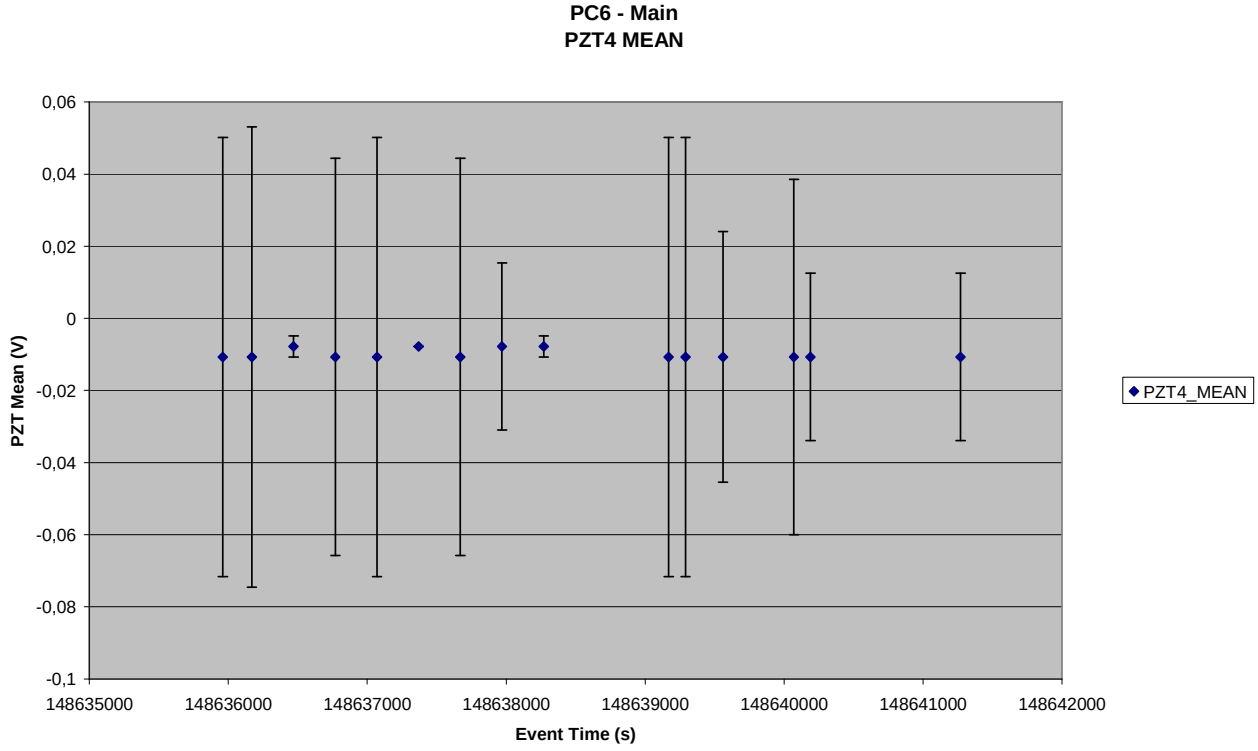


Figure 9.4-17. PZT 5 Mean and St Dev. CAL vs. time - Main

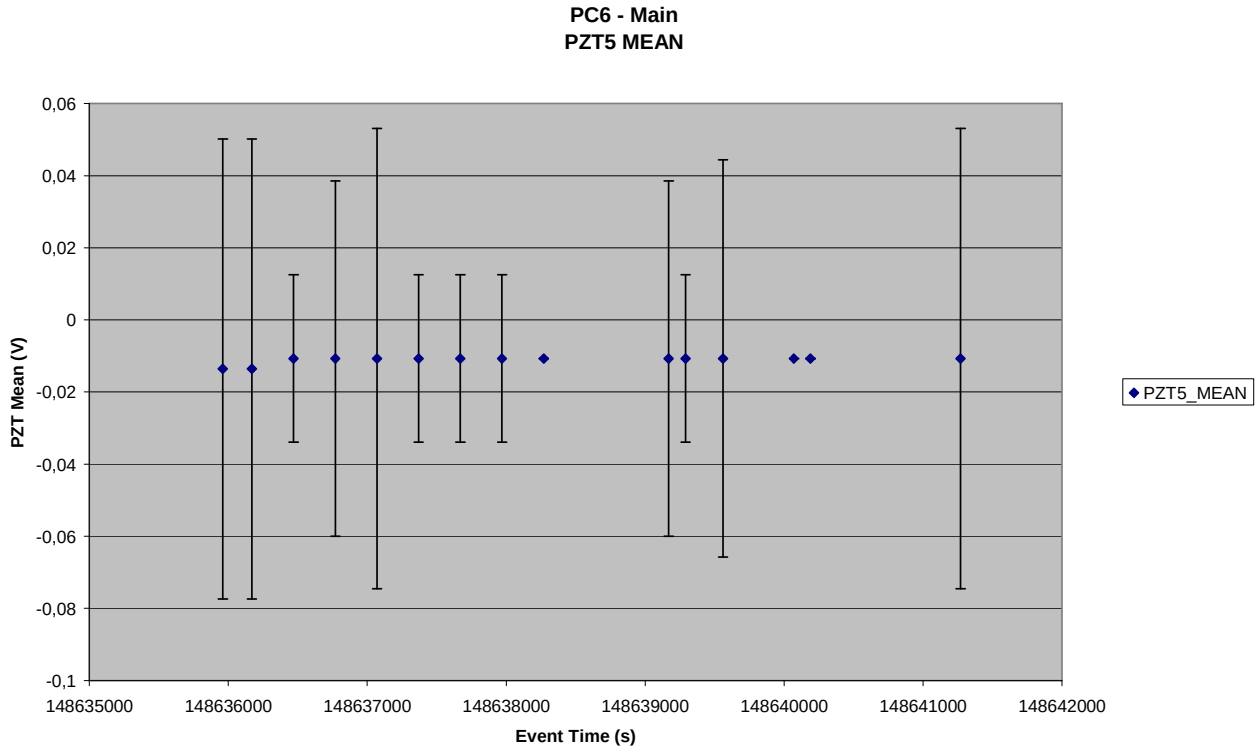


Figure 9.4-18. Reference Voltages for IS calibration vs. time - Main

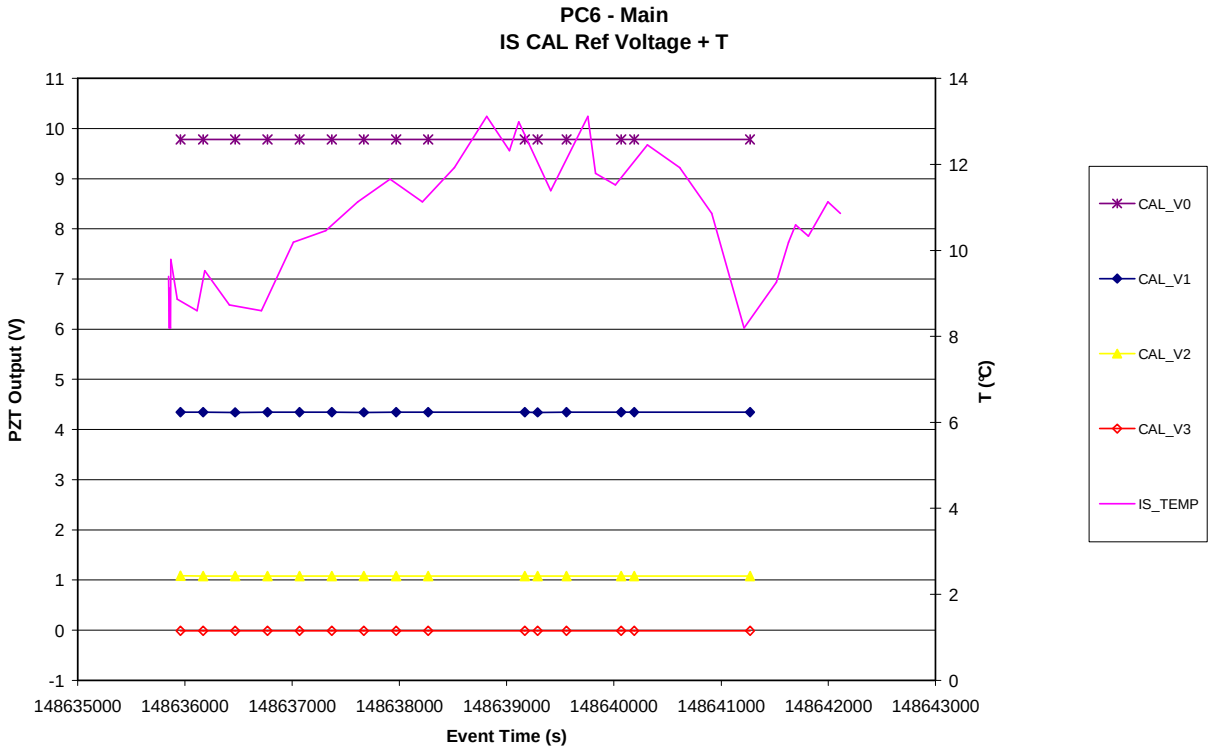


Figure 9.4-19. PZT 1 CAL Signal vs. time - Main

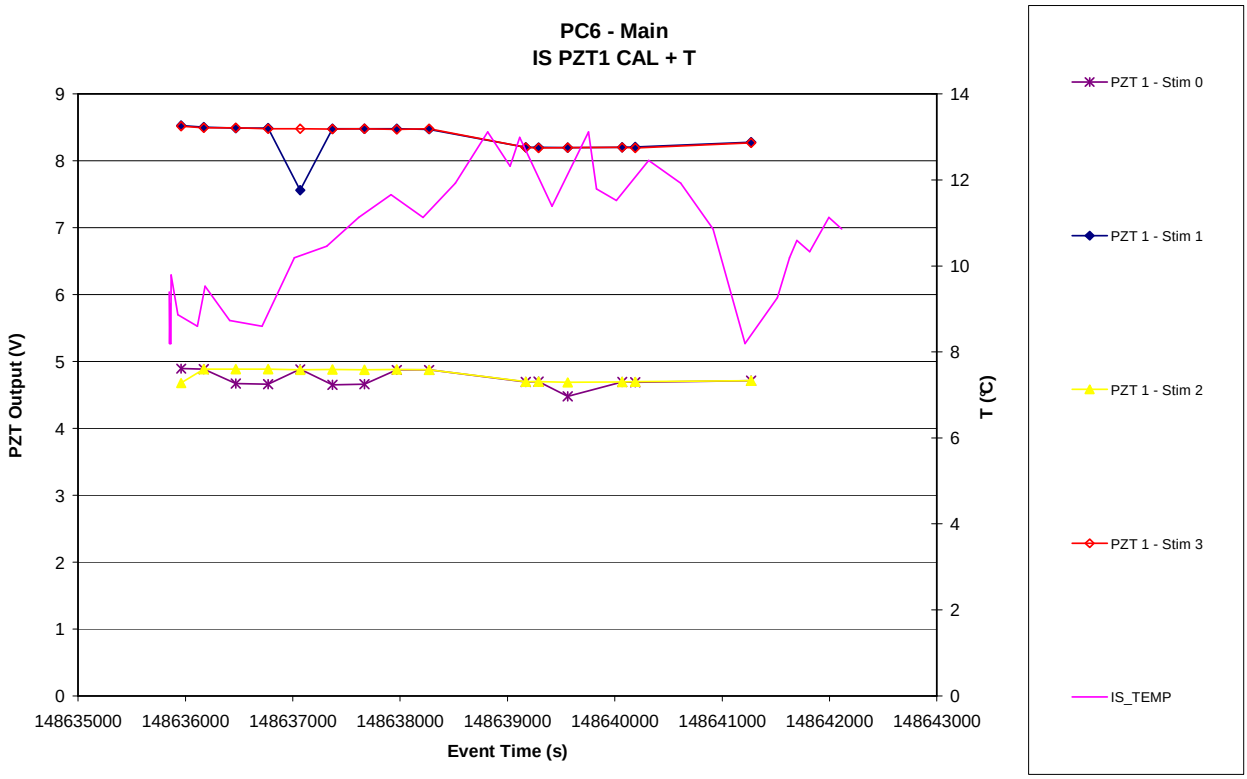


Figure 9.4-20. PZT 2 CAL Signal vs. time - Main

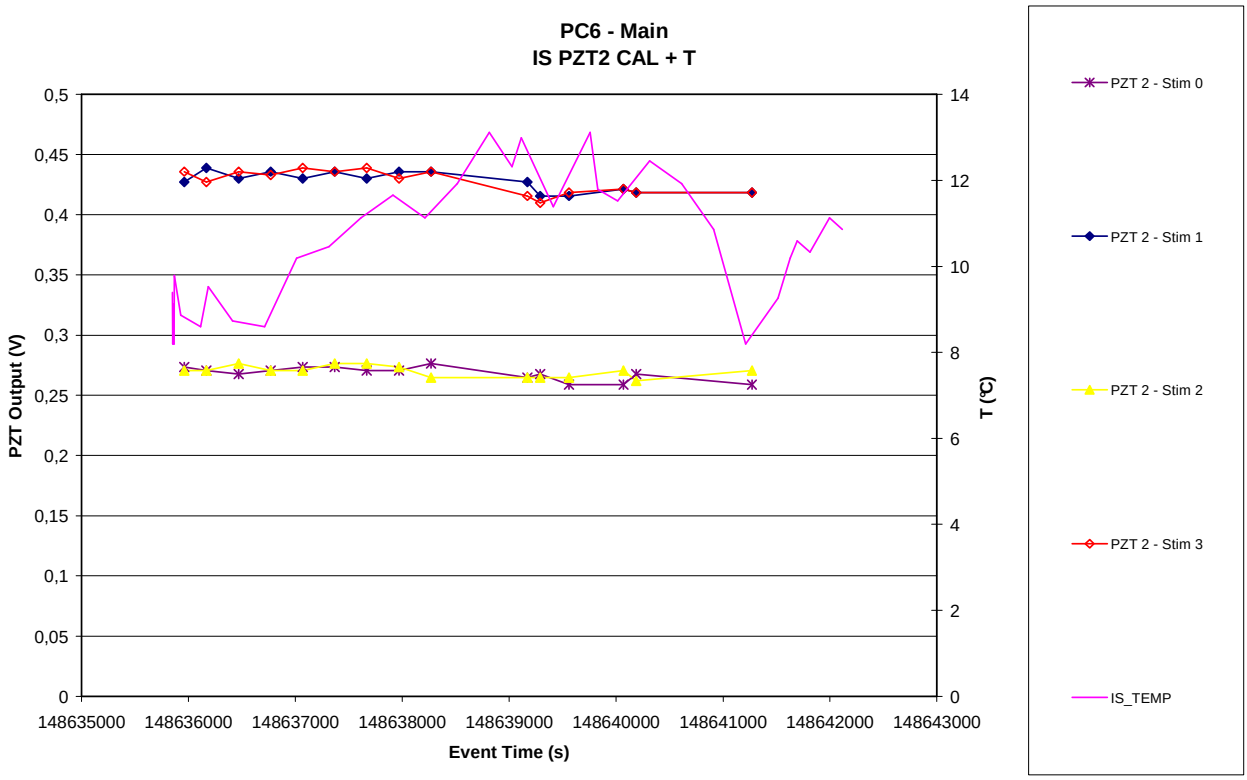


Figure 9.4-21. PZT 3 CAL Signal vs. time - Main

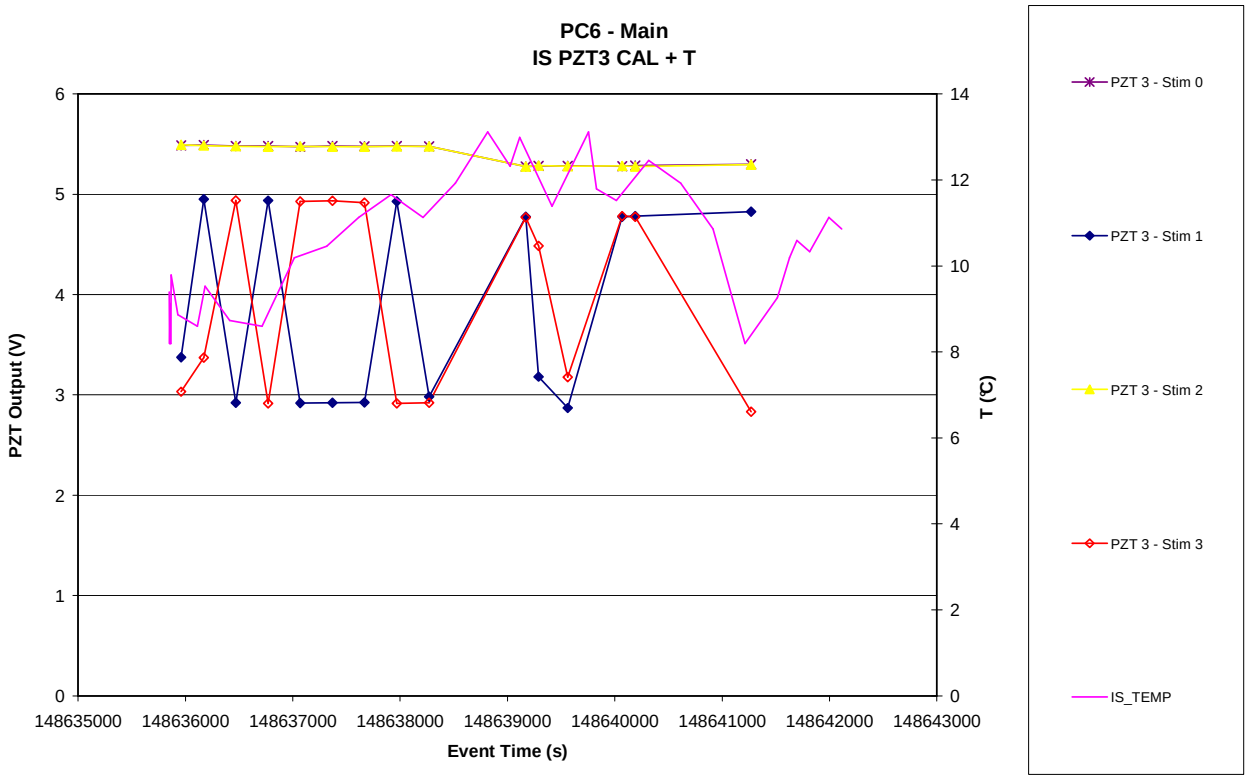


Figure 9.4-22. PZT 4 CAL Signal vs. time - Main

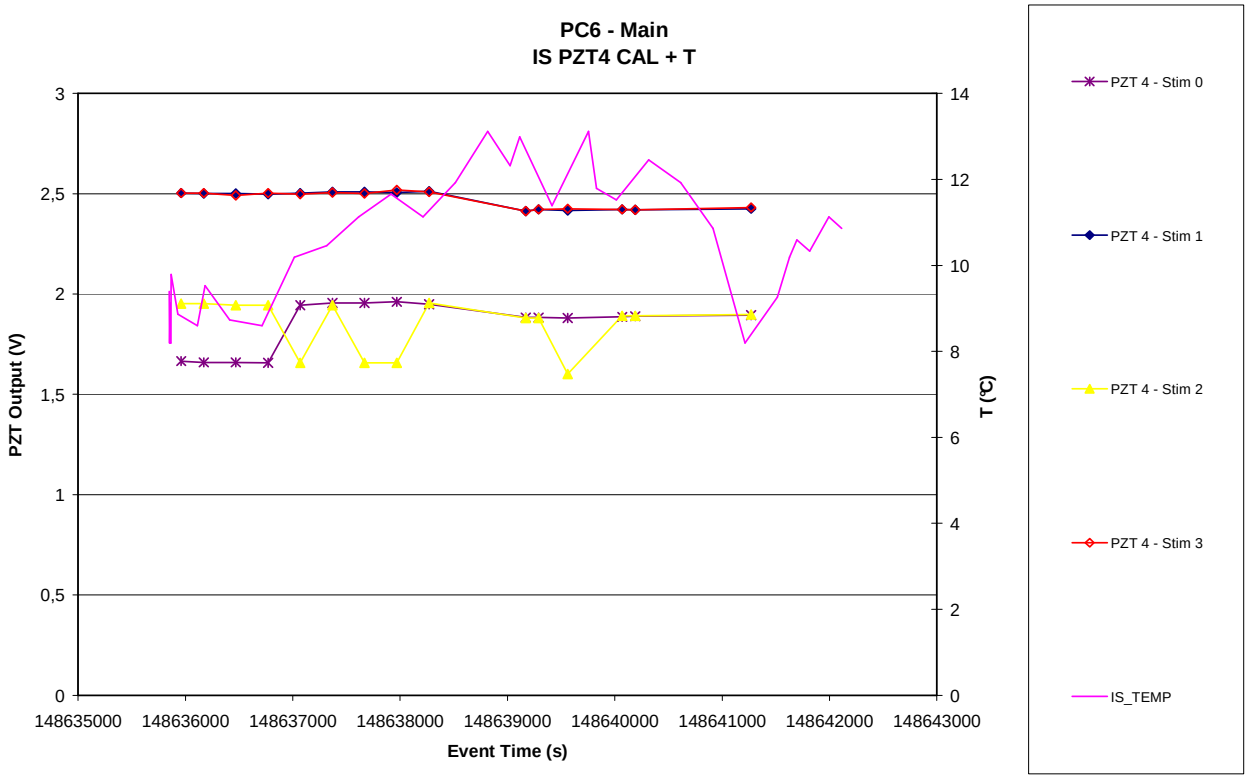


Figure 9.4-23. PZT 5 CAL Signal vs. time - Main

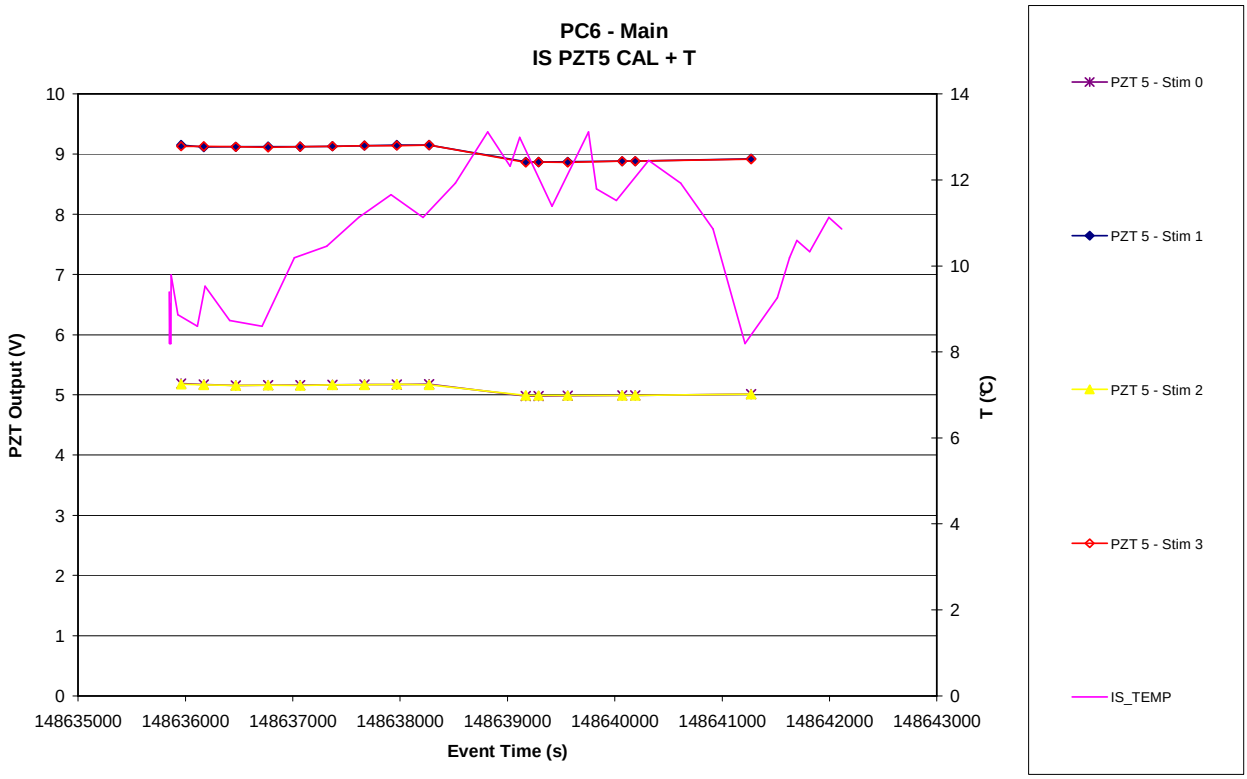


Figure 9.4-24. PZT 1 CAL Time delay vs. time - Main

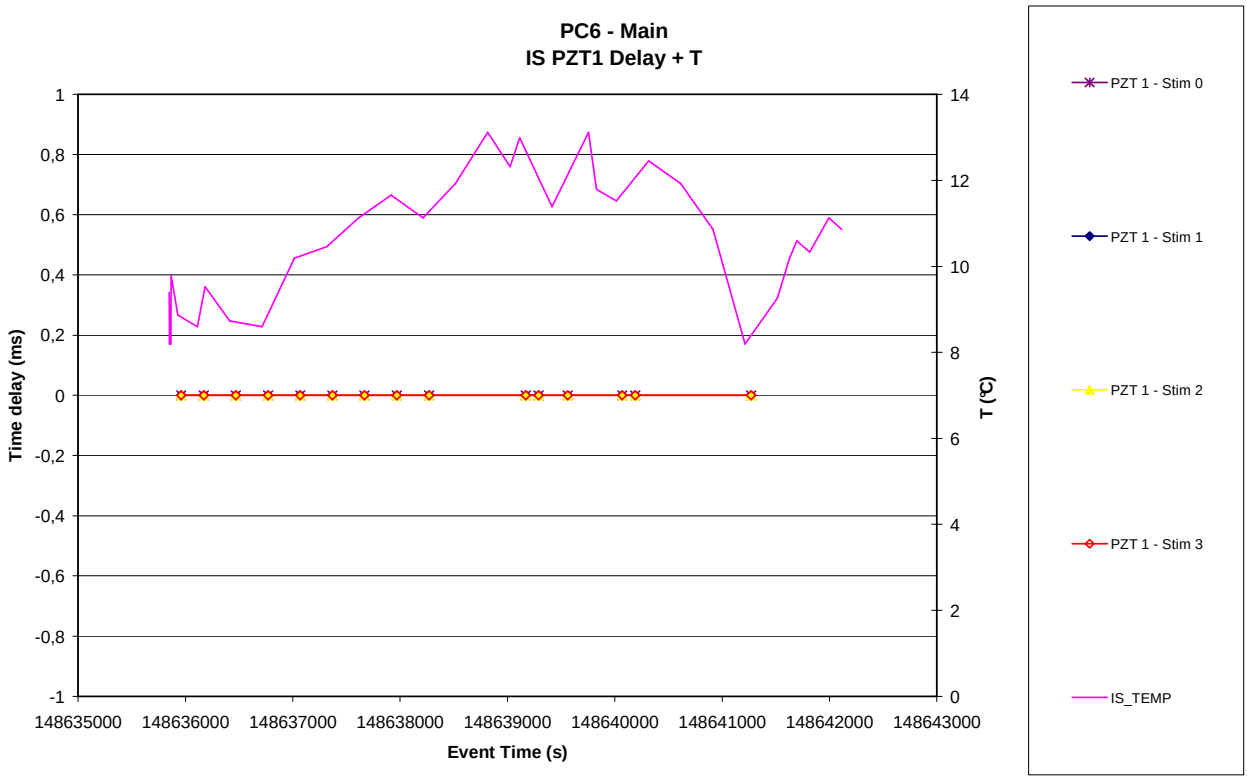


Figure 9.4-25. PZT 2 CAL Time delay vs. time - Main

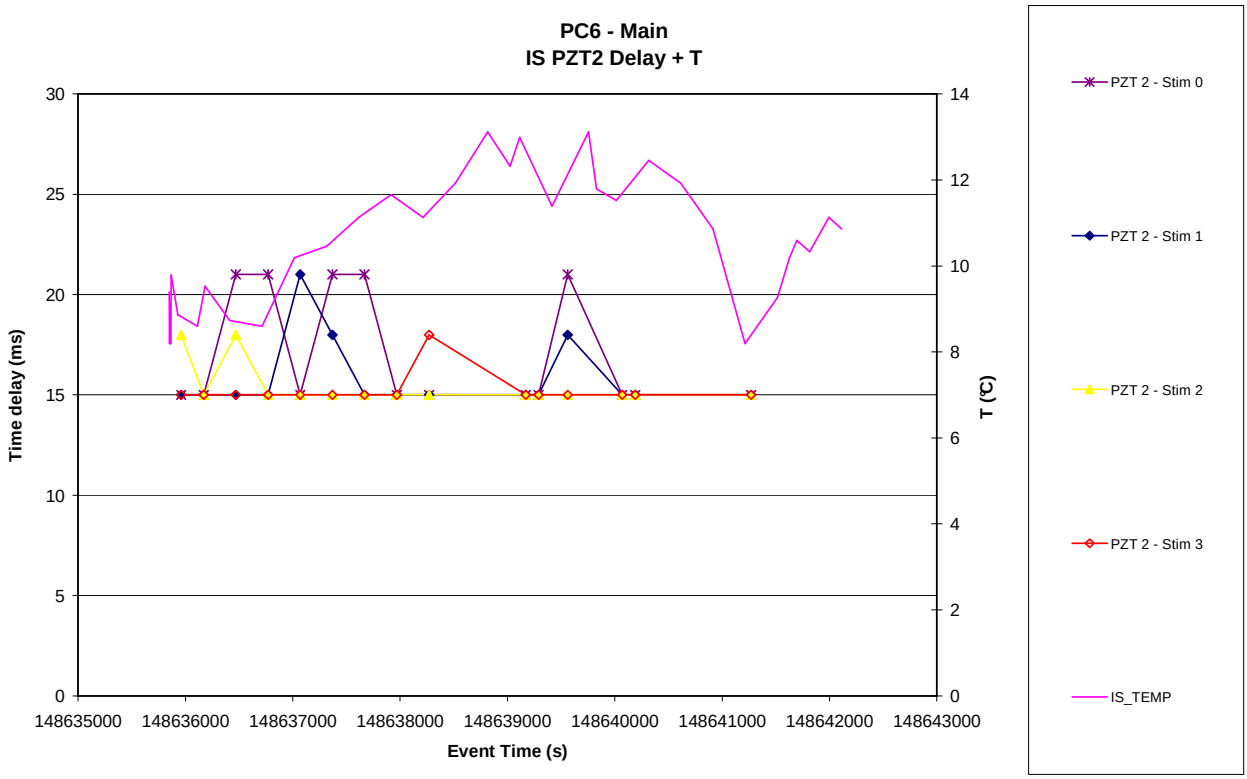


Figure 9.4-26. PZT 3 CAL Time delay vs. time - Main

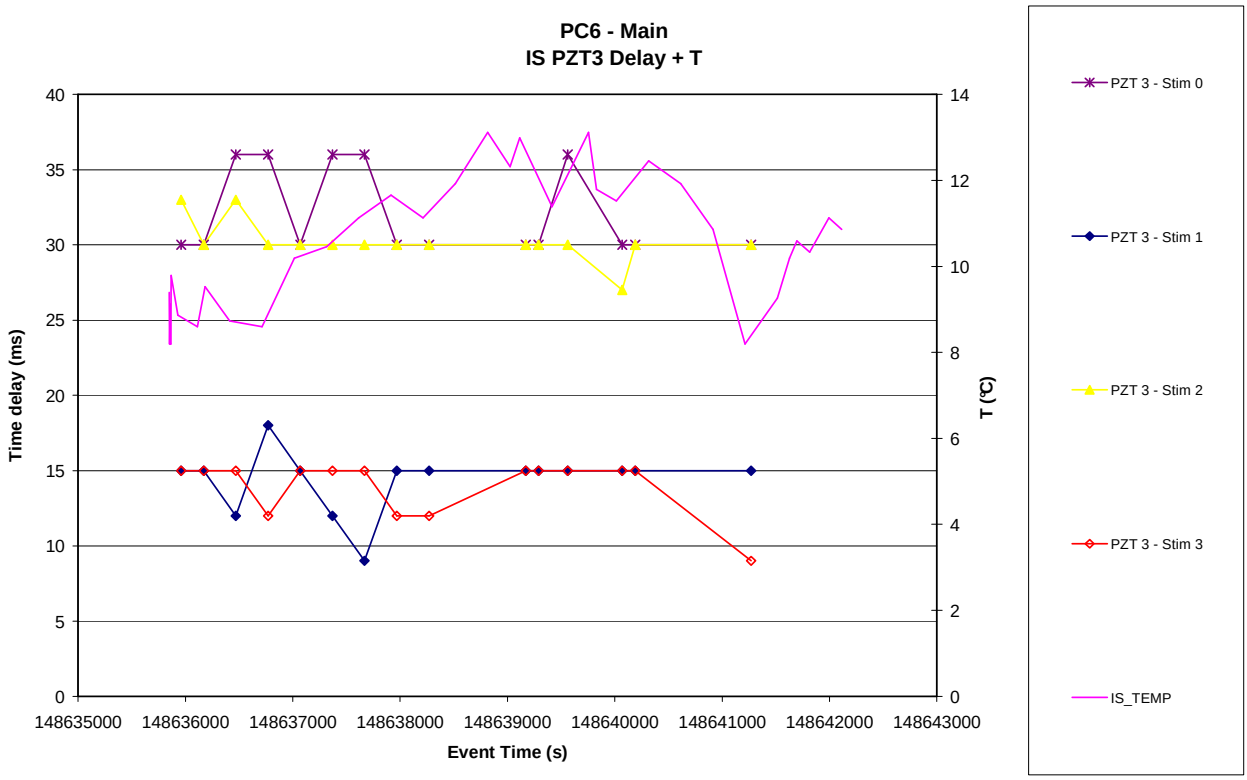


Figure 9.4-27. PZT 4 CAL Time delay vs. time - Main

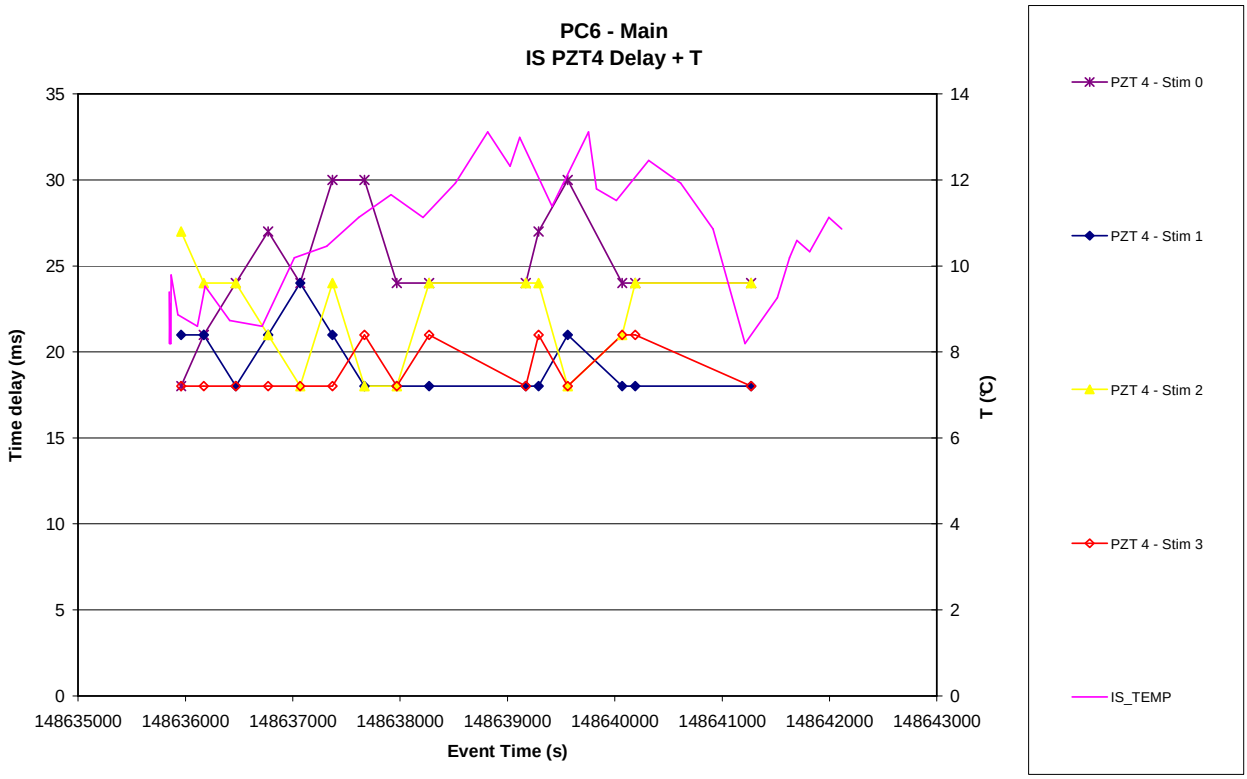


Figure 9.4-28. PZT 5 CAL Time delay vs. time - Main

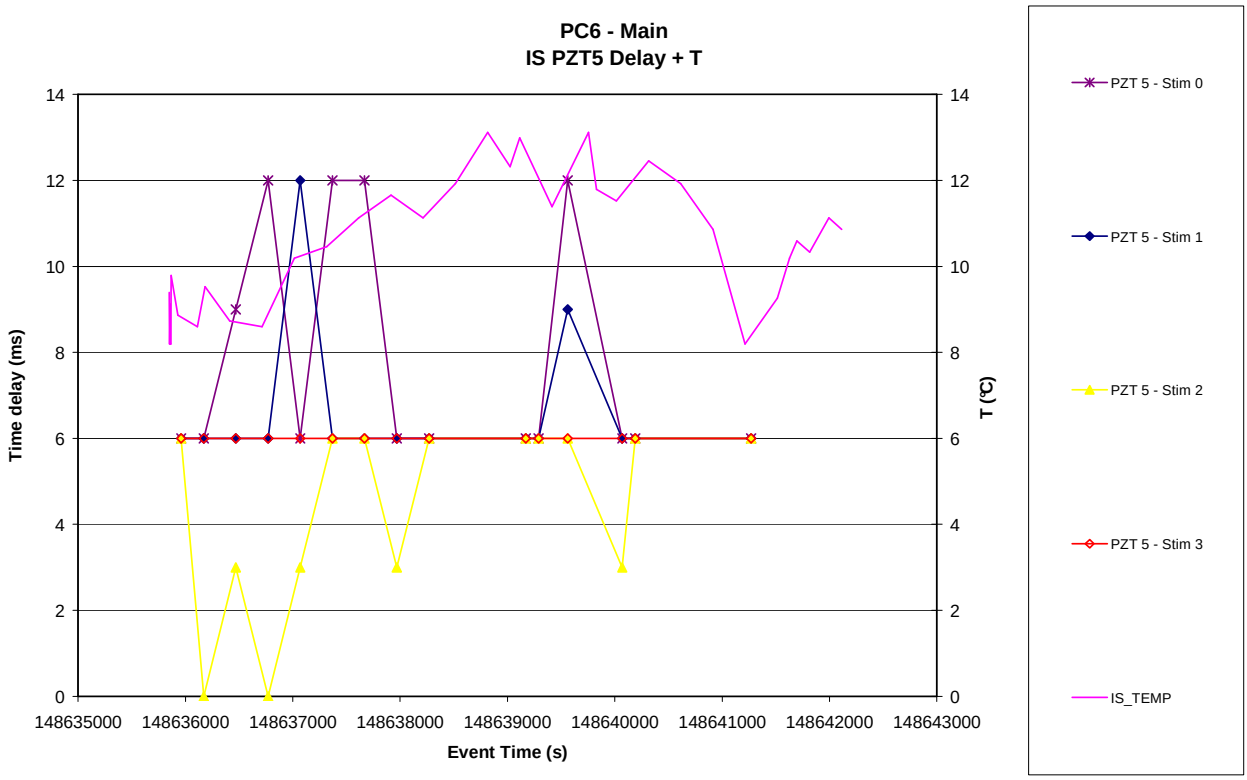


Figure 9.4-29. PZT 1 CAL Signal vs. stimulus – Main

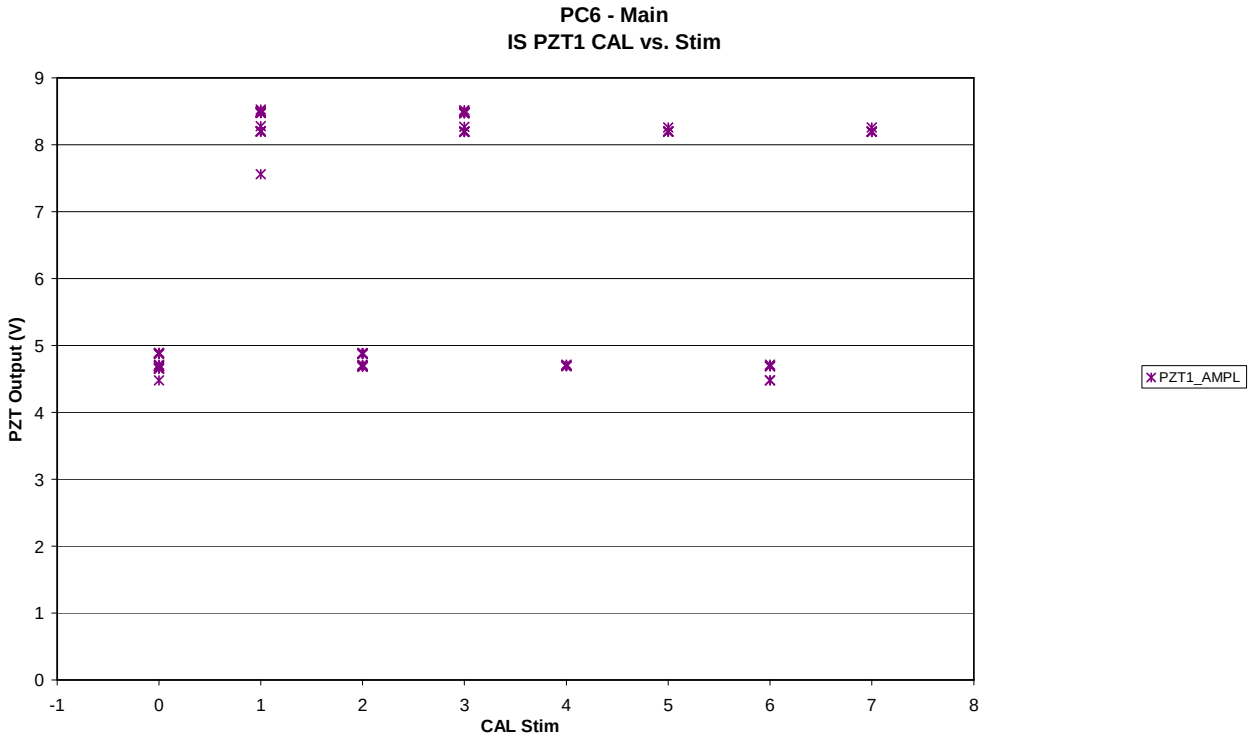


Figure 9.4-30. PZT 2 CAL Signal vs. stimulus – Main

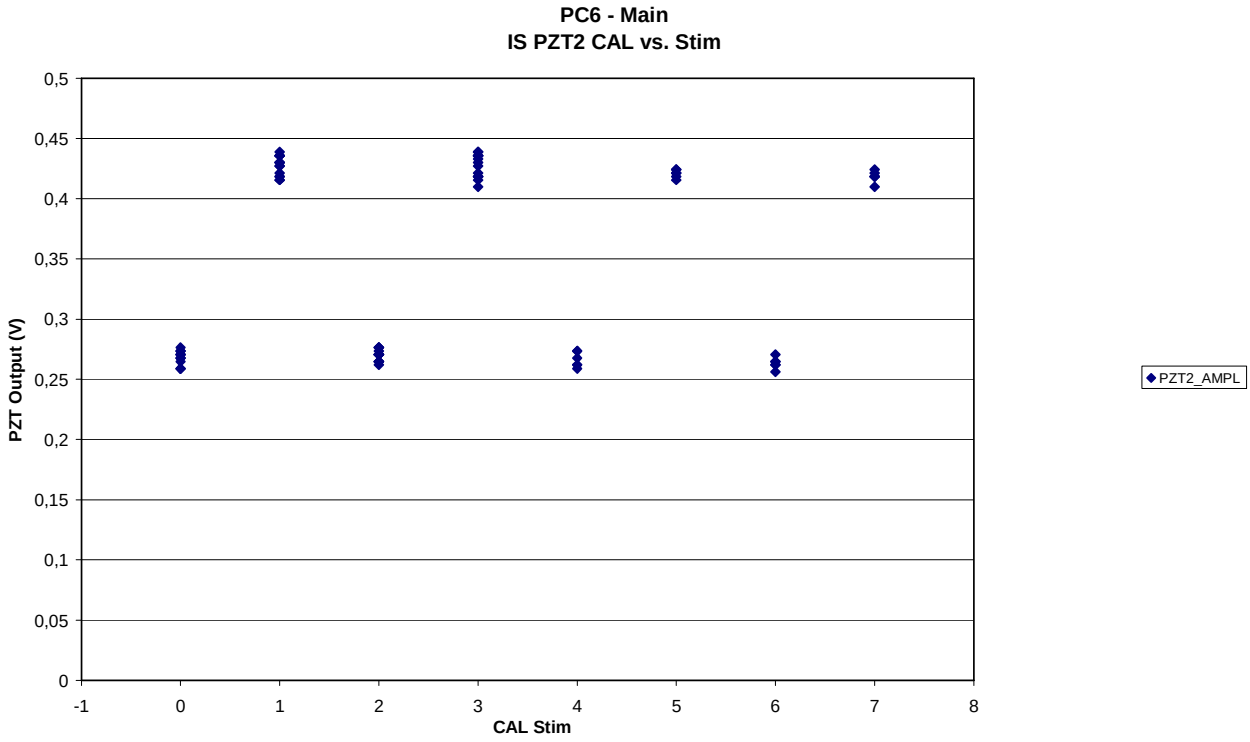


Figure 9.4-31. PZT 3 CAL Signal vs. stimulus – Main

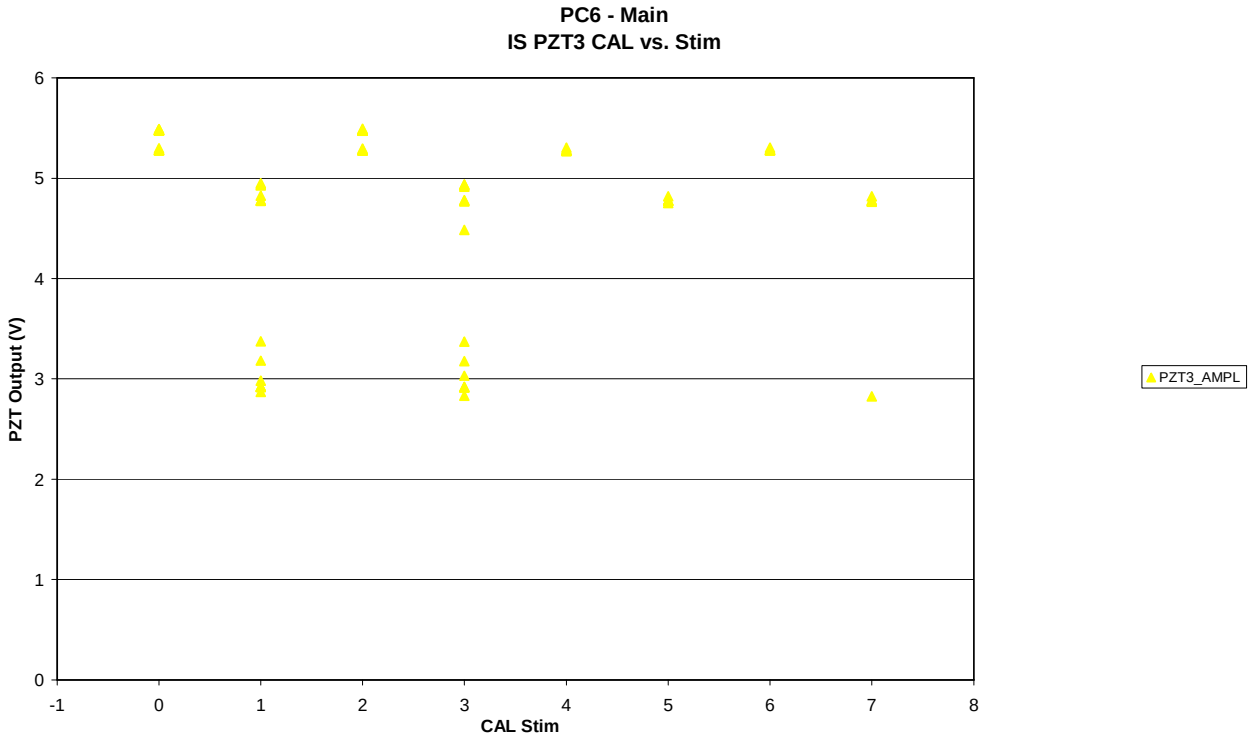


Figure 9.4-32. PZT 4 CAL Signal vs. stimulus – Main

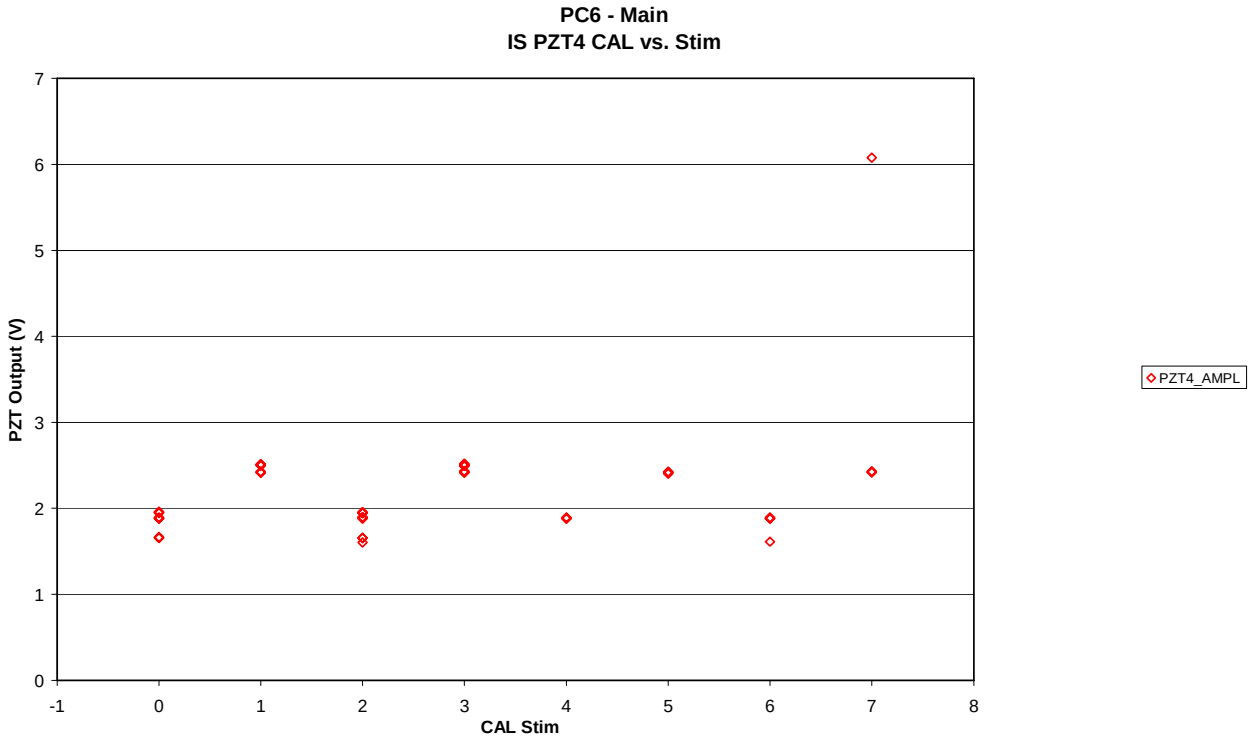


Figure 9.4-33. PZT 5 CAL Signal vs. stimulus – Main

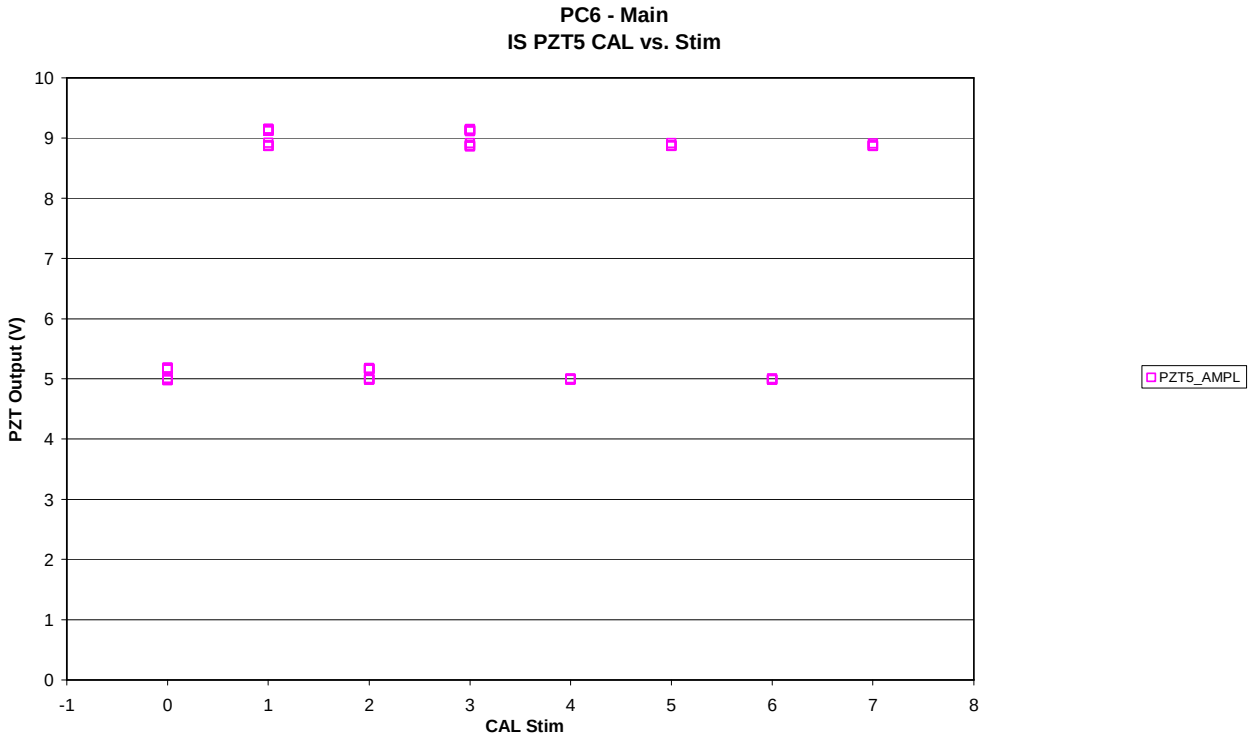


Figure 9.4-34. PZT 1 CAL Time delay vs. stimulus – Main

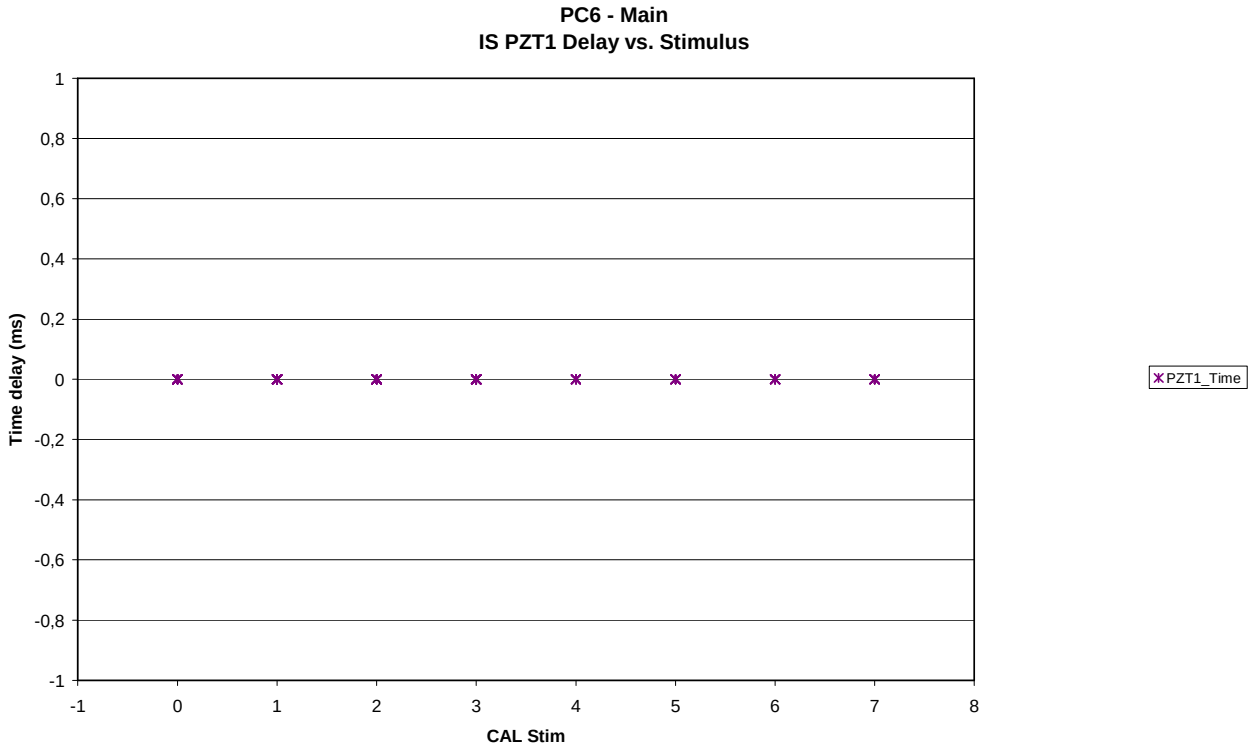


Figure 9.4-35. PZT 2 CAL Time delay vs. stimulus - Main

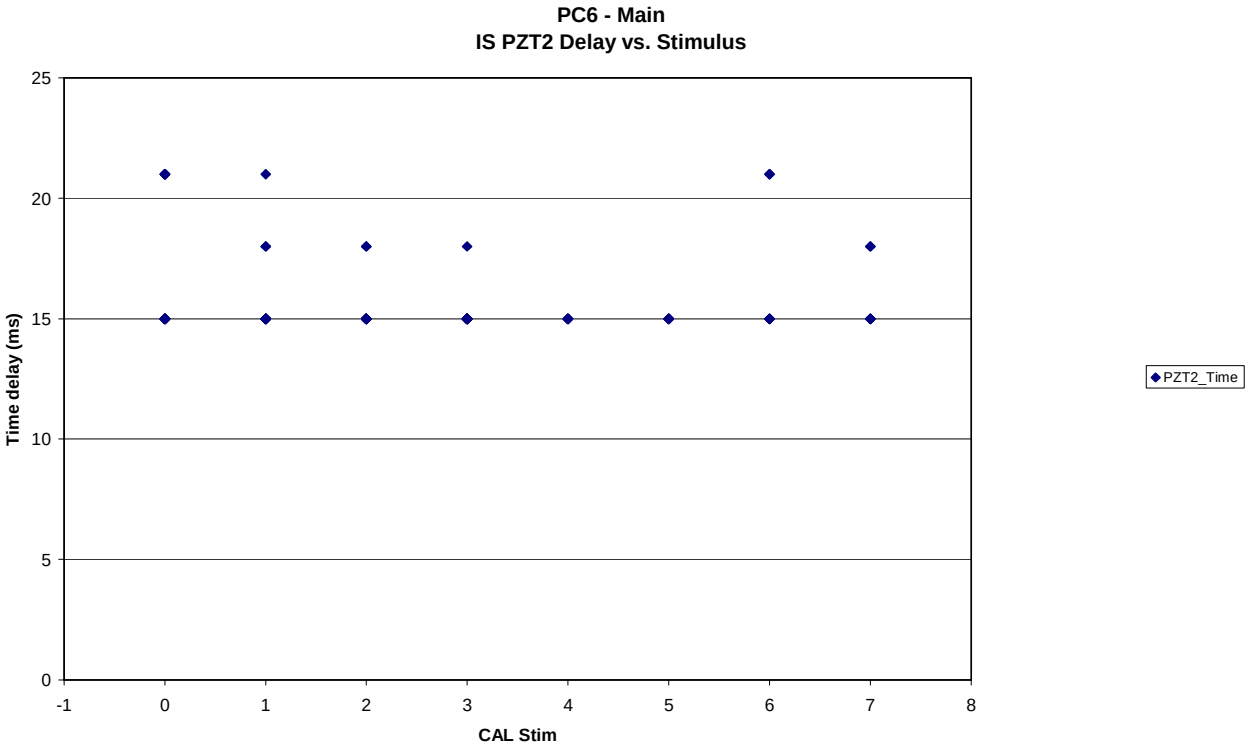


Figure 9.4-36. PZT 3 CAL Time delay vs. stimulus - Main

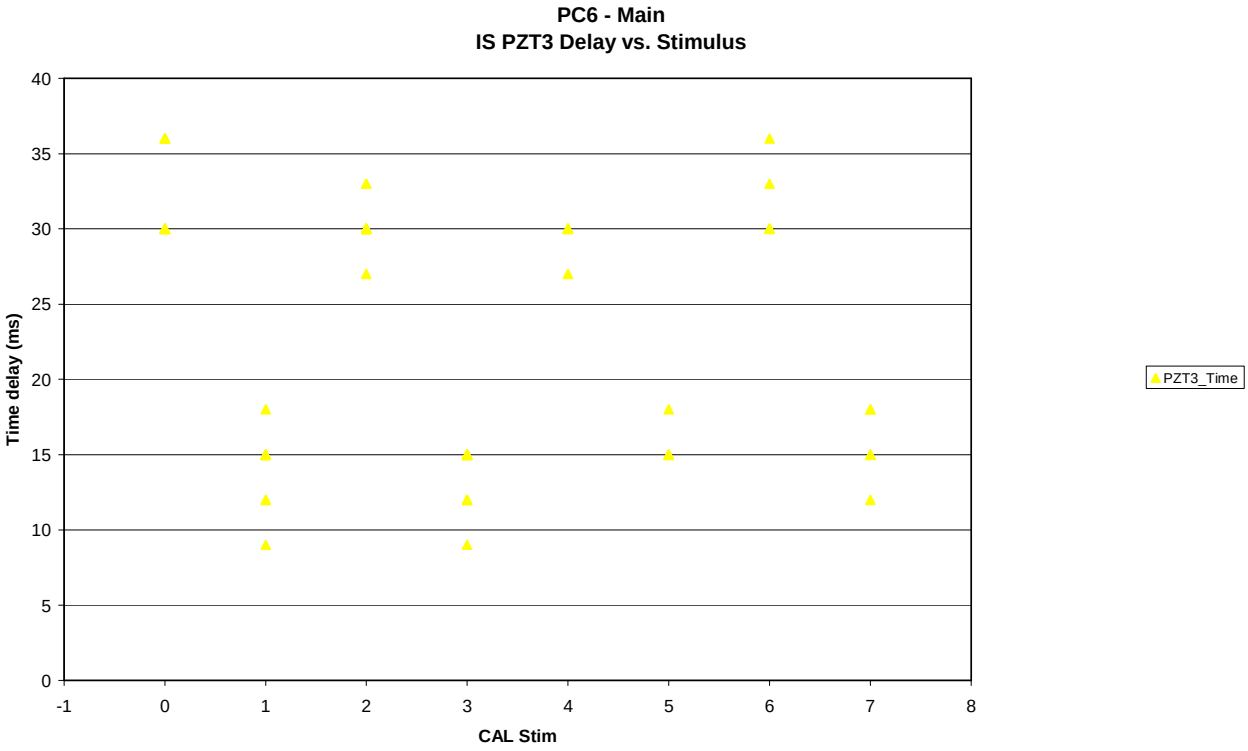


Figure 9.4-37. PZT 4 CAL Time delay vs. stimulus - Main

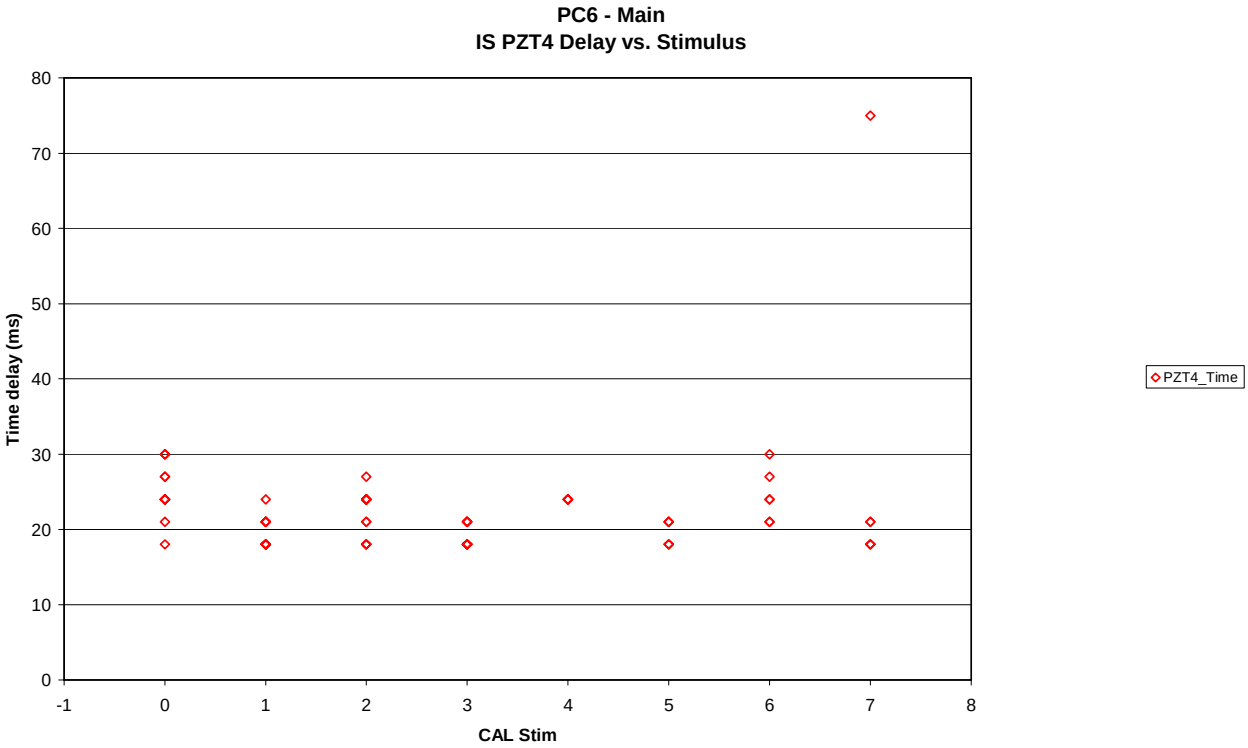
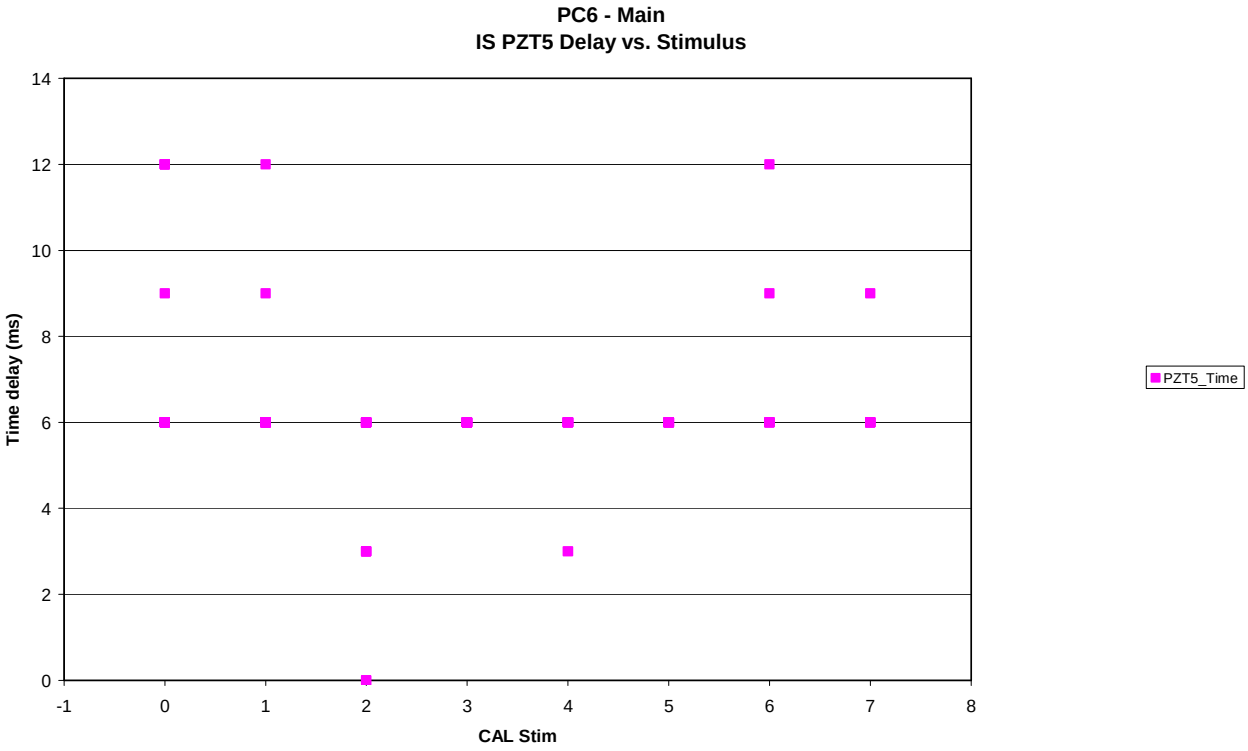


Figure 9.4-38. PZT 5 CAL Time delay vs. stimulus - Main



9.5 MICRO BALANCE SYSTEM (MBS)

9.5.1 MBS – Status

Figure 9.5-1. MBS Operation Status vs. time - Main

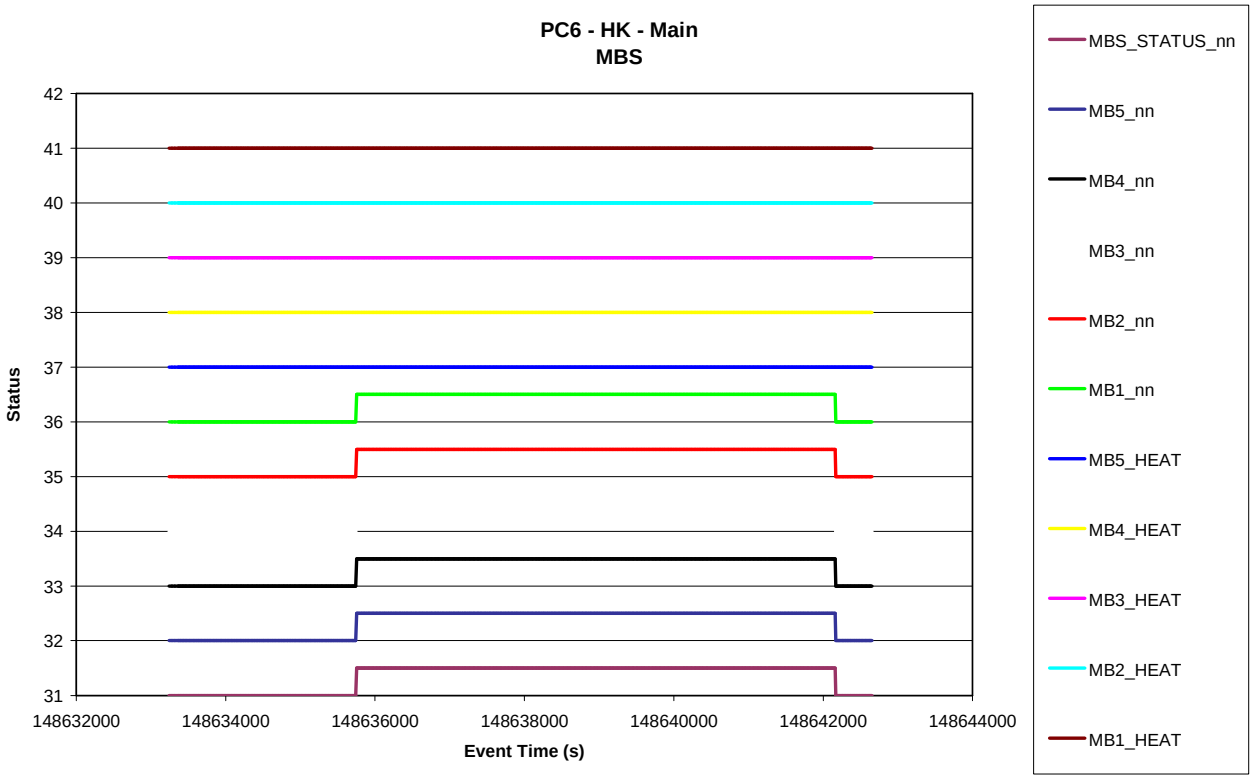


Figure 9.5-2. MBS 1 Temperature vs. time (HK, HK-SCI, SCI) – Main

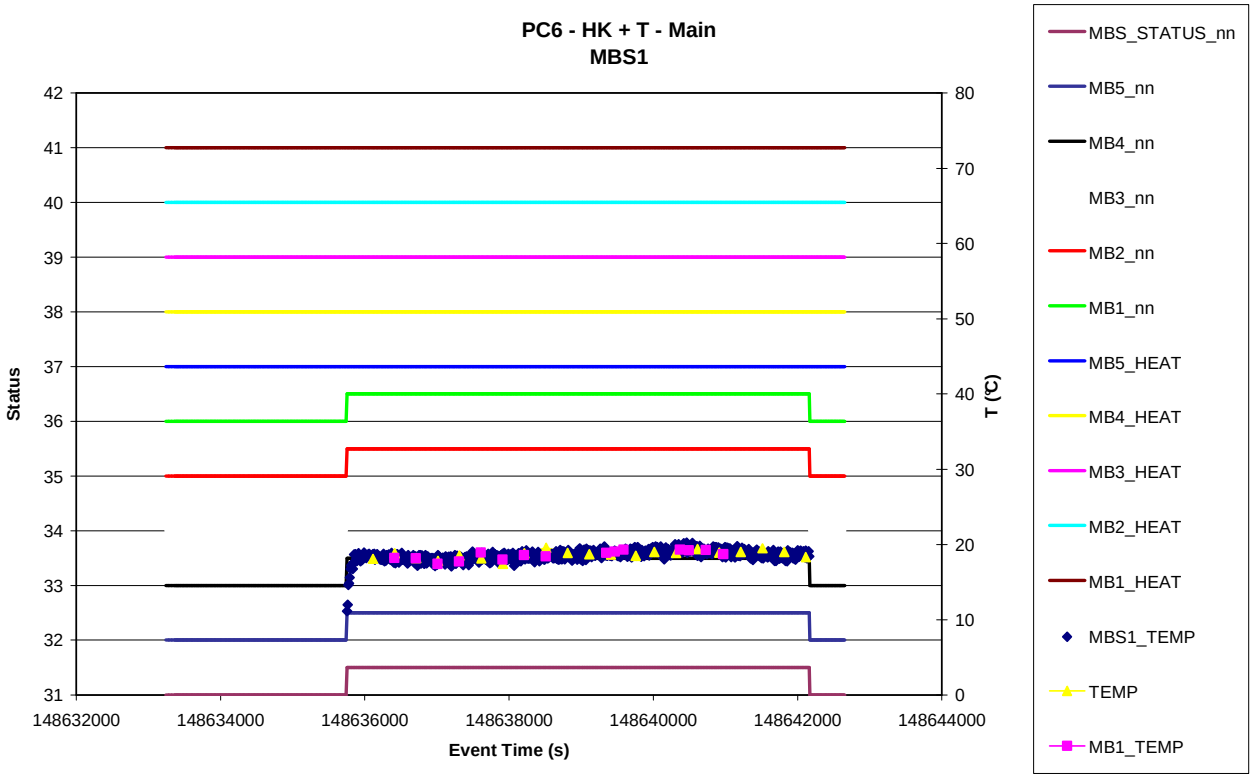


Figure 9.5-3. MBS 2 Temperature vs. time (HK, HK-SCI, SCI) - Main

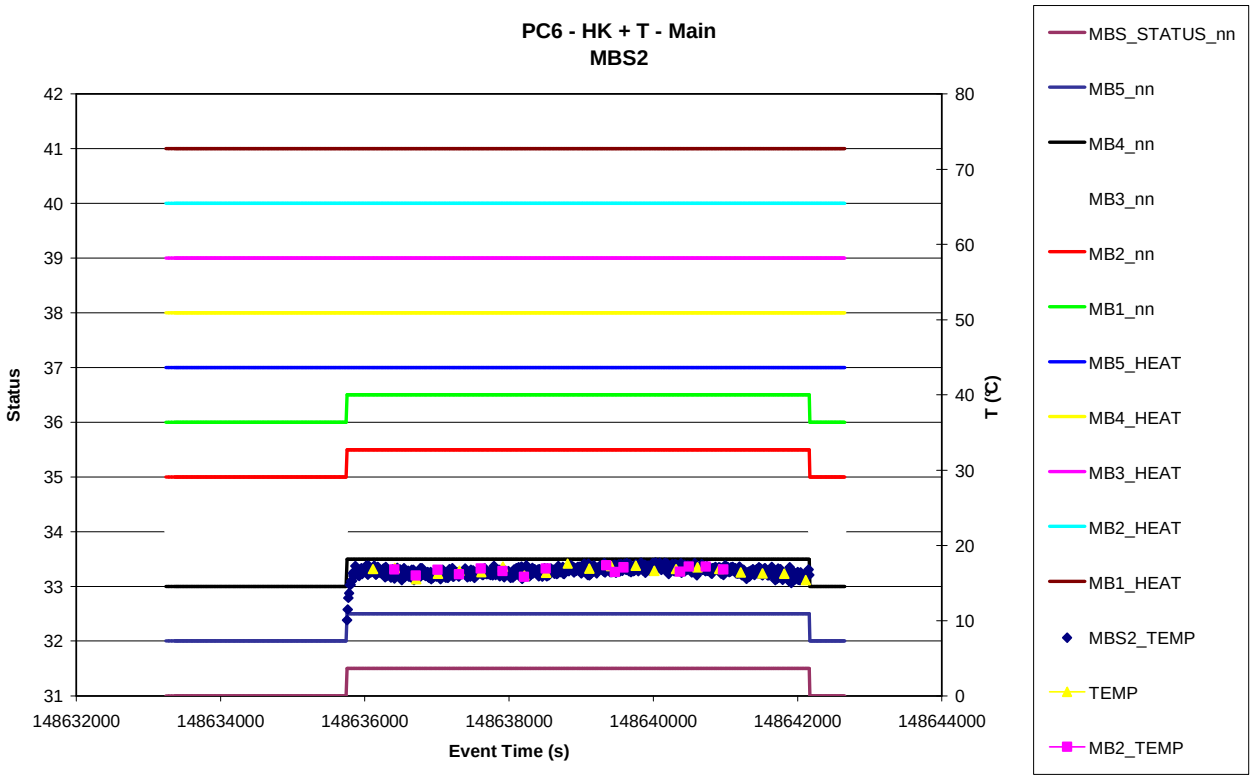


Figure 9.5-4. MBS 3 Temperature vs. time (HK, HK-SCI, SCI) - Main

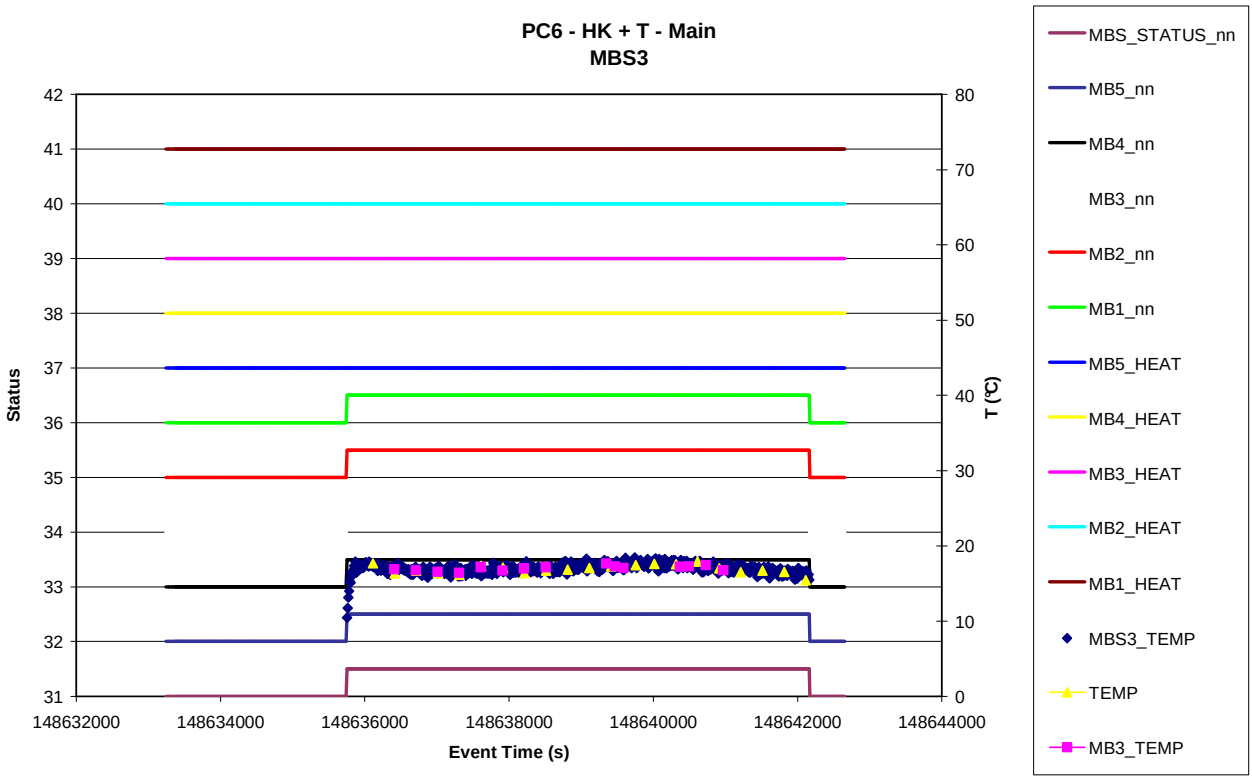


Figure 9.5-5. MBS 4 Temperature vs. time (HK, HK-SCI, SCI) - Main

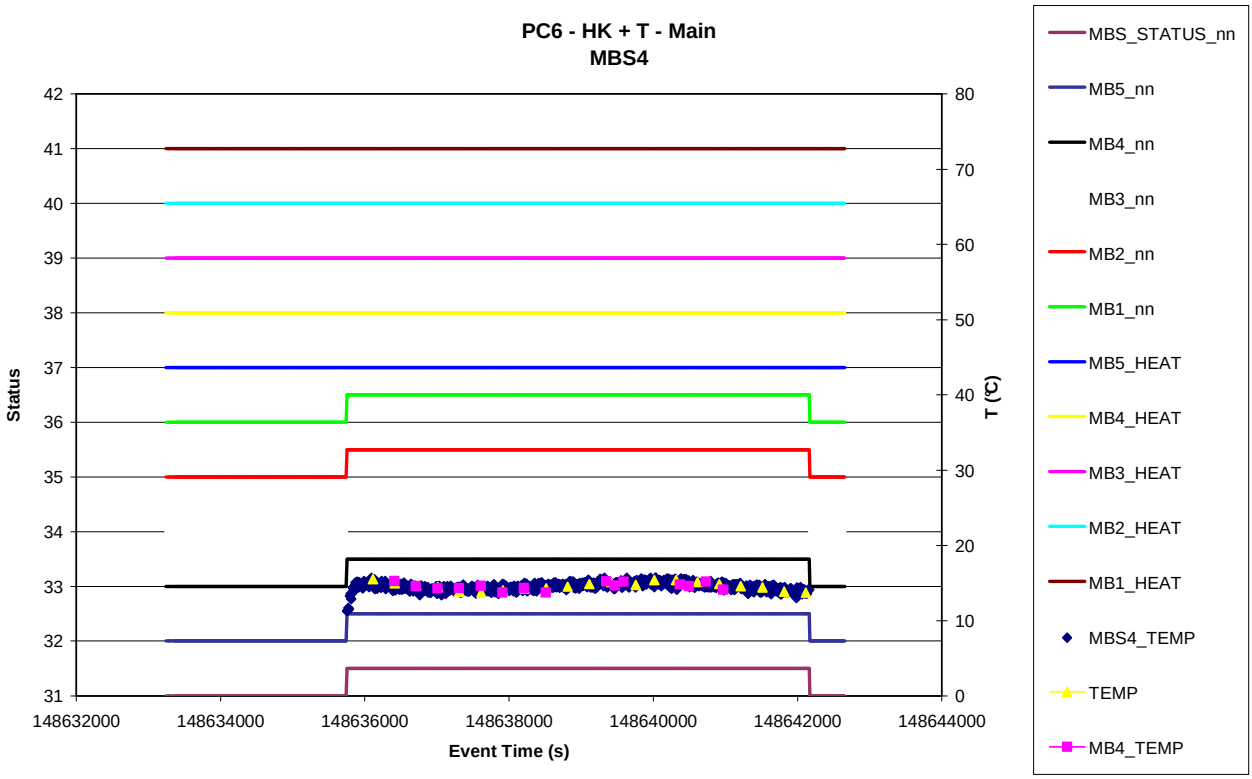
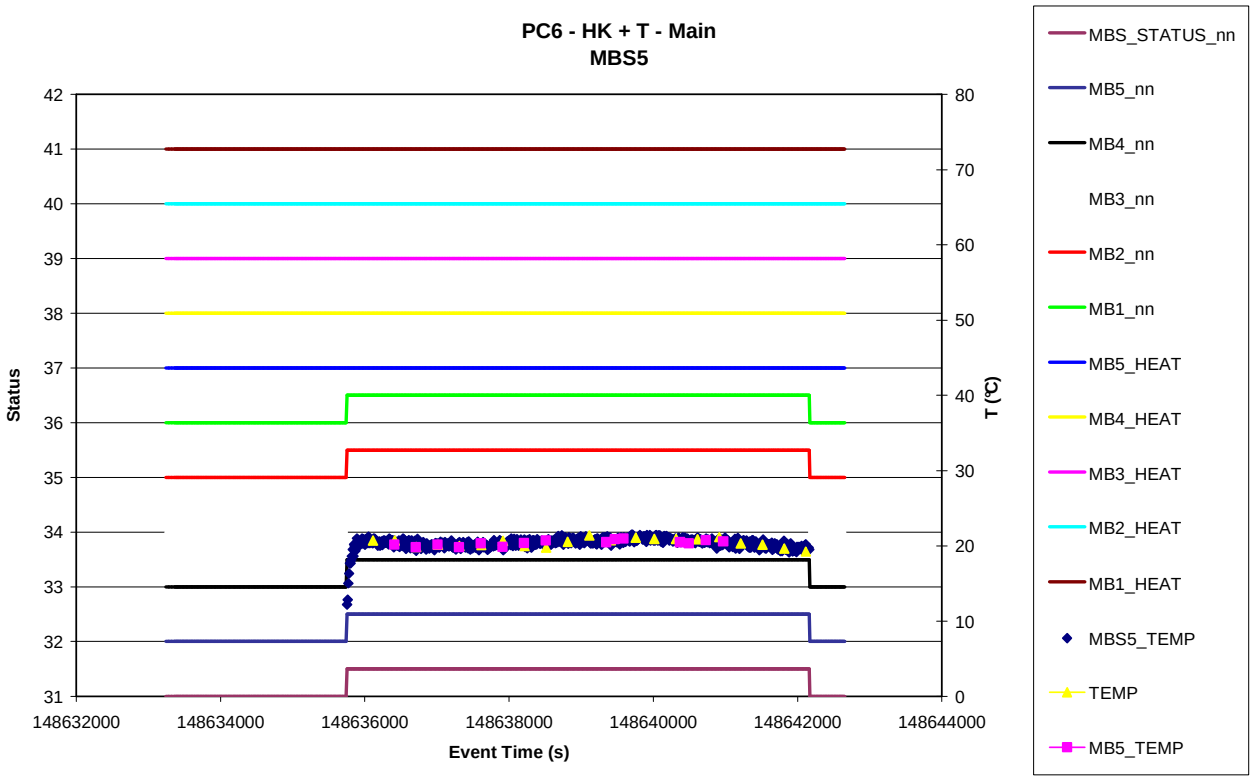


Figure 9.5-6. MBS 5 Temperature vs. time (HK, HK-SCI, SCI) - Main



9.5.2 MBS – Behaviour

9.5.2.1 Science Events (Normal + Heating)

Figure 9.5-7. MBS 1 Frequency and Temperature vs. time - Main

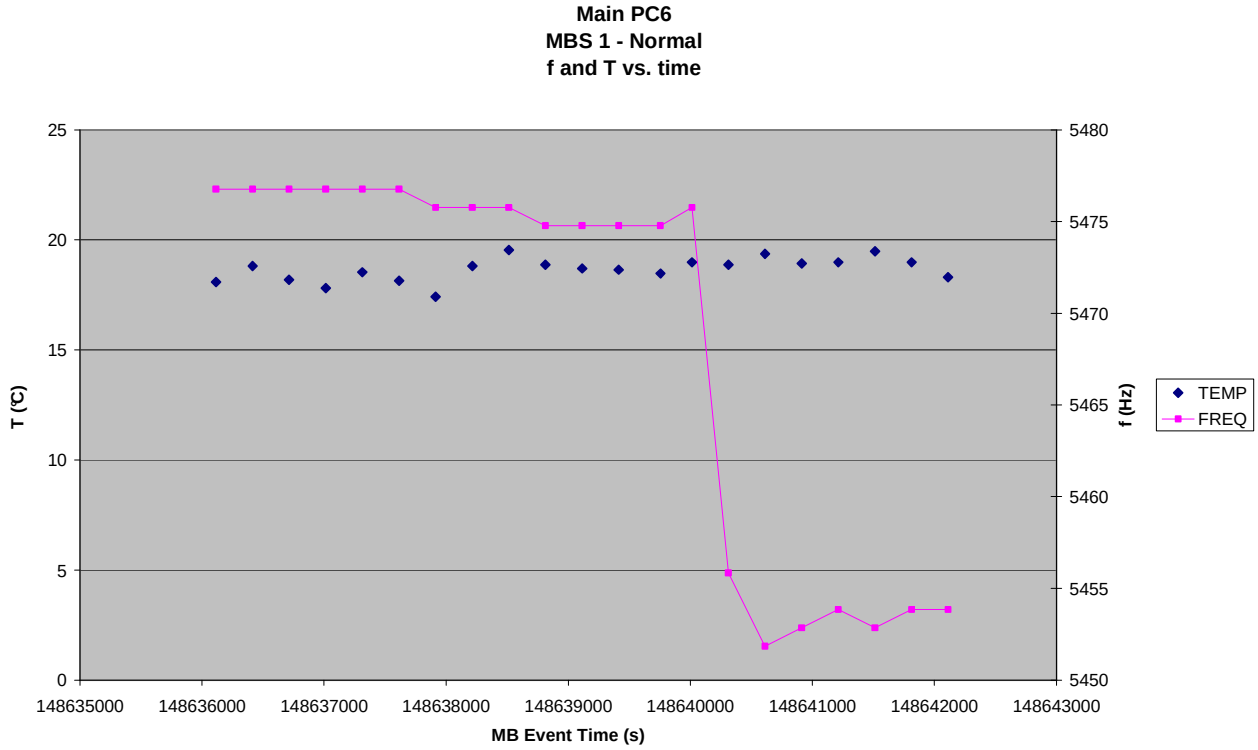


Figure 9.5-8. MBS 2 Frequency and Temperature vs. time - Main

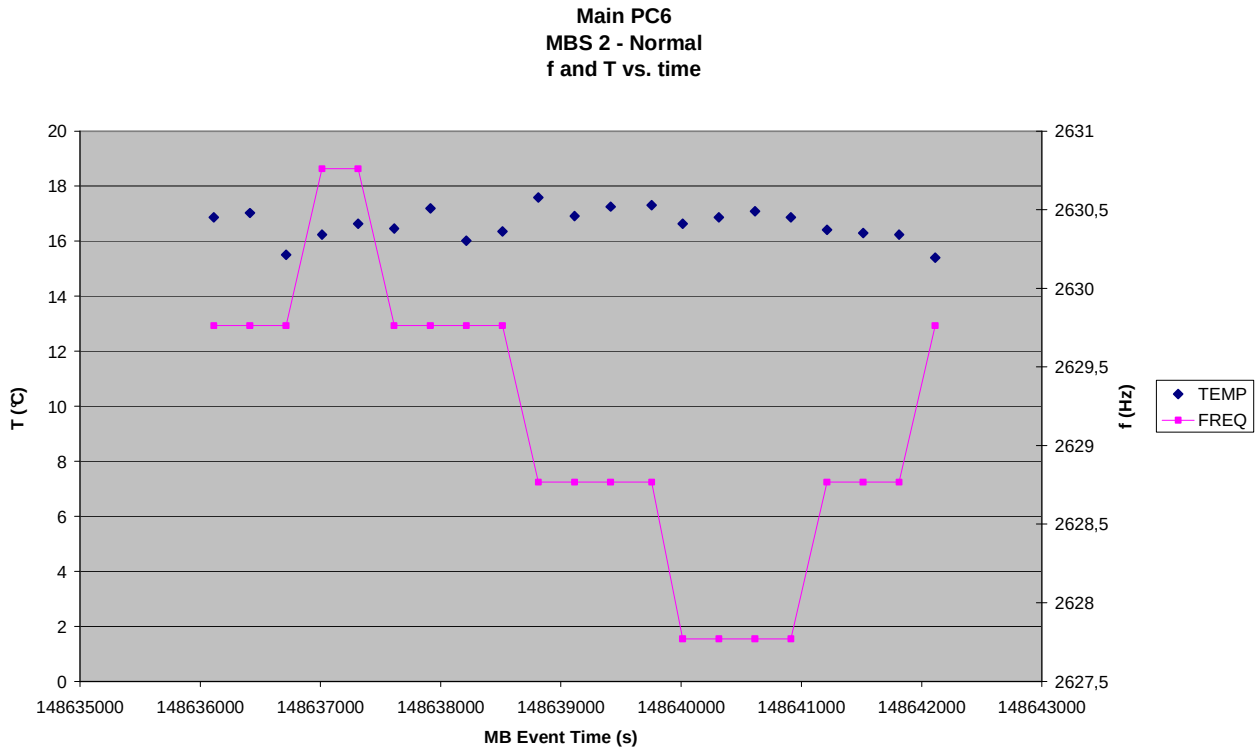


Figure 9.5-9. MBS 3 Frequency and Temperature vs. time - Main

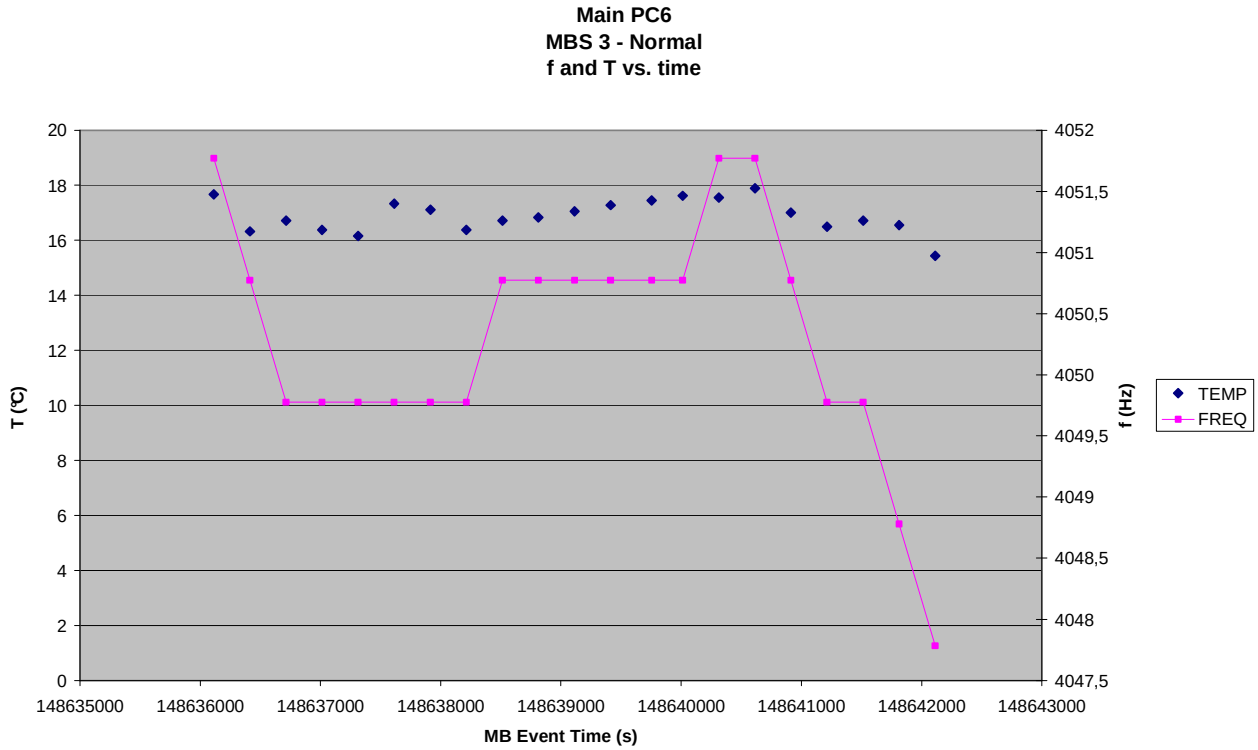


Figure 9.5-10. MBS 4 Frequency and Temperature vs. time - Main

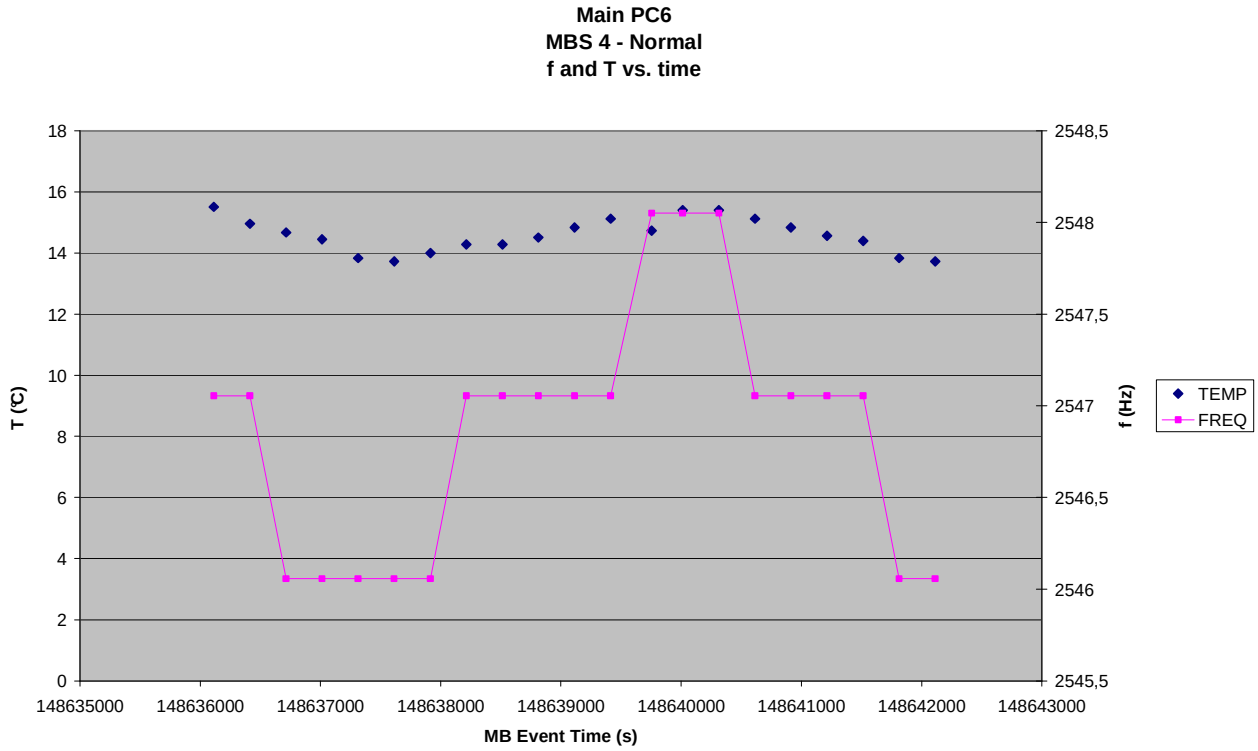
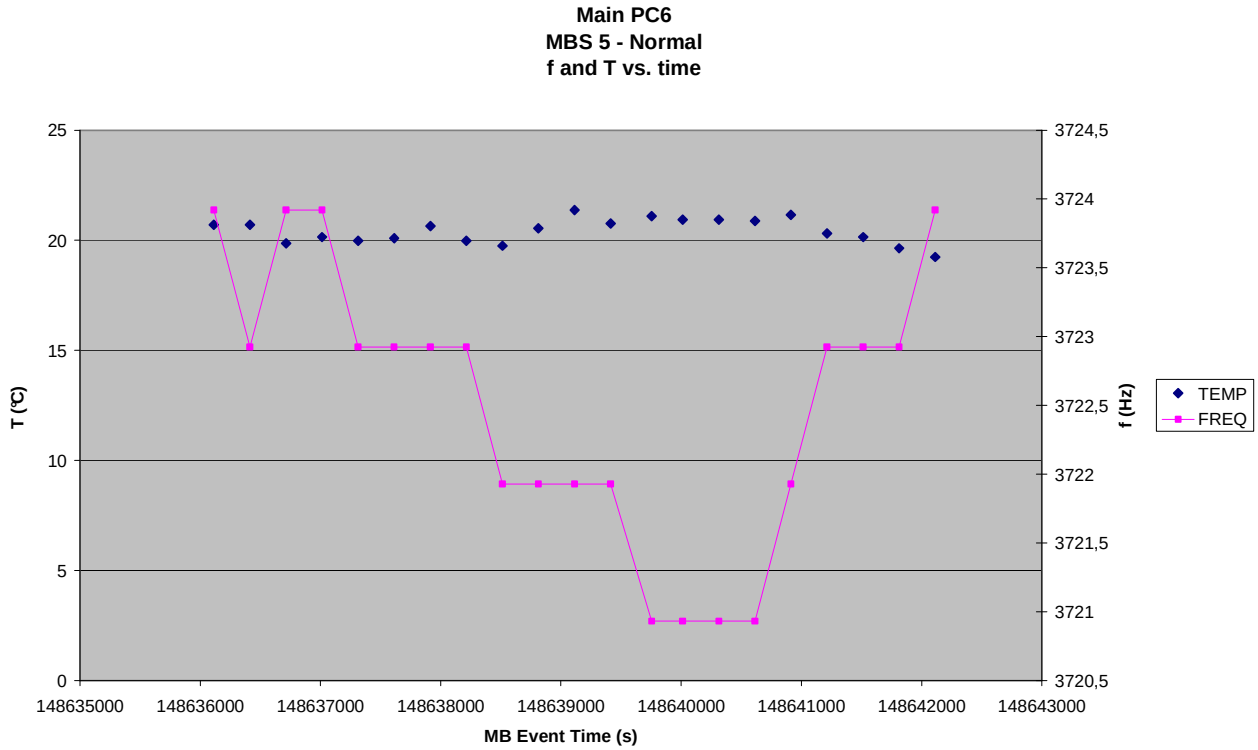


Figure 9.5-11. MBS 5 Frequency and Temperature vs. time - Main



10. PC6 DATA ANALYSIS – MAIN INTERFACE (GD03)

10.1 GIADA STATUS

Figure 10.1-1. HK Status of GIADA and S/S vs. time - Main

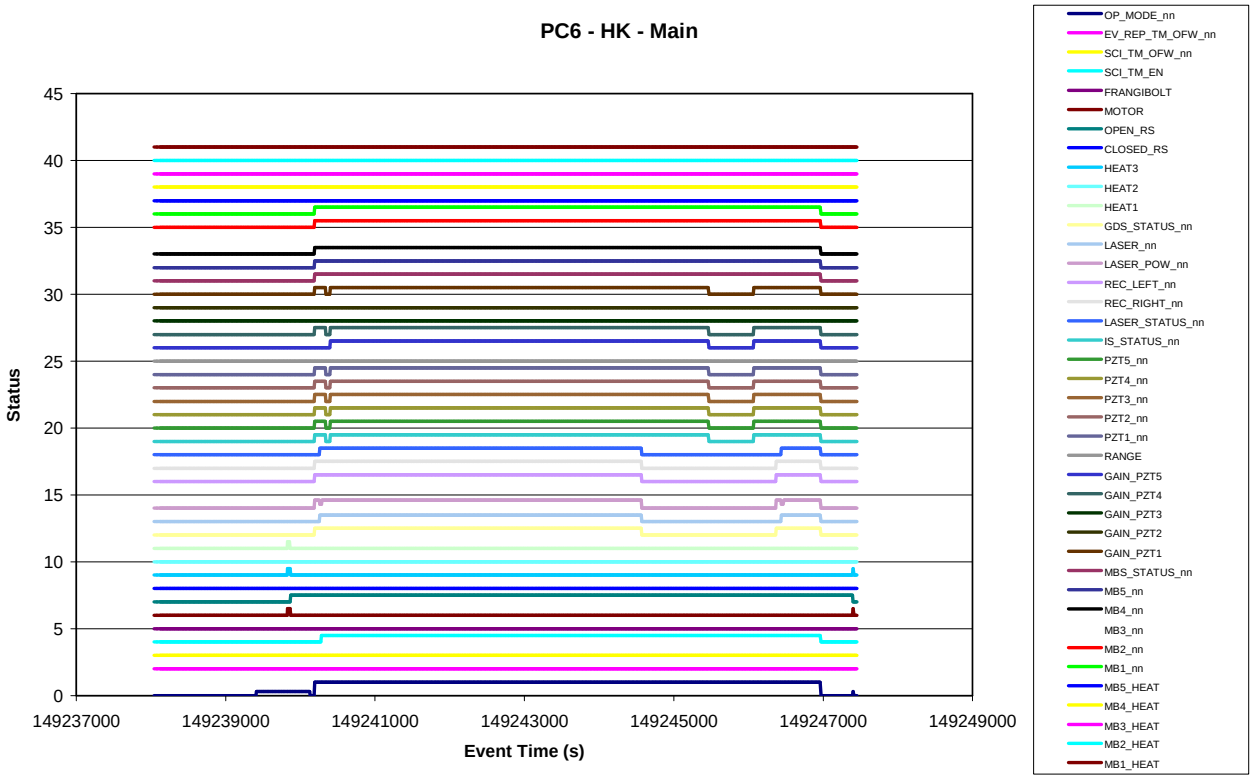


Figure 10.1-2. Evolution of all temperatures vs. time - HK, HK-SCI, SCI - Main

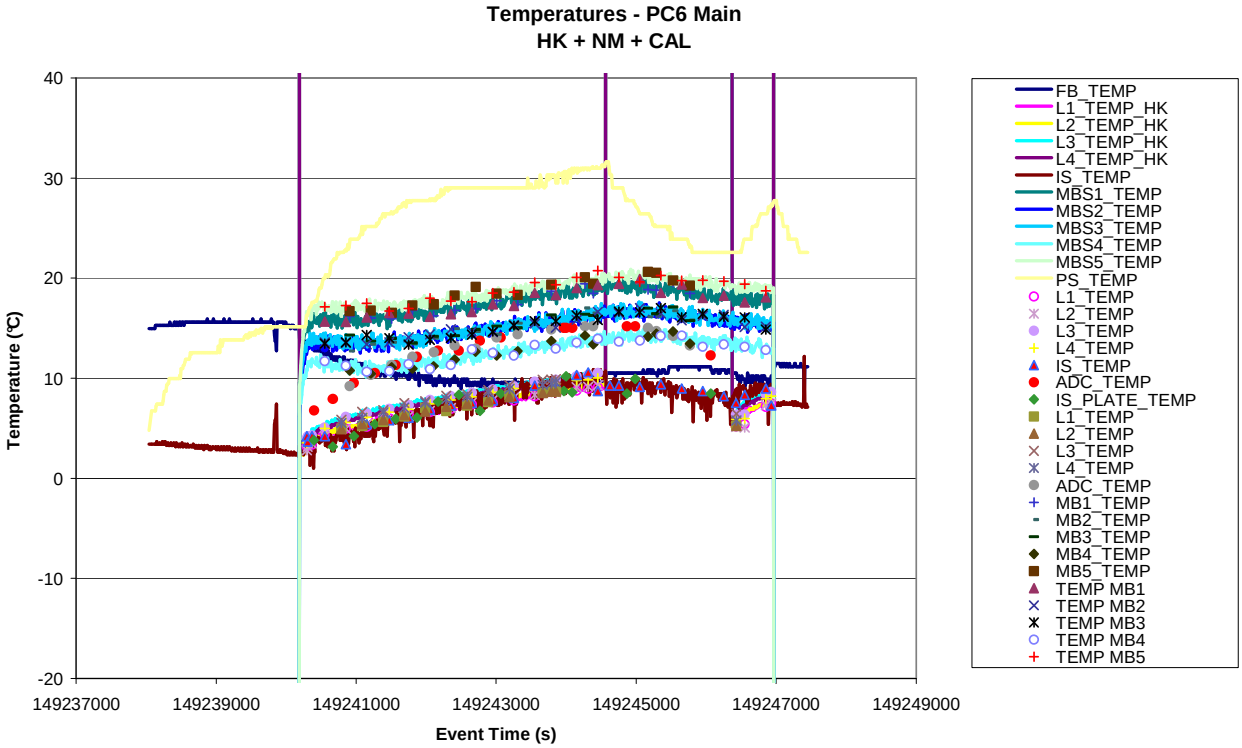


Figure 10.1-3. Evolution of temperatures of system elements vs. time - HK, HK-SCI, SCI - Main

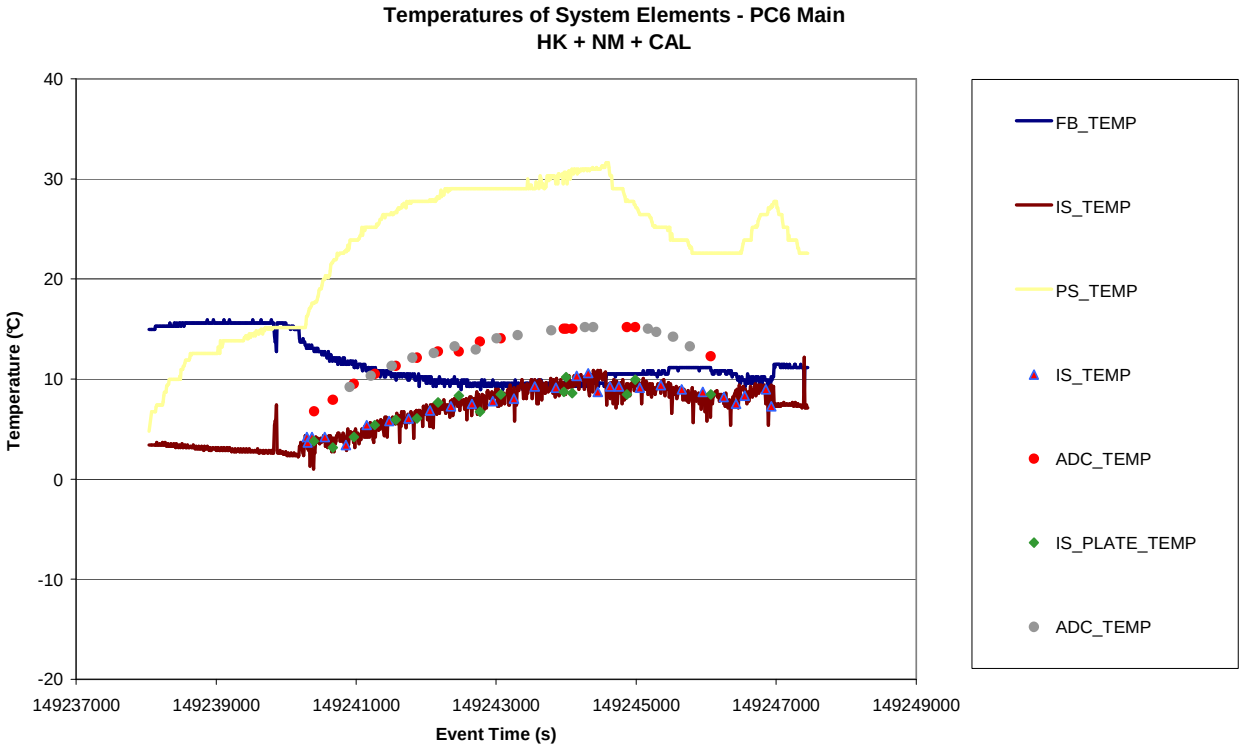


Figure 10.1-4. Evolution of temperatures of sub-systems vs. time - HK, HK-SCI, SCI - Main

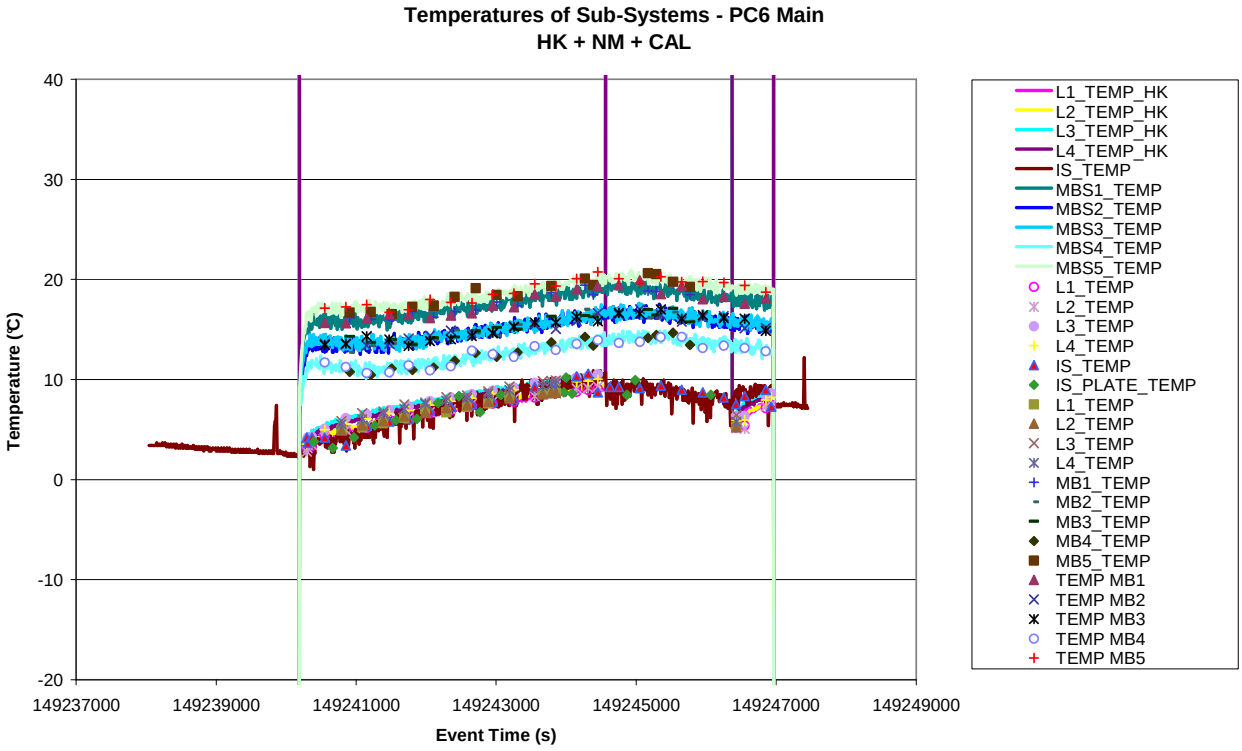


Figure 10.1-5. HK Status versus Temperatures of system elements - Main

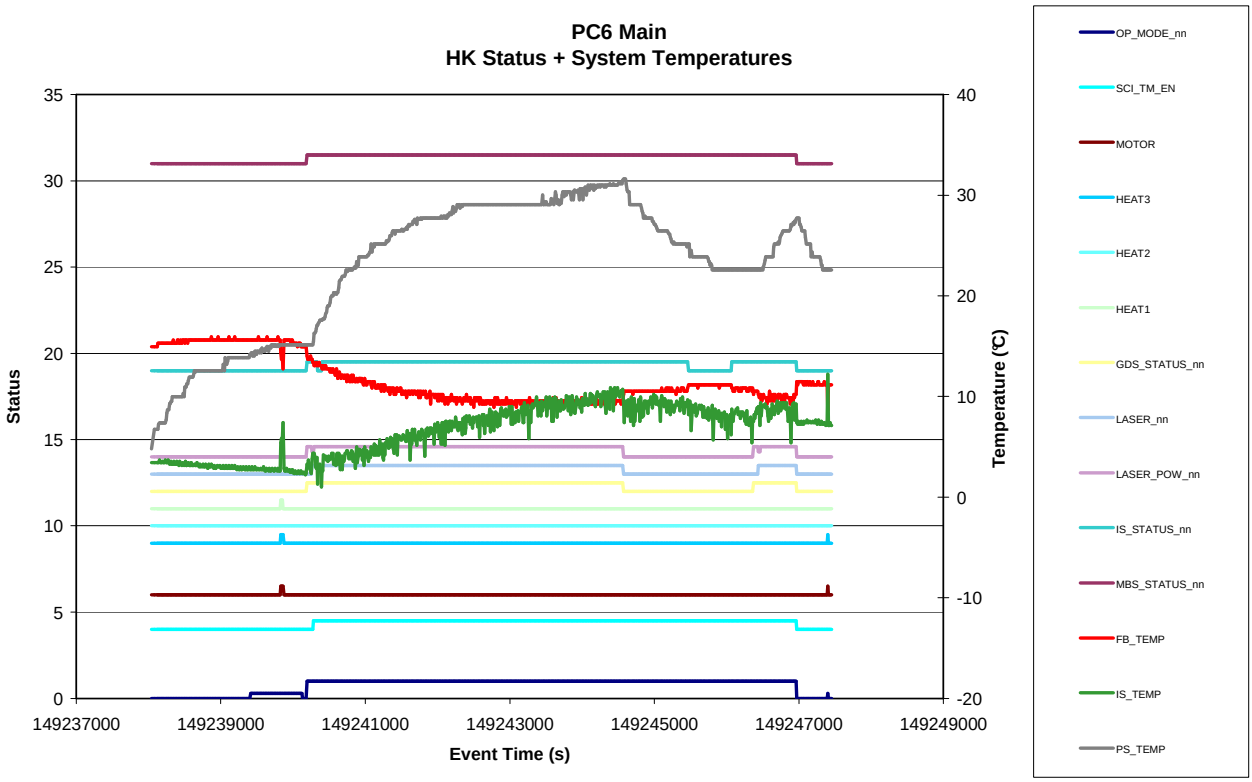


Figure 10.1-6. Operation Status vs. time - Main

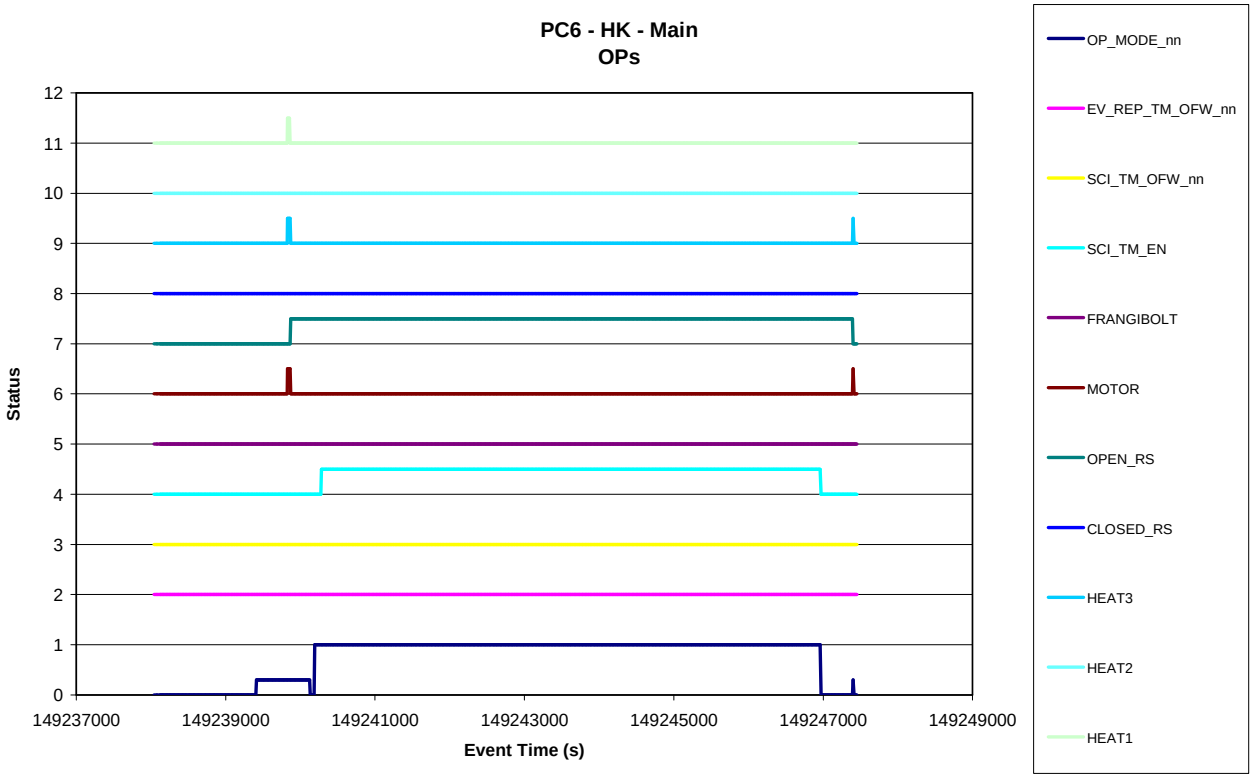


Figure 10.1-7. Operation Status versus Temperatures of system elements - Main

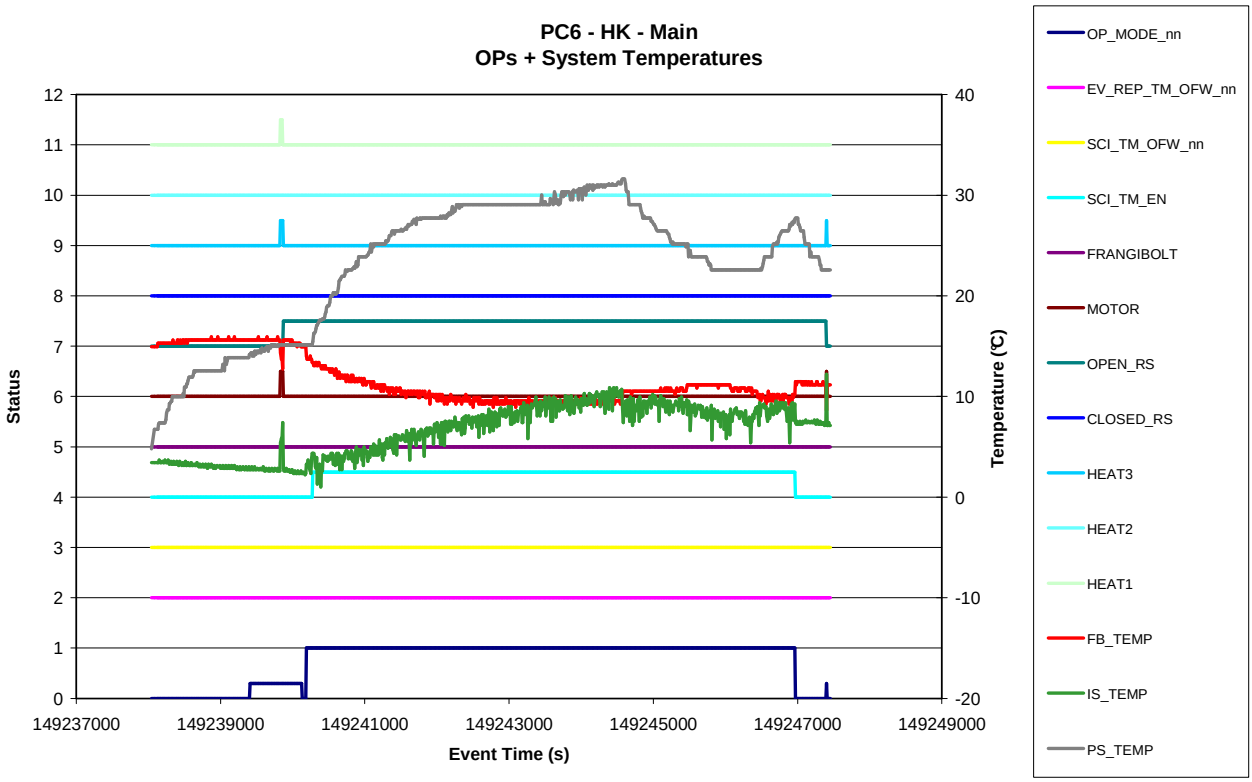


Figure 10.1-8. Power behaviour - Main

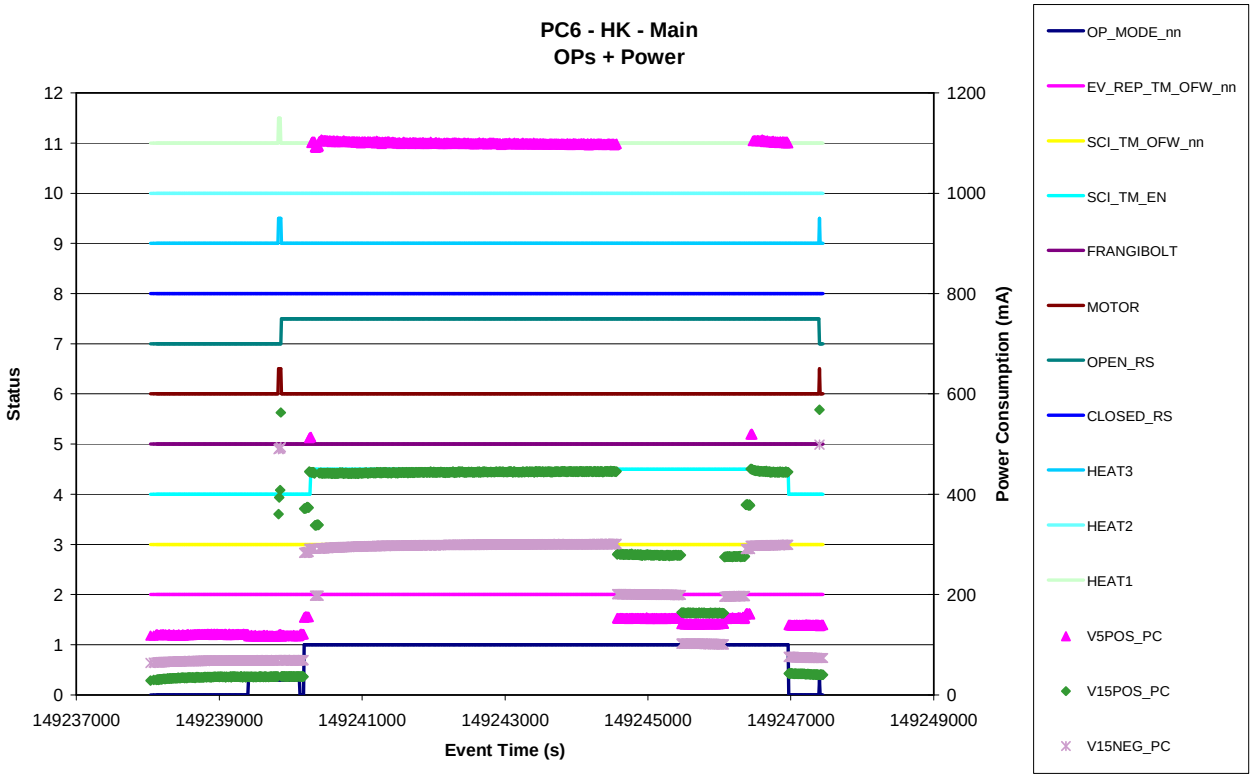


Figure 10.1-9. Power and PS temperature behaviour - Main

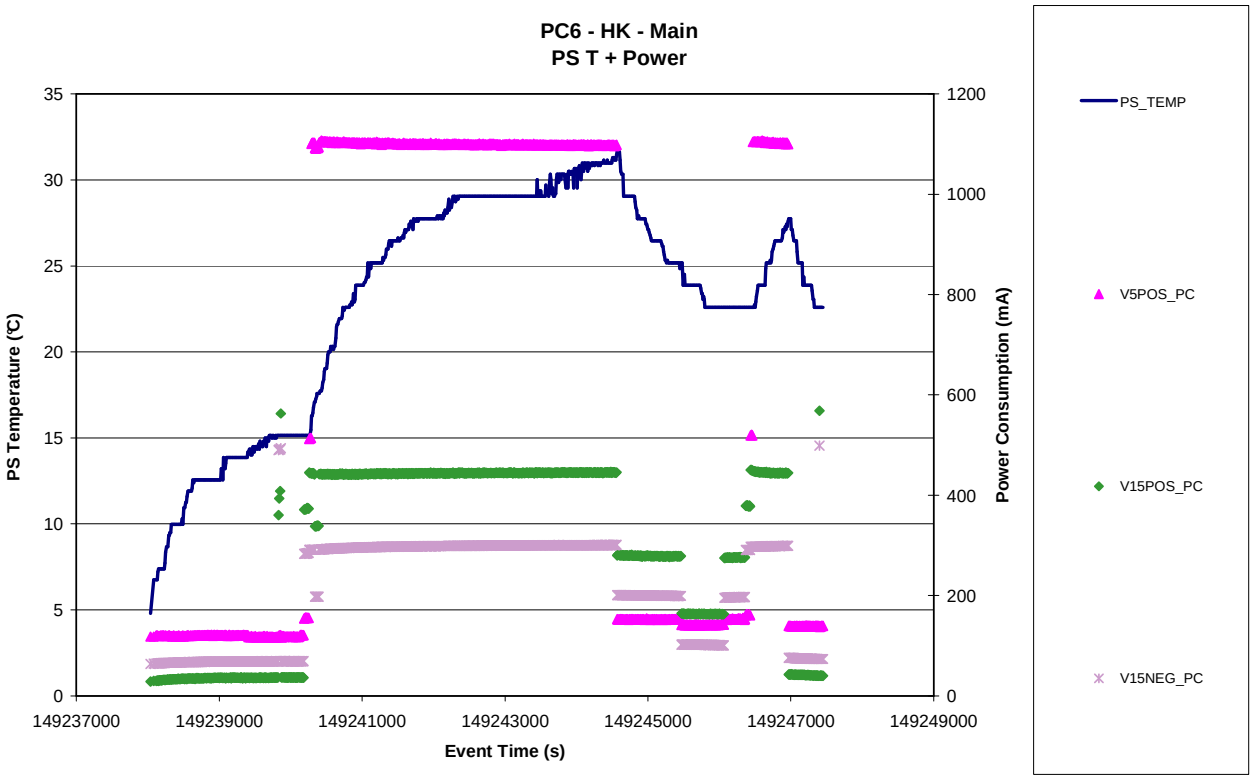


Figure 10.1-10. Source Sequence Count (SSC) of HK Telemetry vs. Time - Main

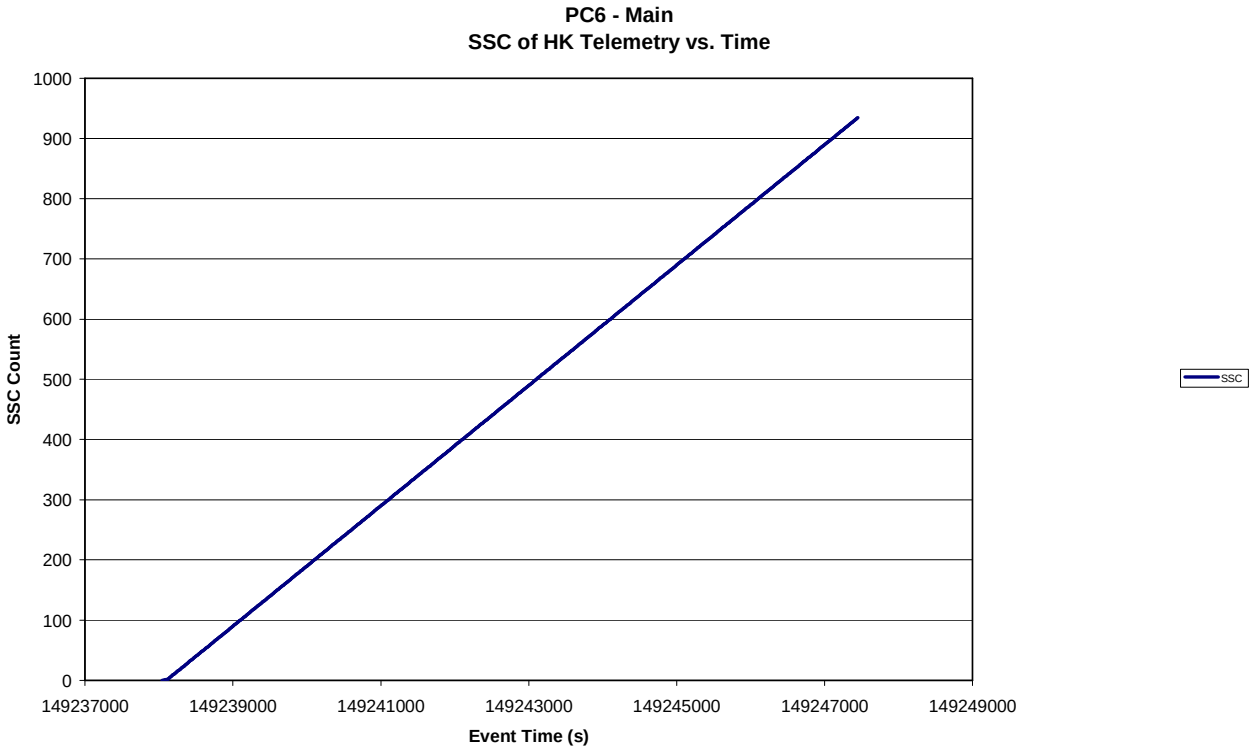


Figure 10.1-11. Source Sequence Count (SSC) of HK Telemetry vs. Number - Main

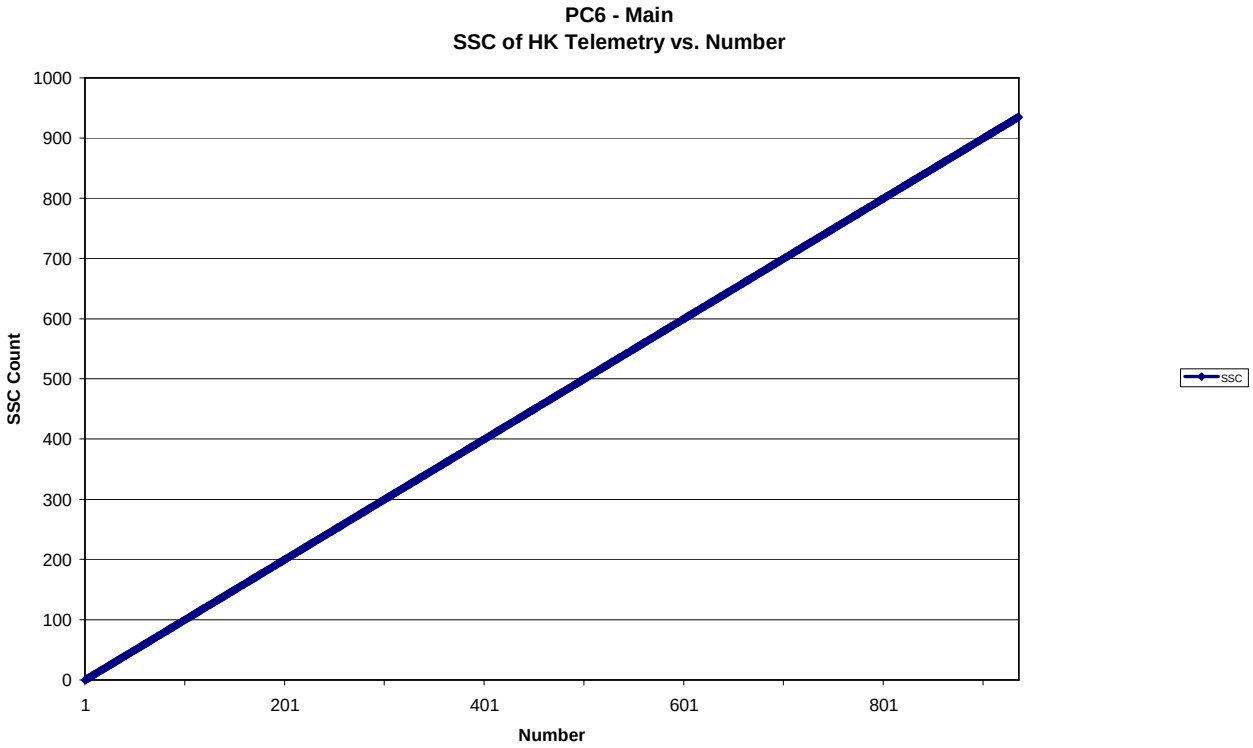


Figure 10.1-12. Source Sequence Count (SSC) of SCI Telemetry vs. Time - Main

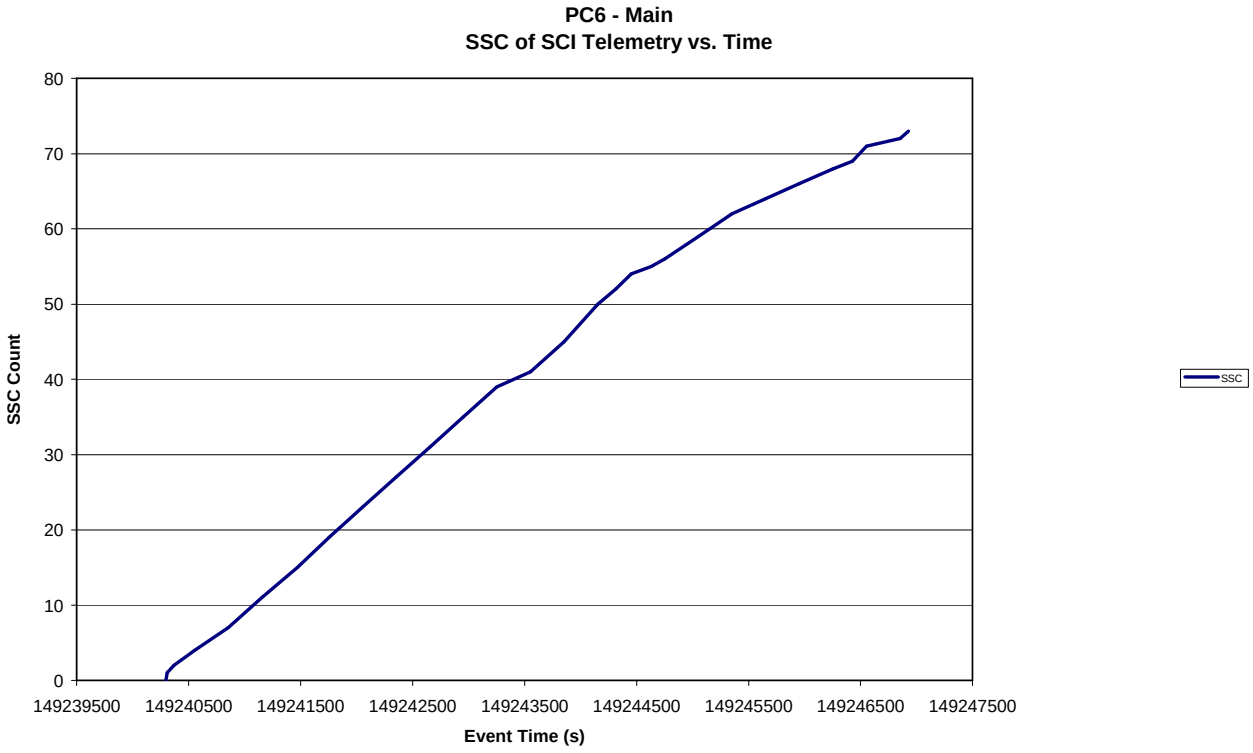
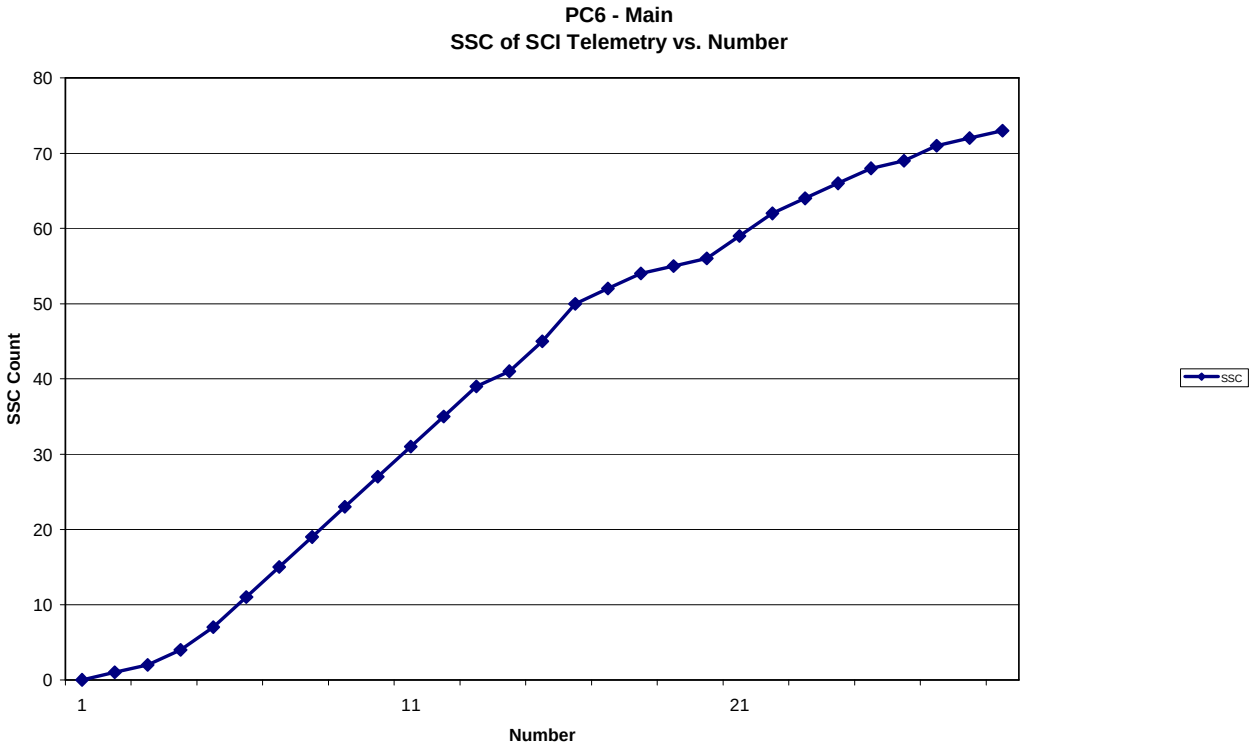


Figure 10.1-13. Source Sequence Count (SSC) of SCI Telemetry vs. Number - Main

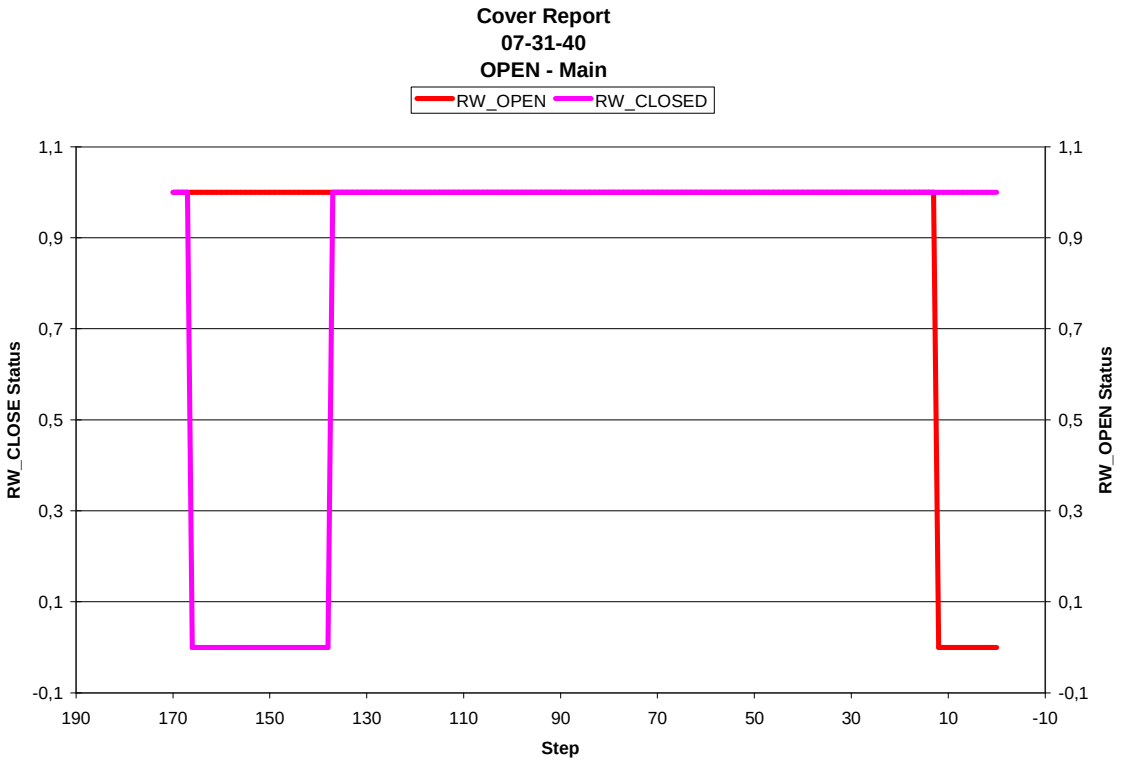


10.2 COVER REPORTS

10.2.1 Open Cover

HEADER_START
CREATION_TIME=2007-09-24T07:31:40Z
USER=AA0000
HEADER_END
//
// Generated by 'GIADA_EGSE_SW '
//
MOVEMENT DIRECTION: To open
BEGIN TIME OF OPERATION: 149239856.000000
END TIME OF OPERATION: 149239872.000000

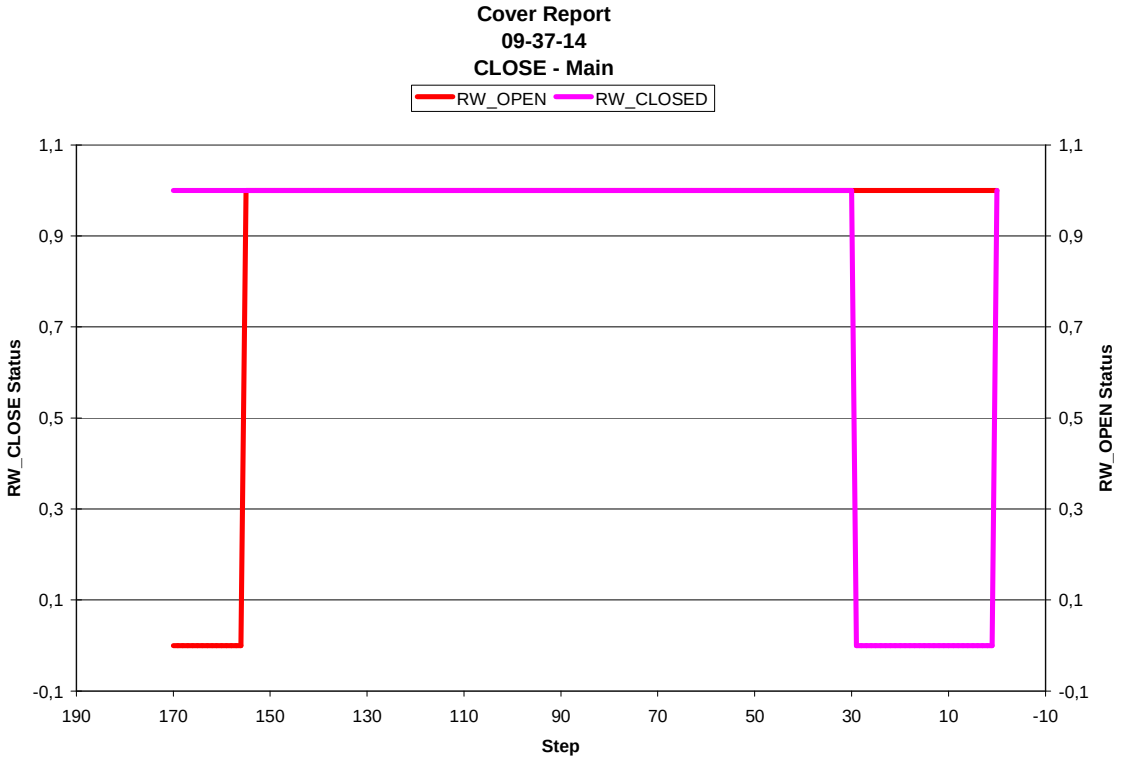
Figure 10.2-1 Cover Report – Open - Main



10.2.2 Close Cover

HEADER_START
CREATION_TIME=2007-09-24T09:37:14Z
USER=AA0000
HEADER_END
//
// Generated by 'GIADA_EGSE_SW '
//
MOVEMENT DIRECTION: To close
BEGIN TIME OF OPERATION: 149247392.000000
END TIME OF OPERATION: 149247408.000000

Figure 10.2-2 Cover Report – Close - Main



10.3 GRAIN DETECTION SYSTEM (GDS)

10.3.1 GDS – Status

Figure 10.3-1. GDS Operation Status vs. time - Main

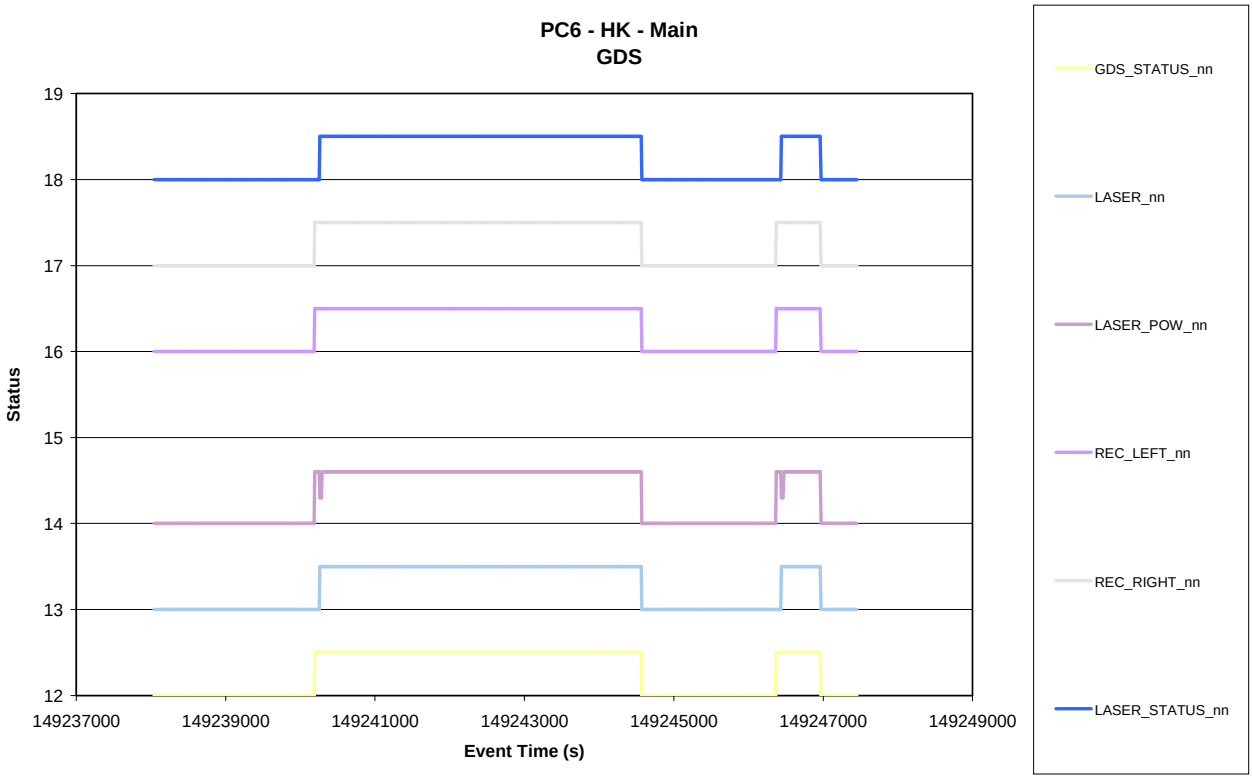


Figure 10.3-2. GDS Thresholds change vs. time - Main

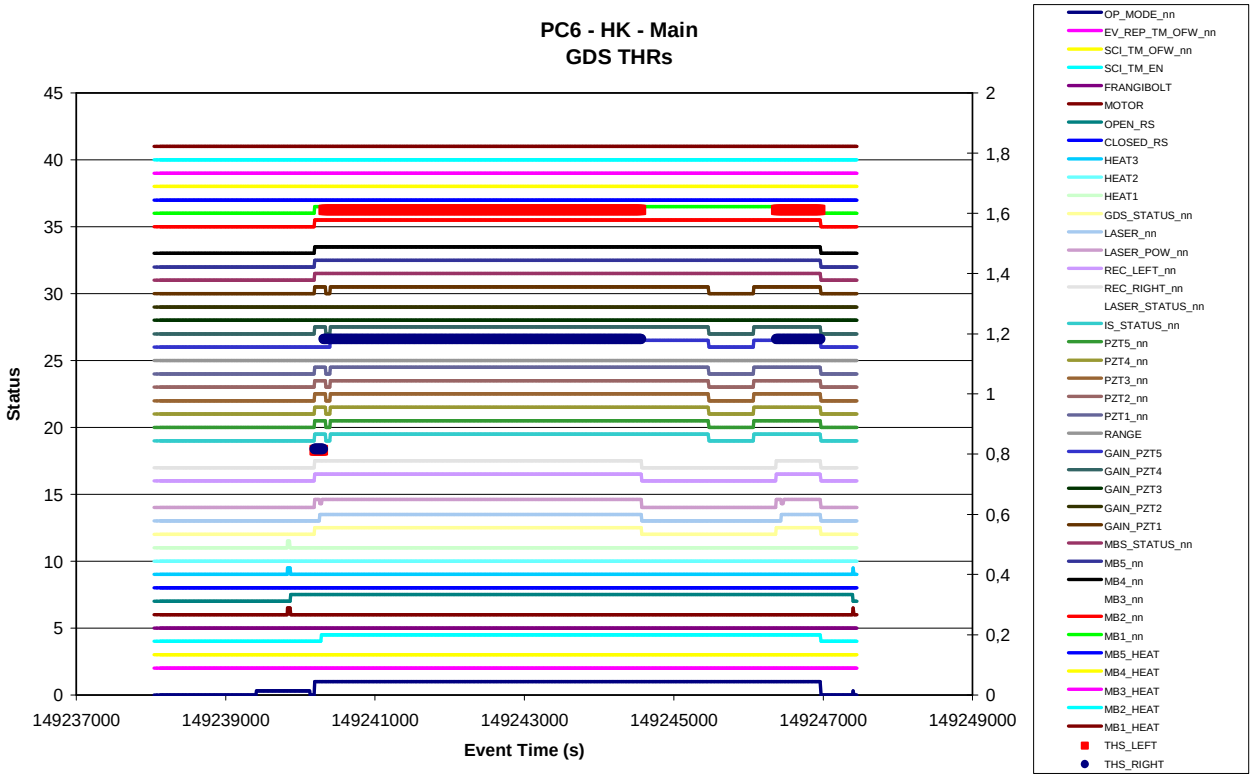


Figure 10.3-3. GDS Laser Temperatures vs. time (HK, HK-SCI, SCI) - Main

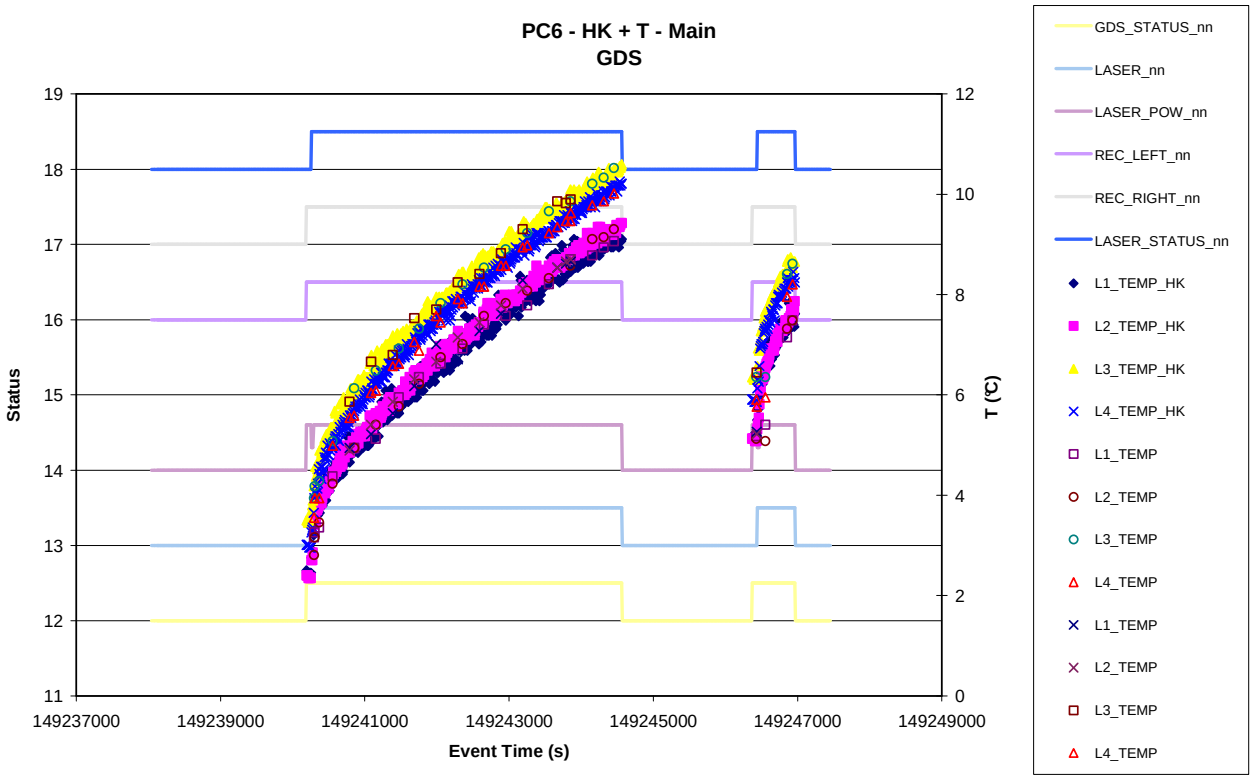


Figure 10.3-4. GDS Laser Monitor vs. time (HK, HK-SCI, SCI) - Main

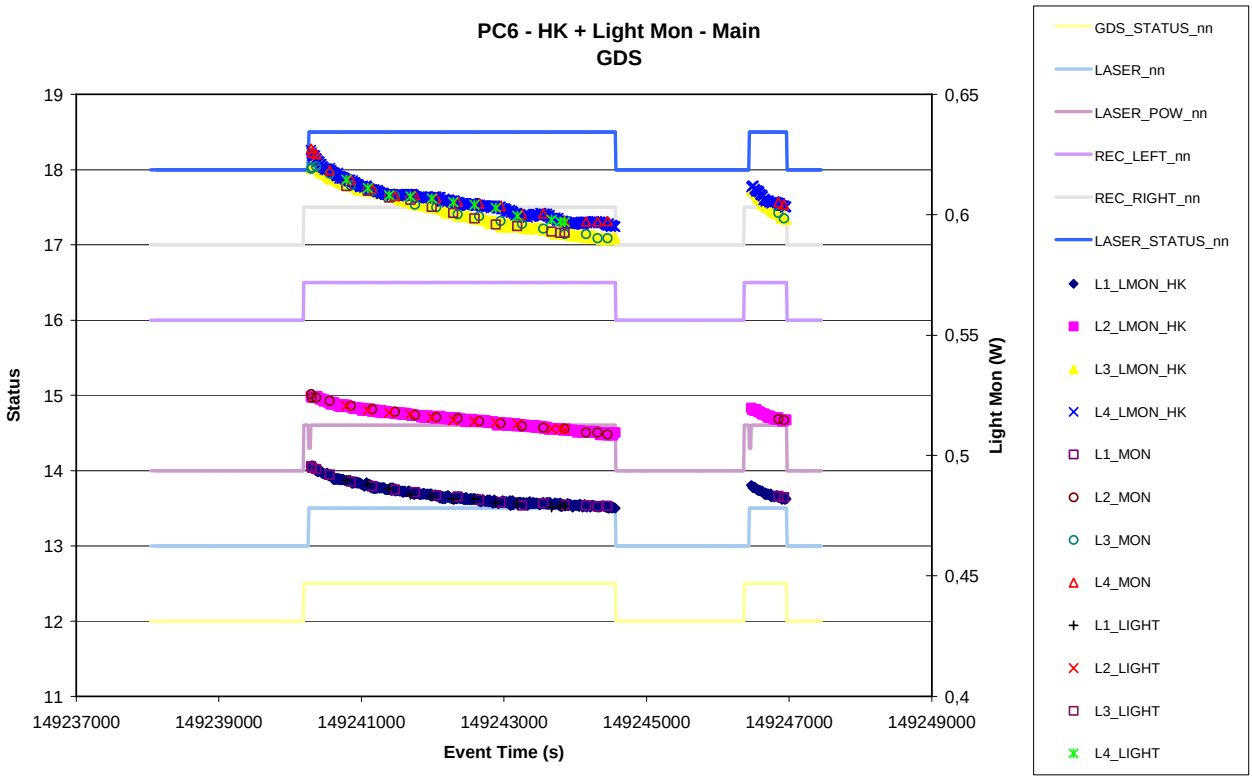


Figure 10.3-5. Laser 1 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main

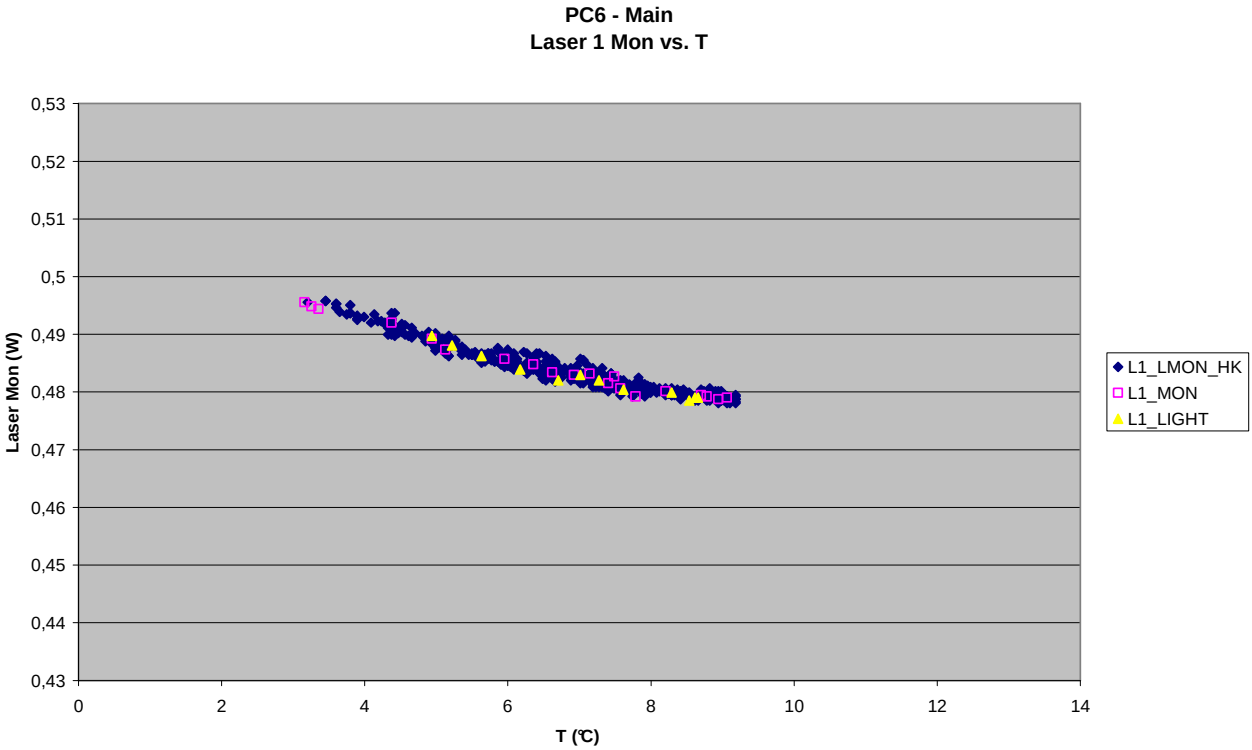


Figure 10.3-6. Laser 2 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main

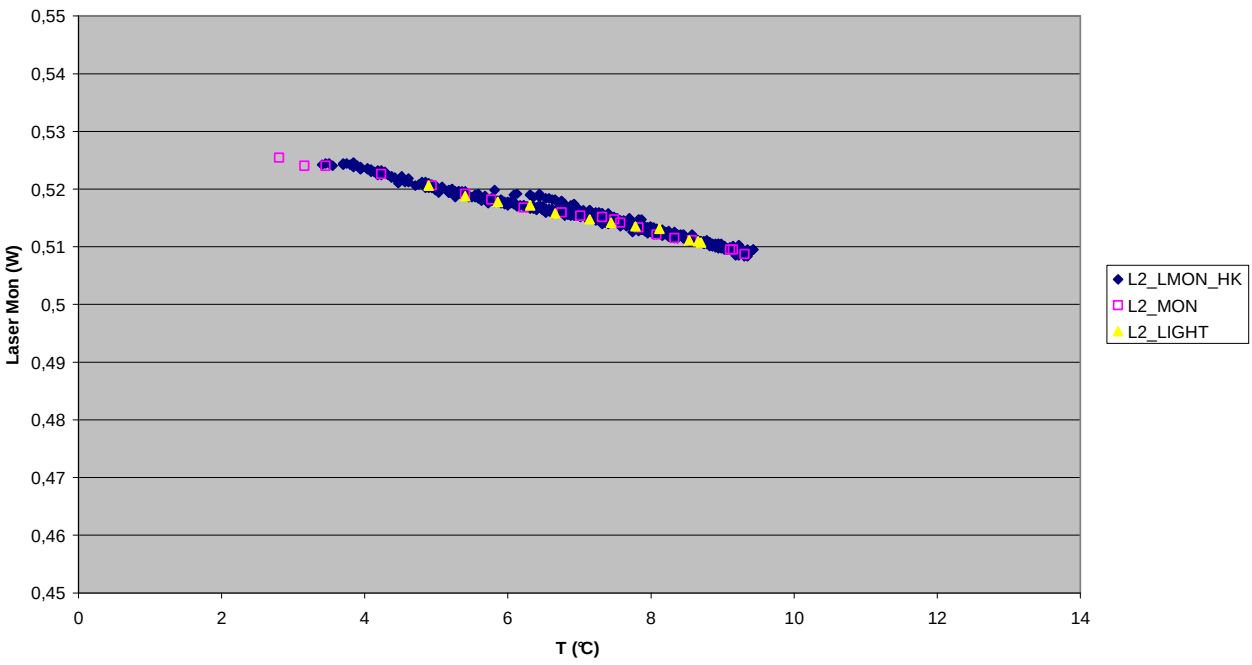


Figure 10.3-7. Laser 3 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main

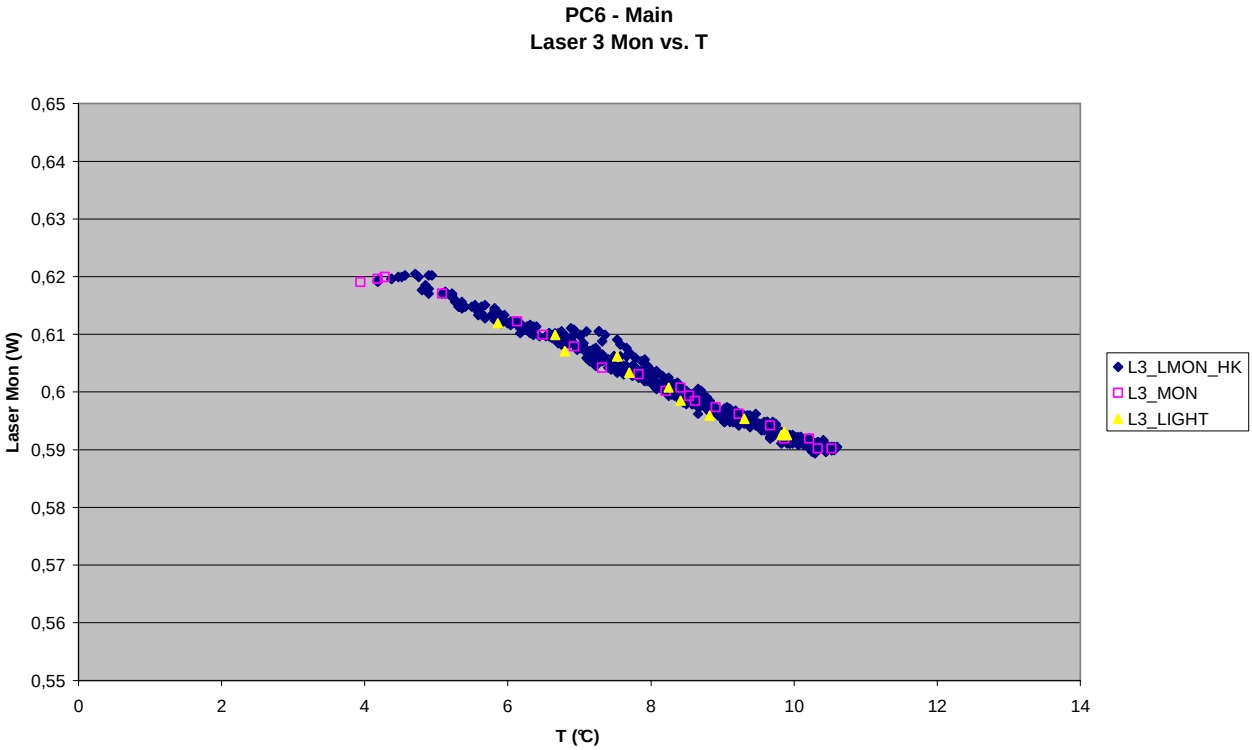
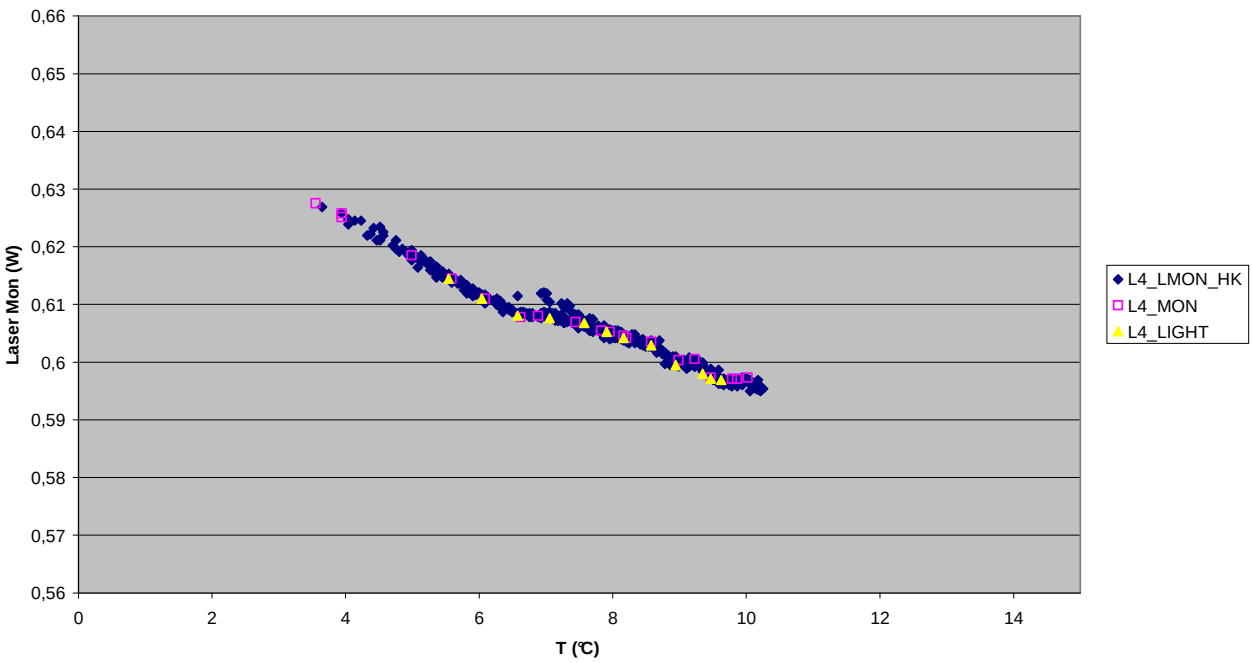


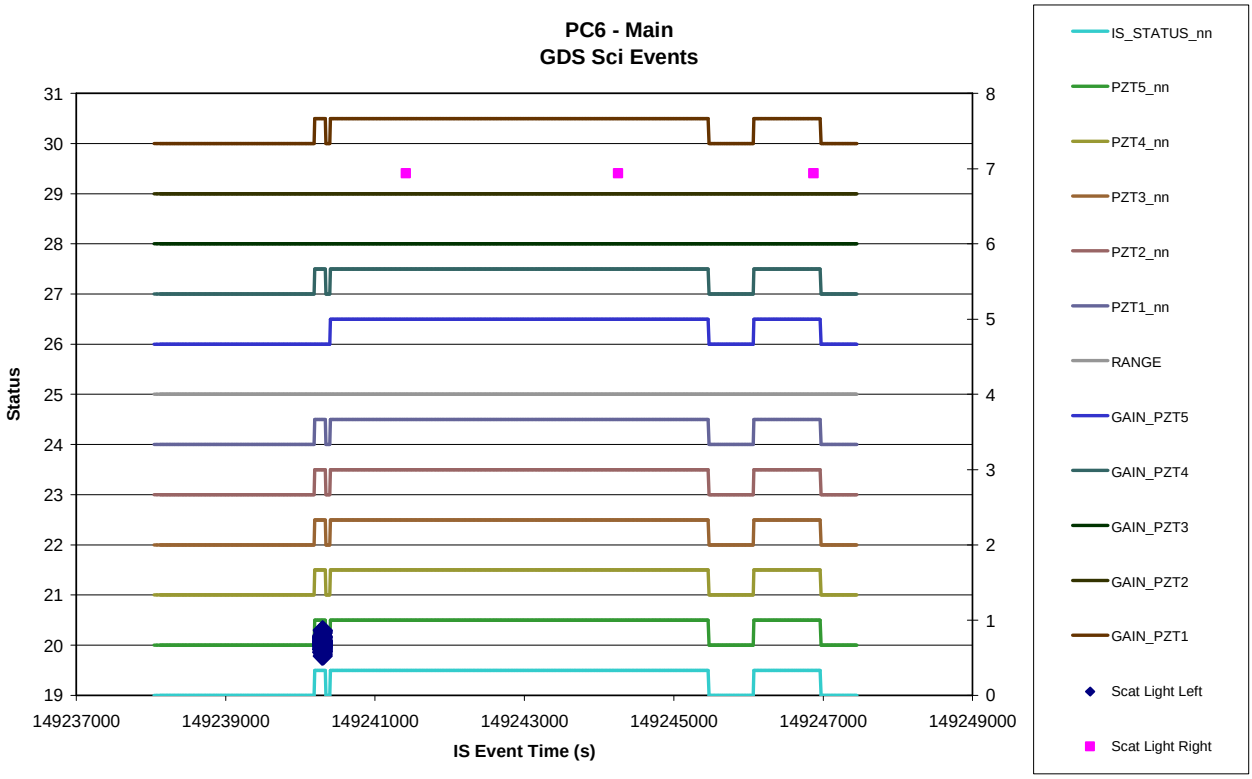
Figure 10.3-8. Laser 4 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main



10.3.2 GDS – Behaviour

10.3.2.1 Science Events

Figure 10.3-9. GDS Left and Right SCI events vs. time - Main

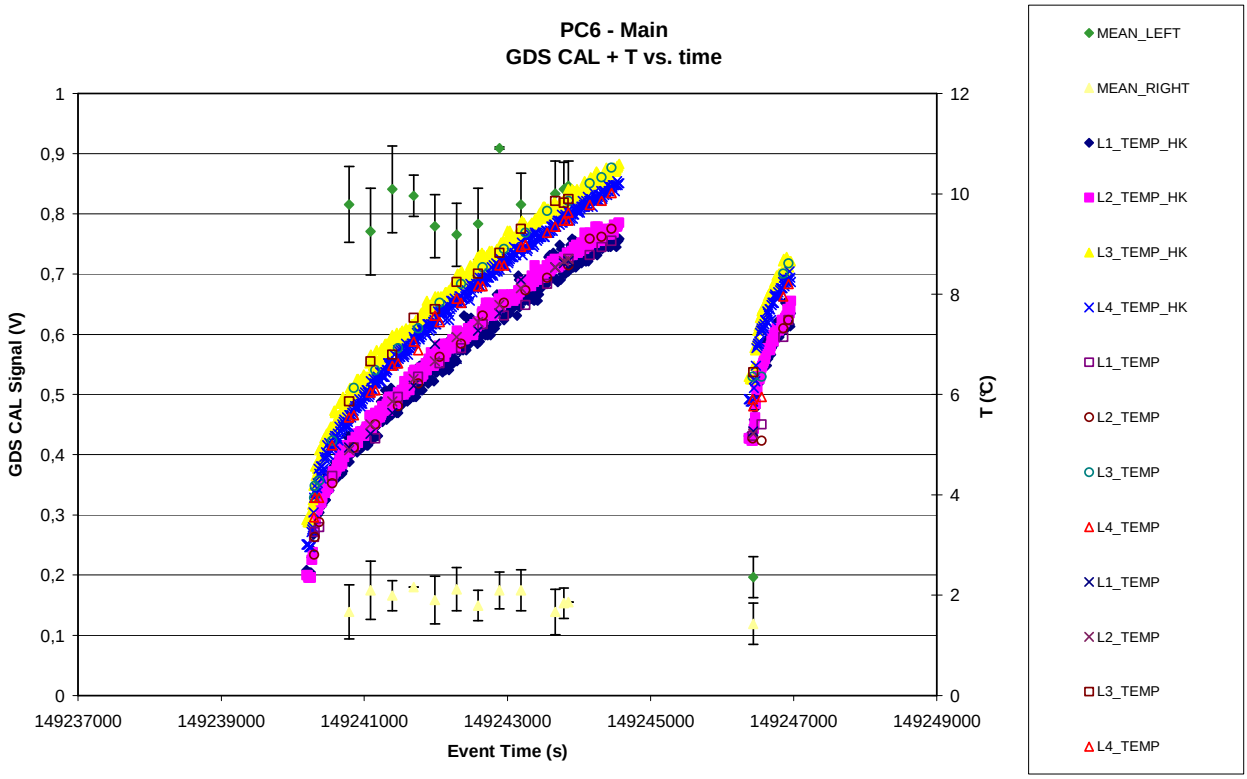


10.3.2.2 Event Rates

Not applicable

10.3.2.3 CAL

Figure 10.3-10. Evolution of GDS CAL Left and Right signals (and T) vs. time (Main)



10.4 IMPACT SENSOR (IS)

10.4.1 IS – Status

Figure 10.4-1. IS Operation Status vs. time - Main

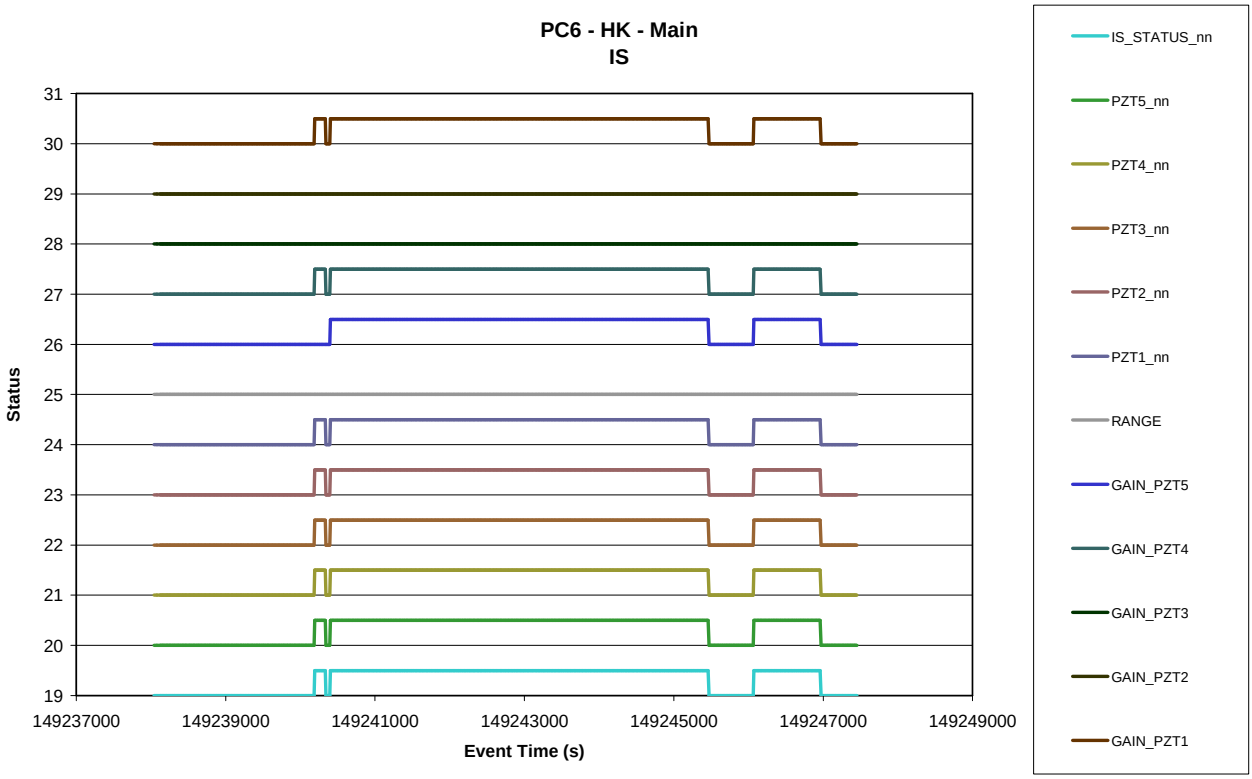


Figure 10.4-2. IS PZT 3 Thresholds change vs. time - Main

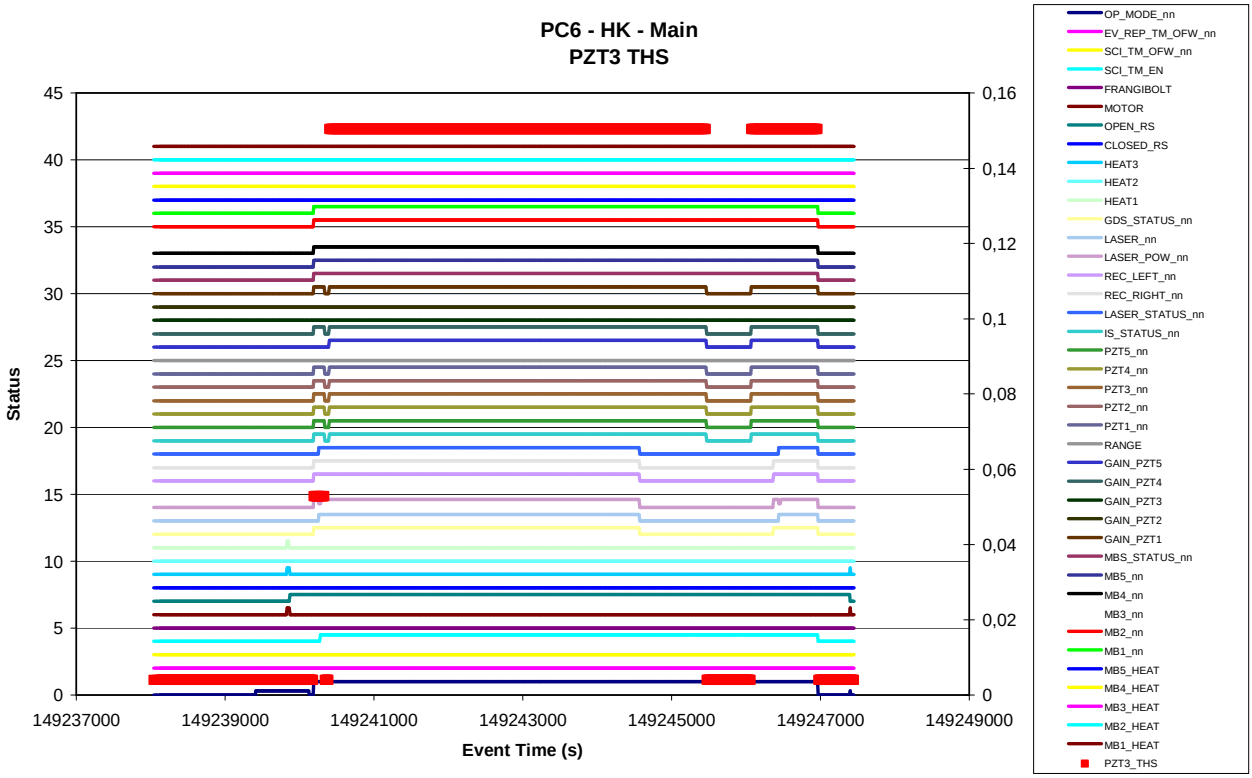


Figure 10.4-3. IS PZT 5 Thresholds change vs. time - Main

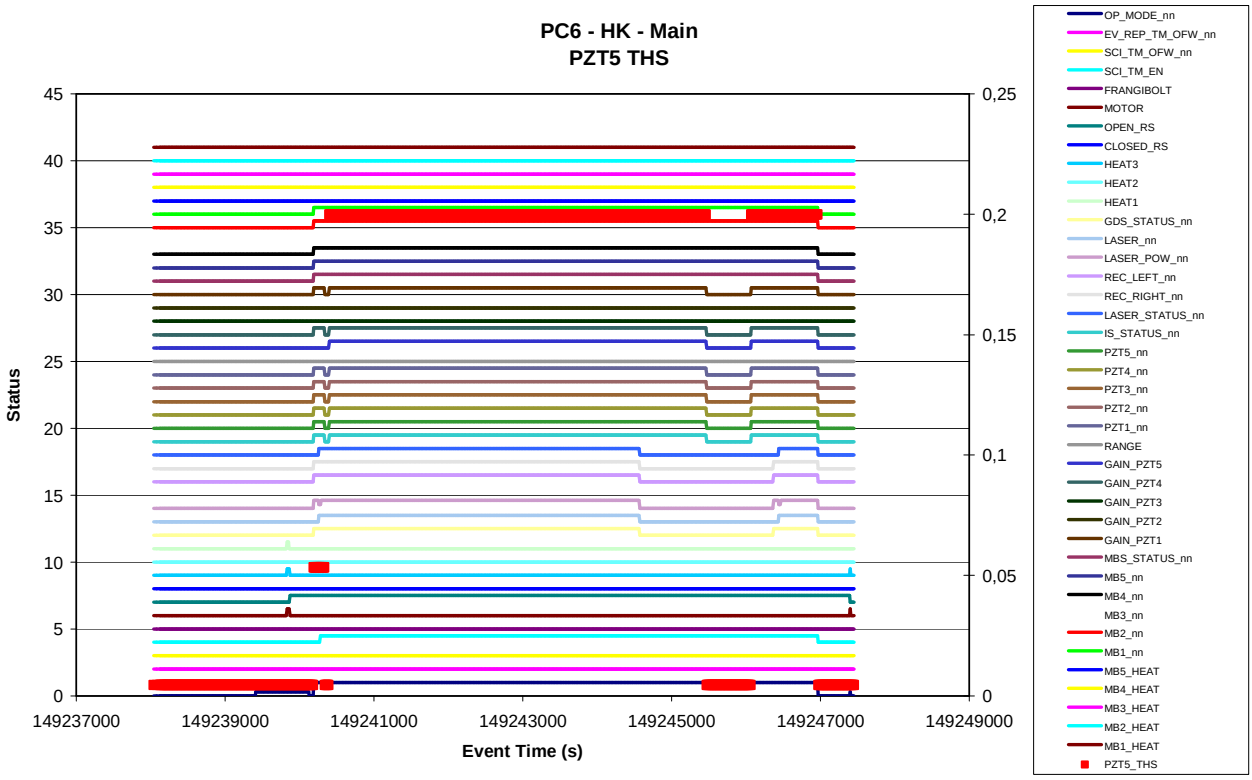
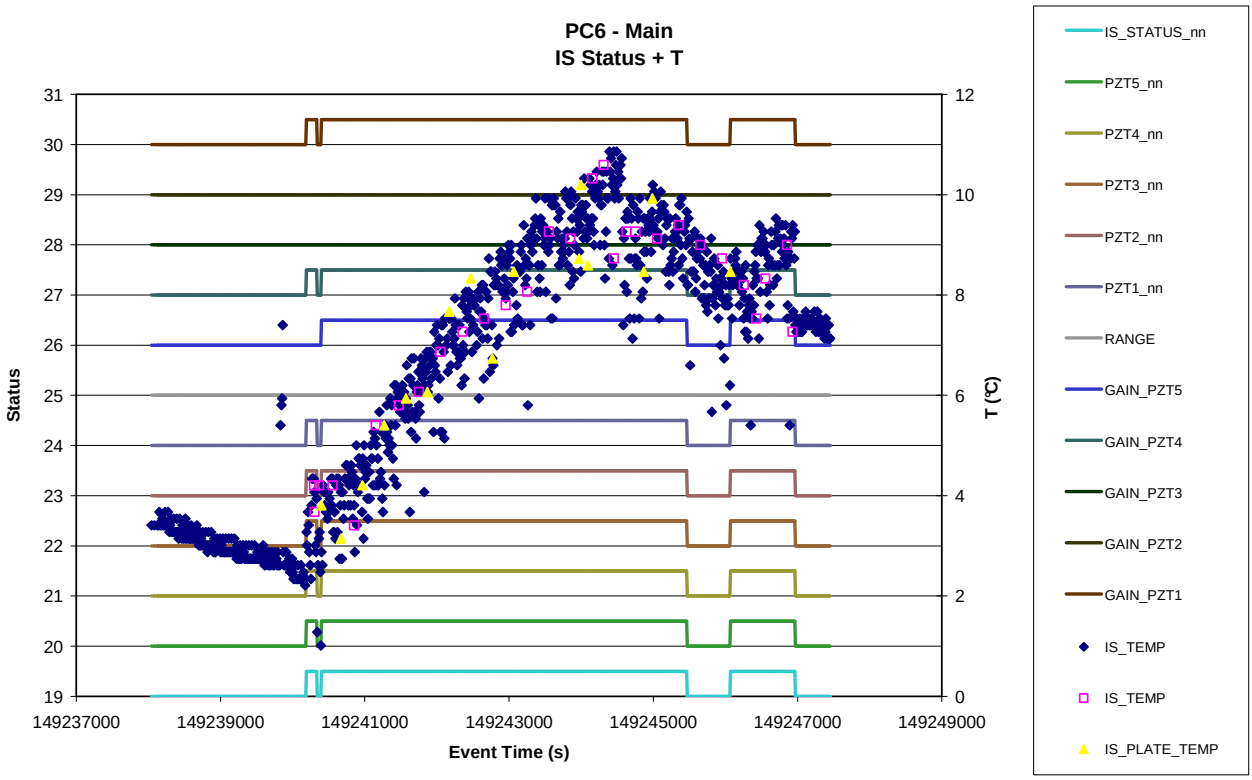


Figure 10.4-4. IS Temperature vs. time (HK, HK-SCI, SCI) - Main



10.4.2 IS – Behaviour

10.4.2.1 Science Events

Figure 10.4-5. All PZT Events (det and non-det) vs. time - Main

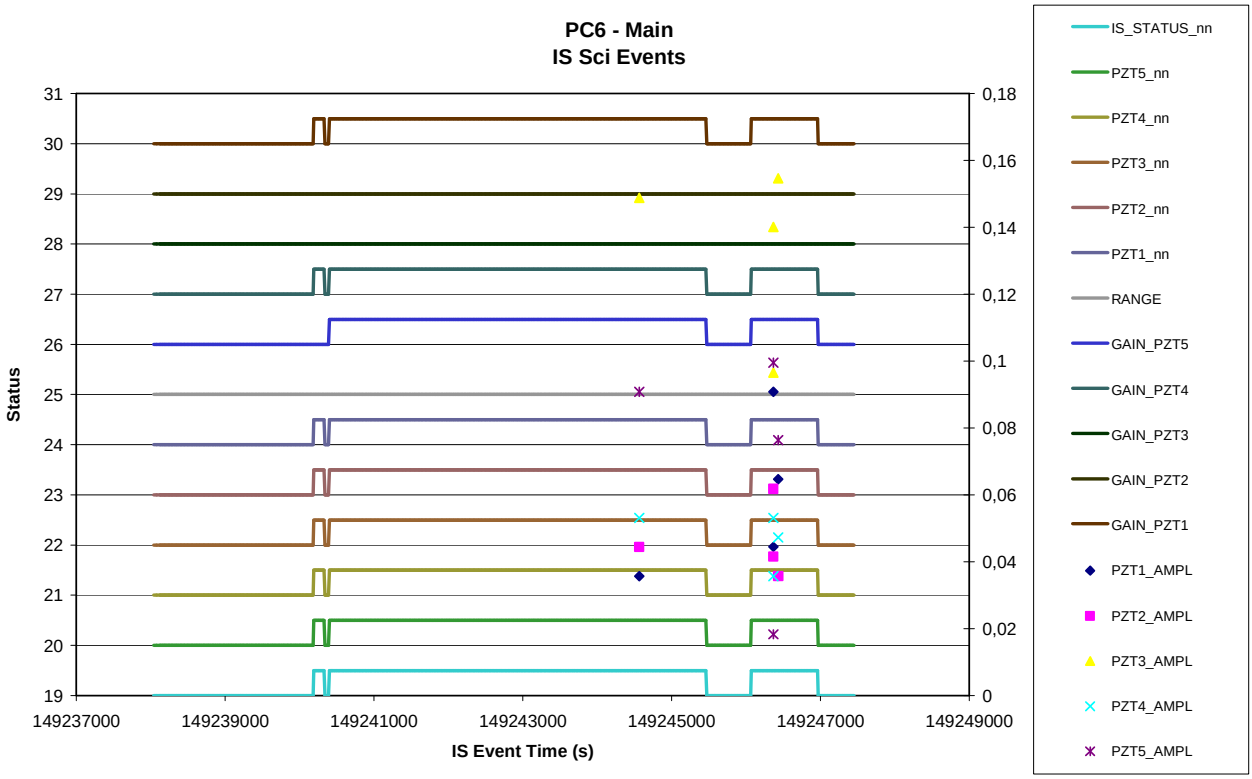


Figure 10.4-6. PZT 1-2-3-4-5 Detected Events vs. time - Main

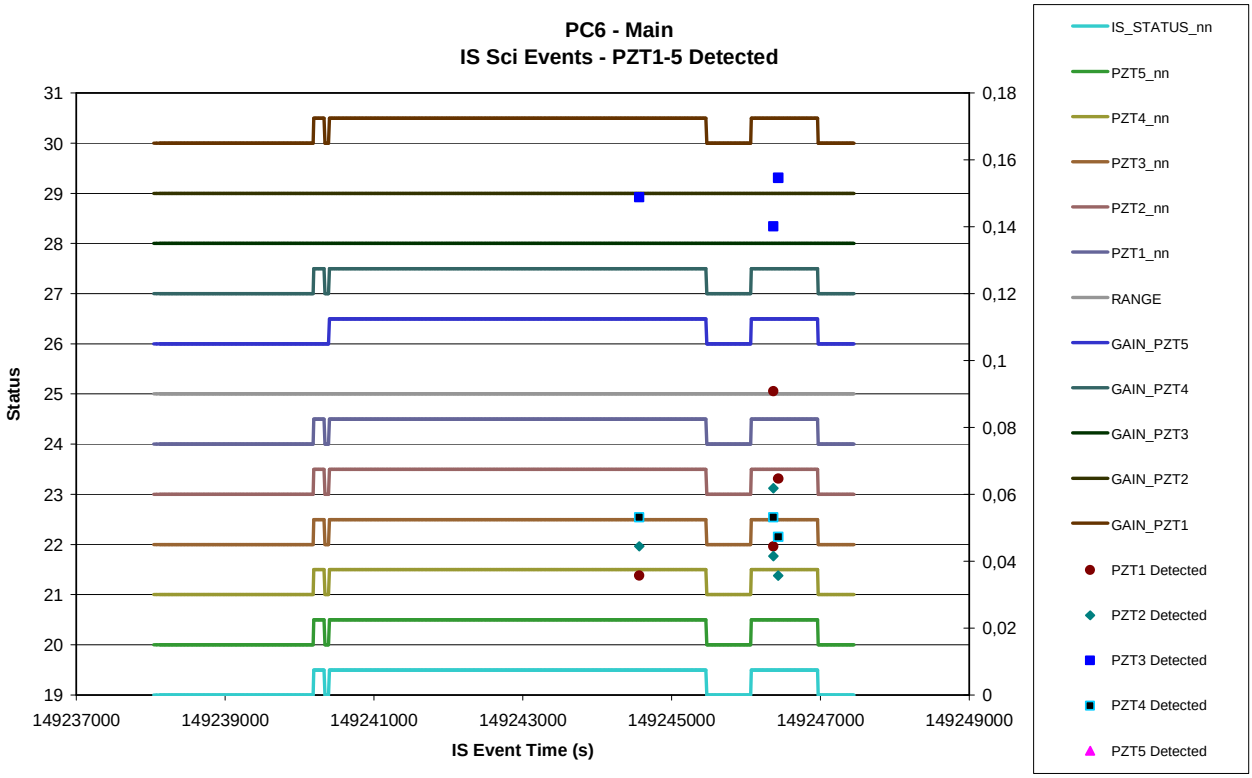


Figure 10.4-7. PZT 1 Detected Events vs. time - Main

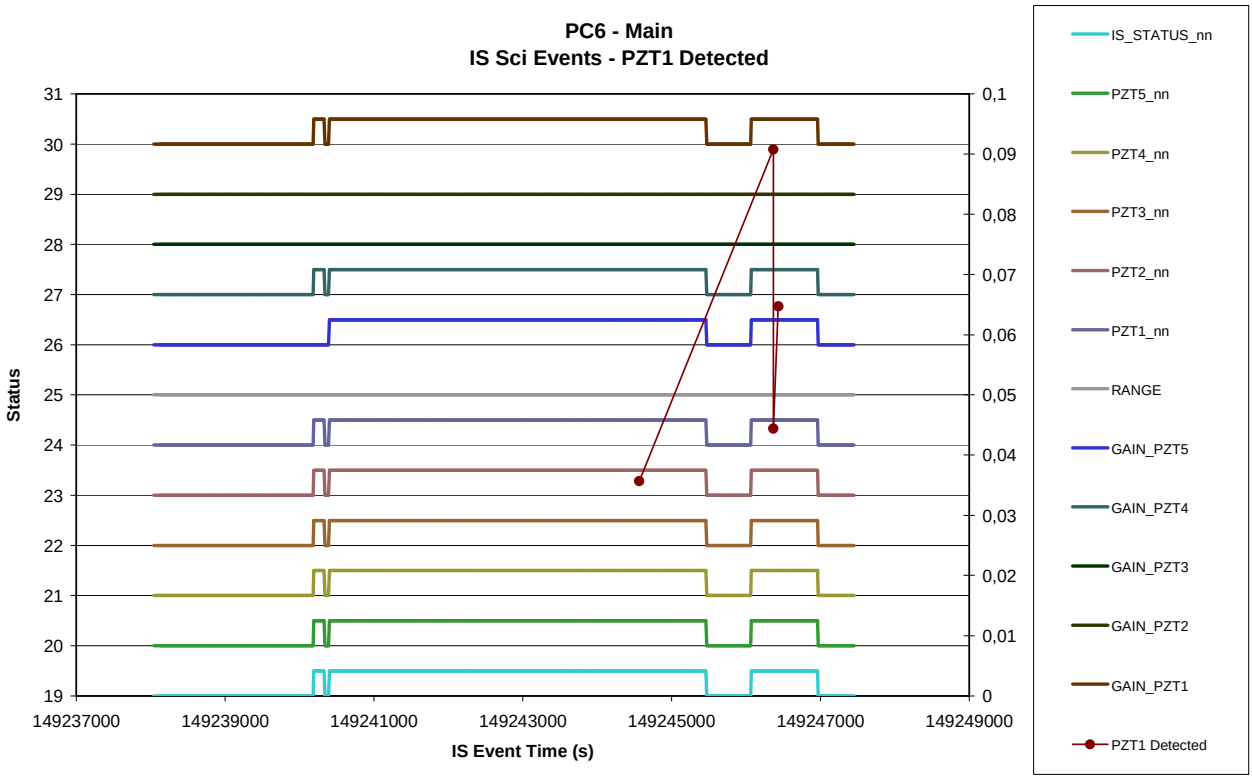


Figure 10.4-8. PZT 2 Detected Events vs. time - Main

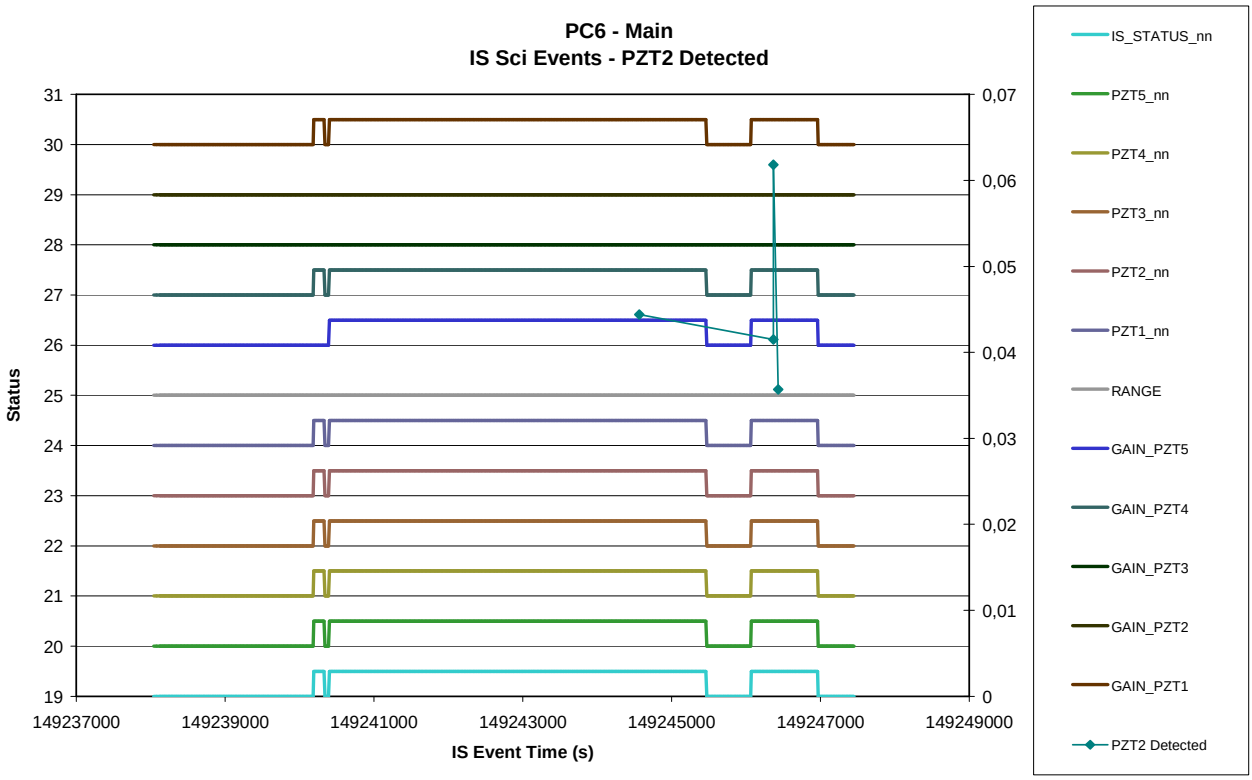


Figure 10.4-9. PZT 3 Detected Events vs. time - Main

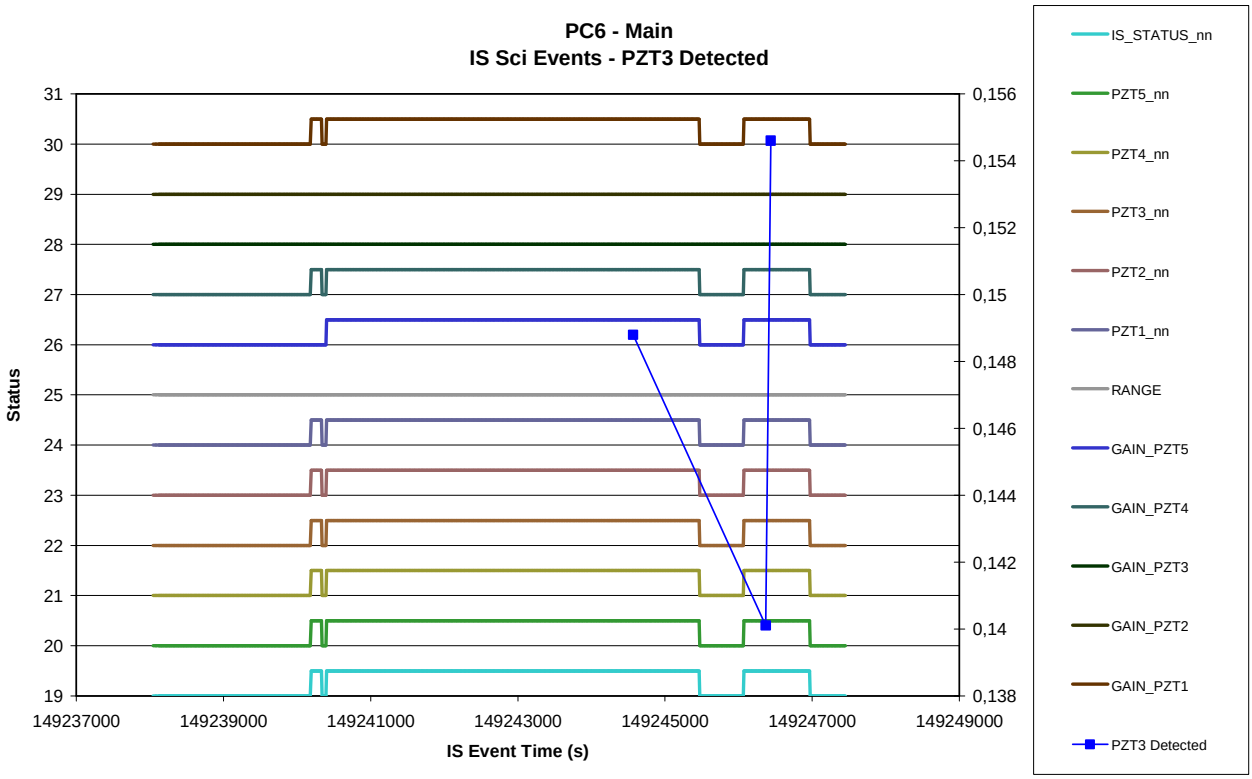


Figure 10.4-10. PZT 4 Detected Events vs. time - Main

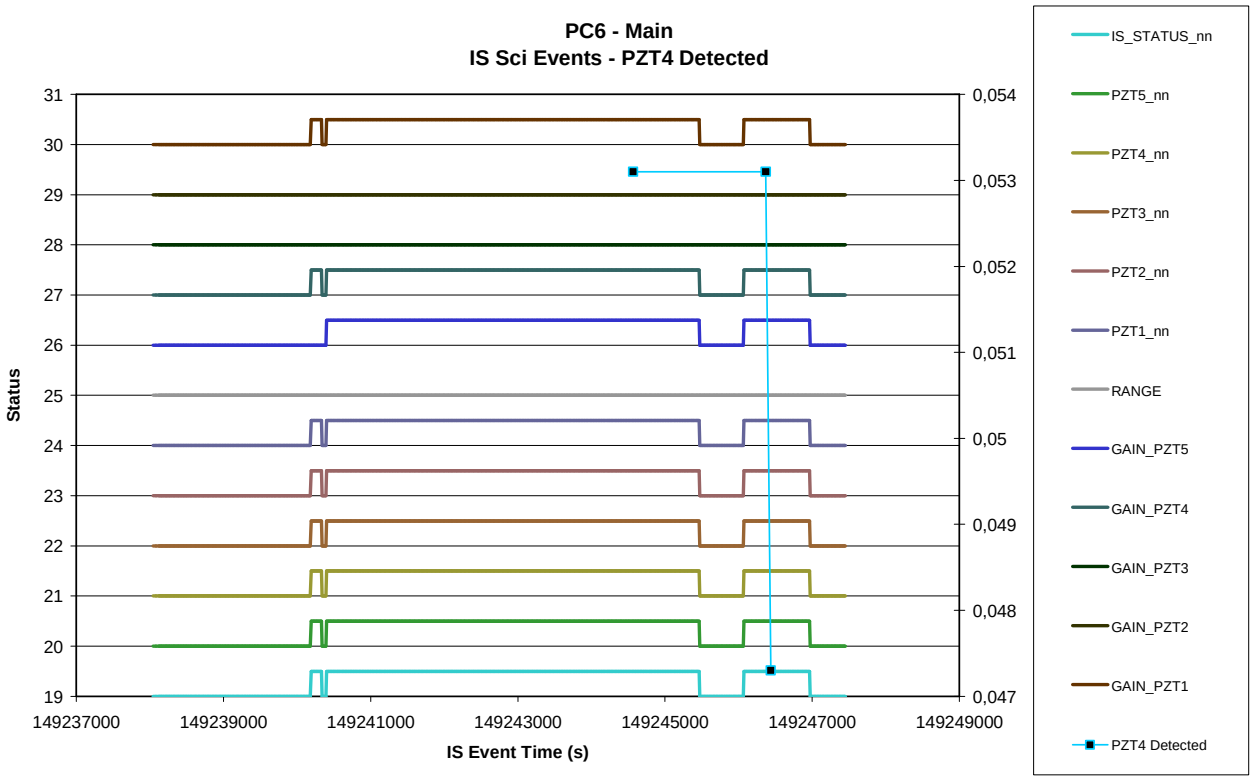


Figure 10.4-11. PZT 5 Detected Events vs. time - Main

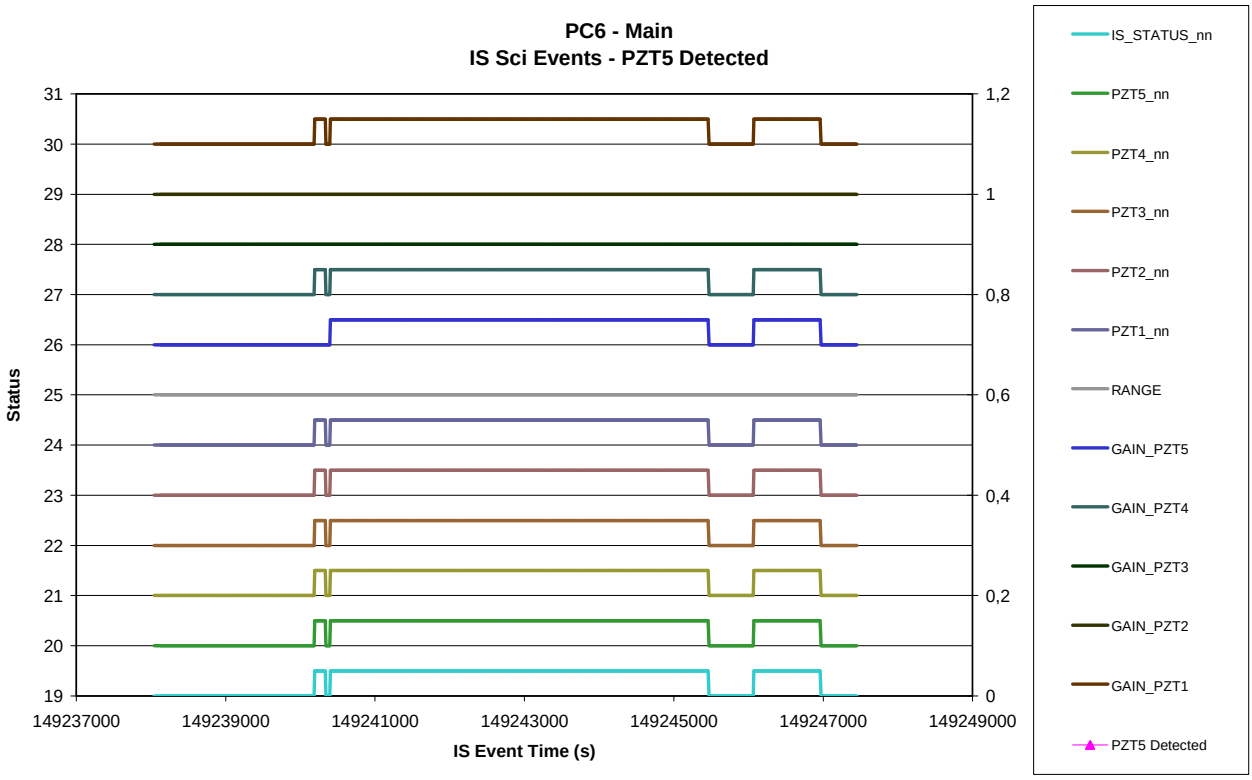
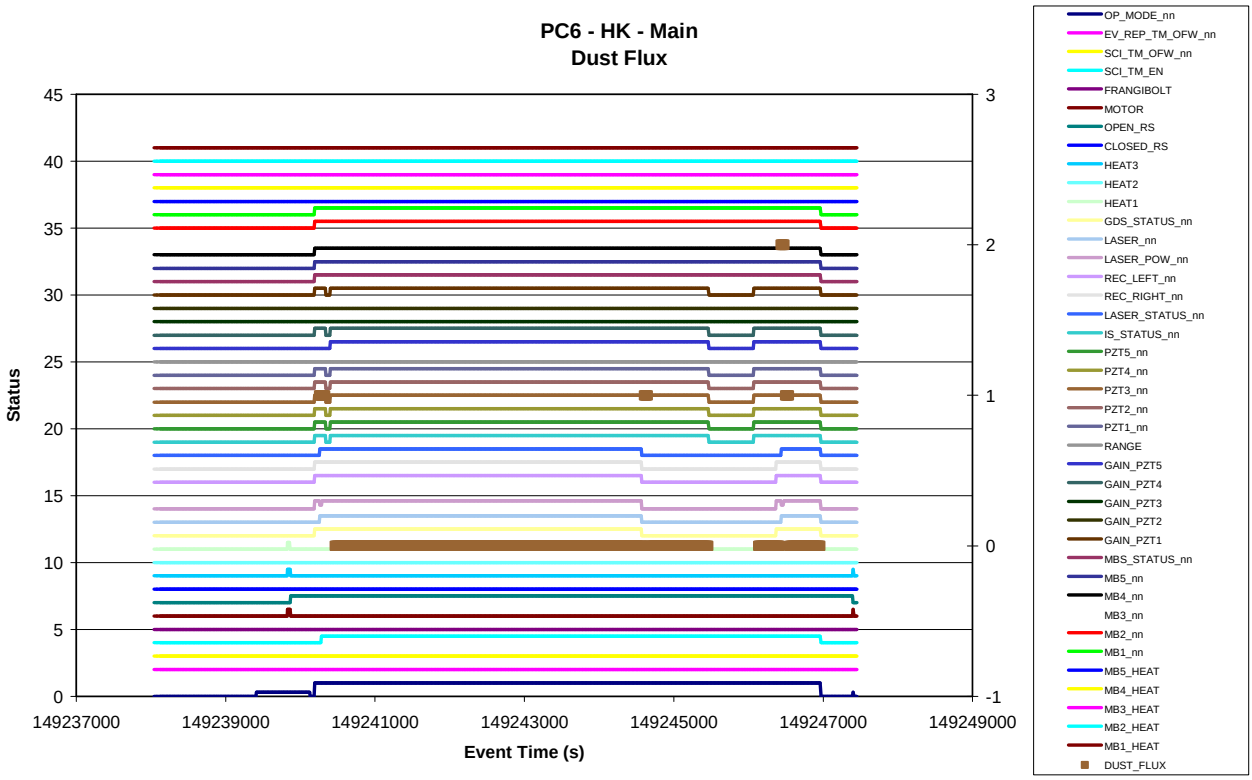


Figure 10.4-12. Dust Flux vs. time - Main



10.4.2.2 Event Rates

Not applicable

10.4.2.3 CAL

Figure 10.4-13. PZT 1 Mean and St Dev. CAL vs. time - Main

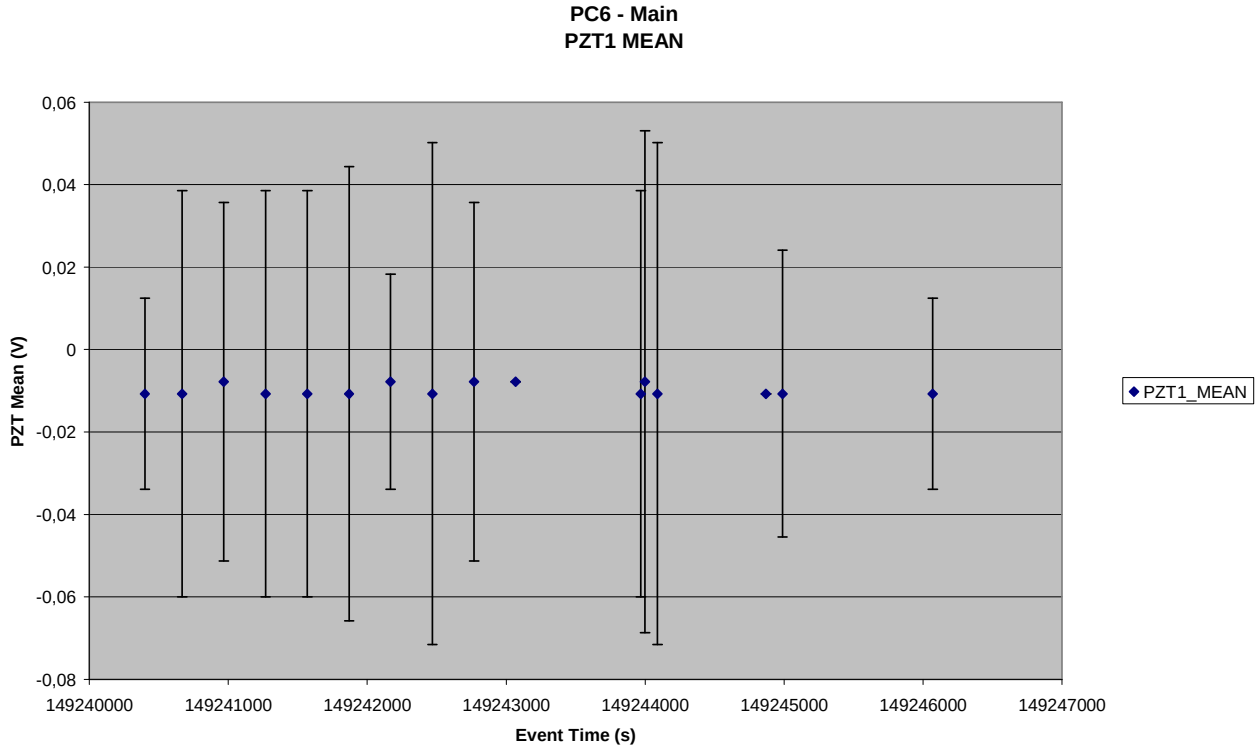


Figure 10.4-14. PZT 2 Mean and St Dev. CAL vs. time - Main

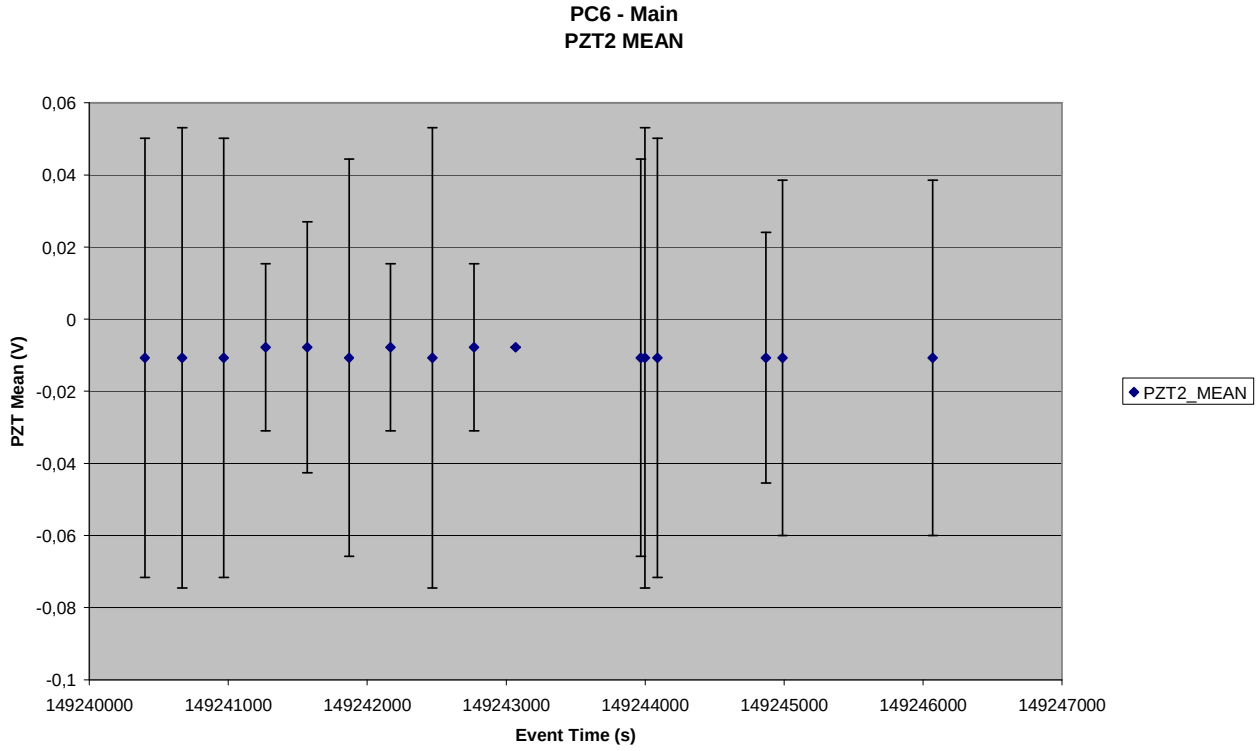


Figure 10.4-15. PZT 3 Mean and St Dev. CAL vs. time - Main

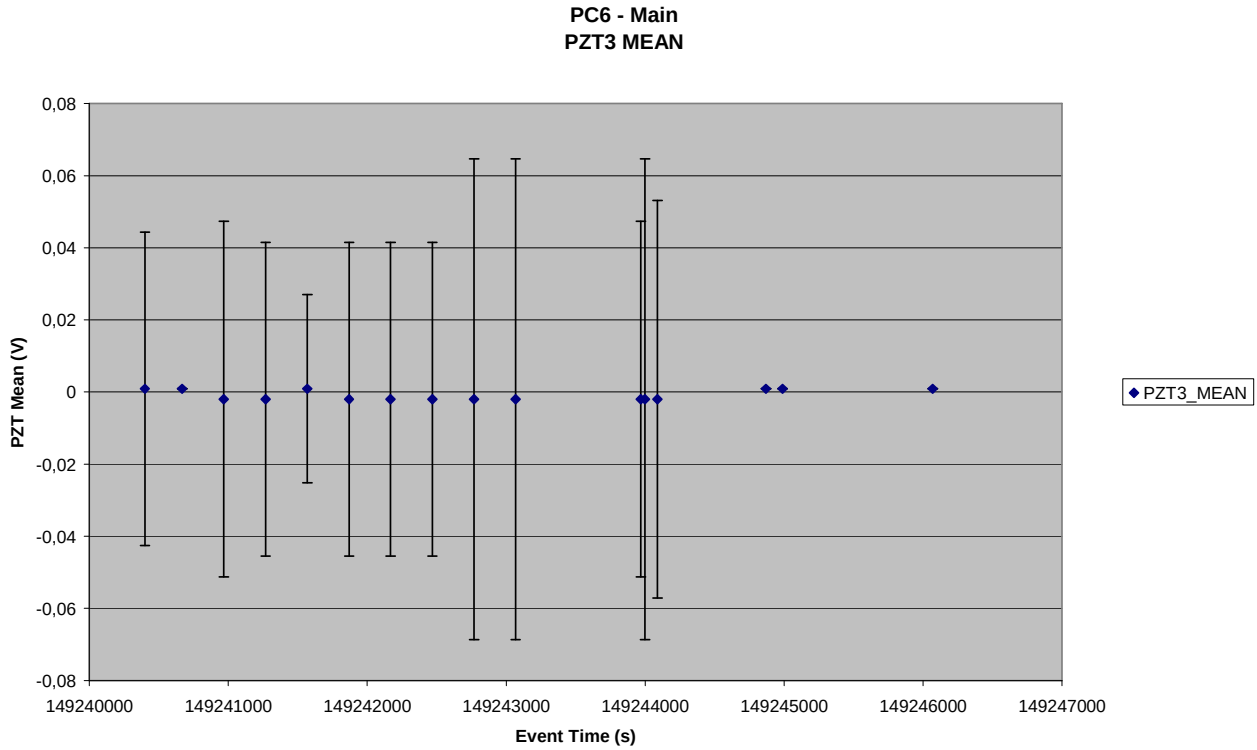


Figure 10.4-16. PZT 4 Mean and St Dev. CAL vs. time - Main

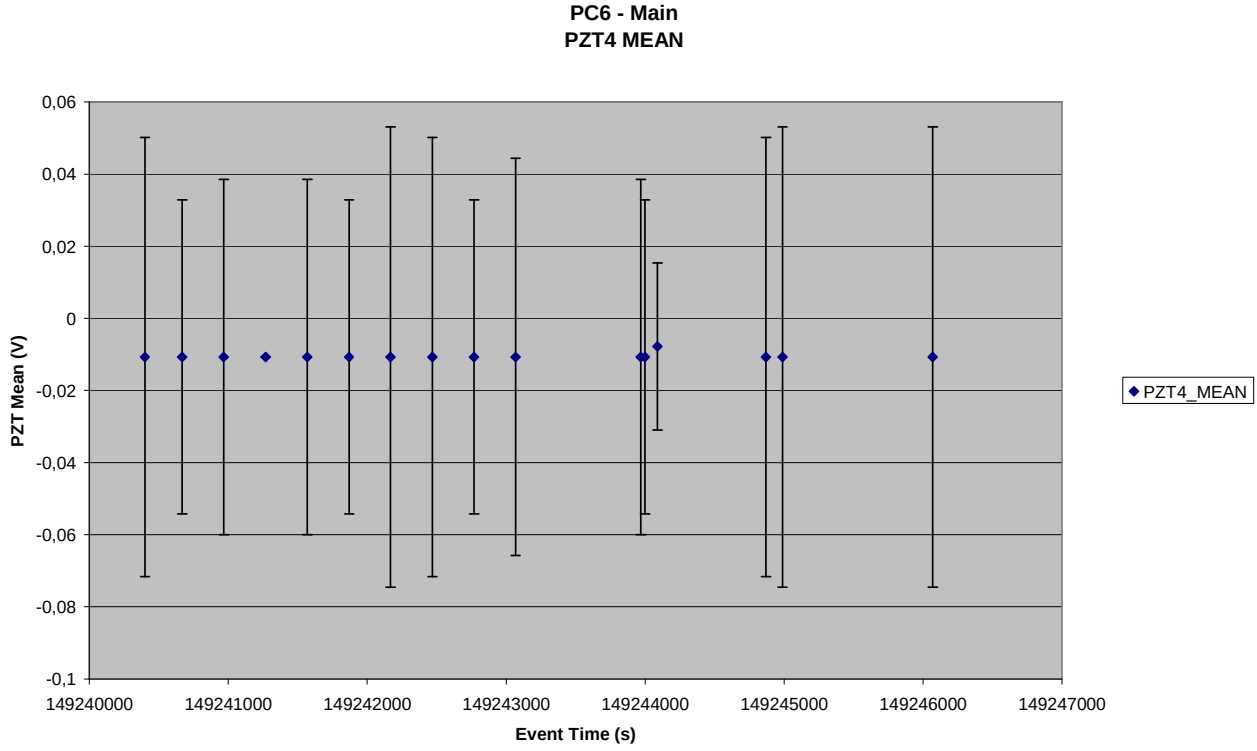


Figure 10.4-17. PZT 5 Mean and St Dev. CAL vs. time - Main

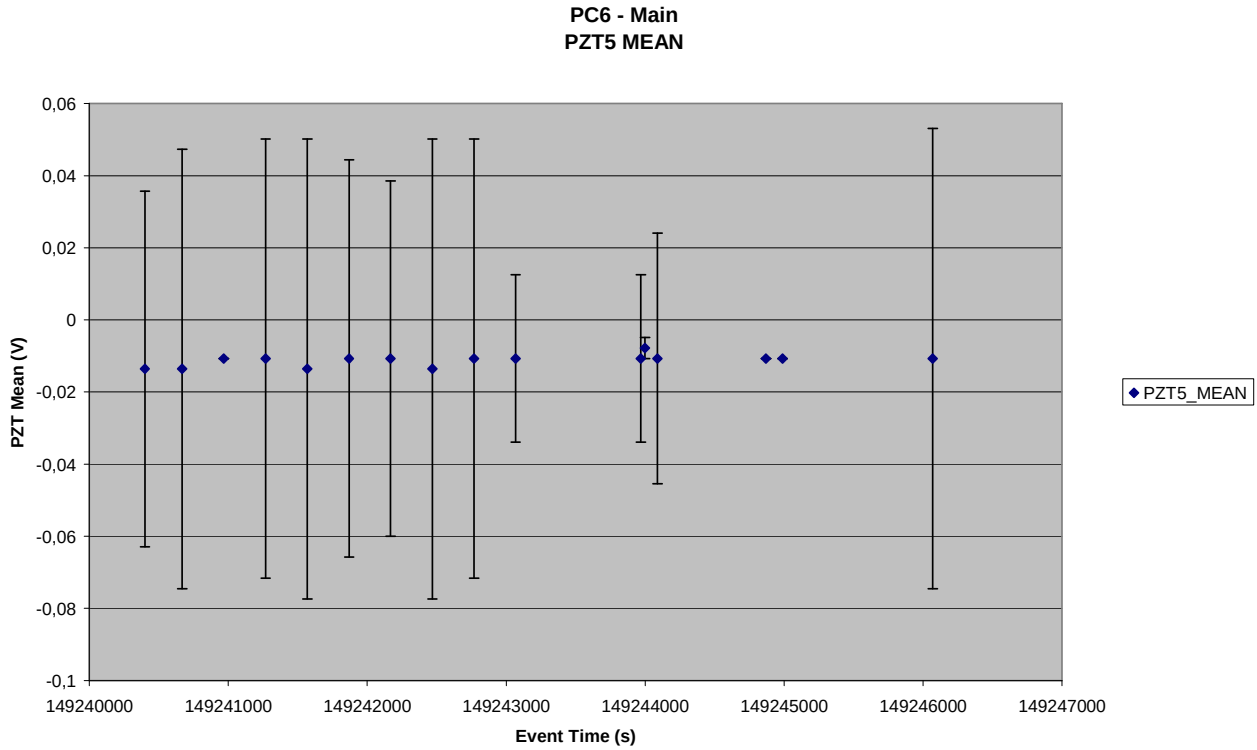


Figure 10.4-18. Reference Voltages for IS calibration vs. time - Main

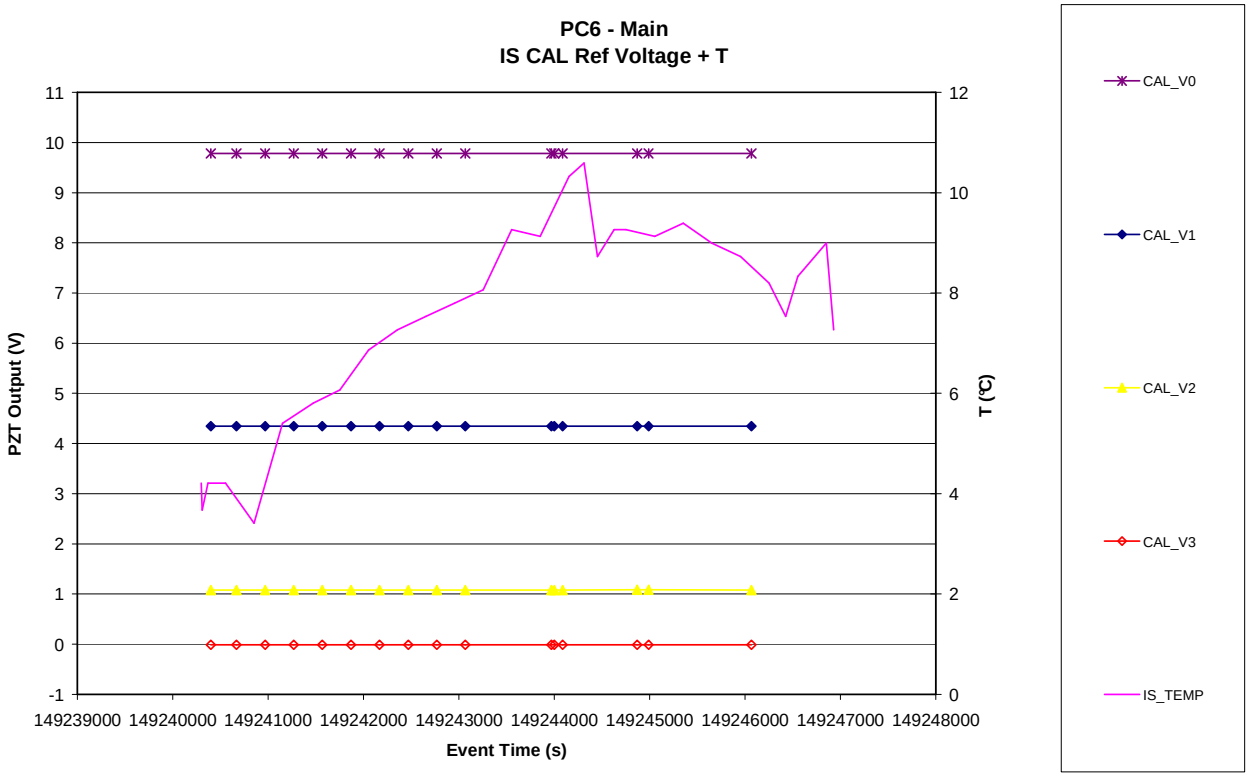


Figure 10.4-19. PZT 1 CAL Signal vs. time - Main

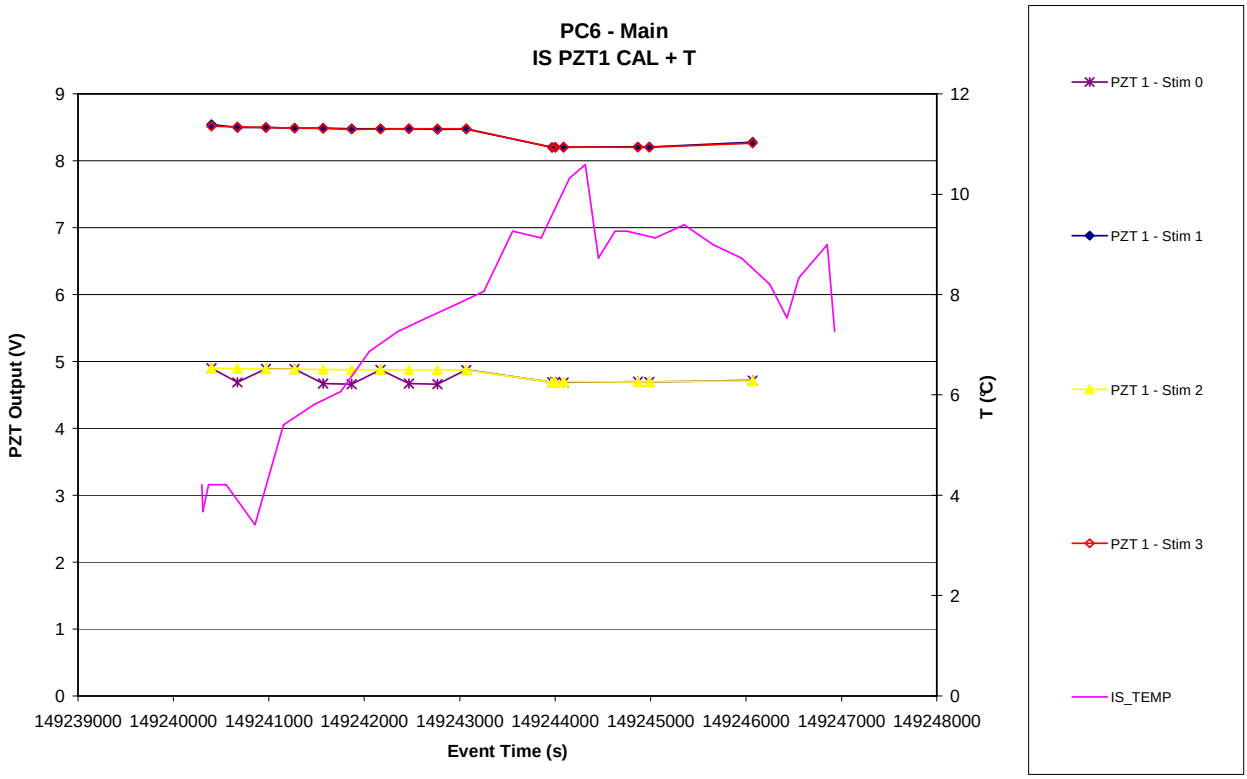


Figure 10.4-20. PZT 2 CAL Signal vs. time - Main

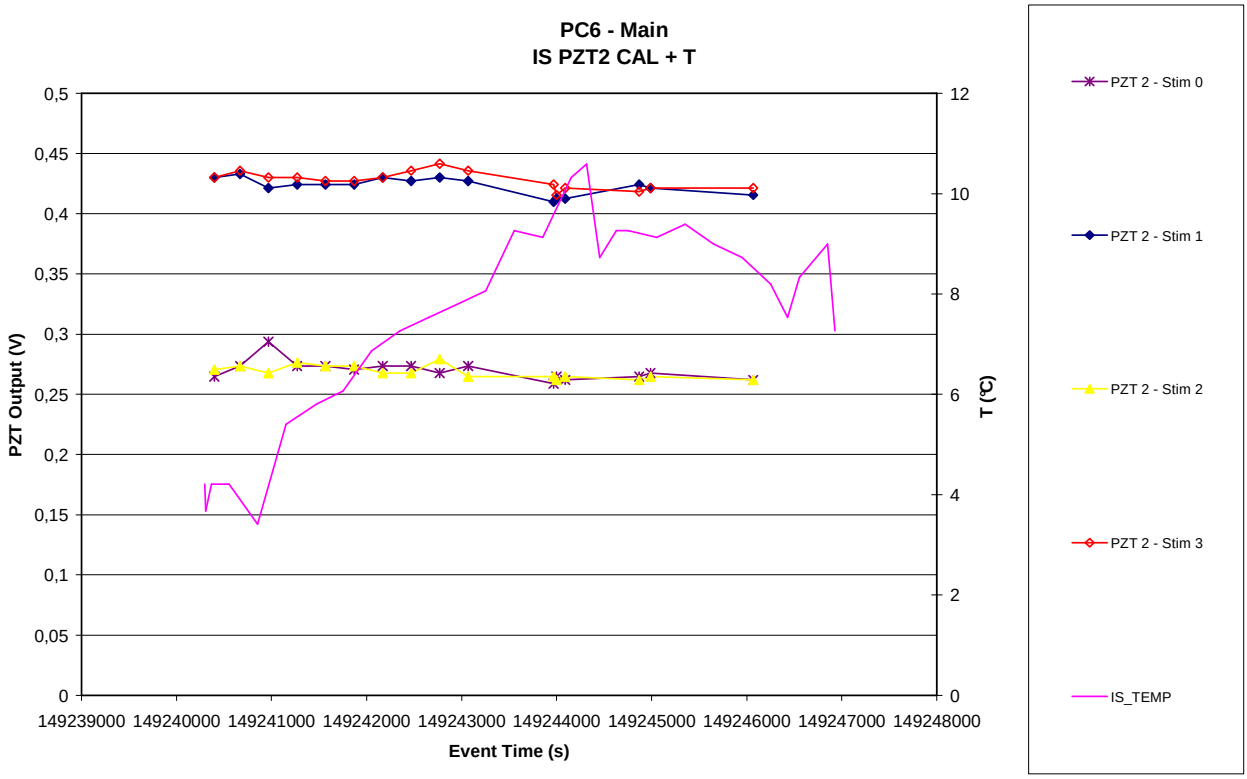


Figure 10.4-21. PZT 3 CAL Signal vs. time - Main

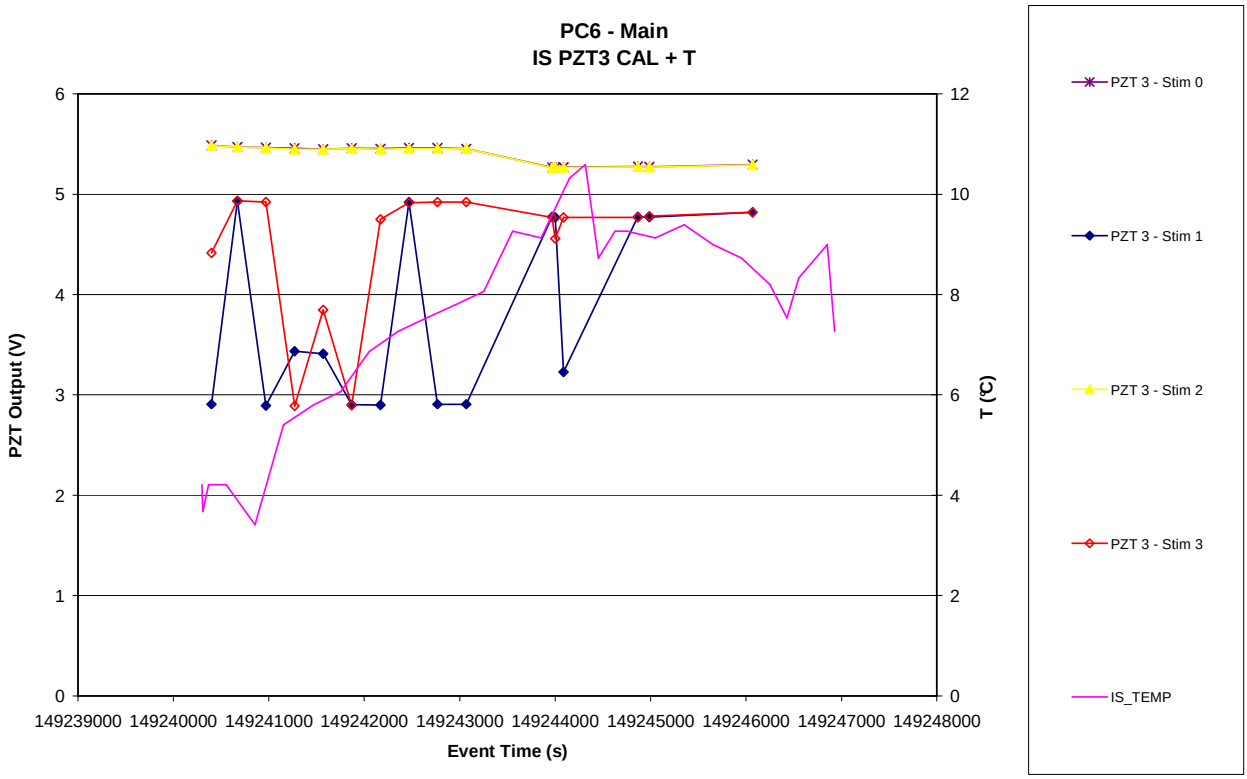


Figure 10.4-22. PZT 4 CAL Signal vs. time - Main

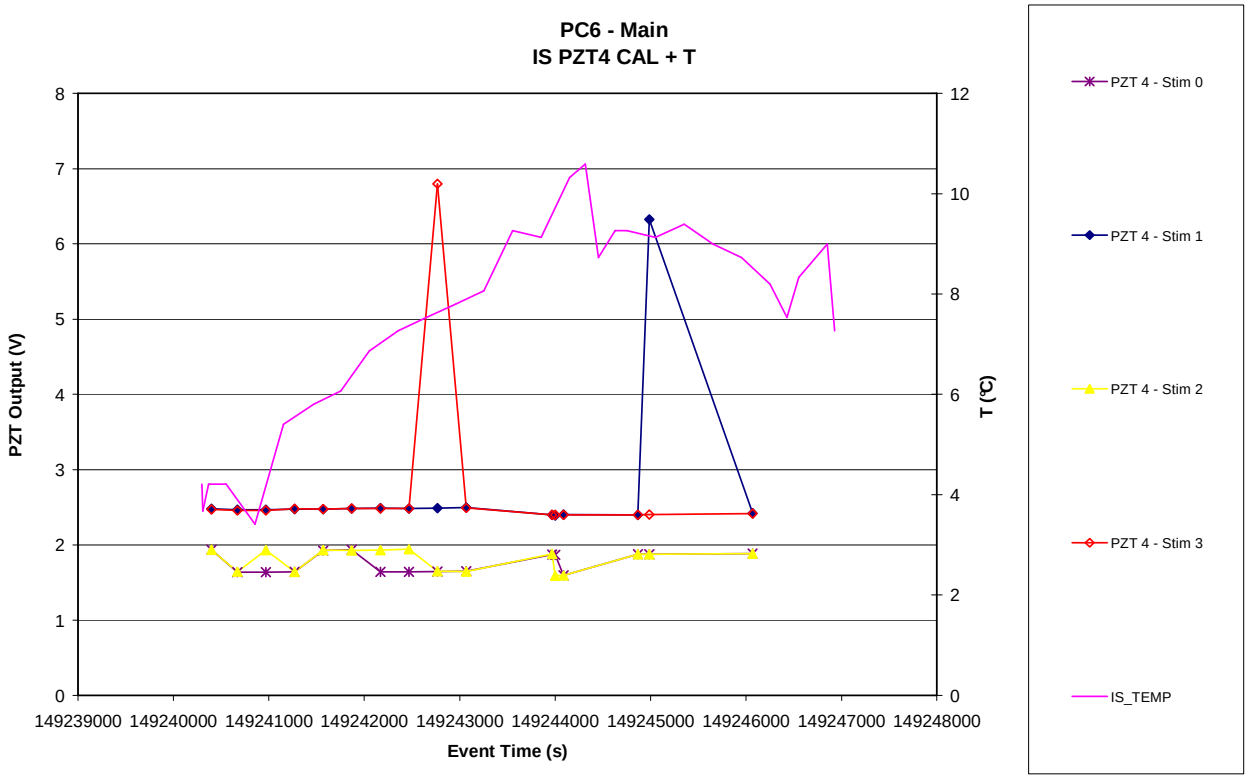


Figure 10.4-23. PZT 5 CAL Signal vs. time - Main

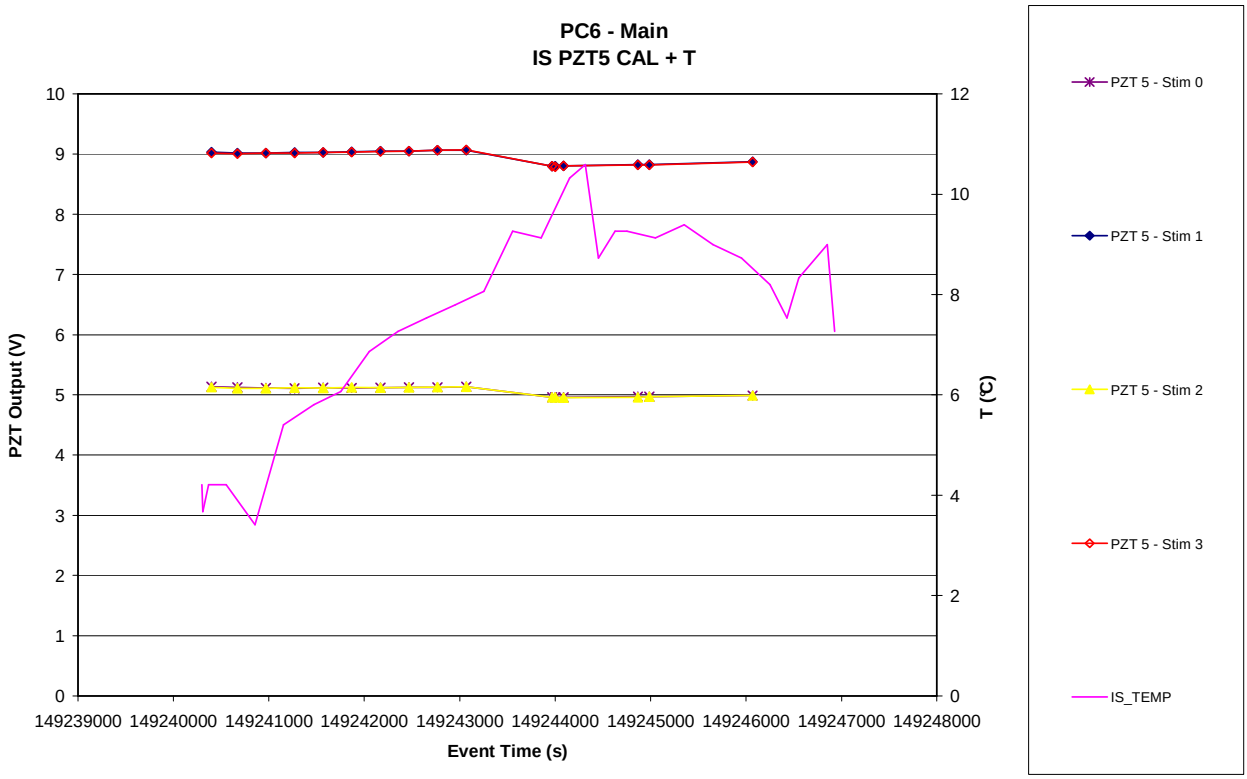


Figure 10.4-24. PZT 1 CAL Time delay vs. time - Main

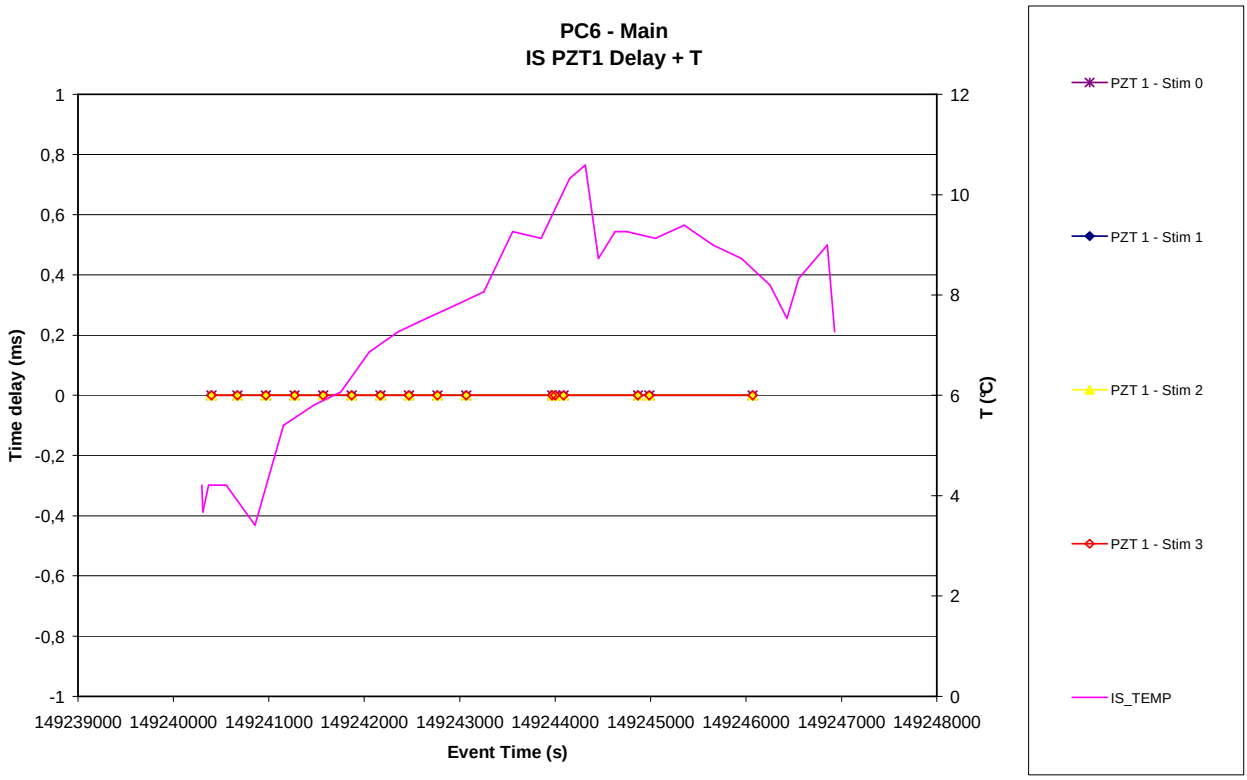


Figure 10.4-25. PZT 2 CAL Time delay vs. time - Main

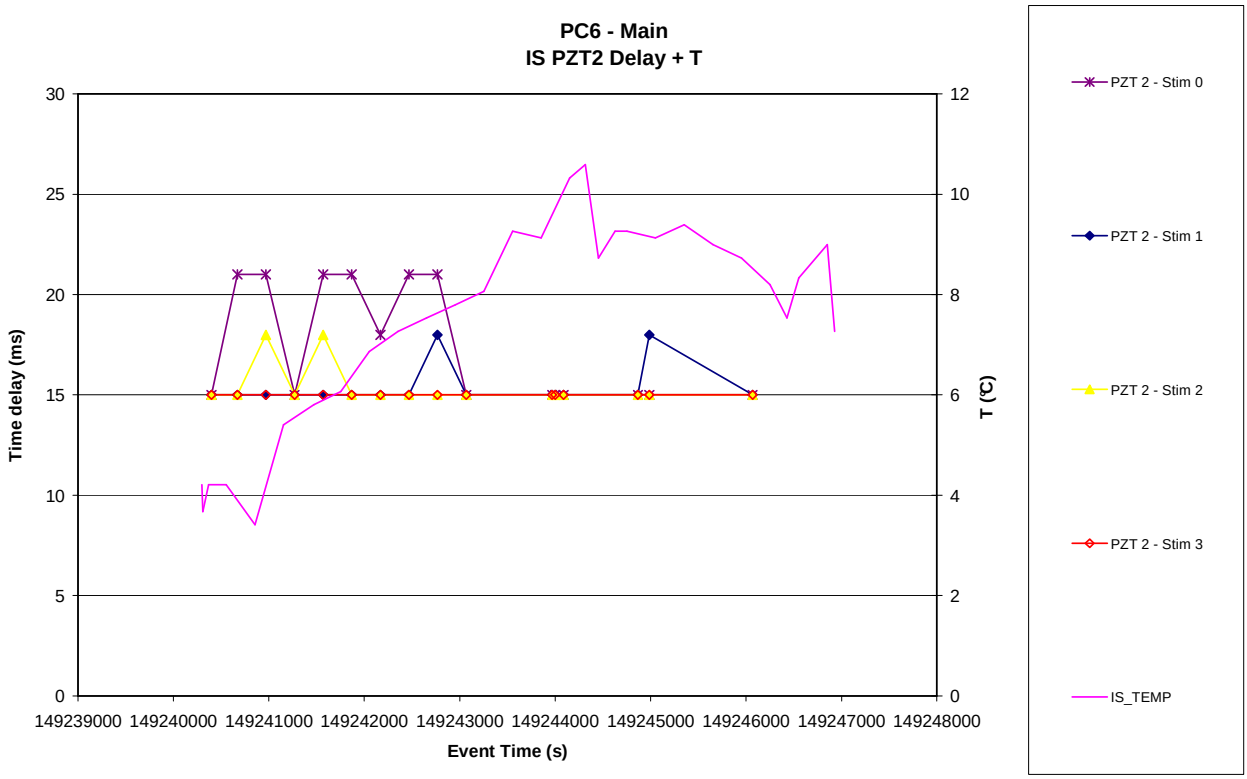


Figure 10.4-26. PZT 3 CAL Time delay vs. time - Main

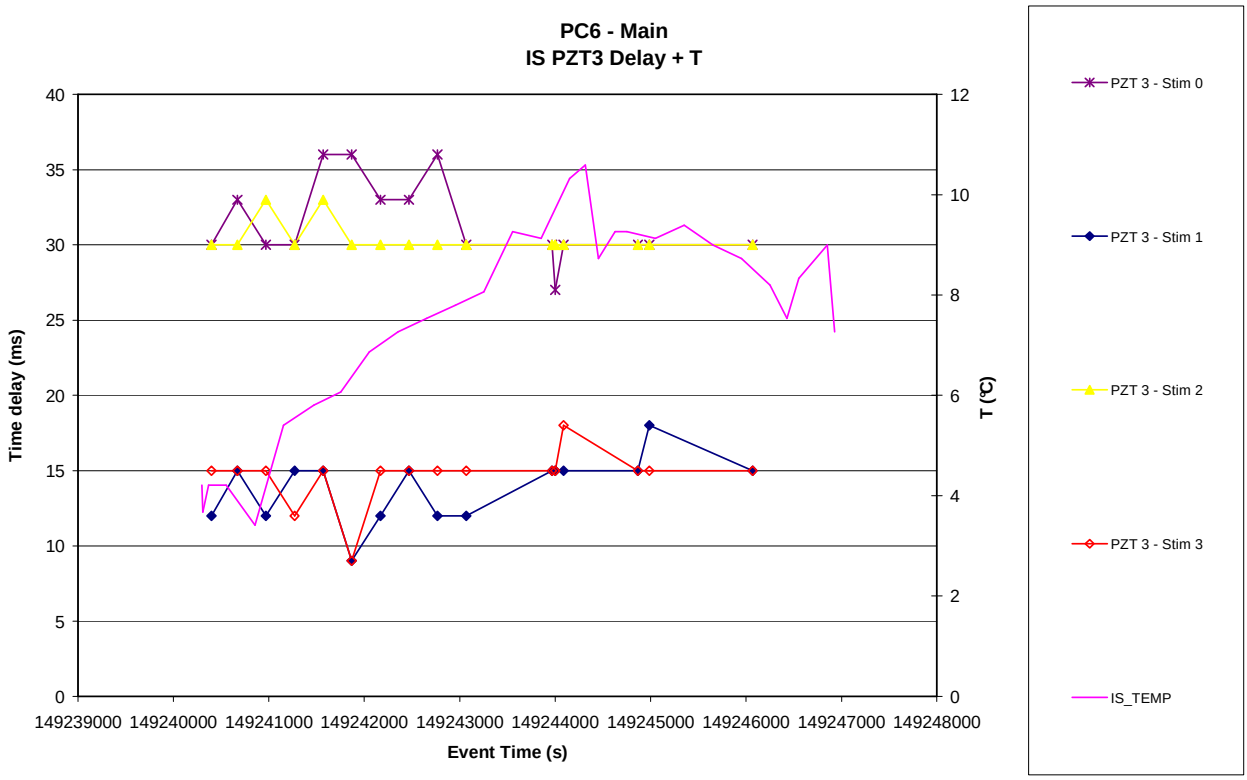


Figure 10.4-27. PZT 4 CAL Time delay vs. time - Main

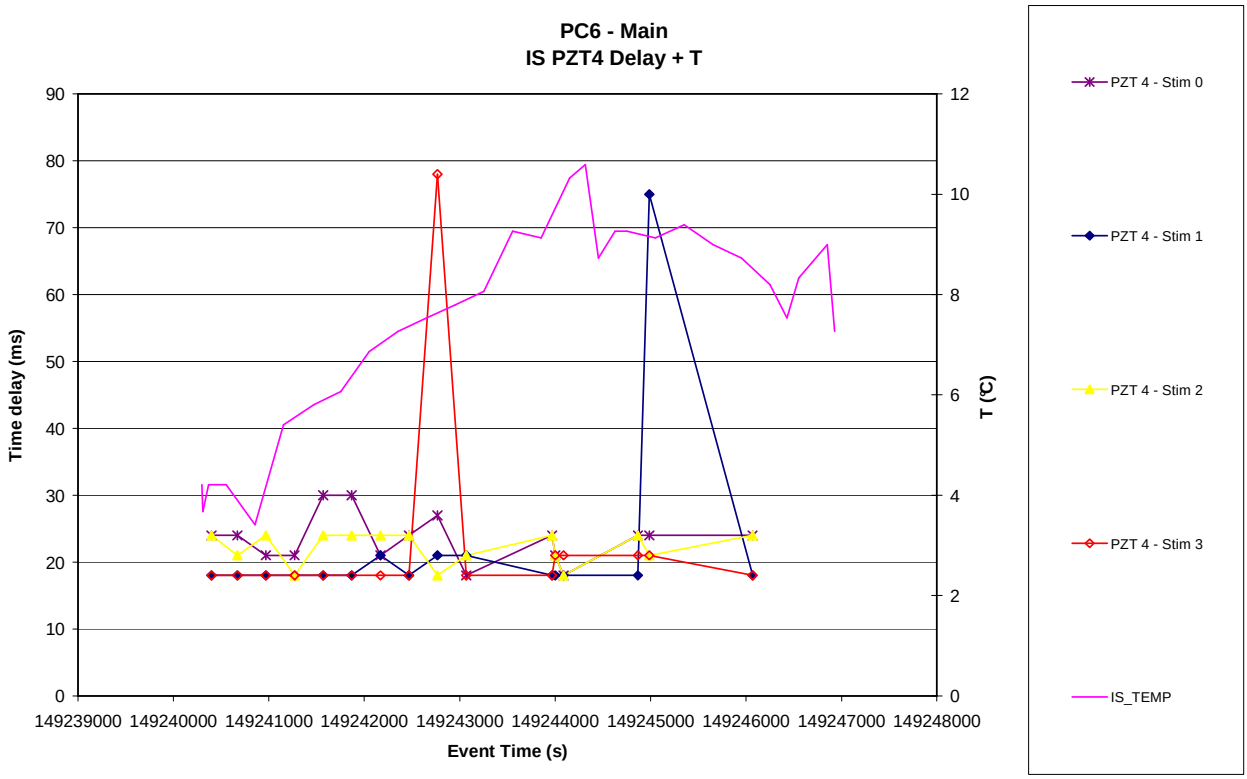


Figure 10.4-28. PZT 5 CAL Time delay vs. time - Main

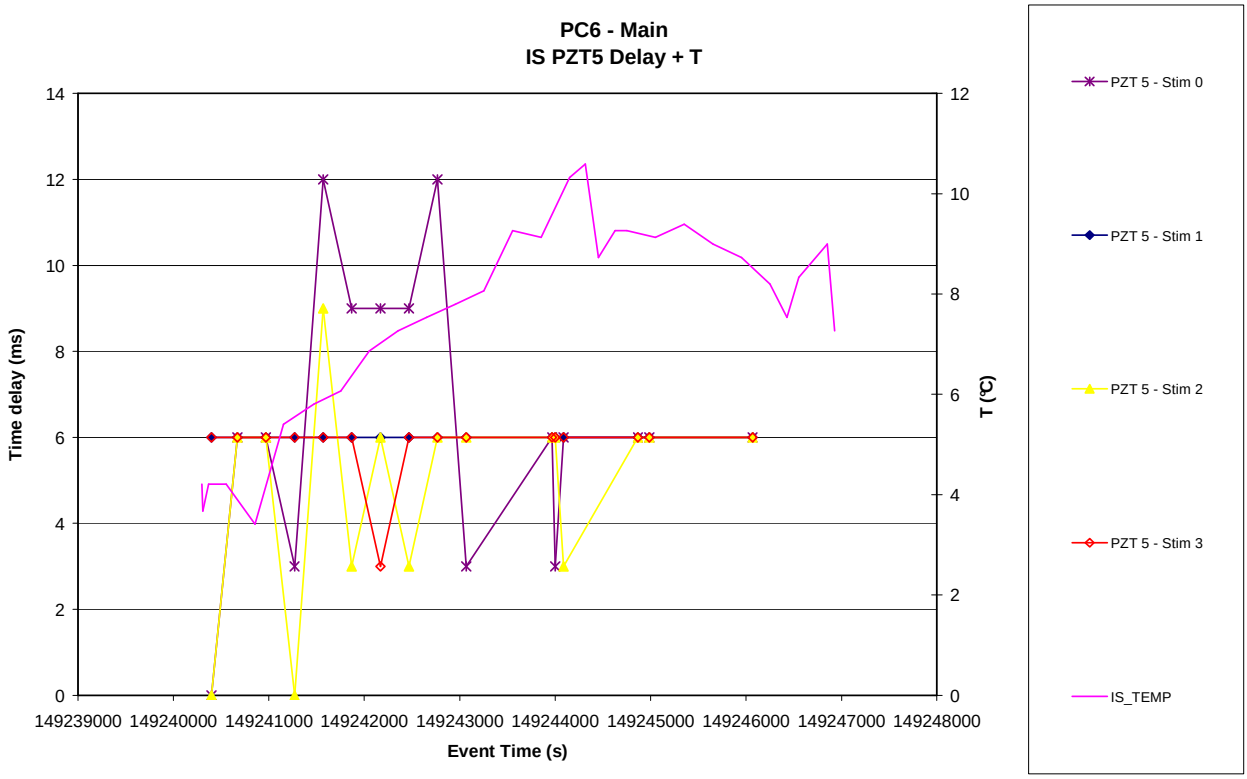


Figure 10.4-29. PZT 1 CAL Signal vs. stimulus – Main

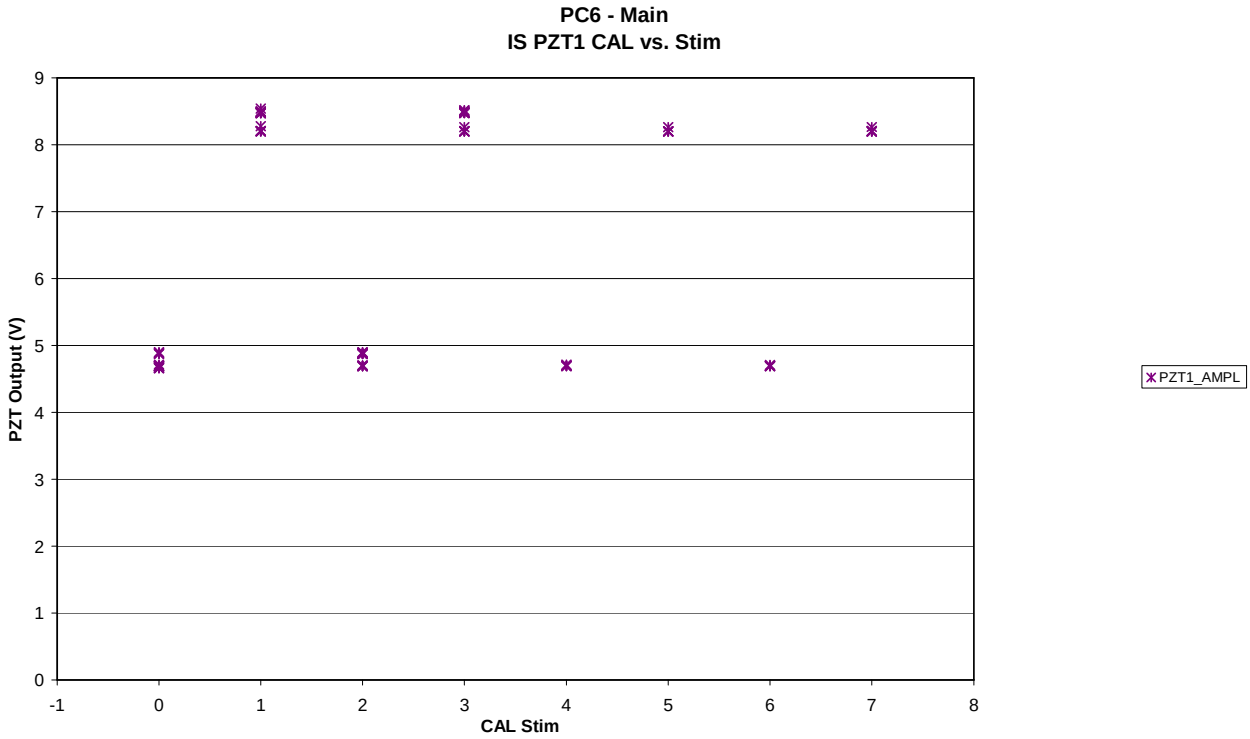


Figure 10.4-30. PZT 2 CAL Signal vs. stimulus – Main

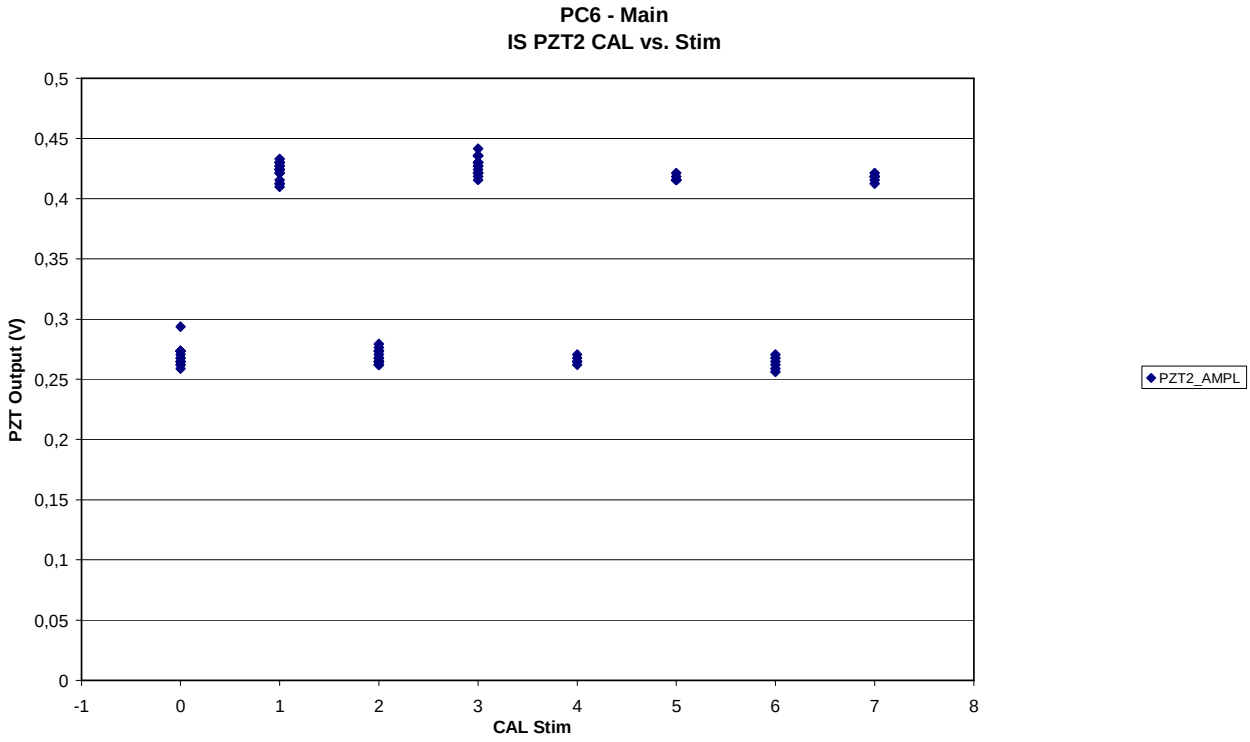


Figure 10.4-31. PZT 3 CAL Signal vs. stimulus – Main

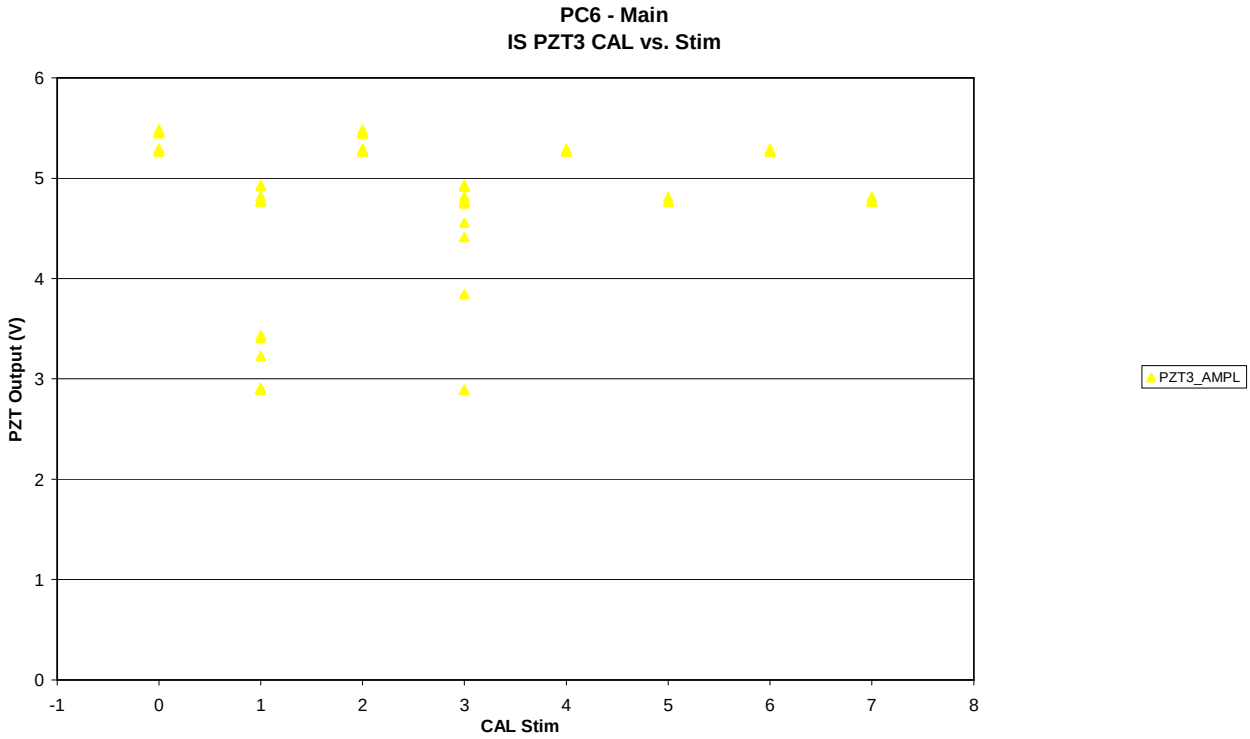


Figure 10.4-32. PZT 4 CAL Signal vs. stimulus – Main

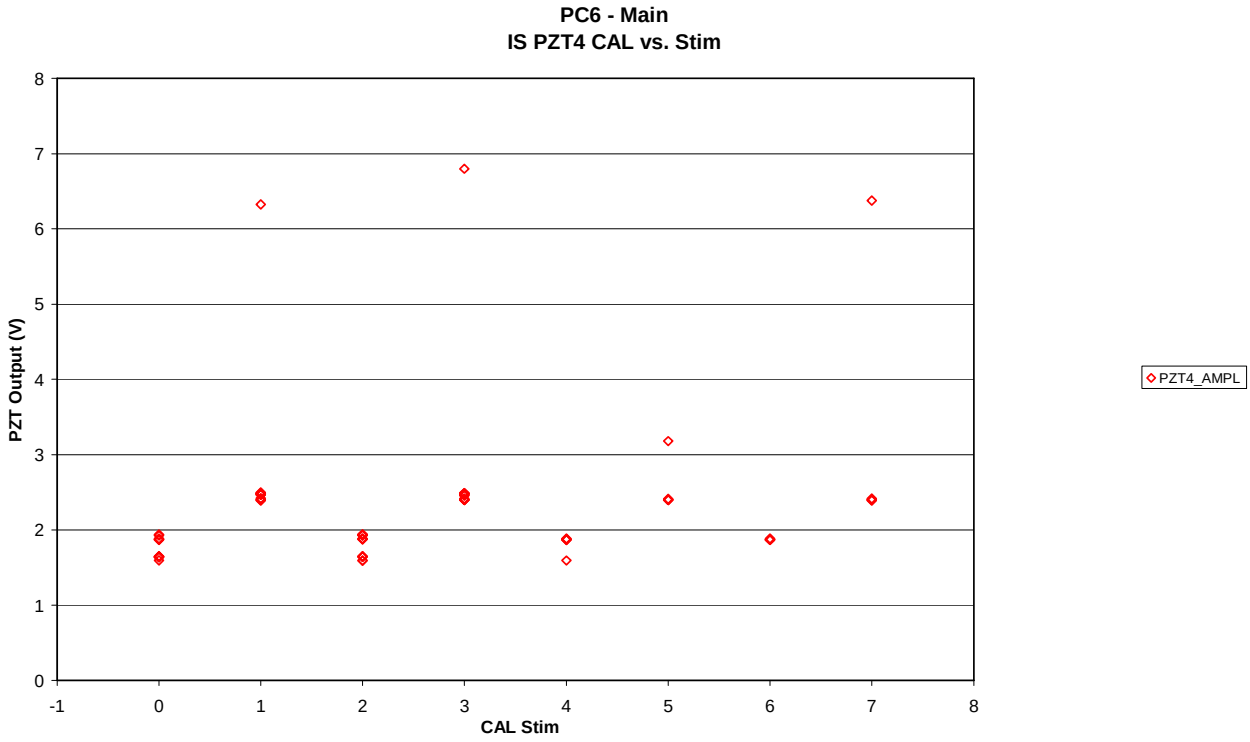


Figure 10.4-33. PZT 5 CAL Signal vs. stimulus – Main

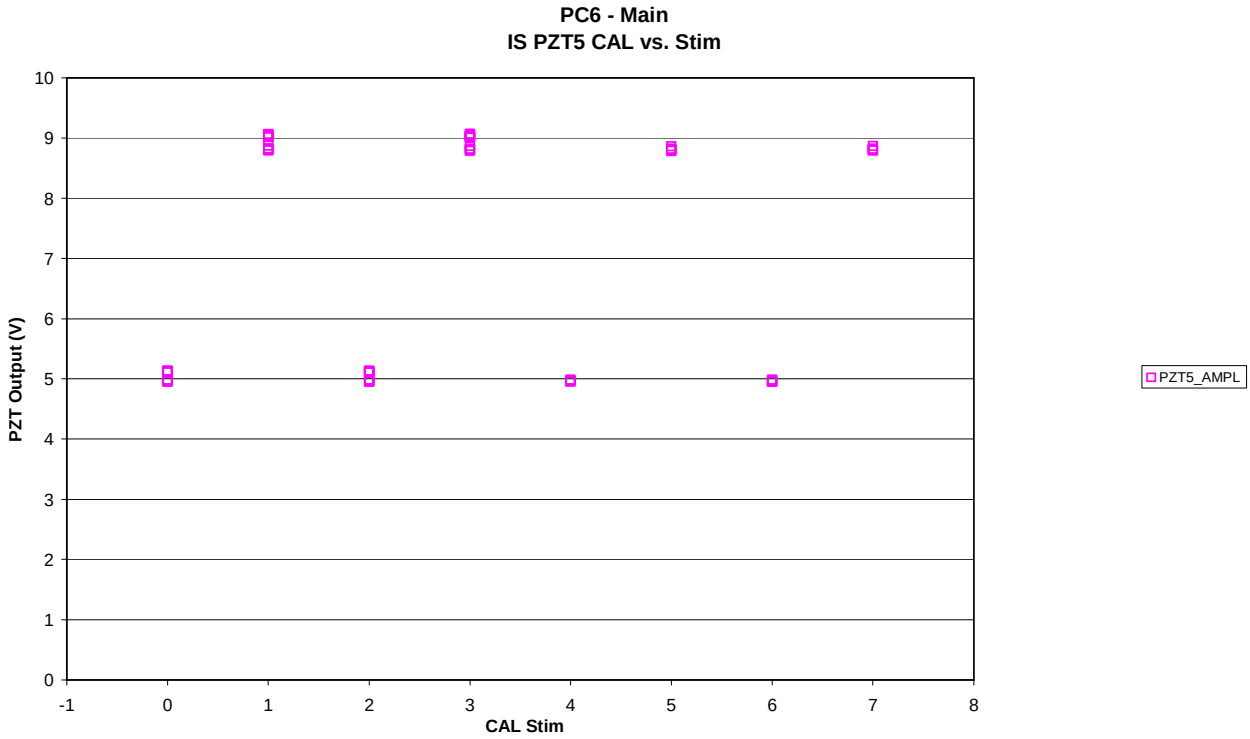


Figure 10.4-34. PZT 1 CAL Time delay vs. stimulus – Main

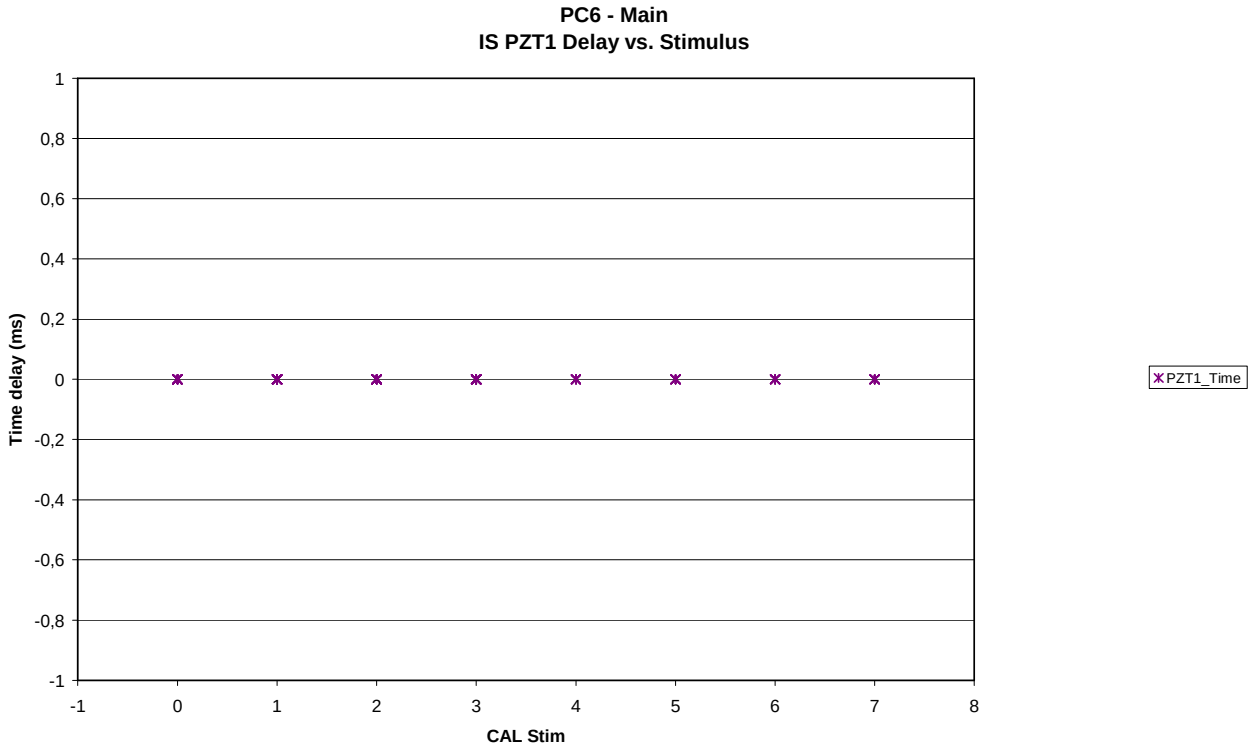


Figure 10.4-35. PZT 2 CAL Time delay vs. stimulus - Main

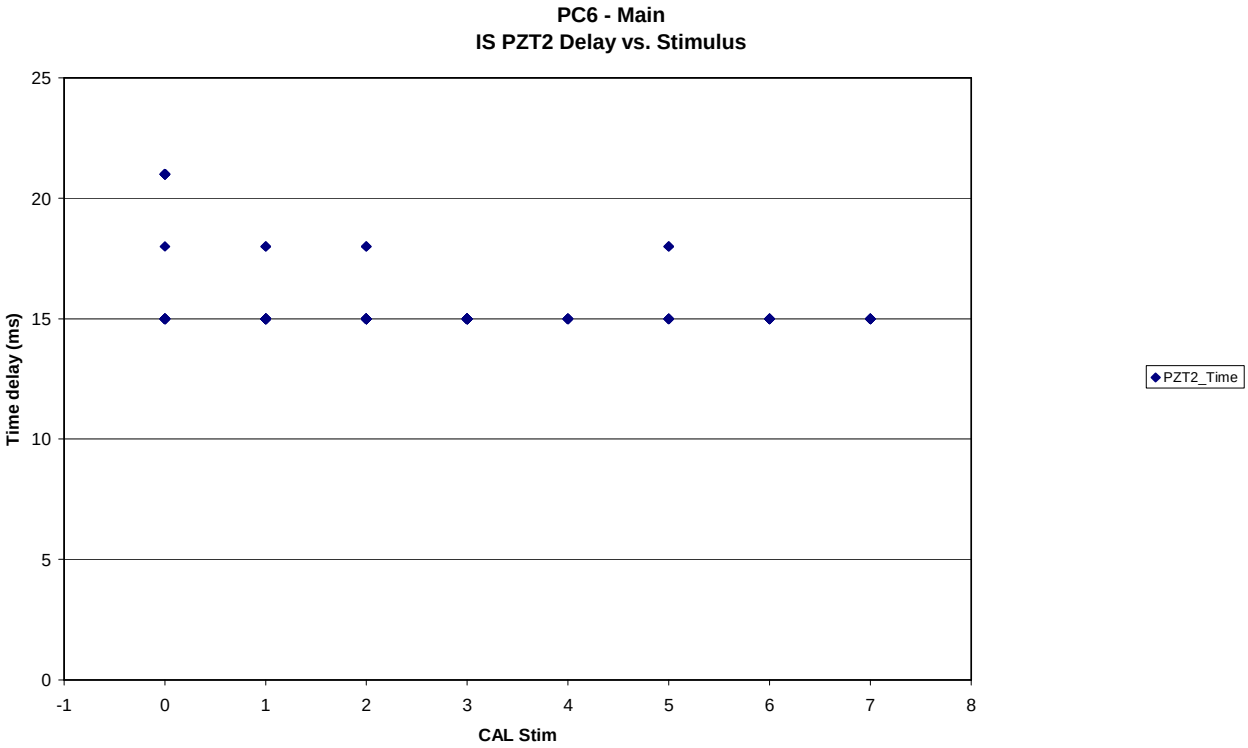


Figure 10.4-36. PZT 3 CAL Time delay vs. stimulus - Main

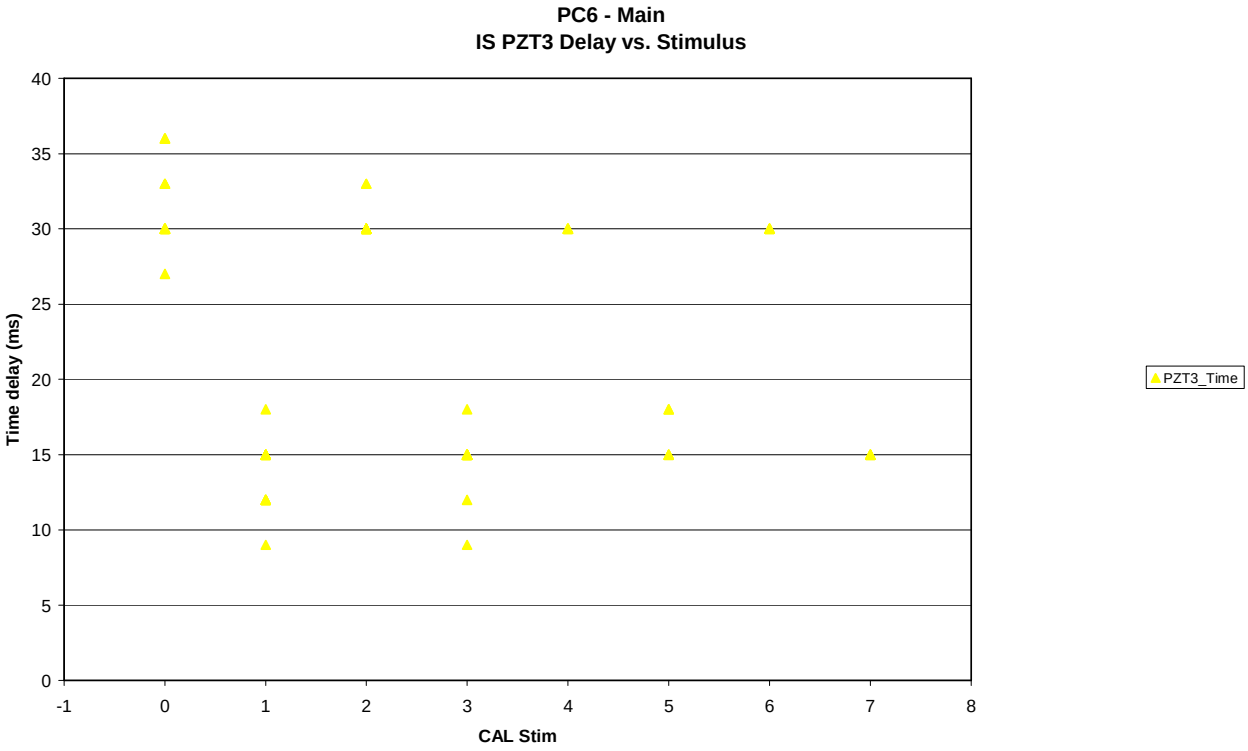


Figure 10.4-37. PZT 4 CAL Time delay vs. stimulus - Main

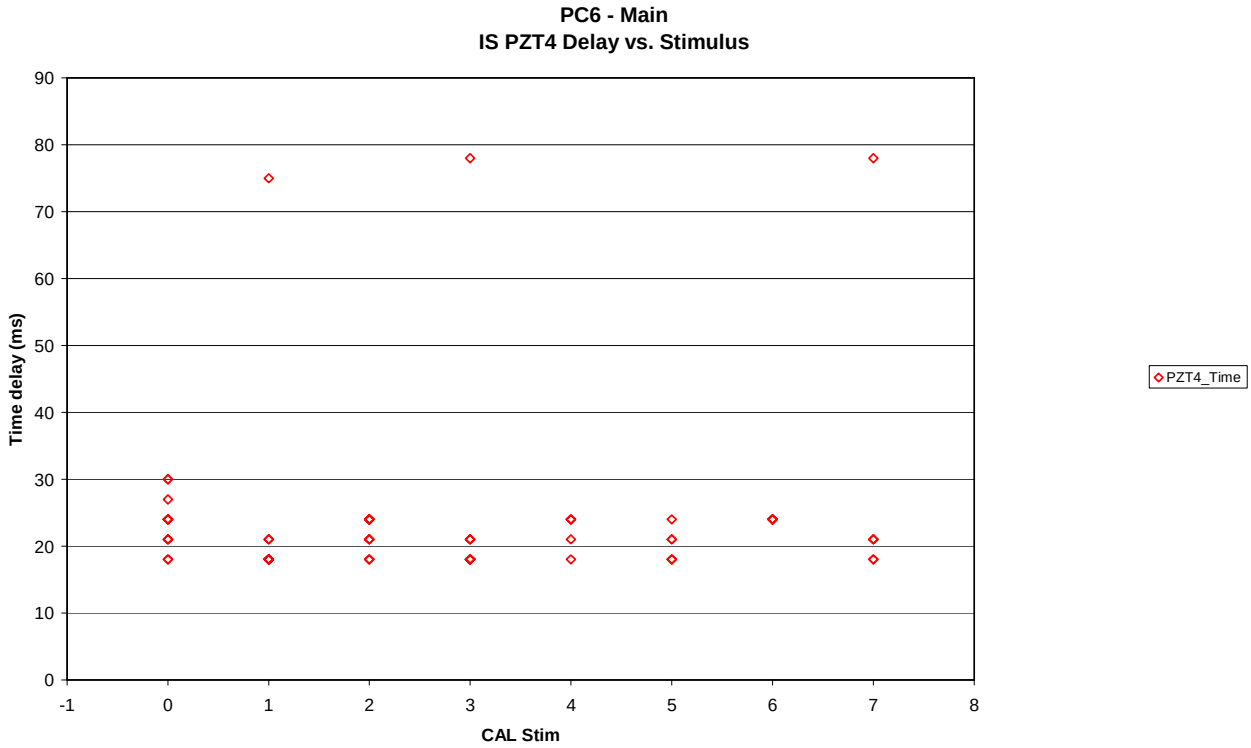
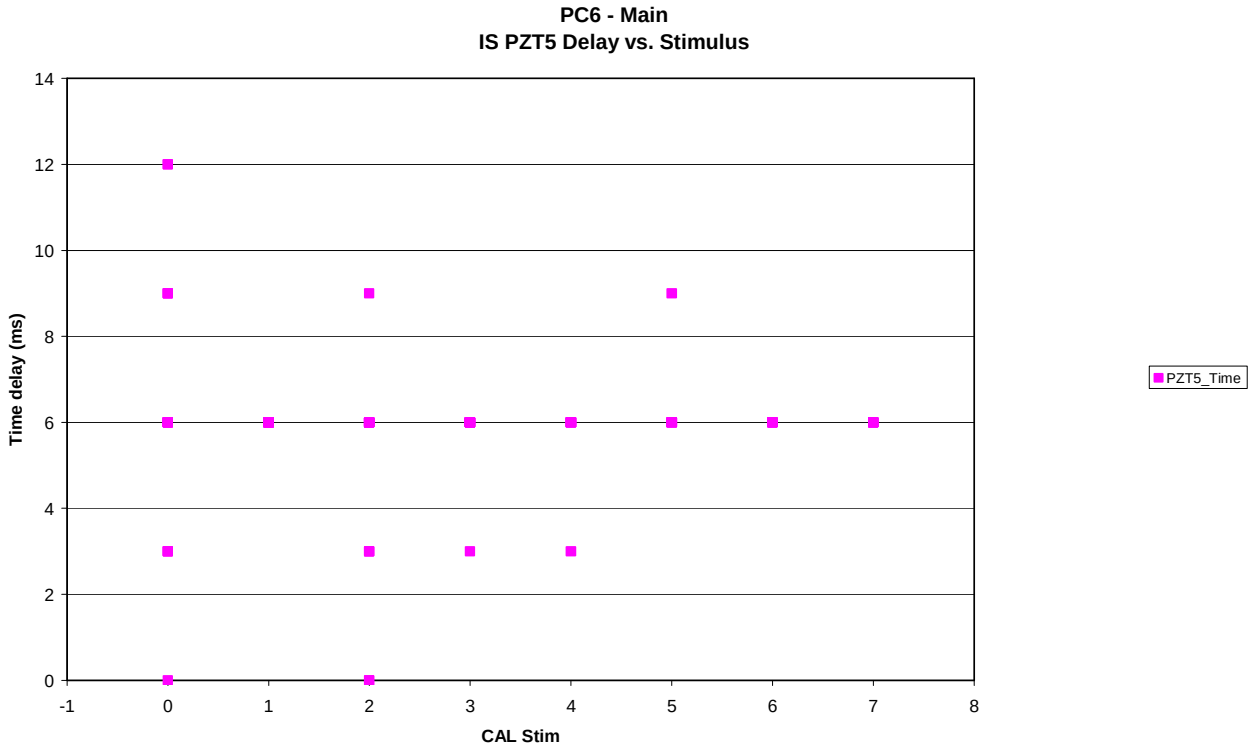


Figure 10.4-38. PZT 5 CAL Time delay vs. stimulus - Main



10.5 MICRO BALANCE SYSTEM (MBS)

10.5.1 MBS – Status

Figure 10.5-1. MBS Operation Status vs. time - Main

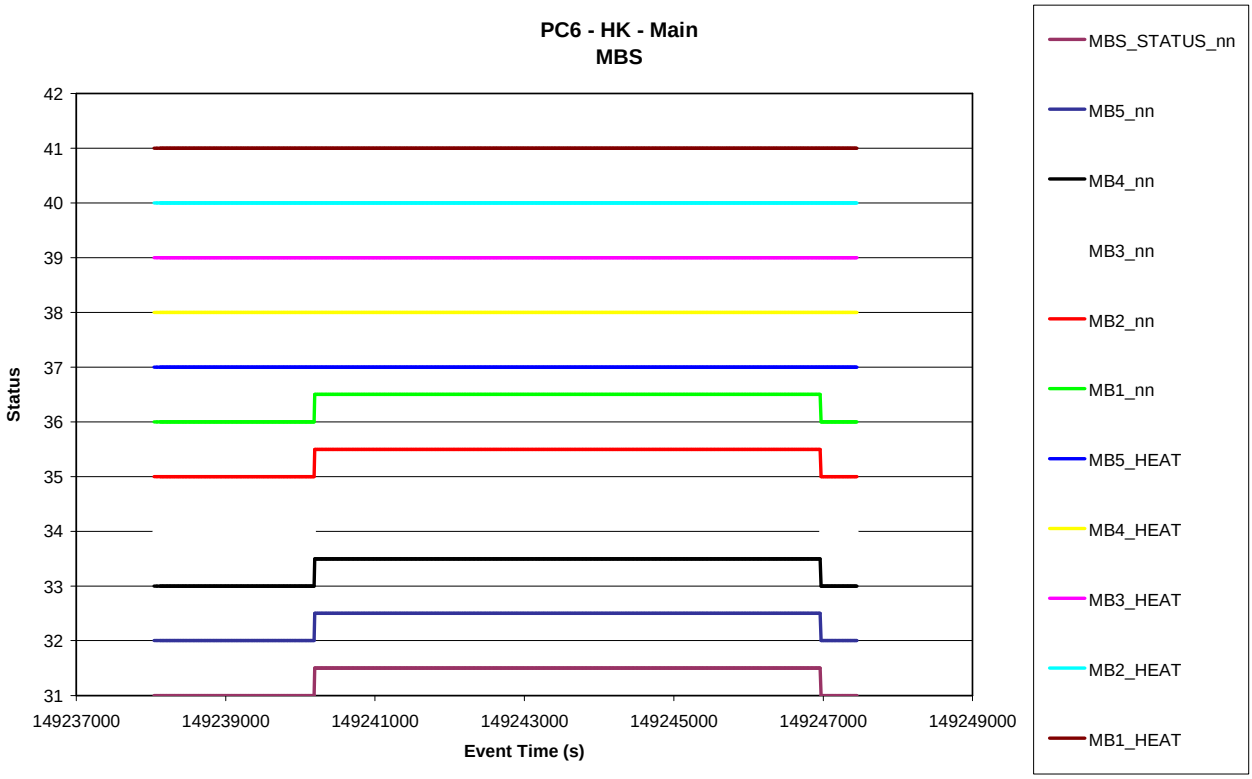


Figure 10.5-2. MBS 1 Temperature vs. time (HK, HK-SCI, SCI) – Main

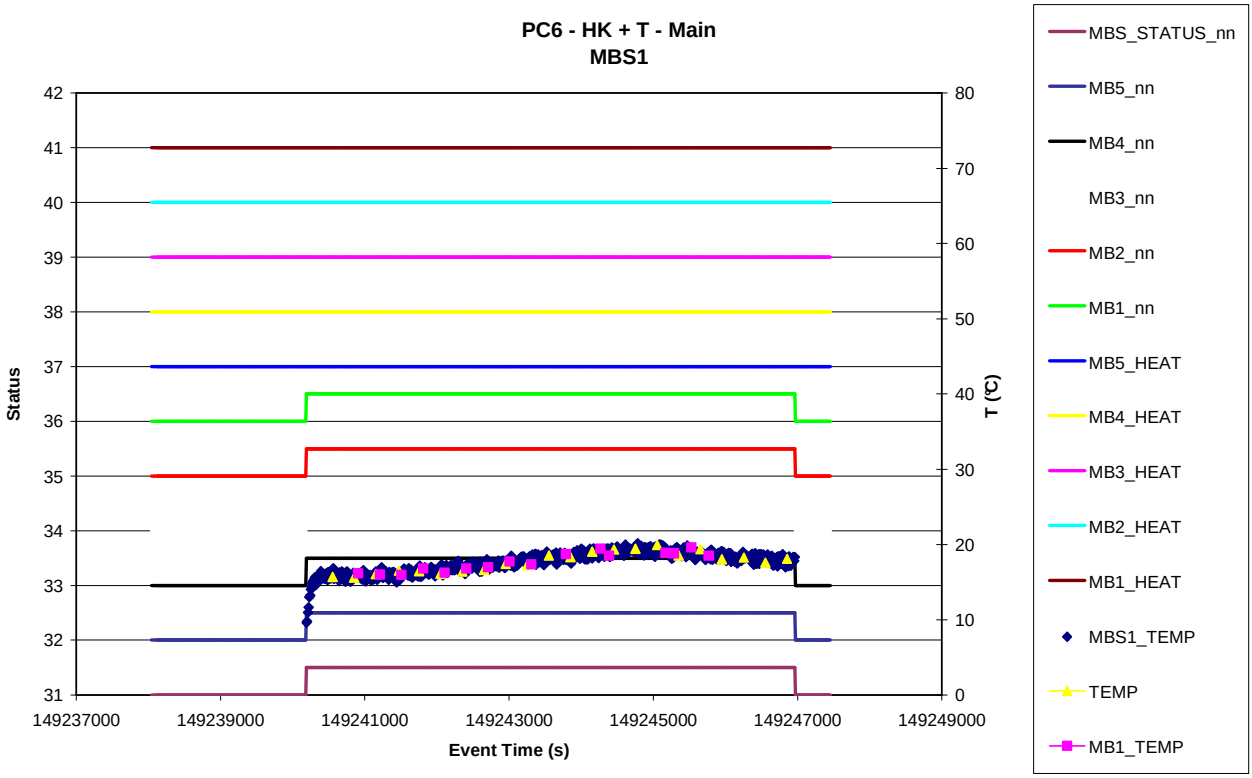


Figure 10.5-3. MBS 2 Temperature vs. time (HK, HK-SCI, SCI) - Main

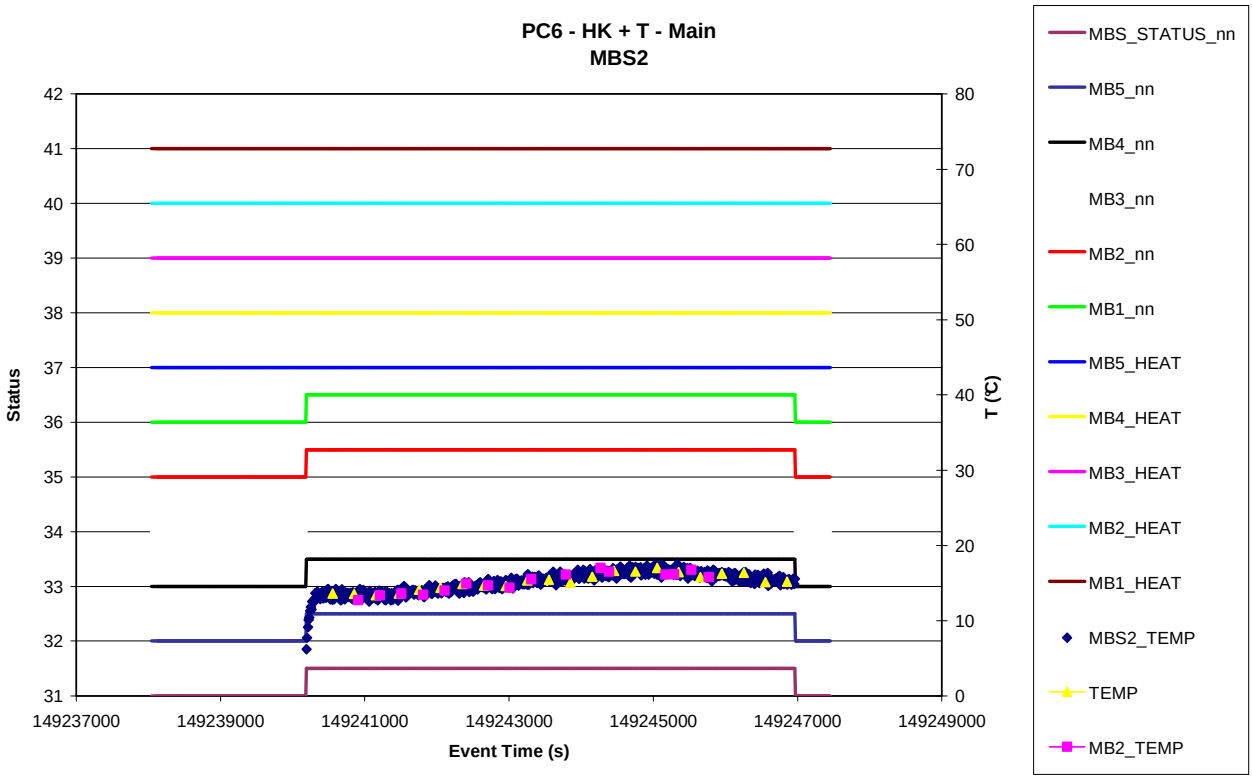


Figure 10.5-4. MBS 3 Temperature vs. time (HK, HK-SCI, SCI) - Main

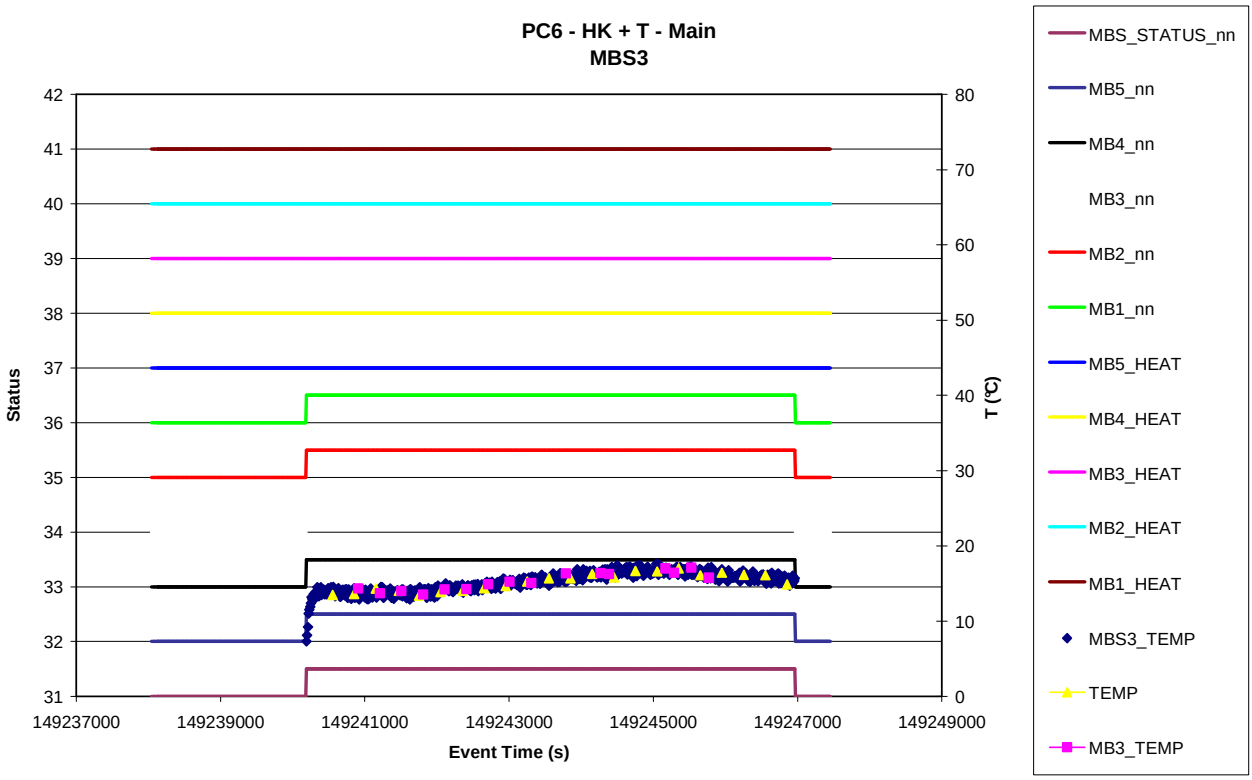


Figure 10.5-5. MBS 4 Temperature vs. time (HK, HK-SCI, SCI) - Main

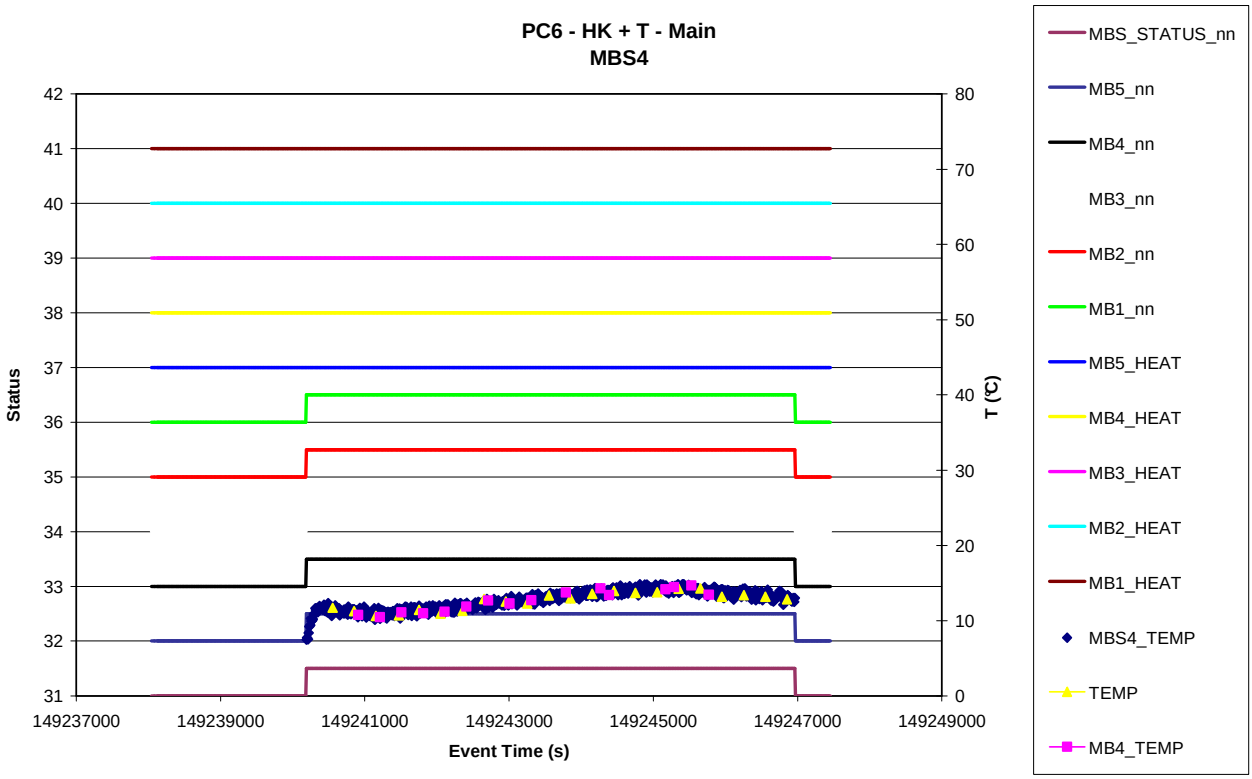
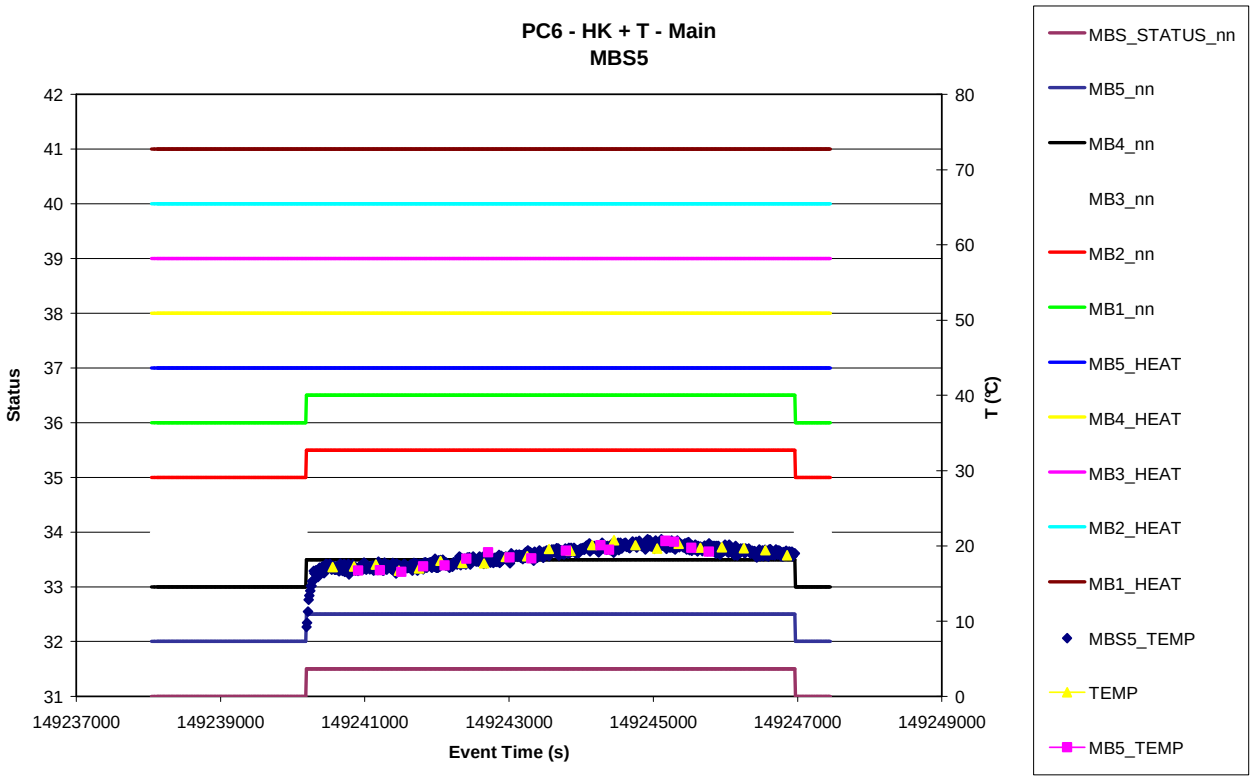


Figure 10.5-6. MBS 5 Temperature vs. time (HK, HK-SCI, SCI) - Main



10.5.2 MBS – Behaviour

10.5.2.1 Science Events (Normal + Heating)

Figure 10.5-7. MBS 1 Frequency and Temperature vs. time - Main

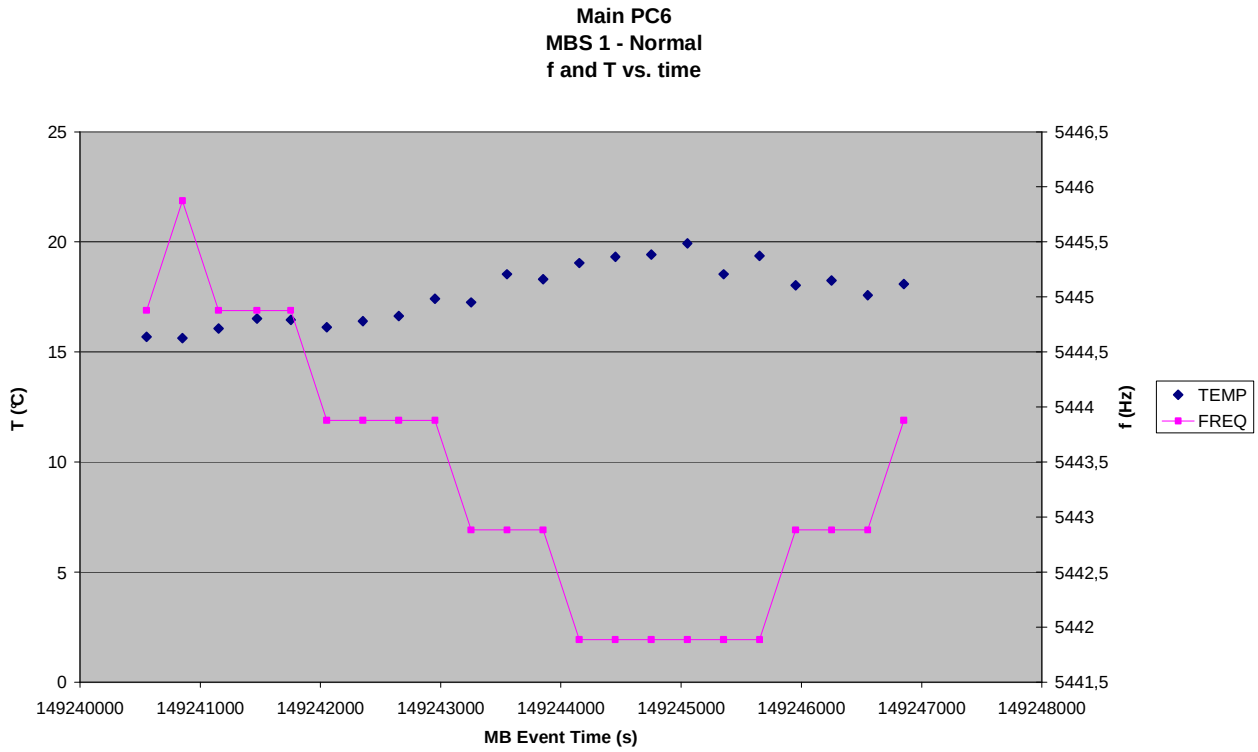


Figure 10.5-8. MBS 2 Frequency and Temperature vs. time - Main

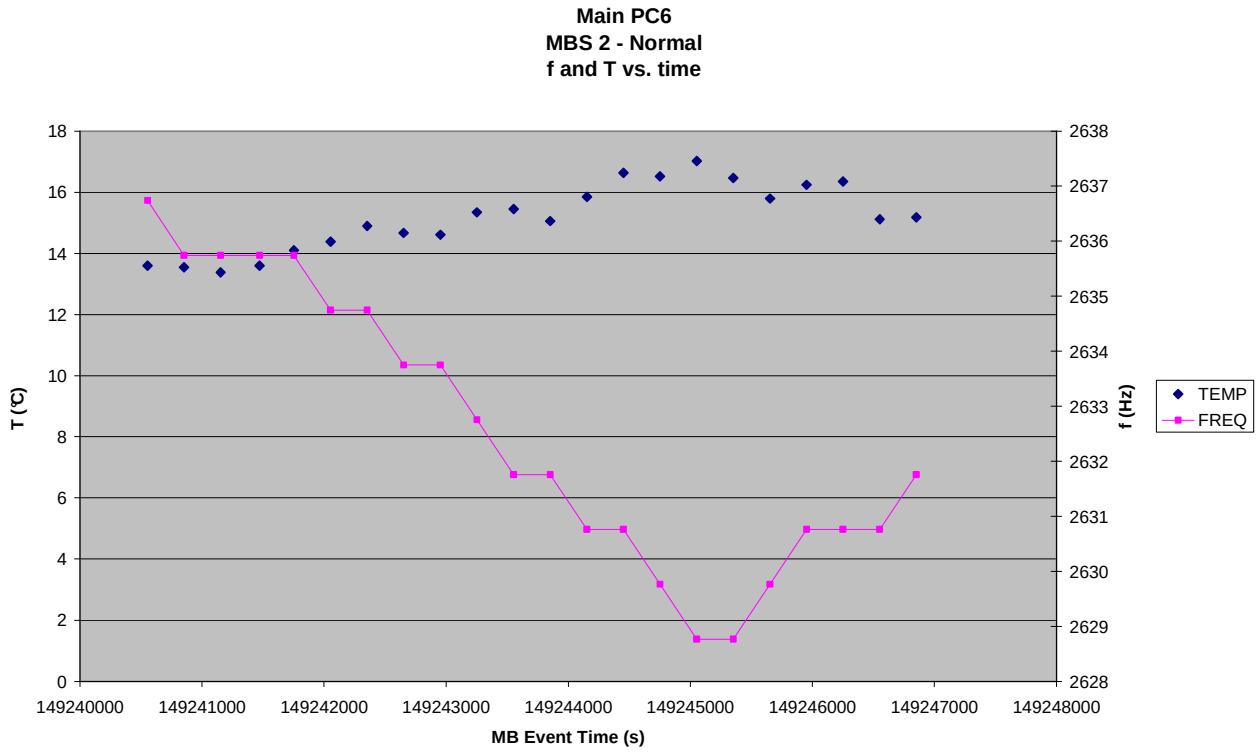


Figure 10.5-9. MBS 3 Frequency and Temperature vs. time - Main

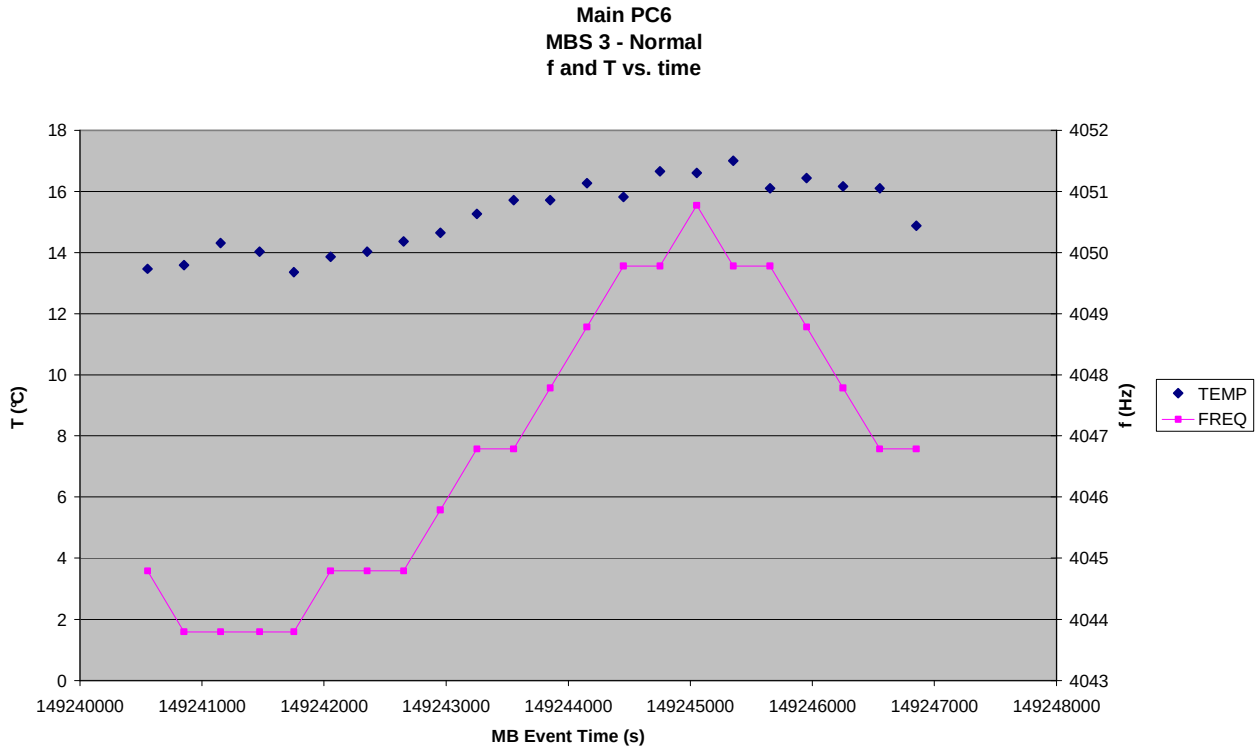


Figure 10.5-10. MBS 4 Frequency and Temperature vs. time - Main

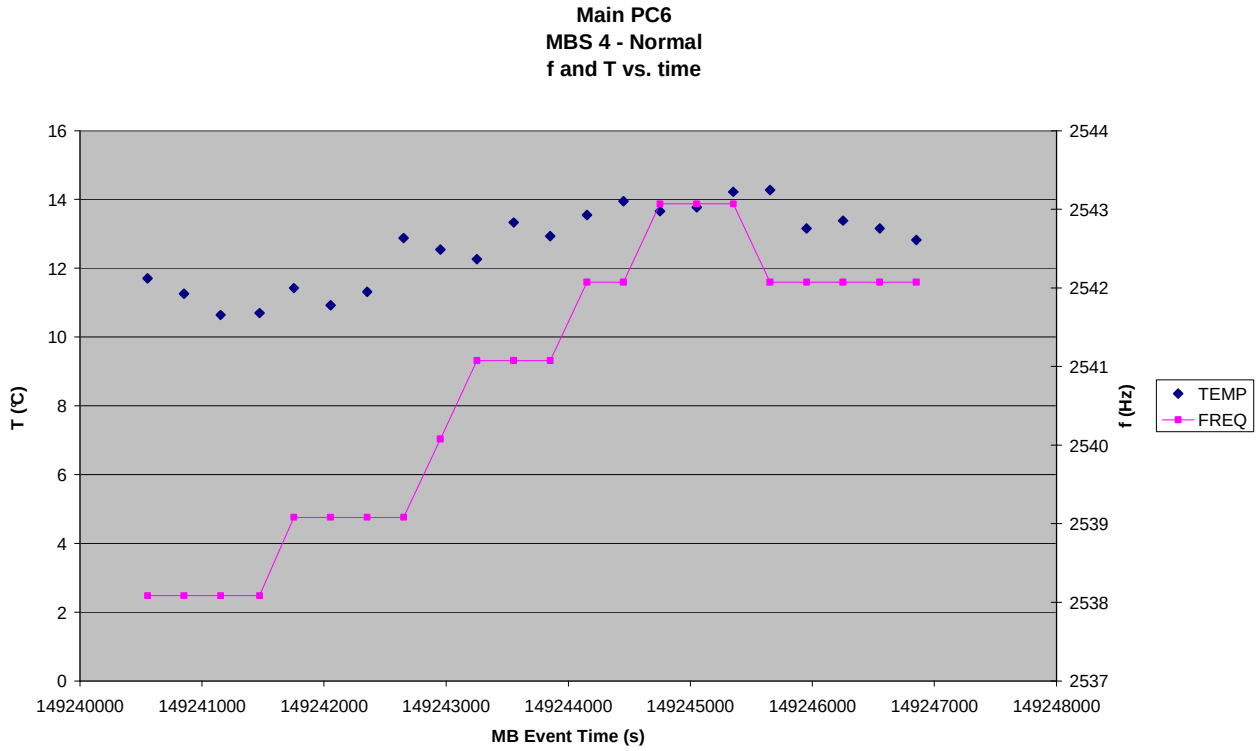
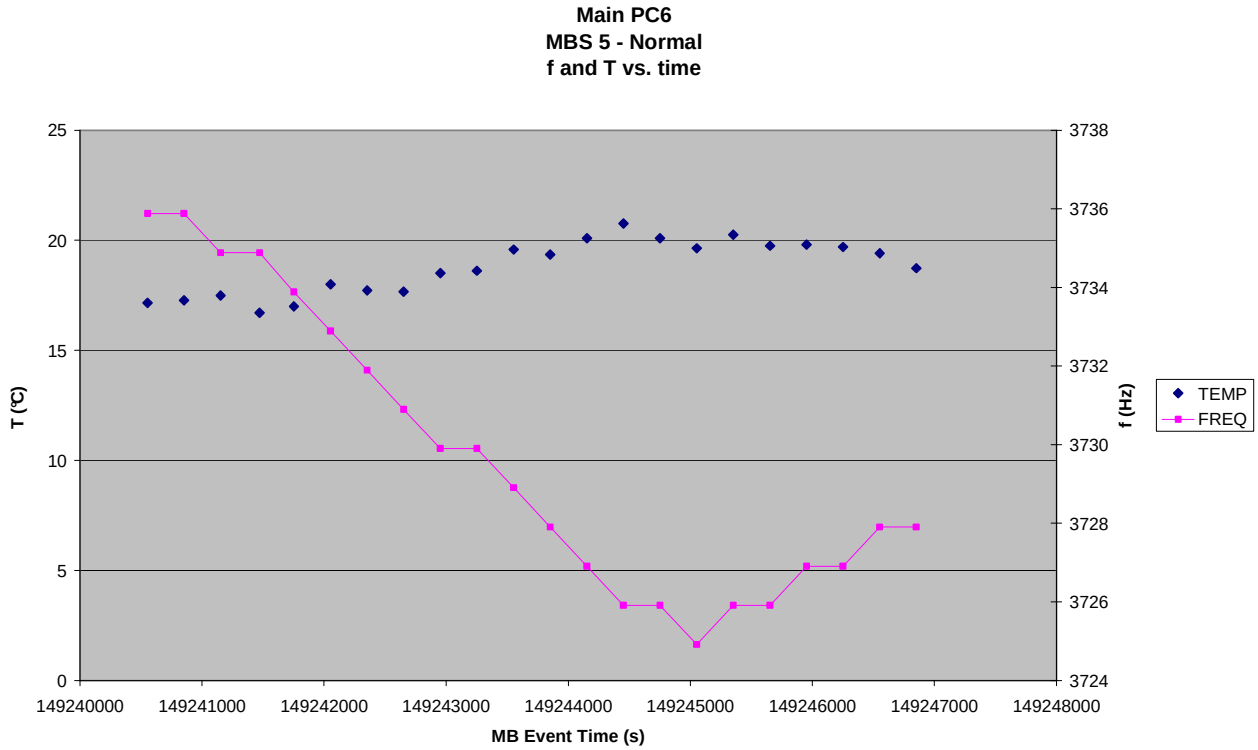


Figure 10.5-11. MBS 5 Frequency and Temperature vs. time - Main



11. COMPARISIONS WITH PREVIOUS TESTS

11.1 GRAIN DETECTION SYSTEM (GDS)

11.1.1 Laser Light Mon vs. Temperature

Figure 11.1-1. GDS Laser 1 Light Mon vs. Temperature (PC6 in cyan)

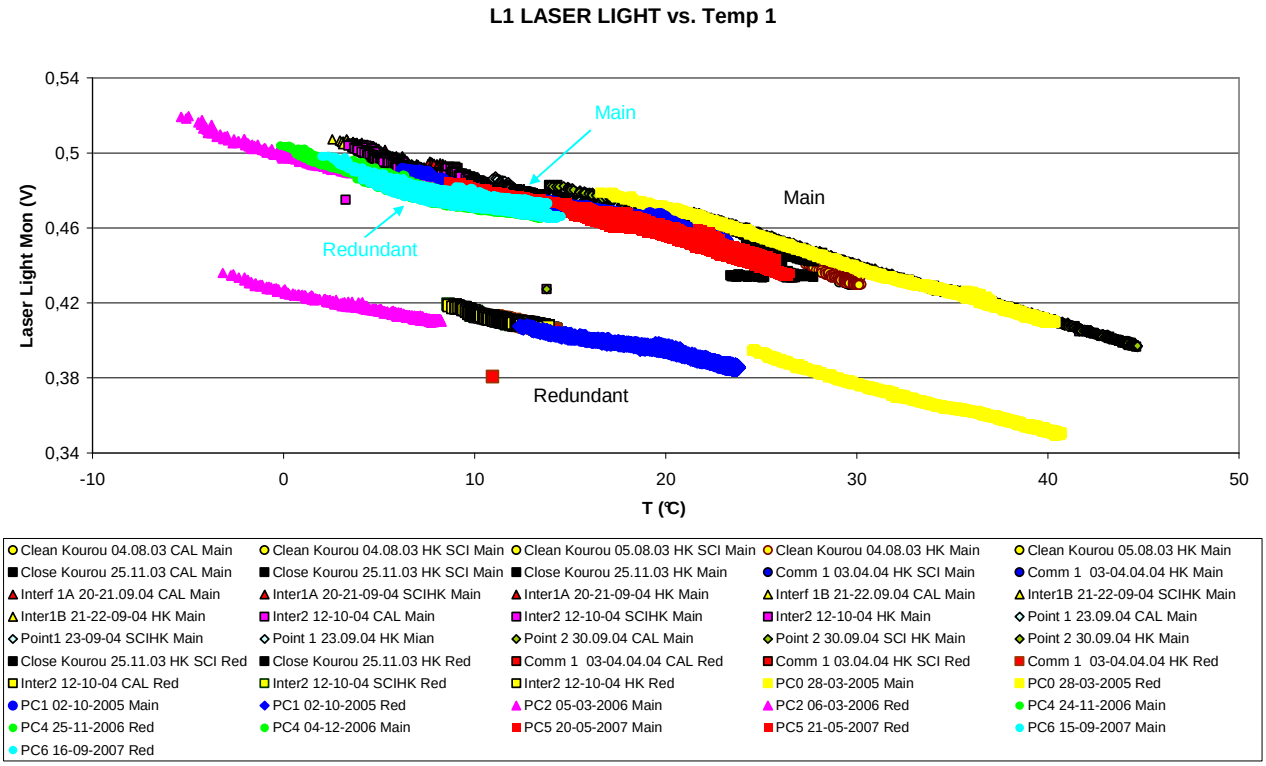


Figure 11.1-2. GDS Laser 2 Light Mon vs. Temperature (PC6 in cyan)

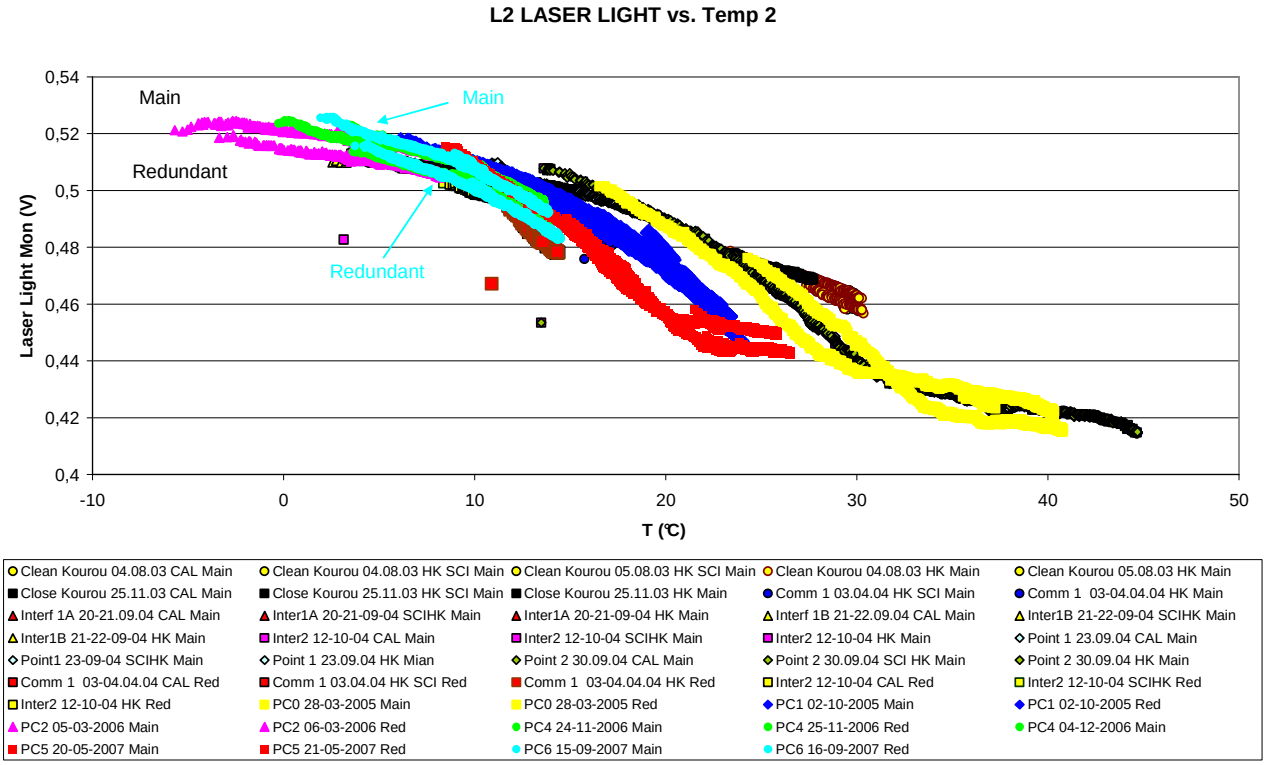


Figure 11.1-3. GDS Laser 3 Light Mon vs. Temperature (PC6 in cyan)

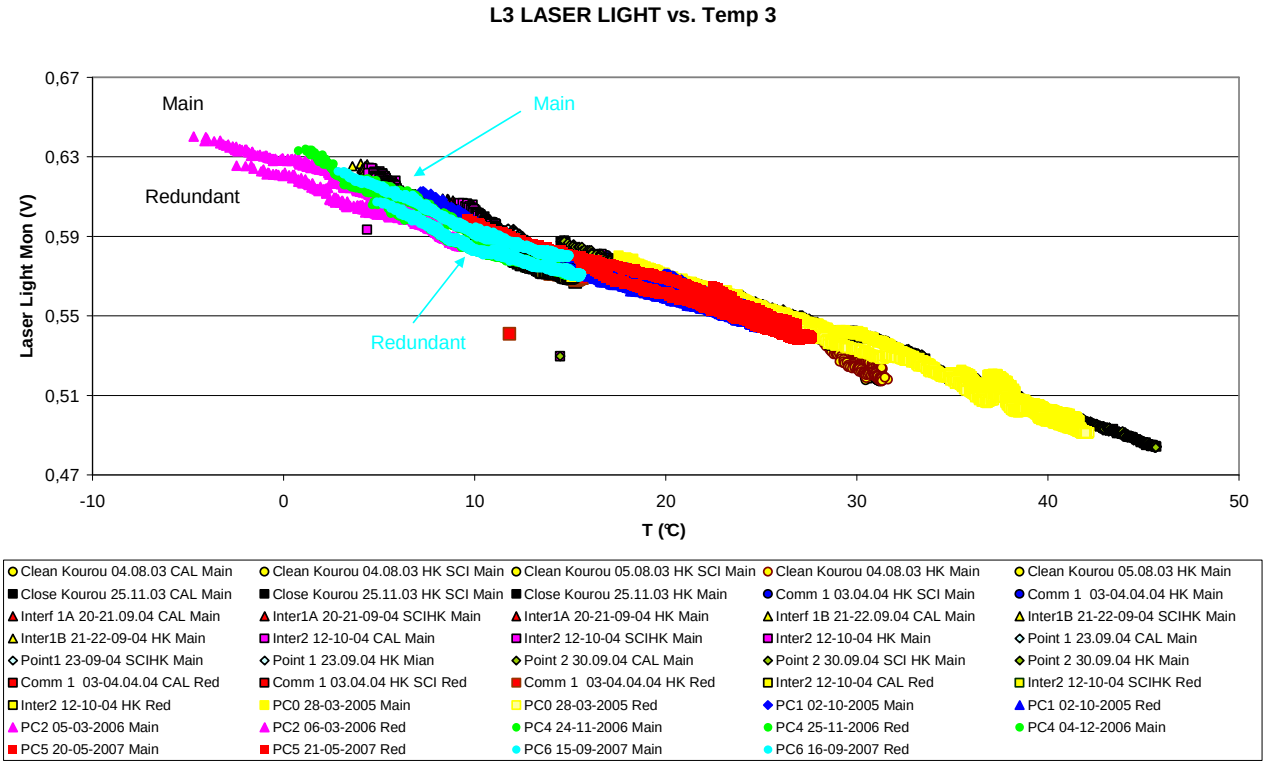
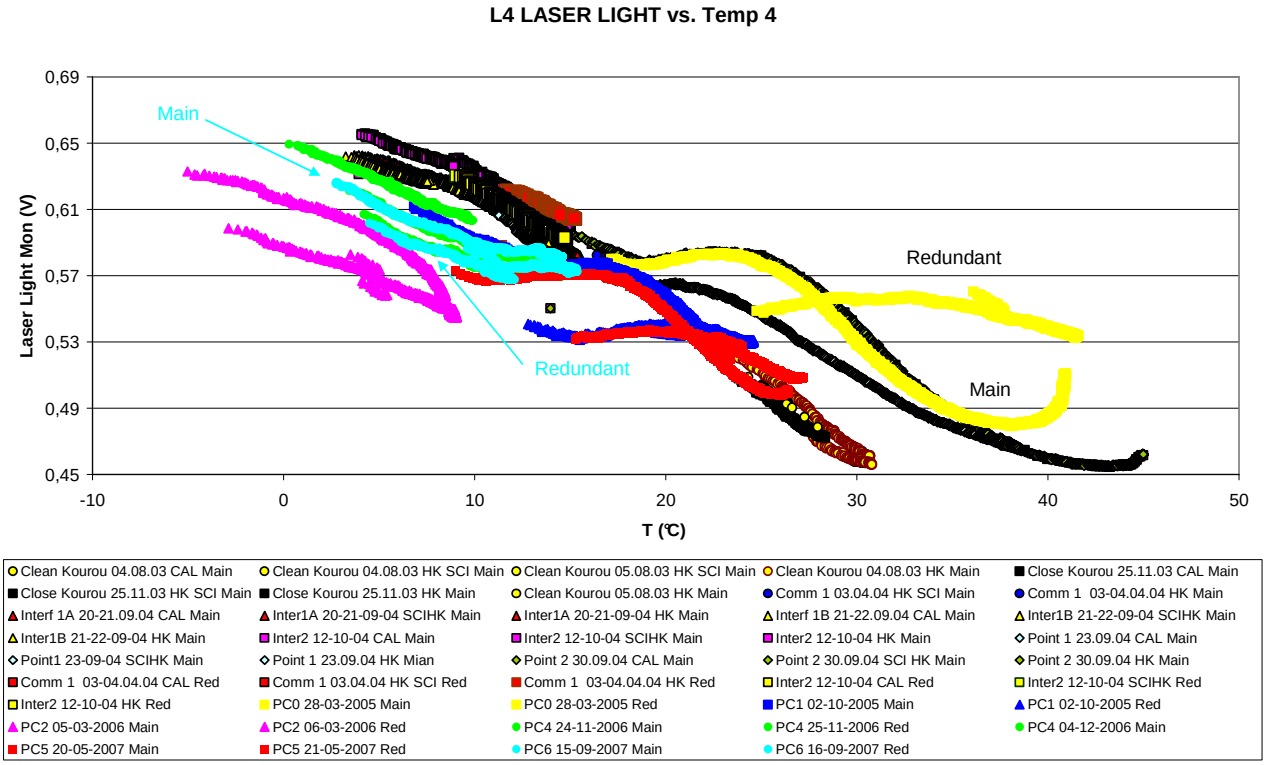


Figure 11.1-4. GDS Laser 4 Light Mon vs. Temperature (PC6 in cyan)



11.2 IMPACT SENSOR (IS)

11.2.1 CAL Amplitude vs. Temperature

Figure 11.2-1. IS PZT-1 CAL Amplitude vs. T – High Voltage

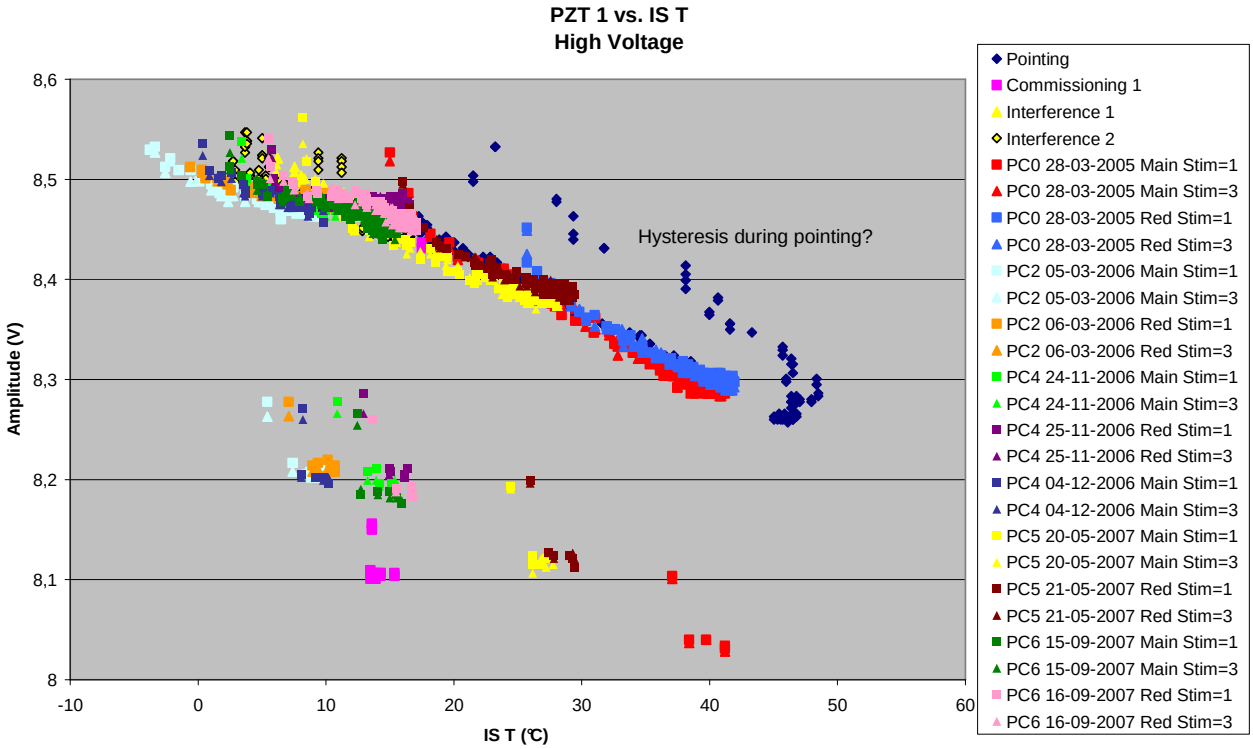
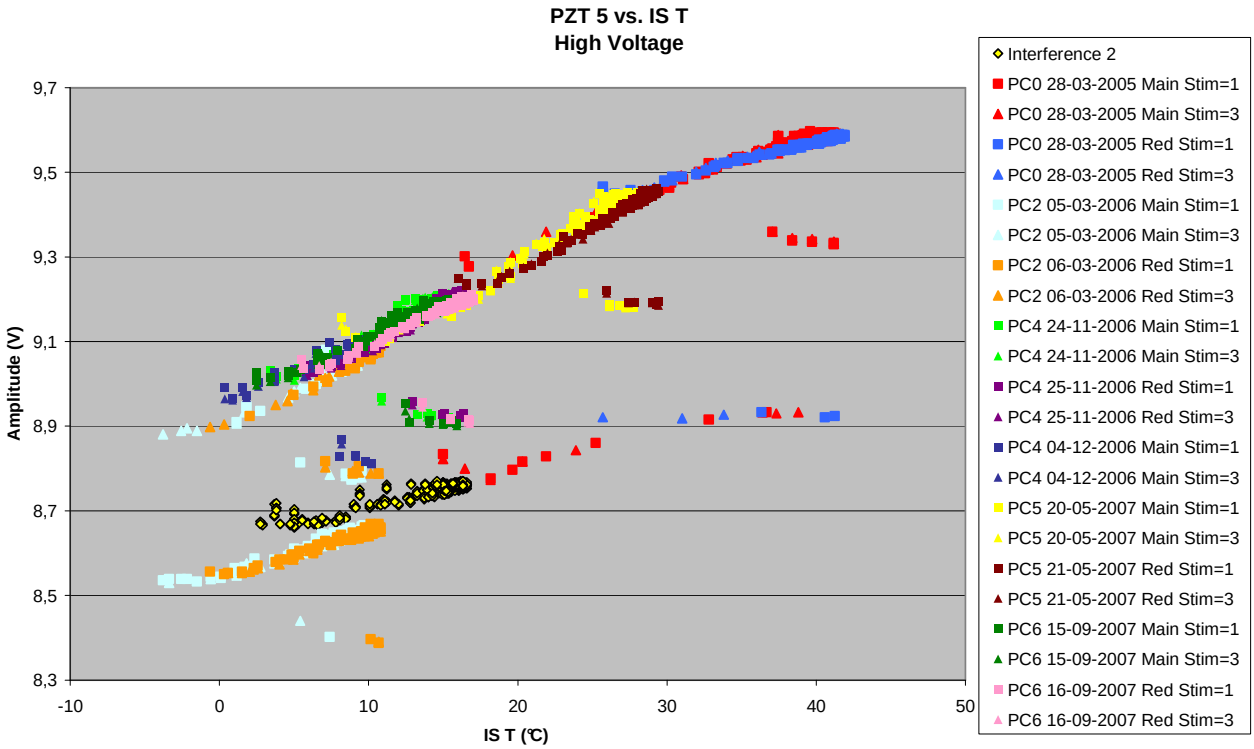


Figure 11.2-2. IS PZT-5 CAL Amplitude vs. T – High Voltage



11.3 MICRO BALANCE SYSTEM (MBS)

11.3.1 Frequency vs. Temperature

Figure 11.3-1. MBS 1 Frequency vs. Temperature

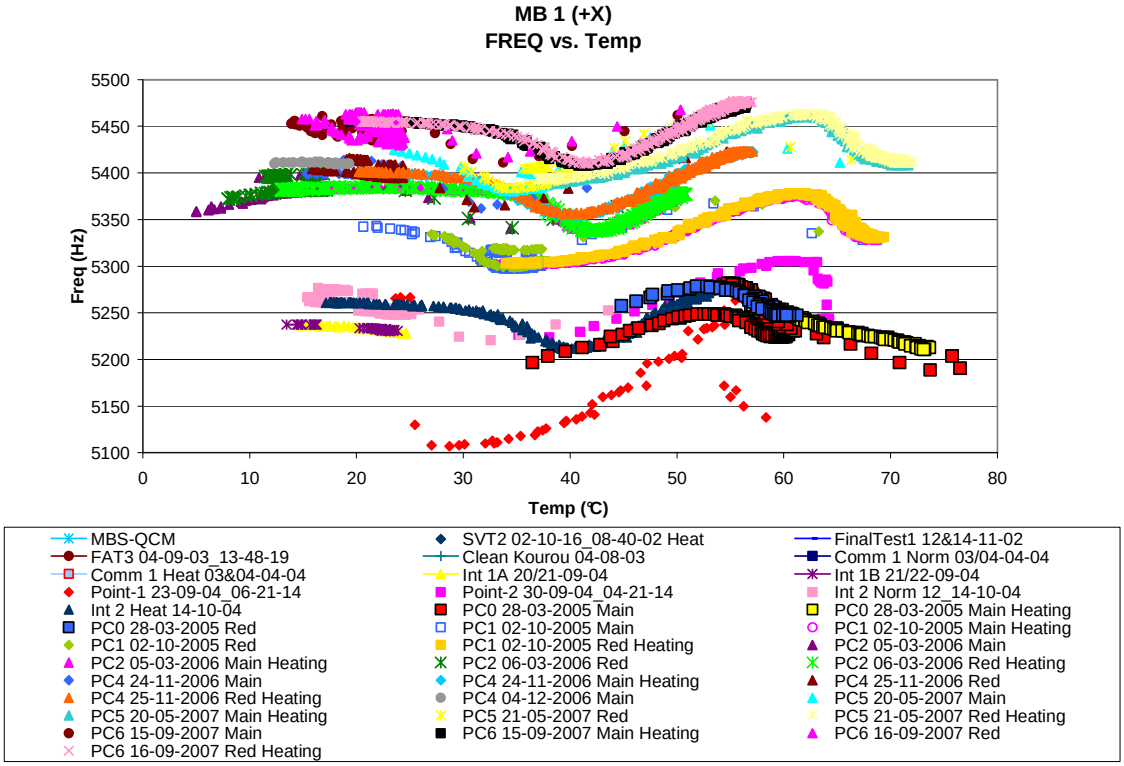


Figure 11.3-2. MBS 2 Frequency vs. Temperature

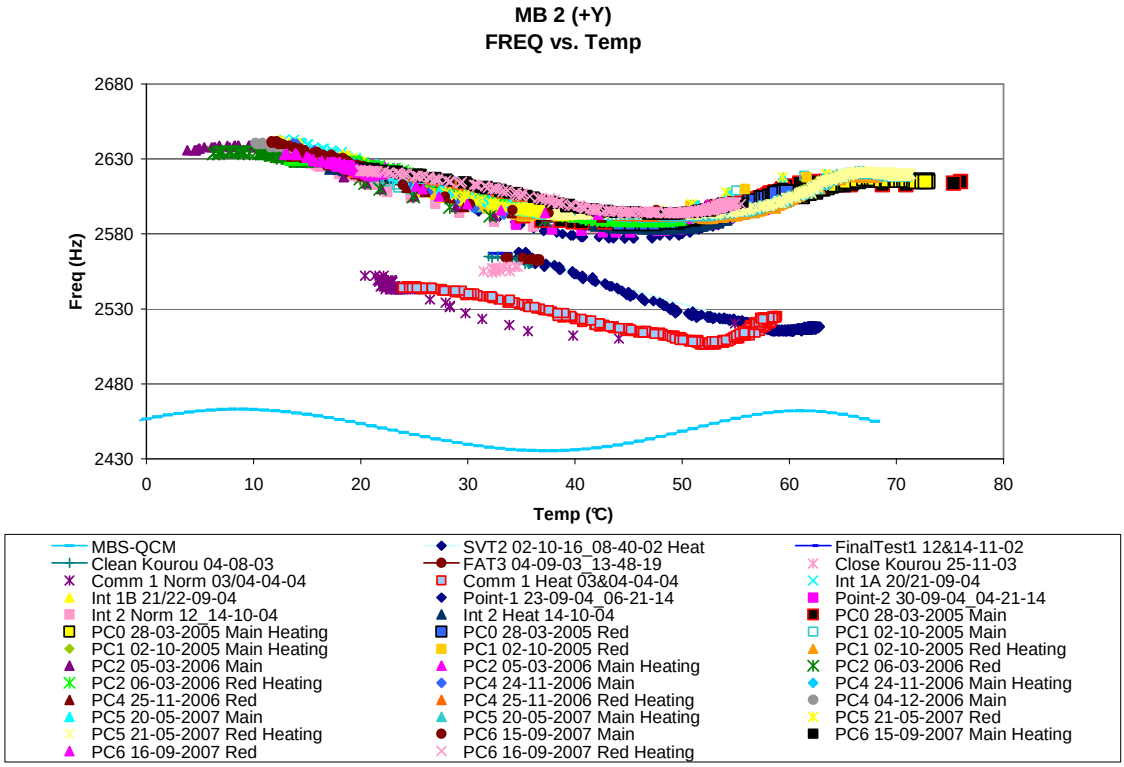


Figure 11.3-3. MBS 3 Frequency vs. Temperature

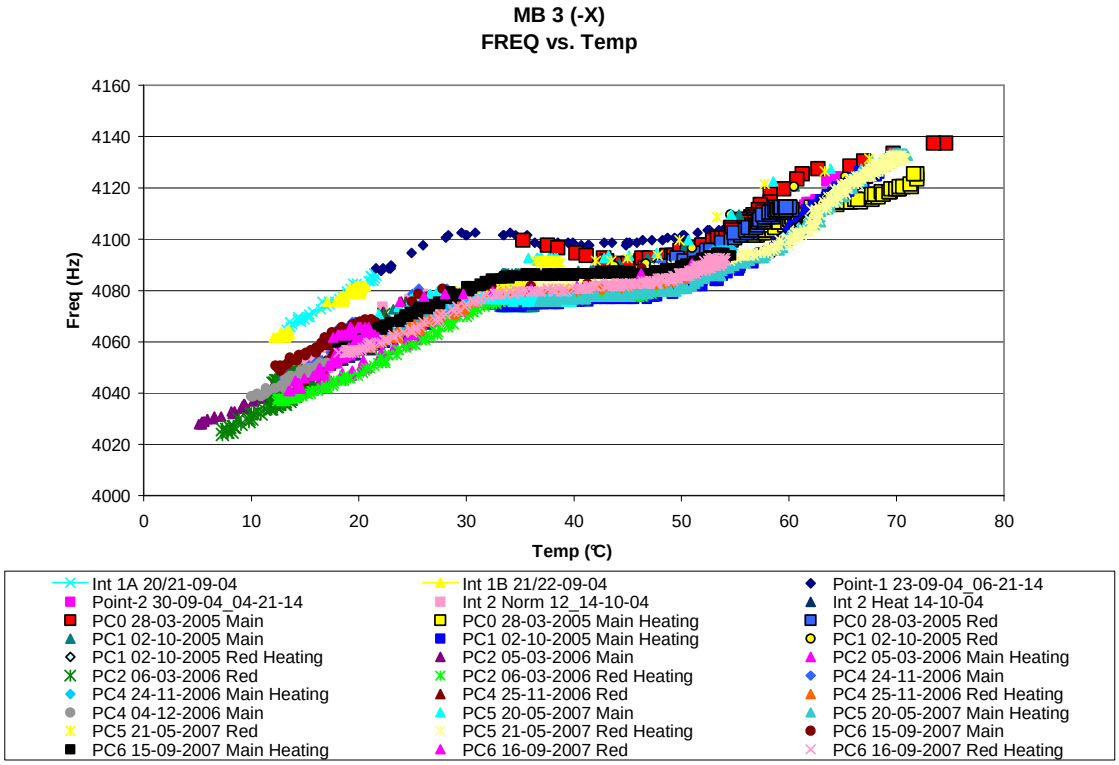


Figure 11.3-4. MBS 4 Frequency vs. Temperature

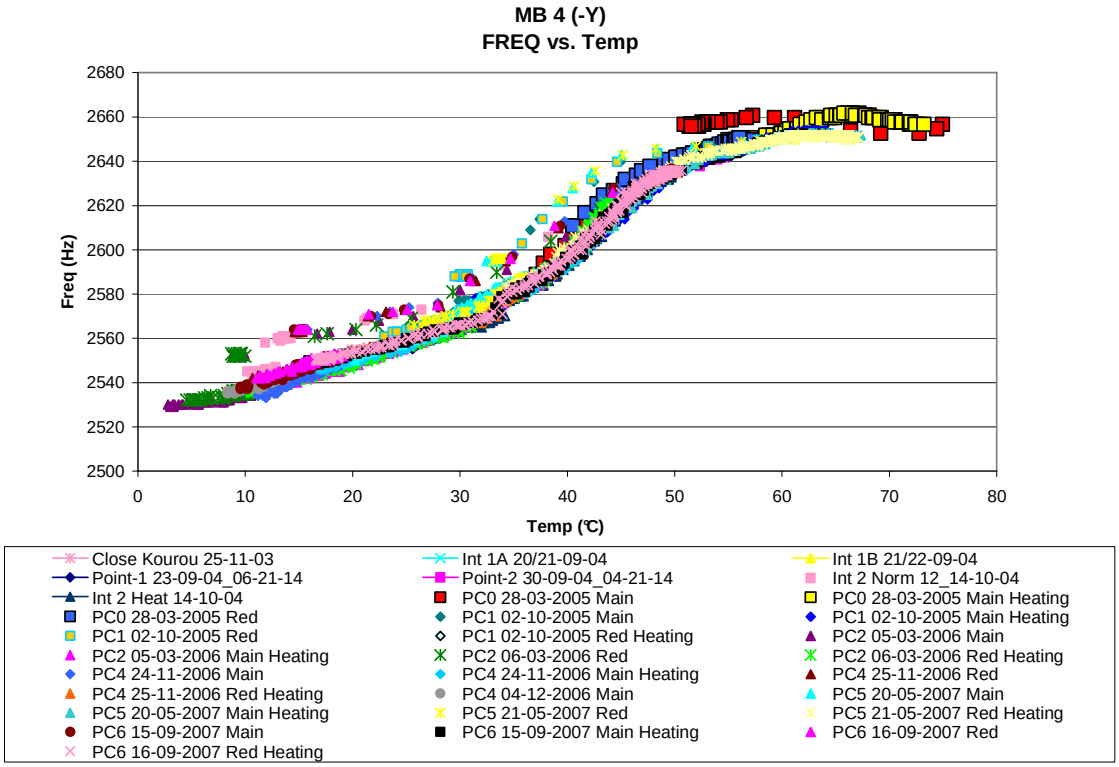
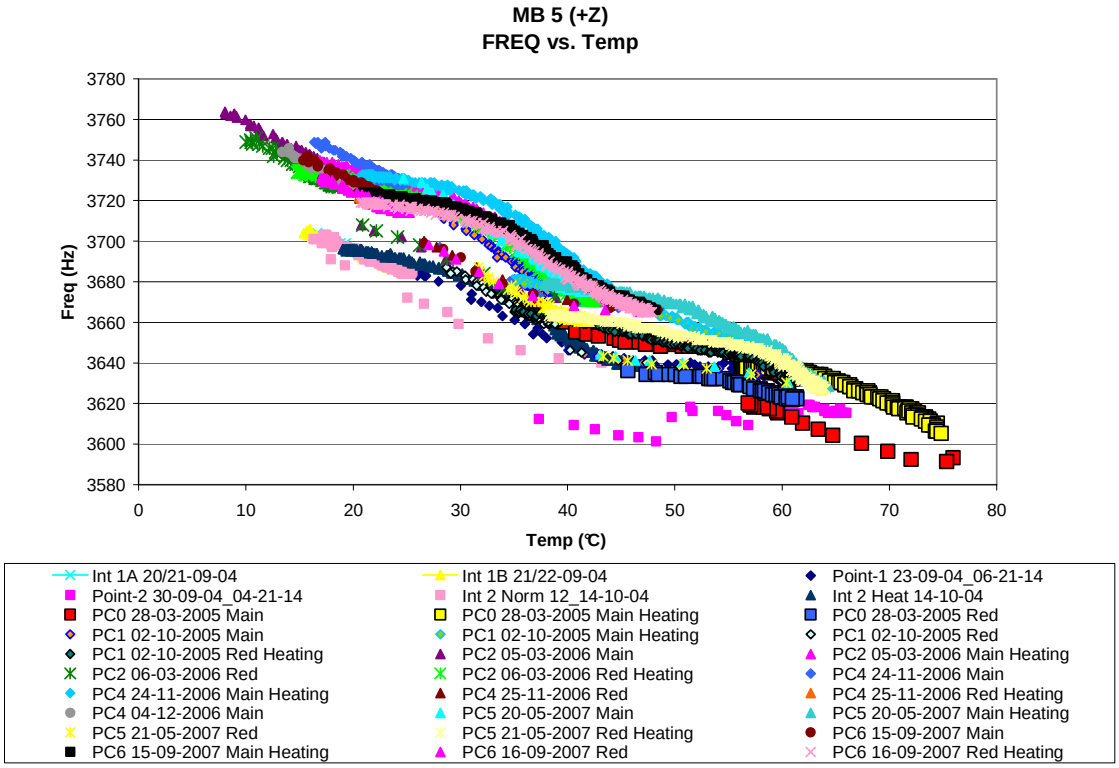


Figure 11.3-5. MBS 5 Frequency vs. Temperature



11.3.2 Frequency vs. Time

Figure 11.3-6. MBS 1 Frequency vs. Time at fixed Temperatures

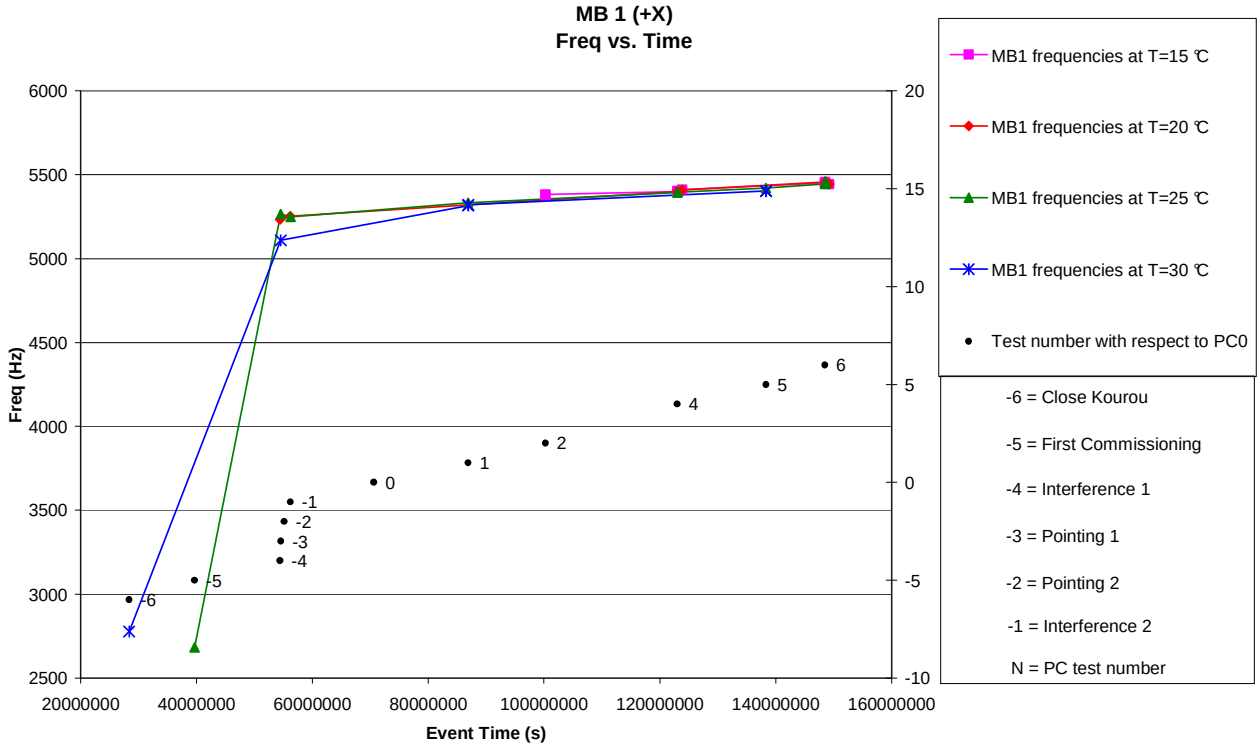


Figure 11.3-7. MBS 1 differently scaled Frequency vs. Time at fixed Temperatures

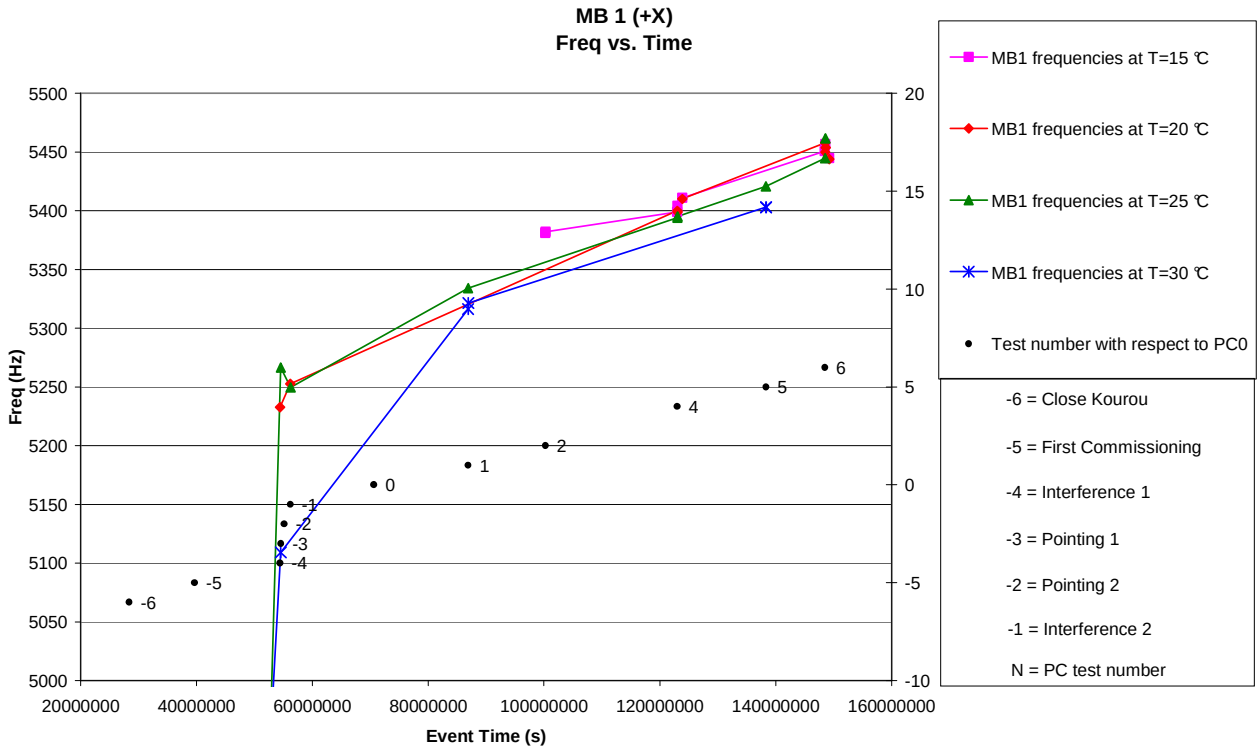


Figure 11.3-8. MBS 2 Frequency vs. Time at fixed Temperatures

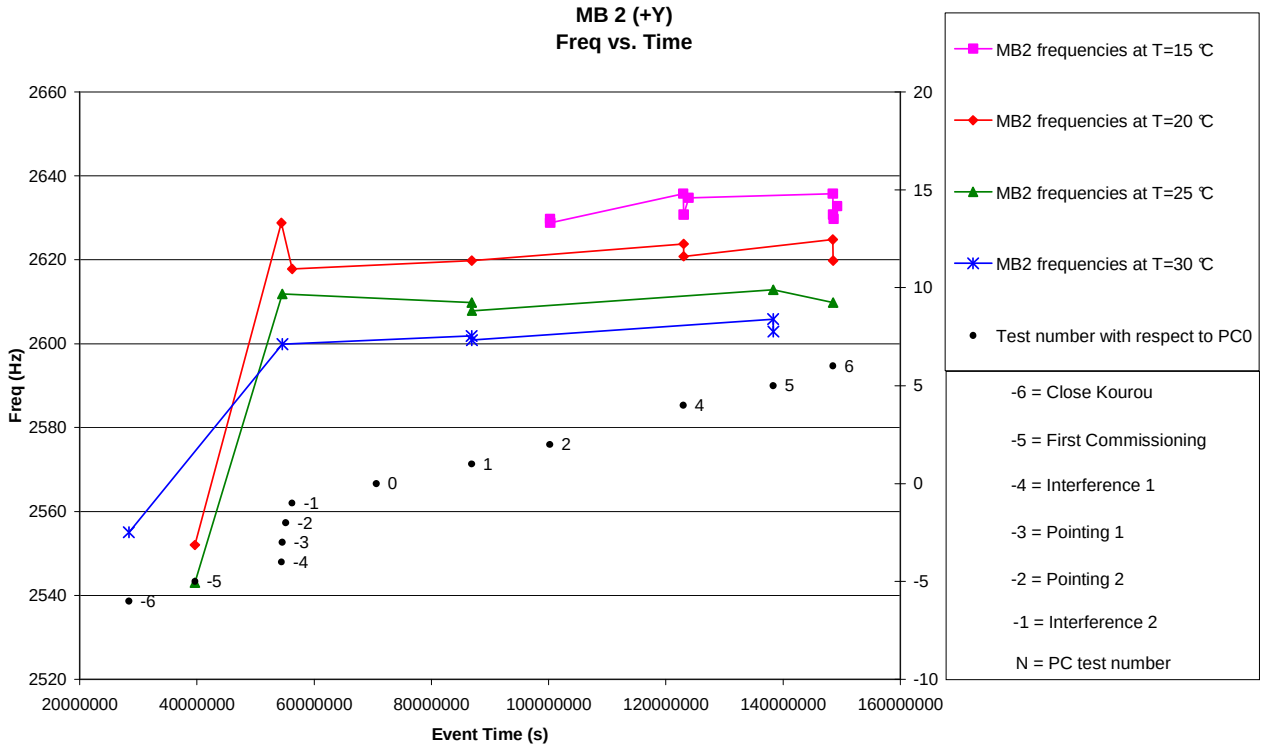


Figure 11.3-9. MBS 3 Frequency vs. Time at fixed Temperatures

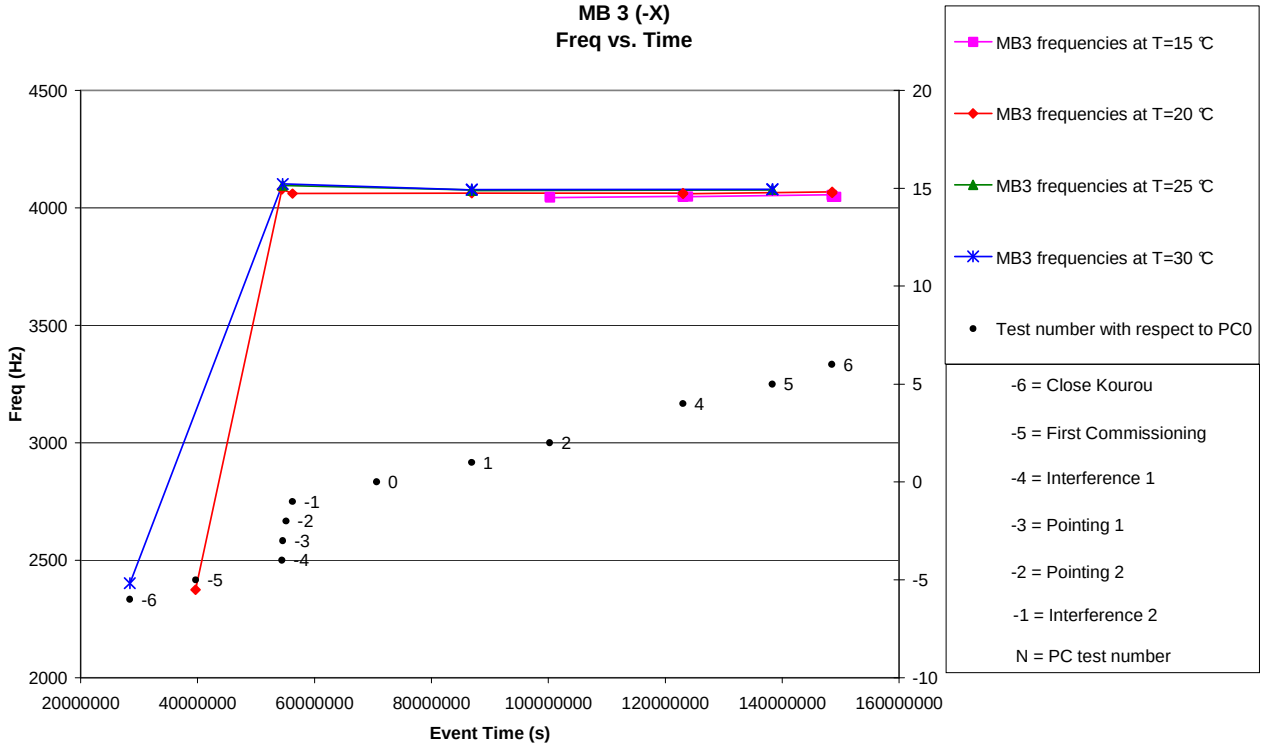


Figure 11.3-10. MBS 4 Frequency vs. Time at fixed Temperatures

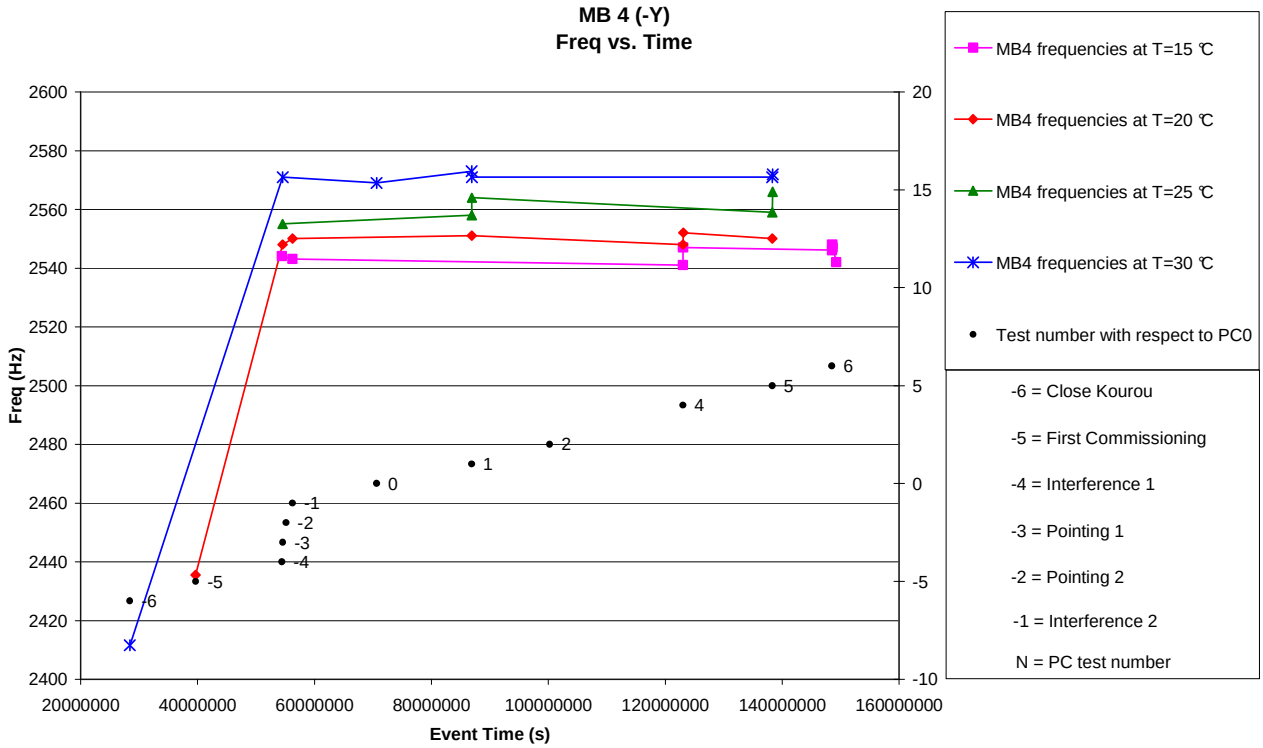


Figure 11.3-11. MBS 5 Frequency vs. Time at fixed Temperatures

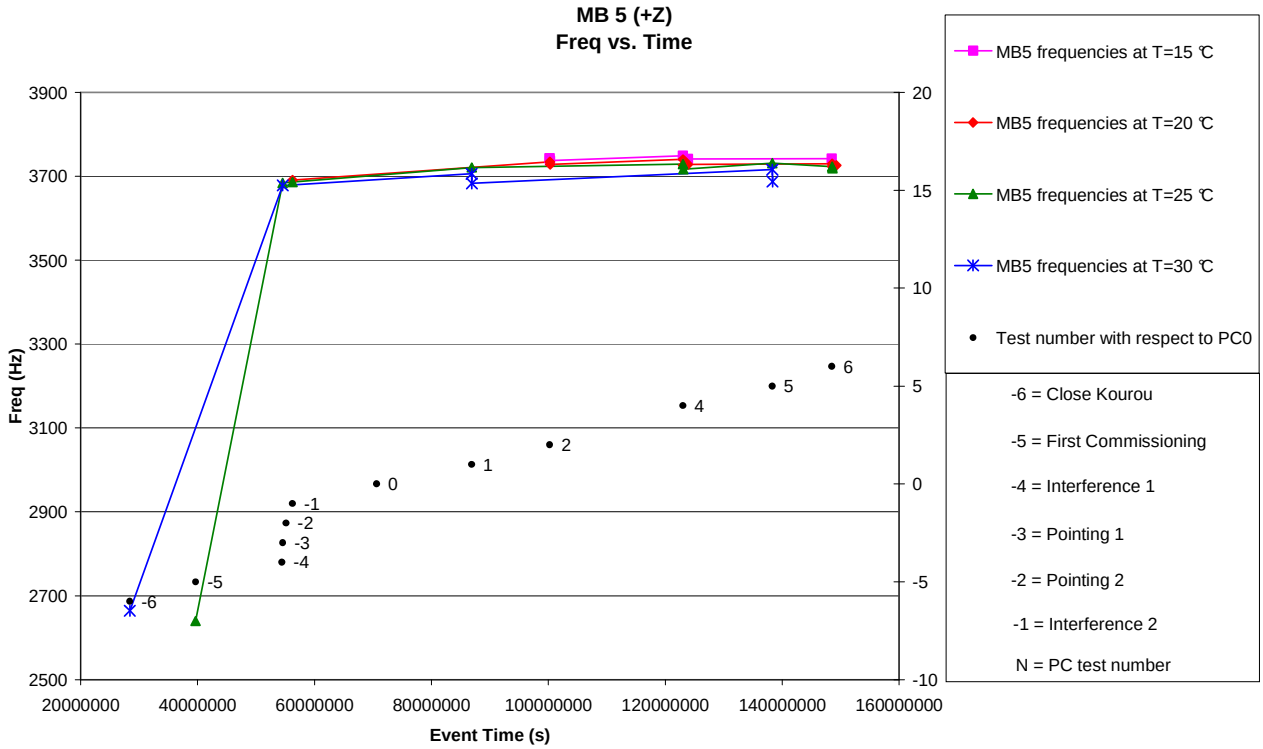
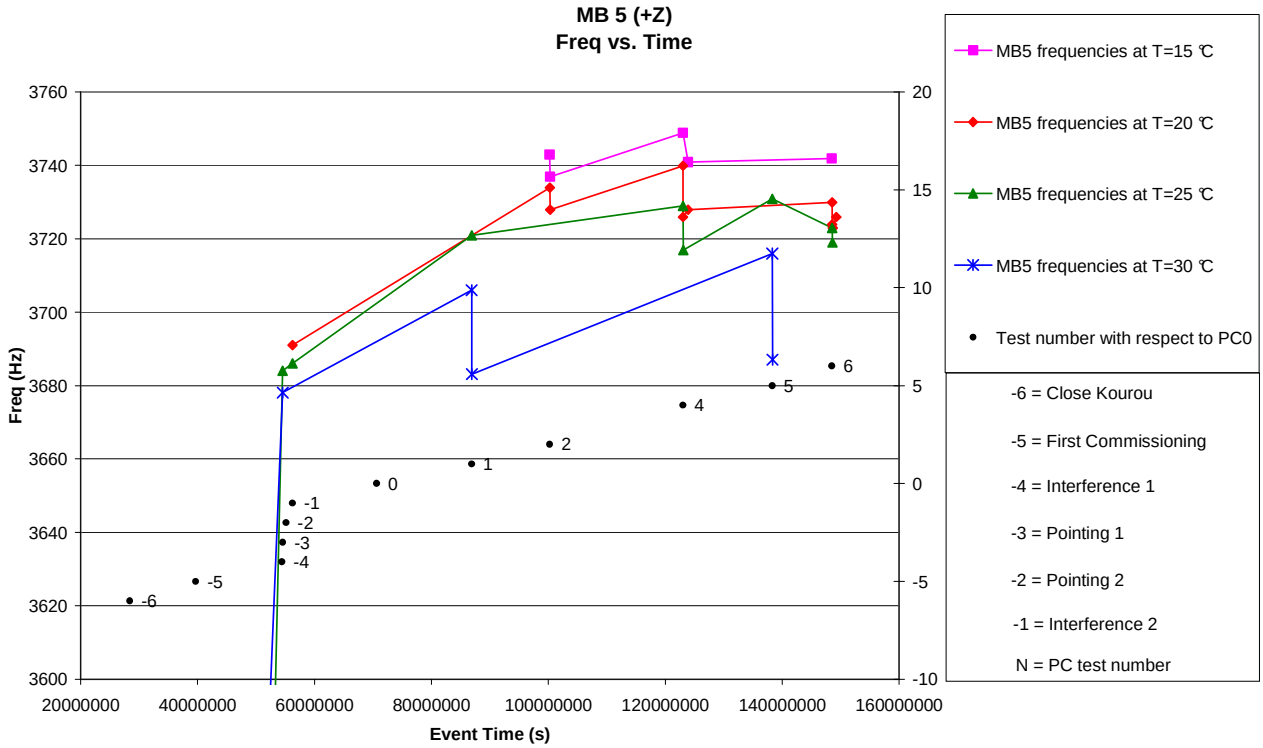


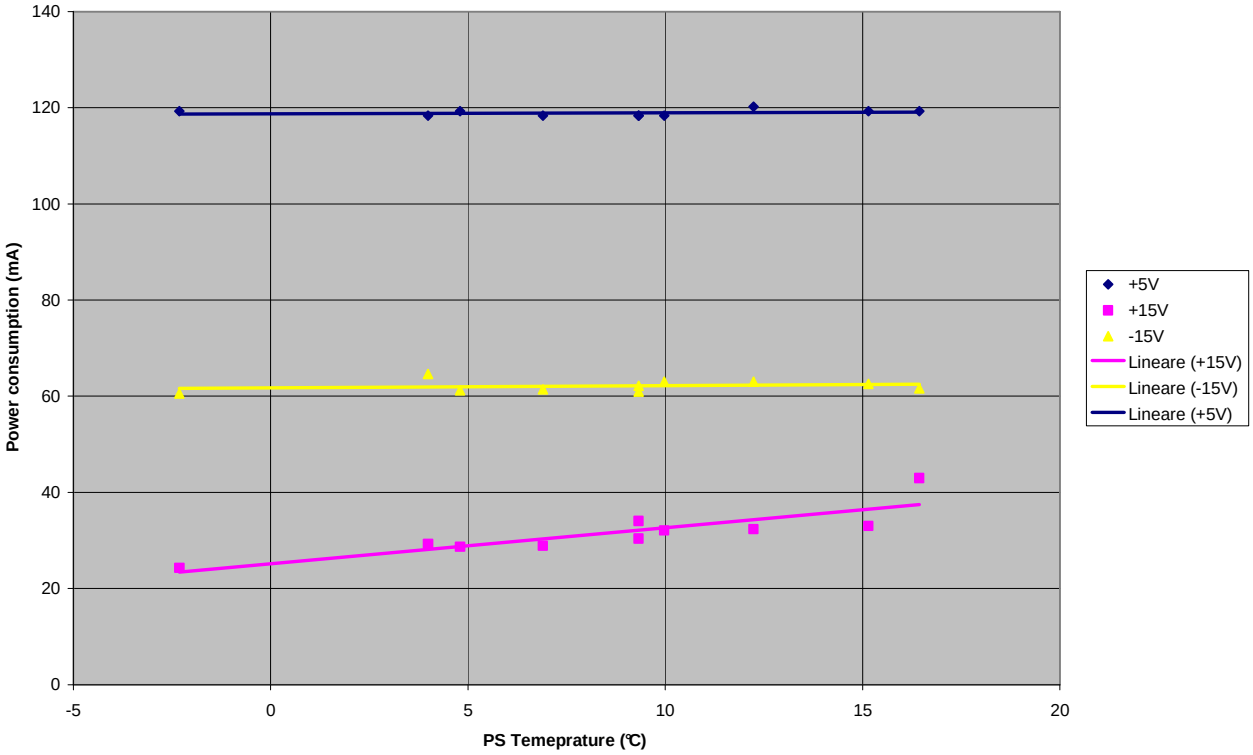
Figure 11.3-12. MBS 5 differently scaled Frequency vs. Time at fixed Temperatures



11.4 POWER SUPPLY (PS)

11.4.1 Power consumption vs. PS Temperature

Figure 11.4-1. Power consumption vs. PS Temp in Safe mode



12. SUN ANGLE VARIATION

12.1 SUN ANGLE WITH S/C +X AXIS VS. TIME

Figure 12.1-1. Sun Angle with S/C +X axis during PC6 - GD01 on Main I/F

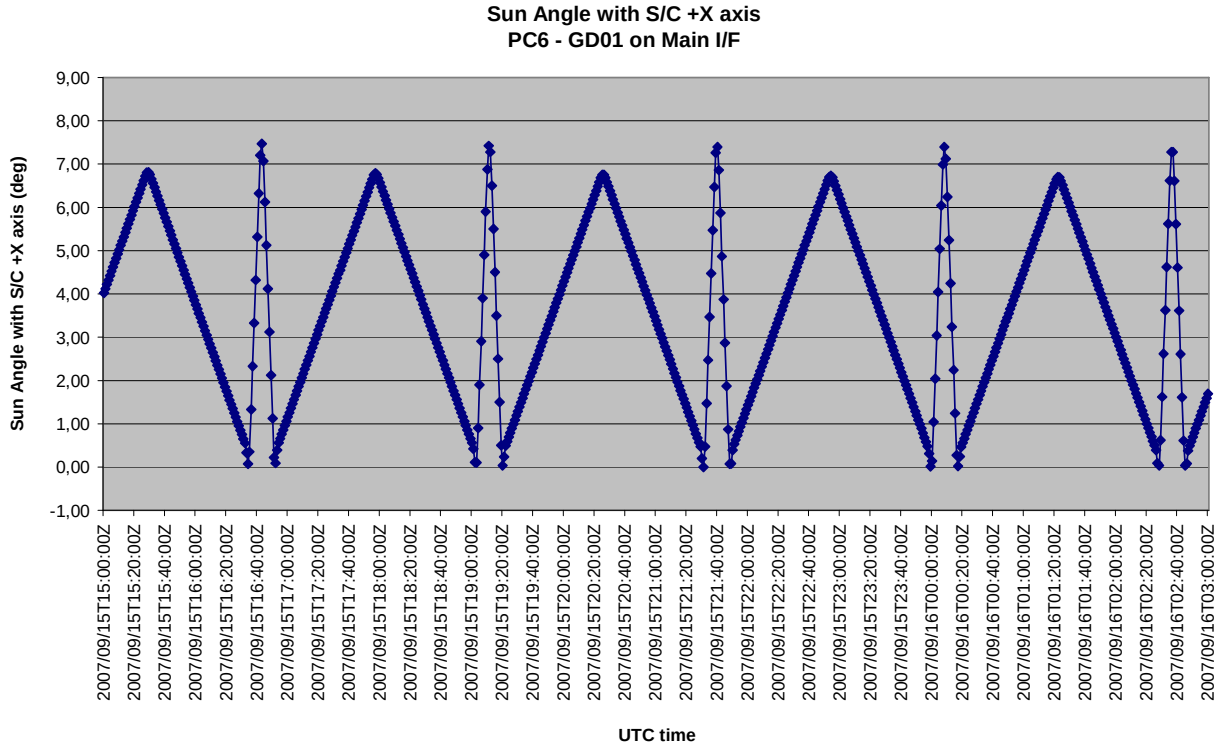


Figure 12.1-2. Sun Angle with S/C +X axis during PC6 - GD01 on Red I/F

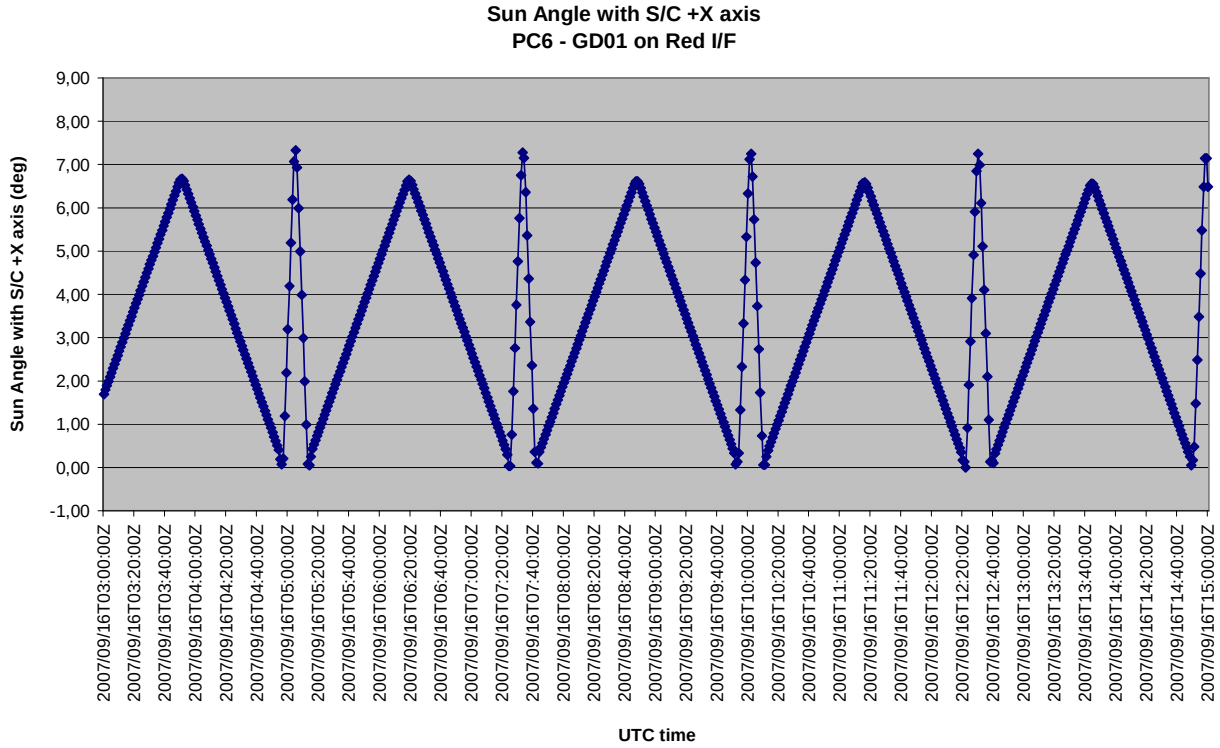


Figure 12.1-3. Sun Angle with S/C +X axis during PC6 - GD02

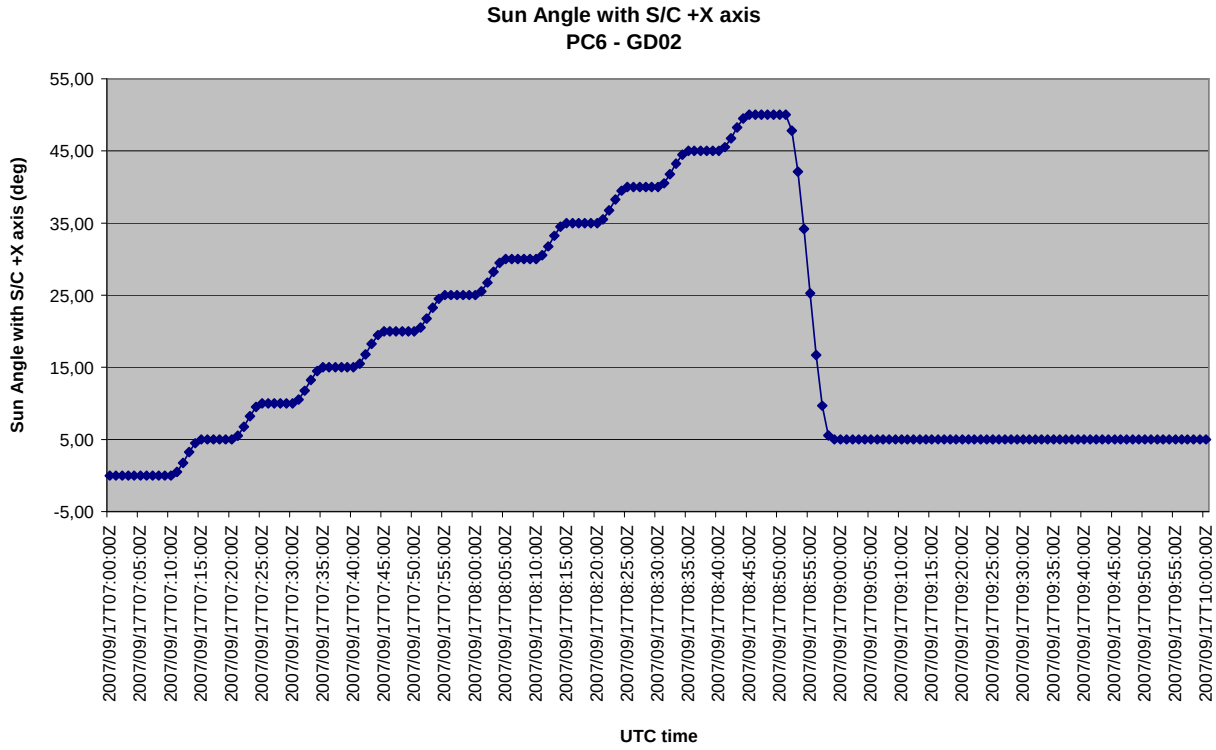
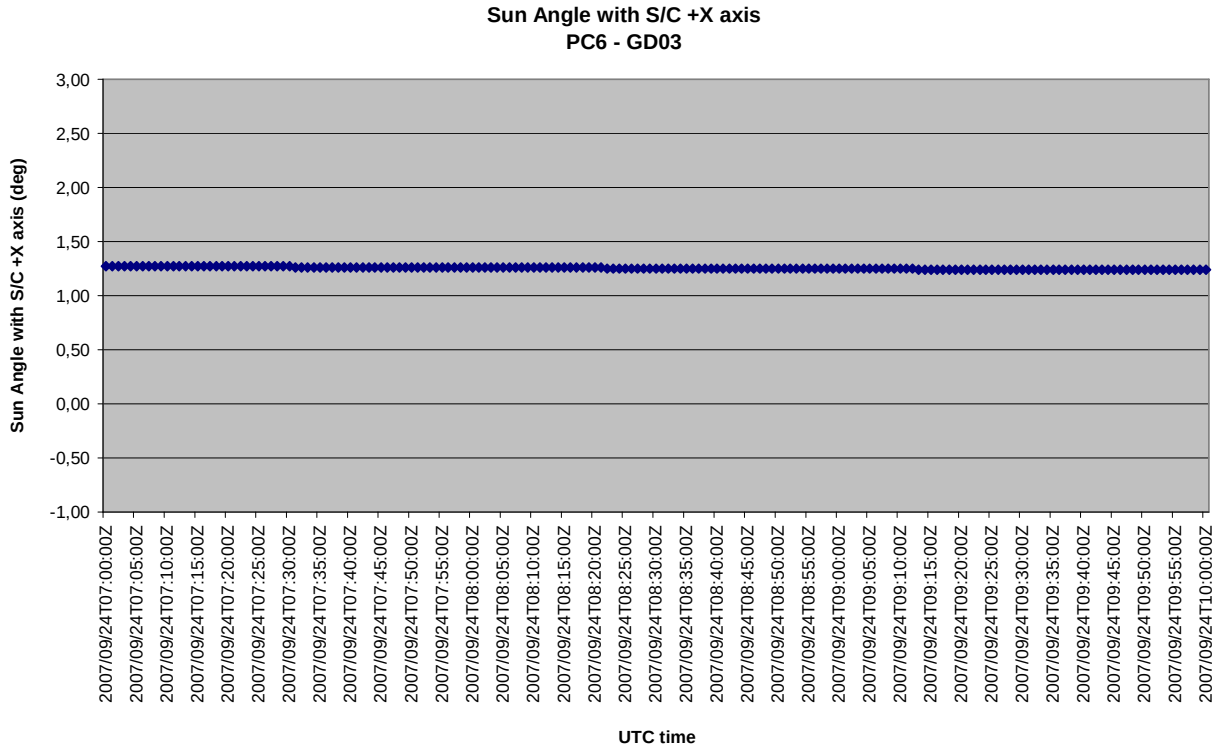


Figure 12.1-4. Sun Angle with S/C +X axis during PC6 - GD03



13. TIMELINES FOR GIADA PC6

13.1 TIMELINE FOR MAIN INTERFACE (GD01)

```
# $Log: OIOR_PIHRSO_D_0009_GD_PCA___.ROS,v $
#
# Revision 1.8  2006/10/07 11:22:23  GIADA
# timing changed after results of PC2; sequences updated after PC1 have internal timing
# slightly different wrt previous sequences and requires this correction in the timeline
# for future PCn. Also IS and GDS thresholds have been modified.
#
# Revision 1.7  2006/09/05 11:22:23  vdhiri
# Updated to have relative timing. Note No Generic Switch ON/OFF used. Use in PC4/Passive PCn.
#
# Revision 1.6  2006/07/13 09:03:58  vdhiri
# Updated for PC3. And use of top level itl that was necessary for use of PORG.
#
# Revision 1.5  2006/01/24 18:51:20  kwirth
# Final GD OIOR for PC2.
# Original filename: OIOR_PIHRSO_D_0000_GD_PCA3__00013.ROS.
#
# Version  1.3  2005/12/12 giada MAIN for PCn
# Passive Checkout OIOR for GD after sequences update
# RSOC Assumption MSP I1
#
#=============================================================================#
# Filename:       OIOR_PIHRSO_D_0009_GD_PCA___00021.ROS
# Type:     Input Timeline file
#
# Description:    Passive Check-Out GD for Active PC6
#
#
# Author:   PP
#
#           GIADA
#
# Date:           19 December 2005
#
#
```

```
# Proposed by GIADA team
# 19 December 2005
#
# (c) ESA/Estec
#
#-------------------------------------------------------------------------------#
#===============================================================================#

# EPS required, but RSOC will use CVS version
Version: 00001

Ref_date: 15-Sep-2007
Start_time: 000_00:00:00
End_time: 002_00:00:00

#===============================================================================#
# Description: "1. | Switch on and test - main I/F"
#===============================================================================#

+000_00:00:00     GIADA   OFF AGDS001A ( \
                                  VGD0001B = "nom. branch" [ENG] \ # GIADA on Main IF
                                  VGD0001A = "YES" [ENG]) # Context exists

+000_00:03:00     GIADA SAFE  AGDS002A # Patch CT v.flight 1

+000_00:08:00     GIADA SAFE  AGDS003A # Patch SW v.2.3

+000_00:24:00     GIADA SAFE  AGDS035A # Go to Cover Mode

+000_00:26:00     GIADA COVER AGDF090A # Open cover

+000_00:36:00     GIADA COVER AGDS065A # Go to Safe mode

+000_00:37:00     GIADA SAFE  AGDS110A # Go to Normal mode

Description: "GIADA operative in normal mode"

+000_00:39:00     GIADA NORMAL      AGDS038A( \
                                        VGDS038A = 35 \
                                        VGDS038B = 26 )   # Set GDS L and R thresholds
```

```
+000_00:39:30     GIADA NORMAL      AGDS037A(\
                                              VGDS037A = Off [ENG])   # Set IS On/Off

+000_00:40:00     GIADA NORMAL      AGDS036A ( \
                                        VGDS0031 = 0x05 \
                                        VGDS0032 = 0x05 \
                                        VGDS0033 = 0x0f \
                                        VGDS0034 = 0x05 \
                                        VGDS0035 = 0x14 \
                                        VGDS0018 = Enabled [ENG] \
                                        VGDS0019 = Enabled [ENG] \
                                        VGDS0020 = Enabled [ENG] \
                                        VGDS0021 = Enabled [ENG] \
                                        VGDS0022 = Enabled [ENG] \
                                        VGDS0023 = Low [ENG] \
                                        VGDS0025 = High [ENG] \
                                        VGDS0026 = High [ENG] \
                                        VGDS0027 = High [ENG] \
                                        VGDS0028 = High [ENG] \
                                        VGDS0029 = High [ENG])  # Set IS status and thresholds

+000_00:40:30     GIADA NORMAL      AGDS037A(\
                                              VGDS037A = On [ENG])    # Set IS On/Off

+000_00:45:00     GIADA NORMAL      AGDS120A ( \
                                        VGDS0010 = 0xF8 \
                                        VGDS0011 = 0x04 \ # Calibrate IS, GDS, MBS
                                        REPEAT = 105 \
                                        SEPARATION = 00:05:00 )

Description: "change GIADA setting and check effects"

+000_09:30:00     GIADA NORMAL      AGDF100A # Self-interference test

+000_10:30:00     GIADA NORMAL      AGDF055A # MBS heating

#============================================================================================#
# Description: "2. | Shut down"
#============================================================================================#
```

```
+000_11:30:00     GIADA NORMAL      AGDF060A # go to safe mode & off

#=======================================END=========================================#
```

13.2 TIMELINE FOR REDUNDANT INTERFACE (GD01)

```
# $Log: OIOR_PIHRSO_D_0009_GD_PCB___.ROS,v $
#
# Revision 1.8  2006/10/07 11:22:23  GIADA
# timing changed after results of PC2; sequences updated after PC1 have internal timing
# slightly different wrt previous sequences and requires this correction in the timeline
# for future PCn. Also IS and GDS thresholds have been modified.
#
# Revision 1.7  2006/09/05 11:22:23  vdhiri
# Updated to have relative timing. Note No Generic Switch ON/OFF used. Use in PC4/Passive PCn.
#
# Revision 1.6  2006/07/13 09:03:58  vdhiri
# Updated for PC3. And use of top level itl that was necessary for use of PORG.
#
# Revision 1.5  2006/01/24 18:51:46  kwirth
# Final GD OIOR for PC2.
# Original filename: OIOR_PIHRSO_D_0000_GD_PCB3__00014.ROS.
#
# Version  1.3  2005/12/12 giada REDUNDANT for PCn
# Passive Checkout OIOR for GD after sequences update
# RSOC Assumption MSP I1
#
#=============================================================================#
# Filename:       OIOR_PIHRSO_D_0009_GD_PCB___00022.ROS
# Type:     Input Timeline file
#
# Description:    Passive Check-Out GD for Active PC6
#
#
# Author:   PP
#
#           GIADA
#
# Date:           19 December 2005
#
#
# Proposed by GIADA team
# 19 December 2005
#
```

```
# (c) ESA/Estec
#-------------------------------------------------------------------------------#
#===============================================================================#

# EPS required, but RSOC will use CVS version
Version: 00001

Ref_date: 15-Sep-2007
Start_time: 000_00:00:00
End_time: 002_00:00:00

#===============================================================================#
# Description: "1. | Switch on and test - redundant I/F"
#===============================================================================#

+000_12:00:00     GIADA   OFF AGDS001A ( \
                                        VGD0001B = "red. branch" [ENG] \ # GIADA on Red IF
                                        VGD0001A = "YES" [ENG]) # Context exists

+000_12:03:00     GIADA SAFE  AGDS002A # Patch CT v.flight 1

+000_12:08:00     GIADA SAFE  AGDS003A # Patch SW v.2.3

+000_12:24:00     GIADA SAFE  AGDS035A # Go to Cover Mode

+000_12:26:00     GIADA COVER AGDF090A # Open cover

+000_12:36:00     GIADA COVER AGDS065A # Go to Safe mode

+000_12:37:00     GIADA SAFE  AGDS110A # Go to Normal mode

Description: "GIADA operative in normal mode"

+000_12:39:00     GIADA NORMAL      AGDS038A( \
                                              VGDS038A = 35 \
                                              VGDS038B = 26 )   # Set GDS L and R thresholds

+000_12:39:30     GIADA NORMAL      AGDS037A(\
                                              VGDS037A = Off [ENG])   # Set IS On/Off
```

```
+000_12:40:00     GIADA NORMAL      AGDS036A ( \
                                          VGDS0031 = 0x05 \
                                          VGDS0032 = 0x05 \
                                          VGDS0033 = 0x0f \
                                          VGDS0034 = 0x05 \
                                          VGDS0035 = 0x14 \
                                          VGDS0018 = Enabled [ENG] \
                                          VGDS0019 = Enabled [ENG] \
                                          VGDS0020 = Enabled [ENG] \
                                          VGDS0021 = Enabled [ENG] \
                                          VGDS0022 = Enabled [ENG] \
                                          VGDS0023 = Low [ENG] \
                                          VGDS0025 = High [ENG] \
                                          VGDS0026 = High [ENG] \
                                          VGDS0027 = High [ENG] \
                                          VGDS0028 = High [ENG] \
                                          VGDS0029 = High [ENG])  # Set IS status and thresholds

+000_12:40:30     GIADA NORMAL      AGDS037A(\
                                                VGDS037A = On [ENG])    # Set IS On/Off

+000_12:45:00     GIADA NORMAL      AGDS120A ( \
                                          VGDS0010 = 0xF8 \
                                          VGDS0011 = 0x04 \ # Calibrate IS, GDS, MBS
                                          REPEAT = 105 \
                                          SEPARATION = 00:05:00 )

Description: "change GIADA setting and check effects"

+000_21:30:00     GIADA NORMAL      AGDF100A # Self-interference test

+000_22:30:00     GIADA NORMAL      AGDF055A # MBS heating

#============================================================================#
# Description: "2. | Shut down"
#============================================================================#

+000_23:30:00     GIADA NORMAL      AGDF060A # go to safe mode & off

#=====================================END=====================================#
```

13.3 TIMELINE FOR MAIN INTERFACE (GD02)

```
# $Log: OIOR_PIHRSO_D_0009_GD_02____.ITL,v $
#
# Revision 1.6  2007/06/11 17:38:00  GIADA
# Modified to shorten total duration to < 3 h
#
# Revision 1.5  2006/10/17 09:40:21  rlaureij
# Modified according to GIADA delivery to ORFA, original filename:
# OIOR_PIHRSO_D_0006_GD_PC42__00017.ROS.
#
# Revision 1.4  2006/10/07 11:22:23  GIADA
# timing changed after results of PC2; sequences updated after PC1 have internal timing
# slightly different wrt previous sequences and requires this correction in the timeline
# for future PCn. Also IS and GDS thresholds have been modified.
#
# Revision 1.3  2006/09/26 15:09:40  vdhiri
# RSOC: Added parameter vallues to be able to run in scenario.
#
# Revision 1.2  2006/08/25 12:44:53  rlaureij
# ITLs made consistent in names and times by RSOC
#
# Revision 1.1  2006/08/24 11:45:05  rlaureij
# GD modified name by RSOC
#
#=============================================================================#
# Filename:     OIOR_PIHRSO_D_0006_GD_02____00023.ROS
# Type:     Input Timeline file
#
# Description:    Active Check-Out GD PC6
#
#
# Author:   PP
#
#           GIADA
#
# Date:           11 June 2007
#
#
# Proposed by GIADA team
```

```
# 28 July 2006
#
# (c) ESA/Estec
#
#-------------------------------------------------------------------------------#
#===============================================================================#

# EPS required, but RSOC will use CVS version
Version: 00002

Ref_date: 17-Sep-2007
Start_time: 000_00:00:00
End_time: 000_12:00:00

# Angle between sun direction and Z-axis > 90 deg

#===============================================================================#
# Description: "5. | Switch on and test setting TC on main I/F" GD02
#===============================================================================#

000_00:00:00      GIADA   OFF AGDS001A ( \
                                VGD0001B = "nom. branch" [ENG] \ # GIADA on Main IF
                                VGD0001A = "YES" [ENG]) # Context exists

000_00:03:00      GIADA SAFE  AGDS002A # Patch CT v.flight 1

000_00:08:00      GIADA SAFE  AGDS003A # Patch SW v.2.3

000_00:24:00      GIADA SAFE  AGDS035A # Go to Cover Mode

000_00:26:00      GIADA COVER AGDF090A # Open cover

000_00:36:00      GIADA COVER AGDS065A # Go to Safe mode

#===============================================================================#
# Description: "6. | GD Patch CT in RAM" GD02
#===============================================================================#

000_00:37:00    GIADA   SAFE    AGDS004A ( \ # GD Patch CT in RAM
                                          VGDX0001 = 0x0000 \  # CF spare 1
```

```
VGDX0002 = 0x1E00 \  # CF CovFra heat on time
VGDX0003 = 0x0000 \  # CF CovMot heat on time
VGDX0004 = 0xA105 \  # CF FB safety temp
VGDX0005 = 0xA105 \  # CF FB test temp
VGDX0006 = 0x1E00 \  # CF FB test timeout 1
VGDX0007 = 0x0000 \  # CF FB test timeout 2
VGDX0008 = 0x6406 \  # CF FB working temp
VGDX0009 = 0x5802 \  # CF FB op timeout 1
VGDX0010 = 0x0000 \  # CF FB op timeout 2
VGDX0011 = 0x3200 \  # CF velocity
VGDX0012 = 0xAB00 \  # CF steps to open
VGDX0013 = 0xAB00 \  # CF steps to close
VGDX0014 = 0x7800 \  # CF opening timeout 1
VGDX0015 = 0x0000 \  # CF opening timeout 2
VGDX0016 = 0x7800 \  # CF closing timeout 1
VGDX0017 = 0x0000 \  # CF closing timeout 2
VGDX0018 = 0x03AF \  # CF GDS status
VGDX0019 = 0x1416 \  # CF GDS thresholds
VGDX0020 = 0xAFF5 \  # CF laser max temp
VGDX0021 = 0xDDFD \  # CF laser min temp
VGDX0022 = 0x0000 \  # CF spare 2
VGDX0023 = 0x0000 \  # CF spare 3
VGDX0024 = 0x100E \  # CF GDS time bet cal 1
VGDX0025 = 0x0000 \  # CF GDS time bet cal 2
VGDX0026 = 0x0F9F \  # CF IS status
VGDX0027 = 0xB81A \  # CF IS maxop temp
VGDX0028 = 0x0000 \  # CF spare 4
VGDX0029 = 0x3500 \  # CF IS hyst temp
VGDX0030 = 0x0500 \  # CF IS thresholds 1
VGDX0031 = 0x0505 \  # CF IS thresholds 2
VGDX0032 = 0x0505 \  # CF IS thresholds 3
VGDX0033 = 0x100E \  # CF IS time bet cal 1
VGDX0034 = 0x0000 \  # CF IS time bet cal 2
VGDX0035 = 0x04F8 \  # CF IS cal config
VGDX0036 = 0x009F \  # CF MBS status
VGDX0037 = 0x4B0A \  # CF MBS max temp
VGDX0038 = 0x00F8 \  # CF MBS temp checking
VGDX0039 = 0x2C01 \  # CF MBS time interval 1
VGDX0040 = 0x0000 \  # CF MBS time interval 2
VGDX0041 = 0xF309 \  # CF MBS max heat temp
```

```
                                        VGDX0042 = 0x6801 \  # CF heating timeout 1
                                        VGDX0043 = 0x0000 \  # CF heating timeout 2
                                        VGDX0044 = 0x100E \  # CF MBS time bet cal 1
                                        VGDX0045 = 0x0000 \  # CF MBS time bet cal 2
                                        VGDX0046 = 0x6D1A \  # CF IS maxnonop temp
                                        VGDX0047 = 0xCE1D \  # CF IS min temp
                                        VGDX0048 = 0xC719 \  # CF ME maxop temp
                                        VGDX0049 = 0x0000 \  # CF spare 5
                                        VGDX0050 = 0x0000 \  # CF spare 6
                                        VGDX0051 = 0x0000 \  # CF spare 7
                                        VGDX0052 = 0x0000 \  # CF spare 8
                                        VGDX0053 = 0x3C00 \  # CF timeout sci pkt 1
                                        VGDX0054 = 0x0000 \  # CF timeout sci pkt 2
                                        VGDX0055 = 0x0A00 \  # CF time HK pkt 1
                                        VGDX0056 = 0x0000 \  # CF time HK pkt 2
                                        VGDX0057 = 0x2800 \  # CF arm TC timeout 1
                                        VGDX0058 = 0x0000 \  # CF arm TC timeout 2
                                        VGDX0059 = 0x0000 \  # CF patches status 1
                                        VGDX0060 = 0x0000 \  # CF patches status 2
                                        VGDX0061 = 0x0000 \  # CF patches status 3
                                        VGDX0062 = 0x0000 \  # CF patches status 4
                                        VGDX0063 = 0x2800 \  # CF max GDS events sec
                                        VGDX0064 = 0x2800 \  # CF max IS events sec
                                        VGDX0065 = 0x0000 \  # CF PAD 1
                                        VGDX0066 = 0x0000 \  # CF PAD 2
                                        VGDX0067 = 0x0000 \  # CF PAD 3
                                        VGDX0068 = 0x0000 \  # CF PAD 4
                                        VGDX0069 = 0xDFC6  ) # CF CRC

000_00:40:00      GIADA SAFE  AGDS006A ( \ # GD Patch CT in NVRAM
                                        VGDX0001 = 0x0000 \  # CF spare 1
                                        VGDX0002 = 0x1E00 \  # CF CovFra heat on time
                                        VGDX0003 = 0x0000 \  # CF CovMot heat on time
                                        VGDX0004 = 0xA105 \  # CF FB safety temp
                                        VGDX0005 = 0xA105 \  # CF FB test temp
                                        VGDX0006 = 0x1E00 \  # CF FB test timeout 1
                                        VGDX0007 = 0x0000 \  # CF FB test timeout 2
                                        VGDX0008 = 0x6406 \  # CF FB working temp
                                        VGDX0009 = 0x5802 \  # CF FB op timeout 1
                                        VGDX0010 = 0x0000 \  # CF FB op timeout 2
```

```
VGDX0011 = 0x3200 \  # CF velocity
VGDX0012 = 0xAB00 \  # CF steps to open
VGDX0013 = 0xAB00 \  # CF steps to close
VGDX0014 = 0x7800 \  # CF opening timeout 1
VGDX0015 = 0x0000 \  # CF opening timeout 2
VGDX0016 = 0x7800 \  # CF closing timeout 1
VGDX0017 = 0x0000 \  # CF closing timeout 2
VGDX0018 = 0x03AF \  # CF GDS status
VGDX0019 = 0x1416 \  # CF GDS thresholds
VGDX0020 = 0xAFF5 \  # CF laser max temp
VGDX0021 = 0xDDFD \  # CF laser min temp
VGDX0022 = 0x0000 \  # CF spare 2
VGDX0023 = 0x0000 \  # CF spare 3
VGDX0024 = 0x100E \  # CF GDS time bet cal 1
VGDX0025 = 0x0000 \  # CF GDS time bet cal 2
VGDX0026 = 0x0F9F \  # CF IS status
VGDX0027 = 0xB81A \  # CF IS maxop temp
VGDX0028 = 0x0000 \  # CF spare 4
VGDX0029 = 0x3500 \  # CF IS hyst temp
VGDX0030 = 0x0500 \  # CF IS thresholds 1
VGDX0031 = 0x0505 \  # CF IS thresholds 2
VGDX0032 = 0x0505 \  # CF IS thresholds 3
VGDX0033 = 0x100E \  # CF IS time bet cal 1
VGDX0034 = 0x0000 \  # CF IS time bet cal 2
VGDX0035 = 0x04F8 \  # CF IS cal config
VGDX0036 = 0x009F \  # CF MBS status
VGDX0037 = 0x4B0A \  # CF MBS max temp
VGDX0038 = 0x00F8 \  # CF MBS temp checking
VGDX0039 = 0x2C01 \  # CF MBS time interval 1
VGDX0040 = 0x0000 \  # CF MBS time interval 2
VGDX0041 = 0xF309 \  # CF MBS max heat temp
VGDX0042 = 0x6801 \  # CF heating timeout 1
VGDX0043 = 0x0000 \  # CF heating timeout 2
VGDX0044 = 0x100E \  # CF MBS time bet cal 1
VGDX0045 = 0x0000 \  # CF MBS time bet cal 2
VGDX0046 = 0x6D1A \  # CF IS maxnonop temp
VGDX0047 = 0xCE1D \  # CF IS min temp
VGDX0048 = 0xC719 \  # CF ME maxop temp
VGDX0049 = 0x0000 \  # CF spare 5
VGDX0050 = 0x0000 \  # CF spare 6
```

```
                                        VGDX0051 = 0x0000 \  # CF spare 7
                                        VGDX0052 = 0x0000 \  # CF spare 8
                                        VGDX0053 = 0x3C00 \  # CF timeout sci pkt 1
                                        VGDX0054 = 0x0000 \  # CF timeout sci pkt 2
                                        VGDX0055 = 0x0A00 \  # CF time HK pkt 1
                                        VGDX0056 = 0x0000 \  # CF time HK pkt 2
                                        VGDX0057 = 0x2800 \  # CF arm TC timeout 1
                                        VGDX0058 = 0x0000 \  # CF arm TC timeout 2
                                        VGDX0059 = 0x0000 \  # CF patches status 1
                                        VGDX0060 = 0x0000 \  # CF patches status 2
                                        VGDX0061 = 0x0000 \  # CF patches status 3
                                        VGDX0062 = 0x0000 \  # CF patches status 4
                                        VGDX0063 = 0x2800 \  # CF max GDS events sec
                                        VGDX0064 = 0x2800 \  # CF max IS events sec
                                        VGDX0065 = 0x0000 \  # CF PAD 1
                                        VGDX0066 = 0x0000 \  # CF PAD 2
                                        VGDX0067 = 0x0000 \  # CF PAD 3
                                        VGDX0068 = 0x0000 \  # CF PAD 4
                                        VGDX0069 = 0xDFC6  ) # CF CRC

000_00:43:00      GIADA SAFE  AGDS110A # Go to Normal mode

Description: "GIADA operative in normal mode"

+000_00:45:00     GIADA NORMAL      AGDS038A( \
                                            VGDS038A = 35 \
                                            VGDS038B = 26 )   # Set GDS L and R thresholds

+000_00:45:30     GIADA NORMAL      AGDS037A(\
                                            VGDS037A = Off [ENG])   # Set IS On/Off

+000_00:46:00     GIADA NORMAL      AGDS036A ( \
                                      VGDS0031 = 0x05 \
                                      VGDS0032 = 0x05 \
                                      VGDS0033 = 0x0f \
                                      VGDS0034 = 0x05 \
                                      VGDS0035 = 0x14 \
                                      VGDS0018 = Enabled [ENG] \
                                      VGDS0019 = Enabled [ENG] \
                                      VGDS0020 = Enabled [ENG] \
```

```
                                    VGDS0021 = Enabled [ENG] \
                                    VGDS0022 = Enabled [ENG] \
                                    VGDS0023 = Low [ENG] \
                                    VGDS0025 = High [ENG] \
                                    VGDS0026 = High [ENG] \
                                    VGDS0027 = High [ENG] \
                                    VGDS0028 = High [ENG] \
                                    VGDS0029 = High [ENG])  # Set IS status and thresholds

+000_00:46:30     GIADA NORMAL      AGDS037A(\
                                            VGDS037A = On [ENG])    # Set IS On/Off

000_00:50:00      GIADA NORMAL      AGDS120A ( \
                                    VGDS0010 = 0xF8 \
                                    VGDS0011 = 0x04 \ # Calibrate IS, GDS, MBS
                                    REPEAT = 8 \
                                    SEPARATION = 00:05:00 )

000_01:30:00      GIADA NORMAL      AGDF100A # Self-interference test


#============================================================================#
# Description: "5. | Shut down" GD02
#============================================================================#

000_02:30:00      GIADA NORMAL      AGDF060A # go to safe mode & off

#============================================================================#
```

13.4 TIMELINE FOR MAIN INTERFACE (GD03)

```
# $Log: OIOR_PIHRSO_D_0009_GD_03____.ITL,v $
#
# Revision 1.5  2007/06/11 17:38:00  GIADA
# Modified to shorten total duration to < 3 h
#
# Revision 1.4  2006/10/17 09:43:07  rlaureij
# Modified according to GIADA delivery to ORFA, original filename:
# OIOR_PIHRSO_D_0006_GD_PC43__00018.ROS
# Increased the version to 00002
#
# Revision 1.3  2006/10/07 11:22:23  GIADA
# timing changed after results of PC2; sequences updated after PC1 have internal timing
# slightly different wrt previous sequences and requires this correction in the timeline
# for future PCn. Also IS and GDS thresholds have been modified.
#
# Revision 1.2  2006/08/25 12:44:53  rlaureij
# ITLs made consistent in names and times by RSOC
#
# Revision 1.1  2006/08/24 11:45:05  rlaureij
# GD modified name by RSOC
#
# Revision 1.1  2006/08/02 15:02:28  vdhiri
# Preliminary Inputs modified by RSOC to fit planning philosophy
#
#=============================================================================#
# Filename:     OIOR_PIHRSO_D_0009_GD_03____00024.ROS
# Type:     Input Timeline file
#
# Description:    Active Check-Out GD number 4
#
#
# Author:   PP
#
#           GIADA
#
# Date:           11 June 2007
#
#
```

```
# Proposed by GIADA team
# 28 July 2006
#
# (c) ESA/Estec
#
#-------------------------------------------------------------------------------------#
#=====================================================================================#

# EPS required, but RSOC will use CVS version
Version: 00002

Ref_date: 24-Sep-2007
Start_time: 000_00:00:00
End_time: 000_12:00:00

# Angle between sun direction and Z-axis > 90 deg

#=====================================================================================#
# Description: "6. | Switch on and test - main I/F" GD03 - optional !!
#=====================================================================================#

000_00:00:00      GIADA   OFF AGDS001A ( \
                                        VGD0001B = "nom. branch" [ENG] \ # GIADA on Main IF
                                        VGD0001A = "YES" [ENG]) # Context exists

000_00:08:00      GIADA SAFE  AGDS003A # Patch SW v.2.3

000_00:24:00      GIADA SAFE  AGDS035A # Go to Cover Mode

000_00:26:00      GIADA COVER AGDF090A # Open cover

000_00:36:00      GIADA COVER AGDS065A # Go to Safe mode

000_00:37:00      GIADA SAFE  AGDS110A # Go to Normal mode

Description: "GIADA operative in normal mode"

+000_00:39:00     GIADA NORMAL      AGDS038A( \
                                             VGDS038A = 35 \
                                             VGDS038B = 26 )   # Set GDS L and R thresholds
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+000_00:39:30     GIADA NORMAL      AGDS037A(\
                                              VGDS037A = Off [ENG])   # Set IS On/Off

+000_00:40:00     GIADA NORMAL      AGDS036A ( \
                                        VGDS0031 = 0x05 \
                                        VGDS0032 = 0x05 \
                                        VGDS0033 = 0x0f \
                                        VGDS0034 = 0x05 \
                                        VGDS0035 = 0x14 \
                                        VGDS0018 = Enabled [ENG] \
                                        VGDS0019 = Enabled [ENG] \
                                        VGDS0020 = Enabled [ENG] \
                                        VGDS0021 = Enabled [ENG] \
                                        VGDS0022 = Enabled [ENG] \
                                        VGDS0023 = Low [ENG] \
                                        VGDS0025 = High [ENG] \
                                        VGDS0026 = High [ENG] \
                                        VGDS0027 = High [ENG] \
                                        VGDS0028 = High [ENG] \
                                        VGDS0029 = High [ENG])  # Set IS status and thresholds

+000_00:40:30     GIADA NORMAL      AGDS037A(\
                                              VGDS037A = On [ENG])    # Set IS On/Off

+000_00:45:00     GIADA NORMAL      AGDS120A ( \
                                        VGDS0010 = 0xF8 \
                                        VGDS0011 = 0x04 \ # Calibrate IS, GDS, MBS
                                        REPEAT = 9 \
                                        SEPARATION = 00:05:00 )

000_01:30:00      GIADA NORMAL      AGDF100A # Self-interference test

#============================================================================#
# Description: "7. | Shut down" GD03
#============================================================================#

000_02:30:00      GIADA NORMAL      AGDF060A # go to safe mode & off

#==================================END=========================================#
```