GIADA FS MODEL

REPORT ON
IN FLIGHT PASSIVE PAYLOAD CHECKOUT N. 7 (PC7)
performed on
06/07-01-2008 and 17-01-2008

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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 Passive Payload Checkout n. 7 (PC7) test is one of the routine checkouts performed during Rosetta Cruise Phase. Payload Checkouts 0-3 and 5 were passive as well, while Payload Checkout 4 and 6 were active.

The PC7 was executed on 06-07 January 2008 by switching on Main and Redundant I/Fs in sequence and executing similar procedures for the two cases. Moreover a further timeline was prepared and performed on 17 January 2008 in order to solve a problem occurred on board during the test on Redundant I/F (see Section 4 for more information).

This document reports the results obtained on GIADA experiment during PC7.

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. 7 (PC7) was performed on 06-07 January 2008 according to the timelines reported in Section 11. The test (named GD01 in ESA documents) is the passive test routinely executed in every payload checkout. During the test on Redundant I/F, however, an emergency procedure was triggered due to a thermal contingency and GIADA was switched off but left with the Cover open. For this reason a "Recovery action" procedure (named Close Cover) was prepared by the GIADA team and executed on 17 January 2008 in order to check the status of all the subsystems and finally to close the Cover. 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, PC5 and PC6.

The plan of activities for PC7 foresaw the following steps for the Main Interface (for the values of parameters see timelines in Section 11.1):

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 11.2):

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

Sequence	**Timeline GD01 – Redundant Interface**
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 plans of activities referred to as “Close Cover” procedure is reported below (for the parameters values see timelines in Sections 11.3):

Sequence	**Timeline CLOSE COVER – 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
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
AGDF060A	GIADA Switch-off (with Cover close operation in the Power-off OBCP)

Settings of Thresholds and Parameters are 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 and 8 for GD01 test on the Main and Redundant I/F's respectively and in Section 9 for the "Close Cover" procedure.

Here following the main findings are summarised.

5.1 GENERAL CONSIDERATIONS

Test started on "Sun Jan 06 2008 16:35:15.824152", 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 "Mon Jan 07 2008 04:12:06.187290". Test on the Redundant interface started on "Mon Jan 07 2008 04:35:15.832076" (1st packet received) and ended on "Mon Jan 07 2008 16:12:06.257714" (last packet received).

The "Recovery action" procedure (named Close Cover) was performed on the Main I/F; it started on "Thu Jan 17 2008 22:01:16.2071" (1st packet received) and ended on "Thu Jan 17 2008 22:53:05.862016" (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 (Close Cover). 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 (Mon Jan 07 2008 02:49:01) and Red I/F (Mon Jan 07 2008 14:49:00), 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 FS UM [**AD 4**]).

Thermal conditions during PC7 were more severe than in previous tests due to the short Sun-Spacecraft distance (0.94 AU). This resulted in higher operating temperatures for GIADA that generated the following events during GD01 execution on Red I/F:

1. EID 42230 "MBS plate Temp too High" (Temp = 79.1829 °C) and above Max Temp, occurred on Mon Jan 07 2008 15:30:21.194755
2. EID 42032 "Emergency Close Cover OBCP", occurred on Mon Jan 07 2008 15:30:21.198661

Following reception of events 42230 and 42032, the S12 onboard monitoring triggered the recovery procedure Close Cover OBCP 8044; the Cover closure occurred nominally and the Cover Report was received on Mon Jan 07 2008 15:31:38.190863 (see Section 8.2.2). The event parameter indicates that the event was raised due to an OOL temperature on one of the MBs (MBS#3) during "heating". In turn, the OOL was caused because in the GIADA Context Table the "MBS Maximum working temperature" (80 °C) is set ONLY 5 degree above the "MBS Max Temperature During Heating" (75 °C). Despite the fact that the Heating was stopped, the MBS#3 reached anyway (due to thermal inertia) the Max working Temp and the OBCP was activated.

An anomalous behaviour, however, was observed: after the Emergency Close Cover OBCP execution, the timeline went on and the Power-OFF OBCP called a new Close Cover OBCP (Cover Report received on Mon Jan 07 2008 16:11:16.281143 – see Section 8.2.3), producing the Cover opening motion. **GIADA was basically left with the Cover open at the end of the passive check-out operation** due to the double "Close Cover" commanding: the first one linked to the Emergency Close Cover OBCP and the second one linked to the nominal timeline (compare Figure 8.2-2 and Figure 8.2-3). The reason why the Cover was left open is related to a known problem that was only discovered in space (on ground testing did not evidence it, probably due to the presence of gravity and the different momentum of inertia induced by the use of a counter-balance): when a "Close Cover" command is executed with the Cover already closed, it "bounces back" until full opening. This anomaly already happened during the Pointing 1 Scenario performed by GIADA on 23 Sep 2004 when the Cover remained in the open position after the instrument had received the second close Cover command (see the relevant document "GIA_GAL_RP_520", Section 5.1.1).

After the anomaly was recognised, a timeline was agreed with RMOC to close the Cover and it was run a few days after PC7 completion. GIADA was then placed in the nominal cruising configuration and switched off with the Cover closed. During the recovery activity, some checking was performed on the sensors. The only variation found is related to the +X MBS, whose frequency increased by about 300 Hz (see Figure 10.3-1, Figure 10.3-6 and Figure 10.3-7). This result could indicate some additional contamination that could be evidenced in the next payload check-out operations.

Concerning cover monitoring, it should be reminded that no parameter provides real time information about the successful closure of the Cover. Cover position can only be derived by the analysis of a specific TM packet (Cover Report – GIADA FS UM (**AD4**), Sect. 3.9.8 and 3.9.9). This anomalous behaviour (traced by ESA in the anomaly report ROS_SC-149) suggests that an update of the Emergency Close Cover OBCP is needful, in order to avoid the same failure in the future.

Besides the emergency procedure, the other expected steps were correctly executed with the exception of some warnings:

1. Inconsistent Packet Data Field (TC Packet Type/Subtype = 20,1) occurred on Mon Jan 07 2008 03:07:00.163137 during GD01 execution on Main I/F;
2. Inconsistent Packet Data Field (TC Packet Type/Subtype = 20,1) occurred on Mon Jan 07 2008 15:07:01.159342 during GD01 execution on Red I/F;
3. Command can not be executed in the actual operation mode (TC Packet Type/Subtype = 195,26 - Cover) occurred on Mon Jan 07 2008 15:39:01.69850 during GD01 execution on Red I/F.
4. Command can not be executed in the actual operation mode (TC Packet Type/Subtype = 195,26 - Cover) occurred on Mon Jan 07 2008 15:49:01.66054 during GD01 execution on Red I/F.
5. Command can not be executed in the actual operation mode (TC Packet Type/Subtype = 195,26 - Cover) occurred on Mon Jan 07 2008 15:59:00.171633 during GD01 execution on Red 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 11.1 and Section 11.2). 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.

Warnings 3. 4. and 5. are due to the execution of the nominal timeline even after the Emergency Close Cover OBCP was executed. After the call to the emergency procedure, the programmed sequence AGDF055A (MBS Heating) continued with the execution of its last three commands: ZGD19526 (Heat MB 4), ZGD19526 (Heat MB 5) and ZGD19521 (Set Time Meas.). These are not compatible with the mode where the OBCP left GIADA (Cover mode) so that they were rejected by the instrument, generating the mentioned warnings.

Some OOLs occurred (without consequences) on the lasers temperatures and on the PS currents; these are due to the limits set in the RSDB. To mitigate the problem of OOLs, the expected acceptable values were evaluated also considering temperature effects; new values were derived for several limits of lasers temperatures and PS currents and were included in the DCR "RO-GIA-OACUPA-DCR-008_parameter_limits_variation_2008Mar08" that was sent to ESA two months after PC7 execution.

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 (GD01), Figure 8.2-1, Figure 8.2-2 and Figure 8.2-3 for Red–open, Red–close and again Red–open respectively (GD01) and Figure 9.2-1 for Main–close (Close Cover). The reports related to the Red I/F testify an **anomalous behaviour** of the close operations already described above in details. Moreover the CREPs generated by the EGSE SW show an anomalous coincidence of "Begin time of operation" and "End time of operation" for both Main I/F (section 7.2.1 and 7.2.2) and Red I/F (section 8.2.1 and 8.2.3). This problem was already flagged and explained during PC2 data analysis. In fact, a revision of on-ground data has demonstrated that this problem was already present in previous tests. A careful analysis of TM data has shown that the behaviour of GIADA is nominal and the time data provided by the experiment are as expected. The cause of the anomalous coincidence is identified in a bug in the conversion from the Hex time stamp values to the Dec time stamp values operated by the GES SW. Possibly it is due to the roundoff in the HEX to DEC conversion that can vary between 0 and 16 seconds. As a consequence, the identified problem in the GES was flagged in the GIADA User Manual and shall have to be recovered as soon as possible in future updating of the GIADA EGSE SW.

Some PC7 general information:

Scenario period	04/01/08 to 09/01/08
Scenario duration	5 days
Sun distance	0.93 AU to 0.95 AU
Earth distance	0.27 AU to 0.29 AU
Propagation delay	~2.5 min.
Sun-SpaceCraft-Earth angle	92.47 deg. to 89.05 deg.

5.2 GIADA STATUS

The **current consumption** and **power supply temperatures** (Main on GD01: Figure 7.1-9; Red on GD01: Figure 8.1-9; Main on Close Cover: Figure 9.1-9) are in line with nominal evolution of operative modes (Main on GD01: Figure 7.1-8; Red on GD01: Figure 8.1-8; Main on Close Cover: Figure 9.1-8).

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 PC7 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 ≈ 1090 mA, Red ≈ 1060 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 GD01: Figure 7.1-2, Figure 7.1-3, Figure 7.1-4; Red on GD01: Figure 8.1-2, Figure 8.1-3, Figure 8.1-4; Main on Close Cover: Figure 9.1-2, Figure 9.1-3, Figure 9.1-4). 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 GD01; Figure 8.1-5 and Figure 8.1-7 for Red on GD01).

The trend of the IS Temperature is more noisy with the Main than with the Red I/F (Main on GD01: Figure 7.4-4; Red on GD01: Figure 8.4-4; Main on Close Cover: Figure 9.4-4).

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 and Figure 10.1-1).

The detection **Thresholds** applied on GDS are shown in Figure 7.3-2 (Main on GD01), Figure 8.3-2 (Red on GD01) and Figure 9.3-2 (Main on Close Cover), while those applied to PZT3 and PZT5 of IS are shown in Figure 7.4-2 and Figure 7.4-3 (Main on GD01), Figure 8.4-2 and Figure 8.4-3 (Red on GD01), Figure 9.4-2 and Figure 9.4-3 (Main on Close Cover). 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 PC7 test a **saturation of GDS** output did occur due to the Sun position (< 90 deg. with respect to the S/C +Z axis). Therefore the **GDS CAL data** show for the **GDS Left side** an output saturation level of **0.20-0.14 V** (depending on temperature) and for the **GDS Right side** a saturation level of **0.11-0.02 V** (depending on temperature) (Main on GD01: Figure 7.3-10; Red on GD01: Figure 8.3-10; Main on Close Cover: Figure 9.3-10). These are the nominal values occurring when the GDS is saturated.

Since there was saturation, **NO GDS scientific event** was detected (see Figure 7.3-9 for Main I/F on GD01, Figure 8.3-9 for Red I/F on GD01 and Figure 9.3-9 for Main I/F on Close Cover).

The "**Dust Monitor**" presents the following results: 57 single detections and 6 double detections on the Main I/F – GD01 (Figure 7.4-12); 12 single detections and 3 double detections on the Red I/F – GD01 (Figure 8.4-12); 15 single detections on the Main I/F – Close Cover (Figure 9.4-12). 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 – GD01 (Figure 7.4-6), in Section 5.2.2 for the Red I/F – GD01 (Figure 8.4-6) and in Section 5.2.3 for the Main I/F – Close Cover (Figure 9.4-6).

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 GD01: from Figure 7.4-19 to Figure 7.4-23; Red I/F on GD01: from Figure 8.4-19 to Figure 8.4-23; Main I/F on Close Cover: from Figure 9.4-19 to Figure 9.4-23).

The frequency level of all MBS has changed with respect to PC6 test. MBS 1 has increased its frequencies by an amount of about 300 Hz after the Cover failure (Figure 10.3-7), whereas the others have changed their frequencies by an amount < 100 Hz. This is probably due to the thermal conditions occurred during PC7. Except this case, the frequency – temperature behaviour is not changed since previous in-flight tests: see Figure 10.3-1 for MBS 1, Figure 10.3-2 and Figure 10.3-8 for MBS 2, Figure 10.3-3 and Figure 10.3-9 for MBS 3, Figure 10.3-4 and Figure 10.3-10 for MBS 4 and Figure 10.3-5 and Figure 10.3-12 for MBS 5.

5.2.1 Analysis of IS SCI events on the Main I/F (GD01)

Here following is an analysis of the IS SCI events detected on the Main I/F (GD01).

IS Events detected by Channel A (Figure 7.4-7)
- 8 events detected at IS_Event_Time = 158263219.59, 158266090.75, 158274402.45, 158293406.25, 158295206.27, 158295206.28, 158295271.35, 158295867.25 s
- 6 events detected by Ch-A are also detected by Ch-B
- 1 event detected by Ch-A is also detected by Ch-C
- 5 events detected by Ch-A are also detected by Ch-D
- 1 event detected by Ch-A is also detected by Ch-E

IS Events detected by Channel B (Figure 7.4-8)
- 7 events detected at IS_Event_Time = 158263024.25, 158263219.59, 158293406.25, 158295206.27, 158295206.28, 158295271.35, 158295867.25 s
- all events detected by Ch-B but 1 are also detected by Ch-A
- 1 event detected by Ch-B is also detected by Ch-C
- 5 events detected by Ch-B are also detected by Ch-D
- 1 event detected by Ch-B is also detected by Ch-E

IS Events detected by Channel C (Figure 7.4-9)
- 1 event detected at IS_Event_Time = 158263219.59 s
- event detected by Ch-C is also detected by Ch-A-B-D-E

IS Events detected by Channel D (Figure 7.4-10)
- 5 events detected at IS_Event_Time = 158263219.59, 158270755.71, 158293406.25, 158295206.27, 158295271.35, 158295867.25 s
- all events detected by Ch-D but 1 are also detected by Ch-A
- all events detected by Ch-D but 1 are also detected by Ch-B
- 1 event detected by Ch-D is also detected by Ch-C
- 1 event detected by Ch-D is also detected by Ch-E

IS Events detected by Channel E (Figure 7.4-11)
- 1 event detected at IS_Event_Time = 158263219,59 s
- event detected by Ch-E is also detected by Ch-A-B-C –D

Conclusions:
- 1 event is simultaneously detected by all the Channels, at IS_Event_Time = 158263219.59 s
- 5 events are simultaneously detected by Ch-A-B-D, but not by Ch-C-E, at IS_Event_Time = 158263219.59, 158293406.25, 158295206.27, 158295271.35, 158295867.25 s
- 6 events are simultaneously detected by Ch-A-B, but not by Ch-C-D-E, at IS_Event_Time = 158263219.59, 158293406.25, 158295206.27, 158295206.28, 158295271.35, 158295867.25 s
- 8 events are only detected by Ch-A at IS_Event_Time = 158263219.59, 158266090.75, 158274402.45, 158293406.25, 158295206.27, 158295206.28, 158295271.35, 158295867.25 s
- 1 event is only detected by Ch-B at IS_Event_Time = 158263024.25 s

- 1 event is only detected by Ch-D at IS_Event_Time = 158270755.71 s
- Ch-C and Ch-E detect the same unique event at IS_Event_Time = 158263219.59 s

The 10 events detected by Channels A-B-C-D-E are summarized in Table 5.2-3. Five of them (highlighted in yellow) occur in coincidence with other GIADA transitions (switching on/off of the GDS lasers). The other five do not seem correlated to any other GIADA event and cannot be easily identified.

IS	Time	Event
B	158263024.25	
A, B, C, D, E	158263219.59	
A	158266090.75	
D	158270755.71	
A	158274402.45	
A, B, D	158293406.25	Laser OFF
A, B, D	158295206.27	Laser Power ON
A, B	158295206.28	Laser Power ON
A, B, D	158295271.35	Laser ON
A, B, D	158295867.25	Laser OFF

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

5.2.2 Analysis of IS SCI events on the Redundant I/F (GD01)

Here following is an analysis of the IS SCI events detected on the Redundant I/F (GD01).

IS Events detected by Channel A (Figure 8.4-7)
- no event detected

IS Events detected by Channel B (Figure 8.4-8)
- 1 event detected at IS_Event_Time = 158303519.19 s
- event detected by Ch-B is not detected by Ch-A-C-D-E

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

IS Events detected by Channel D (Figure 8.4-10)
- 1 event detected at IS_Event_Time = 158320463.55 s
- event detected by Ch-D is not detected by Ch-A-B-C-E

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

Conclusions:
- 1 event is only detected by Ch-B at IS_Event_Time = 158303519.19 s
- 1 event is only detected by Ch-D at IS_Event_Time = 158320463.55 s
- no event detected by Ch-A-C-E

The 2 events detected by Channels B-D are summarized in Table 5.2-4. All events do not seem correlated to any other GIADA event and cannot be easily identified.

IS	Time	Event
B	158303519.19	
D	158320463.55	

Table 5.2-4. IS SCI Events from PZTs B-D

5.2.3 Analysis of IS SCI events on the Main I/F (Close Cover)

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

IS Events detected by Channel A (Figure 9.4-7)
- no event detected

IS Events detected by Channel B (Figure 9.4-8)
- 2 events detected at IS_Event_Time = 159230068.80, 159230222.26 s
- no event detected by Ch-A-C-D-E

IS Events detected by Channel C (Figure 9.4-9)
- no event detected

IS Events detected by Channel D (Figure 9.4-10)
- no event detected

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

Conclusions:
- 2 events are only detected by Ch-B at IS_Event_Time = 159230068.80, 159230222.26 s
- no event detected by Ch-A-C-D-E

The 2 events detected by Channel B are summarized in Table 5.2-5. All events do not seem correlated to any other GIADA event and cannot be easily identified.

IS	Time	Event
B	159230068.80	
B	159230222.26	

Table 5.2-5. IS SCI Events from PZT B

6. CONCLUSIONS

According to the above data elaboration and results, the following conclusions can be drawn about the Active Payload Checkout 7:

- **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.
- During the test on Redundant I/F an emergency OBCP was triggered due to a thermal contingency on one of the MBs and **GIADA was switched off but left with the Cover open**. The reason why the Cover was left open is related to a known problem that was only discovered in space: when a "Close Cover" command is executed with the Cover already closed, it "bounces back" until full opening. After the anomaly was recognised, a timeline was agreed with RMOC to close the Cover and it was run a few days after PC7 completion. GIADA was then placed in the nominal cruising configuration and switched off with the Cover closed. This anomalous behaviour (traced by ESA in the AR ROS_SC-149) suggests that an update of the Emergency Close Cover OBCP is needful, in order to avoid the same failure in the future.
- Some OOLs occurred (without consequences) on the lasers temperatures and on the PS currents; these are due to the limits set in the RSDB. Two months after PC7 execution a DCR was sent to ESA in order to relax several limits of lasers temperatures and PS currents.
- The CREP generated by the EGSE S/W shows an anomalous coincidence of "Begin time of operation" and "End time of operation" for both "open Cover" and "close Cover" on the Main I/F and Red I/F (GD01). This coincidence is due to a bug in the conversion from the Hex time stamp values to the CREP time stamp values in the EGSE SW. **The problem shall be fixed in future GES update.**
- 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 GDS was **saturated** due to the Sun position, so that NO GDS scientific events were detected. The recorded levels of saturation on GDS Left and Right side are the nominal values occurring when the GDS is saturated.
- 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 not as in previous tests**. MBS 1 has increased his frequency by an amount of about 300 Hz after the Cover failure, whereas the others have changed their frequencies by an amount < 100 Hz with respect to PC6 test.

7. PC7 DATA ANALYSIS – MAIN INTERFACE (GD01)

7.1 GIADA STATUS

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

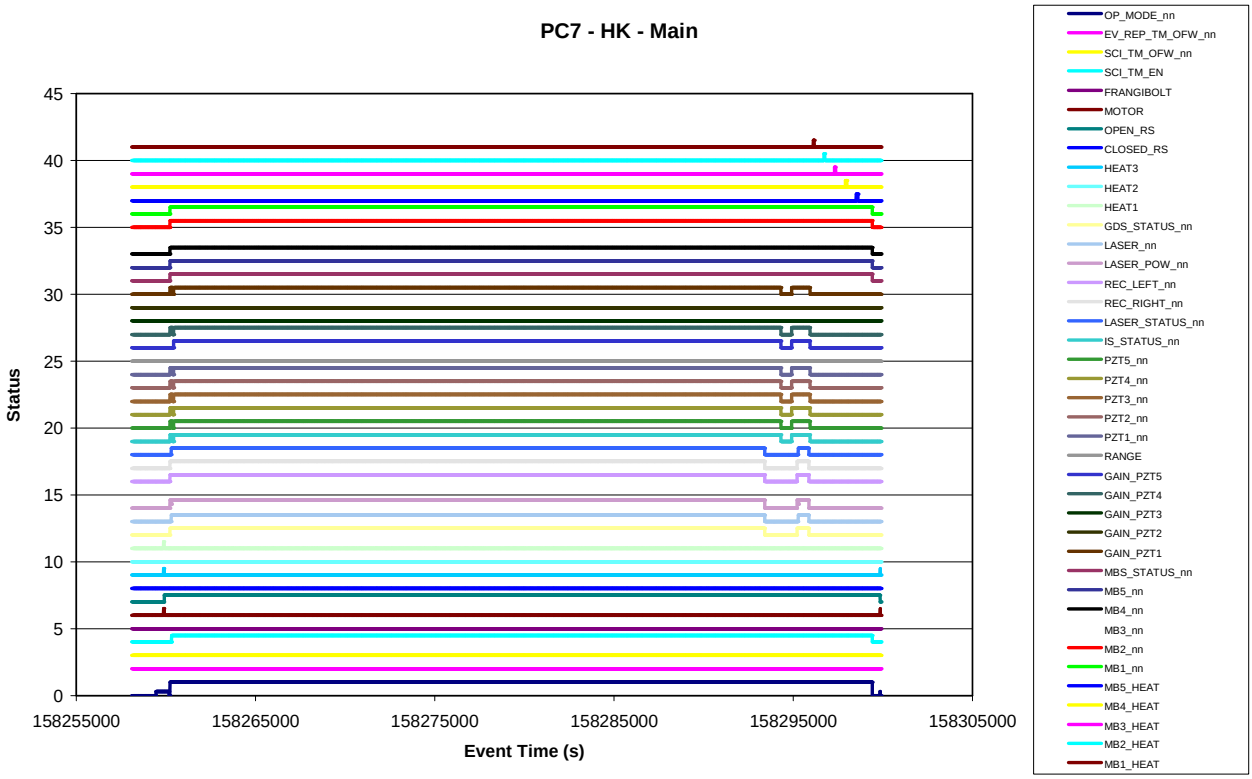


Figure 7.1-2. Evolution of all temperatures vs. time - HK, HK-SCI, SCI - Main

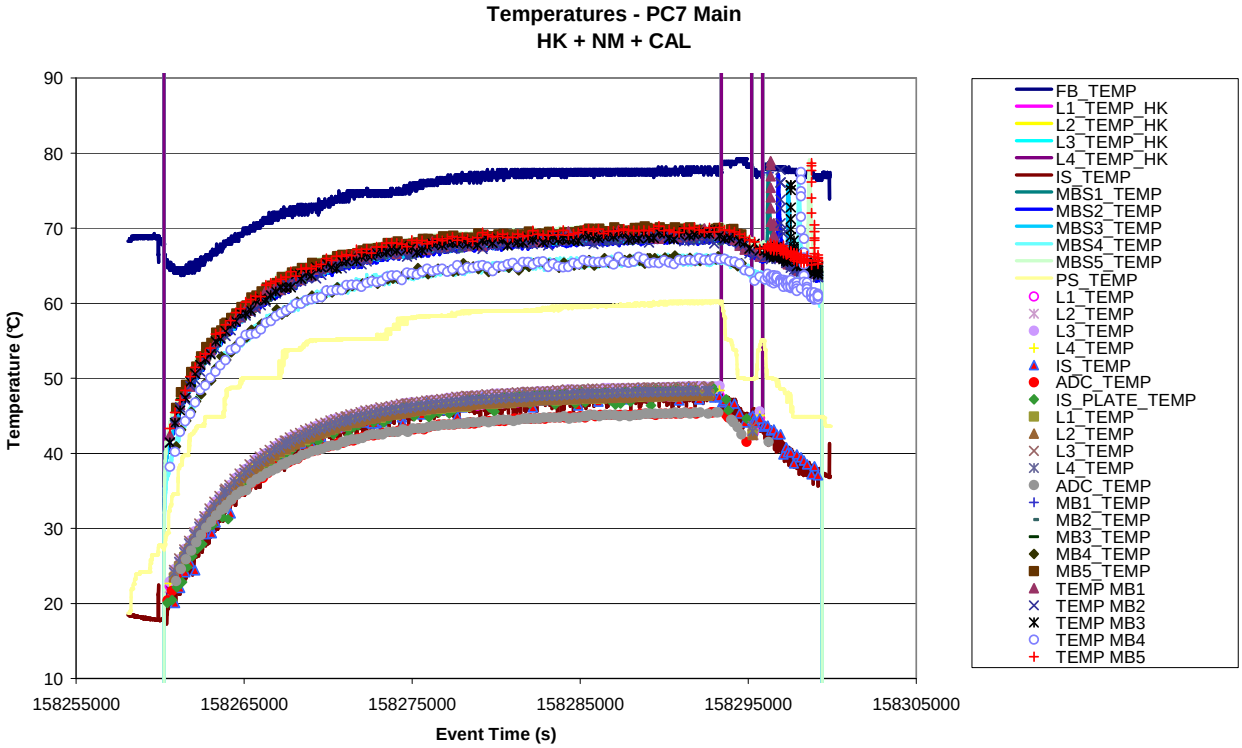


Figure 7.1-3. Evolution of temperatures of system elements vs. time - HK, HK-SCI, SCI - Main

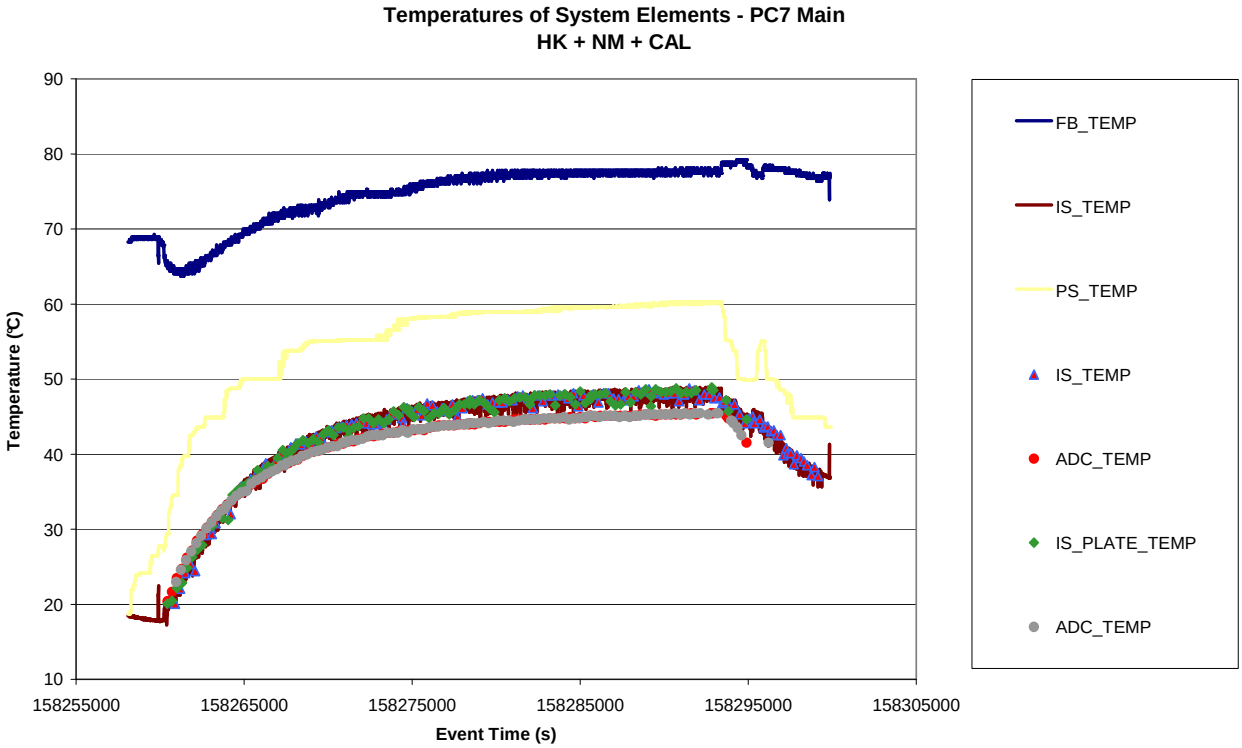


Figure 7.1-4. Evolution of temperatures of sub-systems vs. time - HK, HK-SCI, SCI - Main

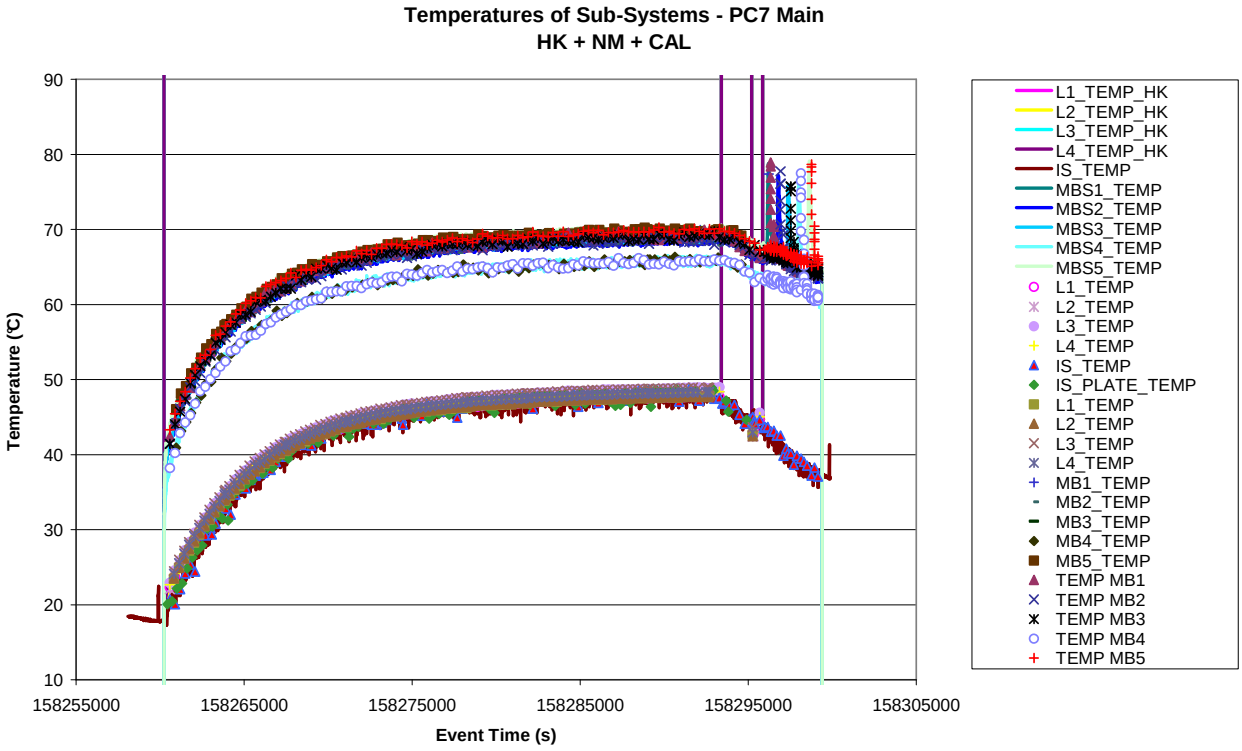


Figure 7.1-5. HK Status versus Temperatures of system elements - Main

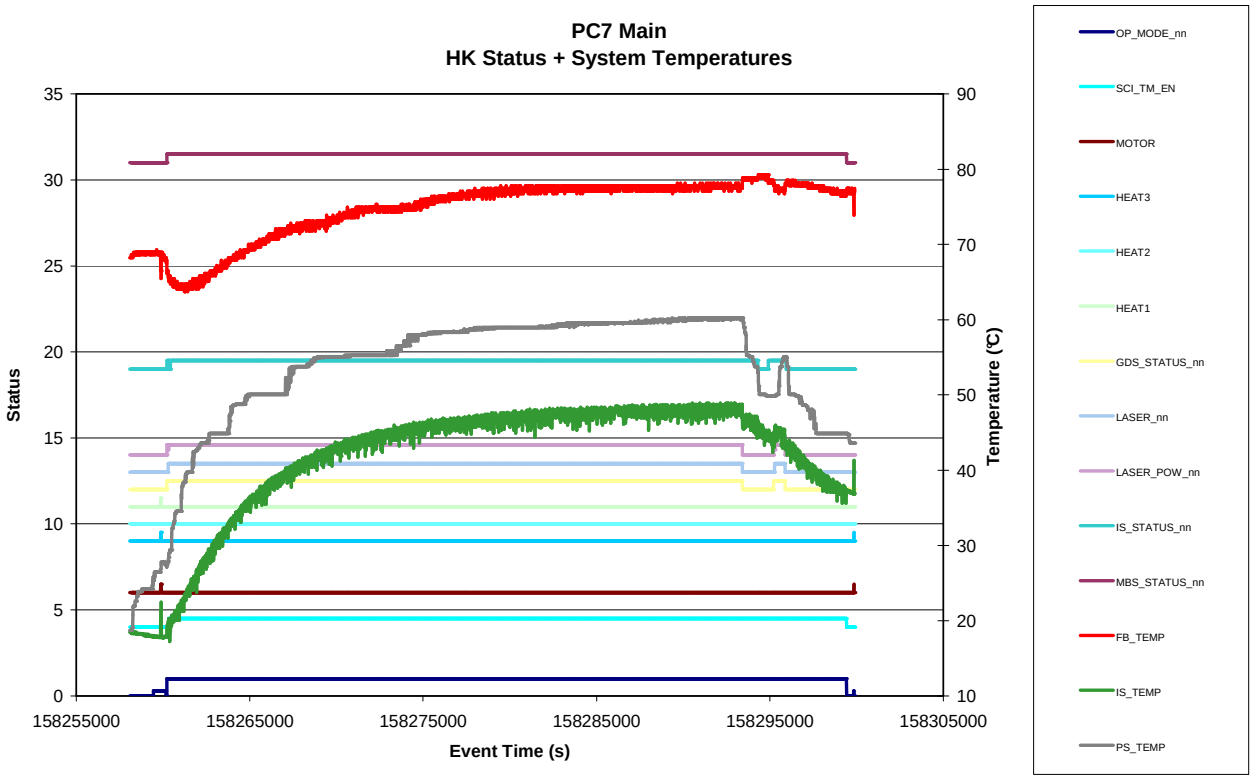


Figure 7.1-6. Operation Status vs. time - Main

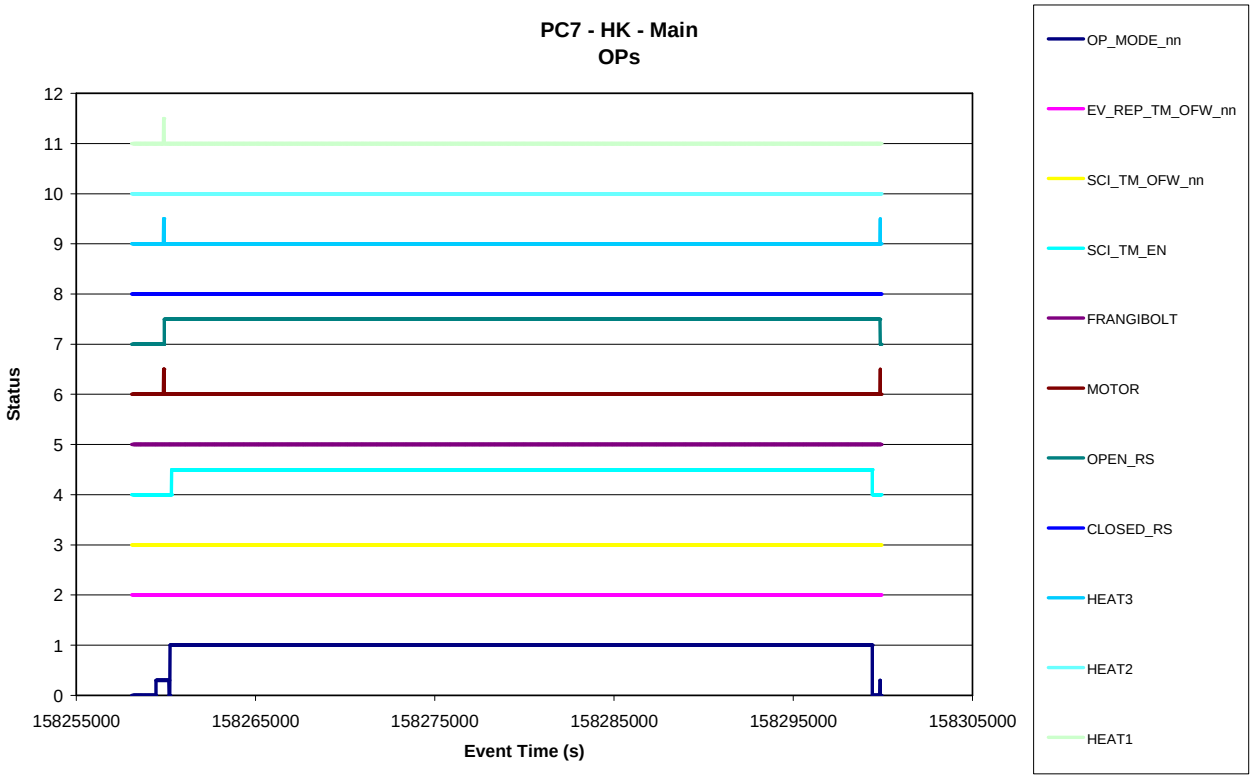


Figure 7.1-7. Operation Status versus Temperatures of system elements - Main

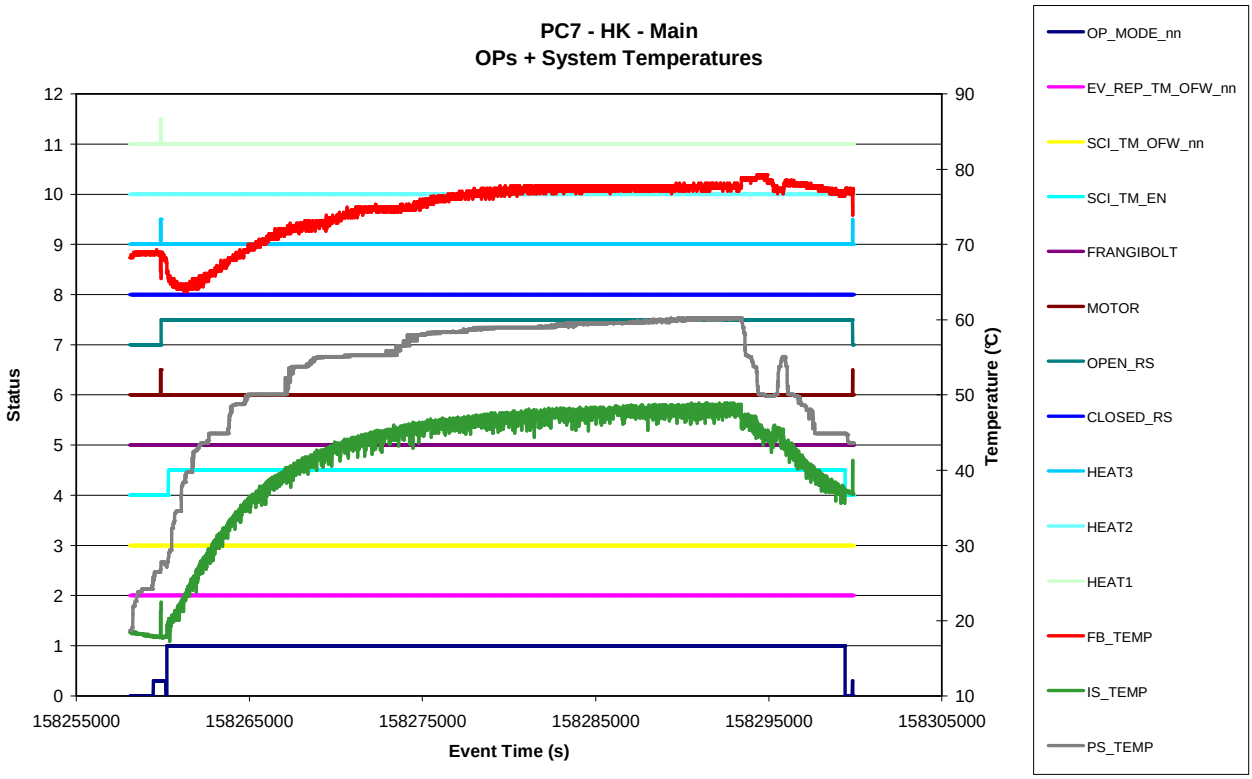


Figure 7.1-8. Power behaviour - Main

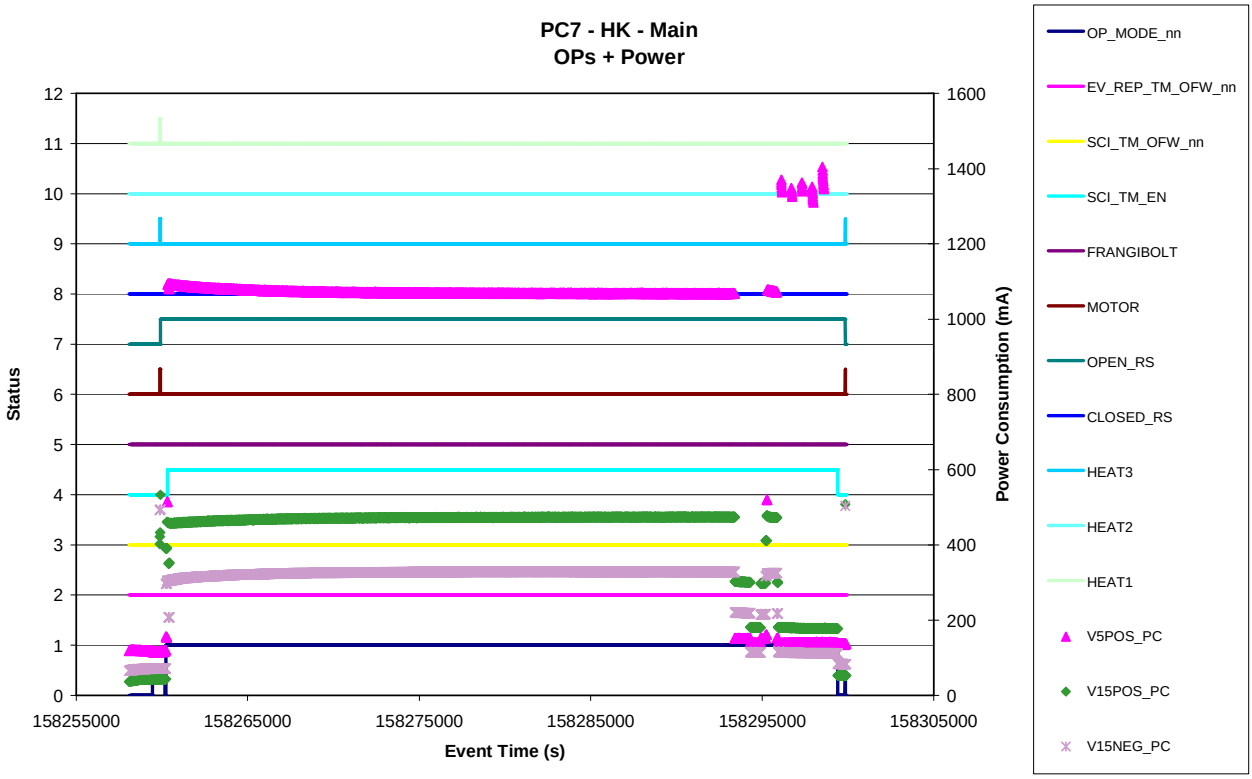


Figure 7.1-9. Power and PS temperature behaviour - Main

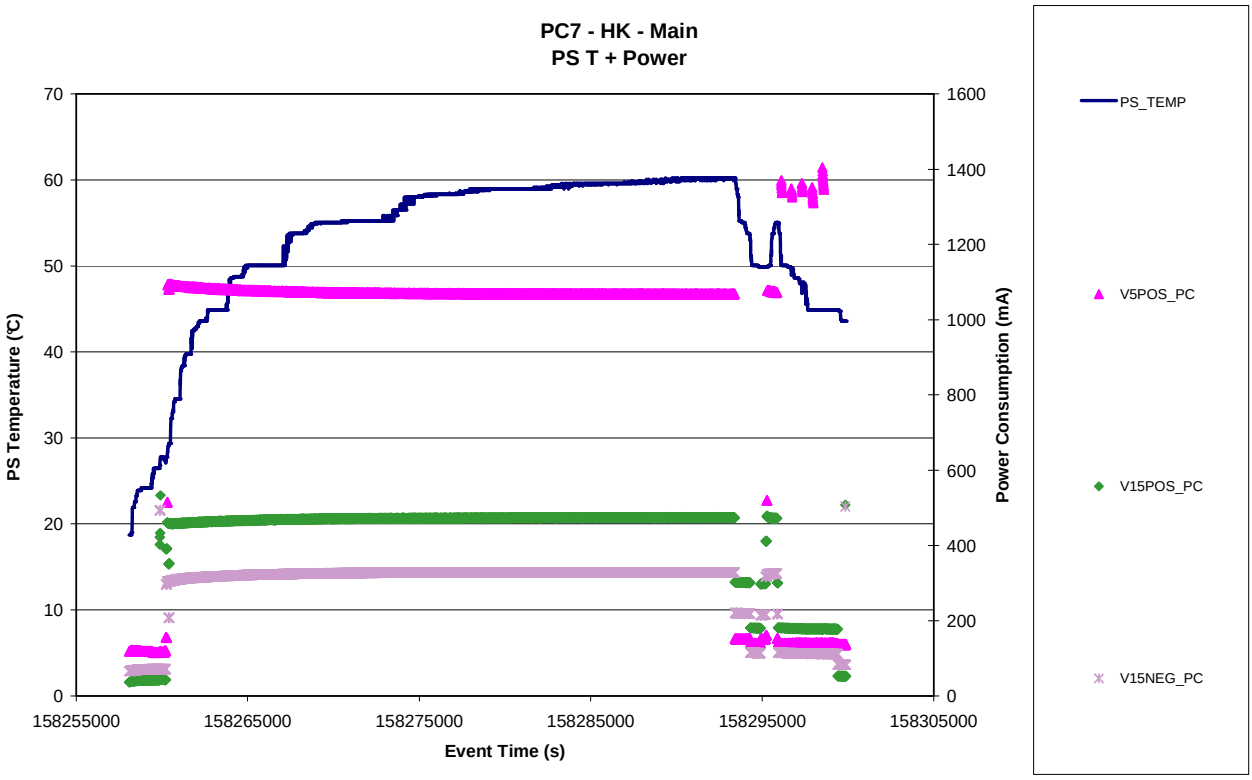


Figure 7.1-10. Source Sequence Count (SSC) of HK Telemetry vs. Time - Main

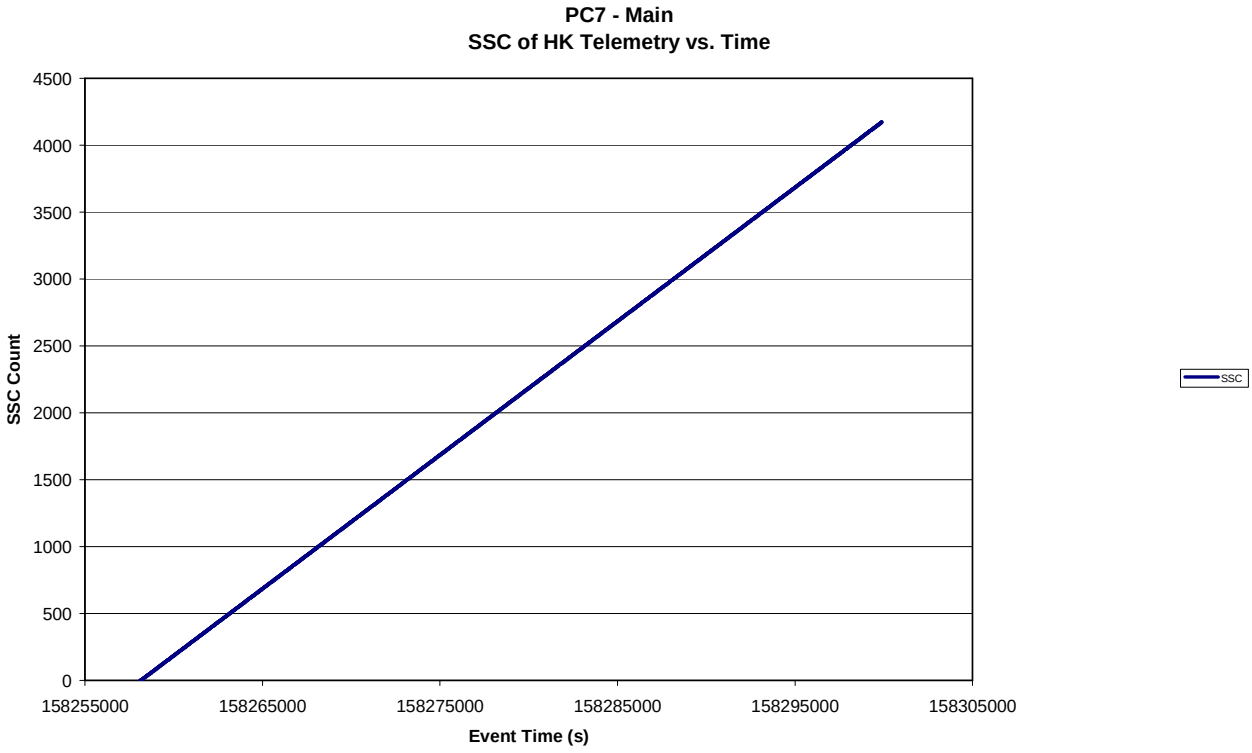


Figure 7.1-11. Source Sequence Count (SSC) of HK Telemetry vs. Number - Main

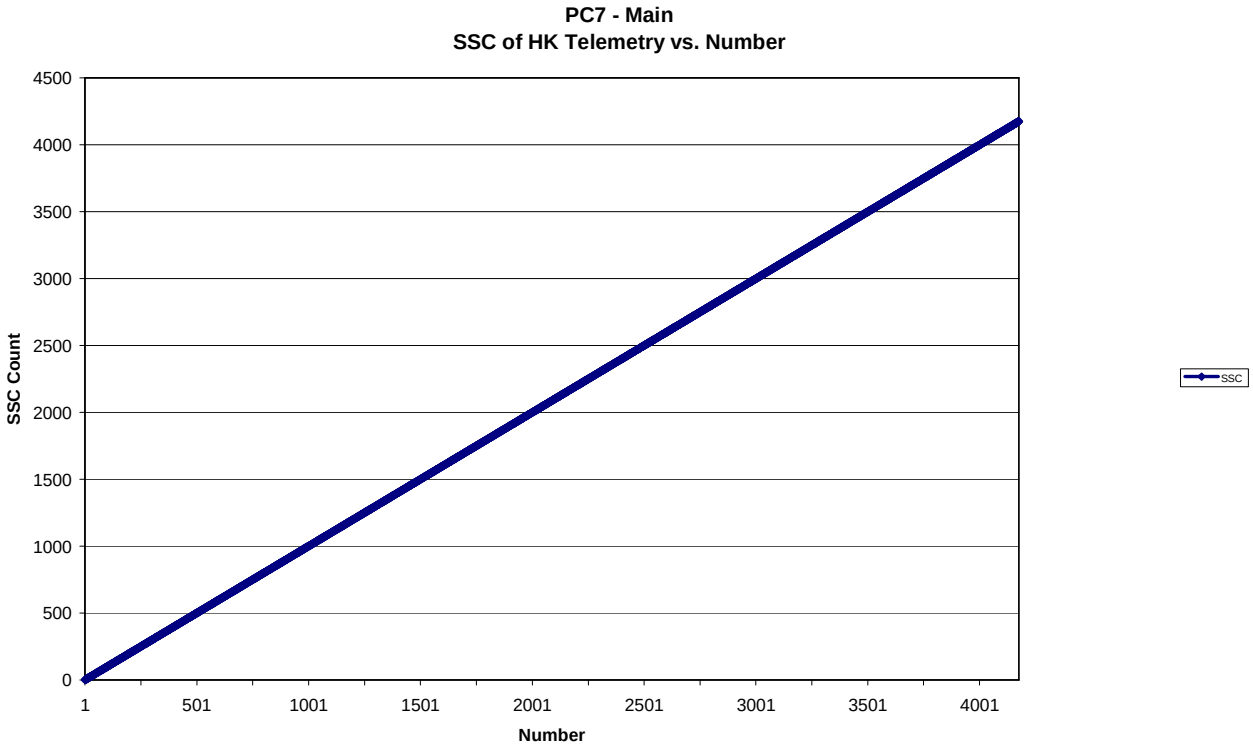


Figure 7.1-12. Source Sequence Count (SSC) of SCI Telemetry vs. Time - Main

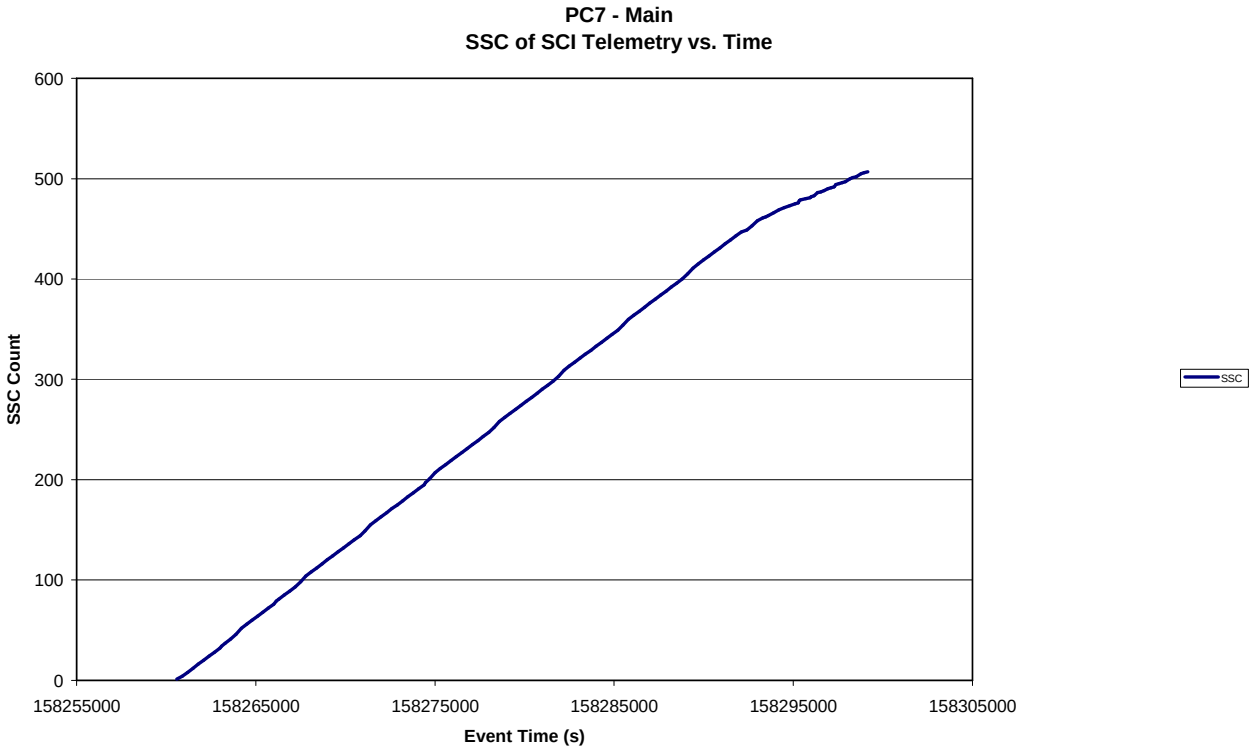
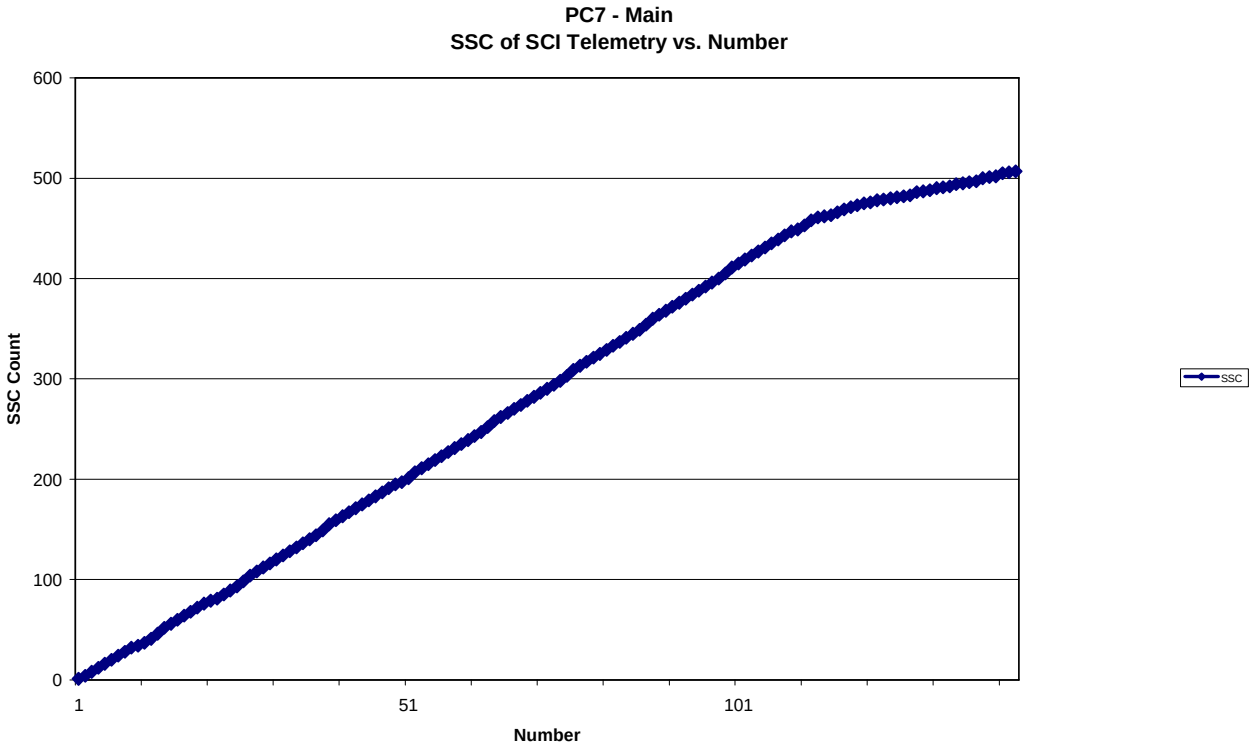


Figure 7.1-13. Source Sequence Count (SSC) of SCI Telemetry vs. Number - Main

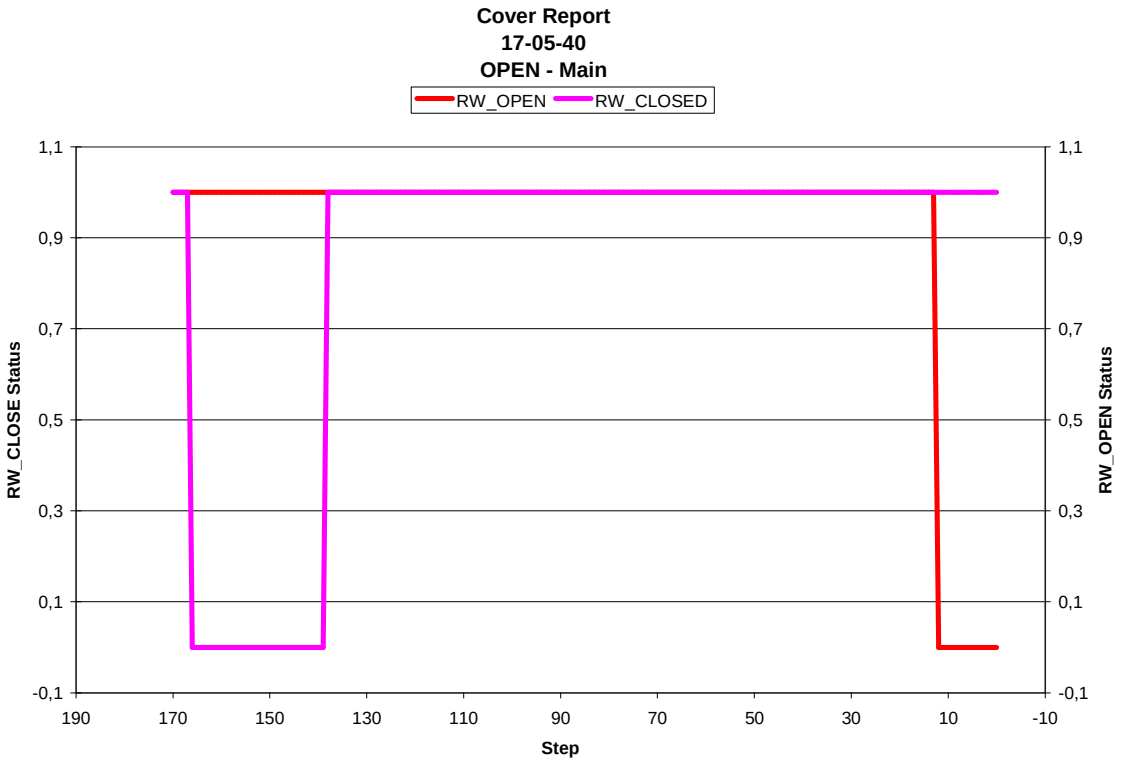


7.2 COVER REPORTS

7.2.1 Open Cover

HEADER_START
CREATION_TIME=2008-01-06T17:05:40Z
USER=giada1
HEADER_END
//
// Generated by 'GIADA_EGSE_SW '
//
MOVEMENT DIRECTION: To open
BEGIN TIME OF OPERATION: 158259904.000000
END TIME OF OPERATION: 158259904.000000

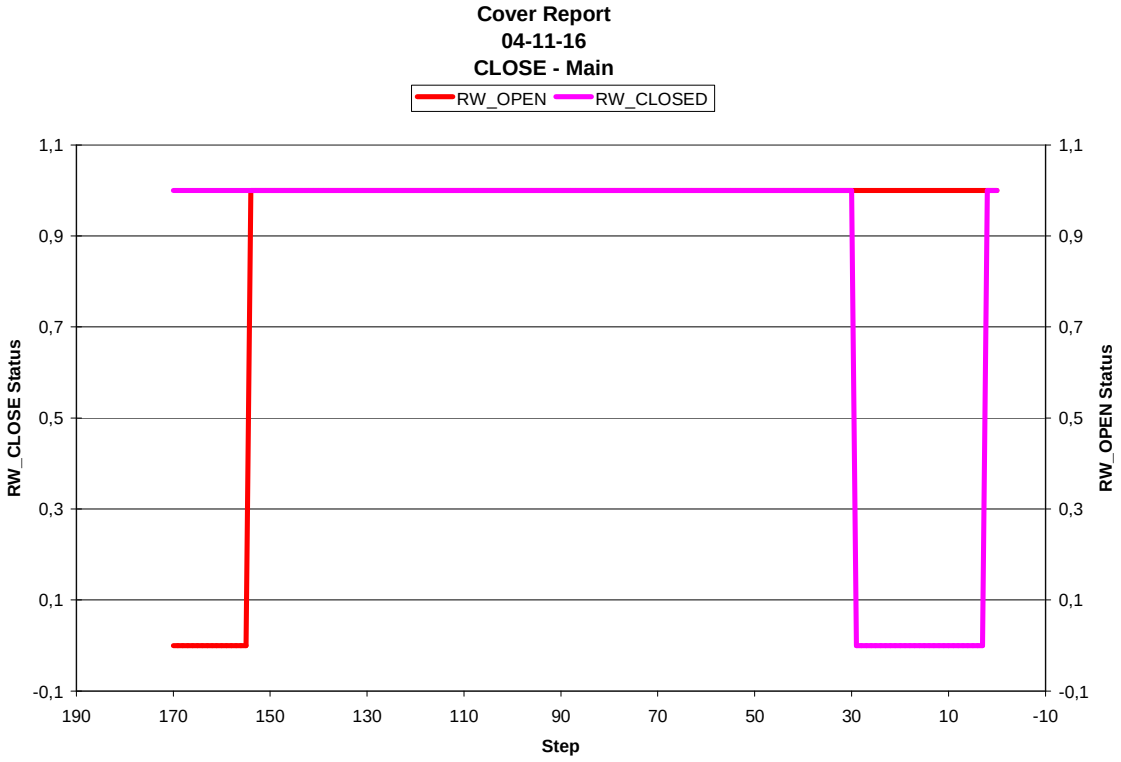
Figure 7.2-1. Cover Report – Open - Main



7.2.2 Close Cover

HEADER_START
CREATION_TIME=2008-01-07T04:11:16Z
USER=giada1
HEADER_END
//
// Generated by 'GIADA_EGSE_SW '
//
MOVEMENT DIRECTION: To close
BEGIN TIME OF OPERATION: 158299840.000000
END TIME OF OPERATION: 158299840.000000

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

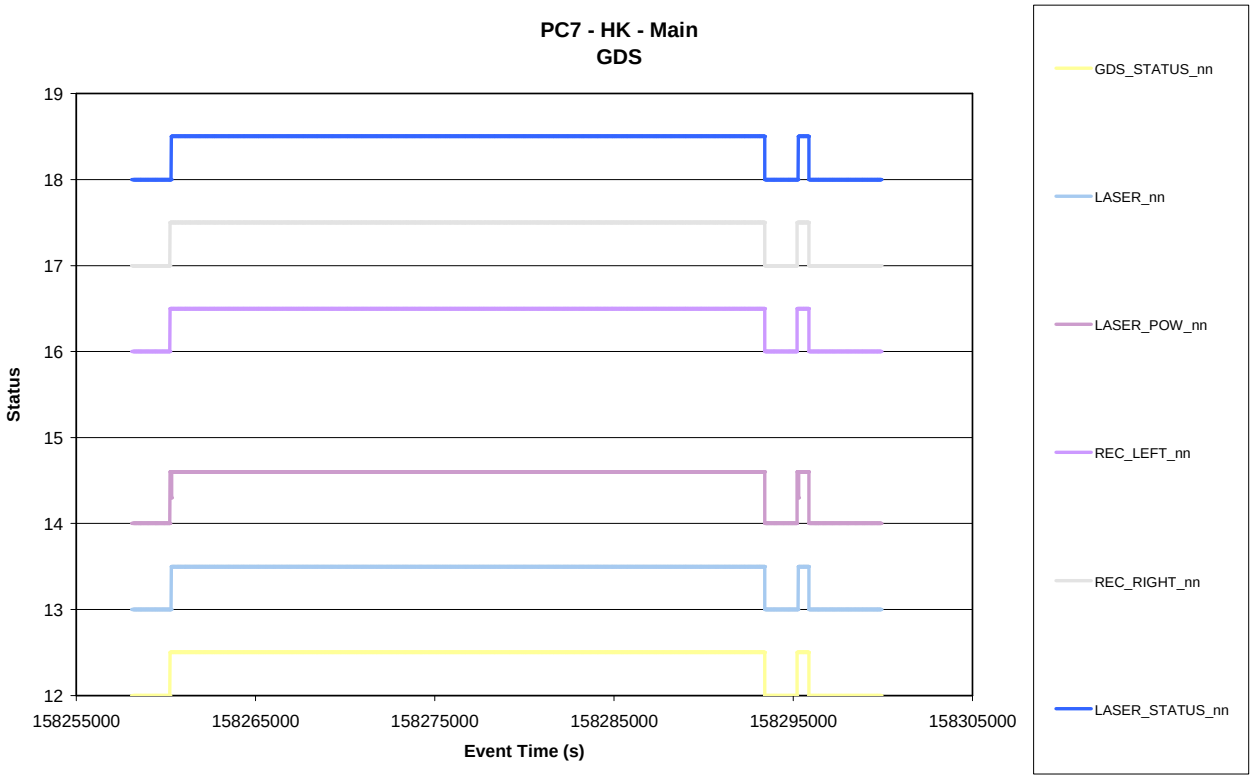


Figure 7.3-2. GDS Thresholds change vs. time - Main

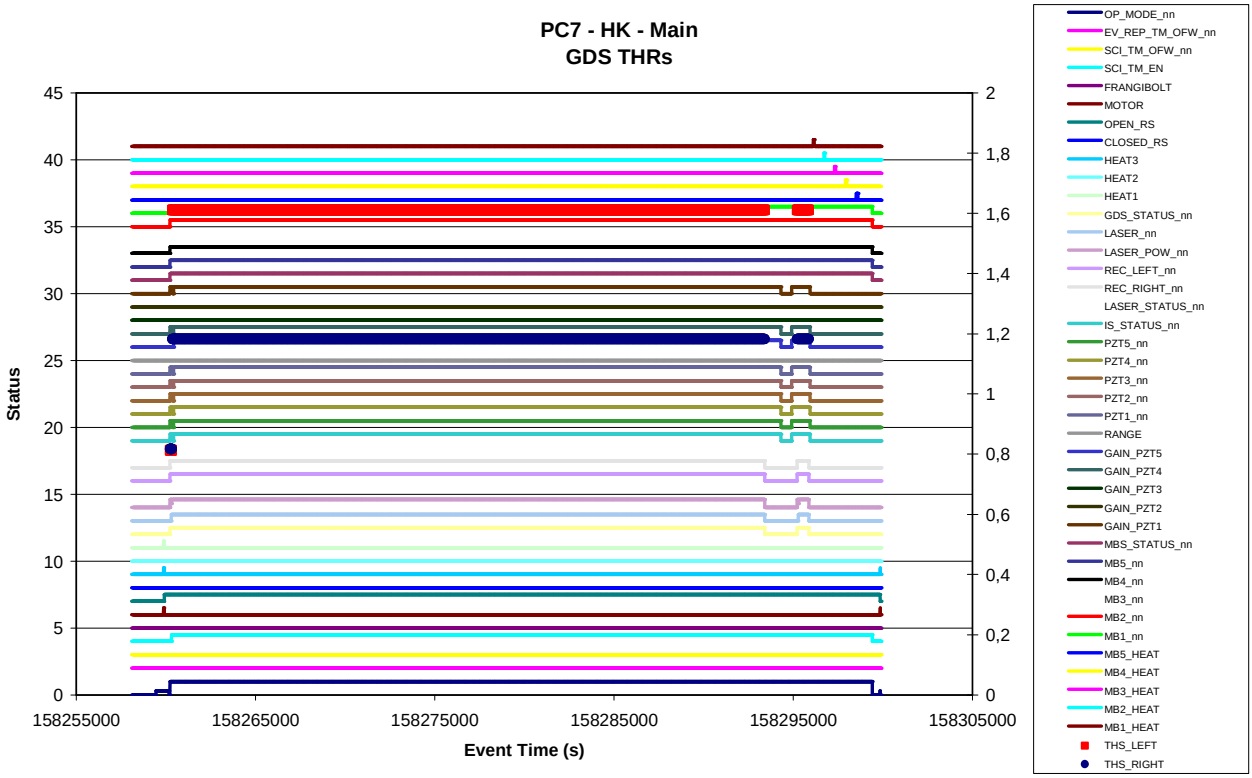


Figure 7.3-3. GDS Laser Temperatures vs. time (HK, HK-SCI, SCI) - Main

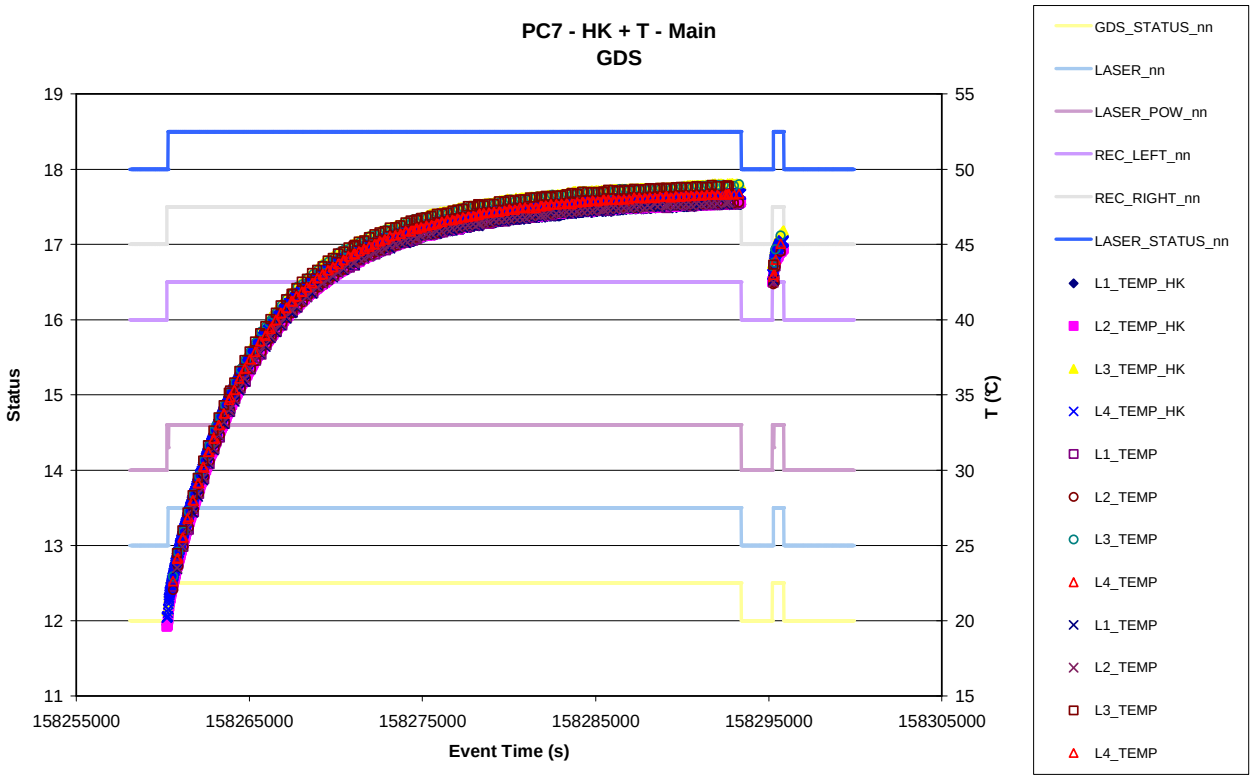


Figure 7.3-4. GDS Laser Monitor vs. time (HK, HK-SCI, SCI) - Main

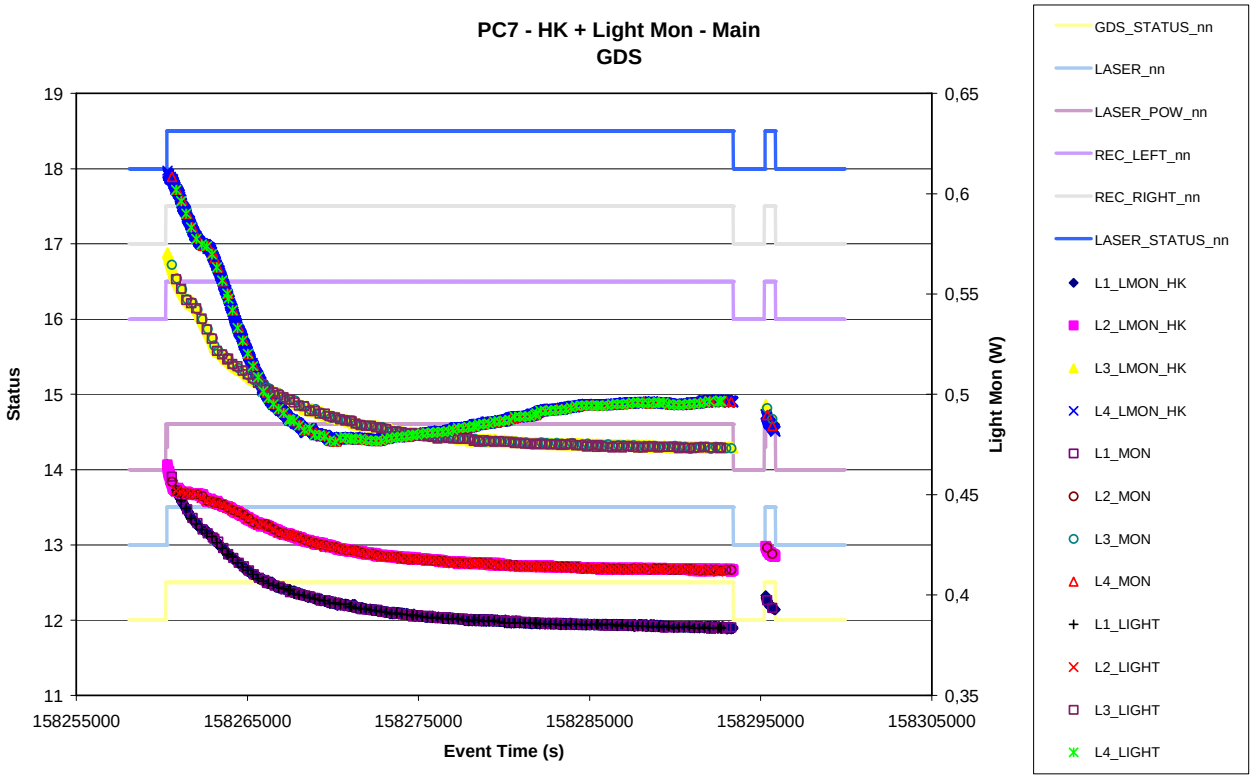


Figure 7.3-5. Laser 1 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main

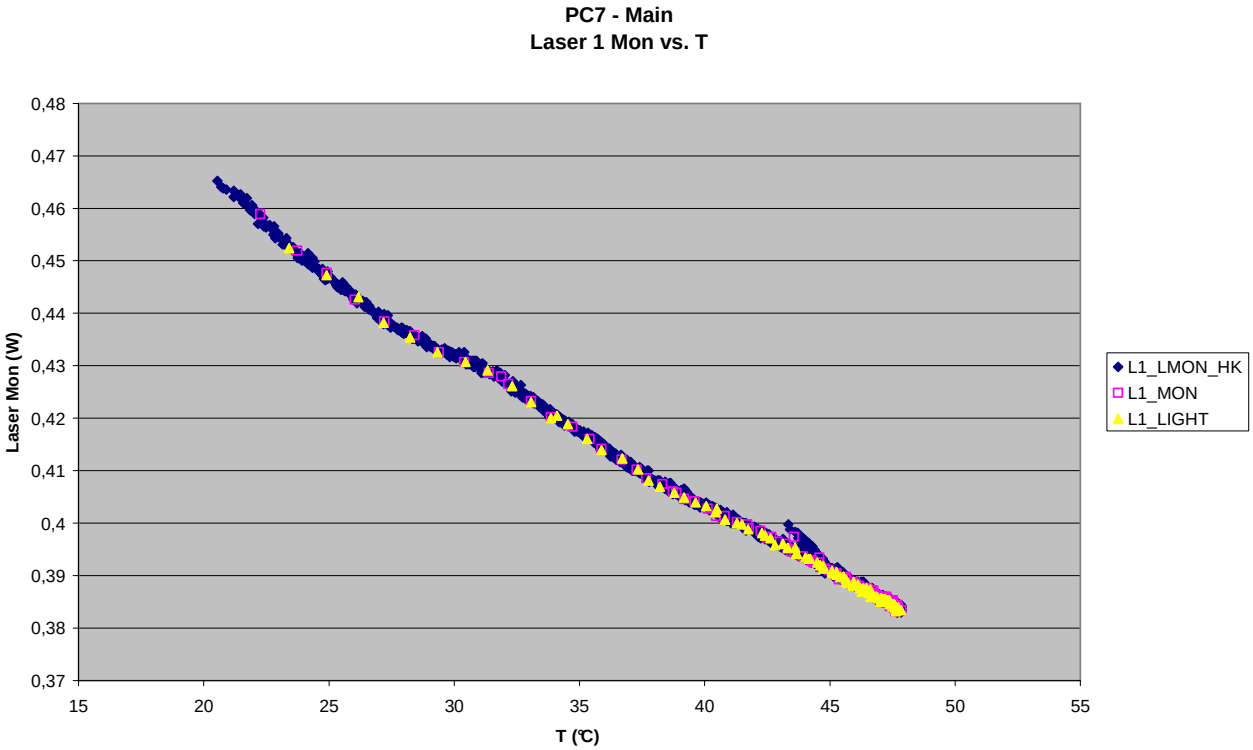


Figure 7.3-6. Laser 2 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main

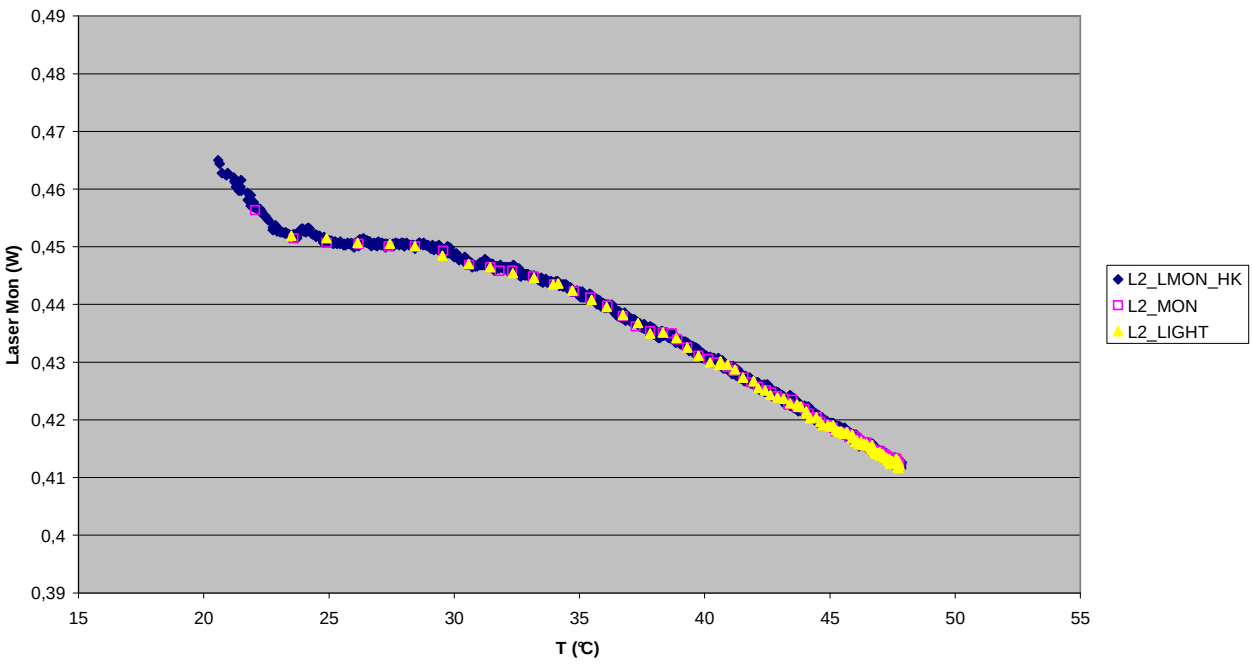


Figure 7.3-7. Laser 3 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main

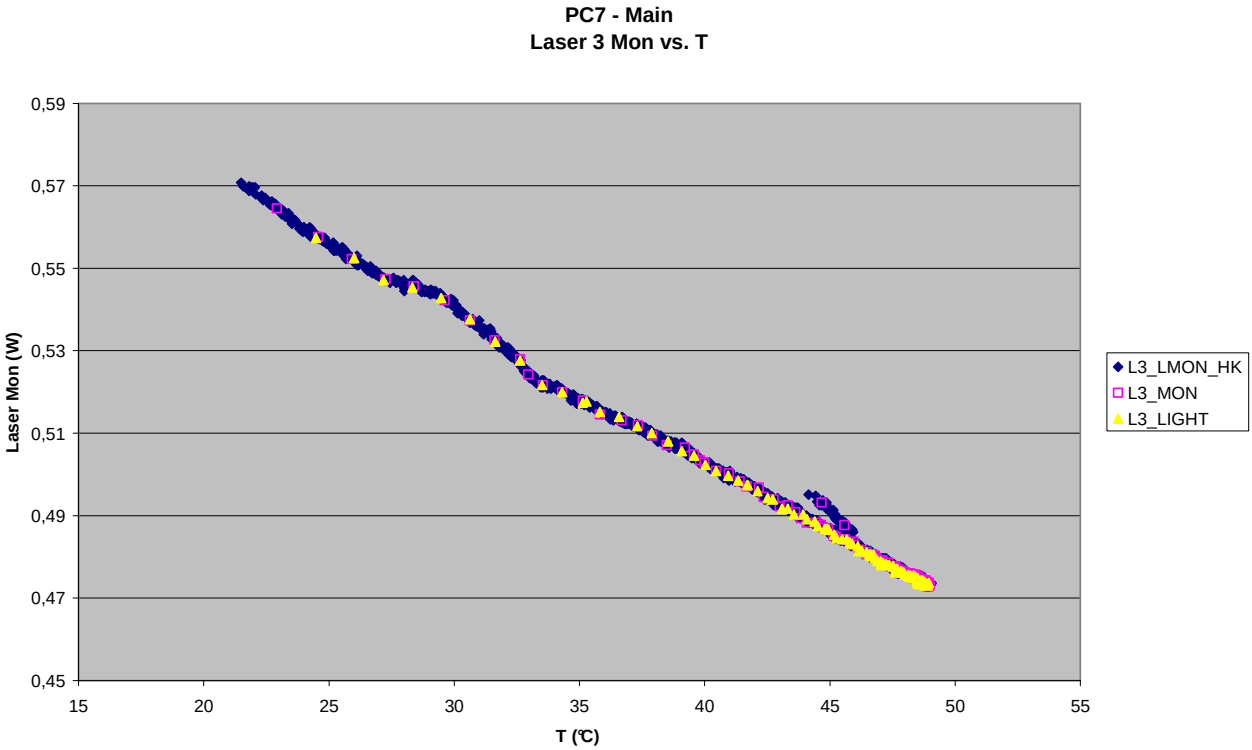
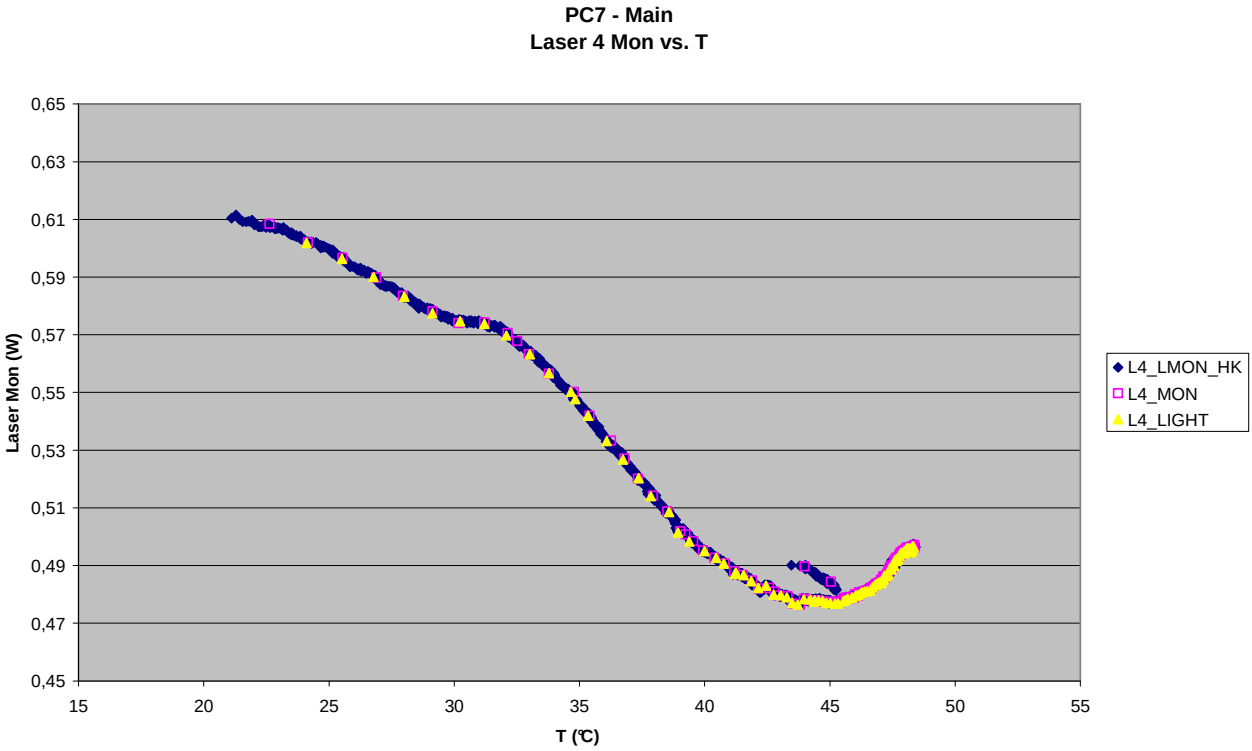


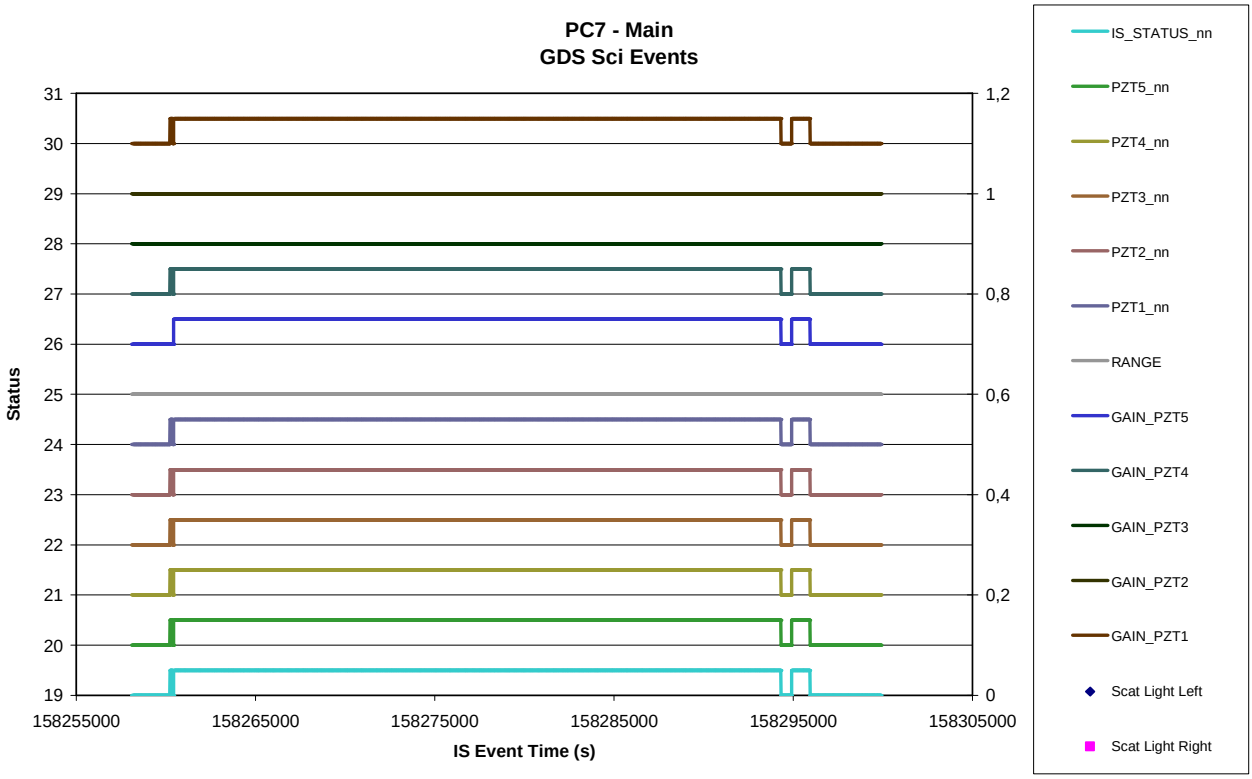
Figure 7.3-8. Laser 4 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main



7.3.2 GDS – Behaviour

7.3.2.1 Science Events

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

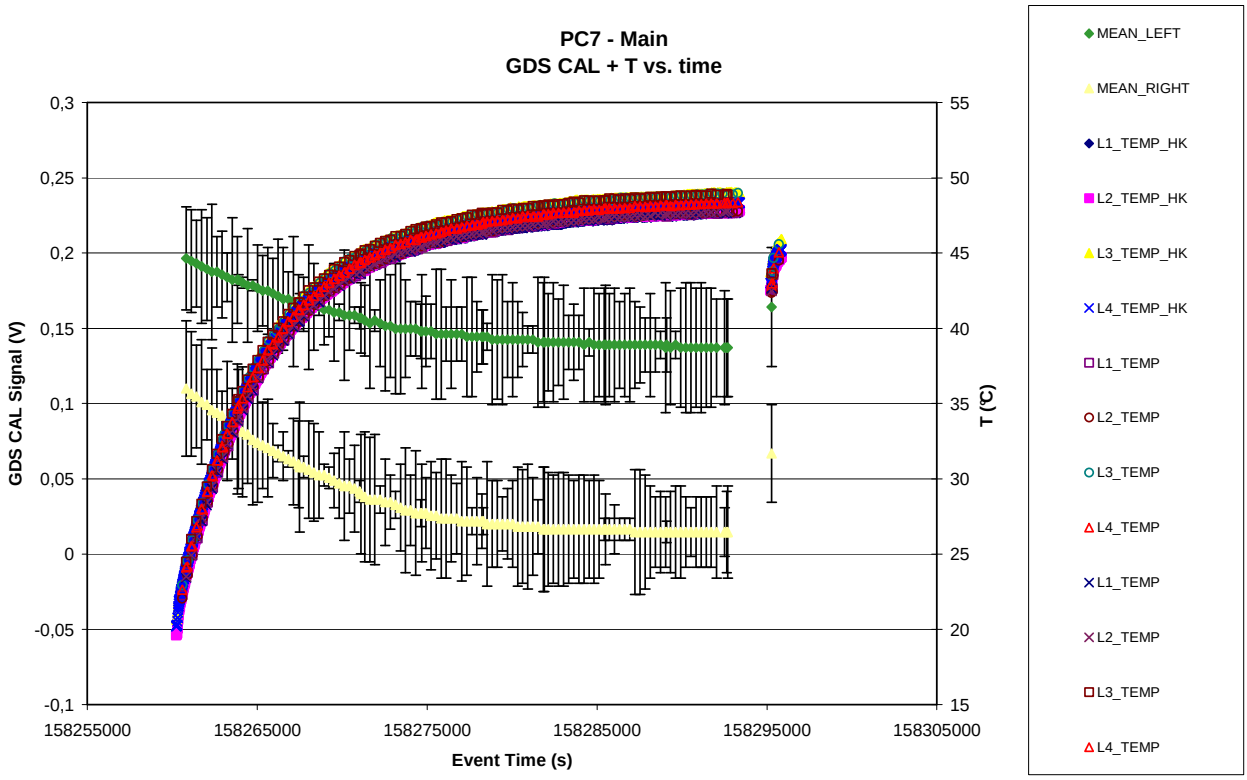


7.3.2.2 Event Rates

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

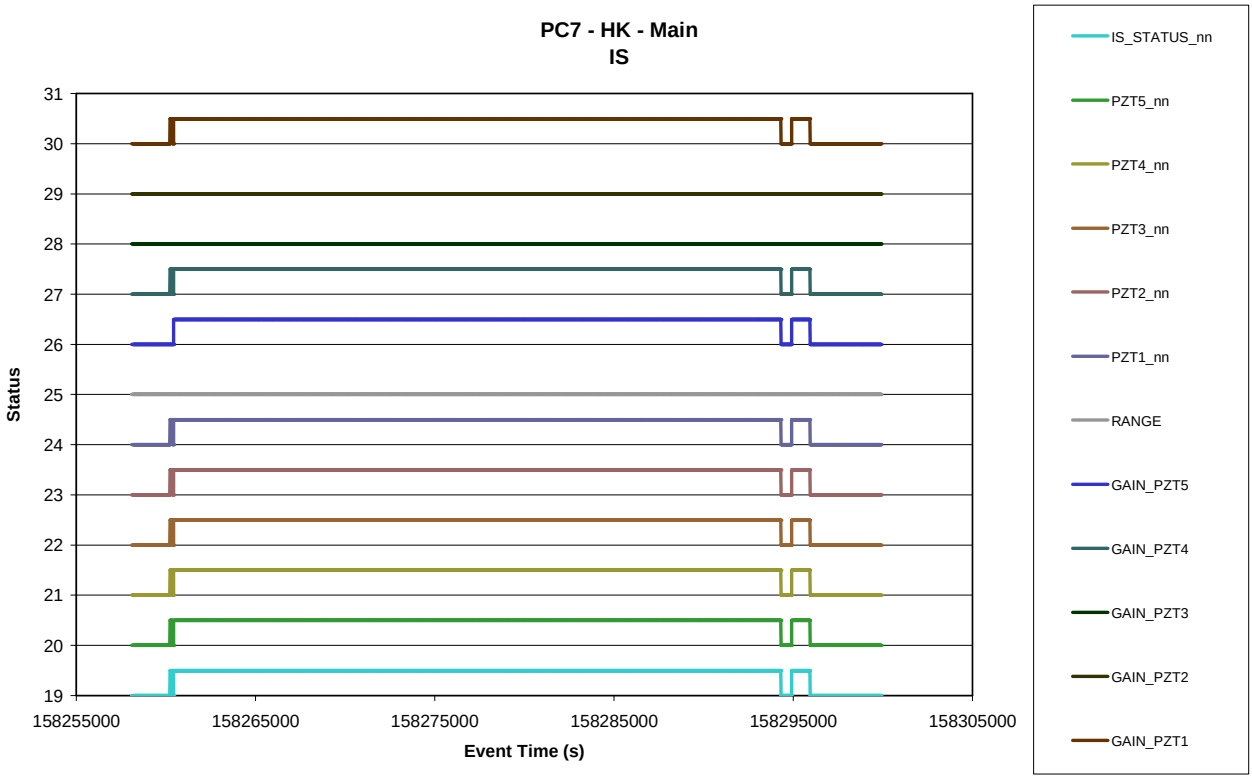


Figure 7.4-2. IS PZT 3 Thresholds change vs. time - Main

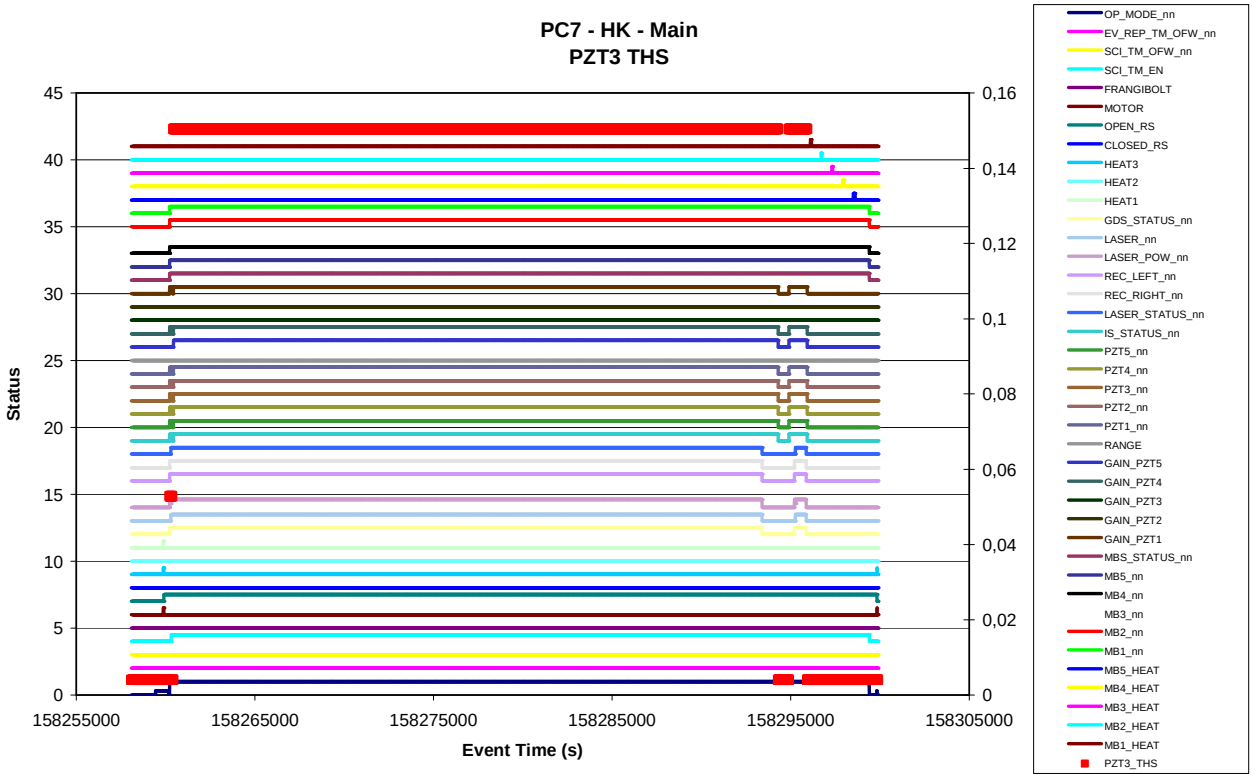


Figure 7.4-3. IS PZT 5 Thresholds change vs. time - Main

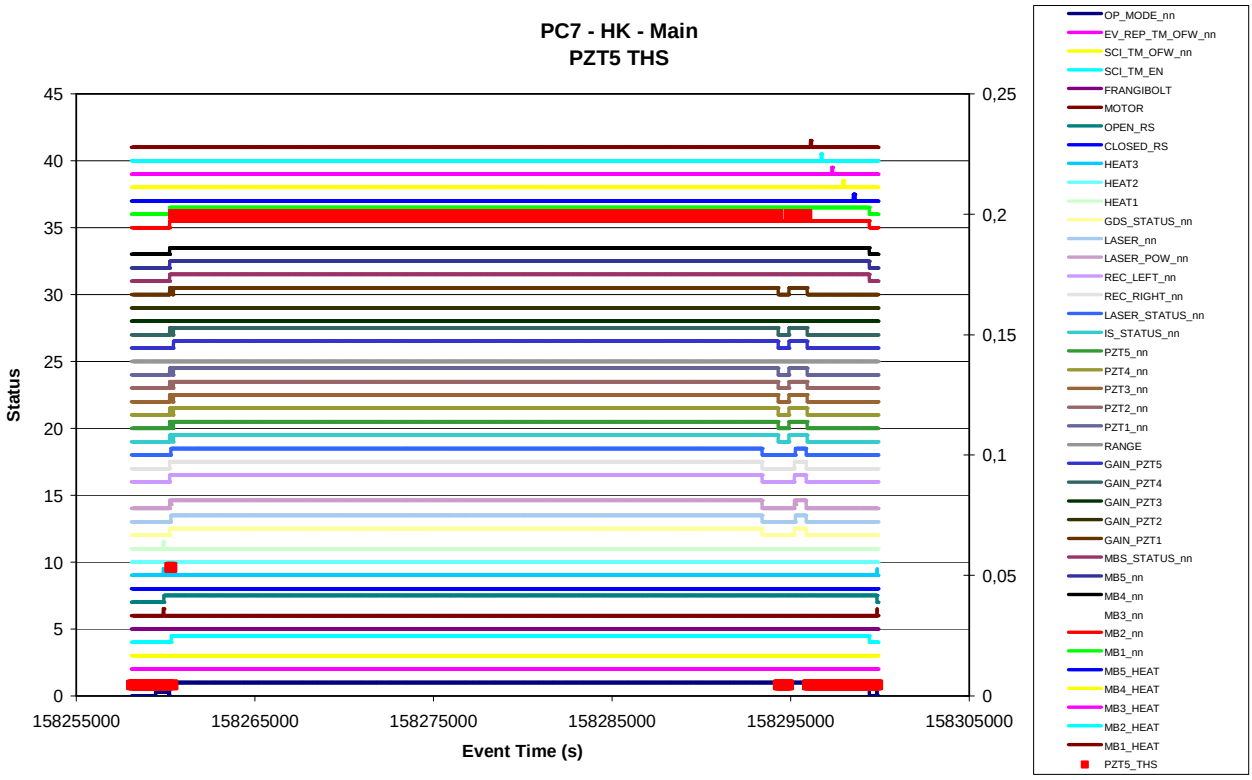
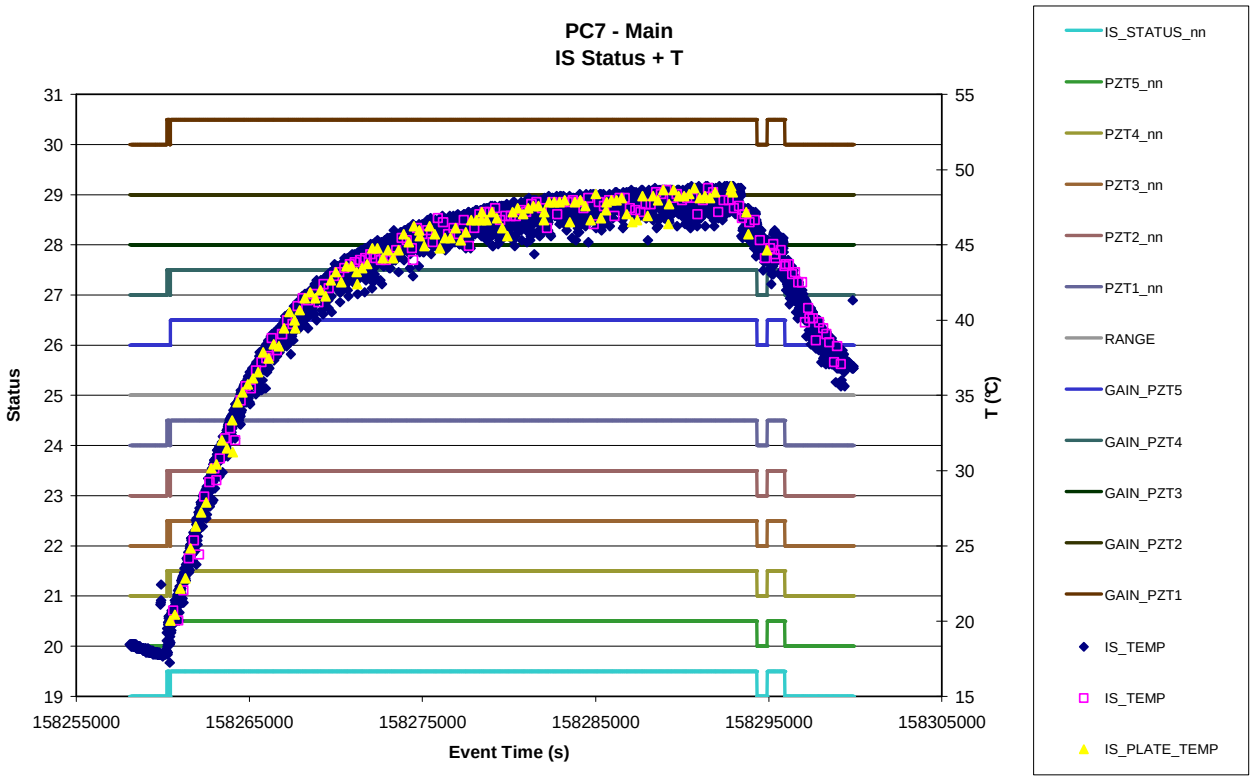


Figure 7.4-4. IS Temperature vs. time (HK, HK-SCI, SCI) - Main



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

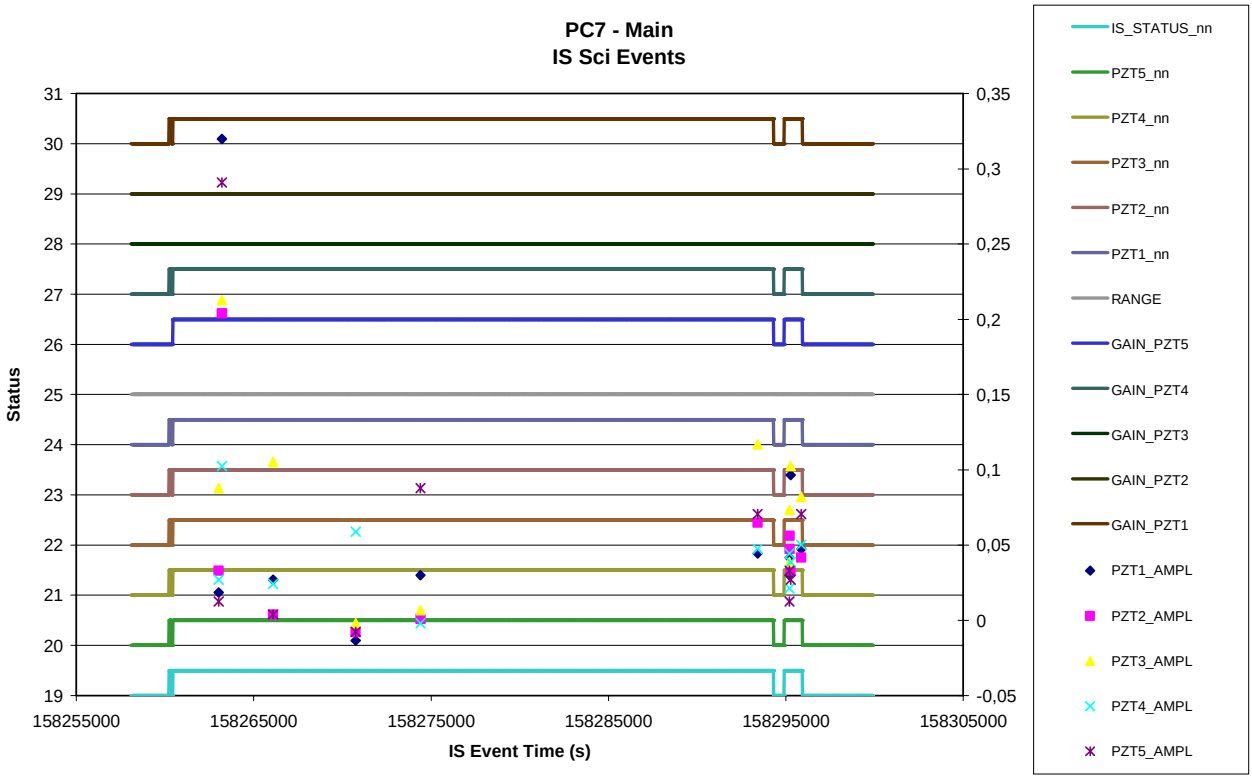


Figure 7.4-6. PZT 1-2-3-4-5 Detected Events vs. time - Main

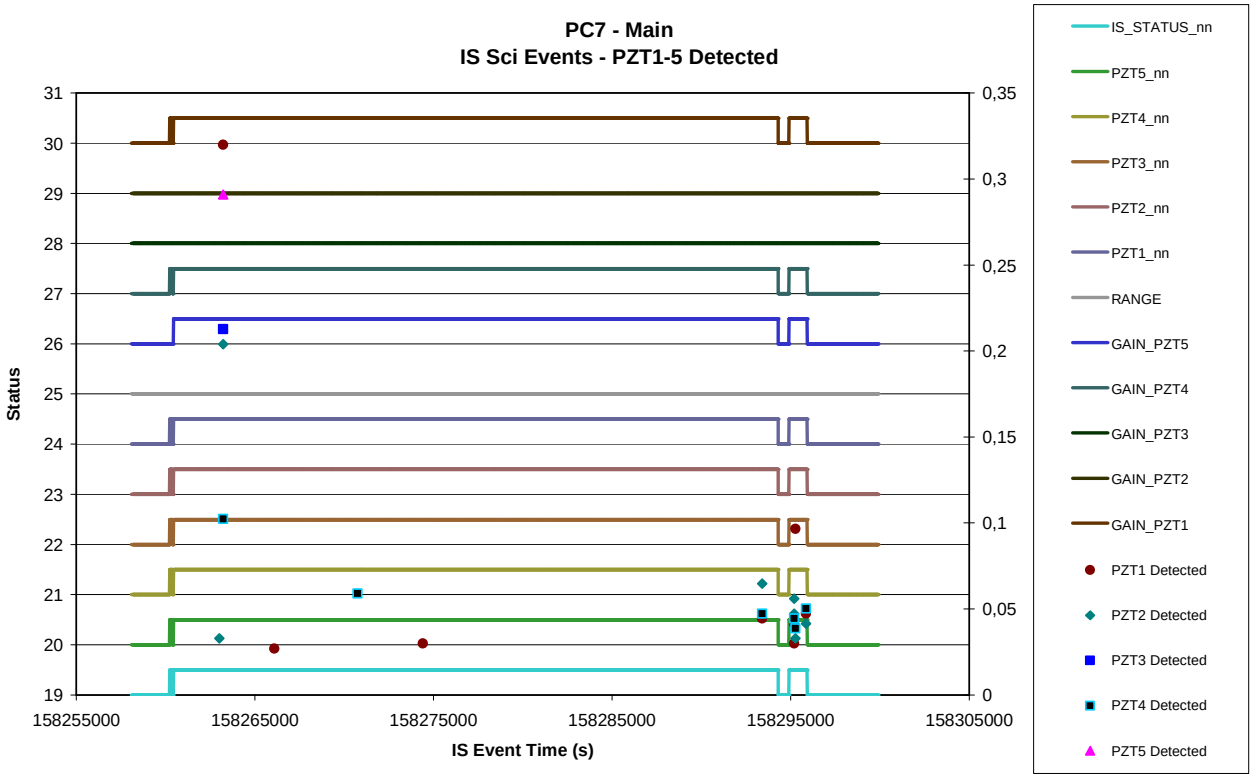


Figure 7.4-7. PZT 1 Detected Events vs. time - Main

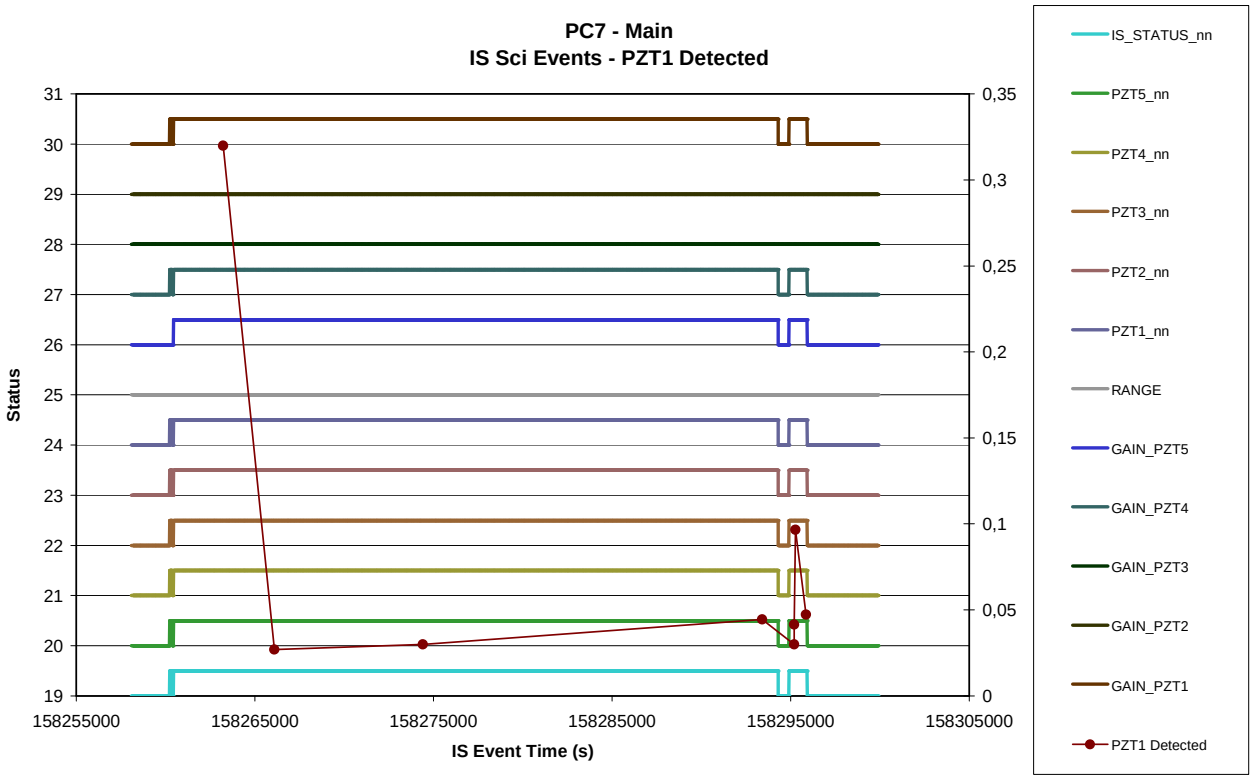


Figure 7.4-8. PZT 2 Detected Events vs. time - Main

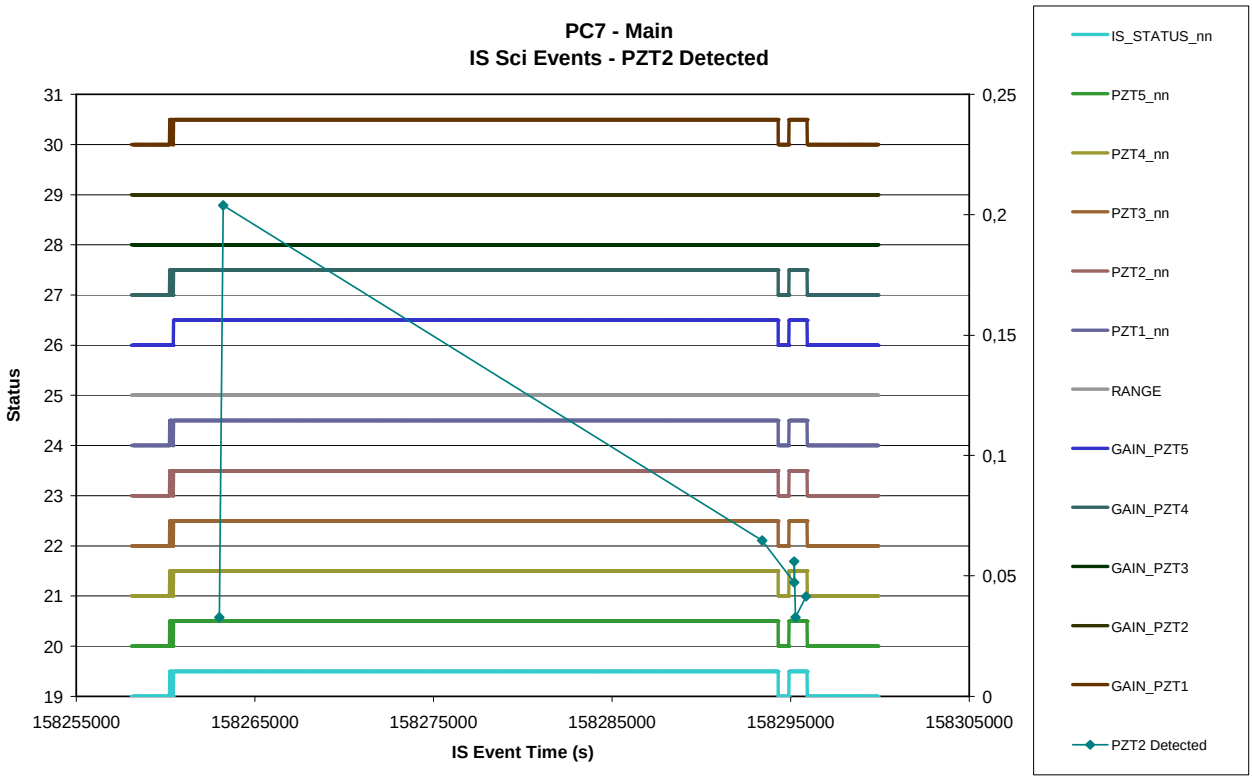


Figure 7.4-9. PZT 3 Detected Events vs. time - Main

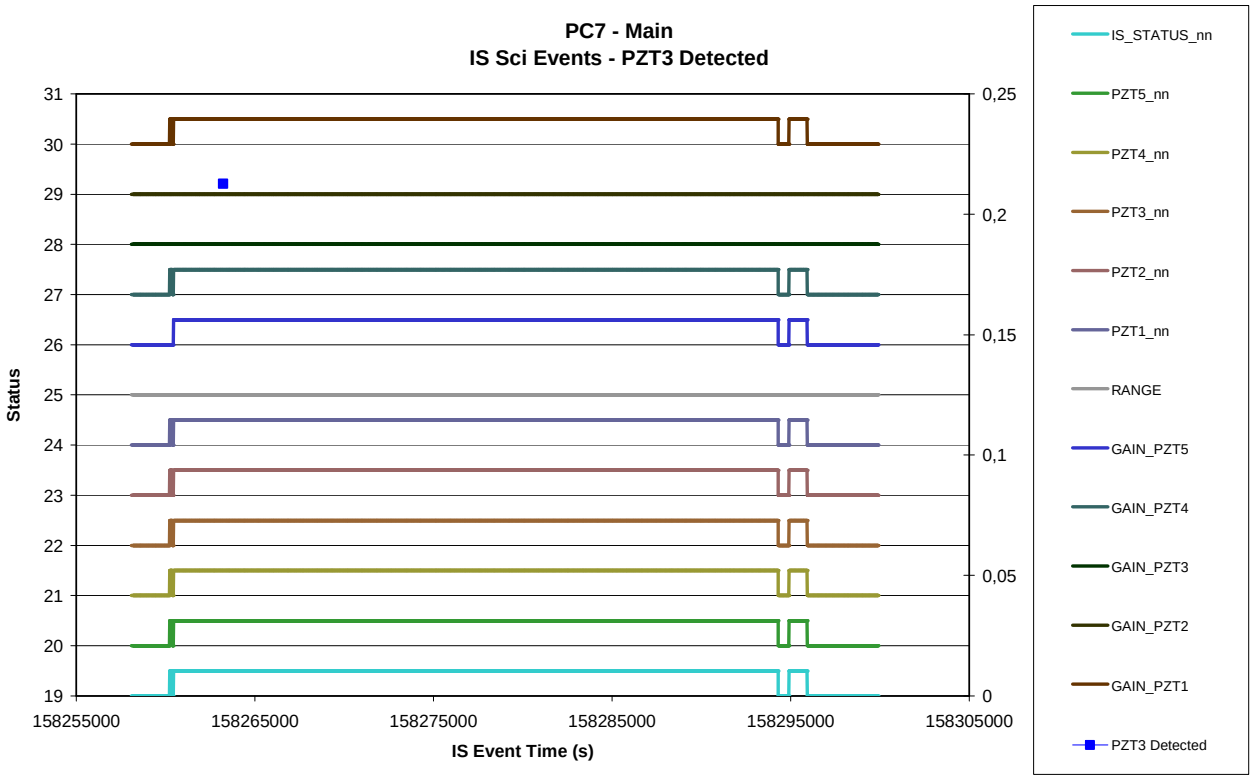


Figure 7.4-10. PZT 4 Detected Events vs. time - Main

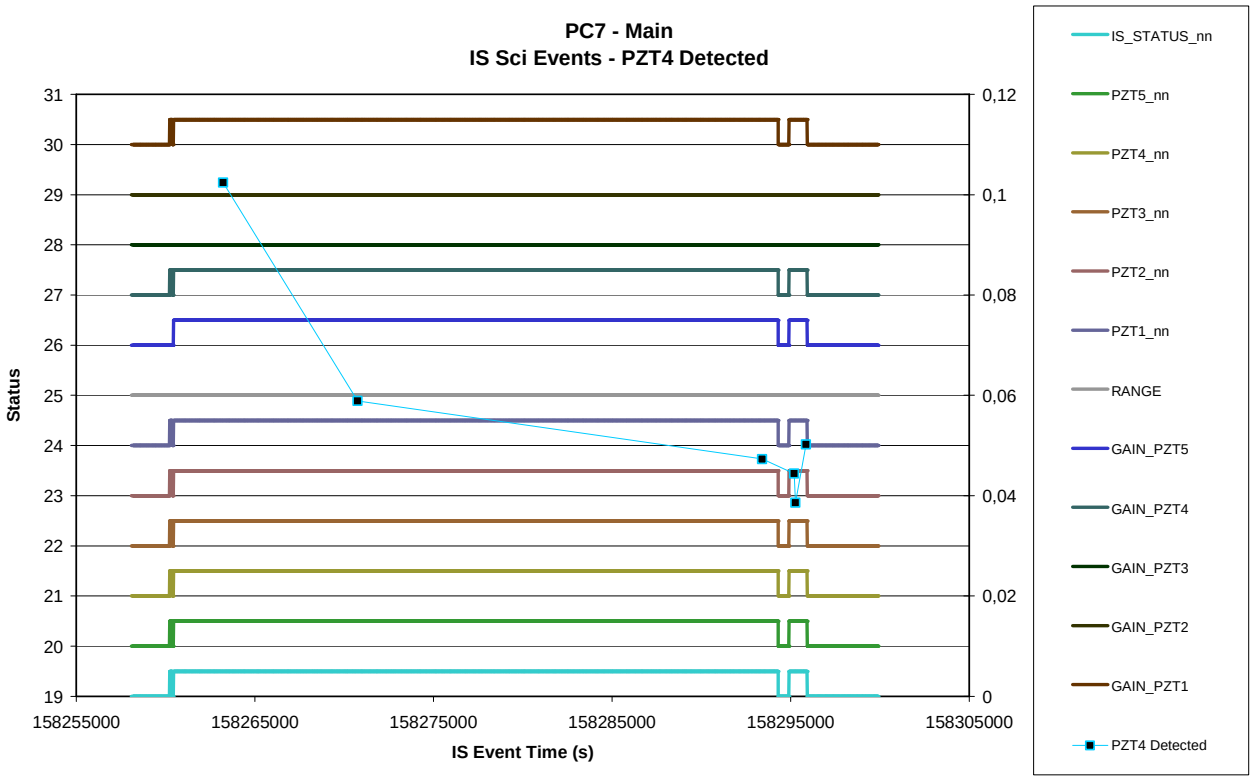


Figure 7.4-11. PZT 5 Detected Events vs. time - Main

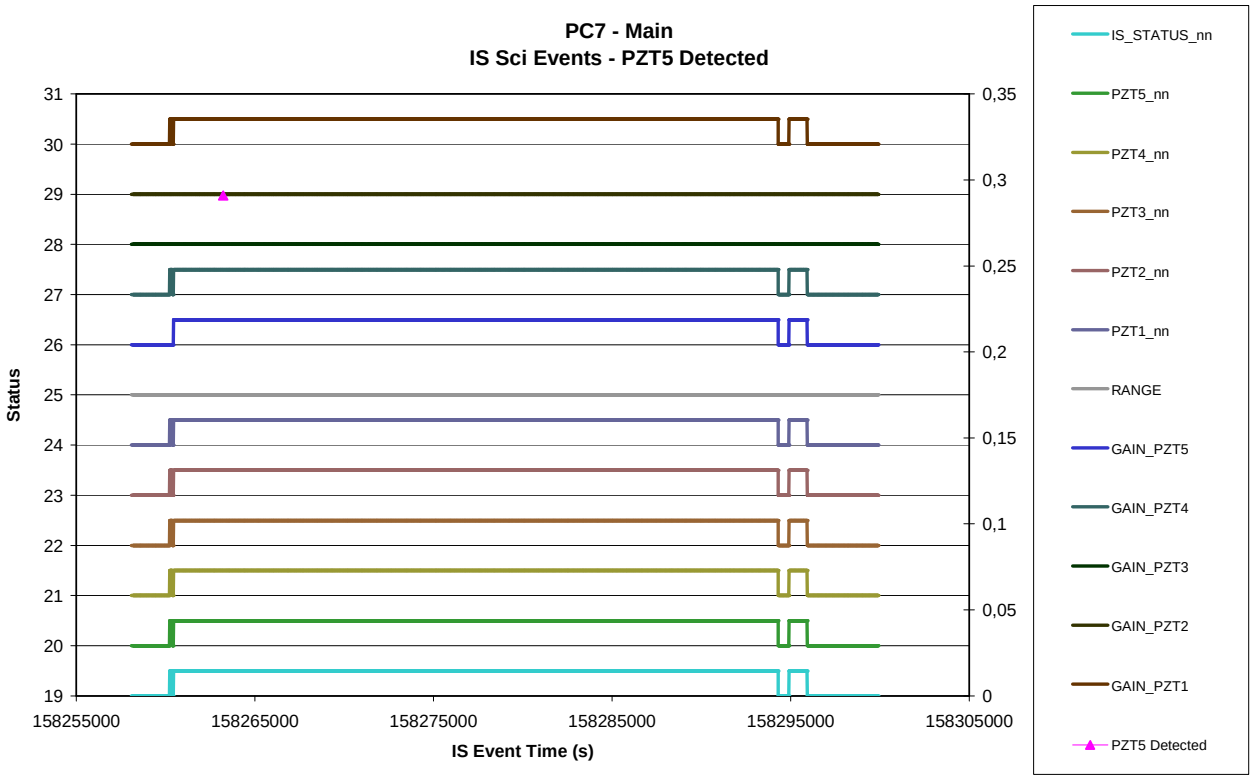
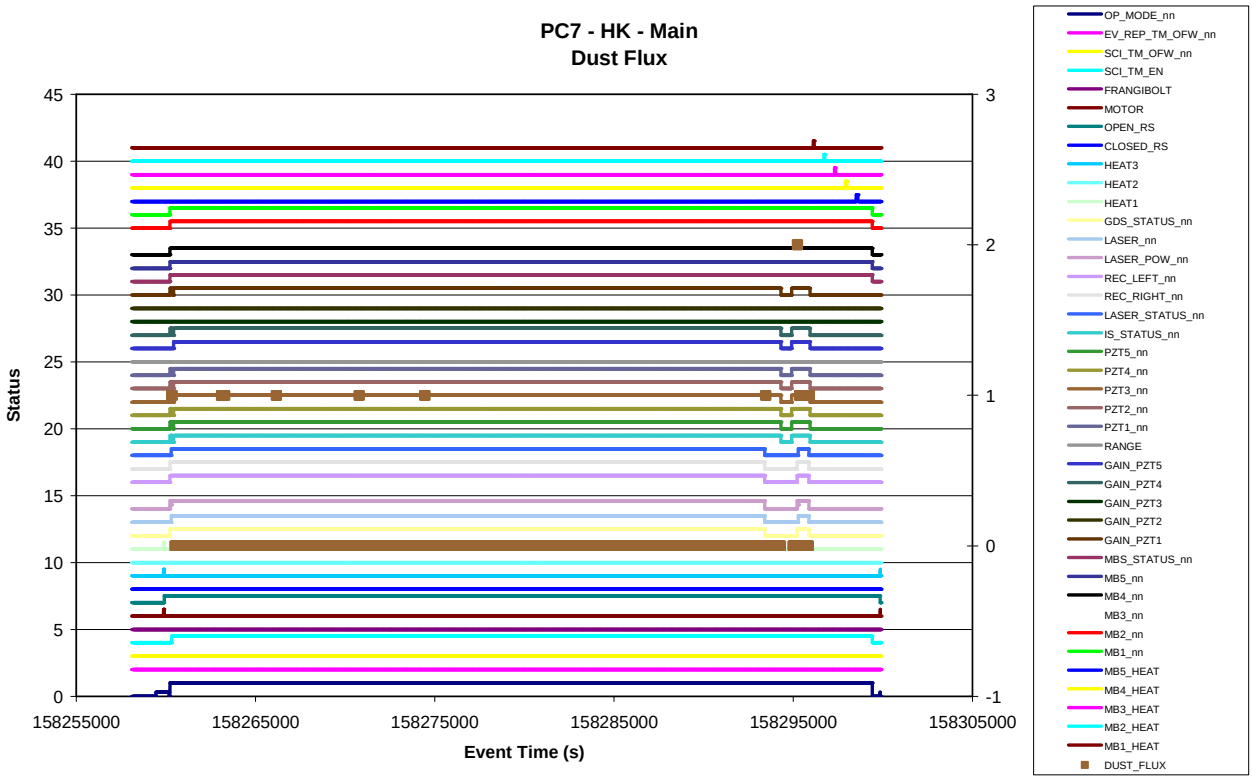


Figure 7.4-12. Dust Flux vs. time - Main



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

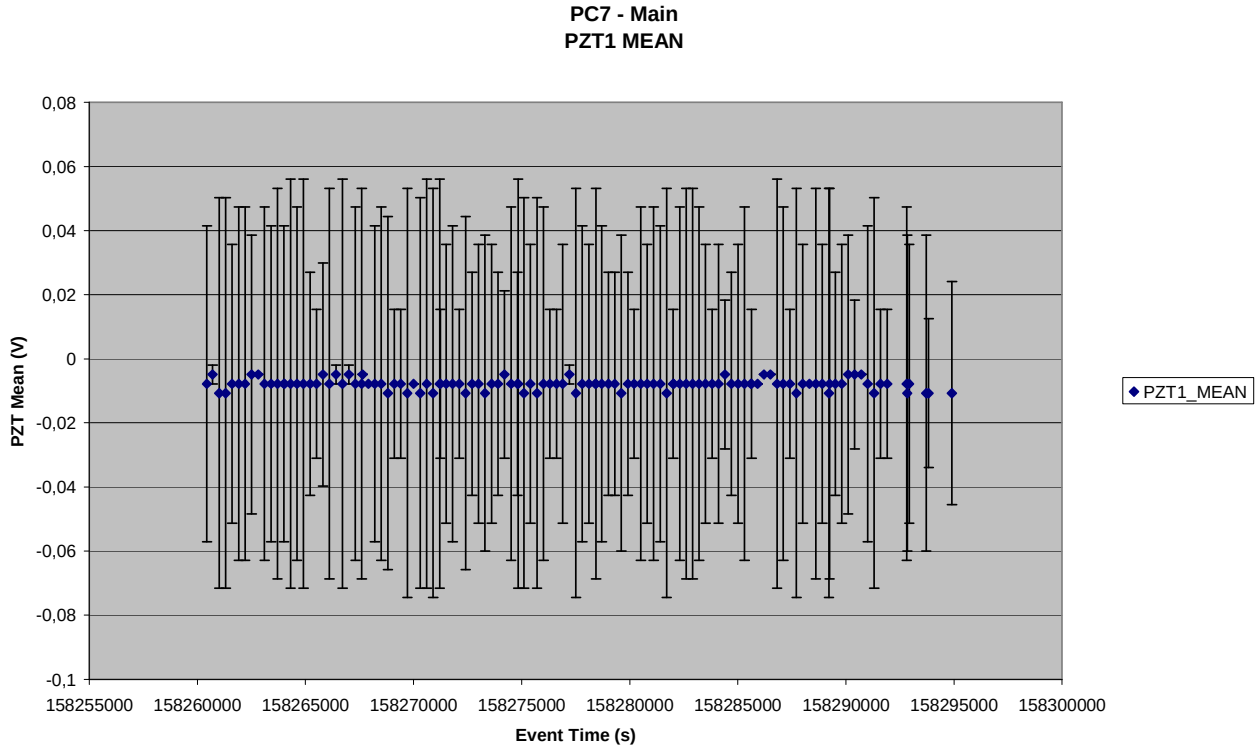


Figure 7.4-14. PZT 2 Mean and St Dev. CAL vs. time - Main

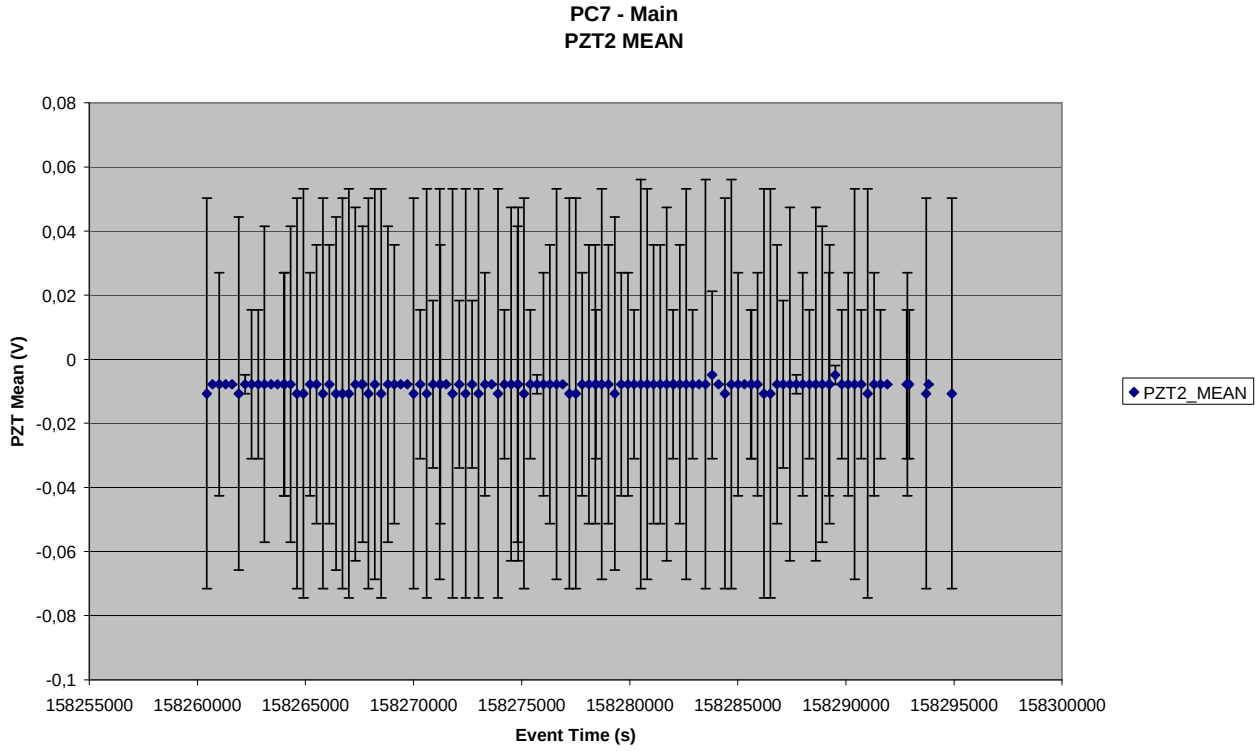


Figure 7.4-15. PZT 3 Mean and St Dev. CAL vs. time - Main

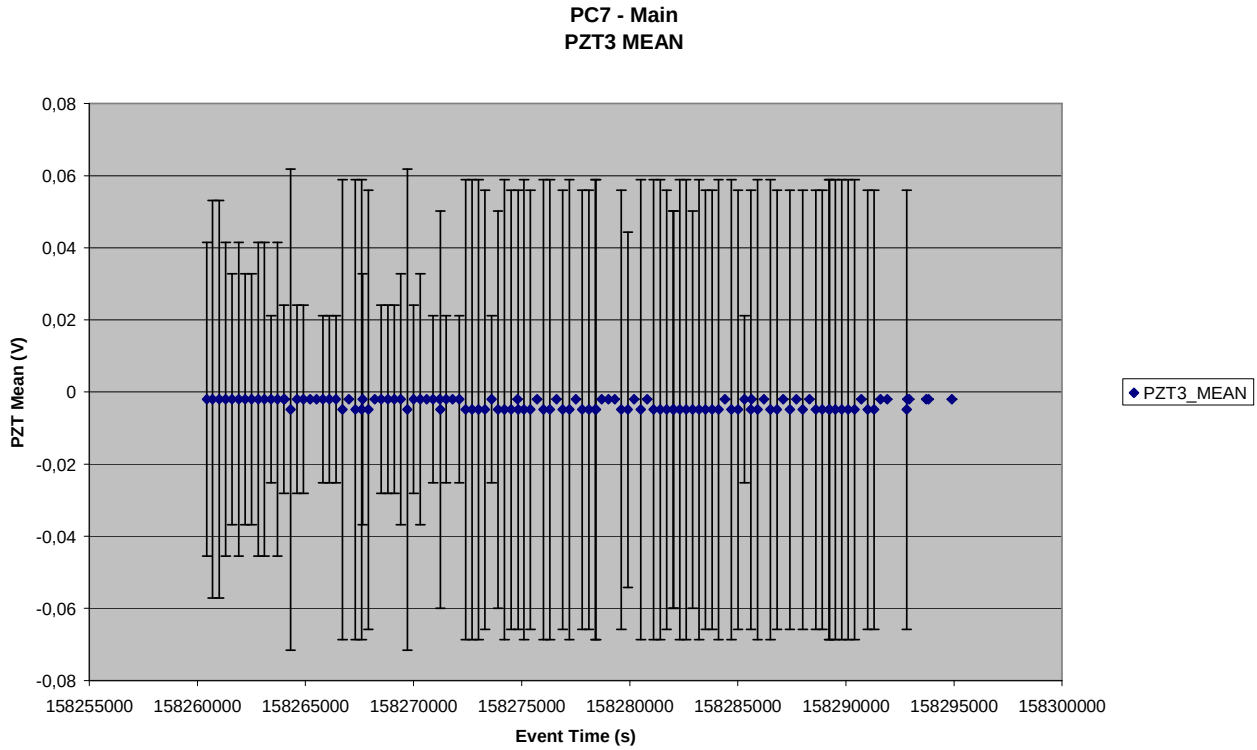


Figure 7.4-16. PZT 4 Mean and St Dev. CAL vs. time - Main

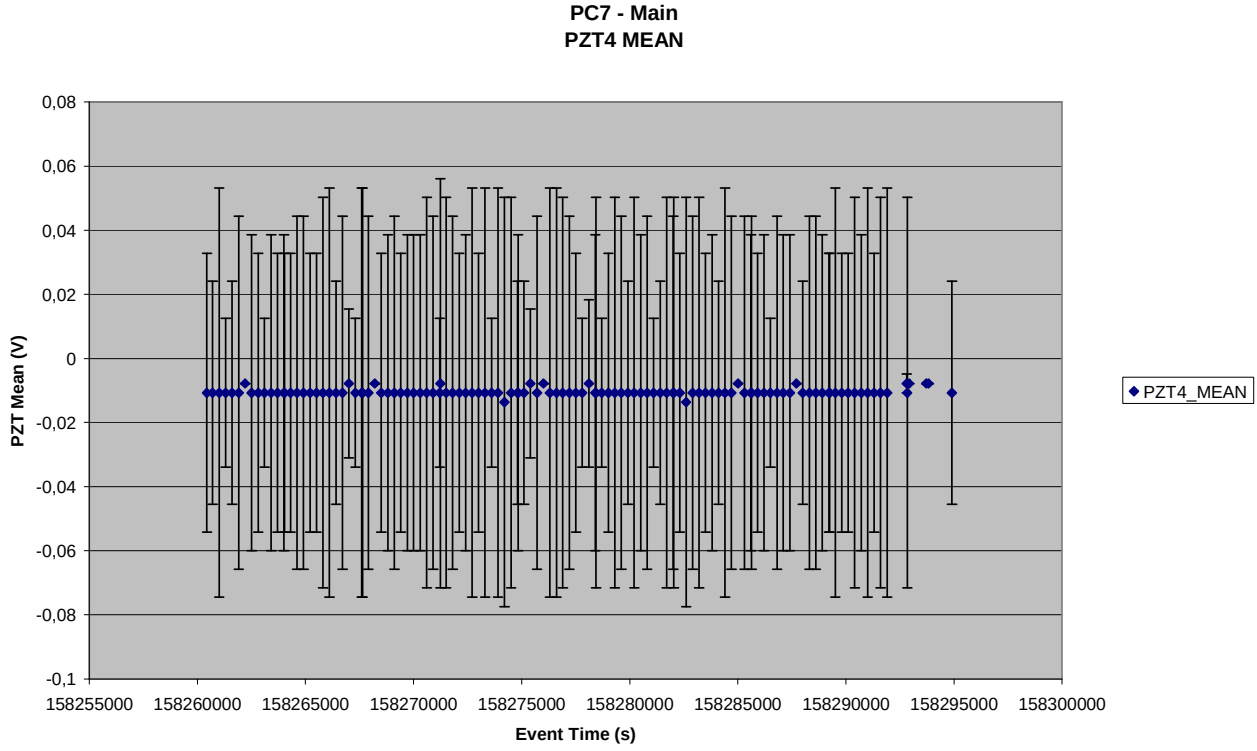


Figure 7.4-17. PZT 5 Mean and St Dev. CAL vs. time - Main

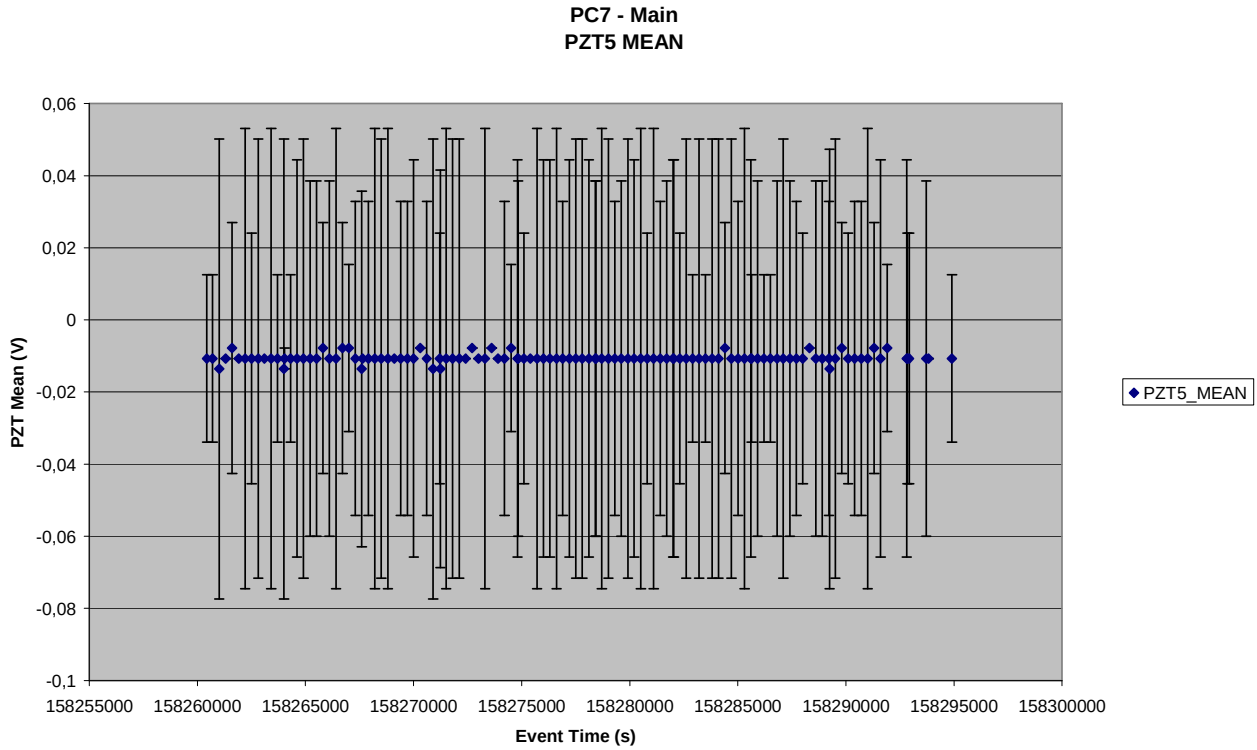


Figure 7.4-18. Reference Voltages for IS calibration vs. time - Main

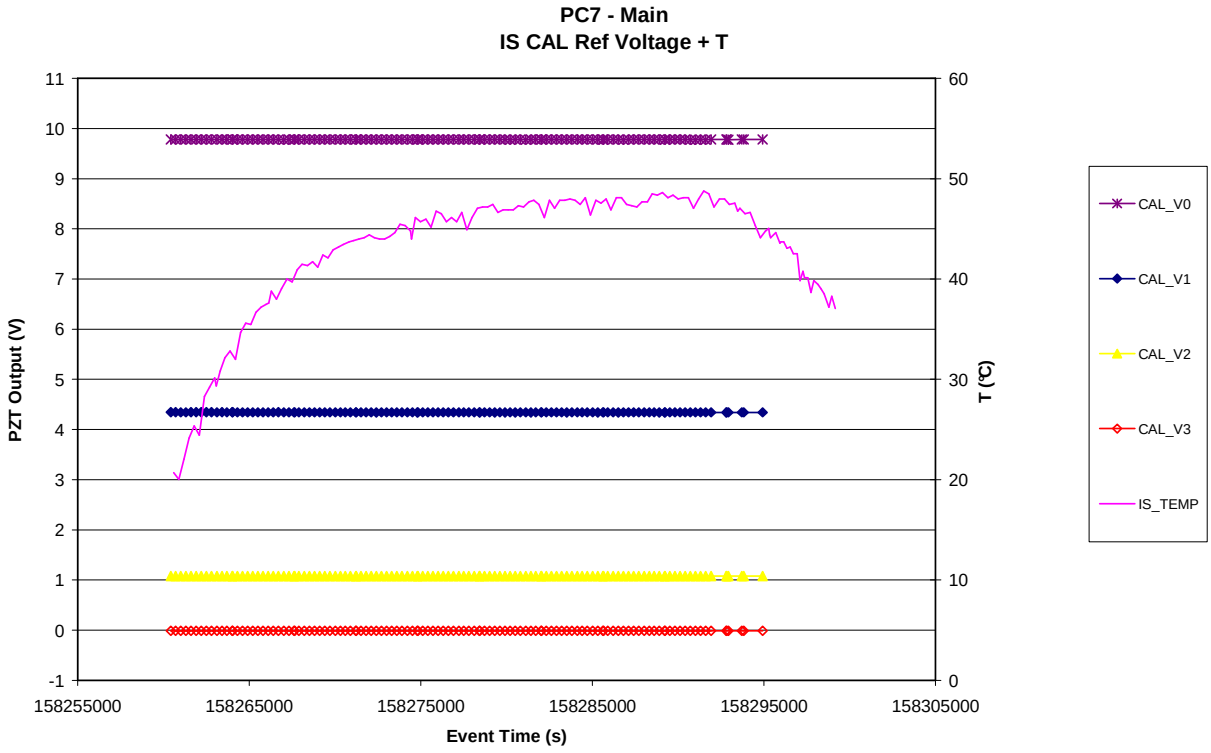


Figure 7.4-19. PZT 1 CAL Signal vs. time - Main

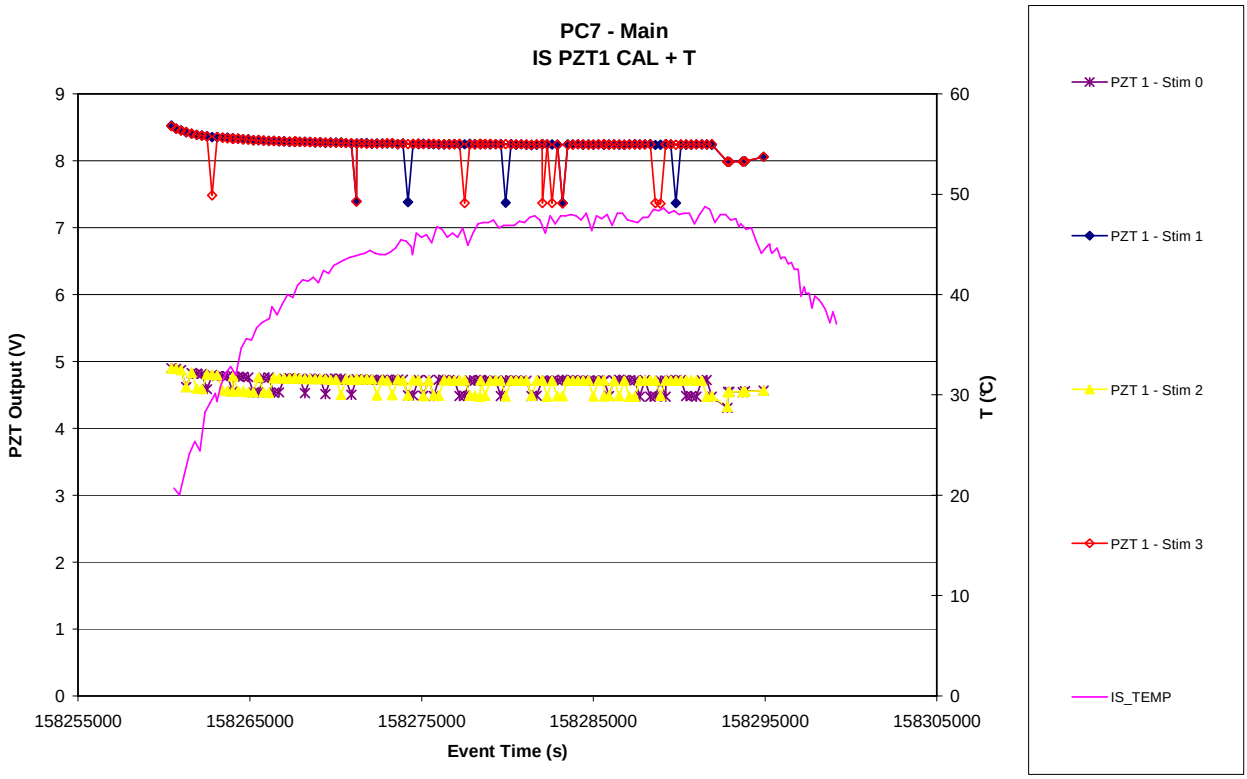


Figure 7.4-20. PZT 2 CAL Signal vs. time - Main

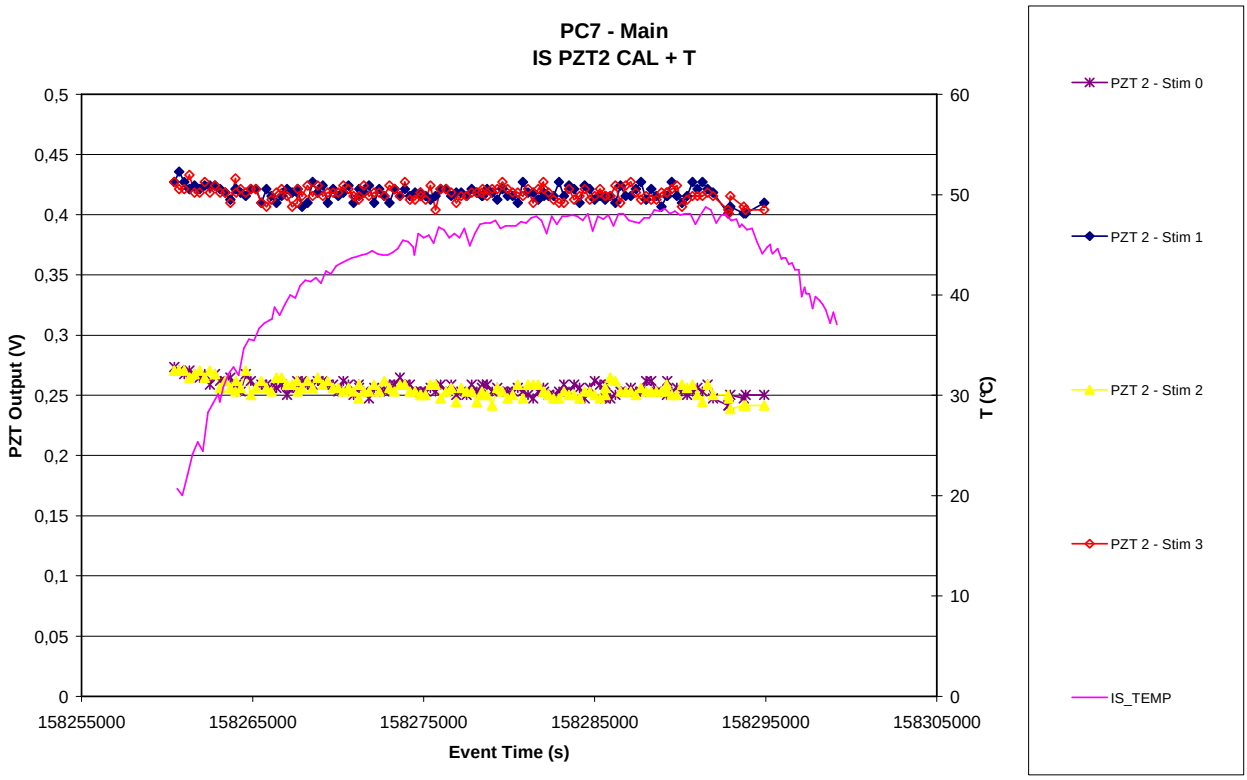


Figure 7.4-21. PZT 3 CAL Signal vs. time - Main

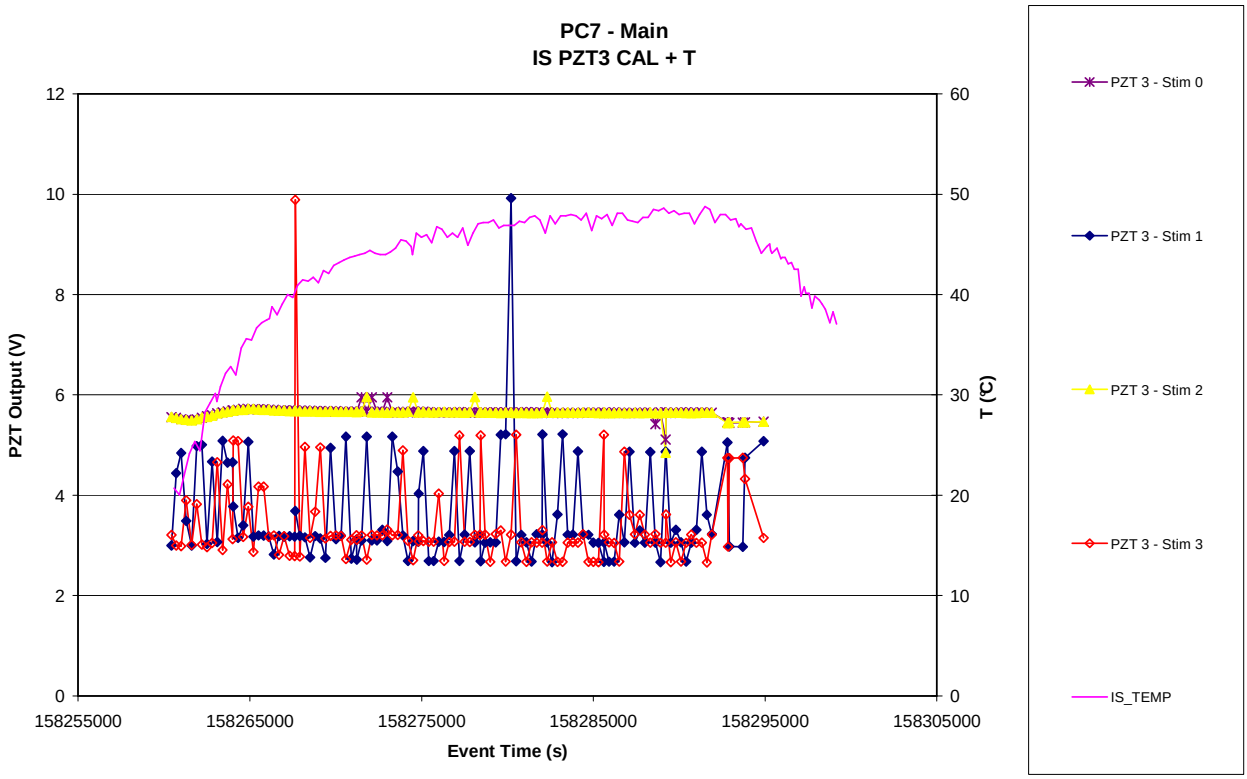


Figure 7.4-22. PZT 4 CAL Signal vs. time - Main

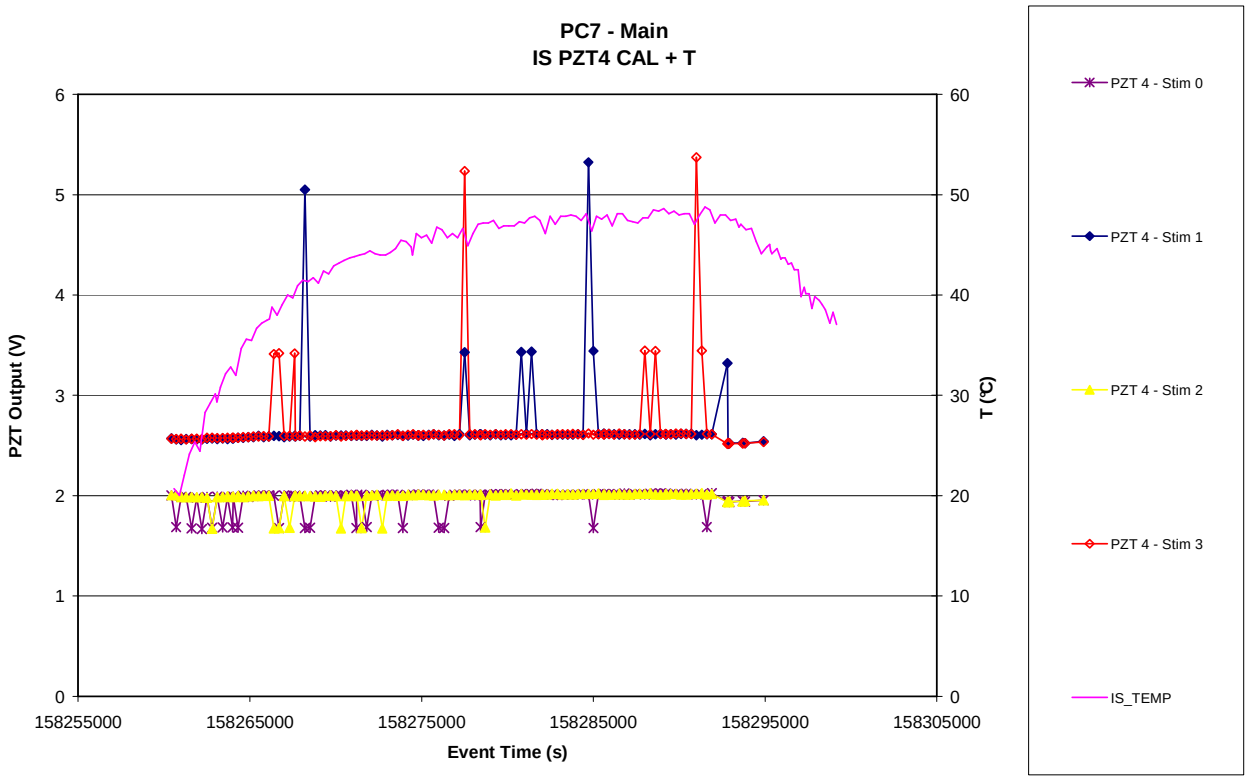


Figure 7.4-23. PZT 5 CAL Signal vs. time - Main

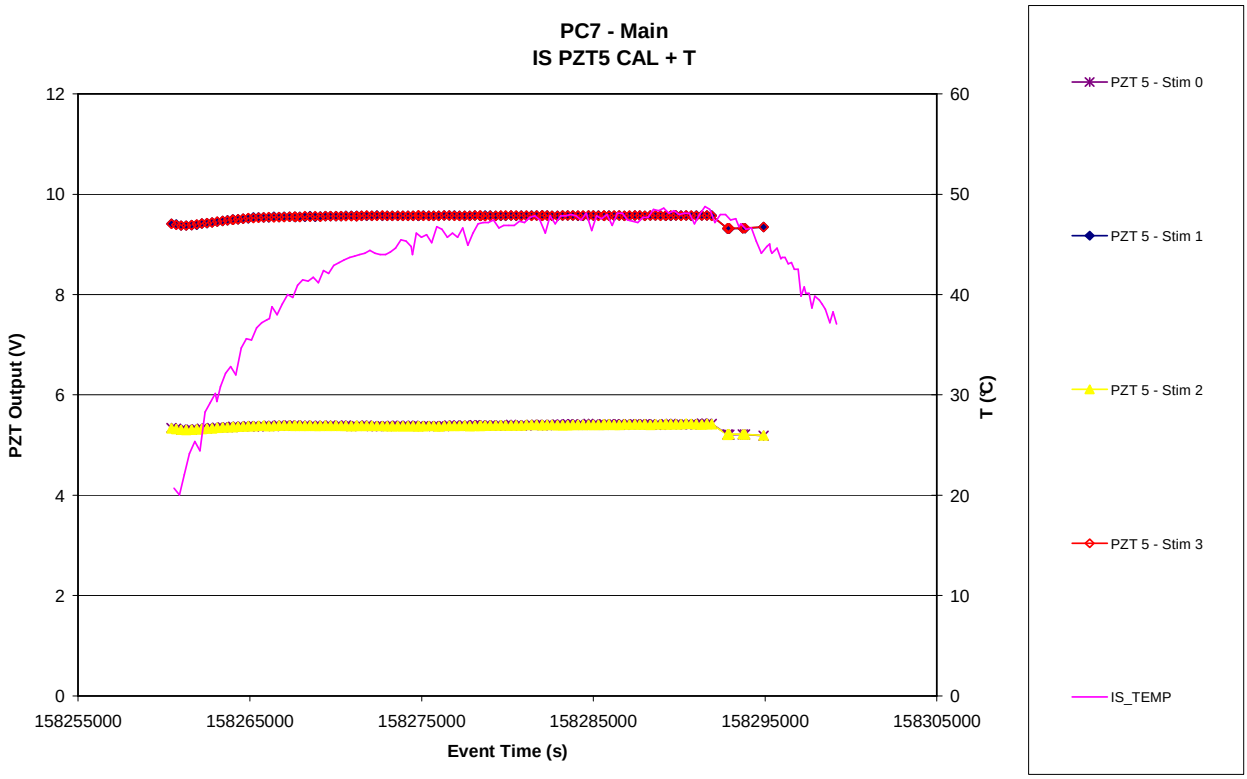


Figure 7.4-24. PZT 1 CAL Time delay vs. time - Main

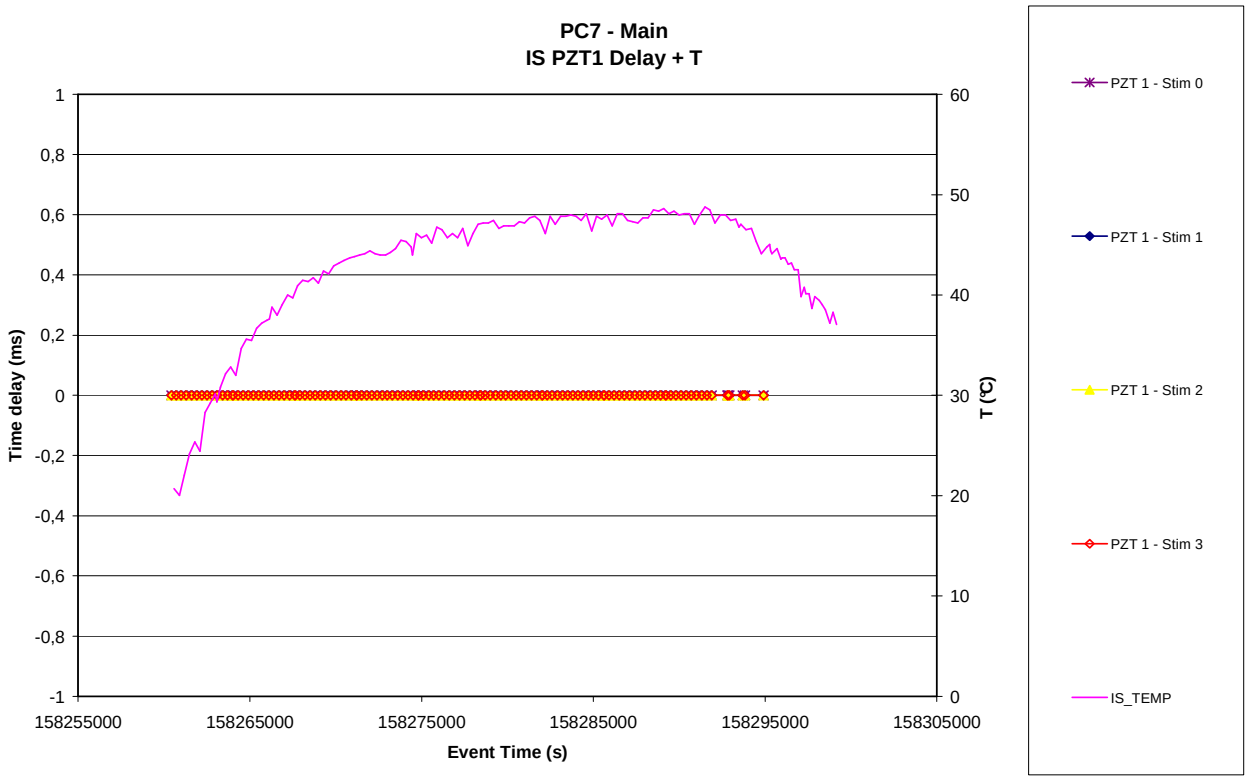


Figure 7.4-25. PZT 2 CAL Time delay vs. time - Main

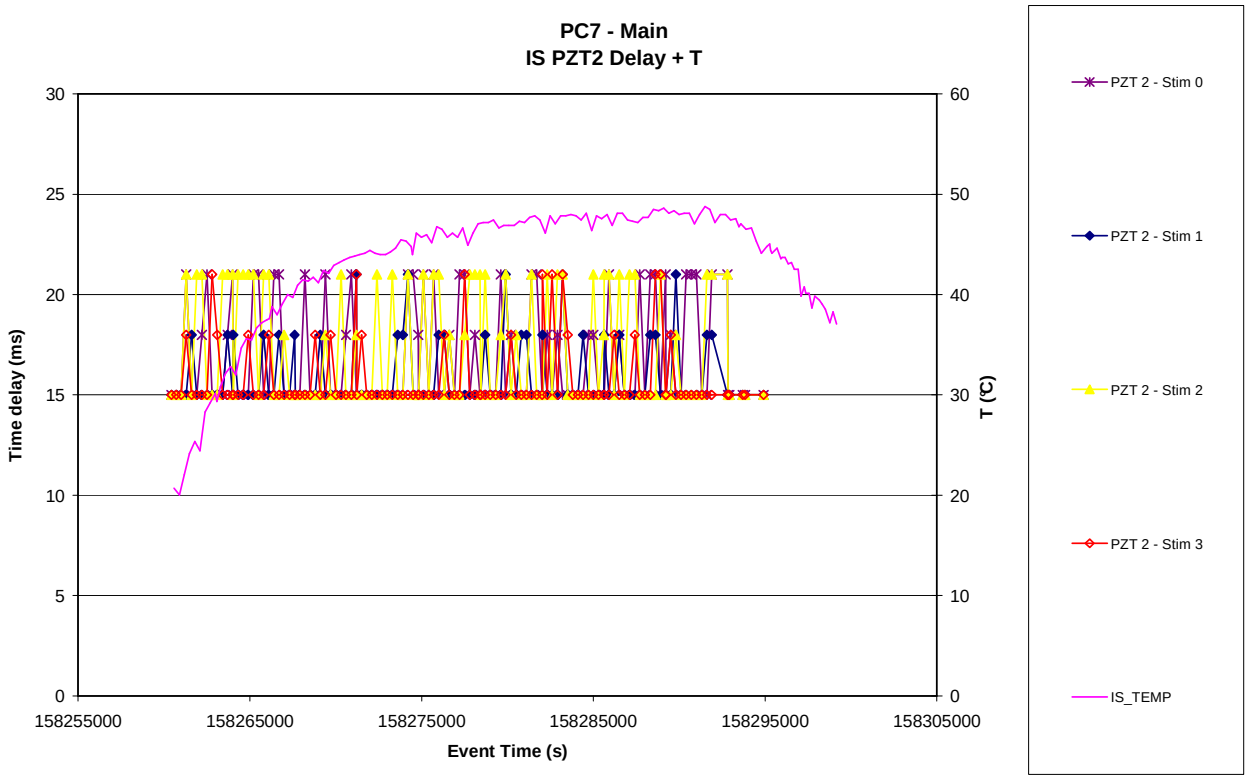


Figure 7.4-26. PZT 3 CAL Time delay vs. time - Main

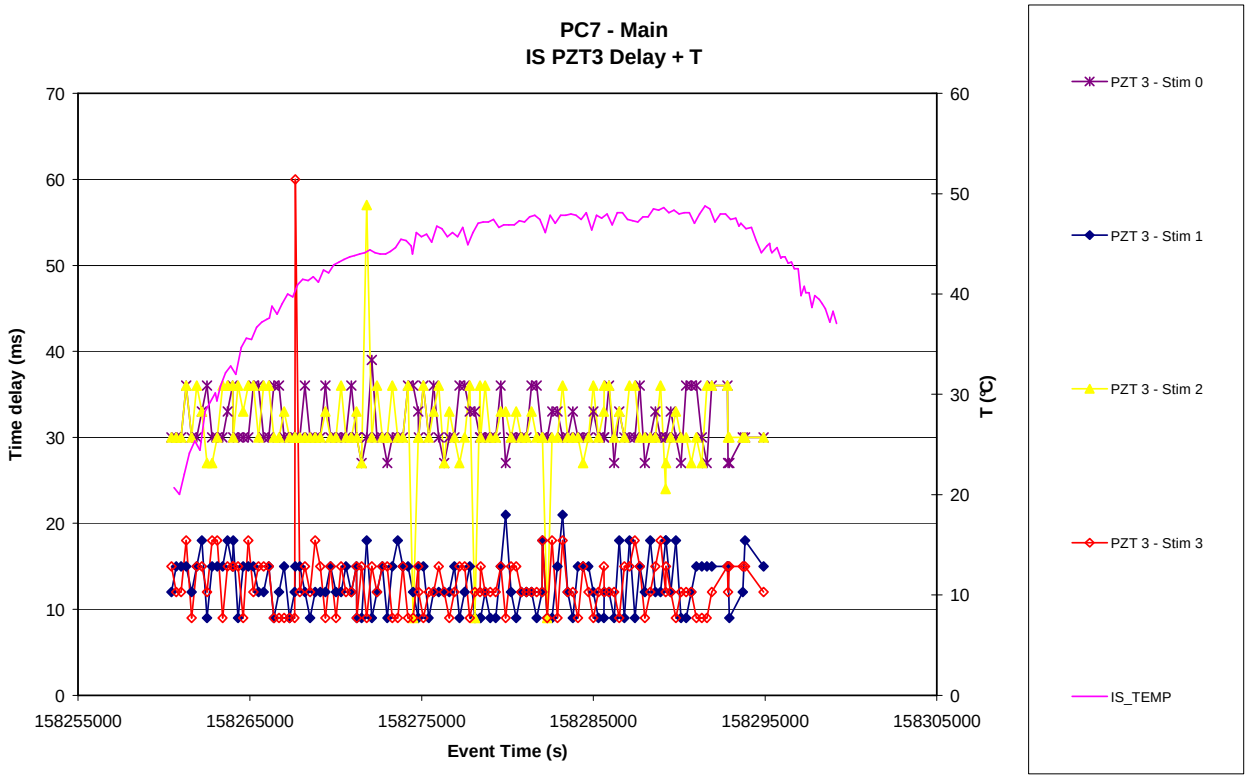


Figure 7.4-27. PZT 4 CAL Time delay vs. time - Main

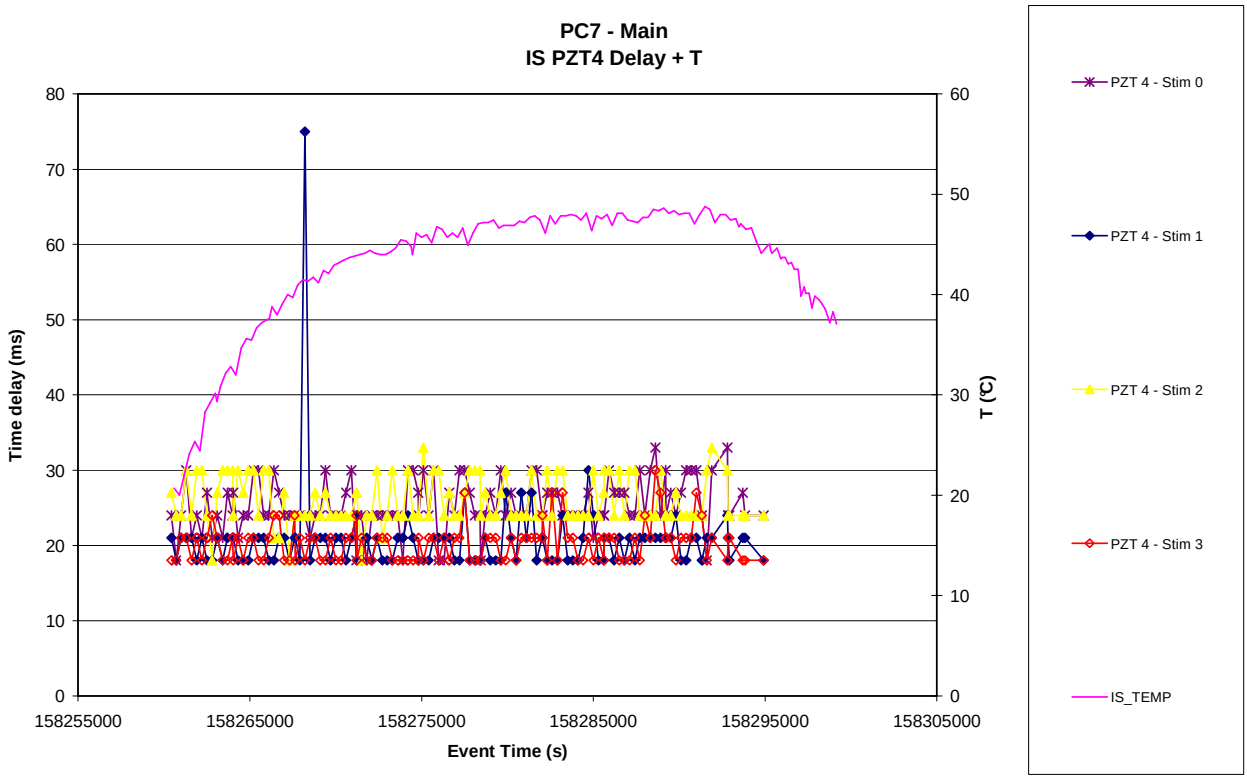


Figure 7.4-28. PZT 5 CAL Time delay vs. time - Main

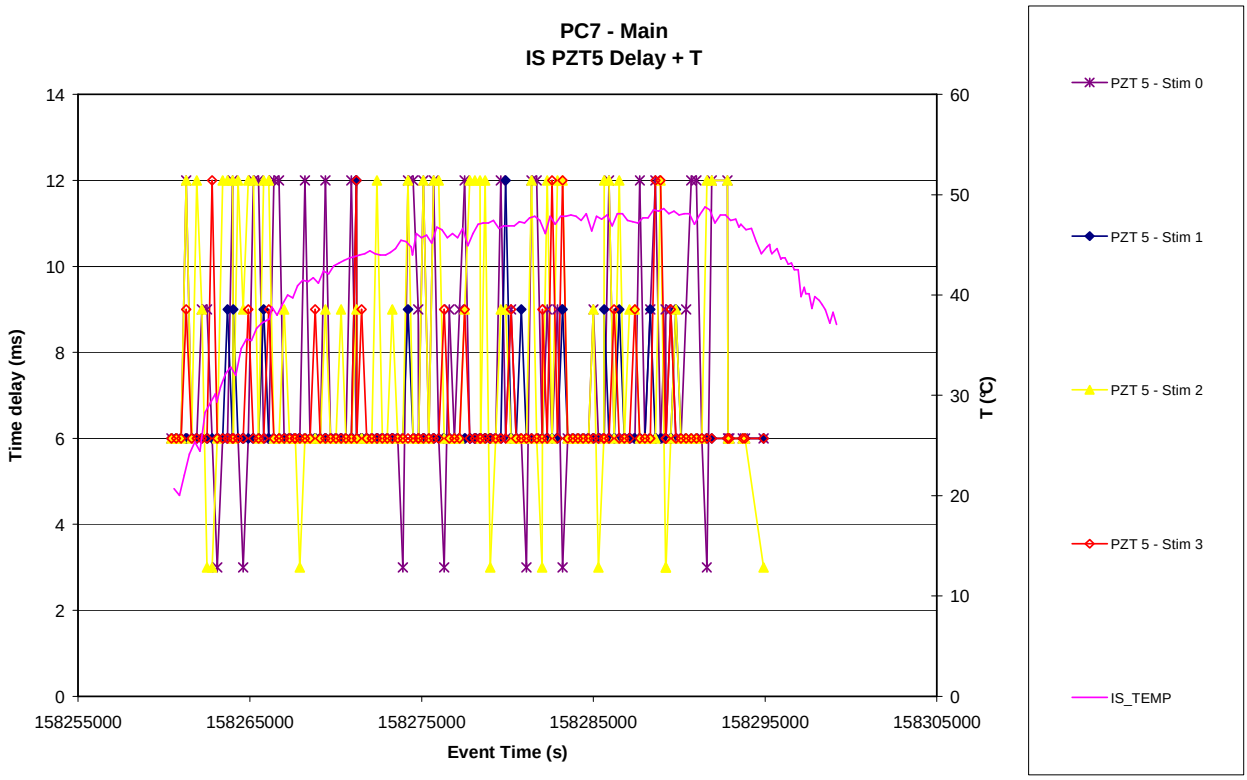


Figure 7.4-29. PZT 1 CAL Signal vs. stimulus – Main

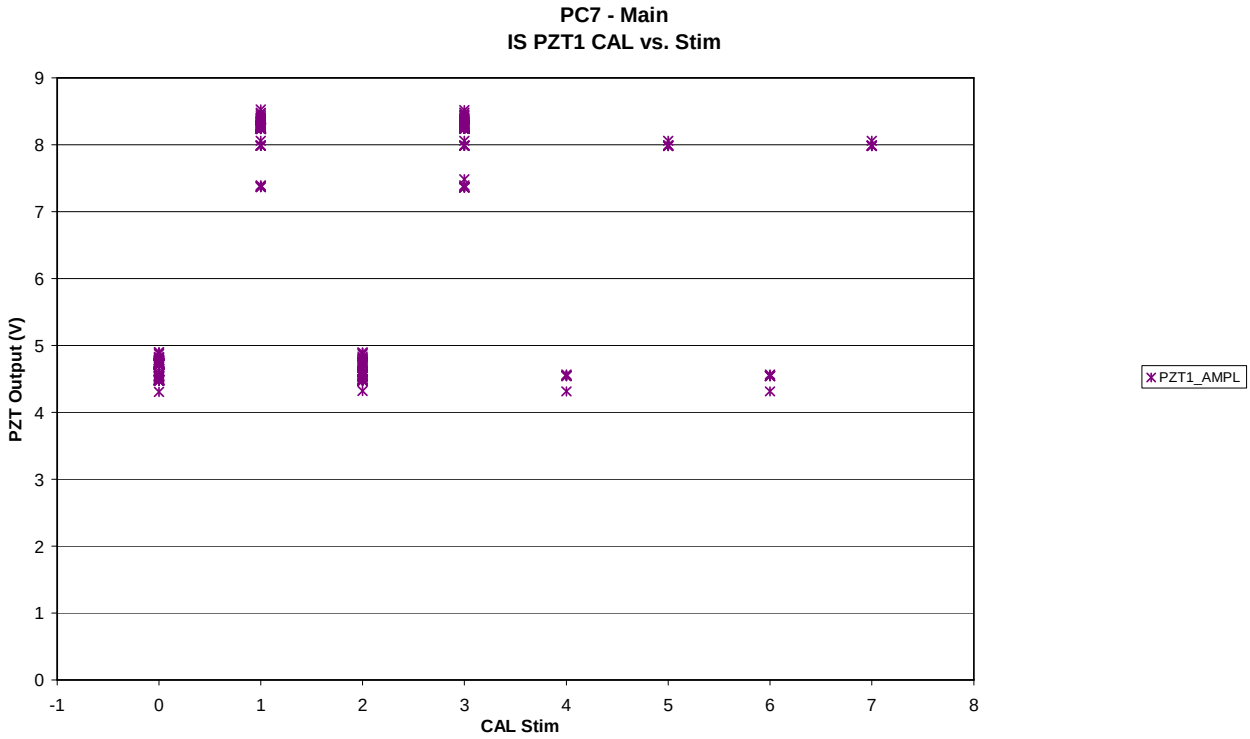


Figure 7.4-30. PZT 2 CAL Signal vs. stimulus – Main

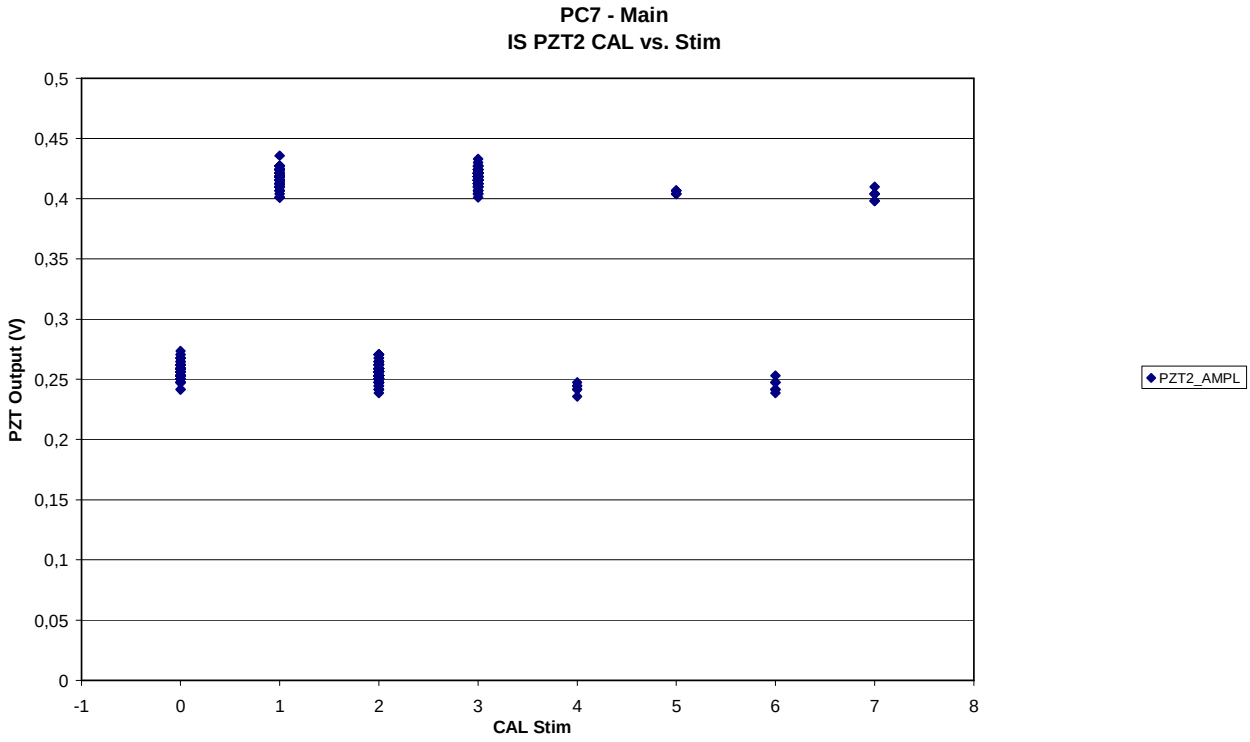


Figure 7.4-31. PZT 3 CAL Signal vs. stimulus – Main

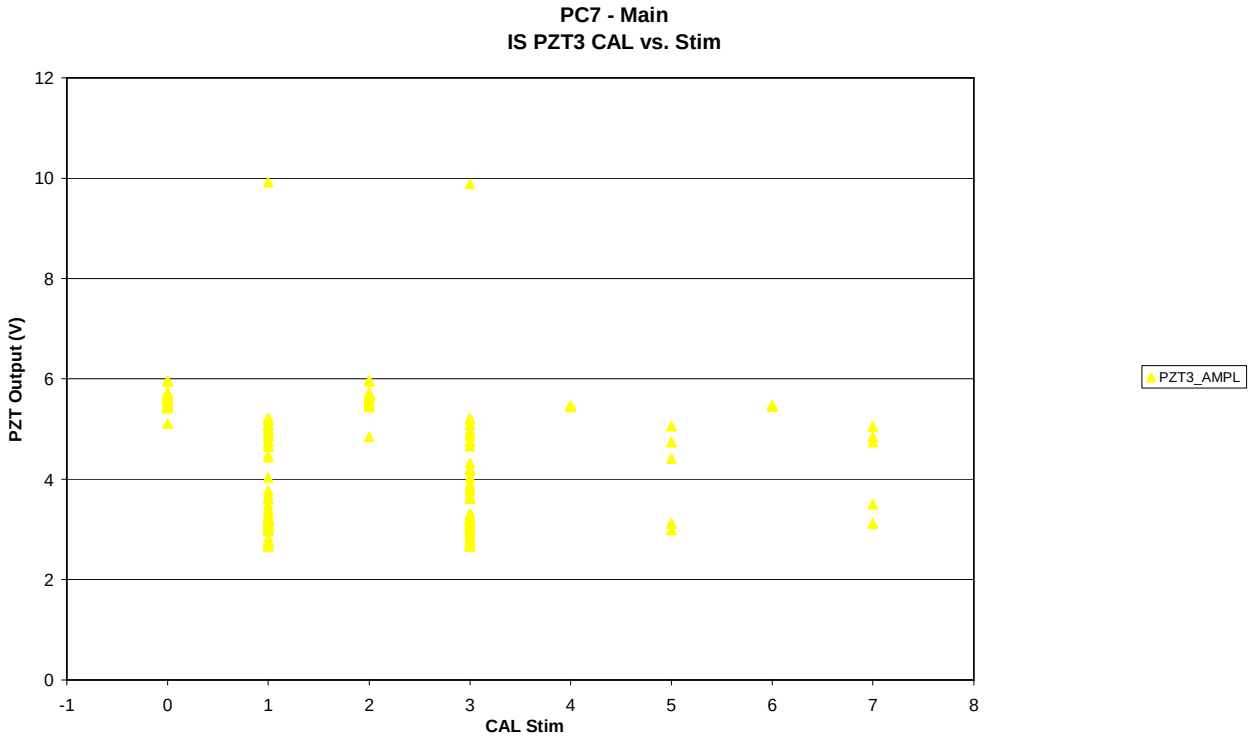


Figure 7.4-32. PZT 4 CAL Signal vs. stimulus – Main

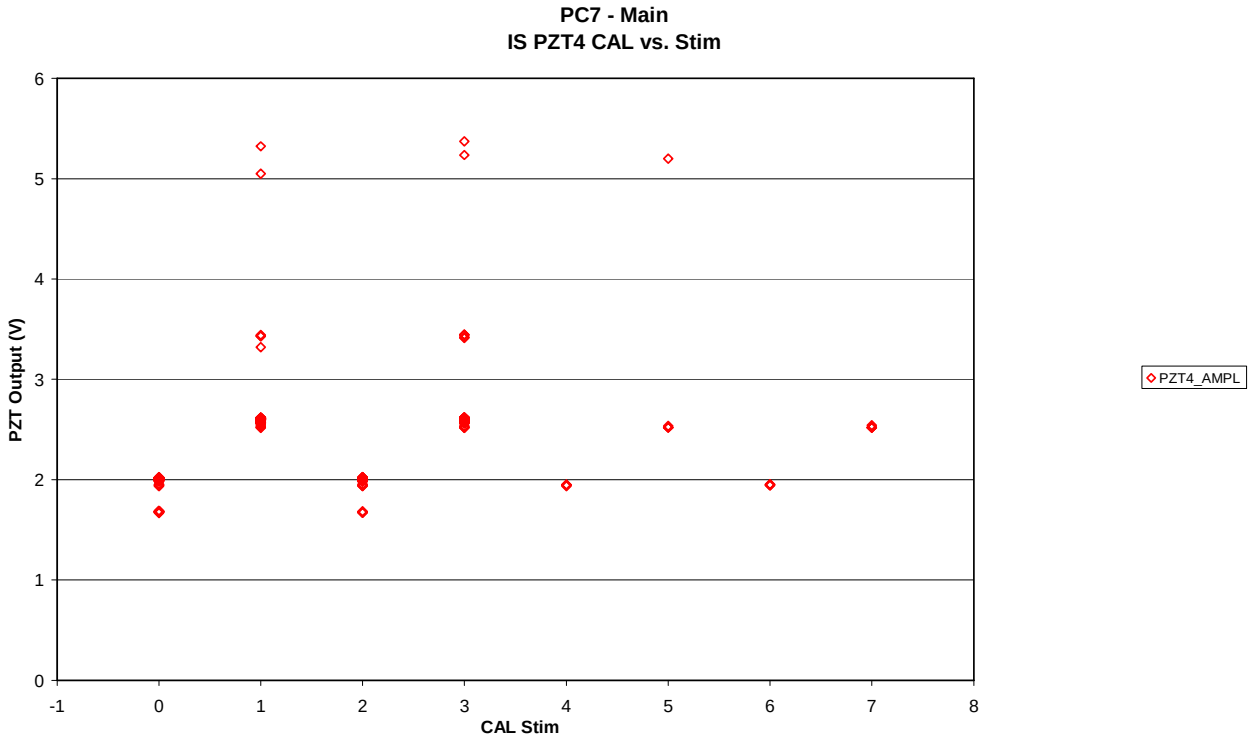


Figure 7.4-33. PZT 5 CAL Signal vs. stimulus – Main

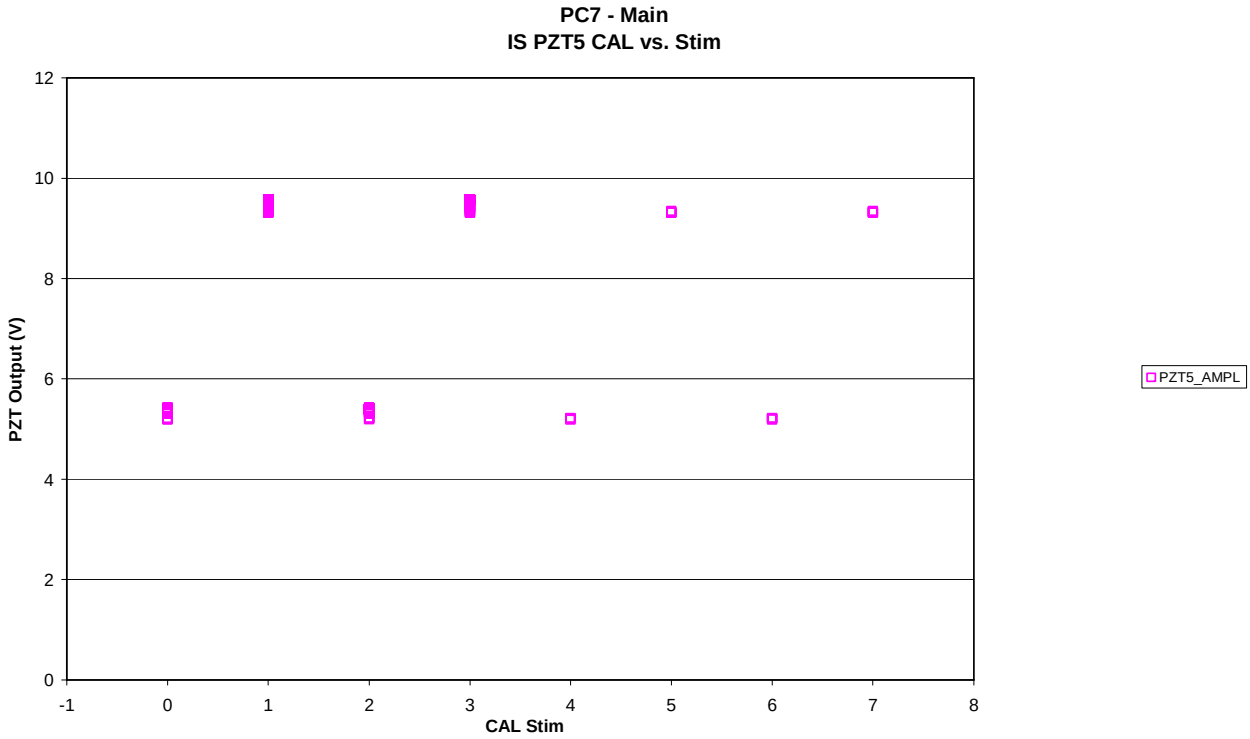


Figure 7.4-34. PZT 1 CAL Time delay vs. stimulus – Main

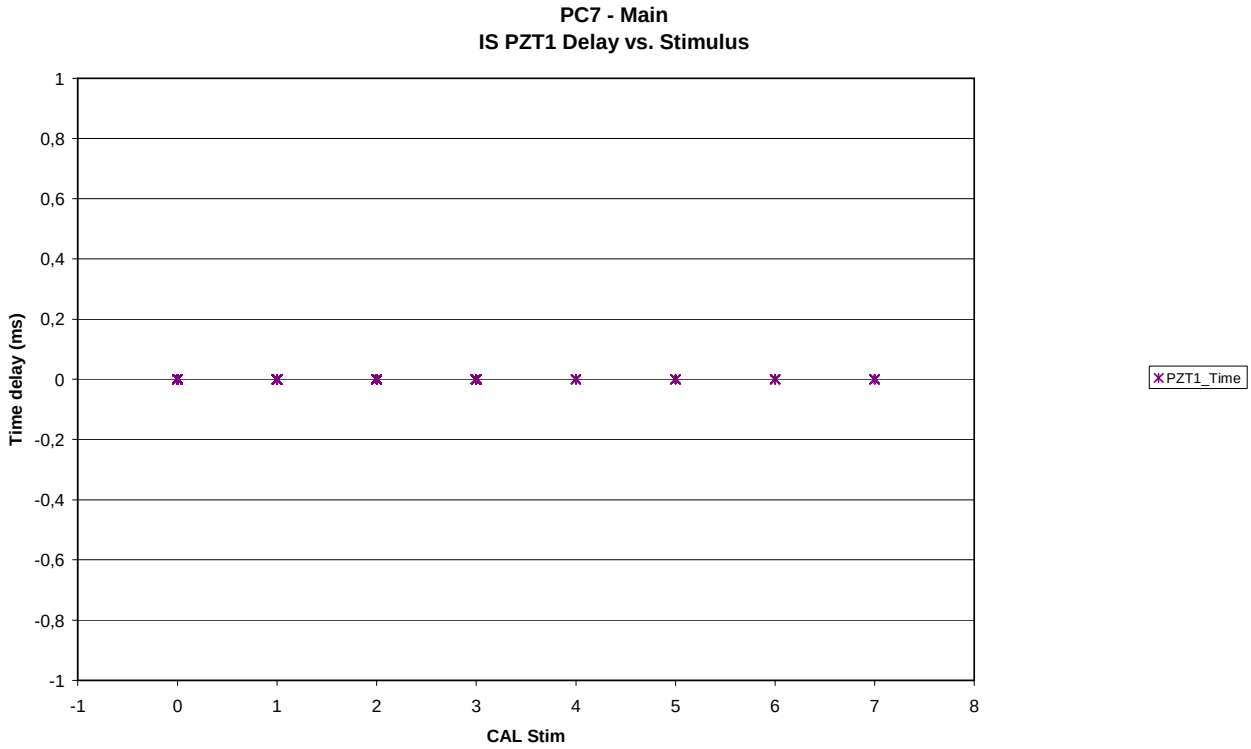


Figure 7.4-35. PZT 2 CAL Time delay vs. stimulus - Main

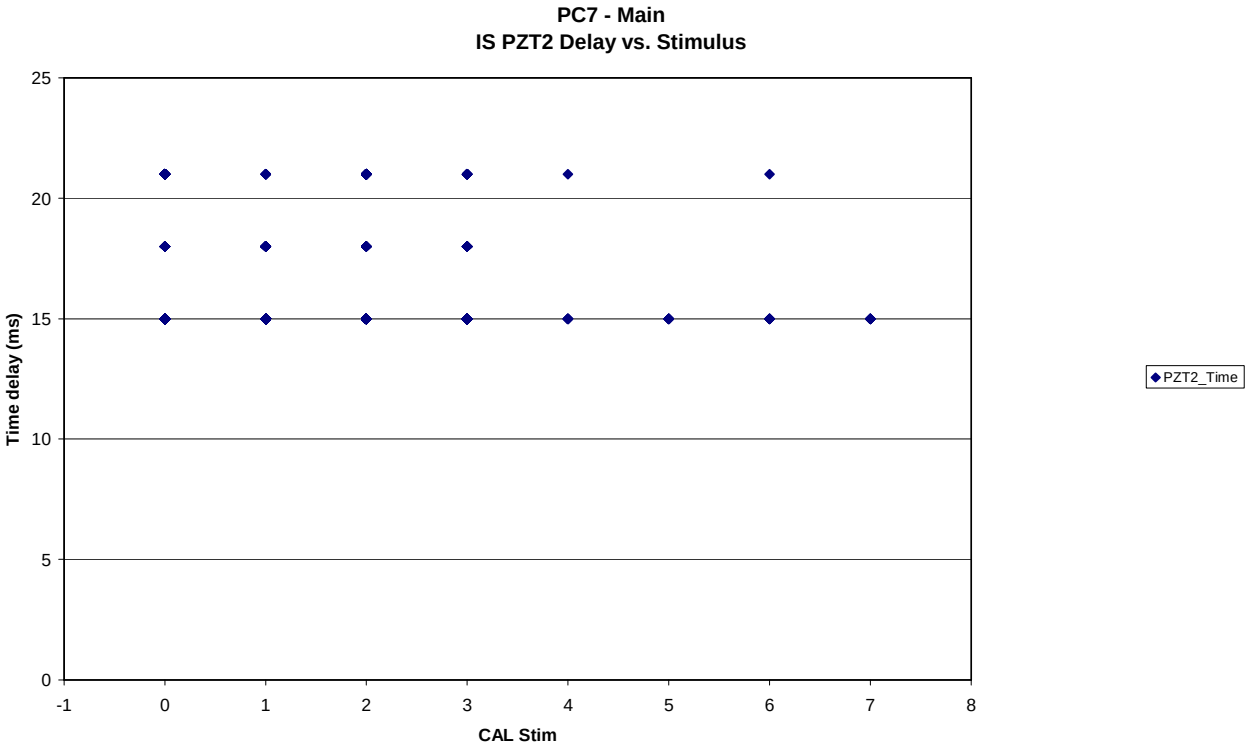


Figure 7.4-36. PZT 3 CAL Time delay vs. stimulus - Main

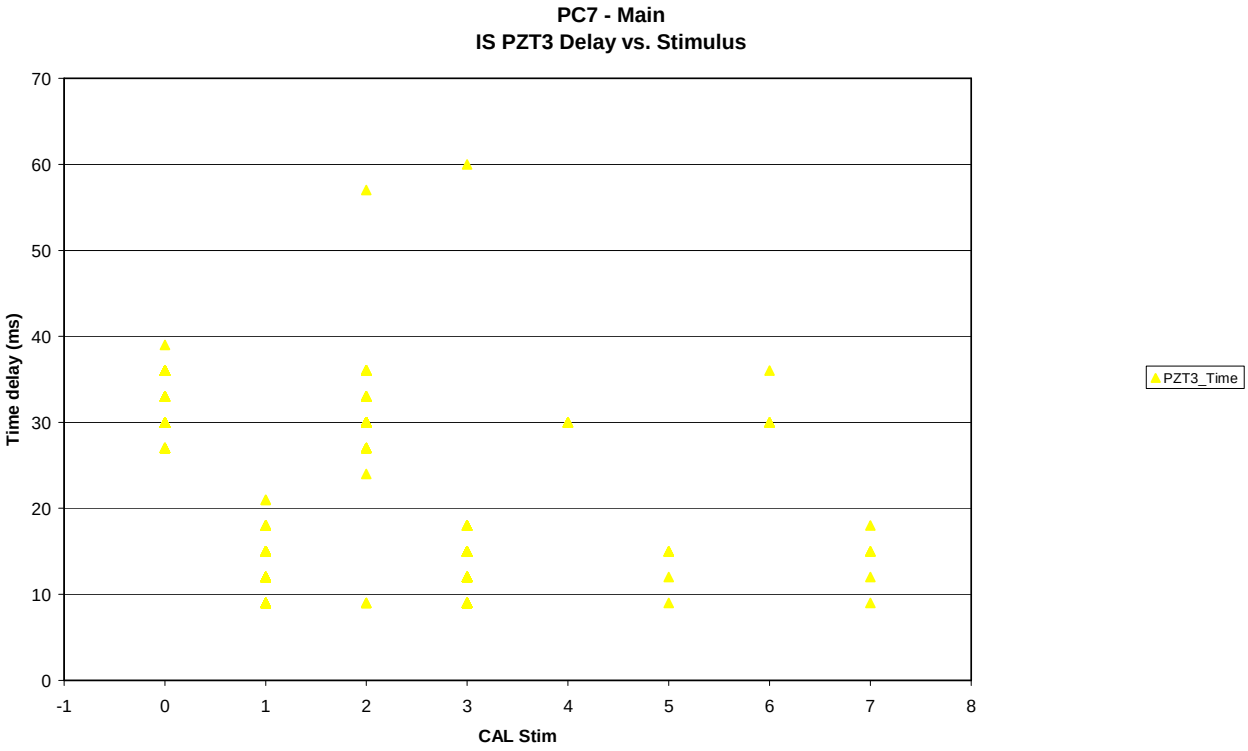


Figure 7.4-37. PZT 4 CAL Time delay vs. stimulus - Main

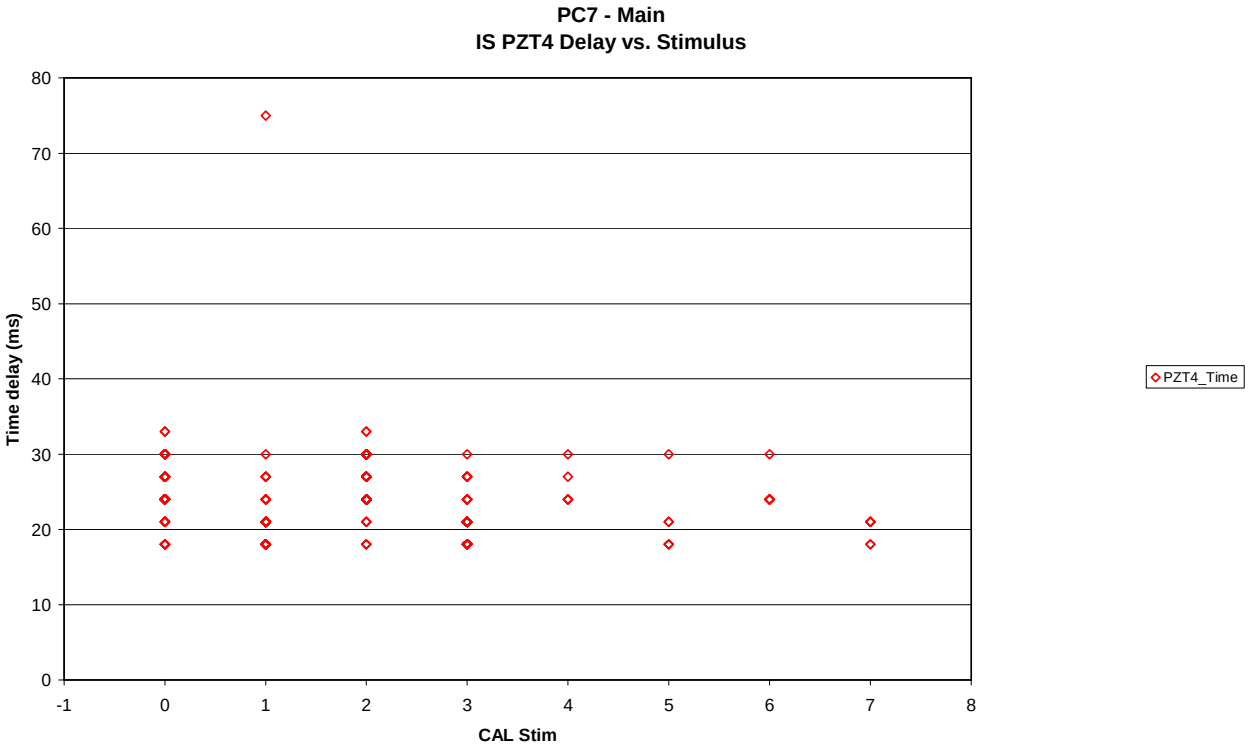
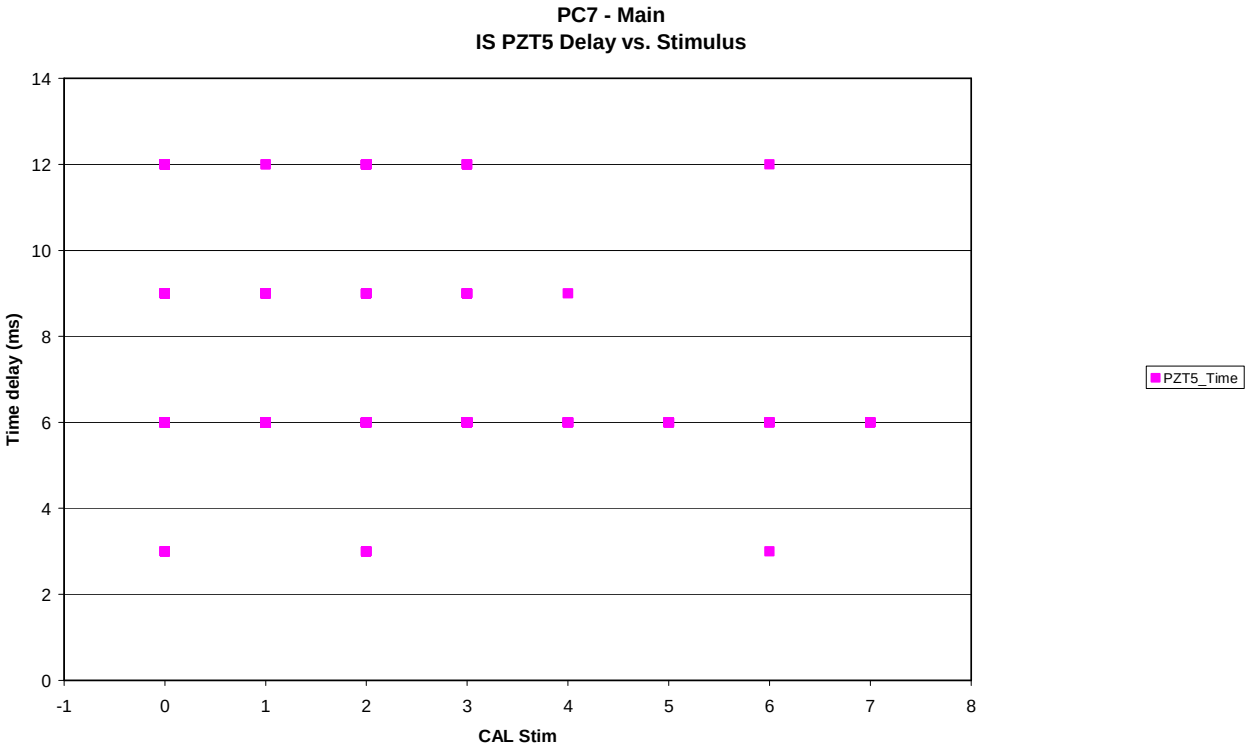


Figure 7.4-38. PZT 5 CAL Time delay vs. stimulus - Main



7.5 MICRO BALANCE SYSTEM (MBS)

7.5.1 MBS – Status

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

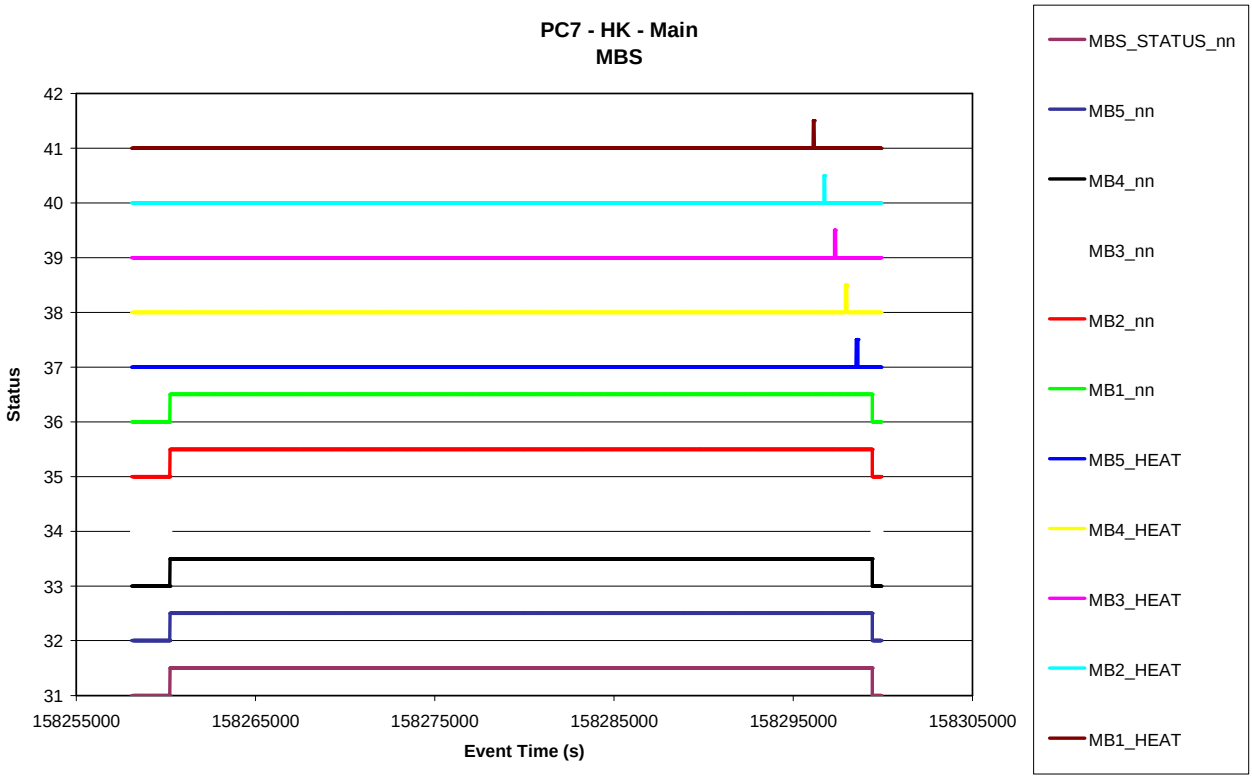


Figure 7.5-2. MBS 1 Temperature vs. time (HK, HK-SCI, SCI) – Main

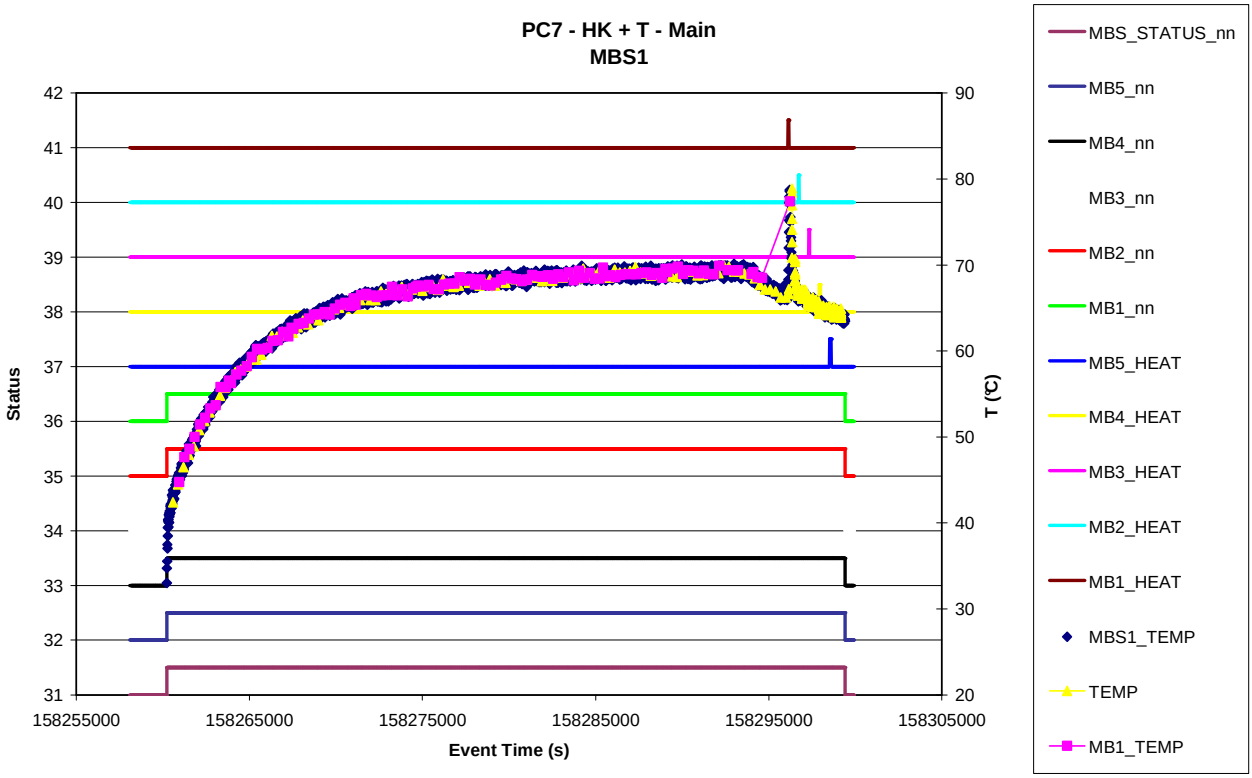


Figure 7.5-3. MBS 2 Temperature vs. time (HK, HK-SCI, SCI) - Main

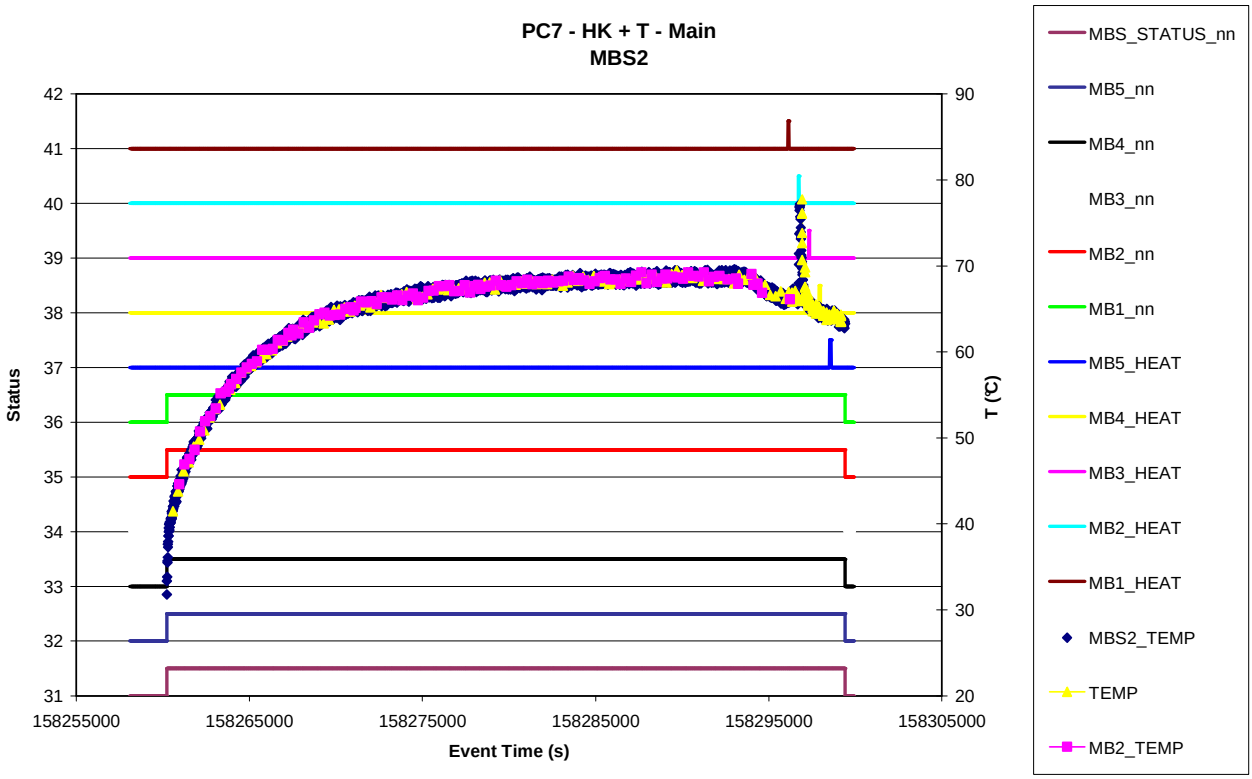


Figure 7.5-4. MBS 3 Temperature vs. time (HK, HK-SCI, SCI) - Main

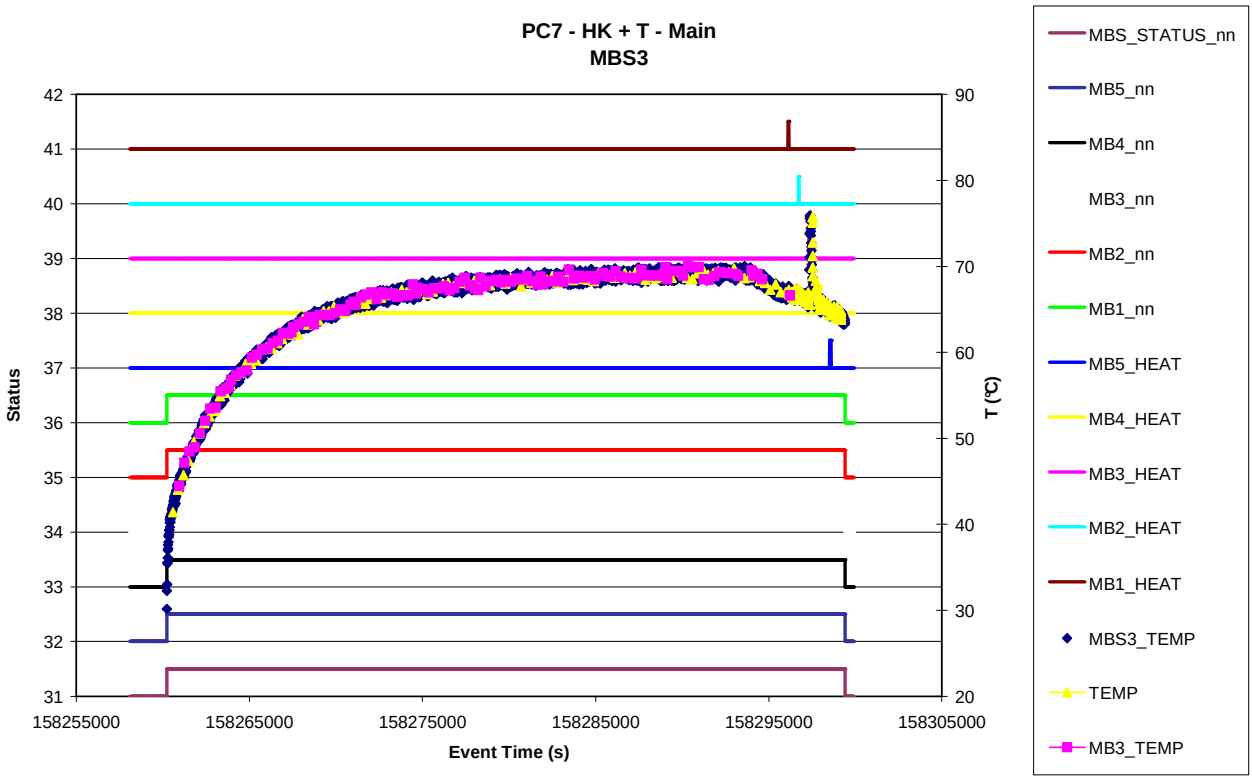


Figure 7.5-5. MBS 4 Temperature vs. time (HK, HK-SCI, SCI) - Main

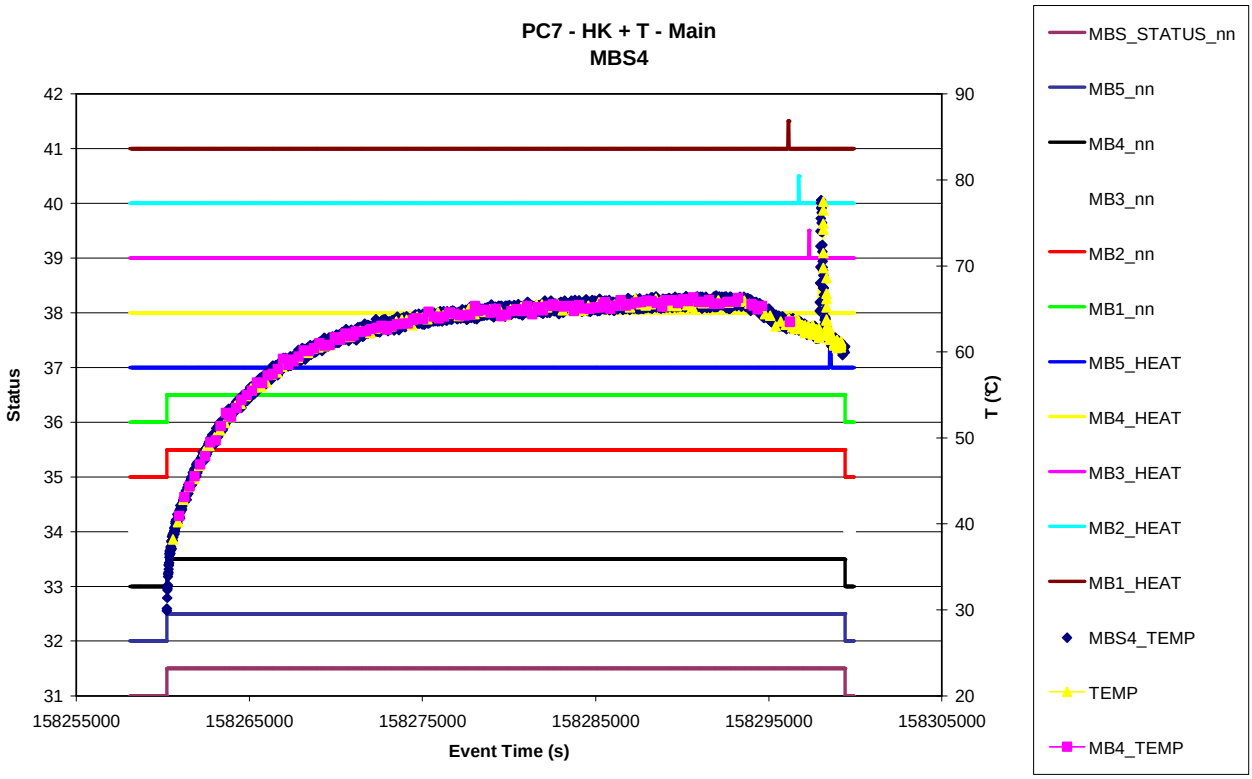
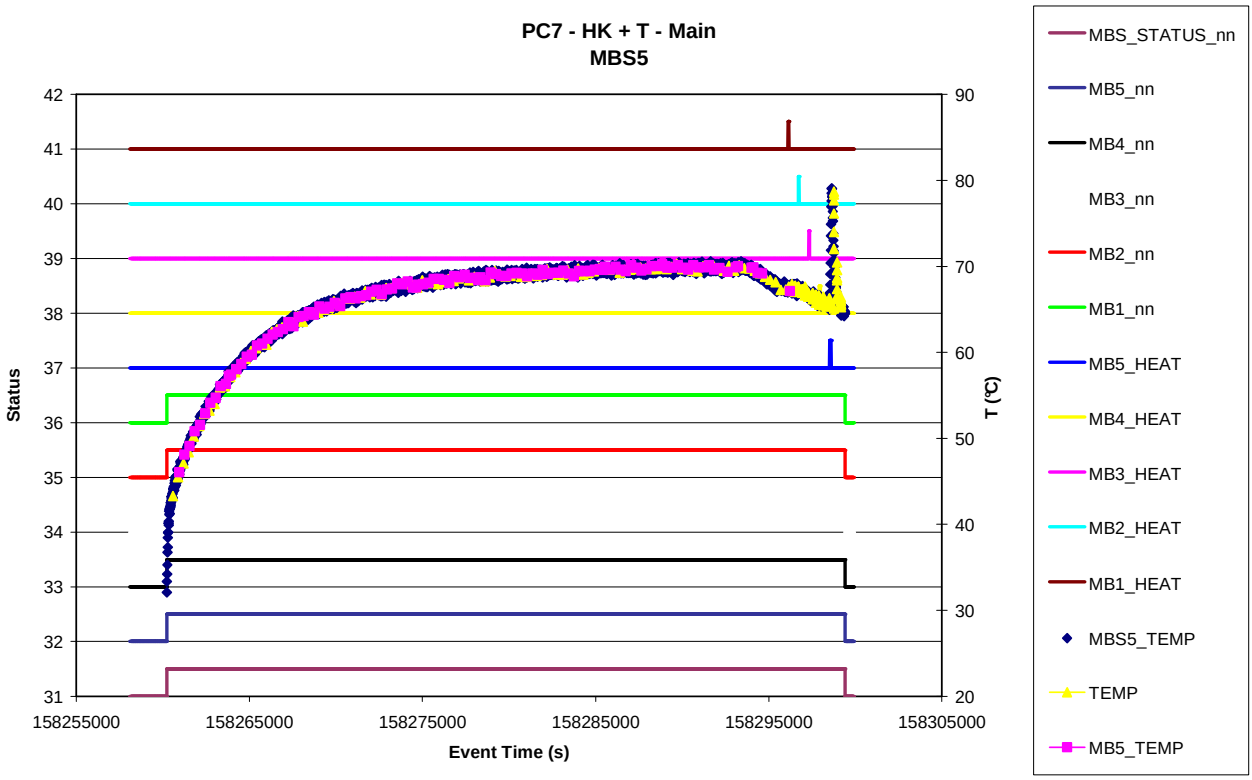


Figure 7.5-6. MBS 5 Temperature vs. time (HK, HK-SCI, SCI) - Main



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

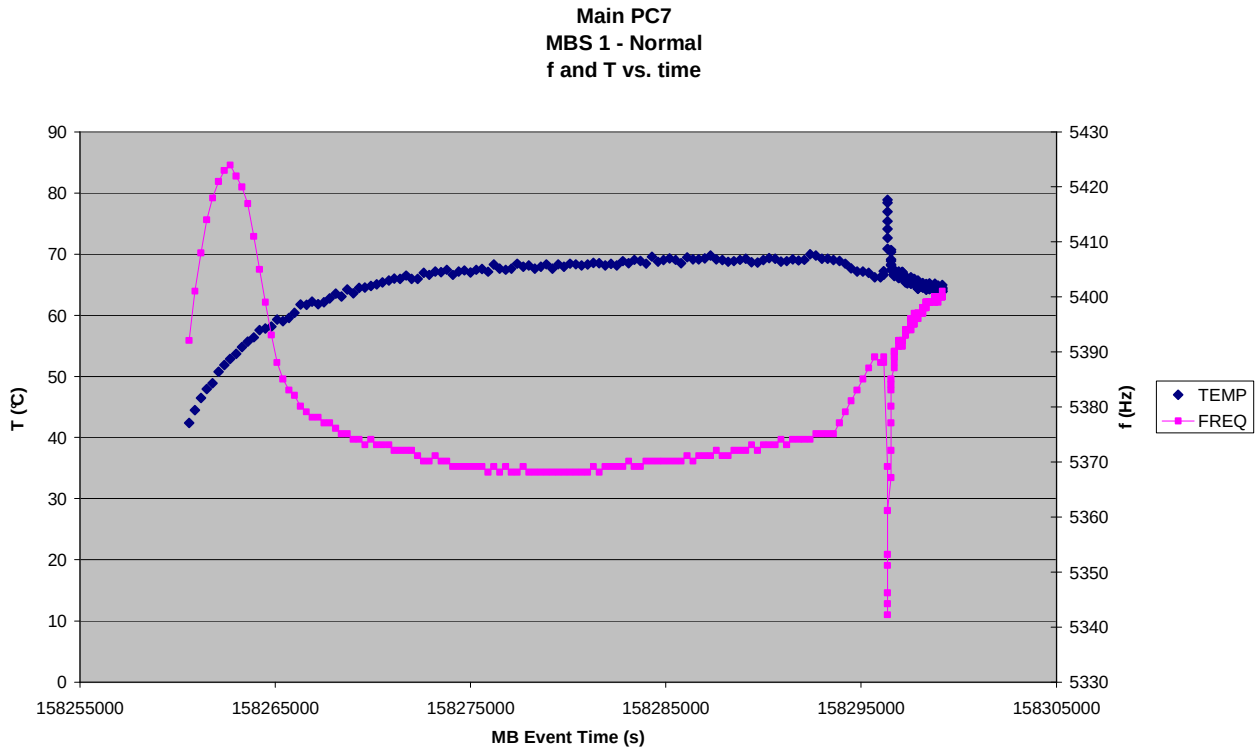


Figure 7.5-8. MBS 2 Frequency and Temperature vs. time - Main

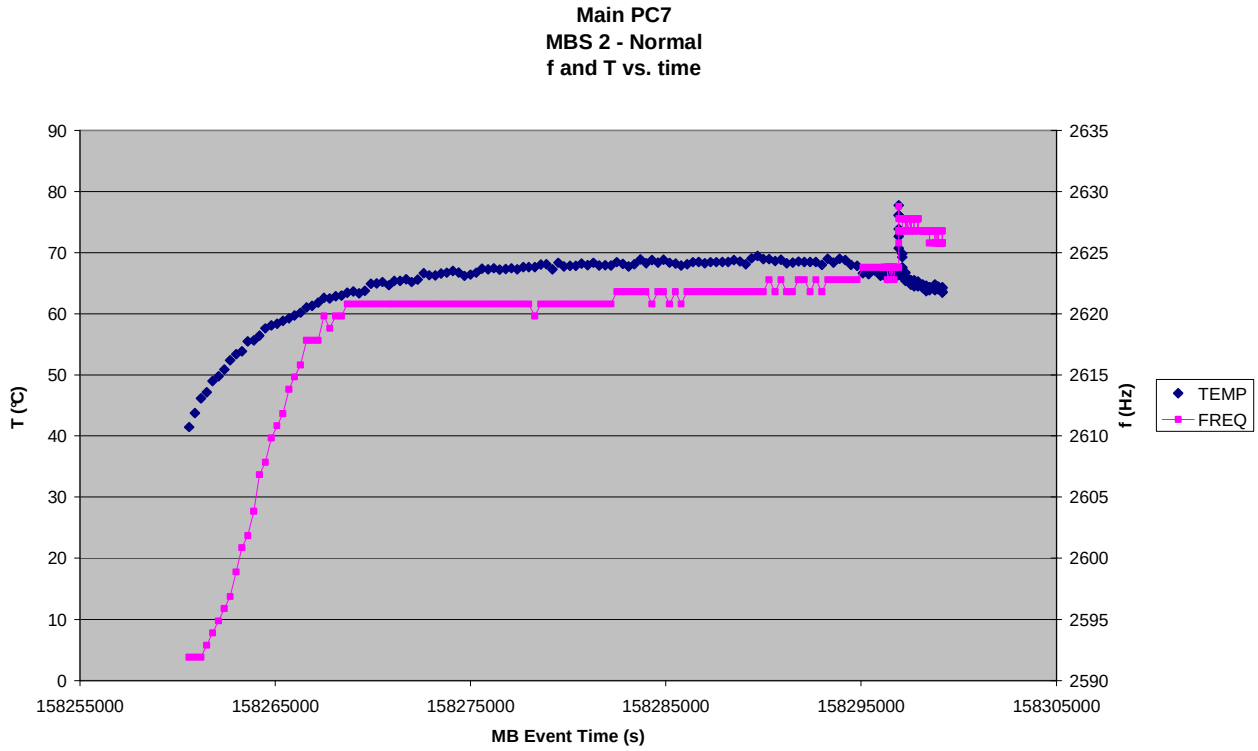


Figure 7.5-9. MBS 3 Frequency and Temperature vs. time - Main

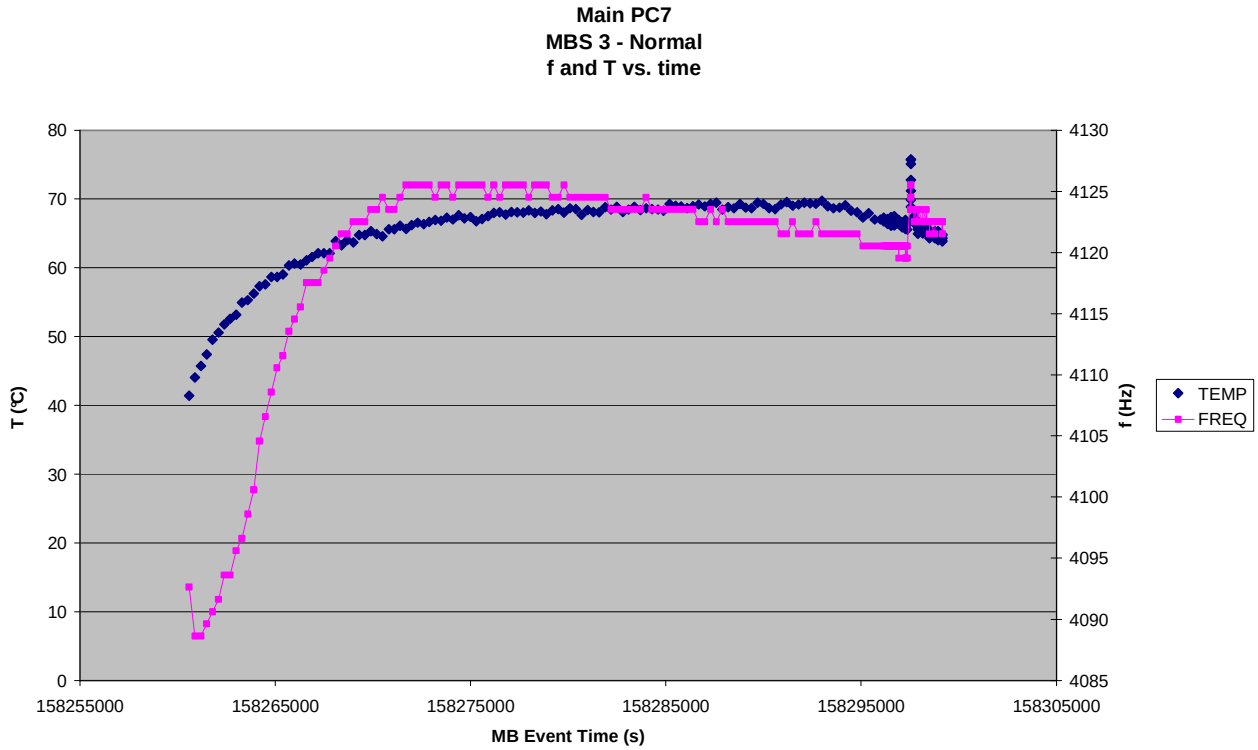


Figure 7.5-10. MBS 4 Frequency and Temperature vs. time - Main

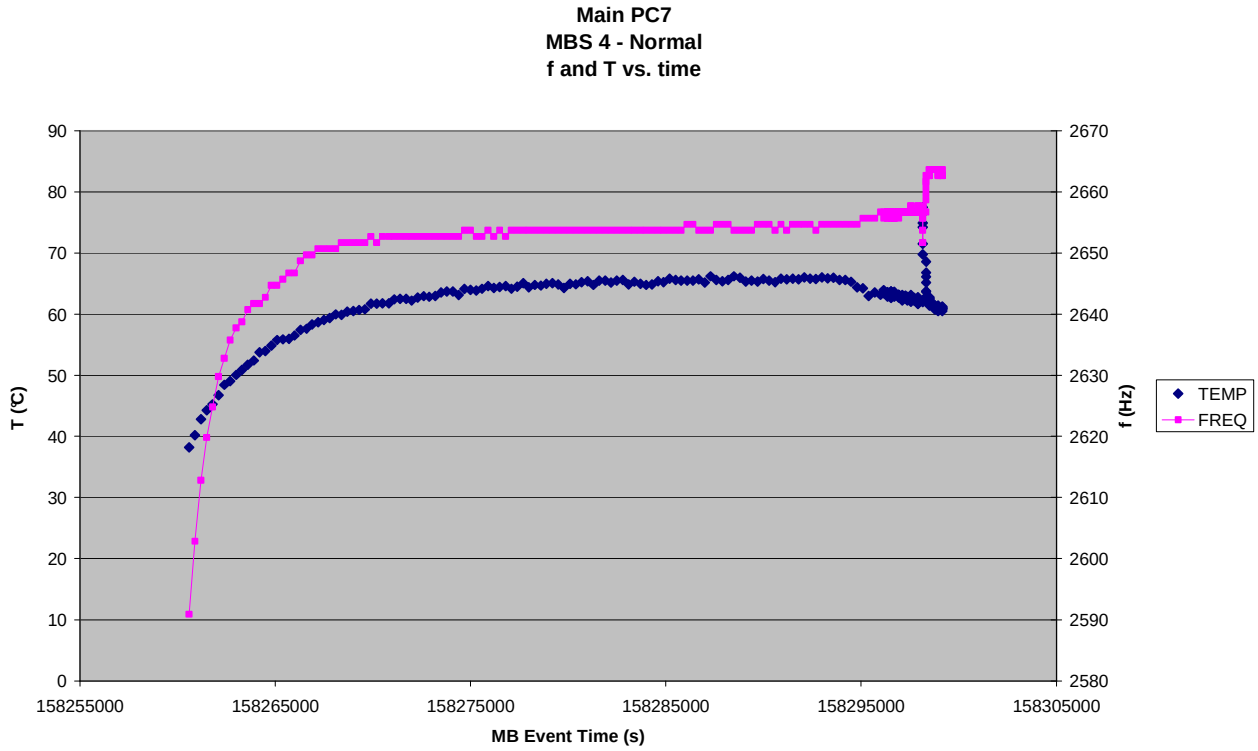


Figure 7.5-11. MBS 5 Frequency and Temperature vs. time - Main

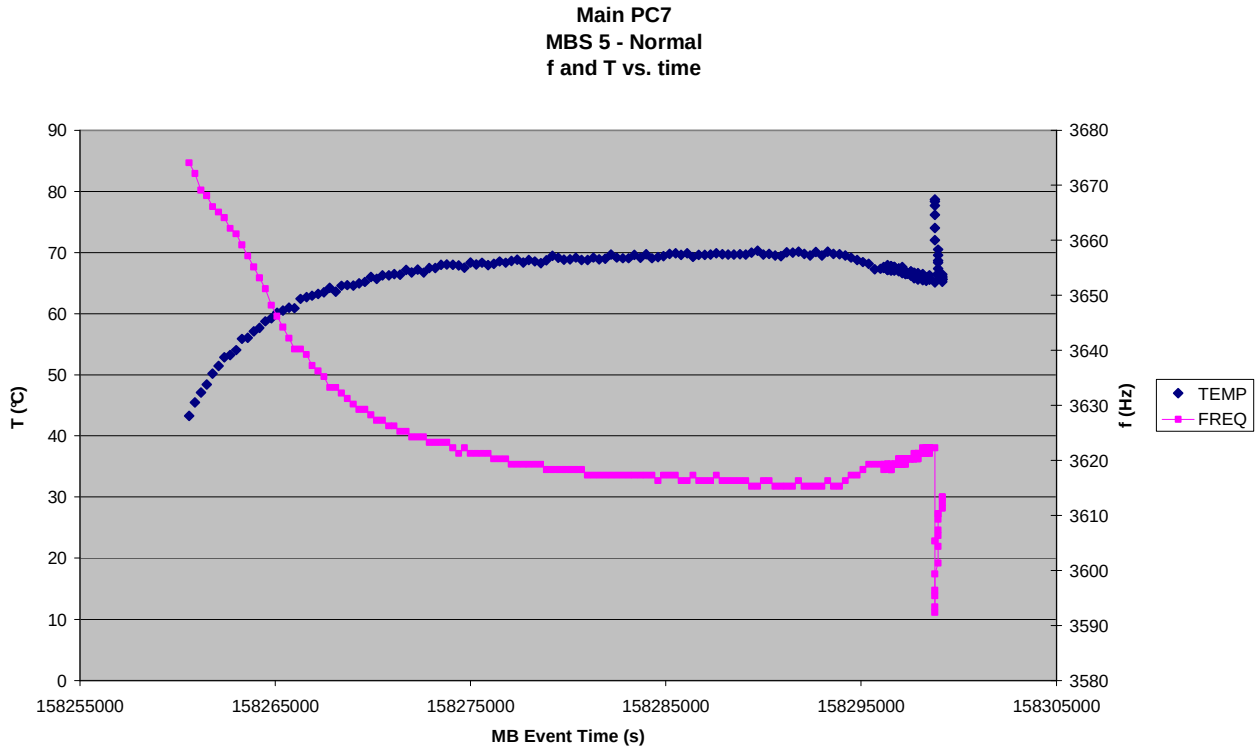


Figure 7.5-12. MBS 1 Frequency vs. Temperature - Main

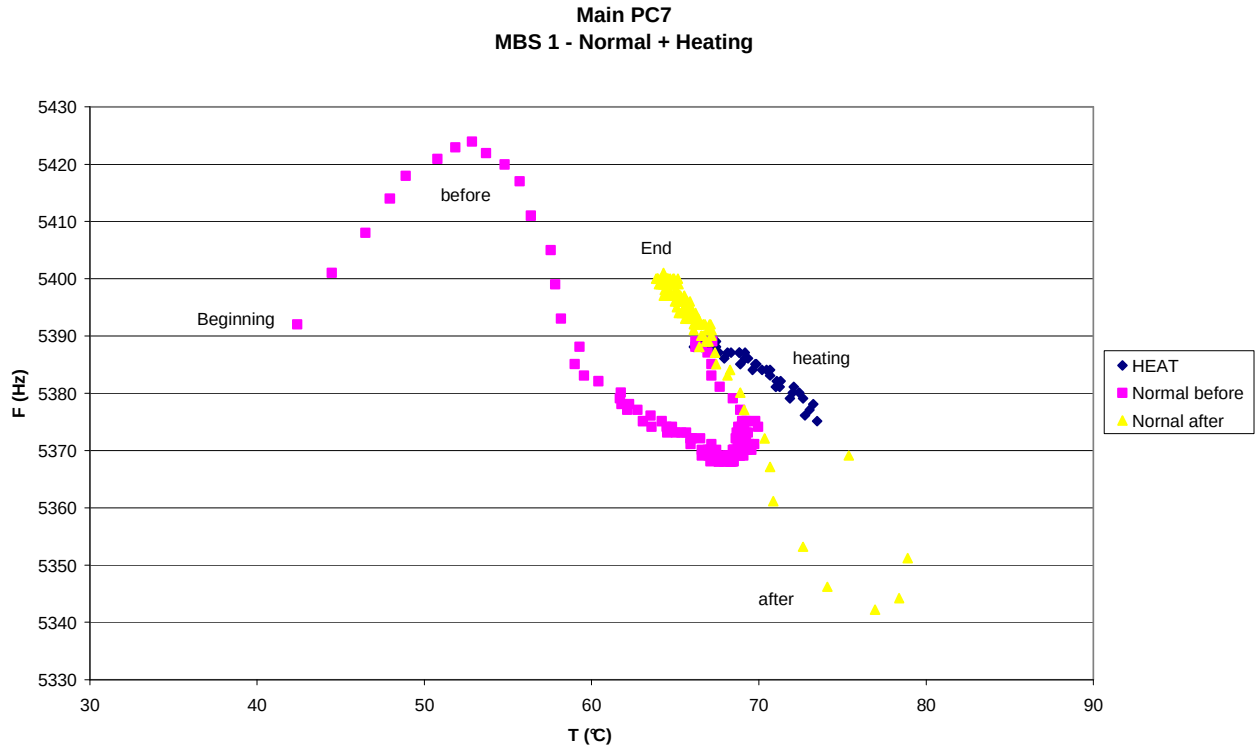


Figure 7.5-13. MBS 2 Frequency vs. Temperature - Main

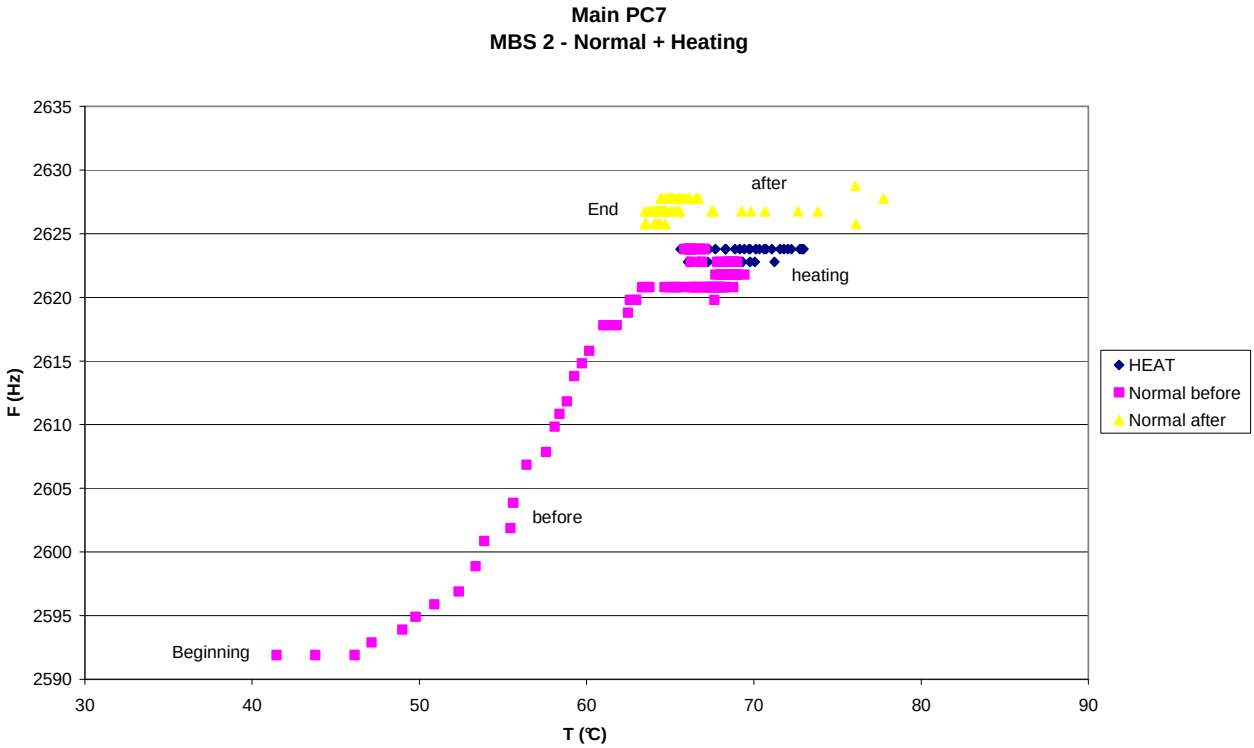


Figure 7.5-14. MBS 3 Frequency vs. Temperature - Main

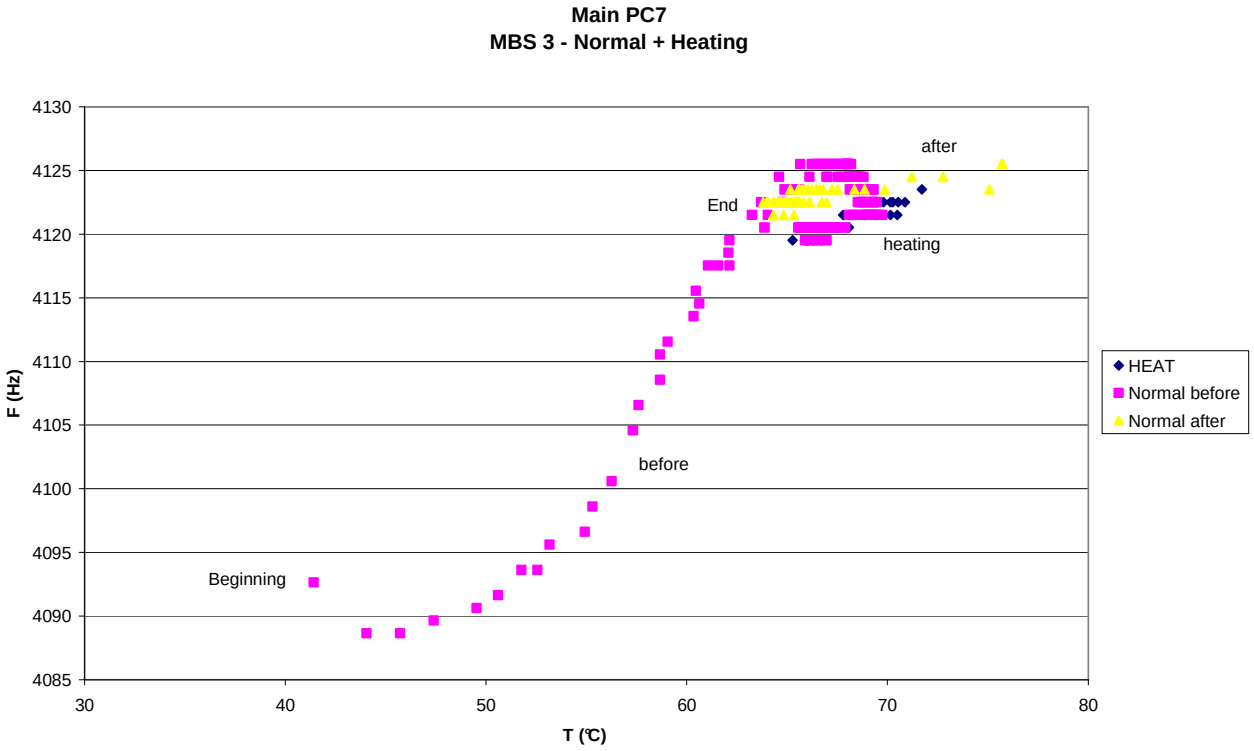


Figure 7.5-15. MBS 4 Frequency vs. Temperature - Main

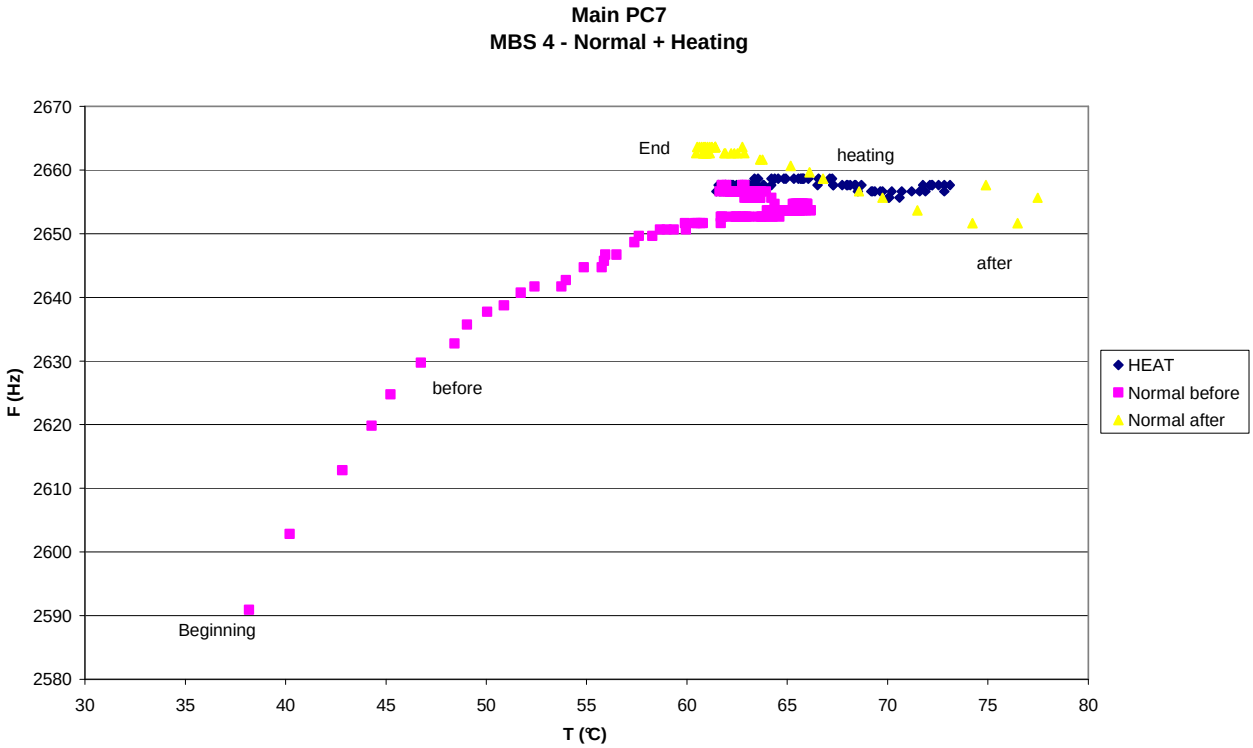
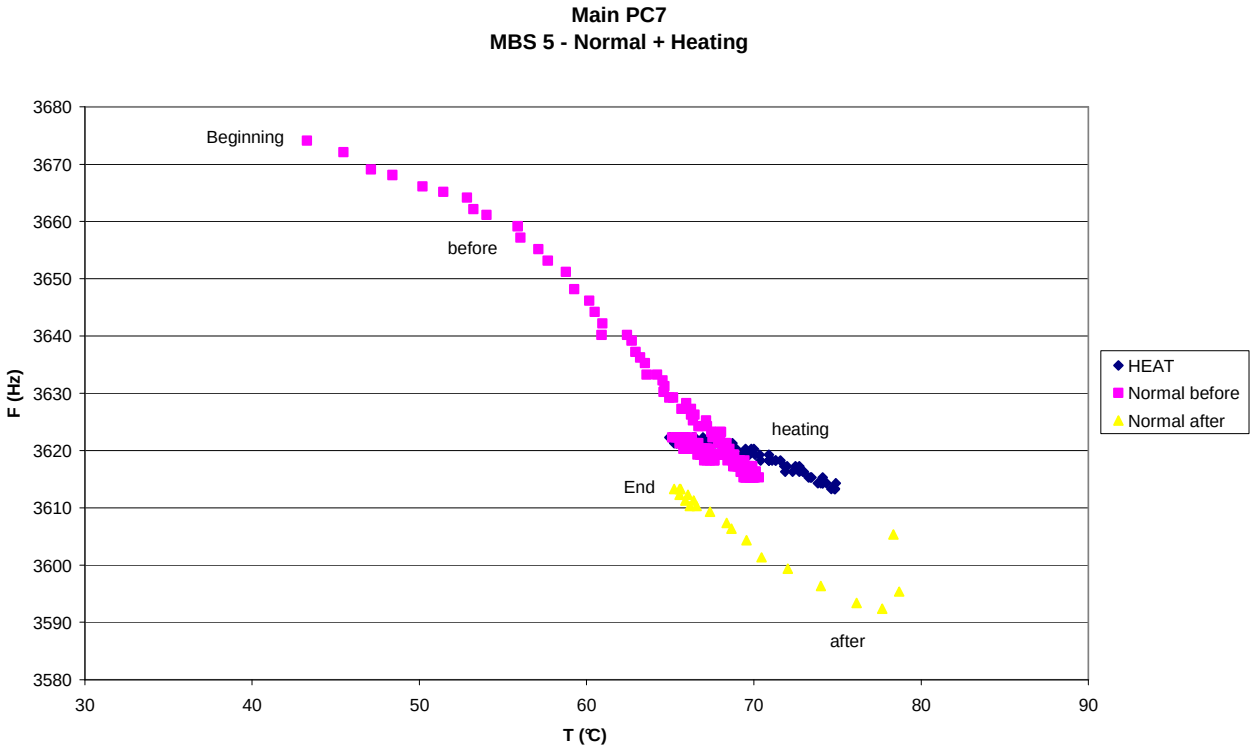


Figure 7.5-16. MBS 5 Frequency vs. Temperature - Main



8. PC7 DATA ANALYSIS – REDUNDANT INTERFACE (GD01)

8.1 GIADA STATUS

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

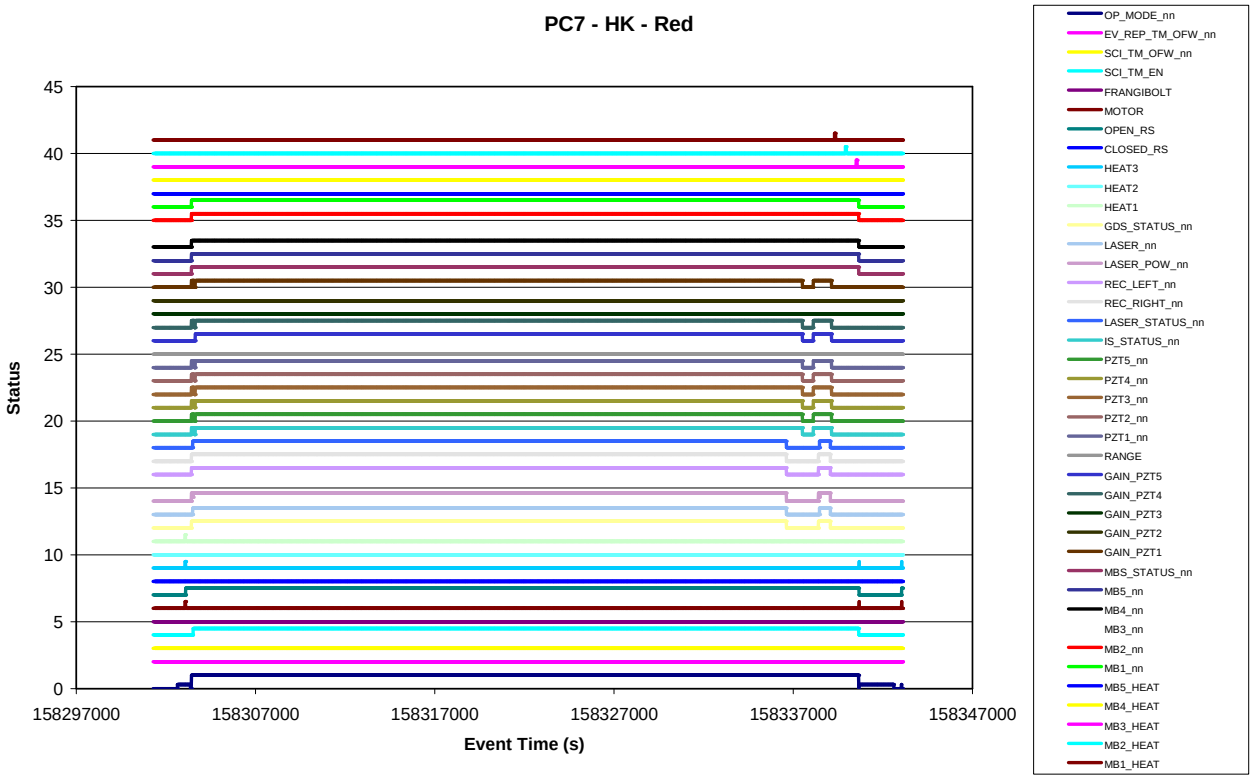


Figure 8.1-2. Evolution of all temperatures vs. time - HK, HK-SCI, SCI - Red

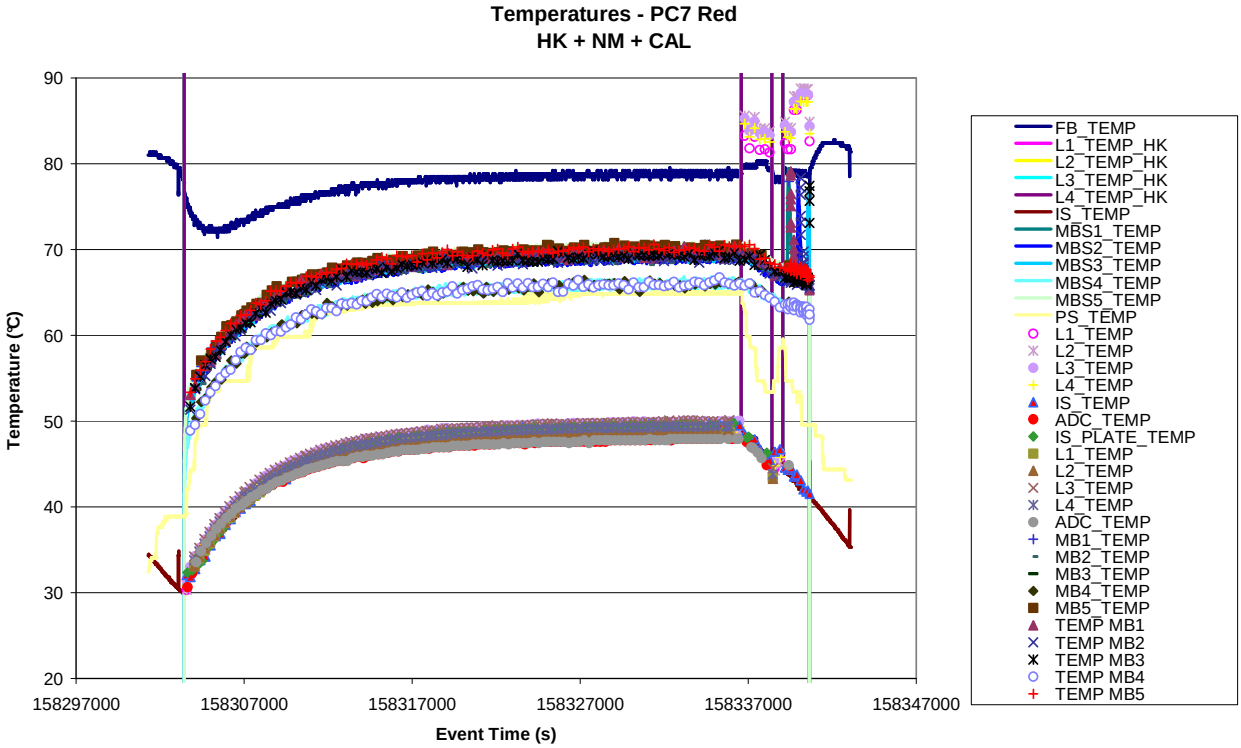


Figure 8.1-3. Evolution of temperatures of system elements vs. time - HK, HK-SCI, SCI - Red

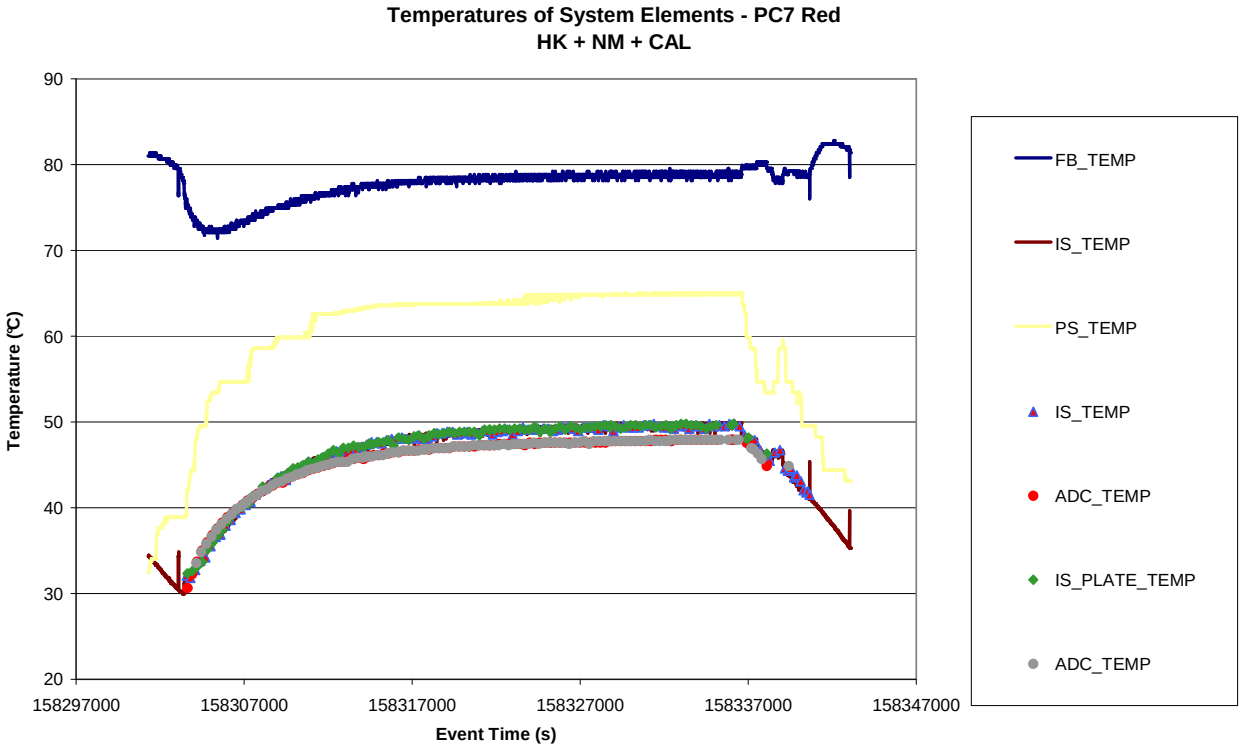


Figure 8.1-4. Evolution of temperatures of sub-systems vs. time - HK, HK-SCI, SCI - Red

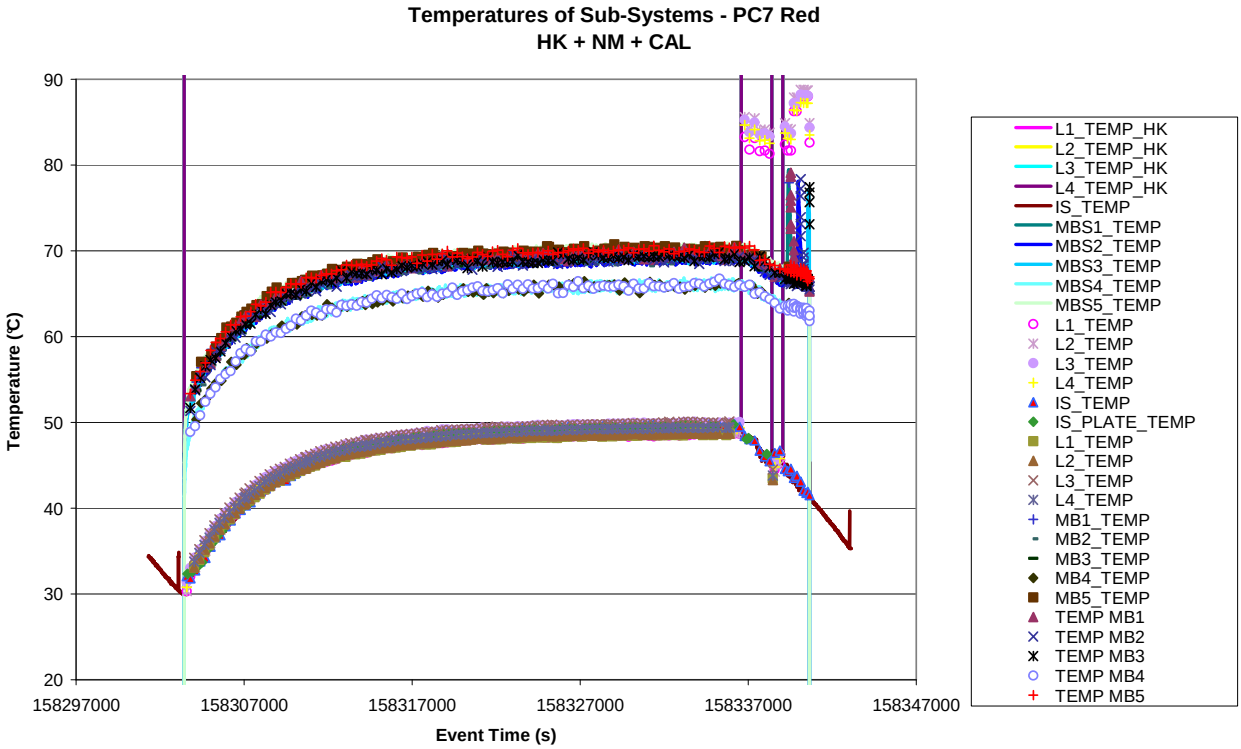


Figure 8.1-5. HK Status versus Temperatures of system elements - Red

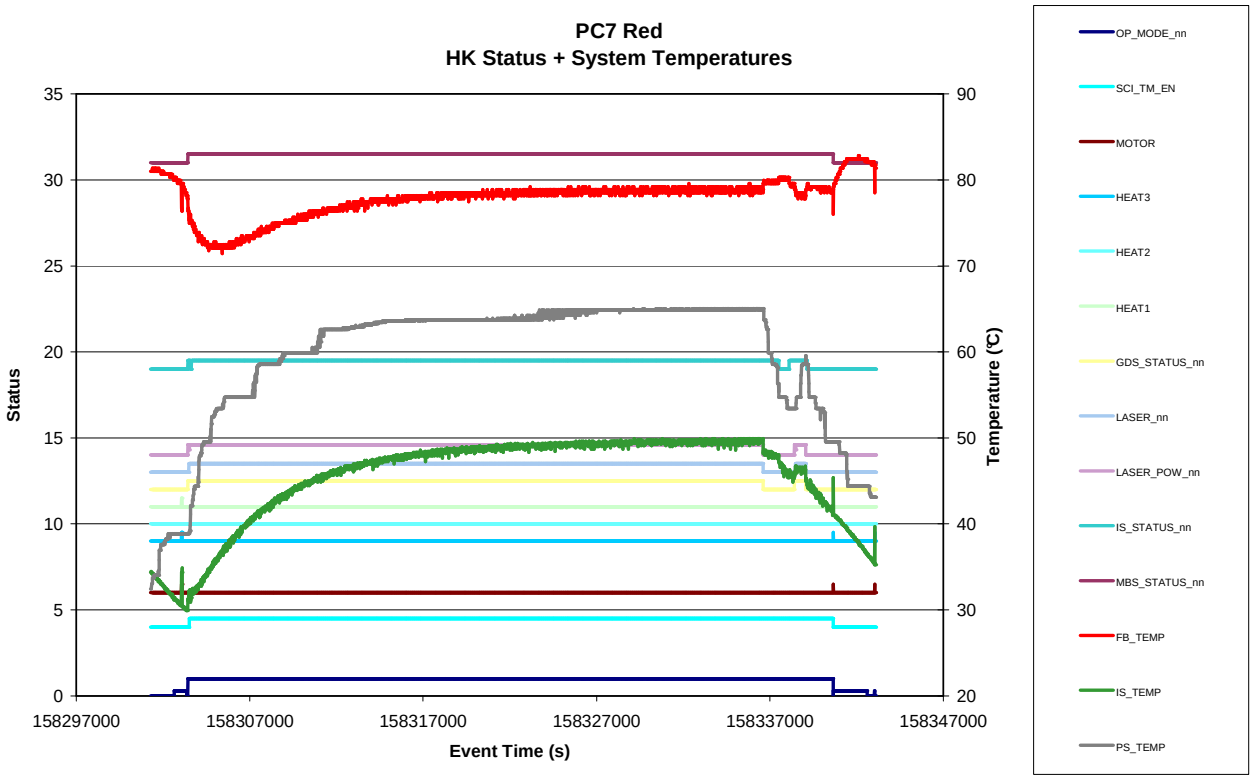


Figure 8.1-6. Operation Status vs. time - Red

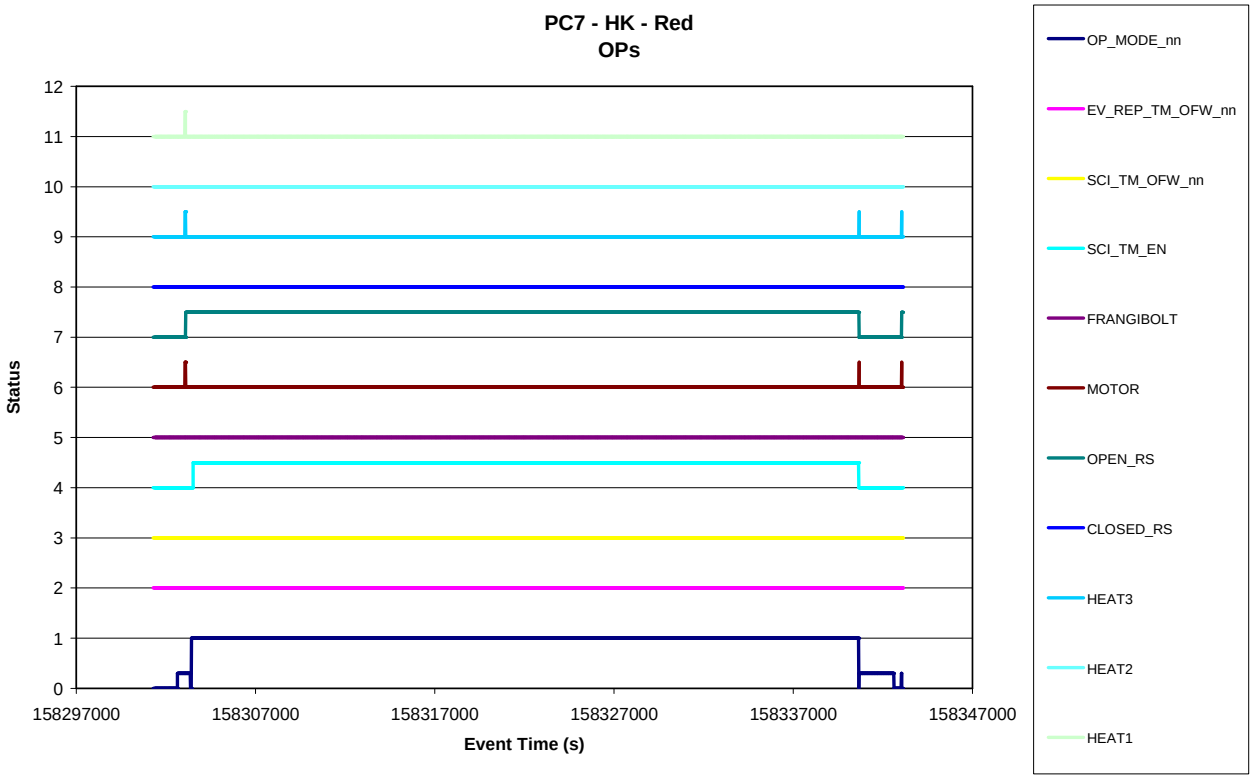


Figure 8.1-7. Operation Status versus Temperatures of system elements - Red

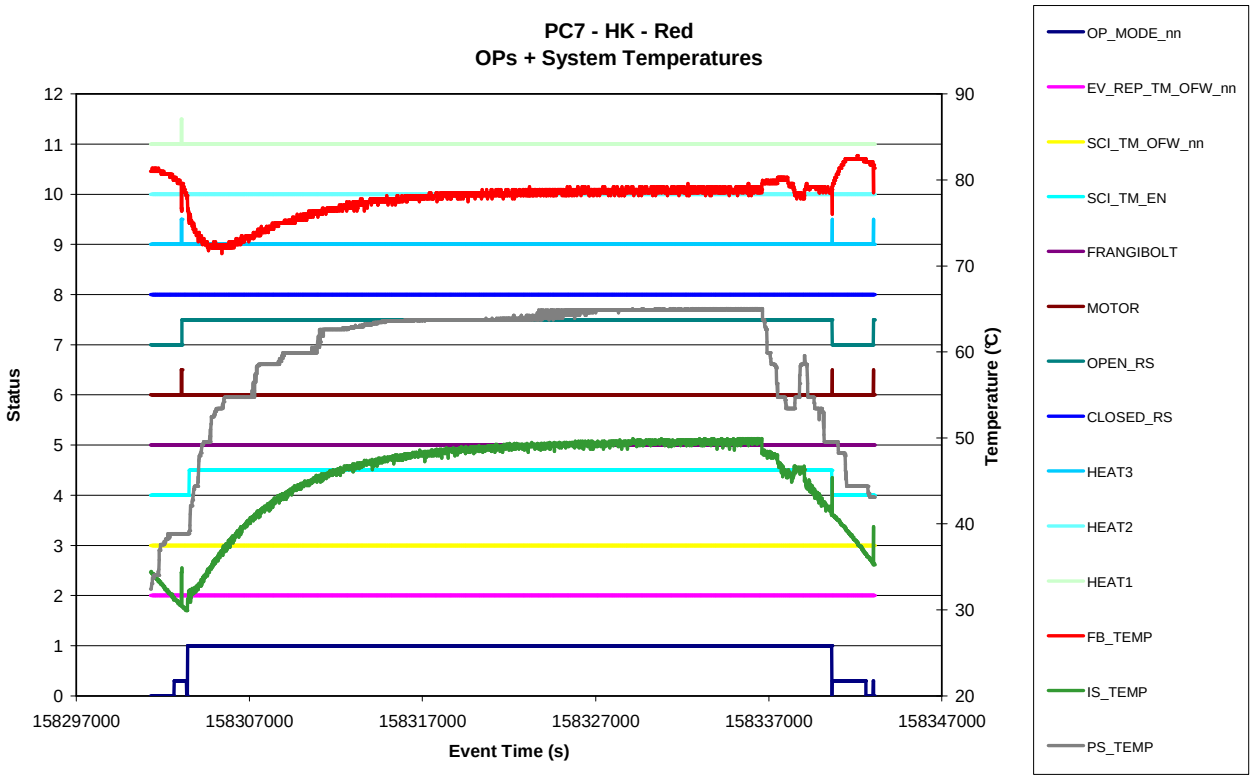


Figure 8.1-8. Power behaviour - Red

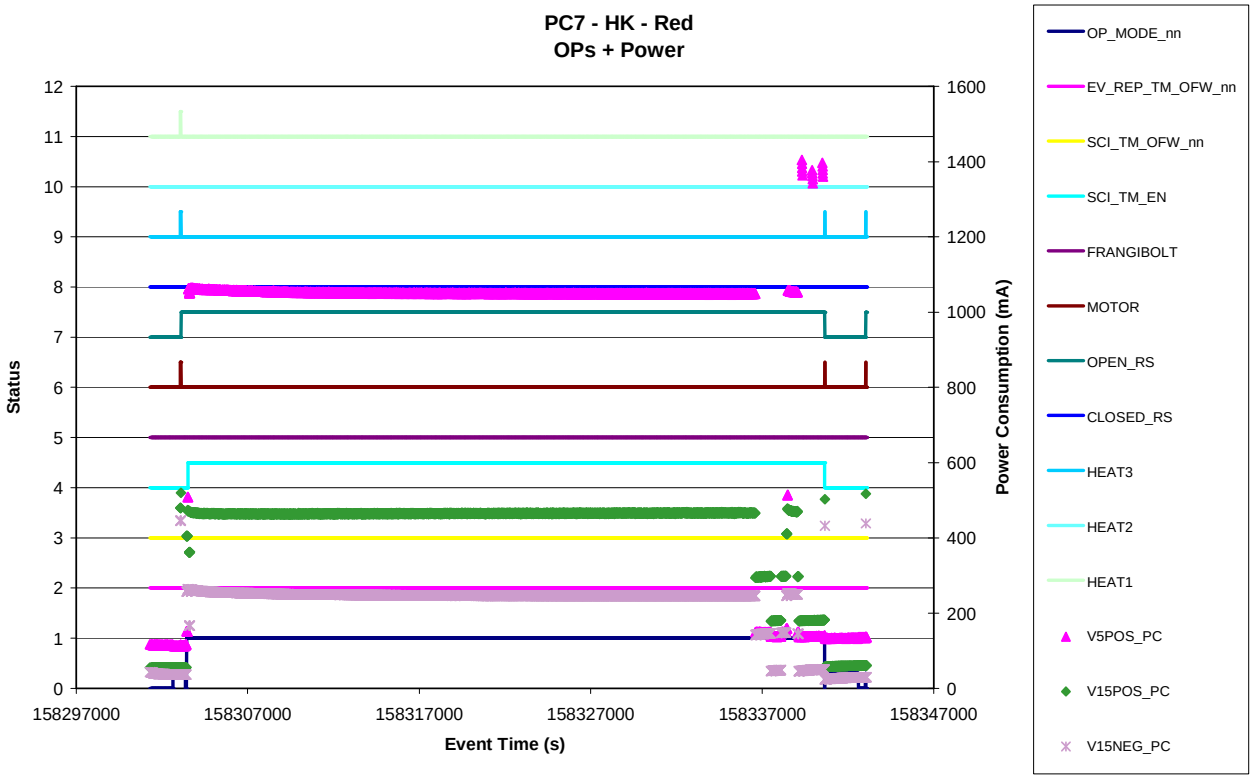


Figure 8.1-9. Power and PS temperature behaviour - Red

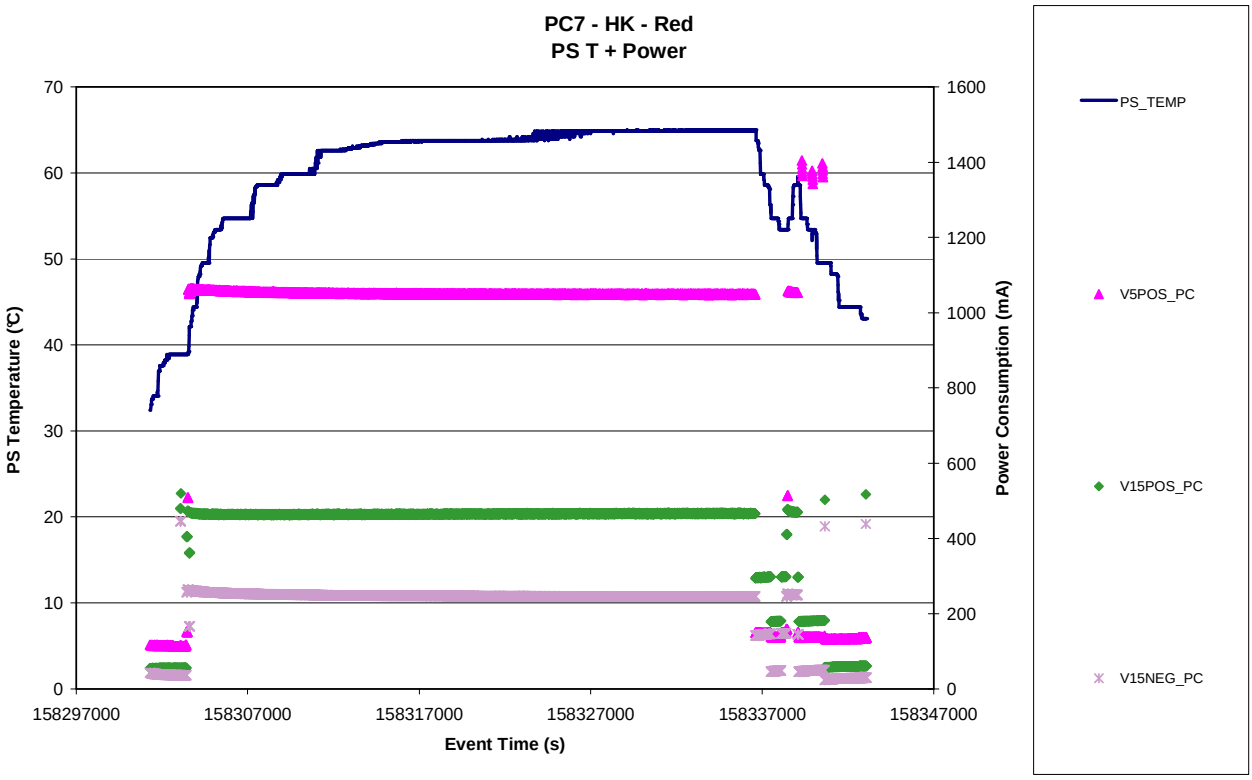


Figure 8.1-10. Source Sequence Count (SSC) of HK Telemetry vs. Time - Red

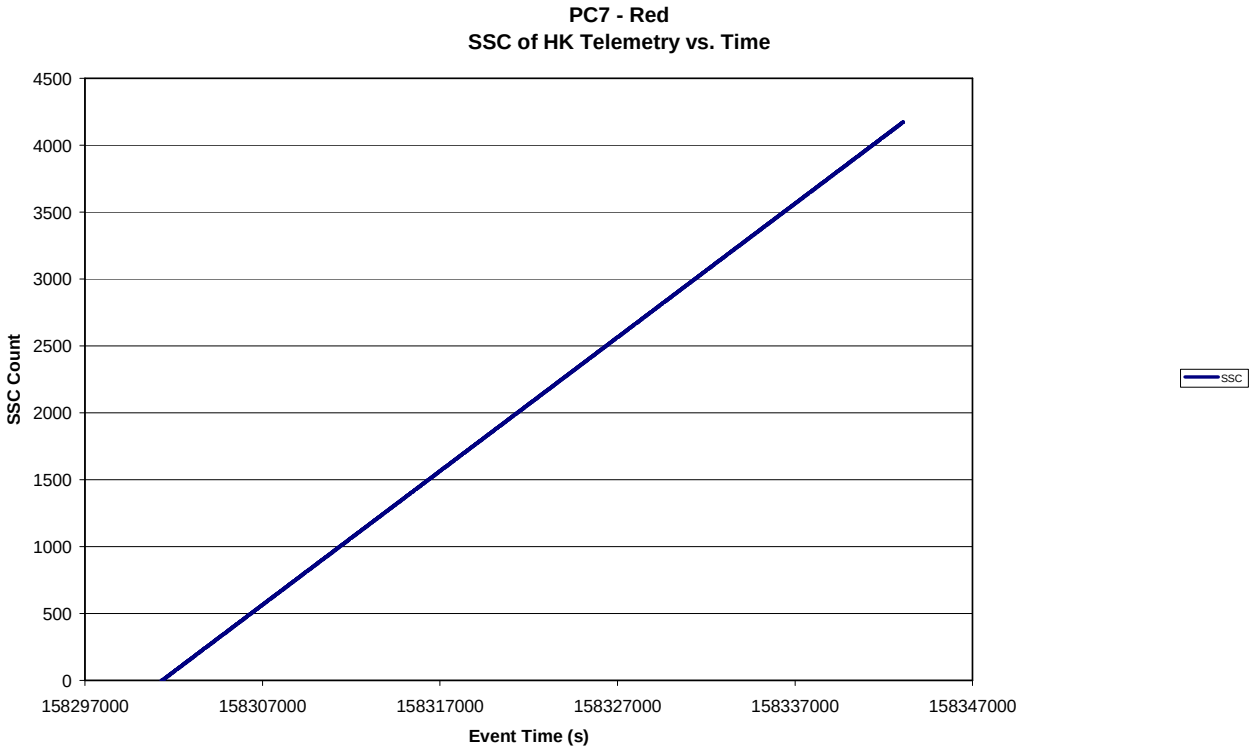


Figure 8.1-11. Source Sequence Count (SSC) of HK Telemetry vs. Number - Red

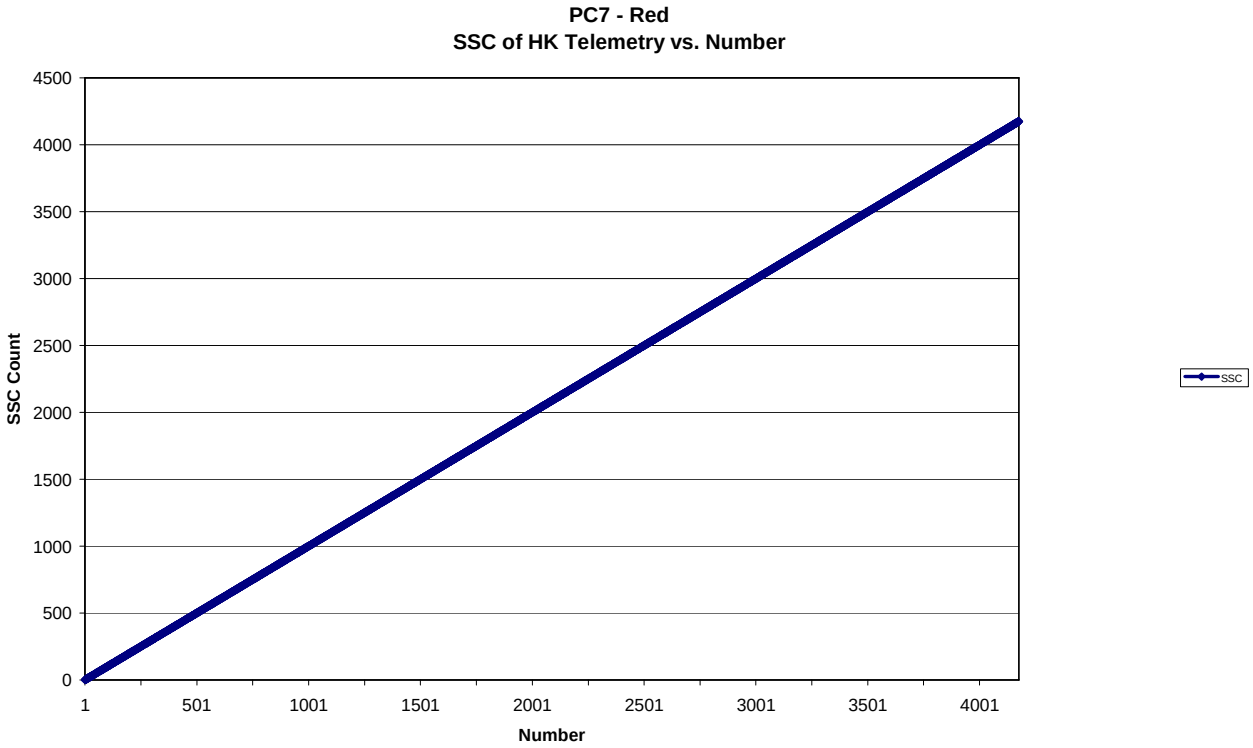


Figure 8.1-12. Source Sequence Count (SSC) of SCI Telemetry vs. Time - Red

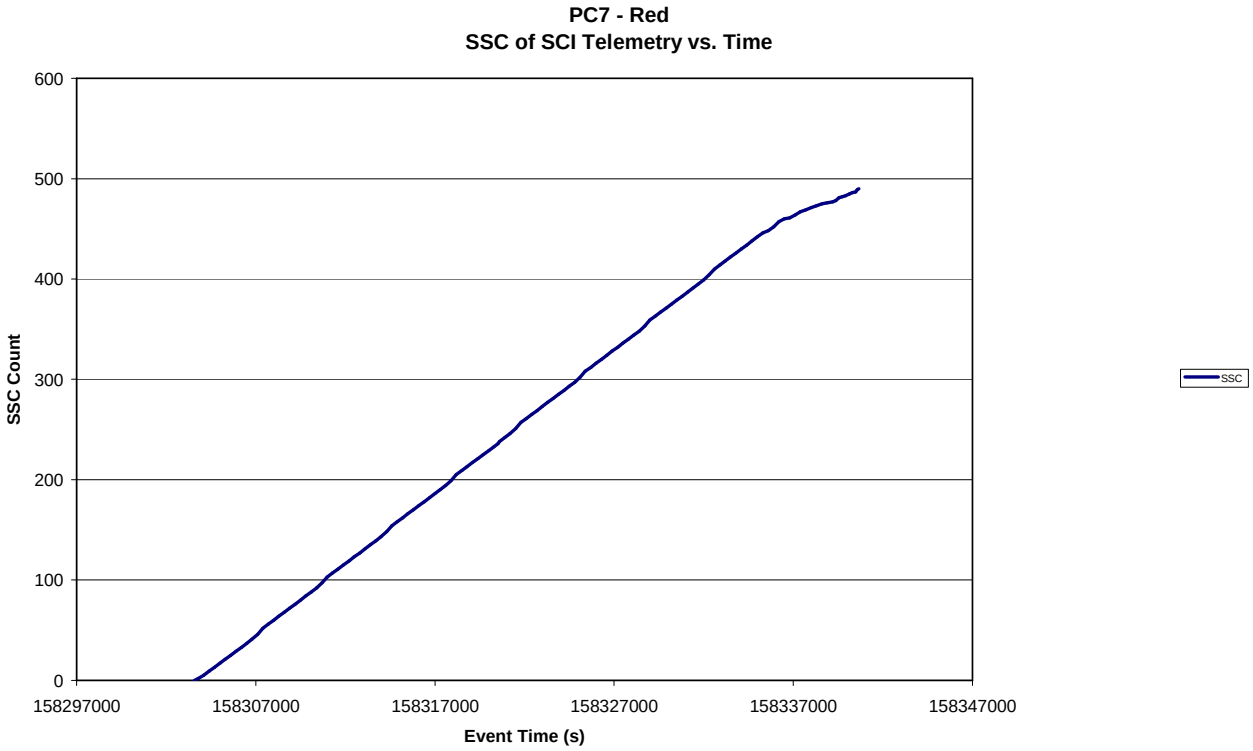
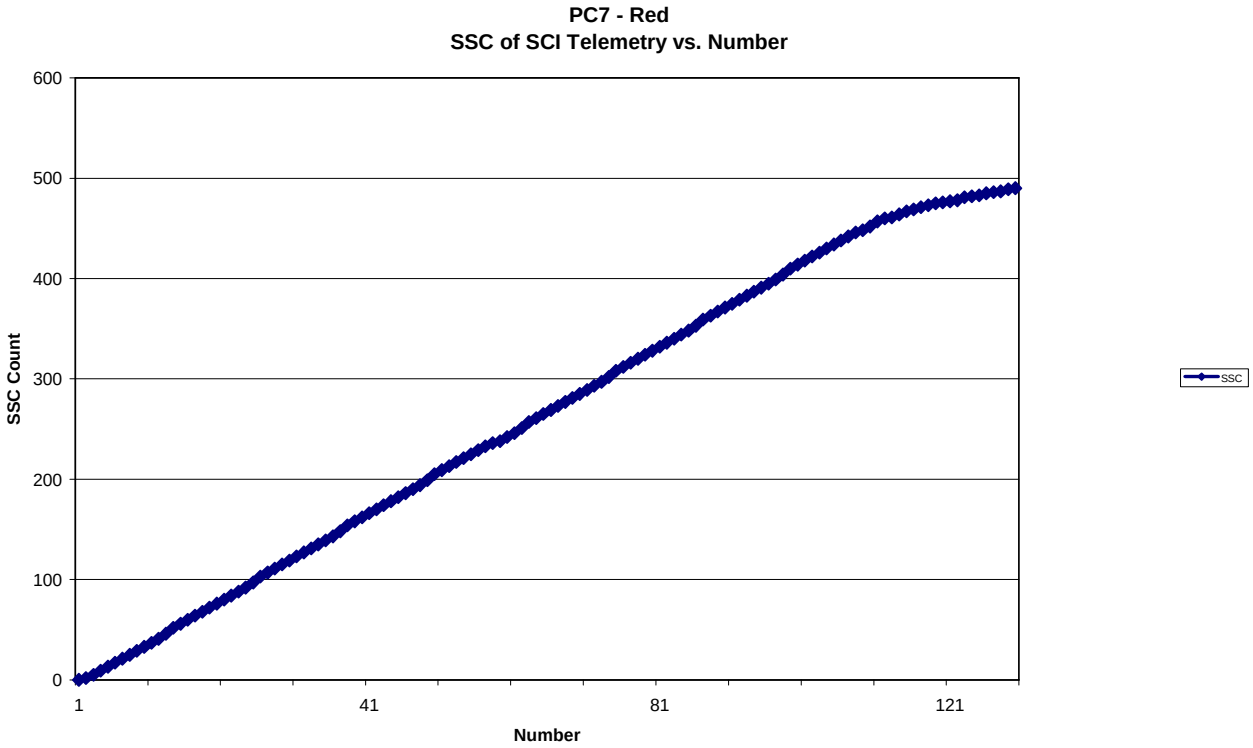


Figure 8.1-13. Source Sequence Count (SSC) of SCI Telemetry vs. Number - Red

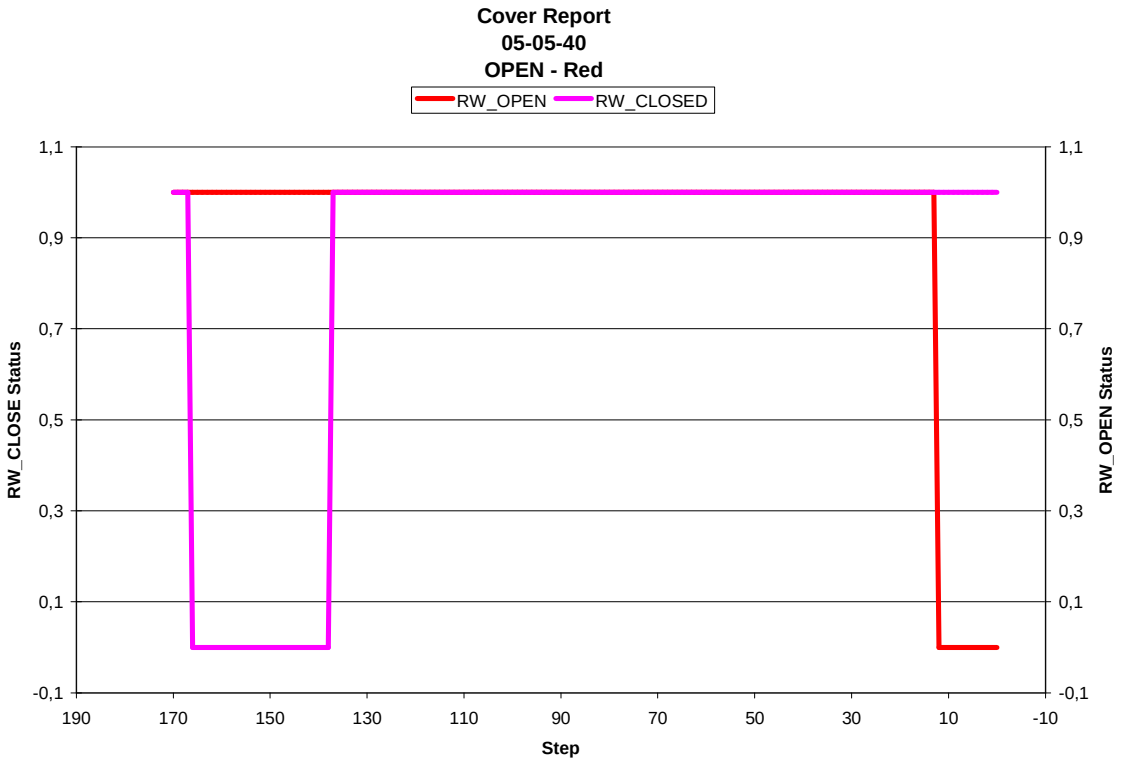


8.2 COVER REPORTS

8.2.1 Open Cover

HEADER_START
CREATION_TIME=2008-01-07T05:05:40Z
USER=giada1
HEADER_END
//
// Generated by 'GIADA_EGSE_SW '
//
MOVEMENT DIRECTION: To open
BEGIN TIME OF OPERATION: 158303104.000000
END TIME OF OPERATION: 158303104.000000

Figure 8.2-1. Cover Report – Open – Red



8.2.2 Close Cover

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HEADER_END
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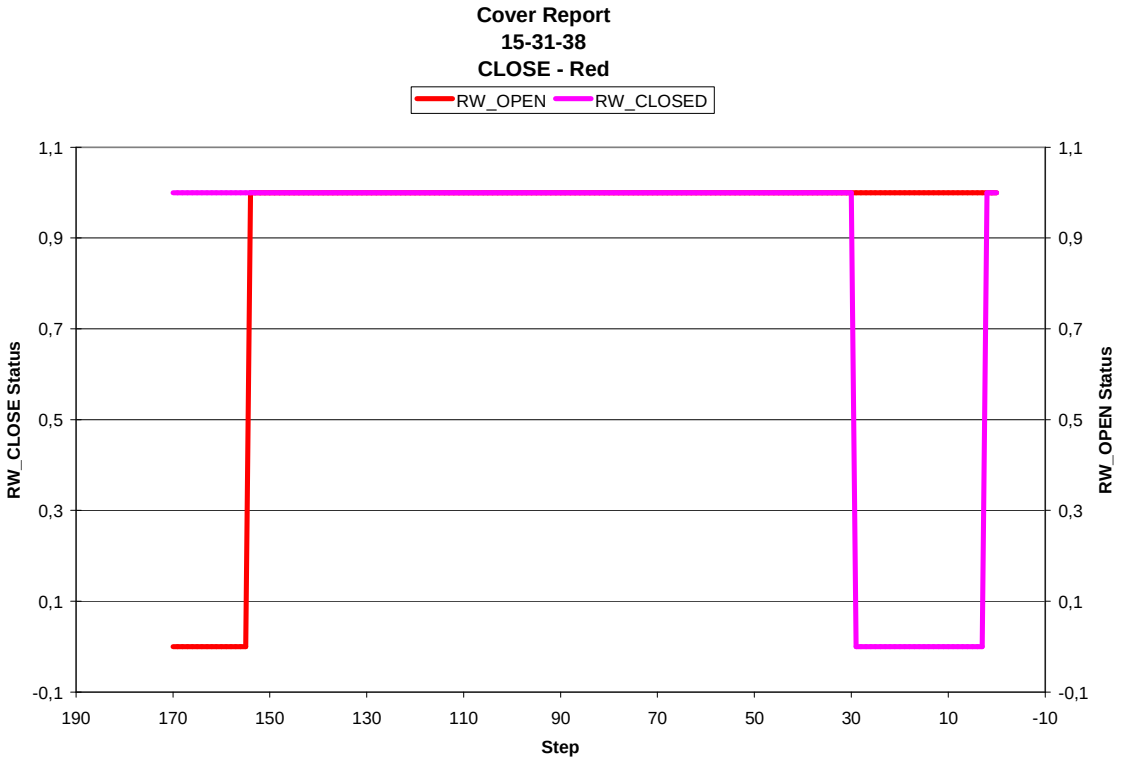
// Generated by 'GIADA_EGSE_SW '
//
MOVEMENT DIRECTION: To close
BEGIN TIME OF OPERATION: 158340656.000000
END TIME OF OPERATION: 158340672.000000

Figure 8.2-2. Cover Report – Close – Red



8.2.3 Open Cover

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HEADER_END
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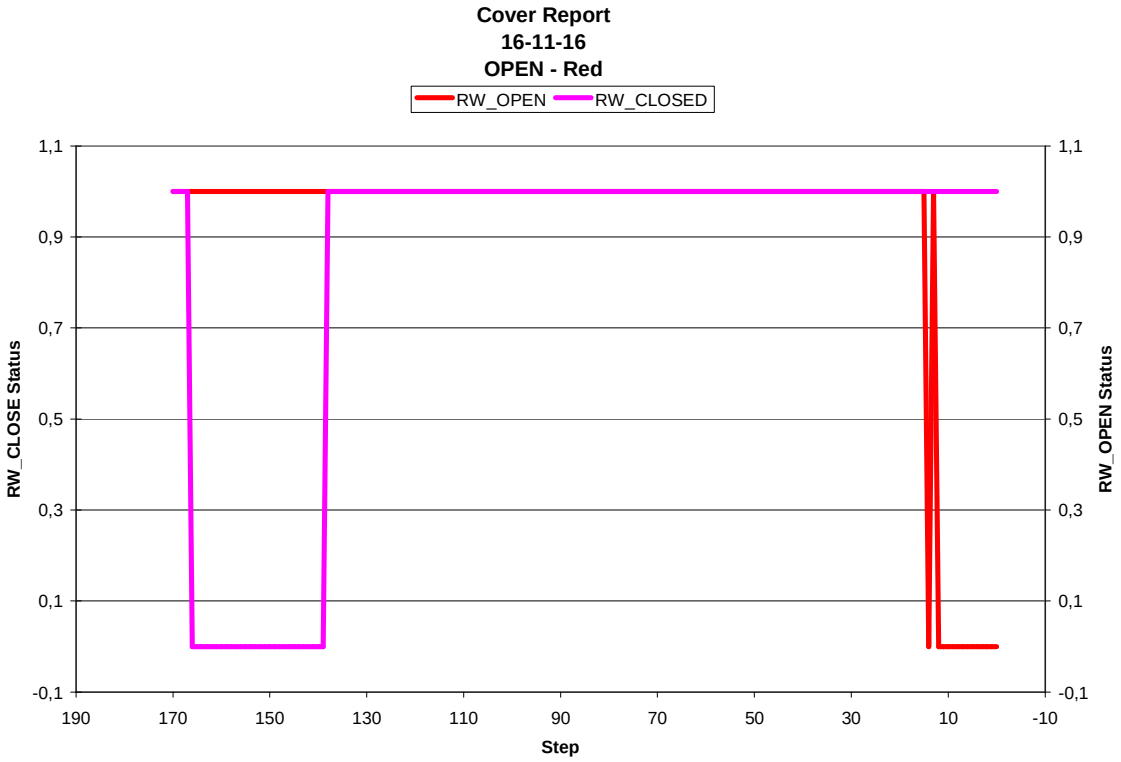
MOVEMENT DIRECTION: To close
BEGIN TIME OF OPERATION: 158343040.000000
END TIME OF OPERATION: 158343040.000000

Figure 8.2-3. Cover Report – Open – Red



8.3 GRAIN DETECTION SYSTEM (GDS)

8.3.1 GDS – Status

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

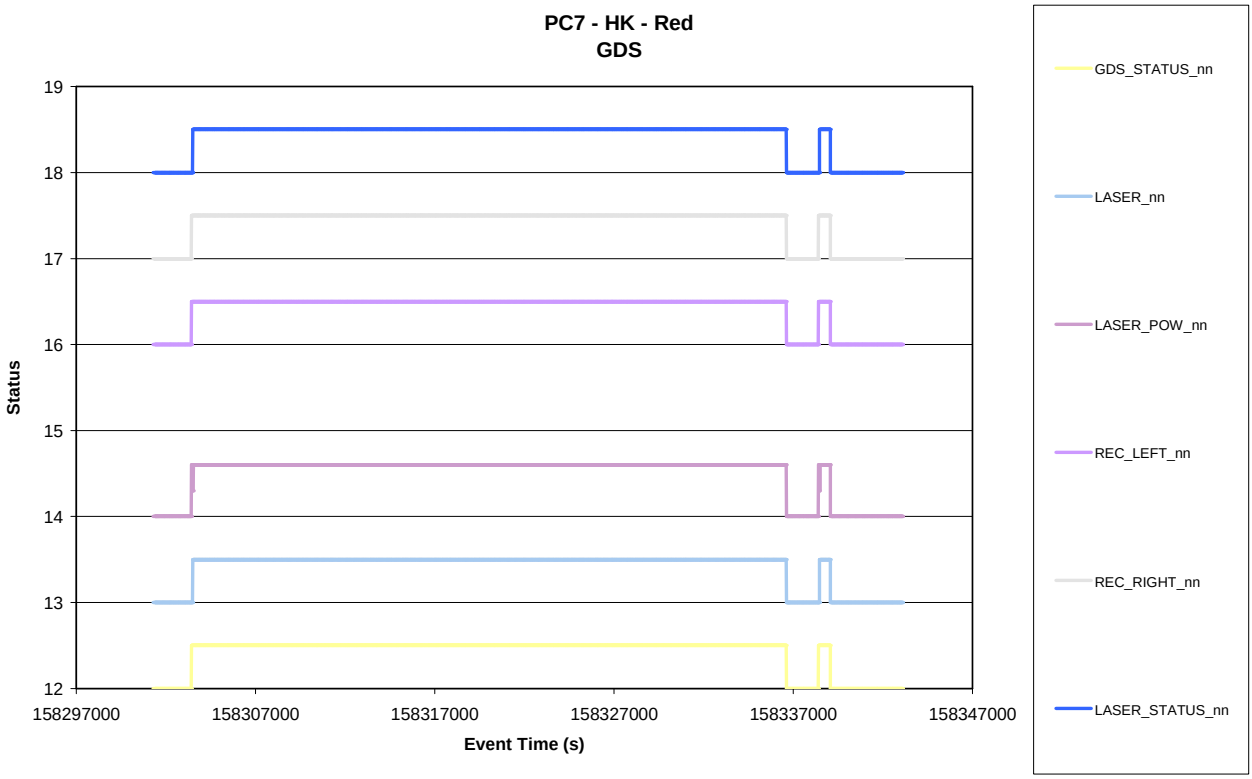


Figure 8.3-2. GDS Thresholds change vs. time - Red

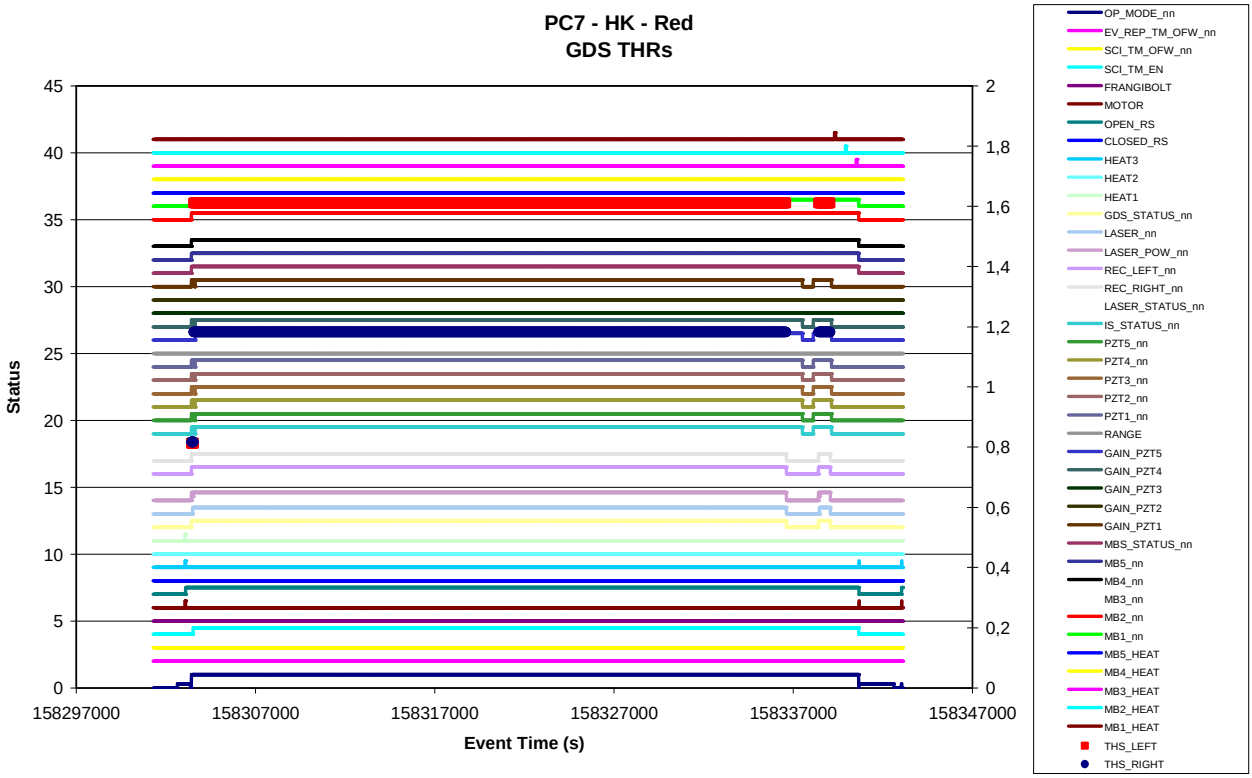


Figure 8.3-3. GDS Laser Temperatures vs. time (HK, HK-SCI, SCI) - Red

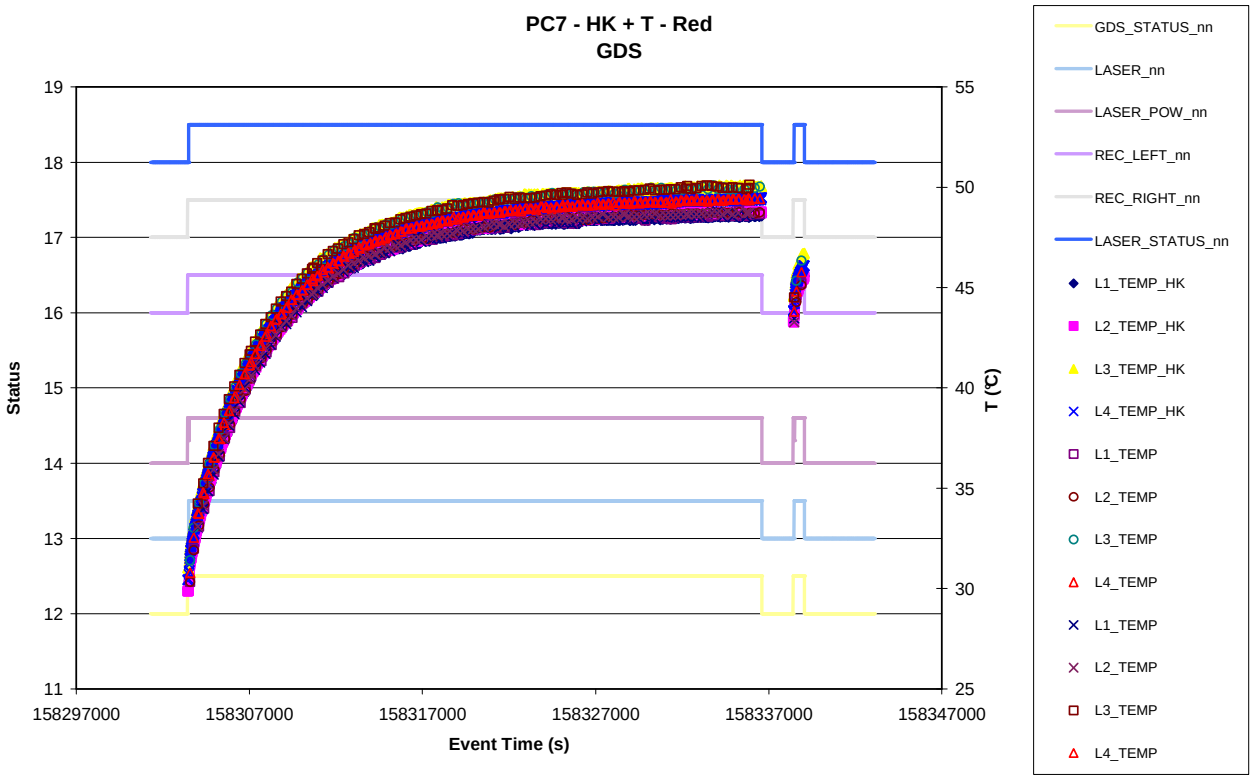


Figure 8.3-4. GDS Laser Monitor vs. time (HK, HK-SCI, SCI) - Red

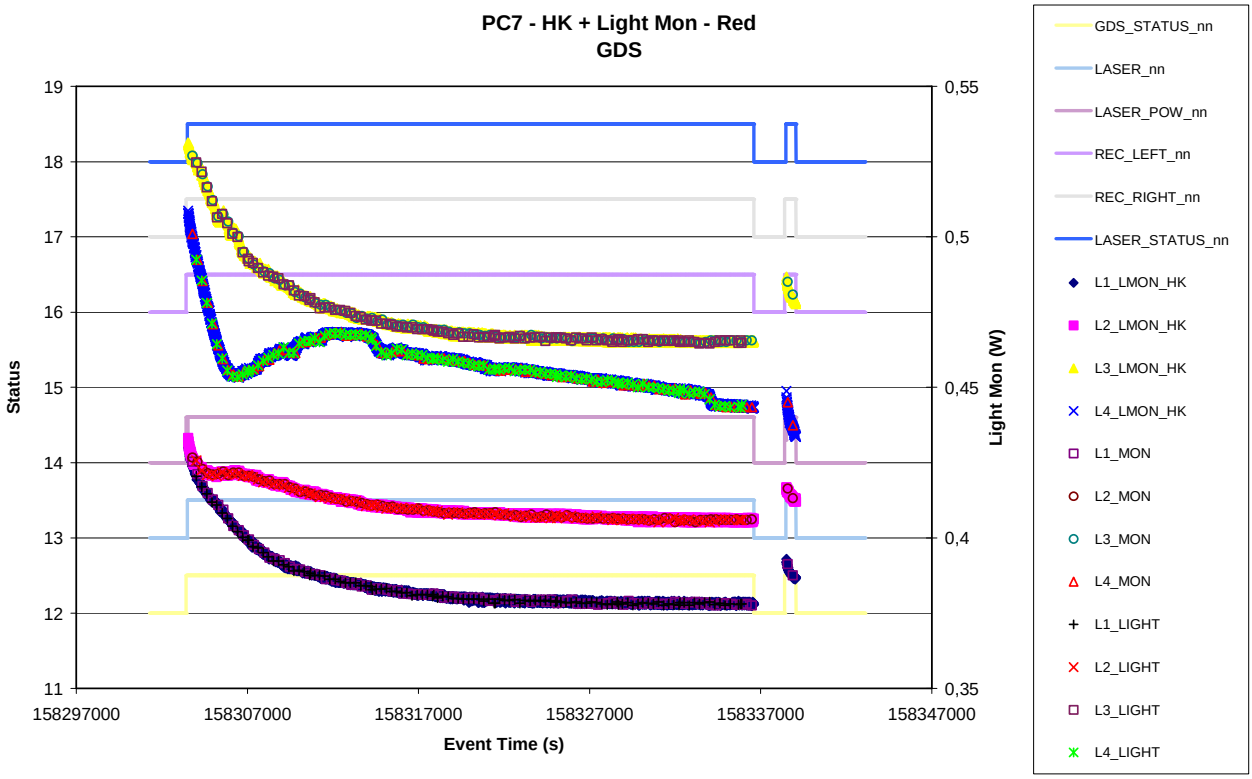


Figure 8.3-5. Laser 1 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Red

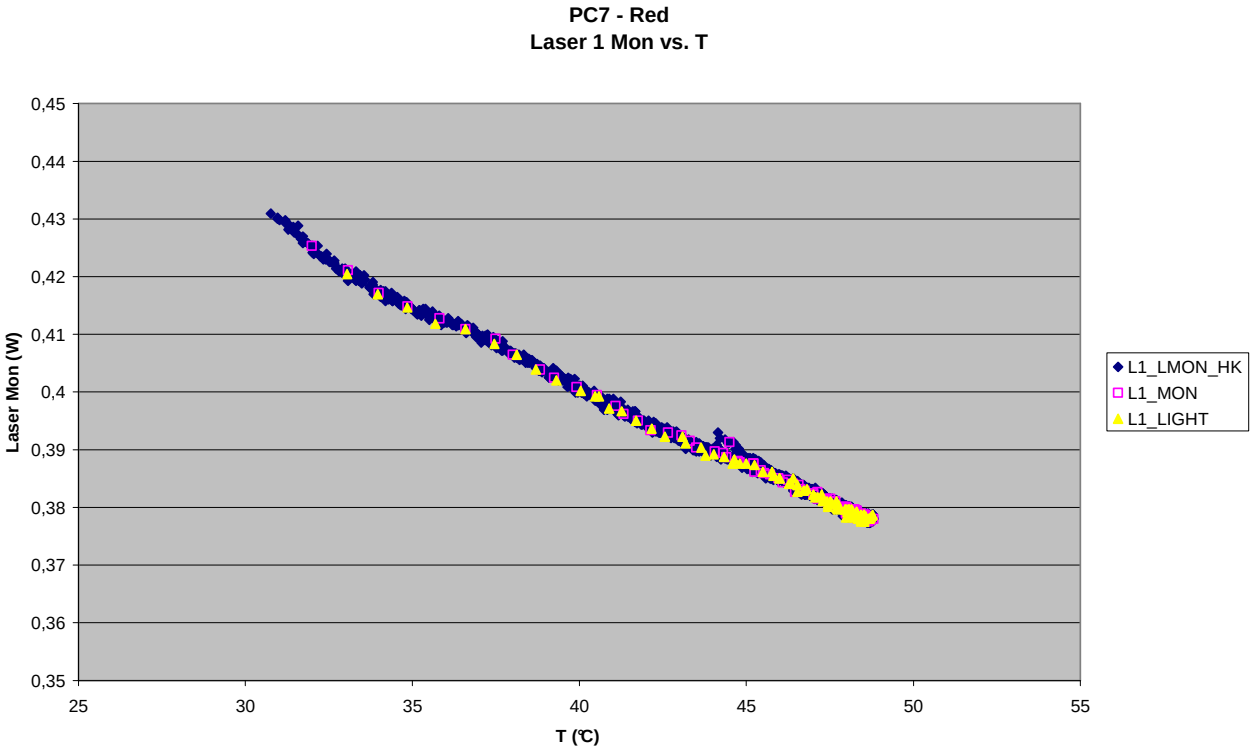


Figure 8.3-6. Laser 2 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Red

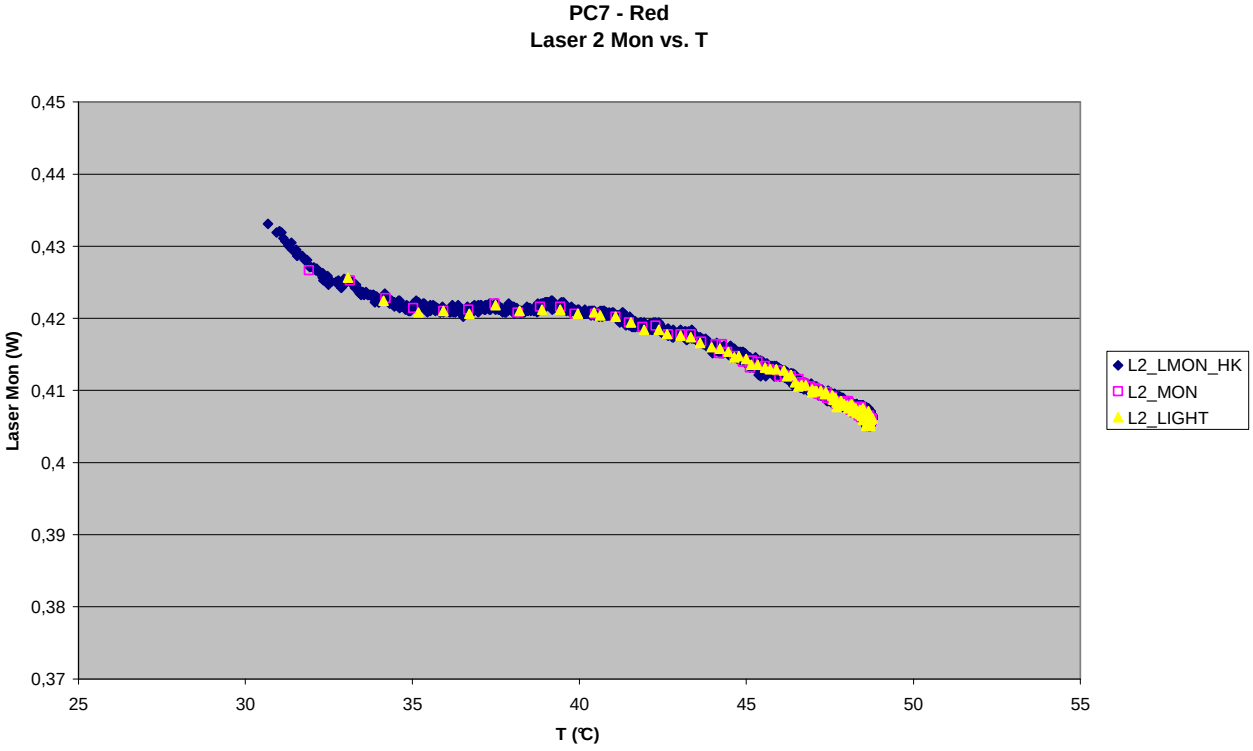


Figure 8.3-7. Laser 3 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Red

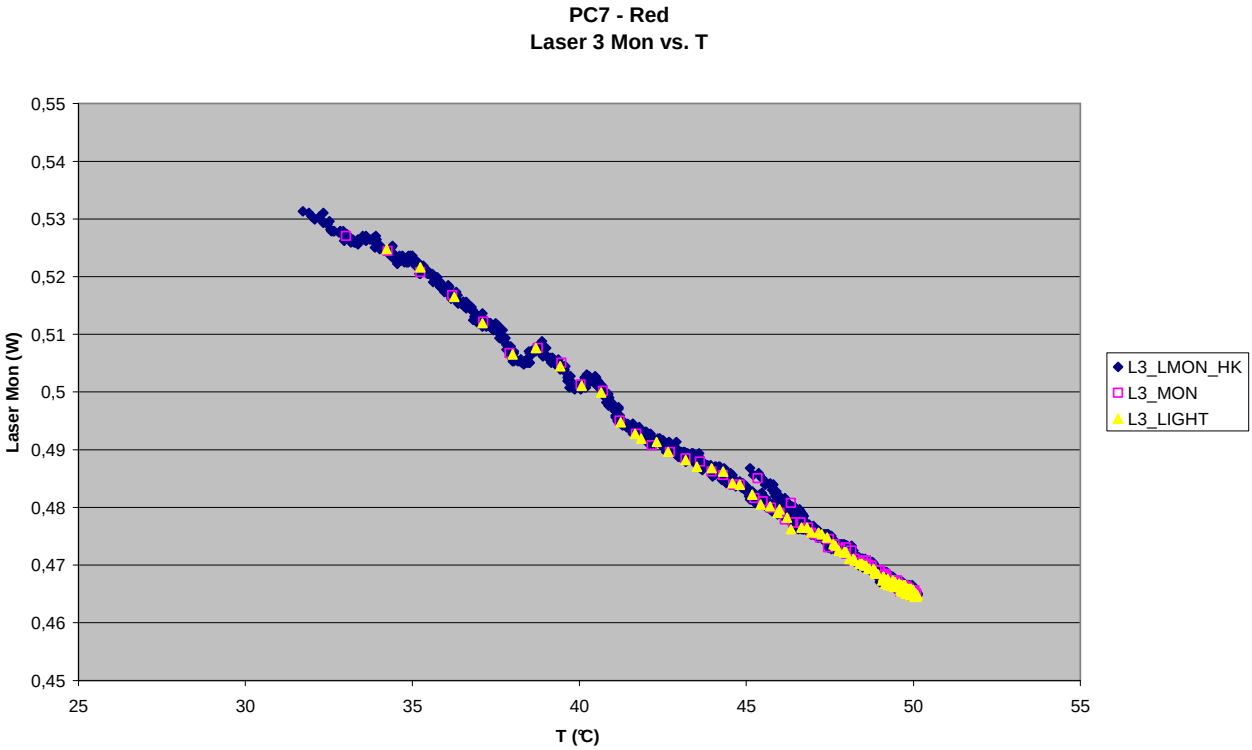
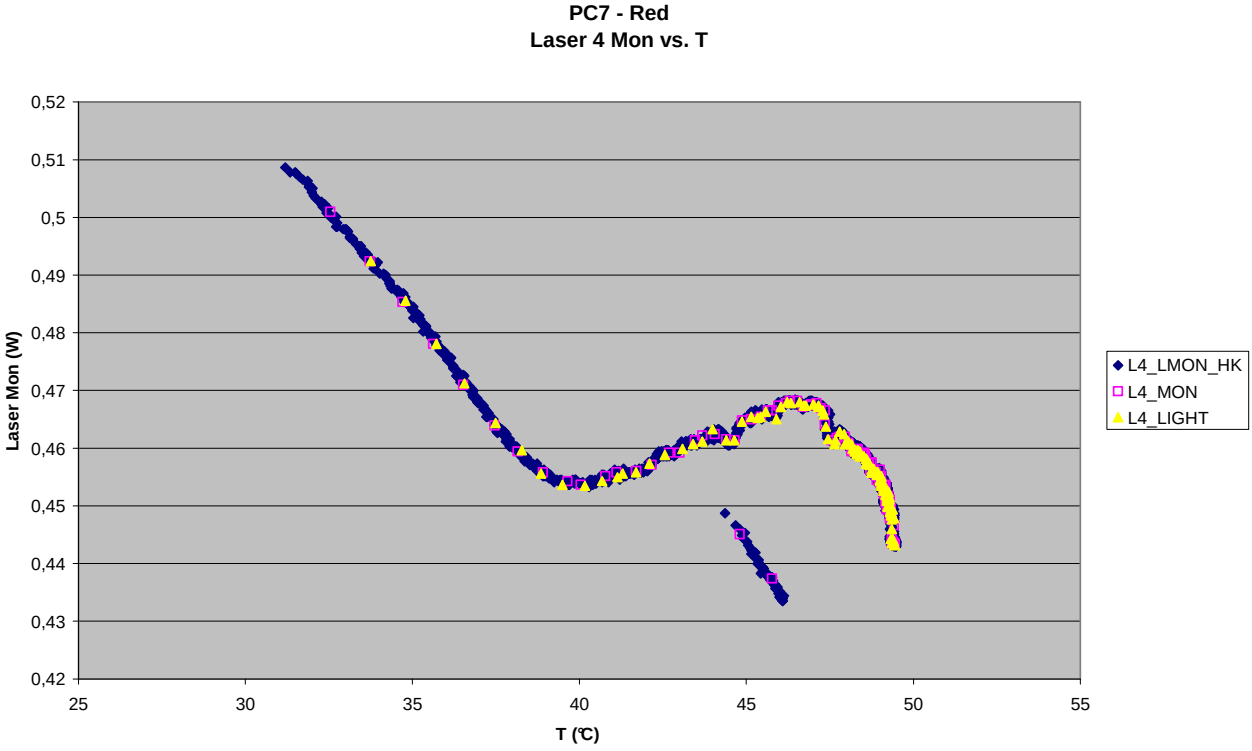


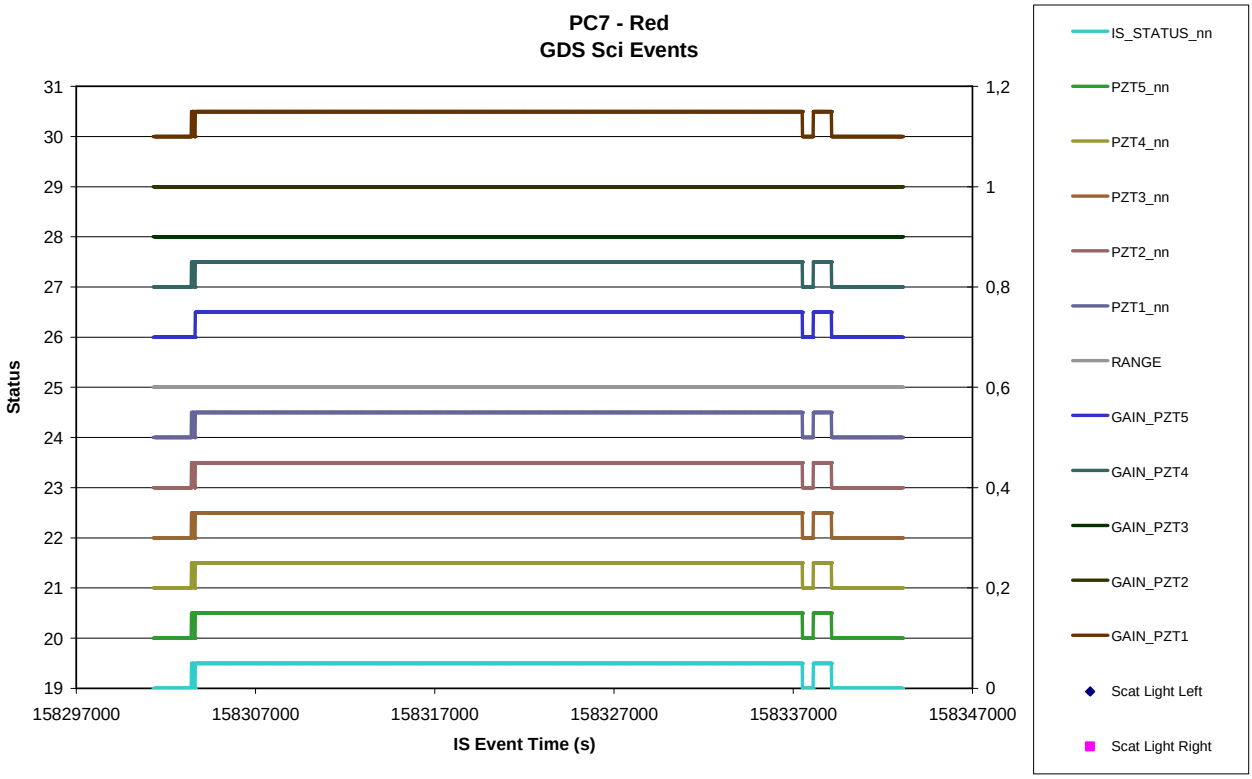
Figure 8.3-8. Laser 4 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Red



8.3.2 GDS – Behaviour

8.3.2.1 Science Events

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

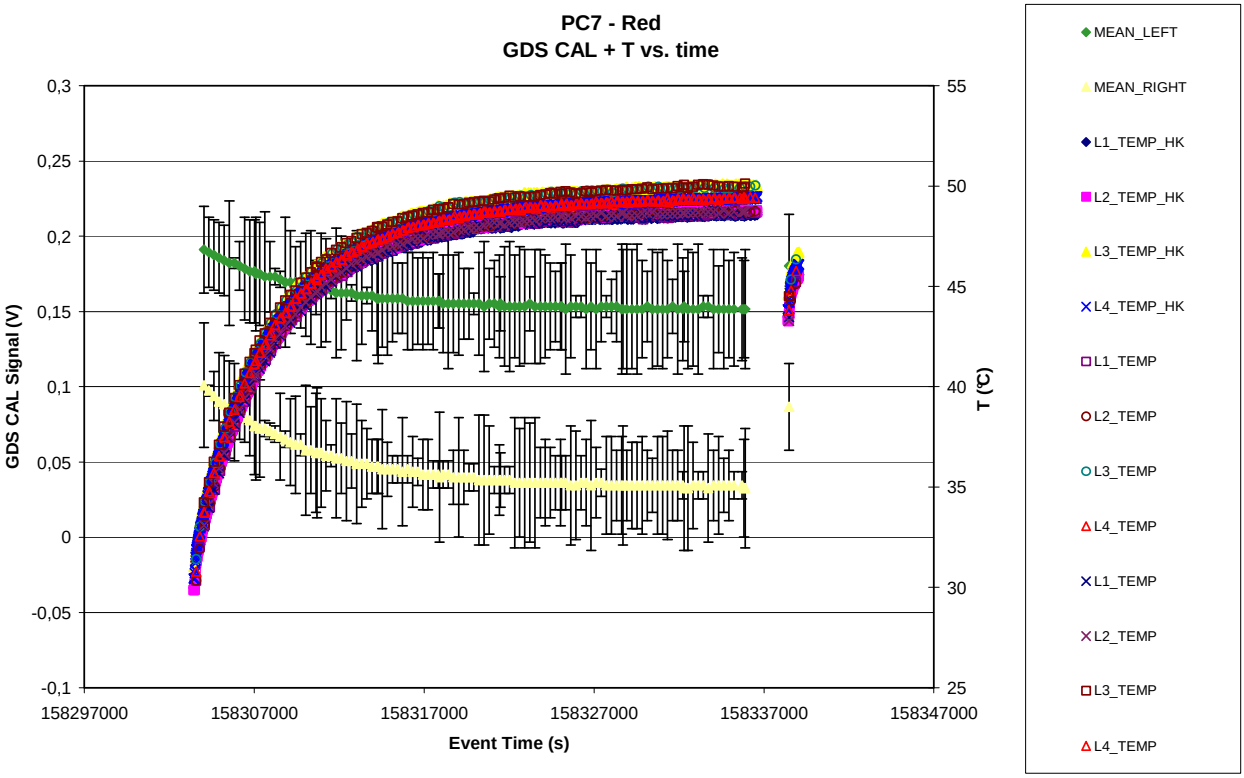


8.3.2.2 Event Rates

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

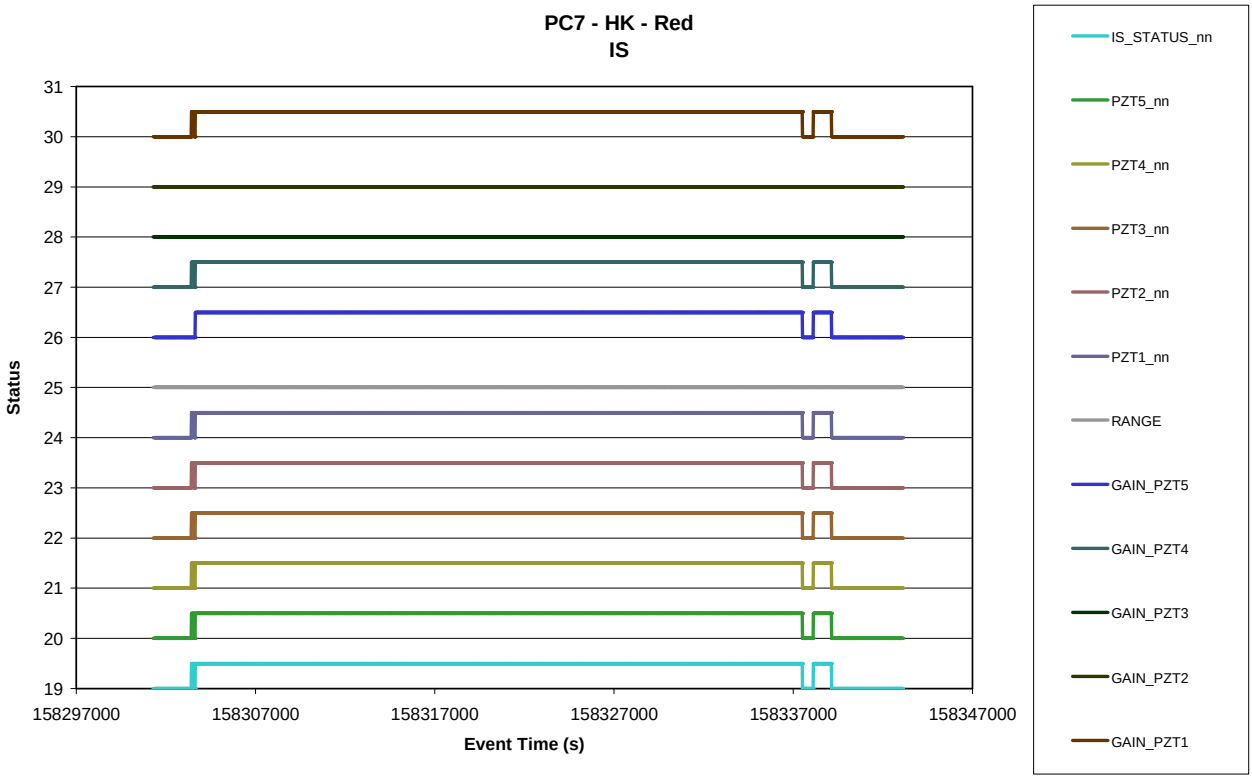


Figure 8.4-2. IS PZT 3 Thresholds change vs. time - Red

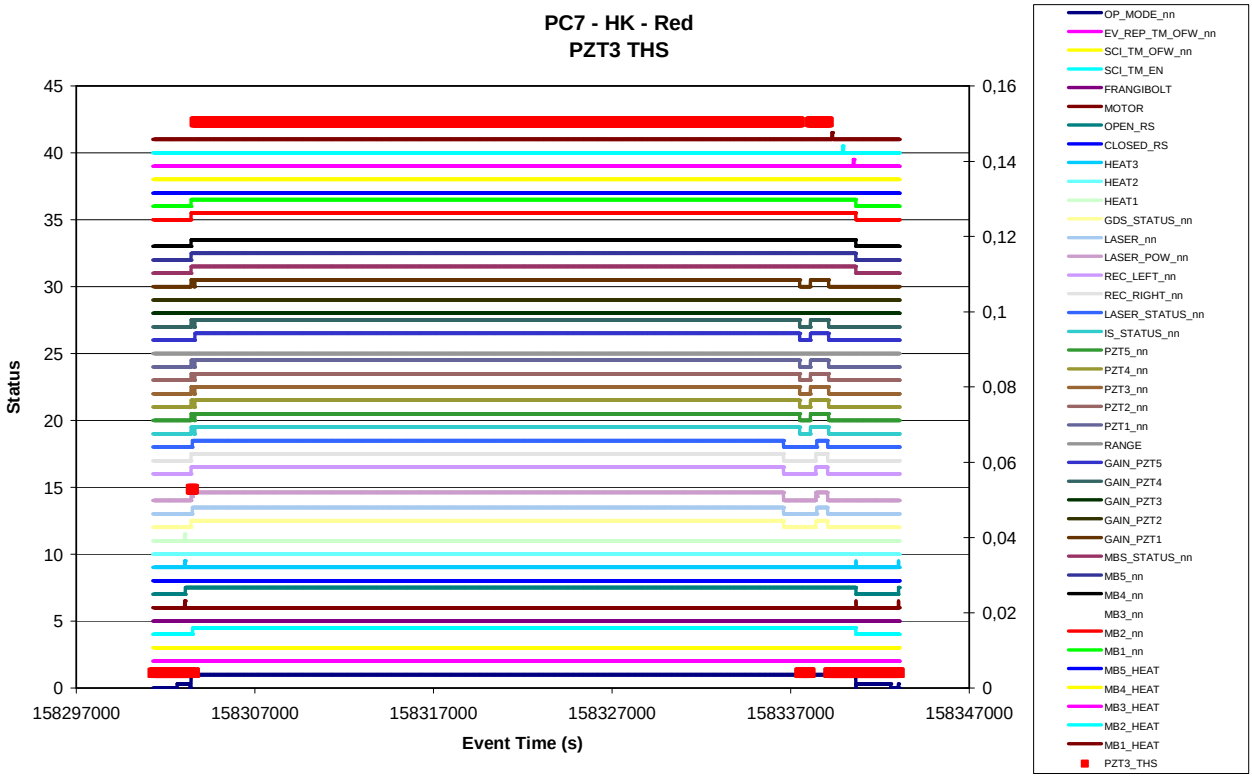


Figure 8.4-3. IS PZT 5 Thresholds change vs. time - Red

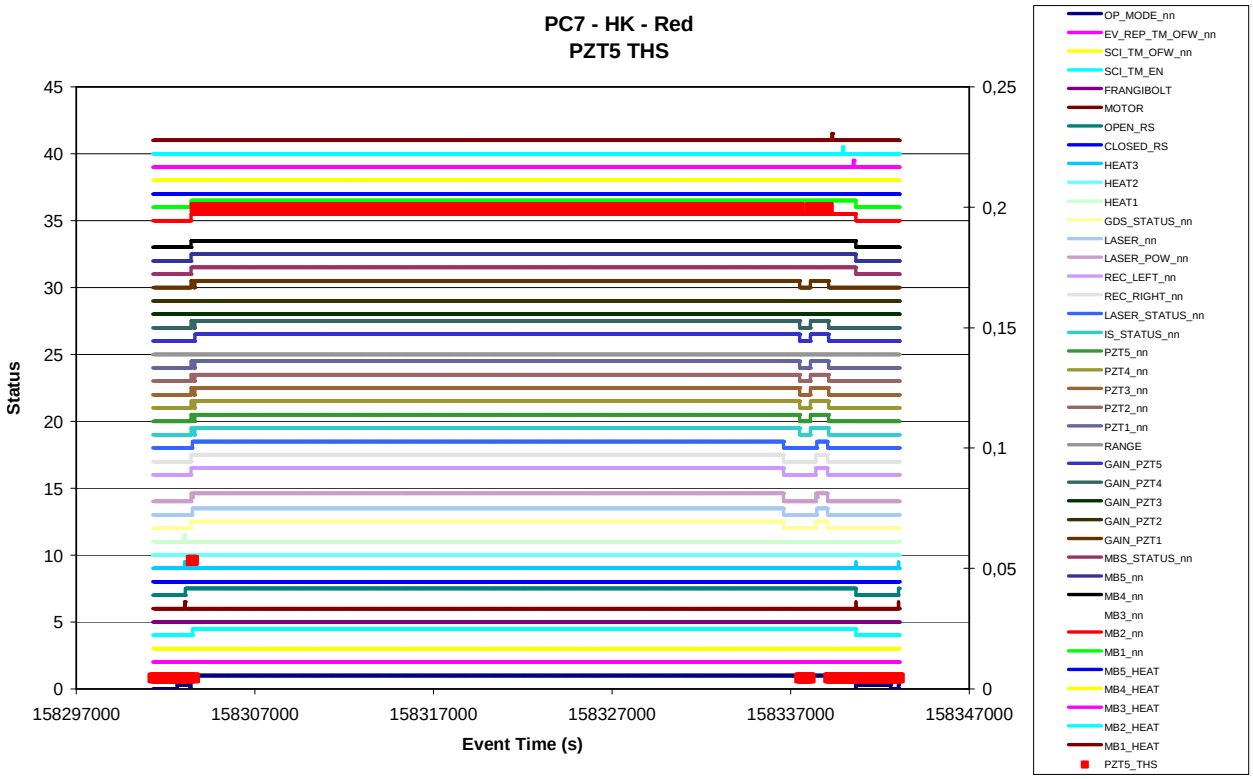
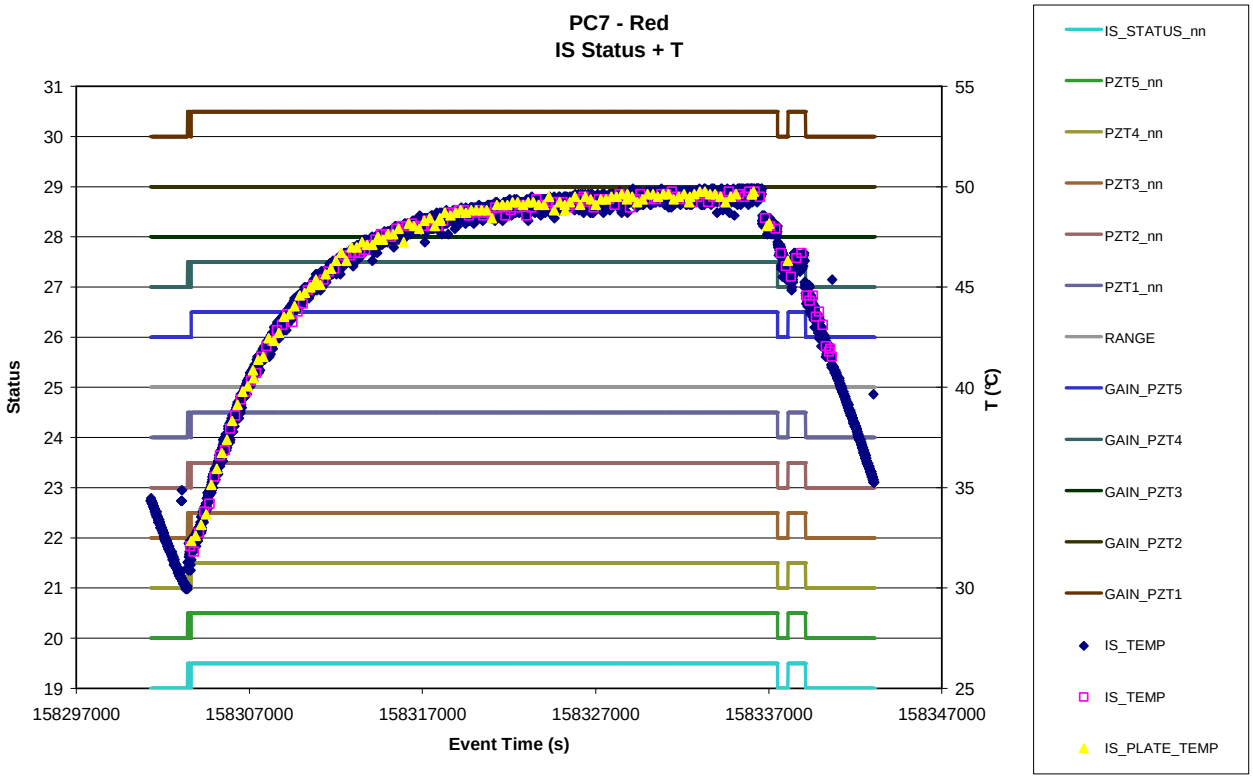


Figure 8.4-4. IS Temperature vs. time (HK, HK-SCI, SCI) - Red



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

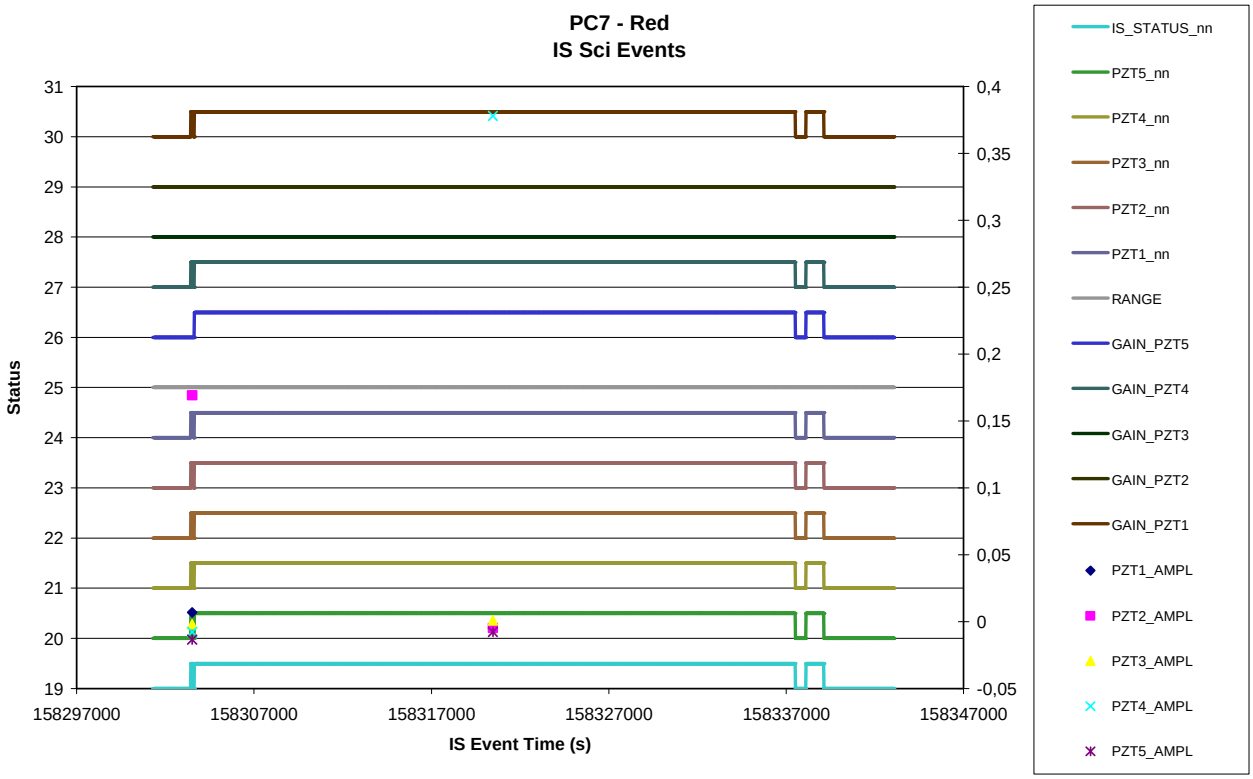


Figure 8.4-6. PZT 1-2-3-4-5 Detected Events vs. time - Red

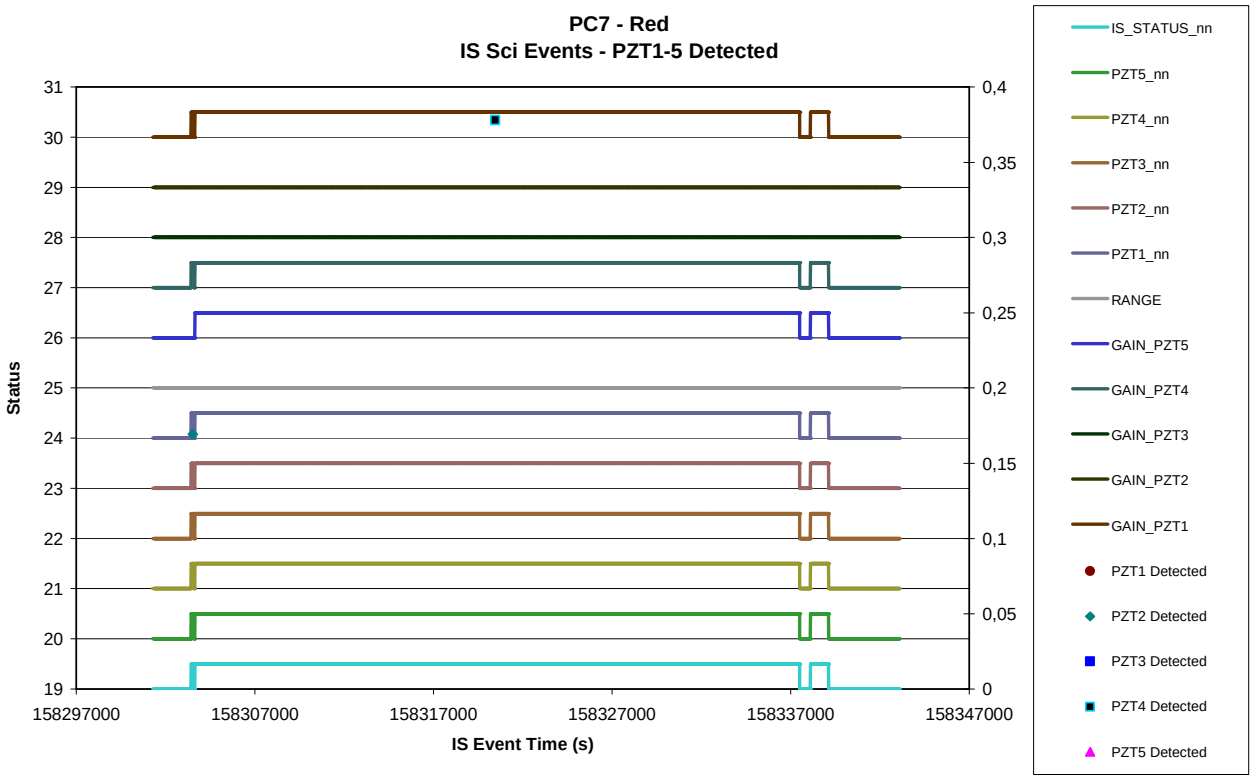


Figure 8.4-7. PZT 1 Detected Events vs. time - Red

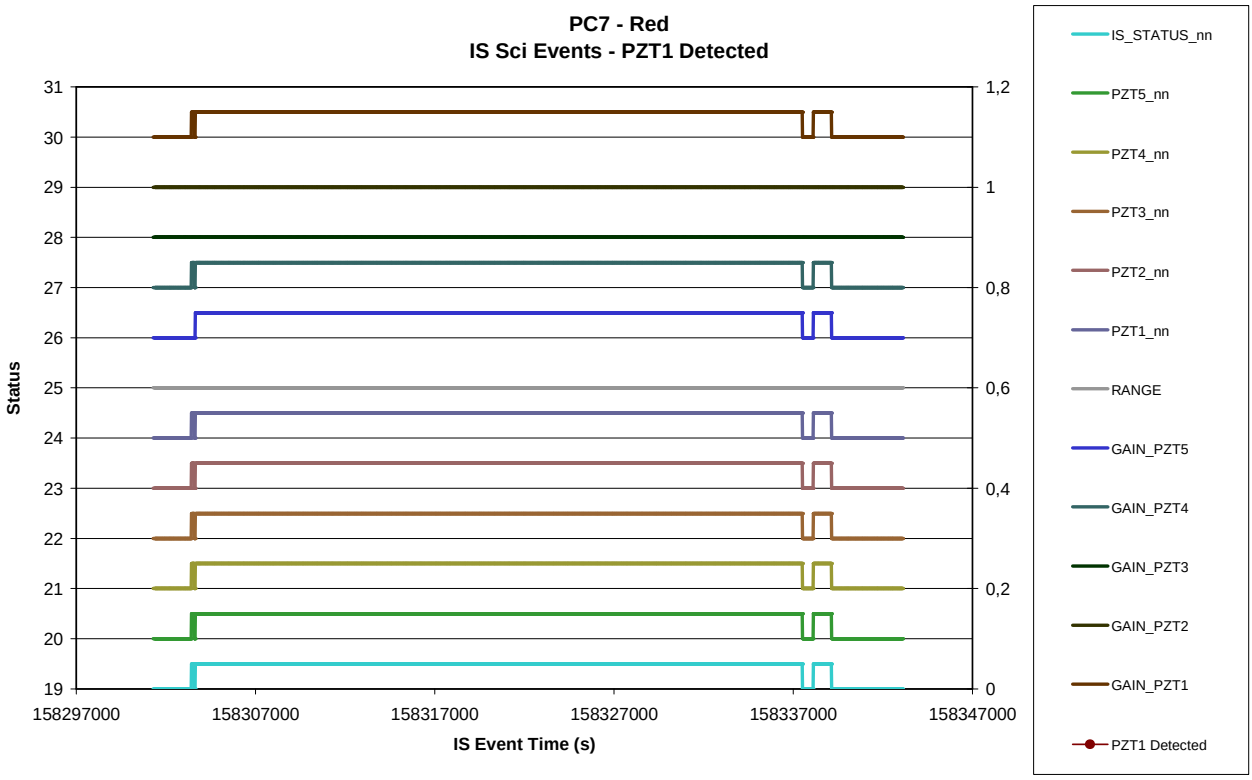


Figure 8.4-8. PZT 2 Detected Events vs. time - Red

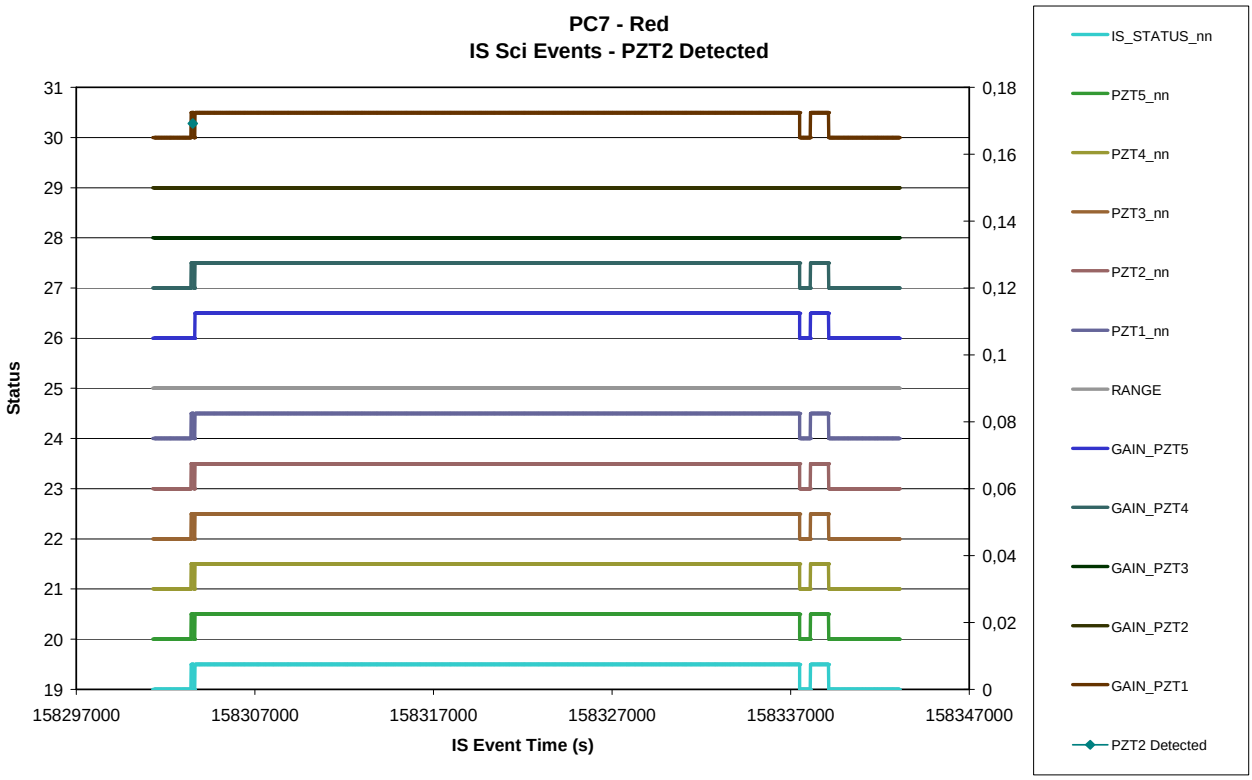


Figure 8.4-9. PZT 3 Detected Events vs. time - Red

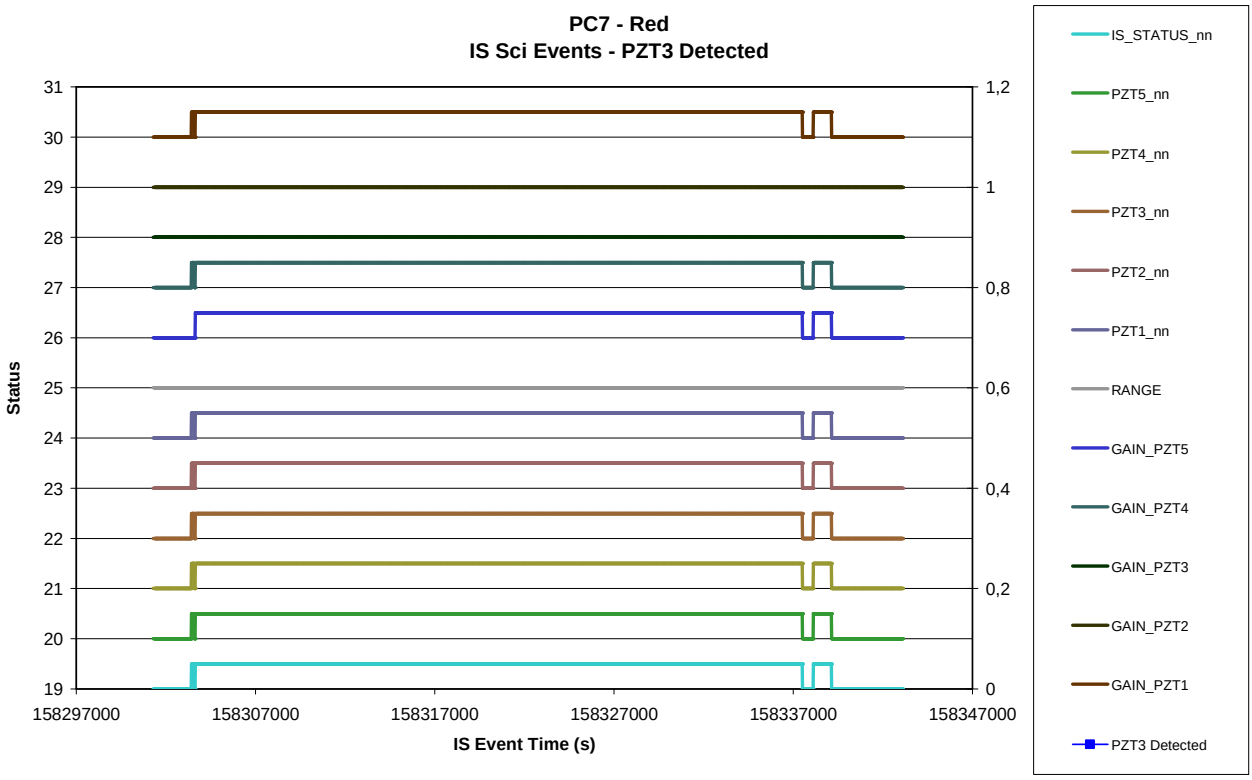


Figure 8.4-10. PZT 4 Detected Events vs. time - Red

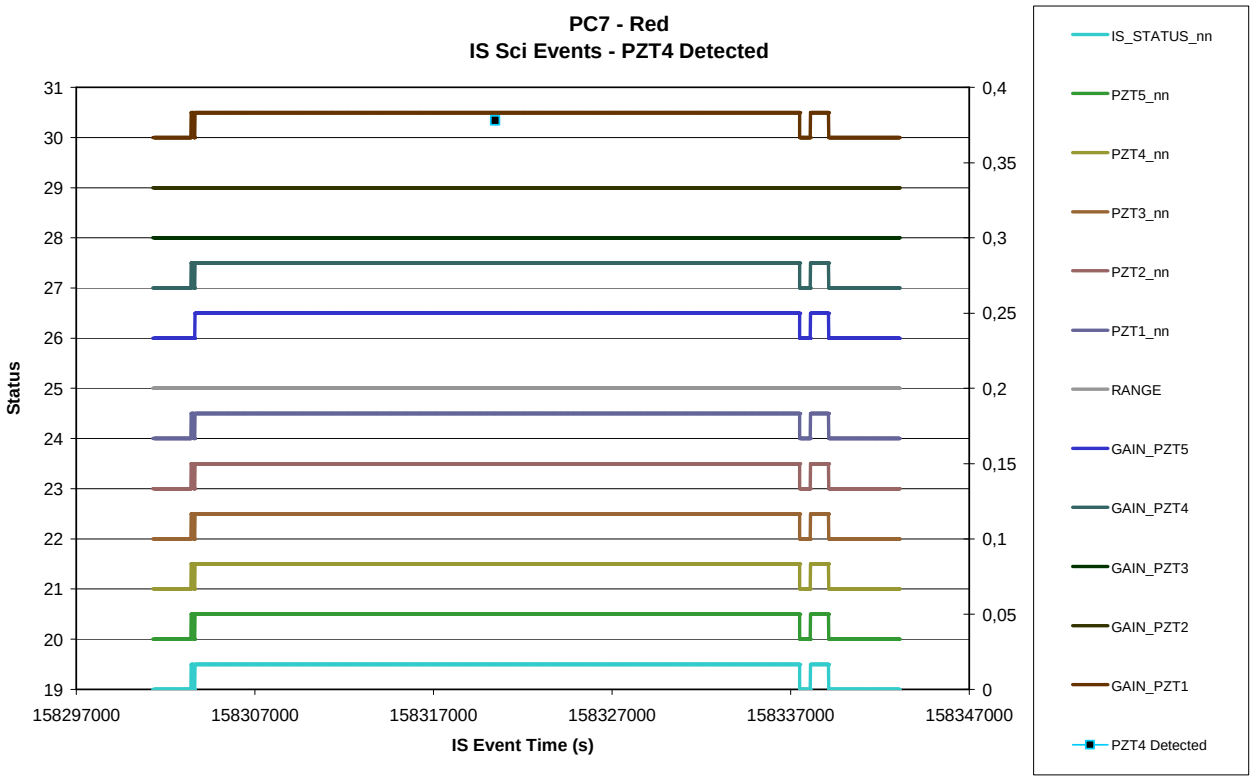


Figure 8.4-11. PZT 5 Detected Events vs. time - Red

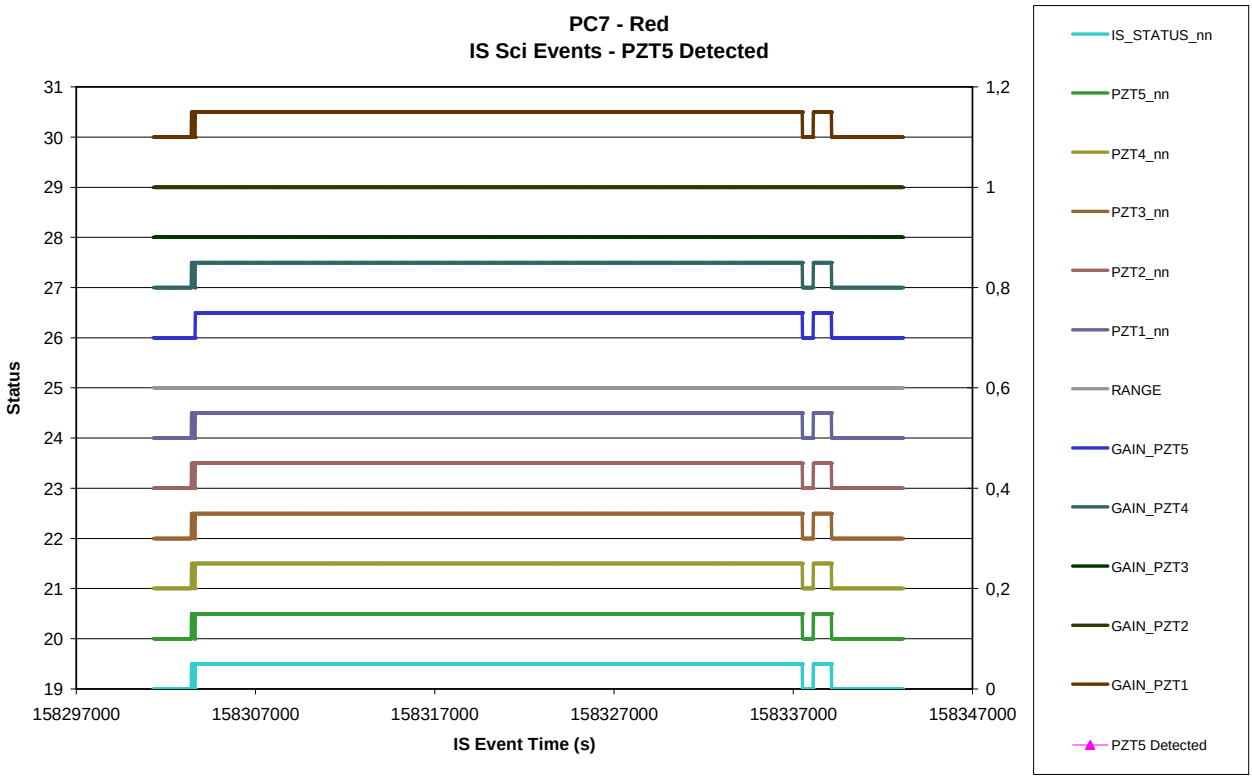
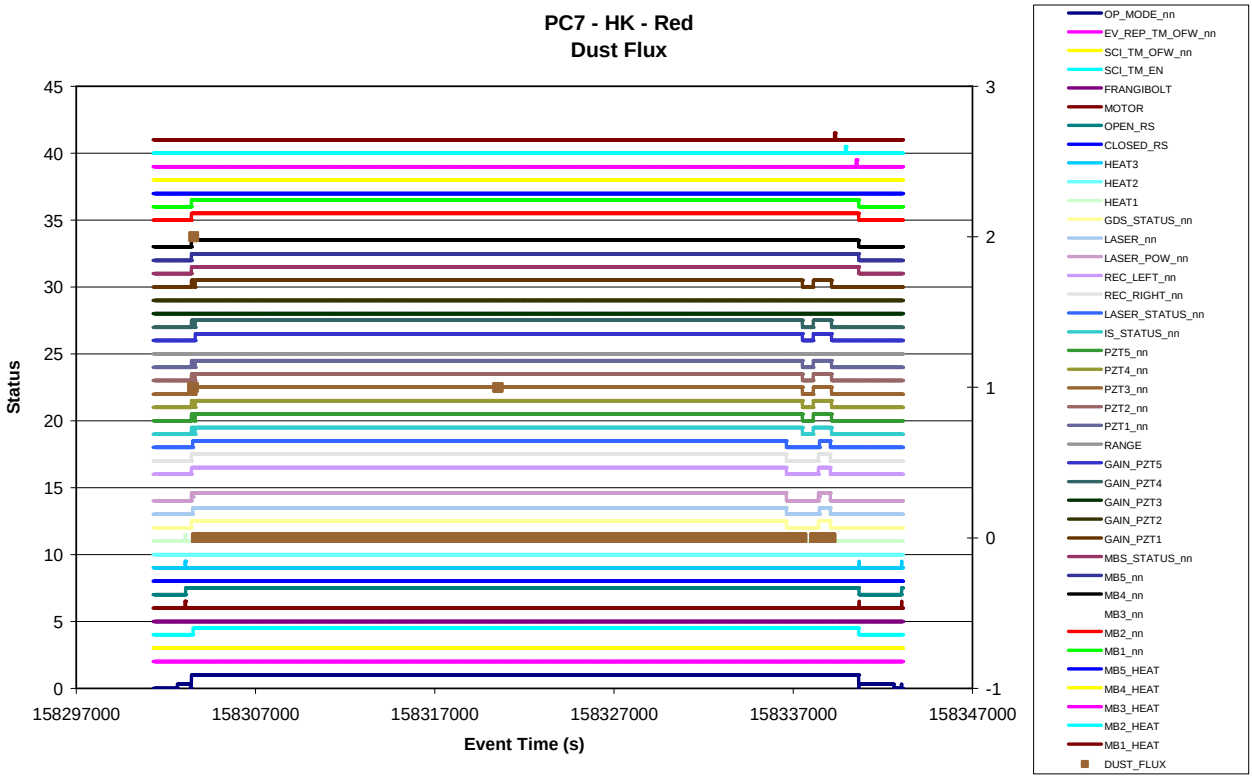


Figure 8.4-12. Dust Flux vs. time - Red



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

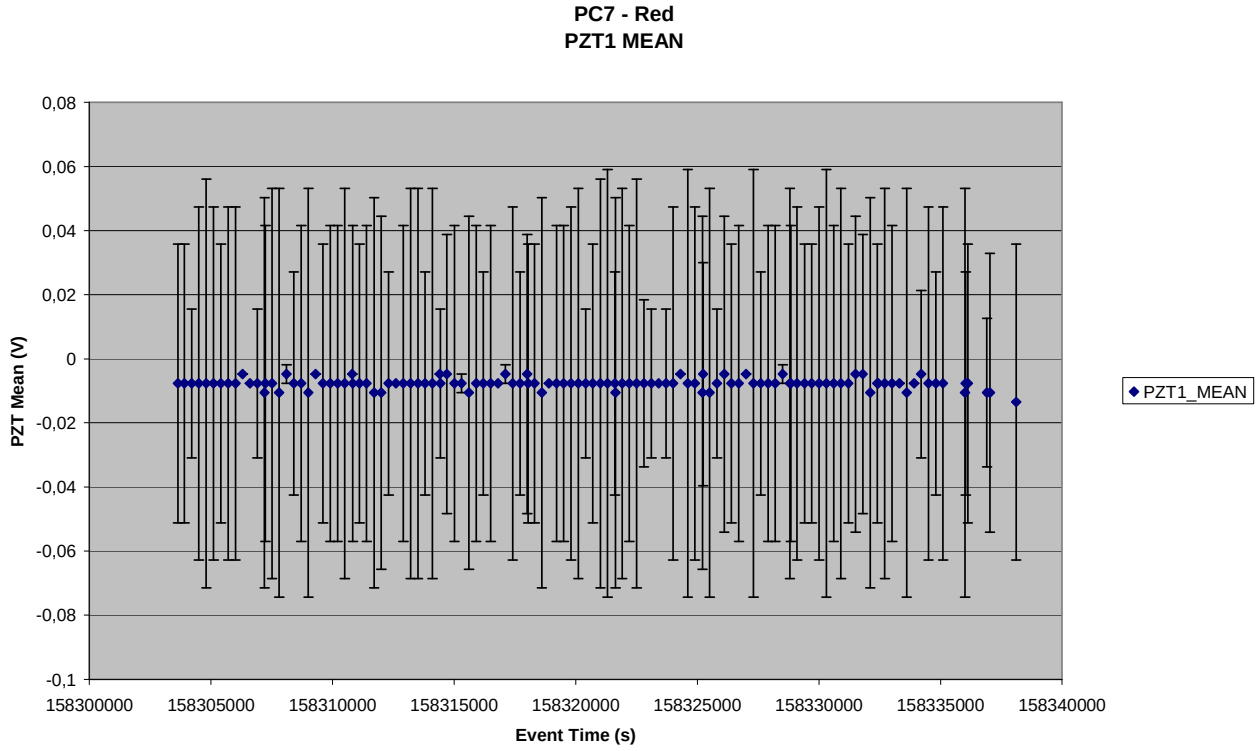


Figure 8.4-14. PZT 2 Mean and St Dev. CAL vs. time - Red

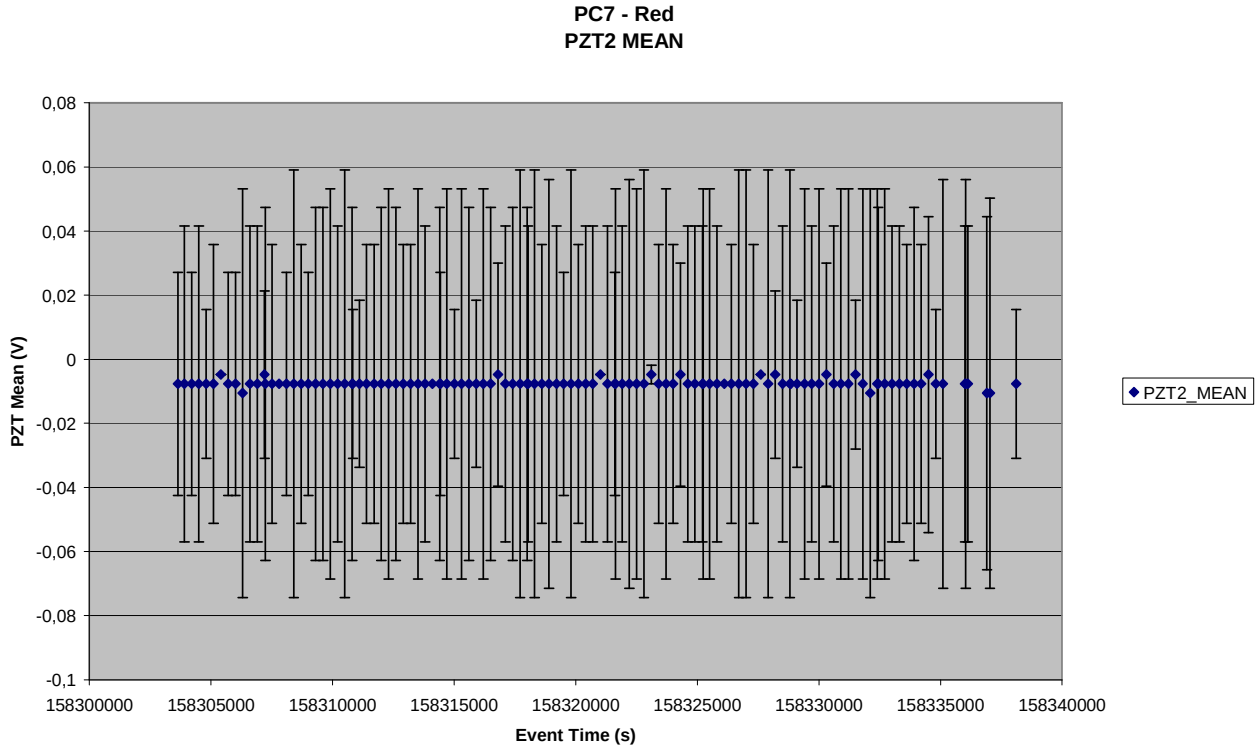


Figure 8.4-15. PZT 3 Mean and St Dev. CAL vs. time - Red

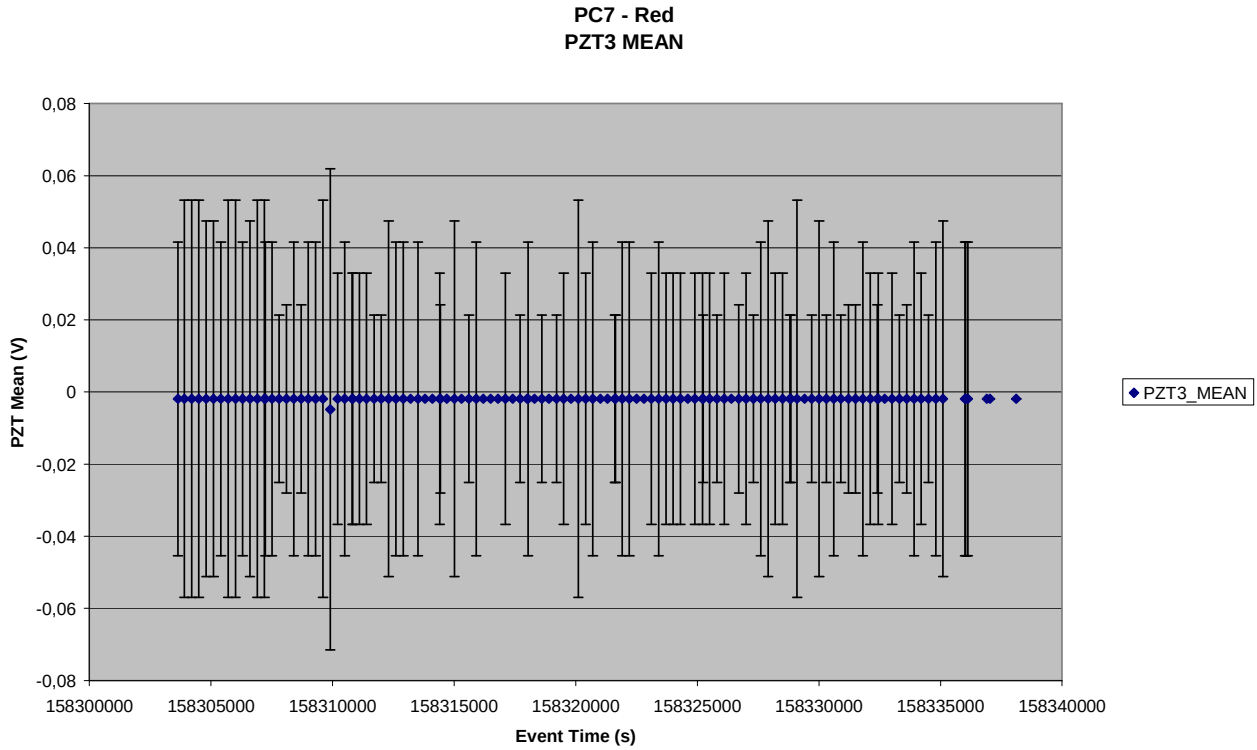


Figure 8.4-16. PZT 4 Mean and St Dev. CAL vs. time - Red

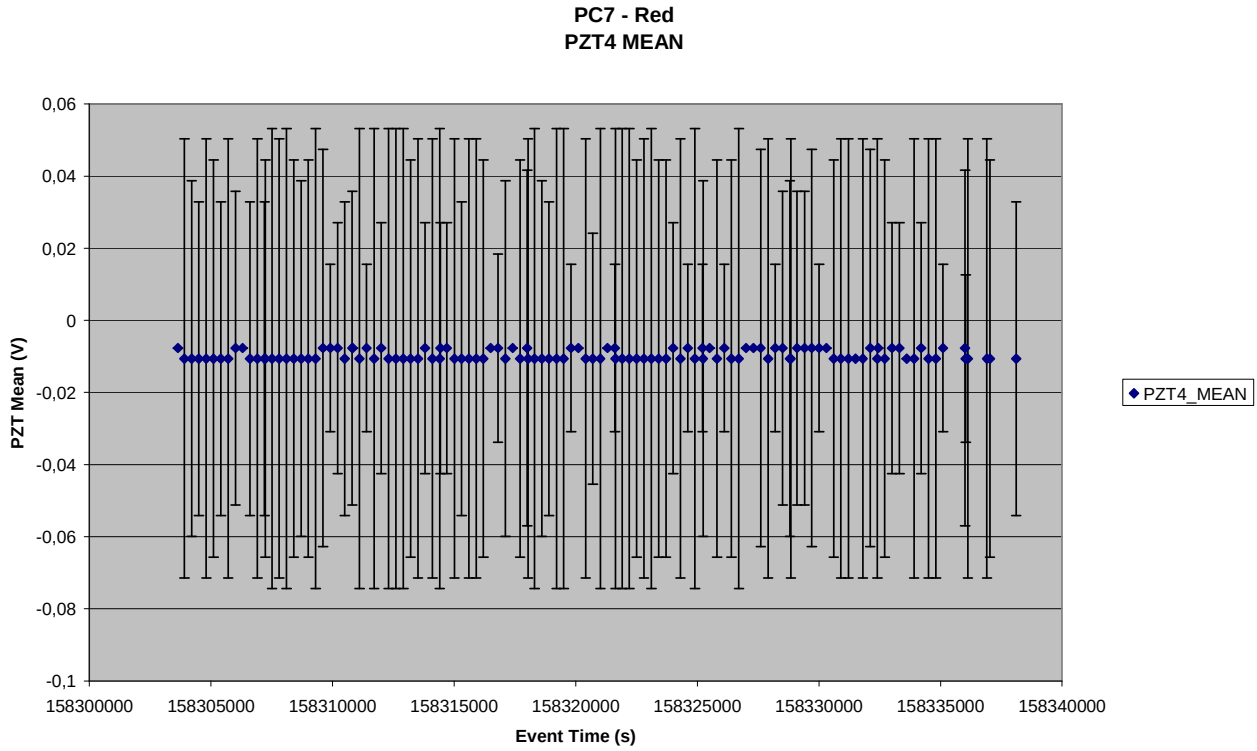


Figure 8.4-17. PZT 5 Mean and St Dev. CAL vs. time - Red

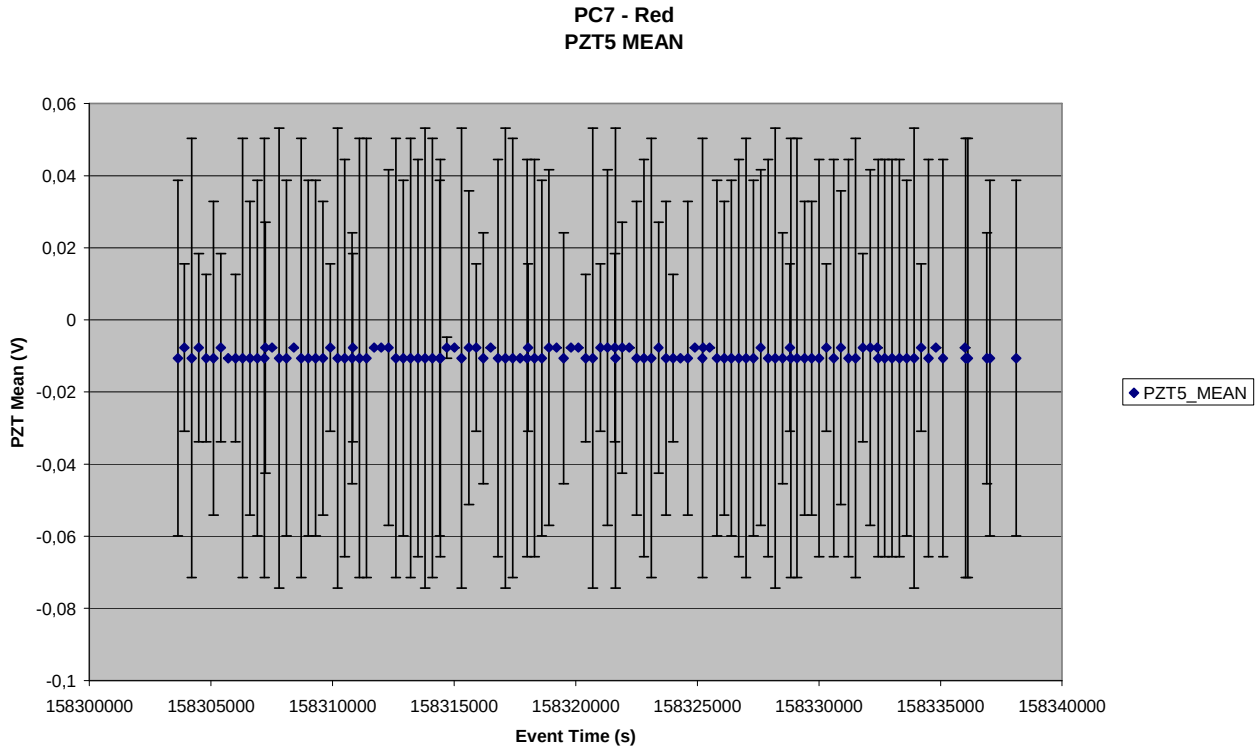


Figure 8.4-18. Reference Voltages for IS calibration vs. time - Red

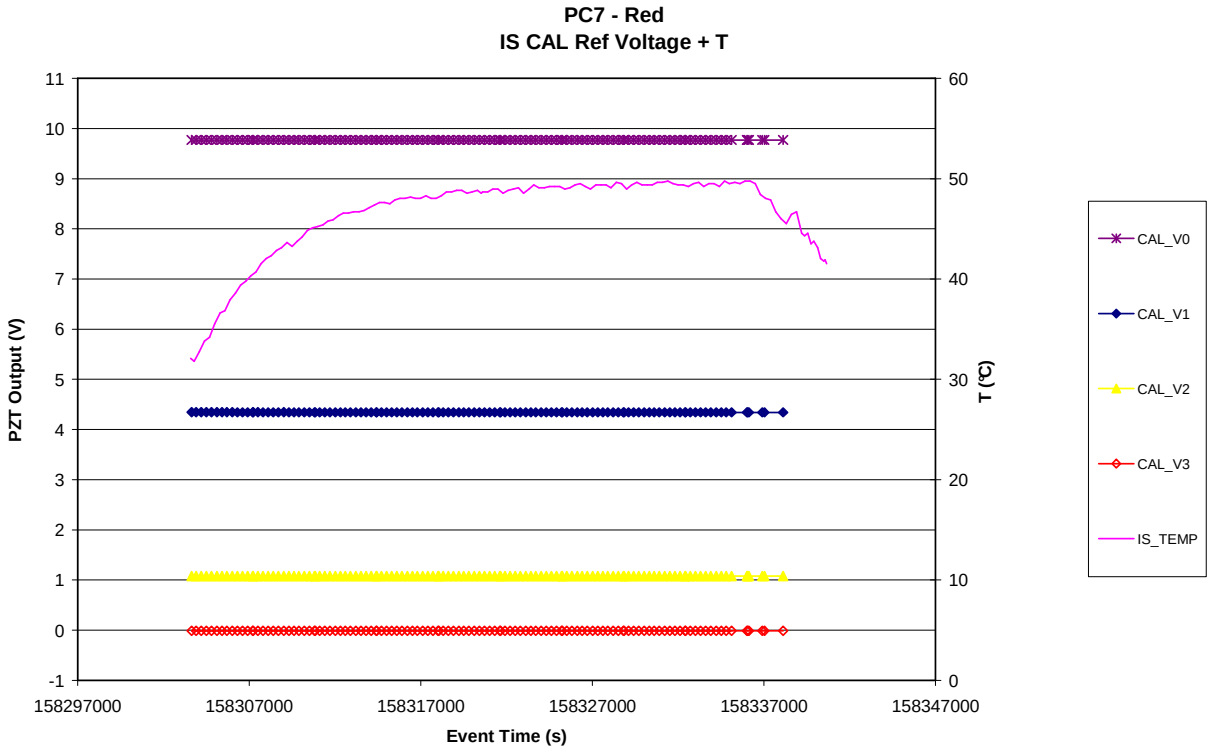


Figure 8.4-19. PZT 1 CAL Signal vs. time - Red

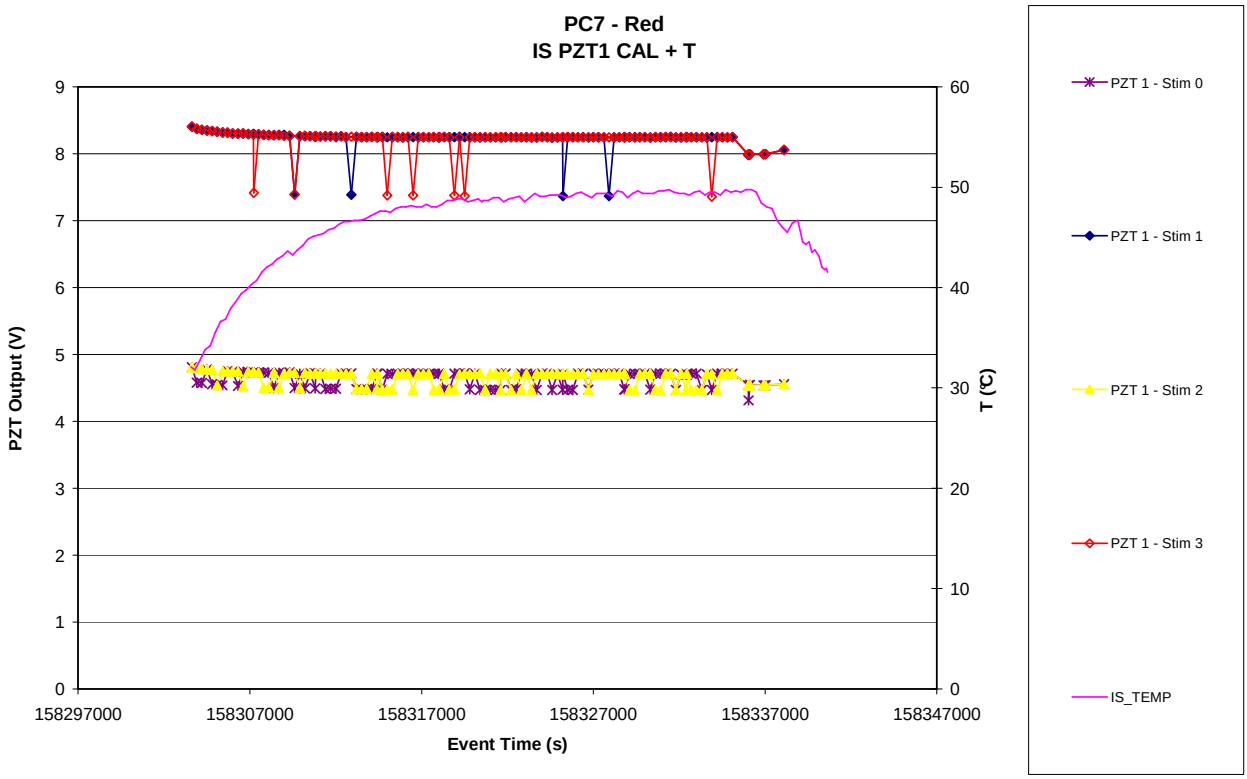


Figure 8.4-20. PZT 2 CAL Signal vs. time - Red

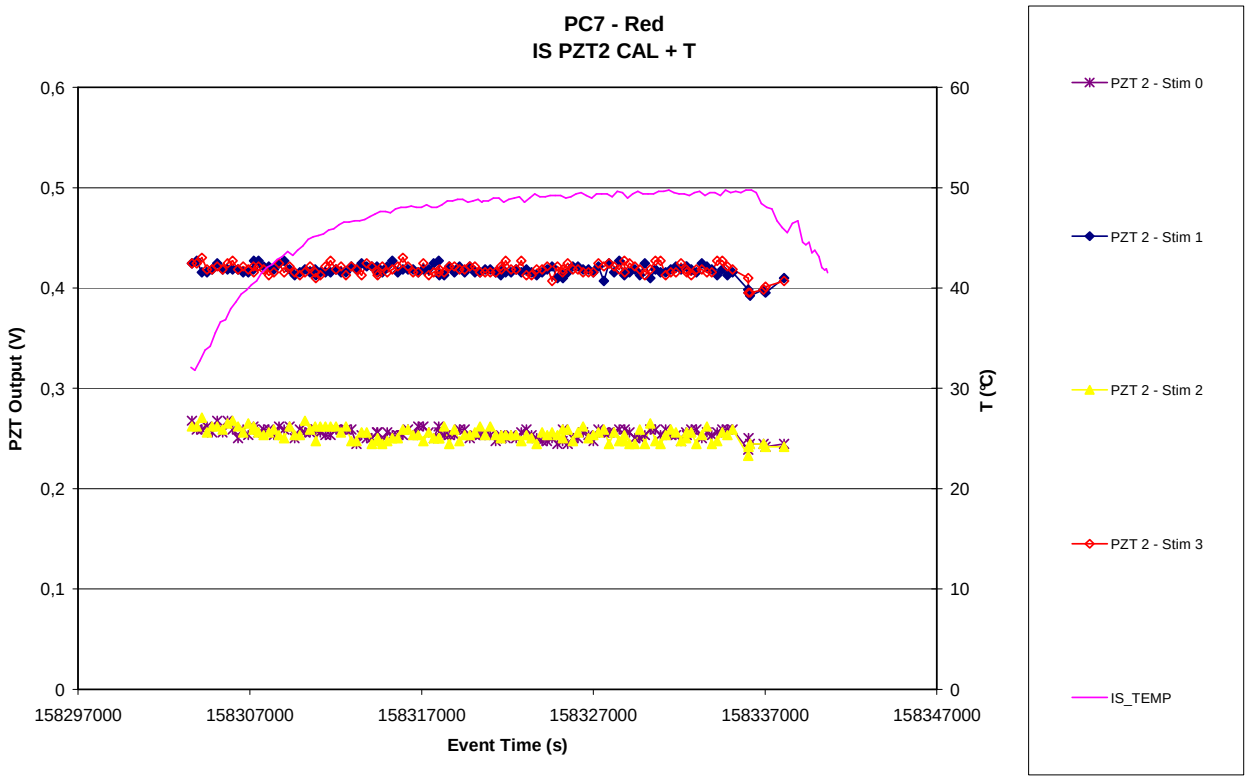


Figure 8.4-21. PZT 3 CAL Signal vs. time - Red

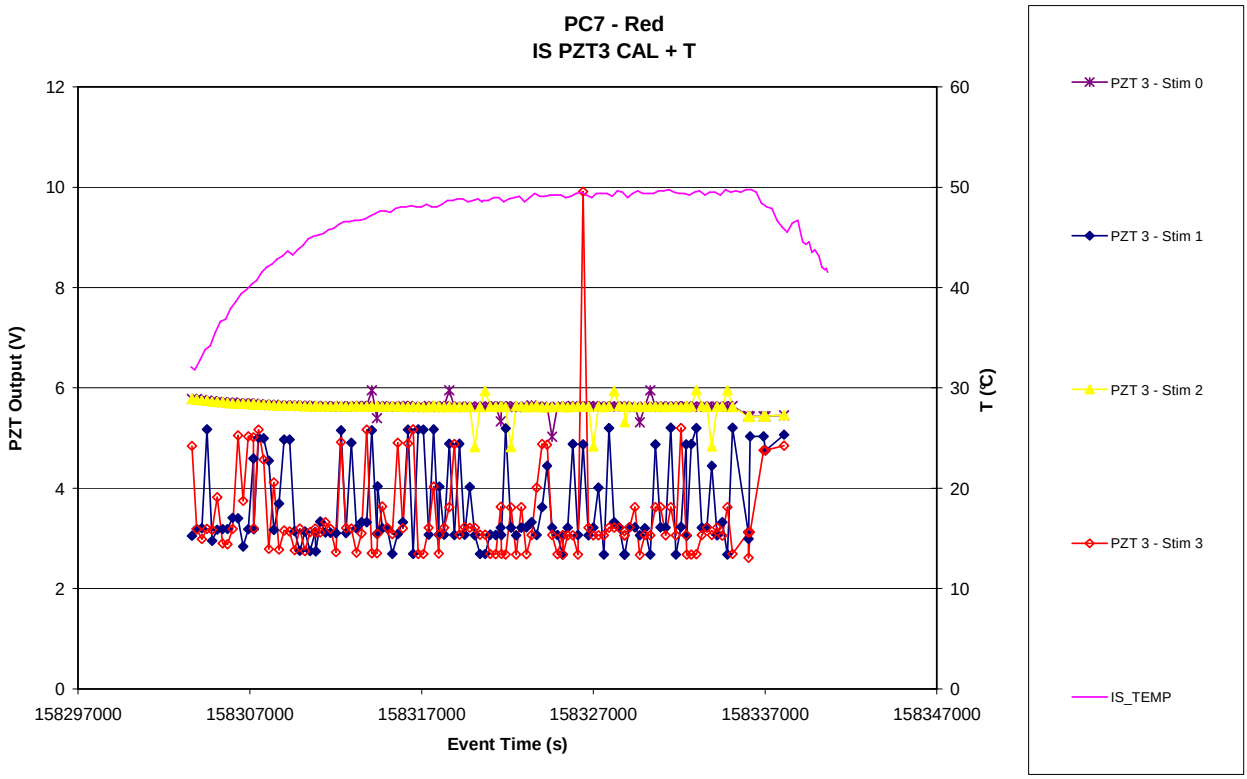


Figure 8.4-22. PZT 4 CAL Signal vs. time - Red

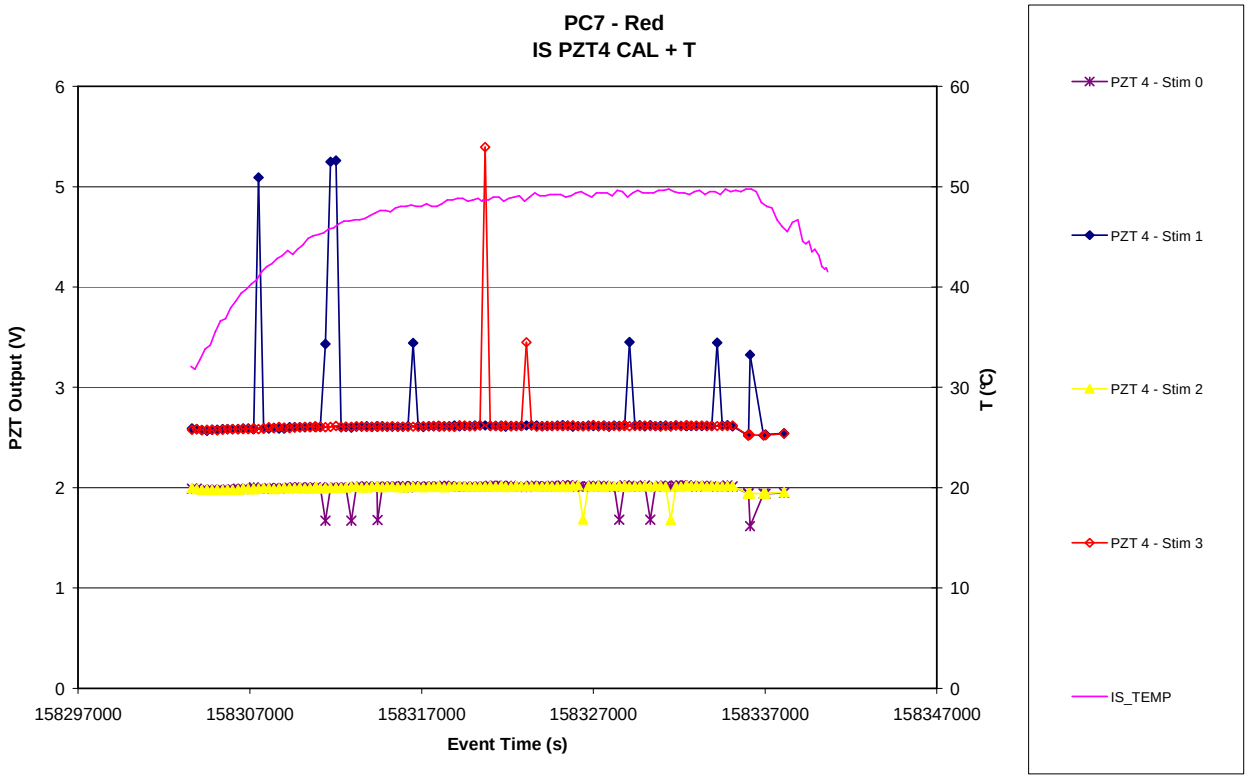


Figure 8.4-23. PZT 5 CAL Signal vs. time - Red

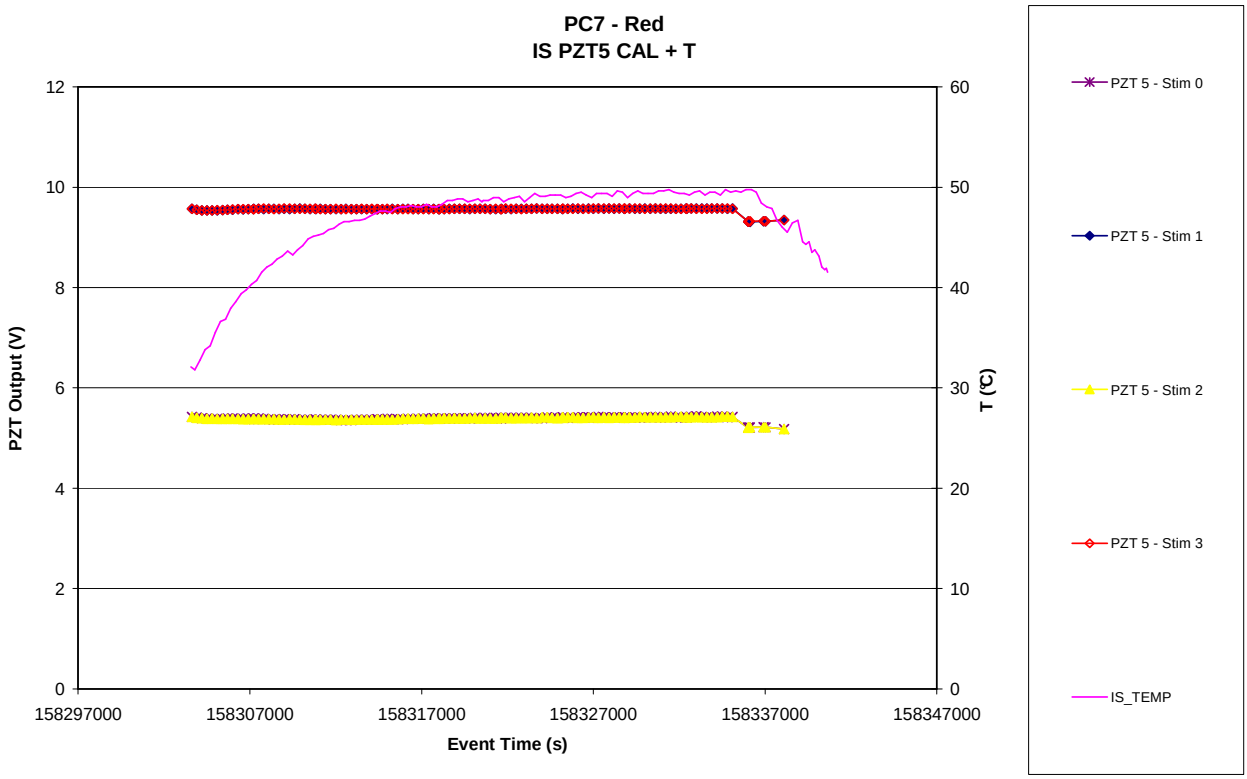


Figure 8.4-24. PZT 1 CAL Time delay vs. time - Red

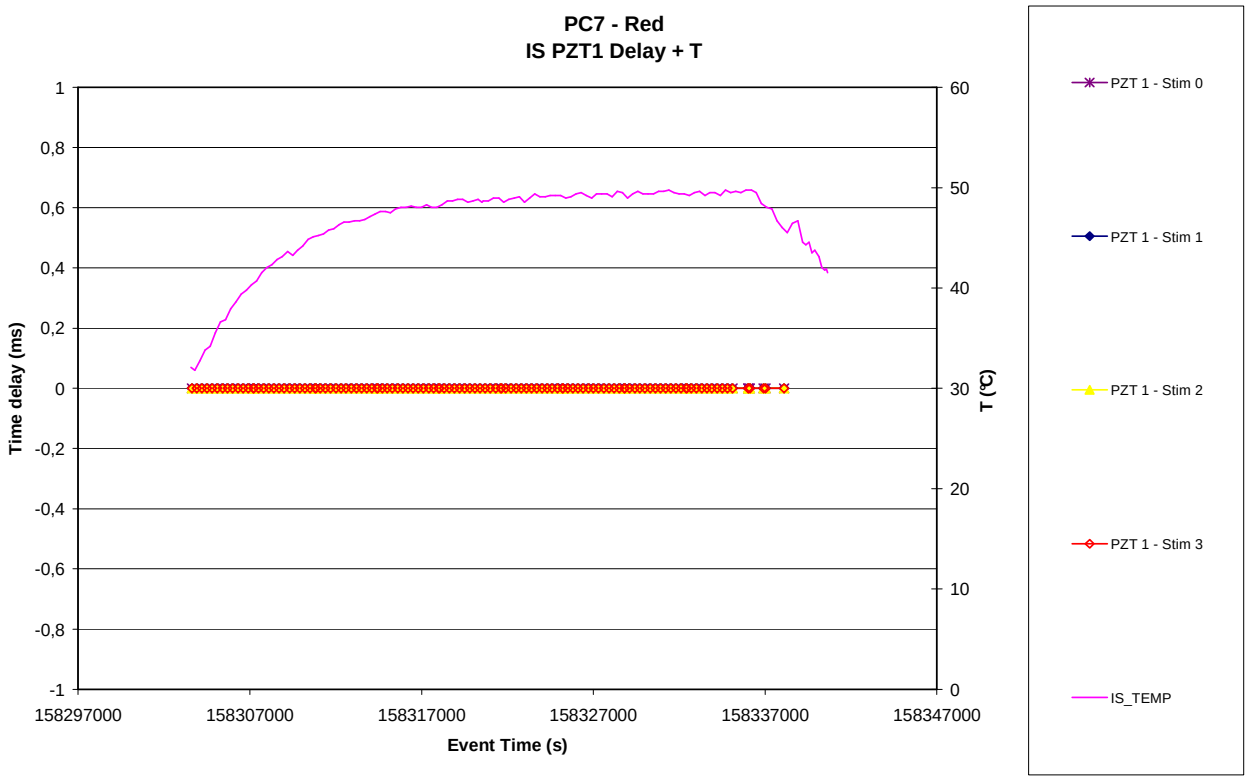


Figure 8.4-25. PZT 2 CAL Time delay vs. time - Red

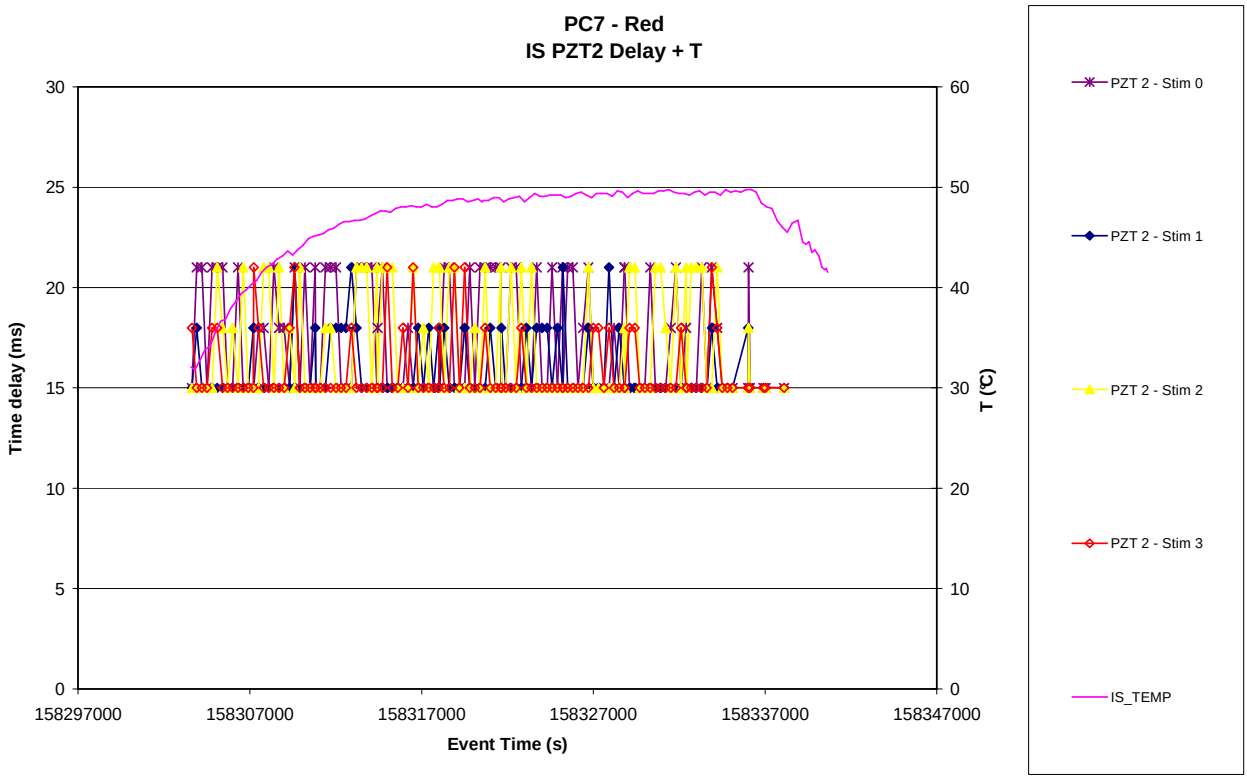


Figure 8.4-26. PZT 3 CAL Time delay vs. time - Red

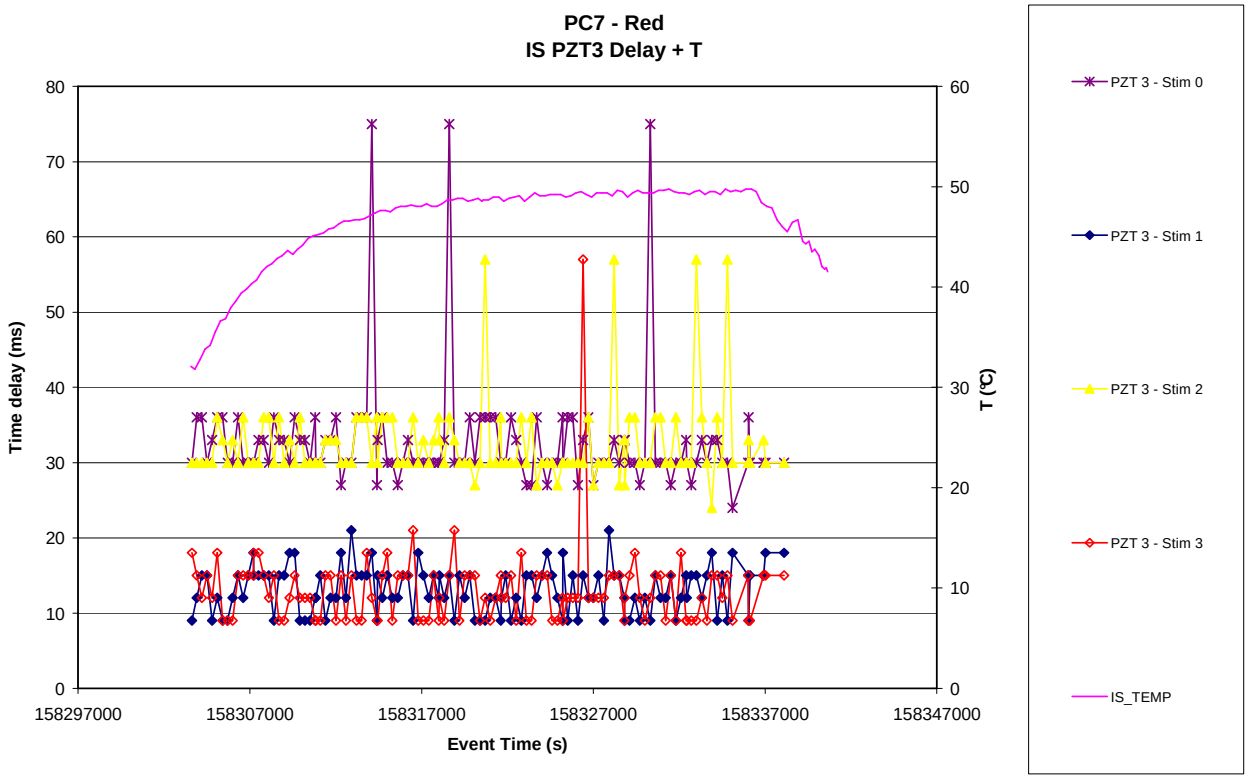


Figure 8.4-27. PZT 4 CAL Time delay vs. time - Red

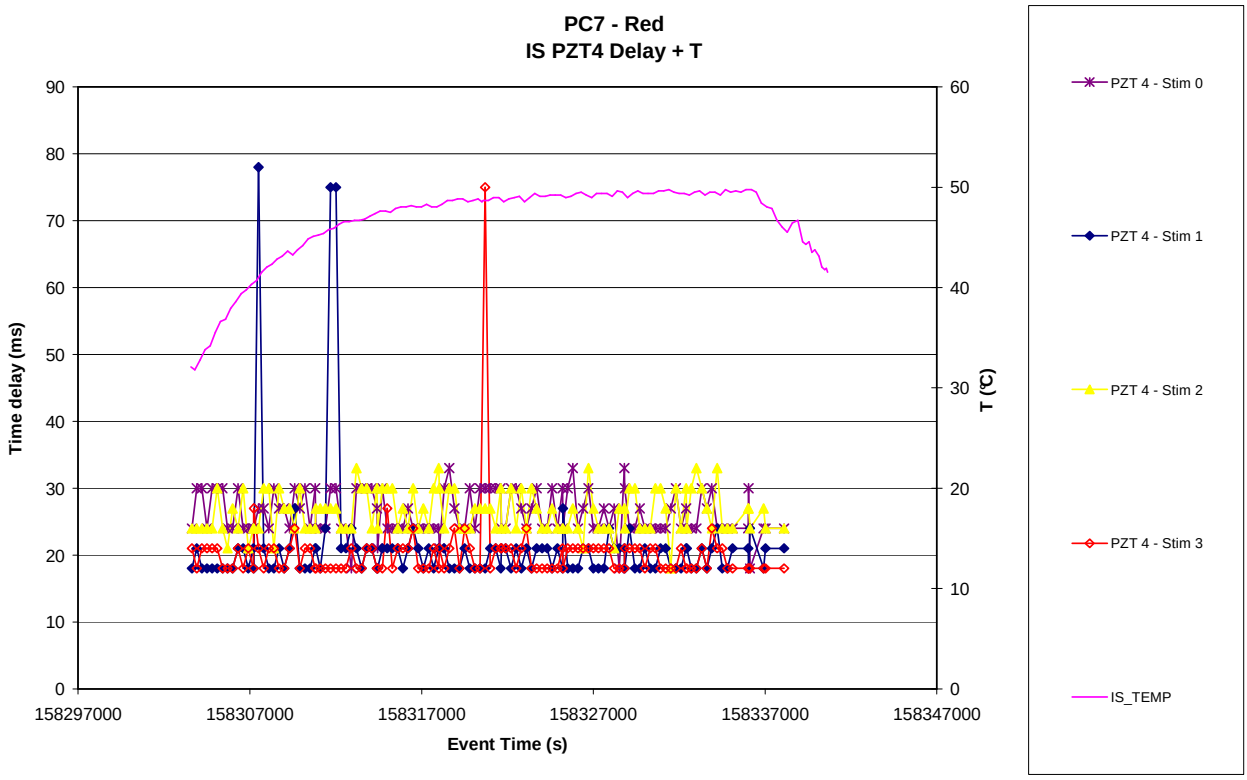


Figure 8.4-28. PZT 5 CAL Time delay vs. time - Red

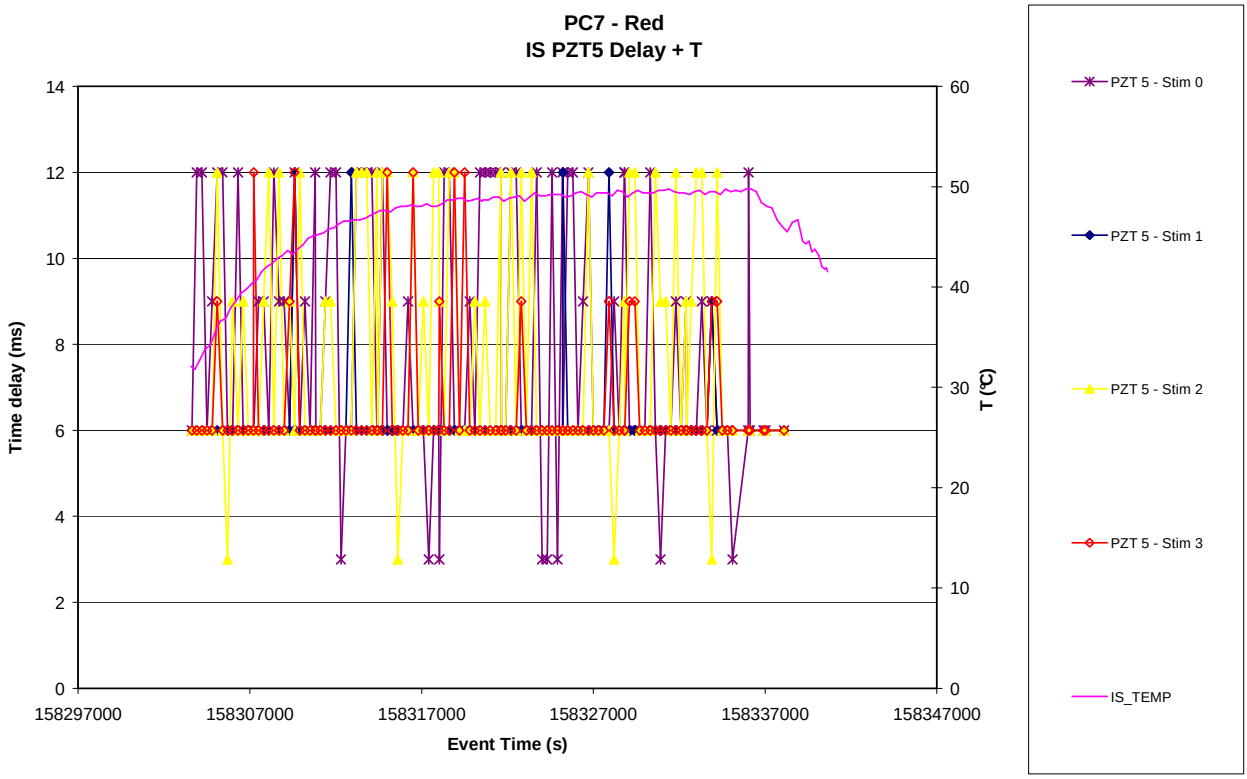


Figure 8.4-29. PZT 1 CAL Signal vs. stimulus – Red

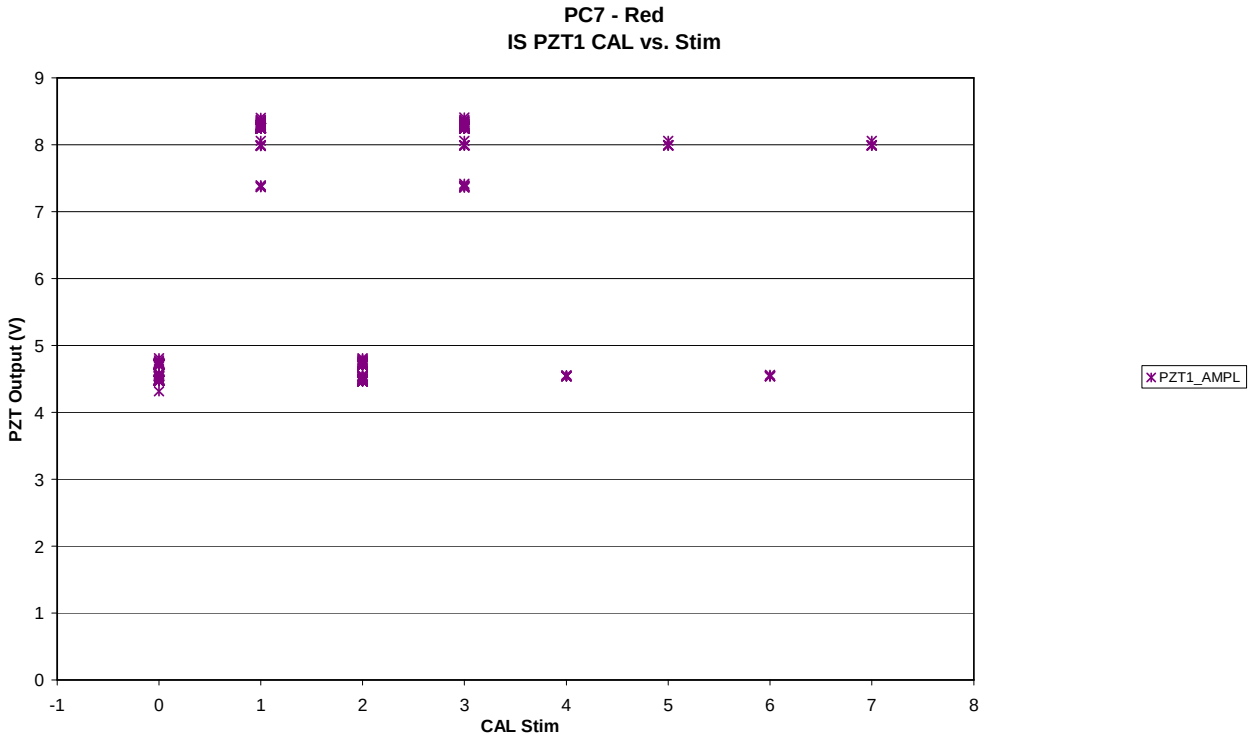


Figure 8.4-30. PZT 2 CAL Signal vs. stimulus – Red

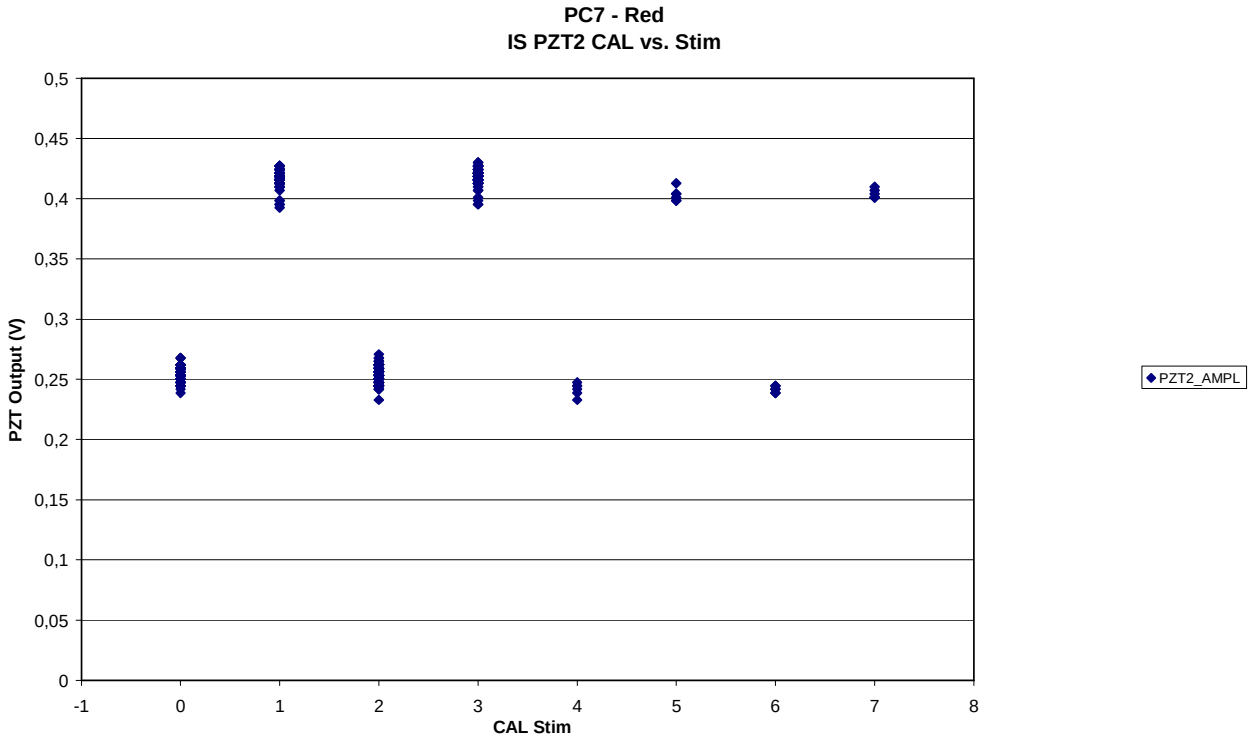


Figure 8.4-31. PZT 3 CAL Signal vs. stimulus – Red

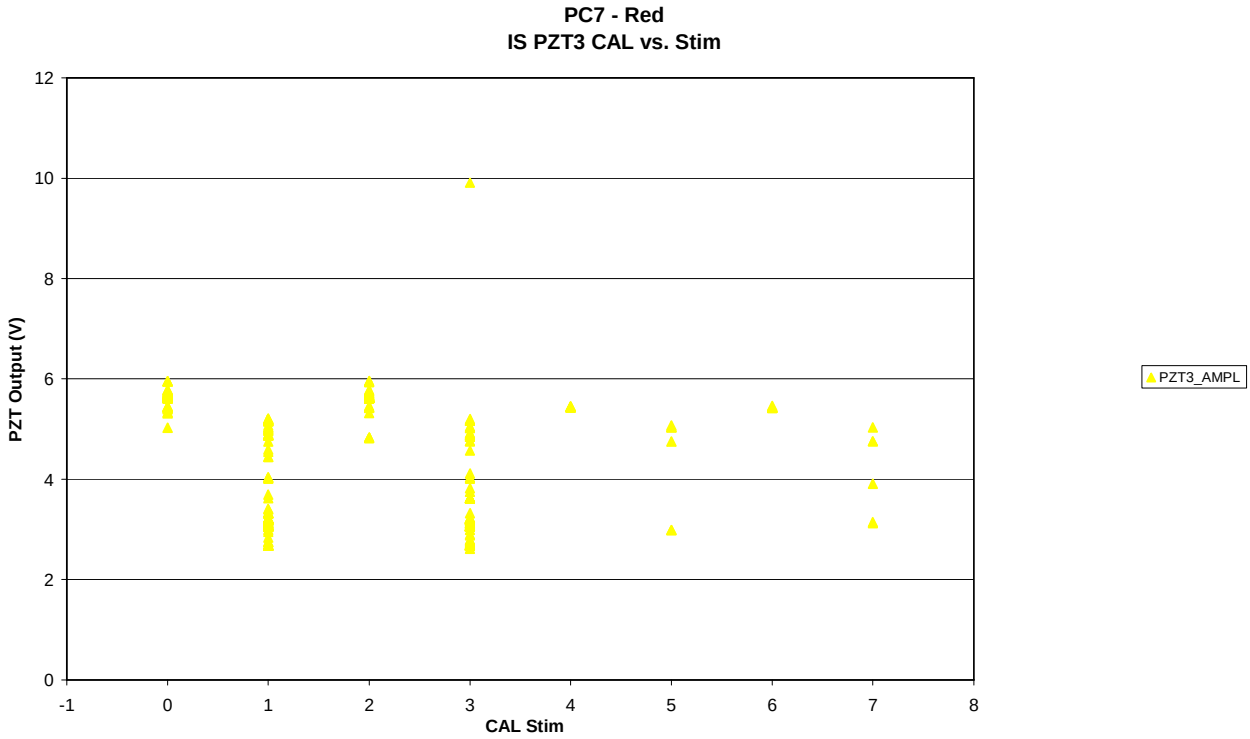


Figure 8.4-32. PZT 4 CAL Signal vs. stimulus – Red

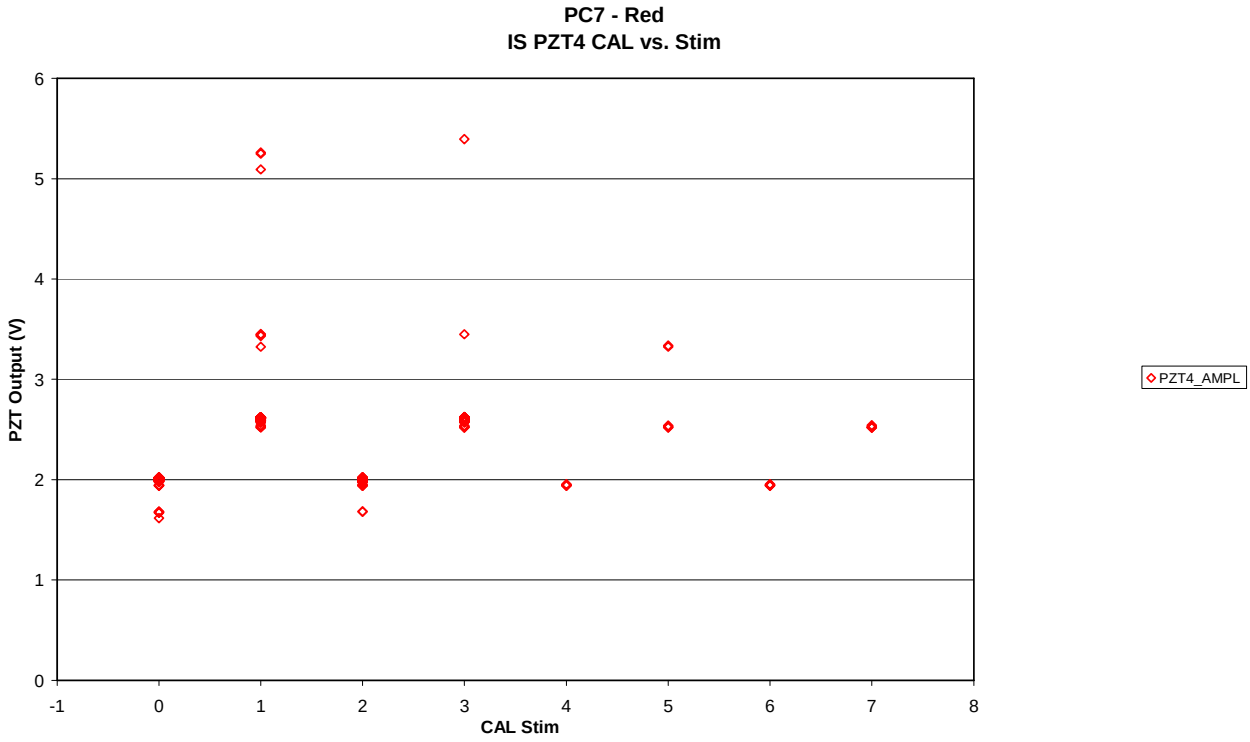


Figure 8.4-33. PZT 5 CAL Signal vs. stimulus – Red

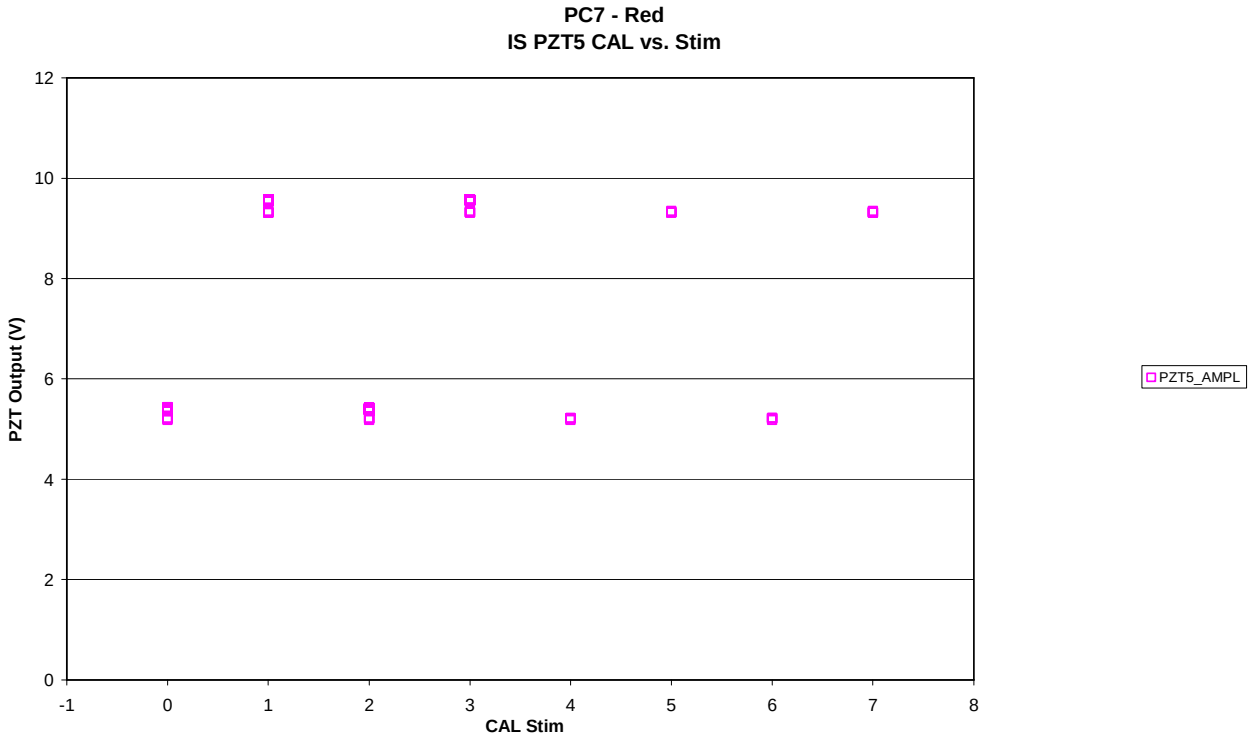


Figure 8.4-34. PZT 1 CAL Time delay vs. stimulus – Red

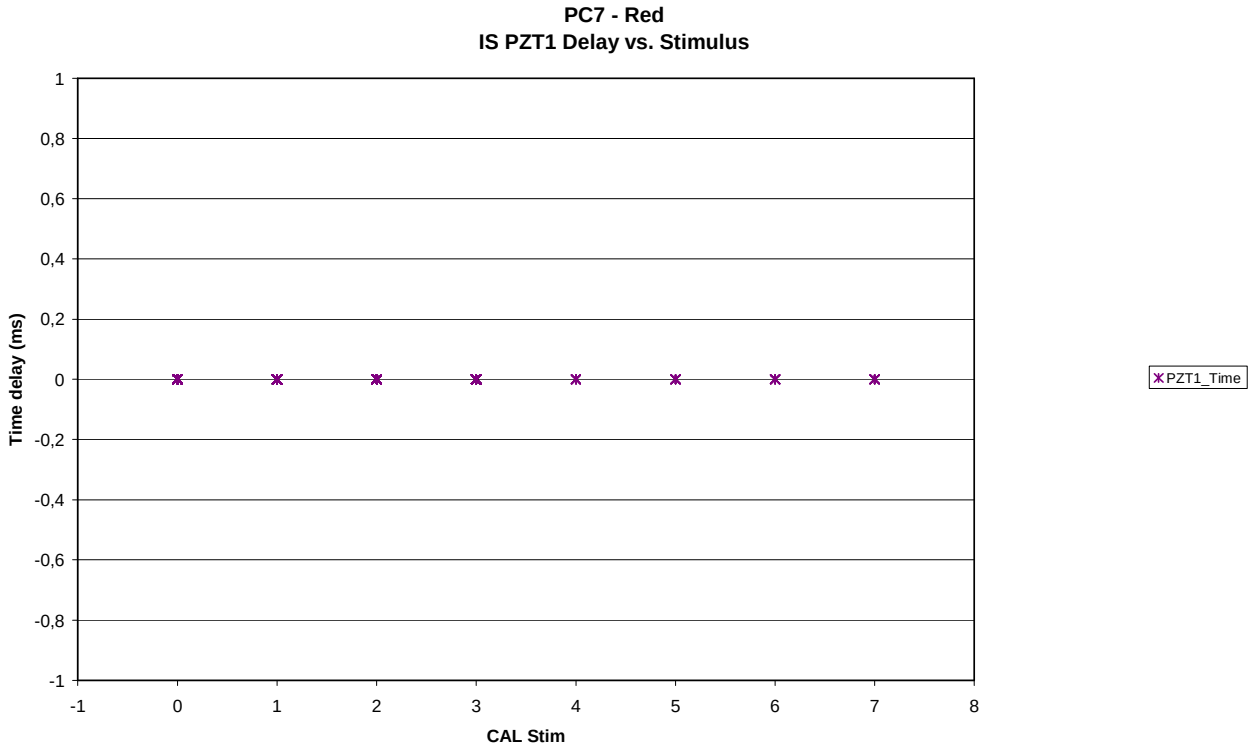


Figure 8.4-35. PZT 2 CAL Time delay vs. stimulus - Red

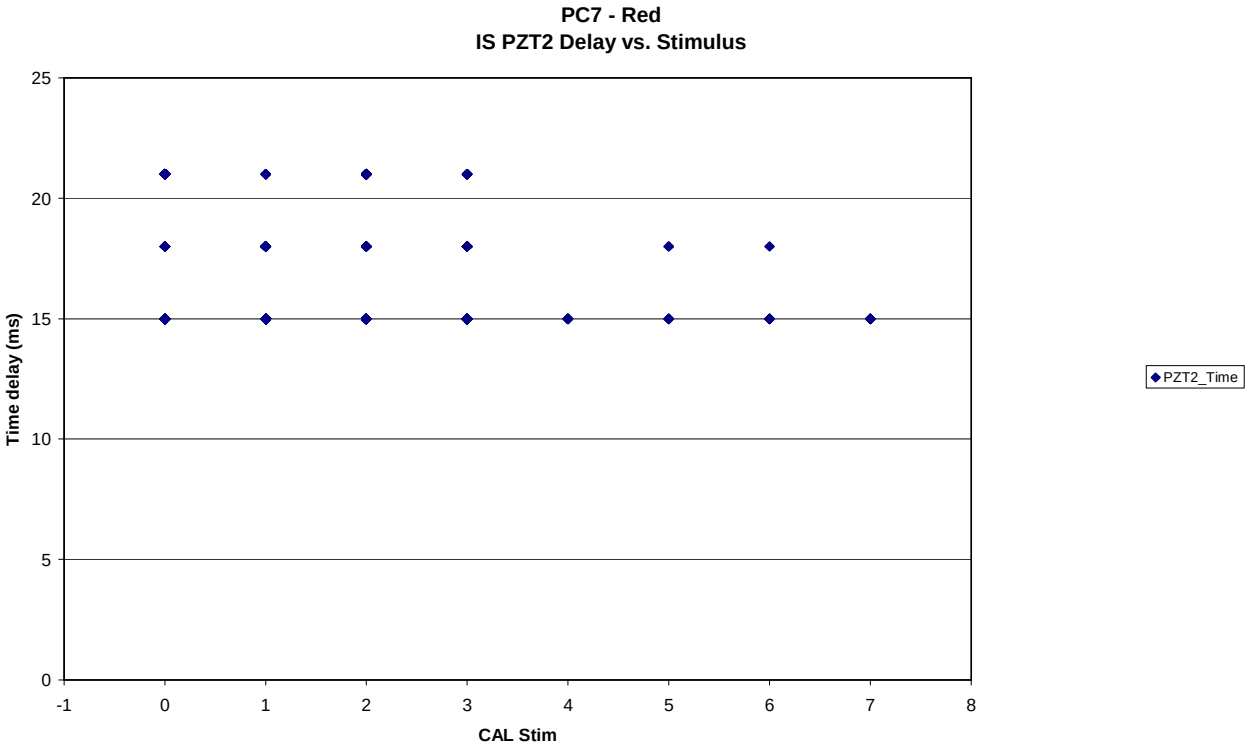


Figure 8.4-36. PZT 3 CAL Time delay vs. stimulus - Red

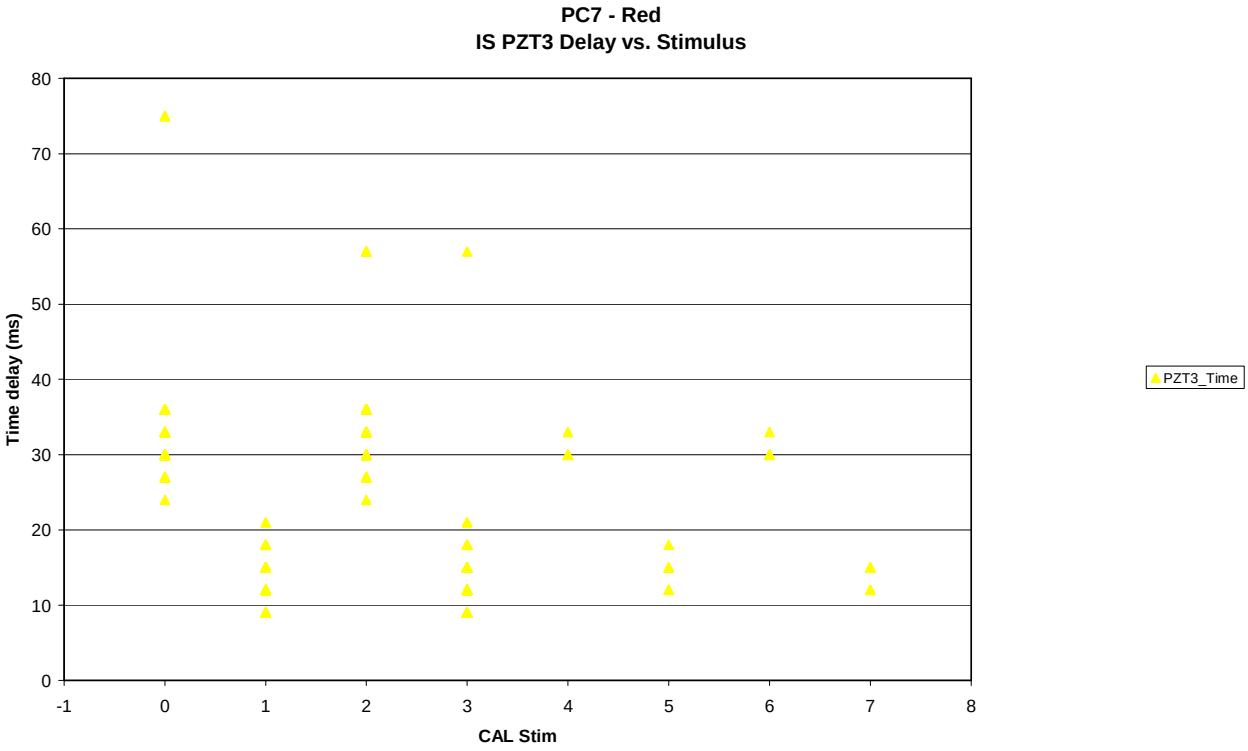


Figure 8.4-37. PZT 4 CAL Time delay vs. stimulus - Red

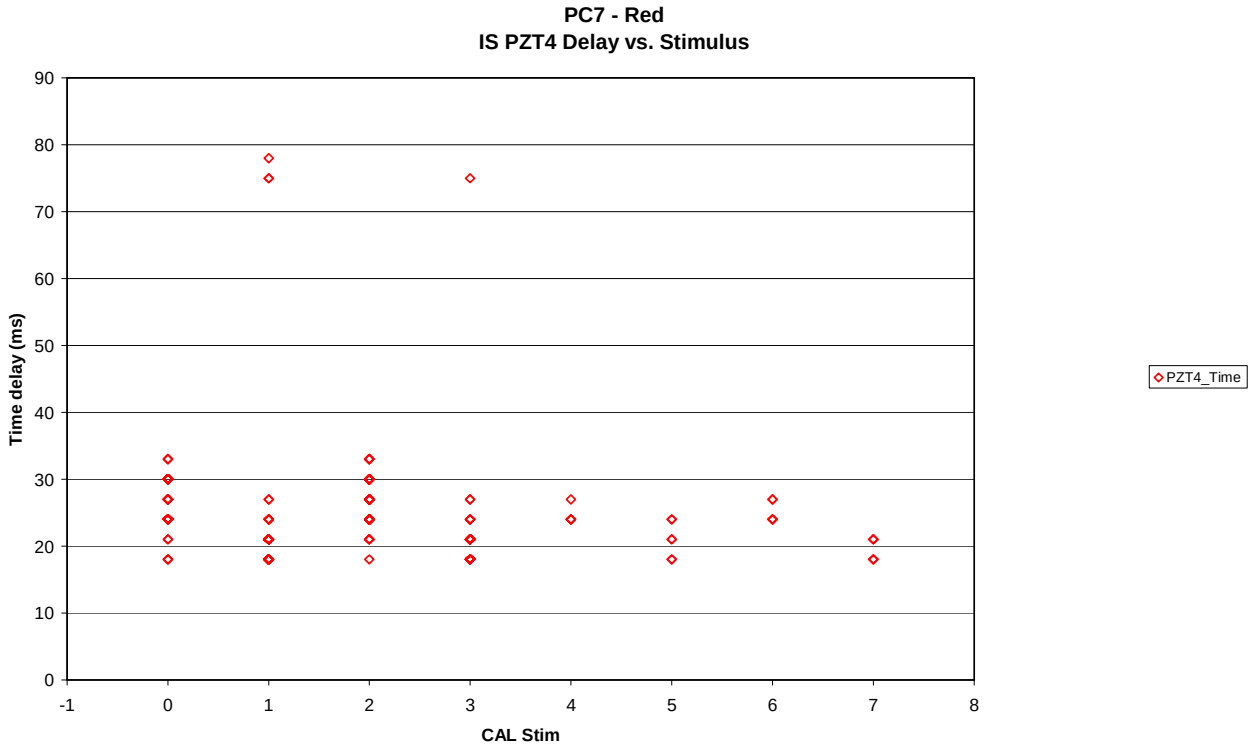
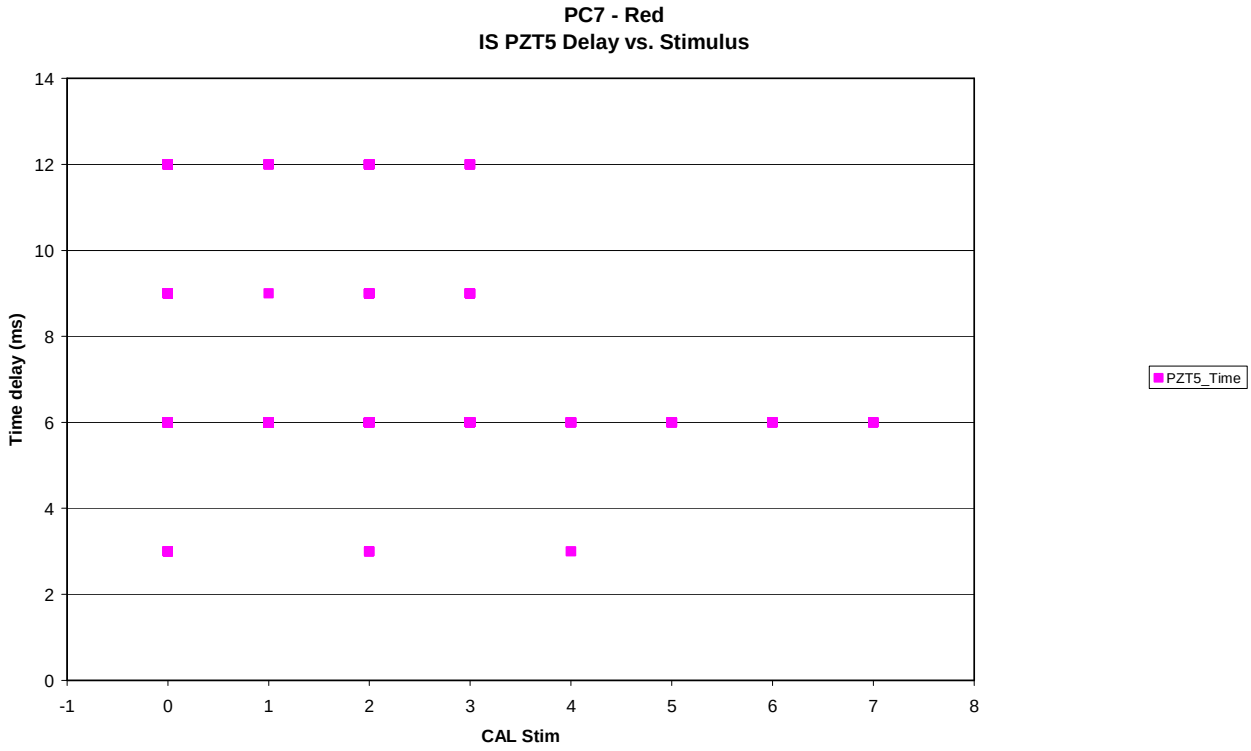


Figure 8.4-38. PZT 5 CAL Time delay vs. stimulus - Red



8.5 MICRO BALANCE SYSTEM (MBS)

8.5.1 MBS – Status

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

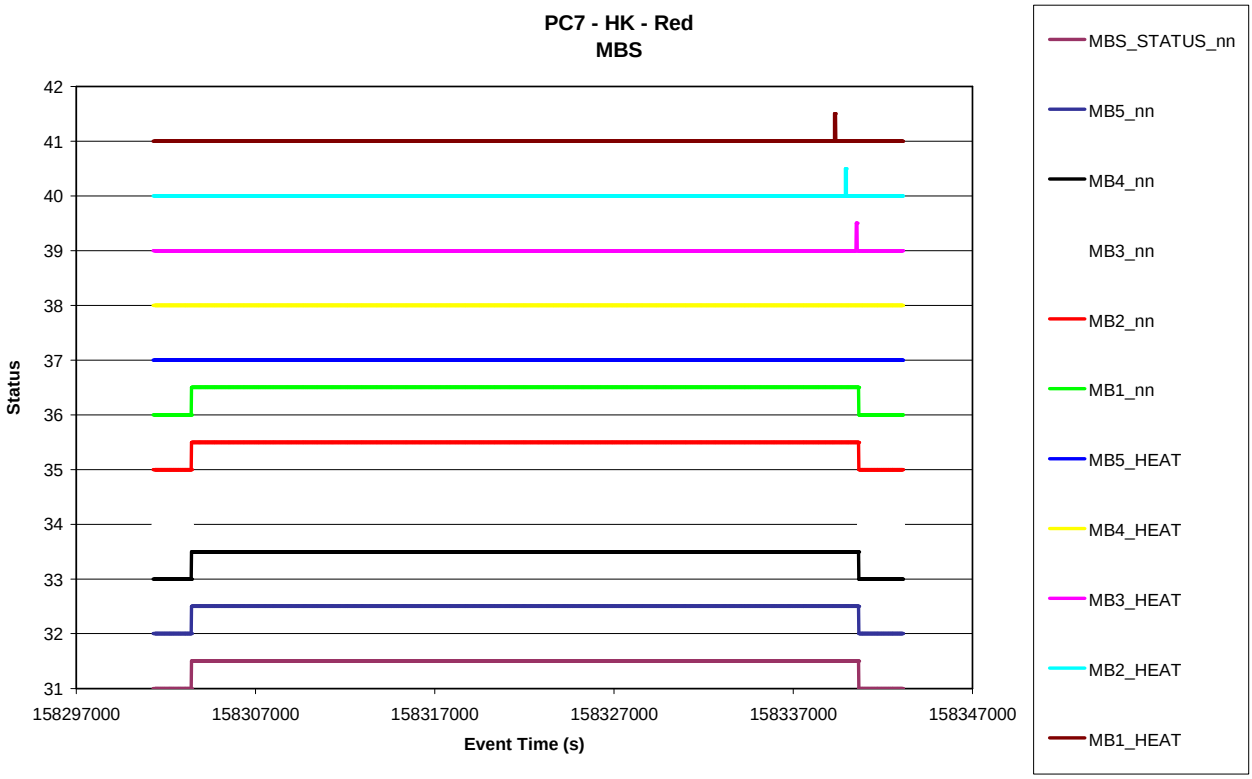


Figure 8.5-2. MBS 1 Temperature vs. time (HK, HK-SCI, SCI) – Red

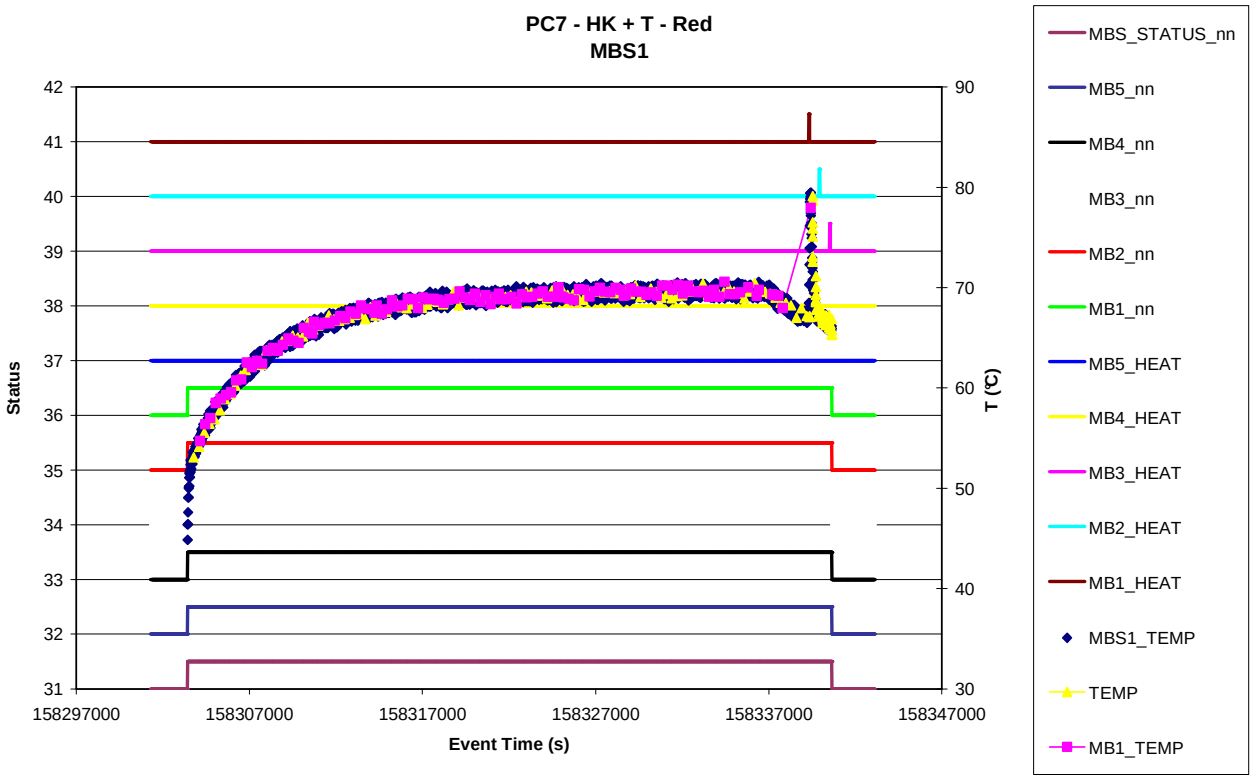


Figure 8.5-3. MBS 2 Temperature vs. time (HK, HK-SCI, SCI) - Red

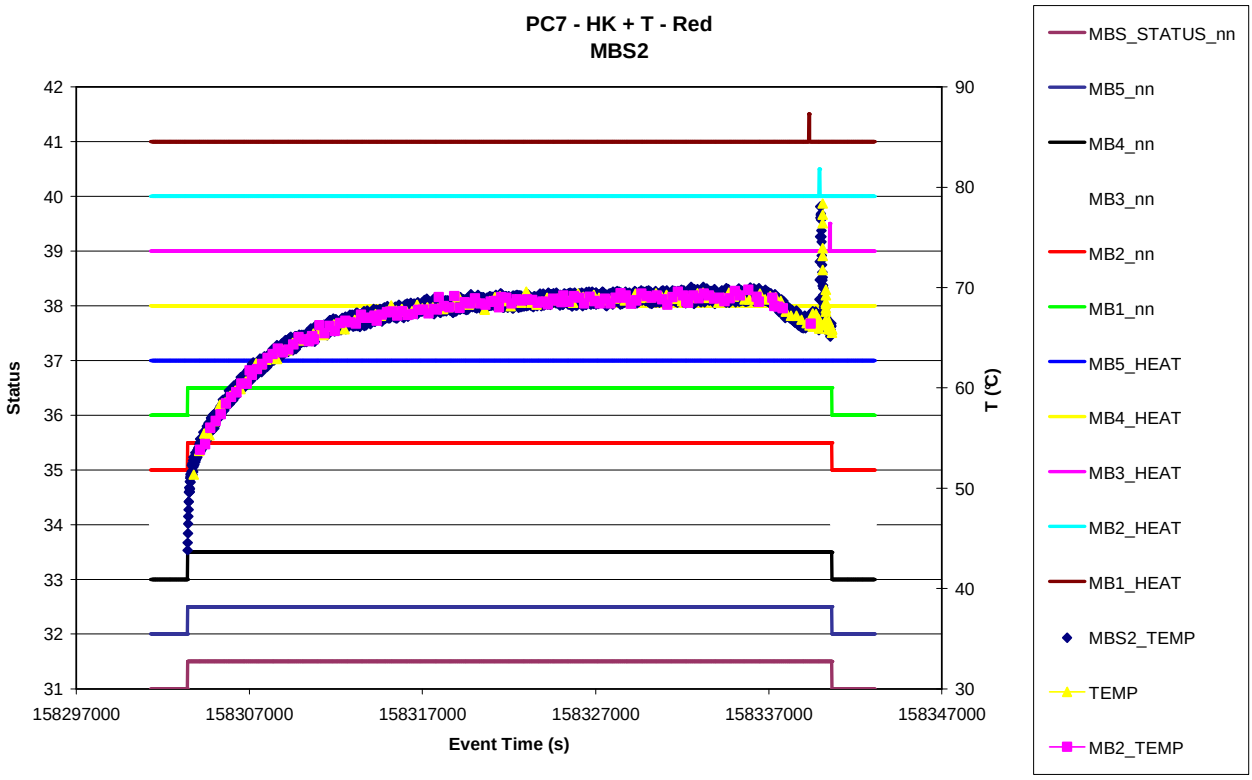


Figure 8.5-4. MBS 3 Temperature vs. time (HK, HK-SCI, SCI) - Red

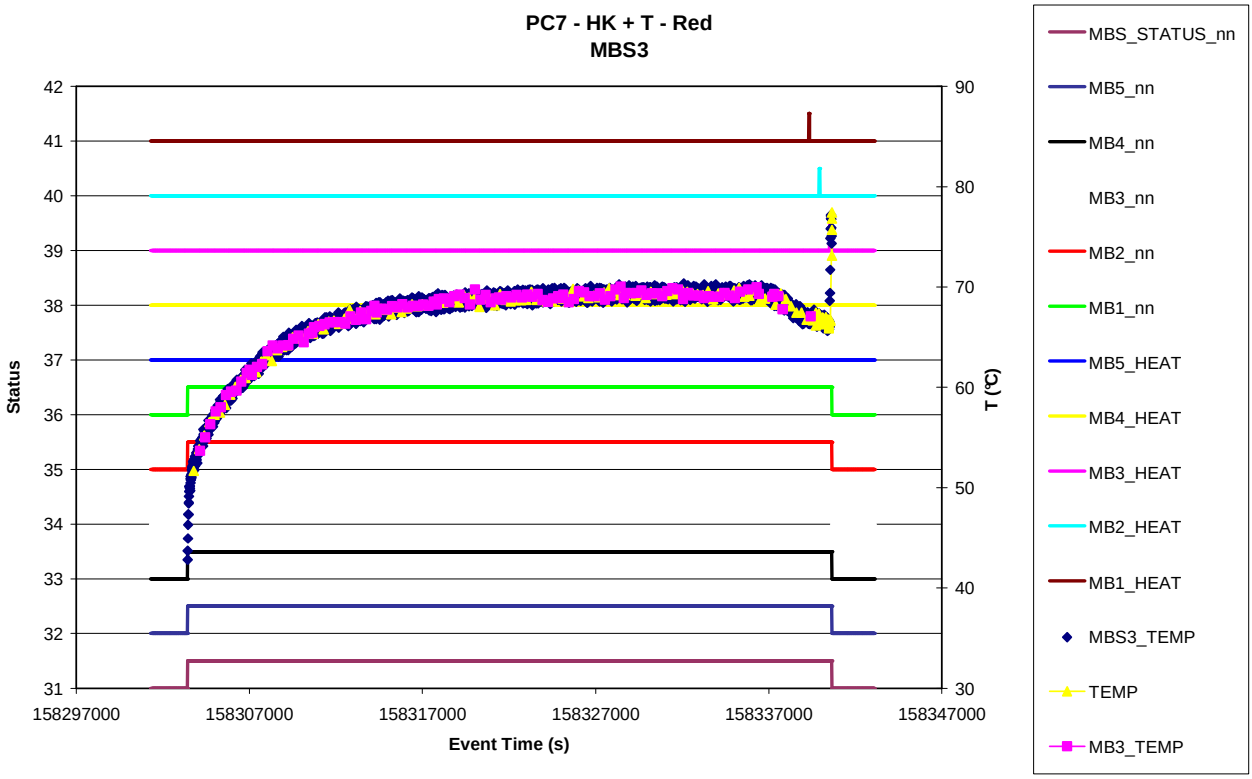


Figure 8.5-5. MBS 4 Temperature vs. time (HK, HK-SCI, SCI) - Red

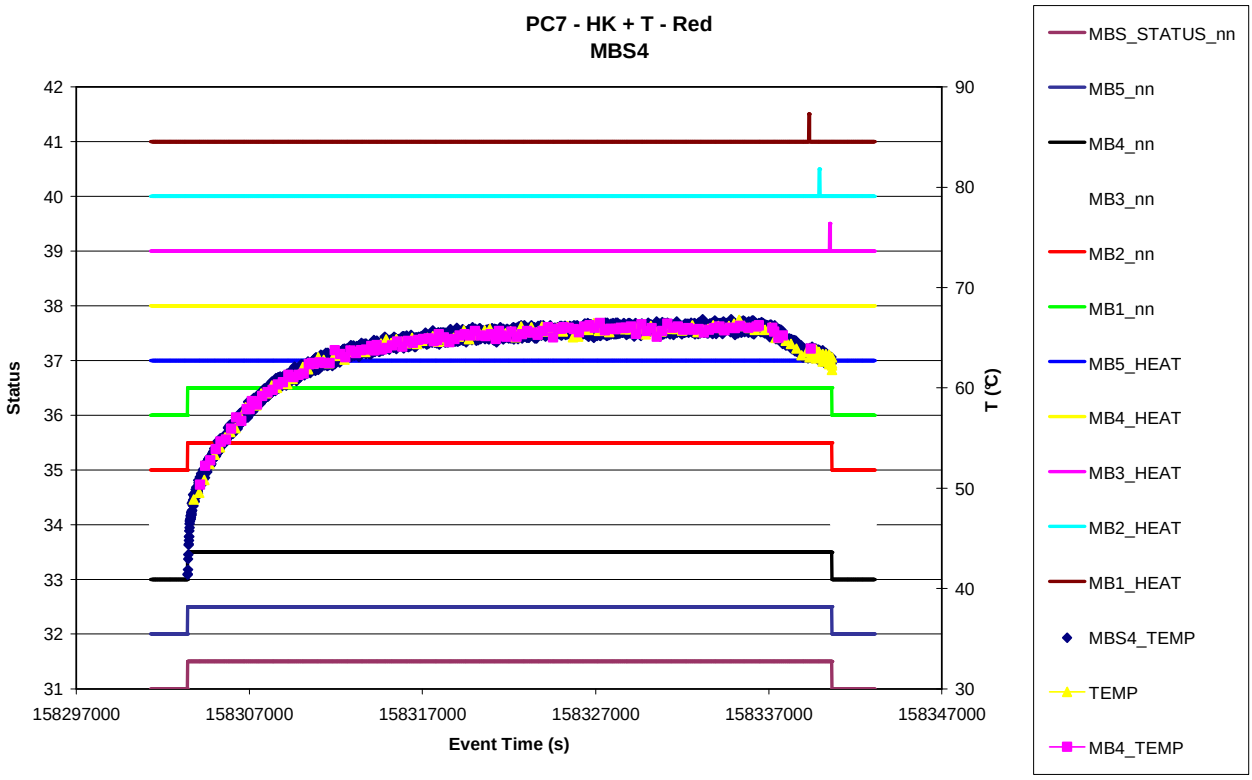
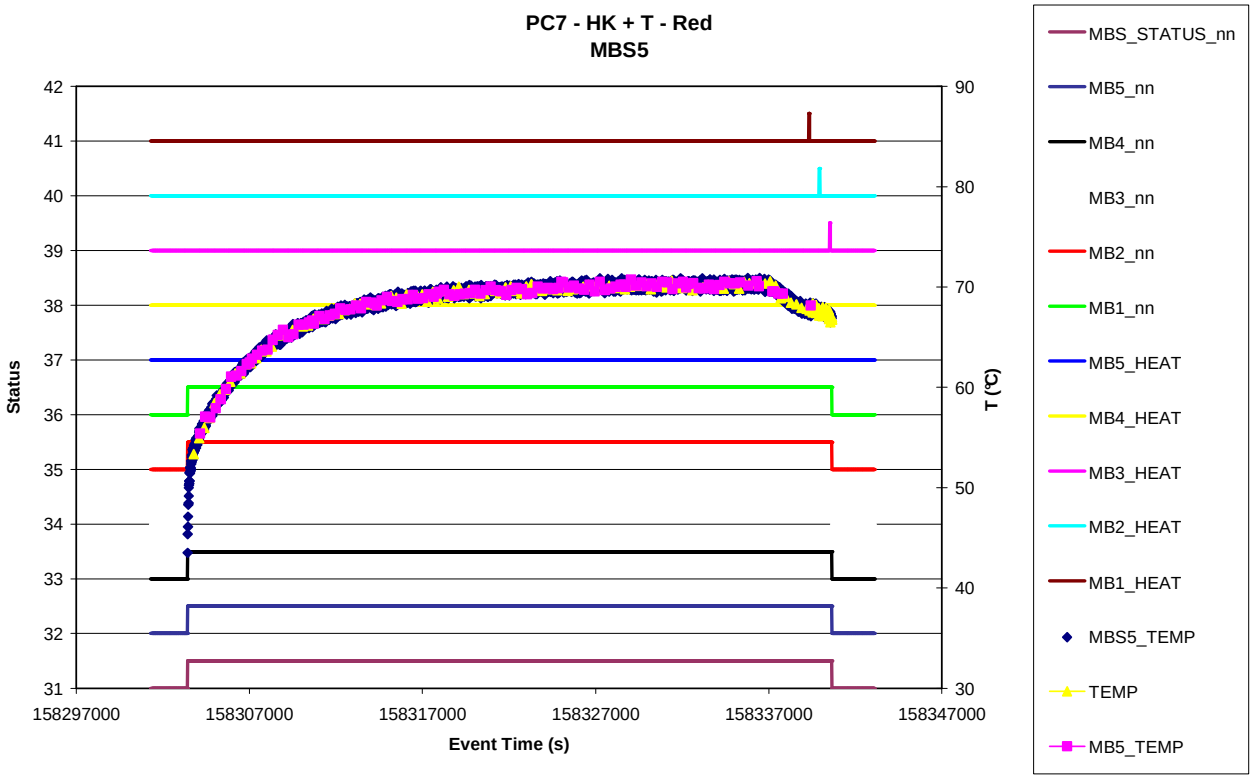


Figure 8.5-6. MBS 5 Temperature vs. time (HK, HK-SCI, SCI) - Red



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

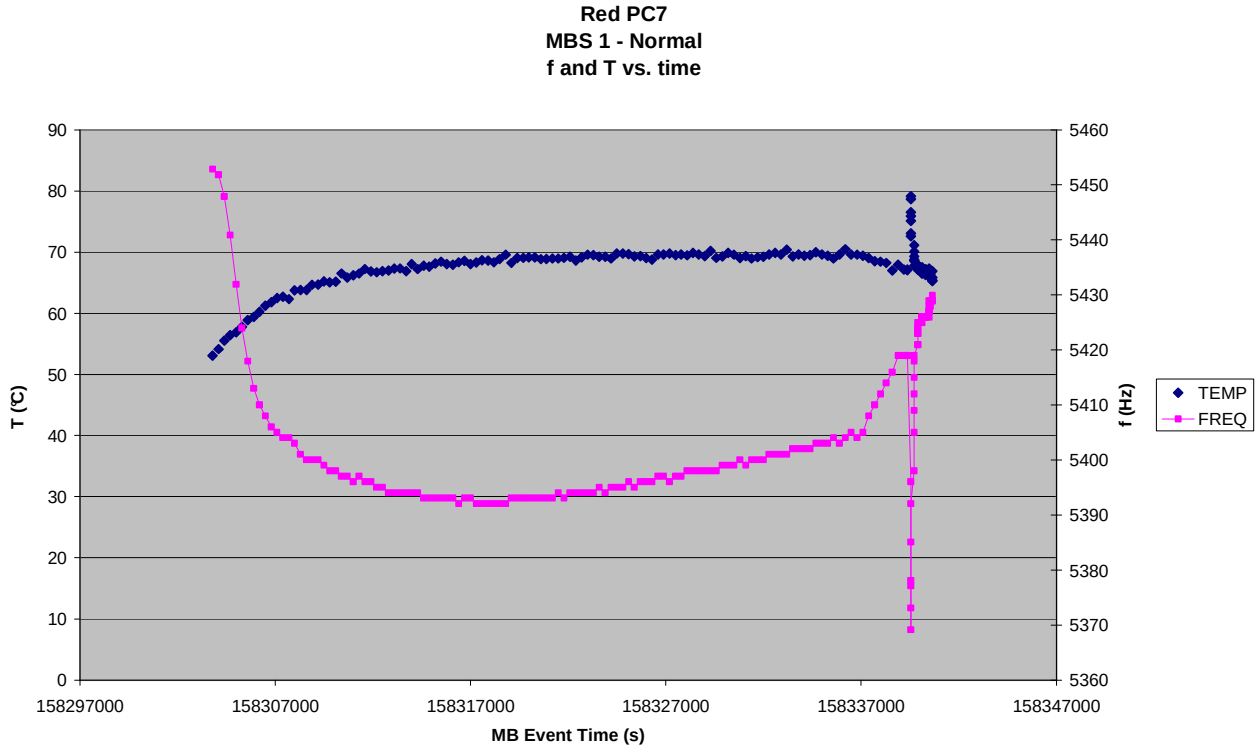


Figure 8.5-8. MBS 2 Frequency and Temperature vs. time - Red

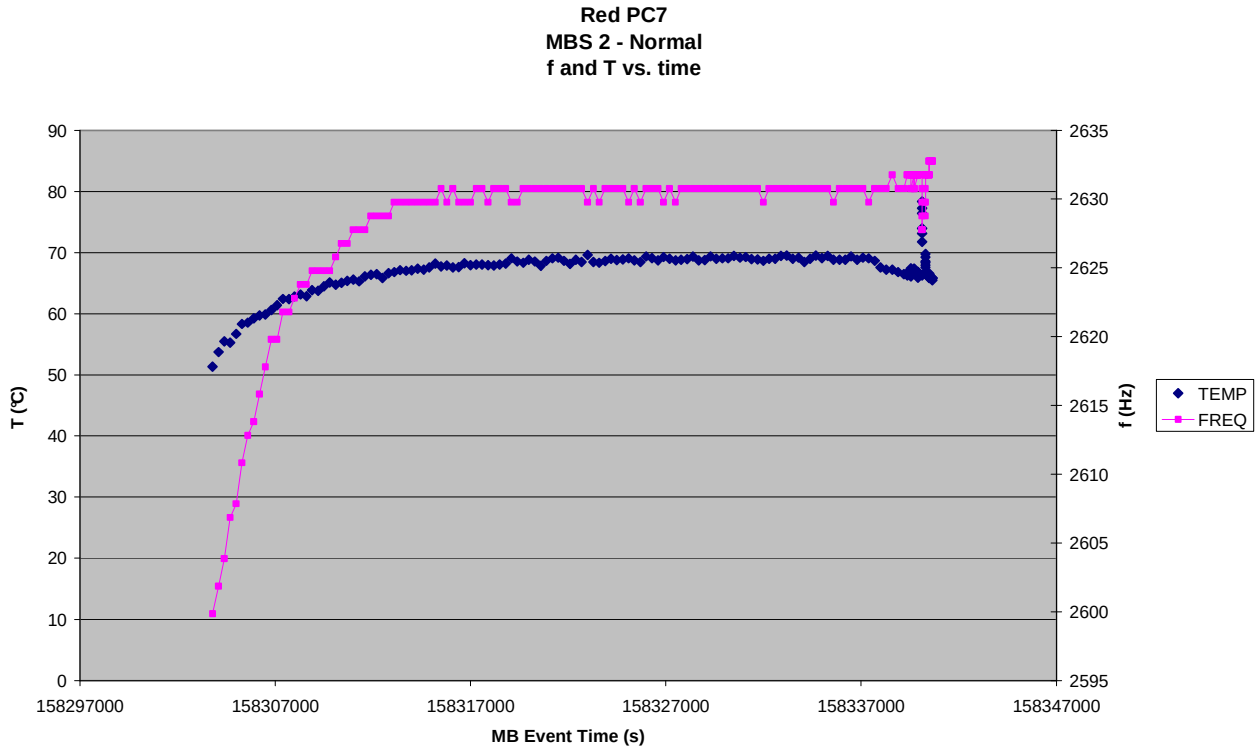


Figure 8.5-9. MBS 3 Frequency and Temperature vs. time - Red

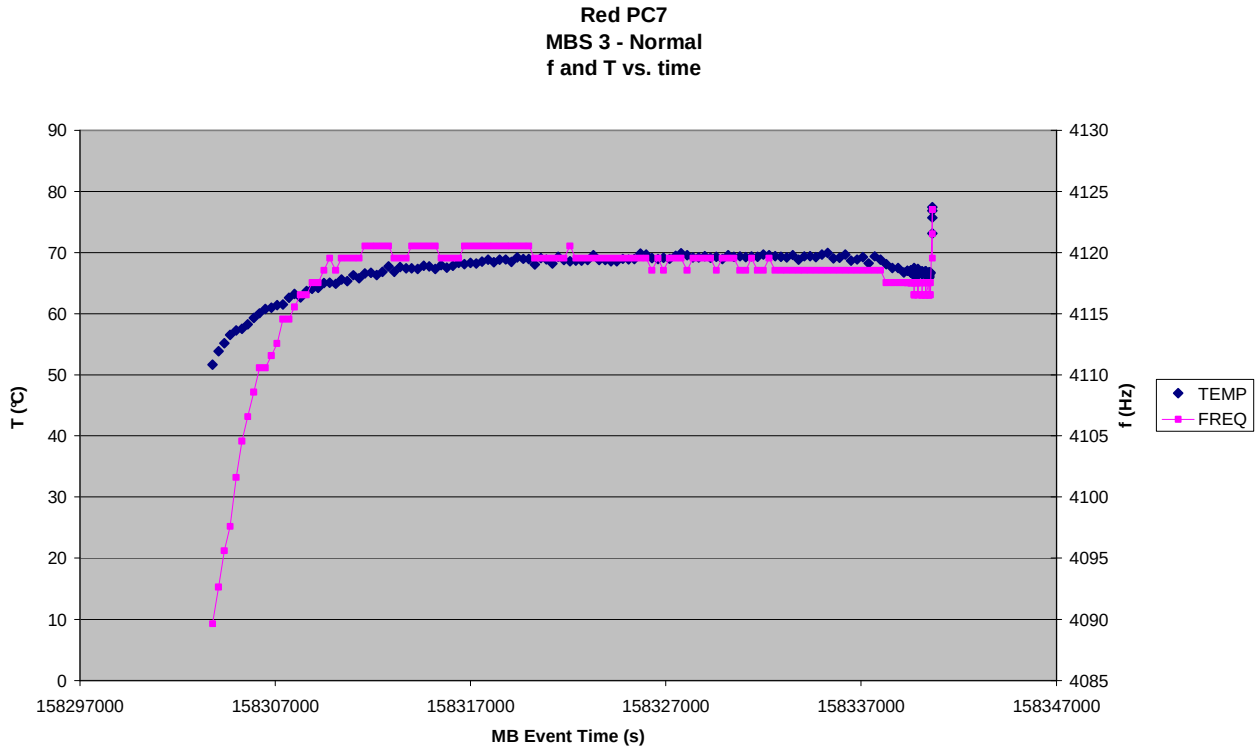


Figure 8.5-10. MBS 4 Frequency and Temperature vs. time - Red

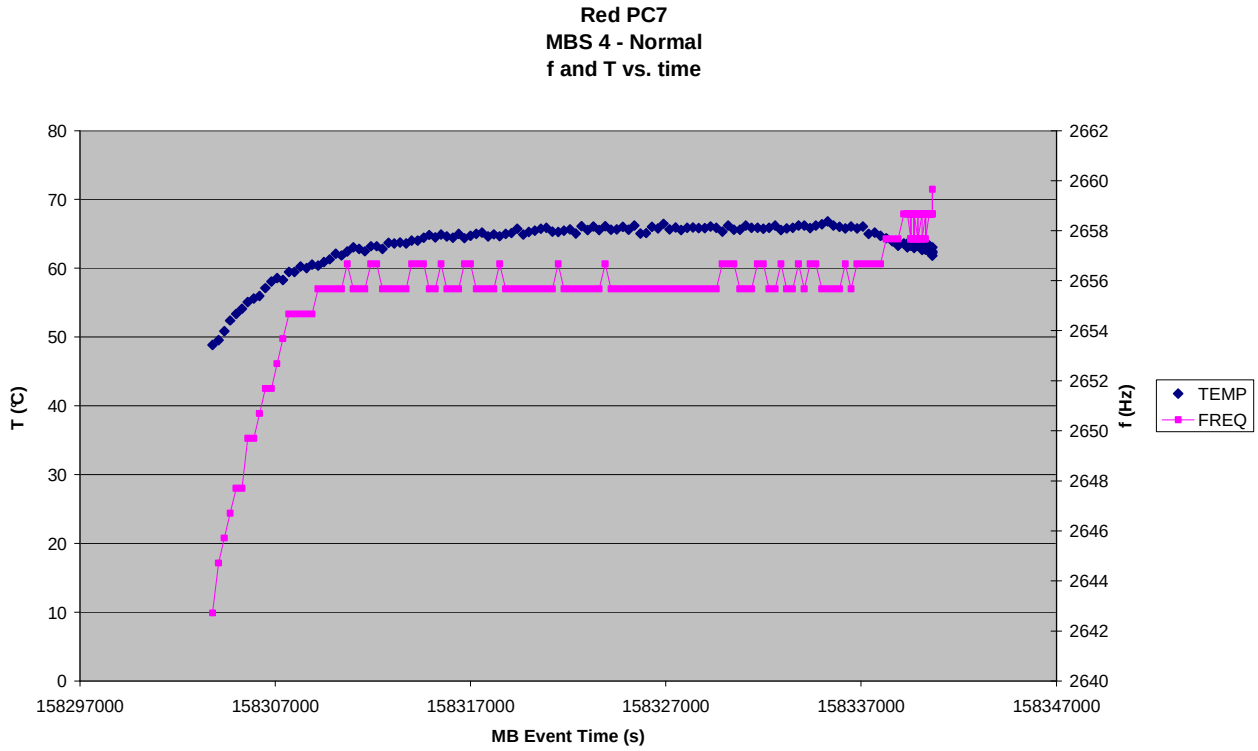


Figure 8.5-11. MBS 5 Frequency and Temperature vs. time - Red

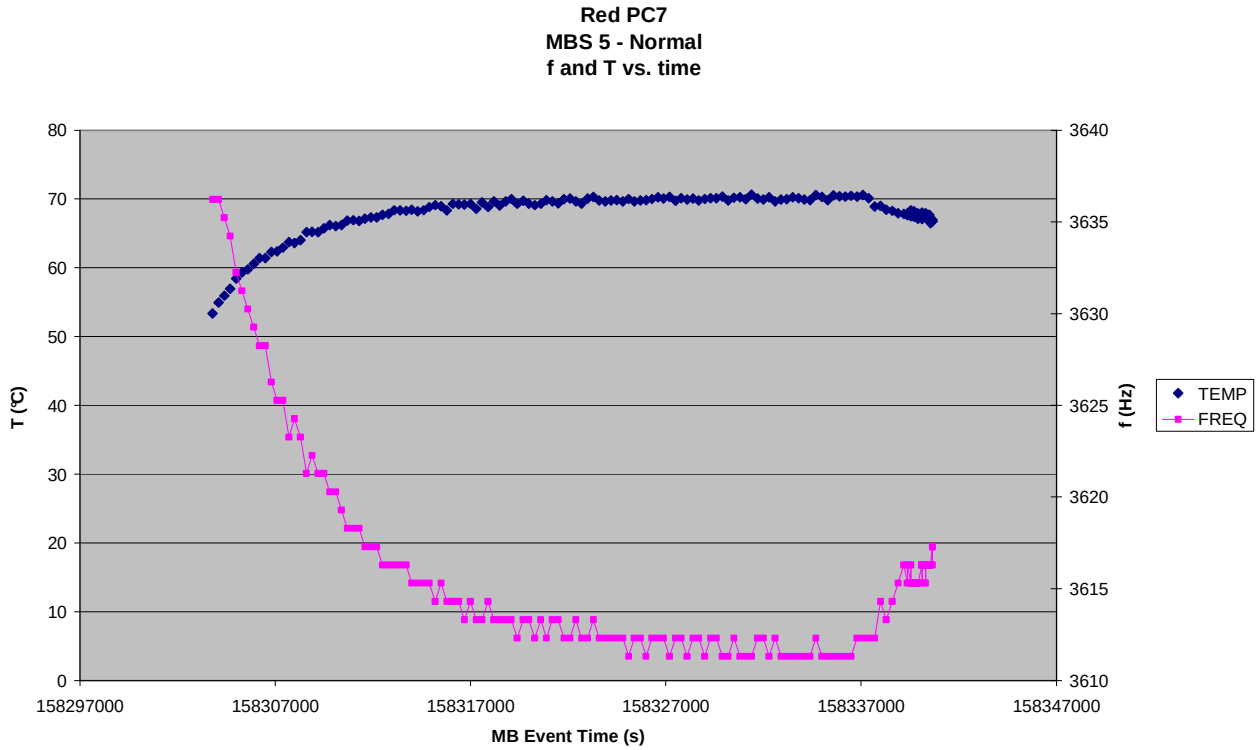


Figure 8.5-12. MBS 1 Frequency vs. Temperature - Red

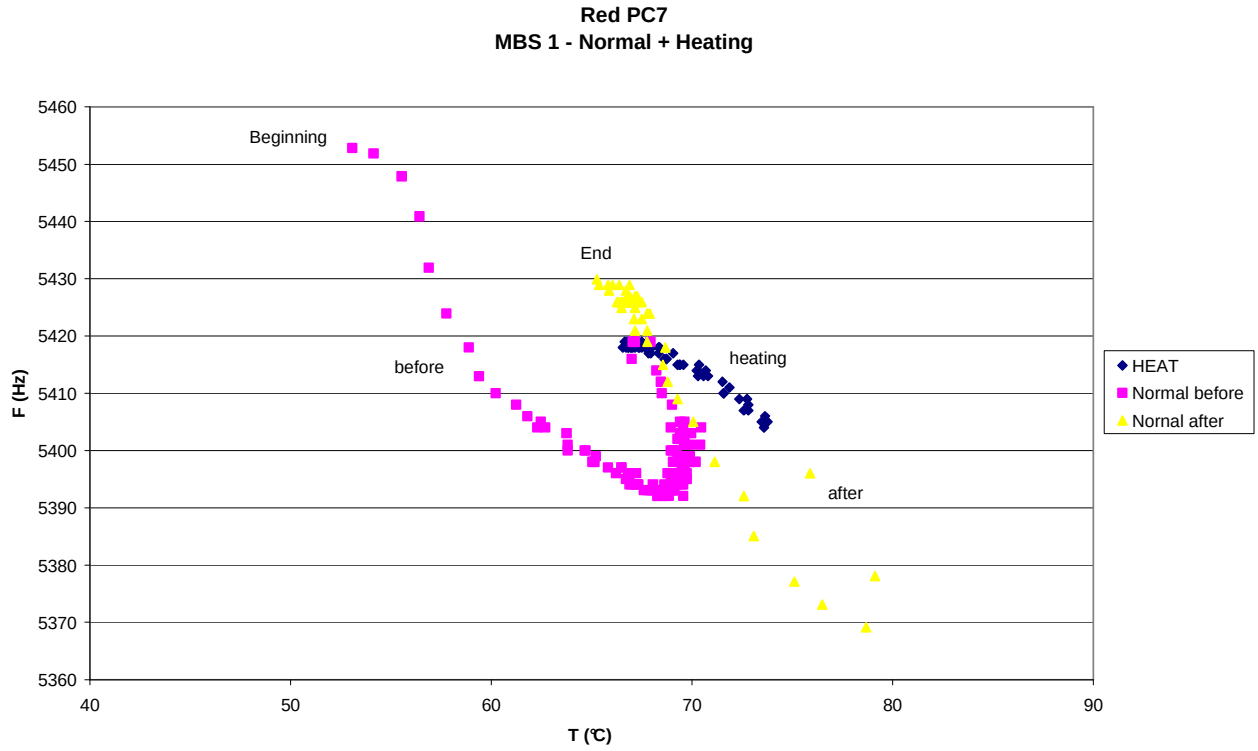


Figure 8.5-13. MBS 2 Frequency vs. Temperature - Red

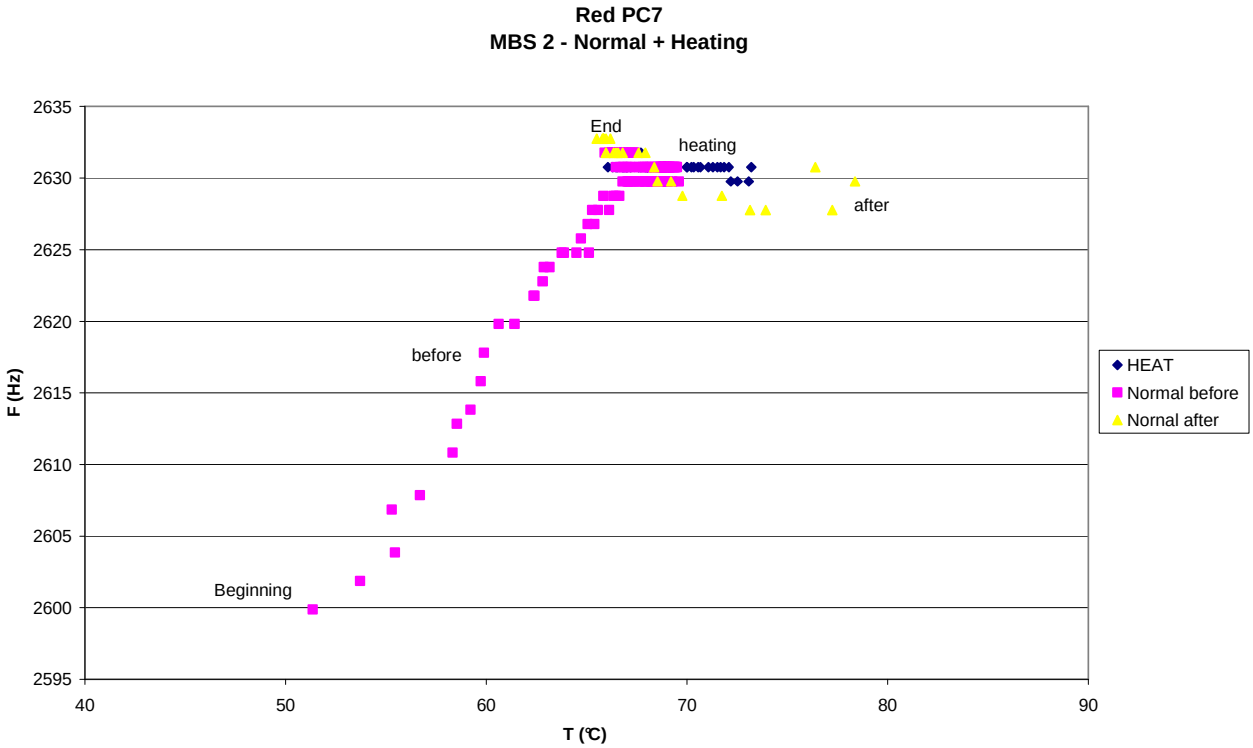


Figure 8.5-14. MBS 3 Frequency vs. Temperature - Red

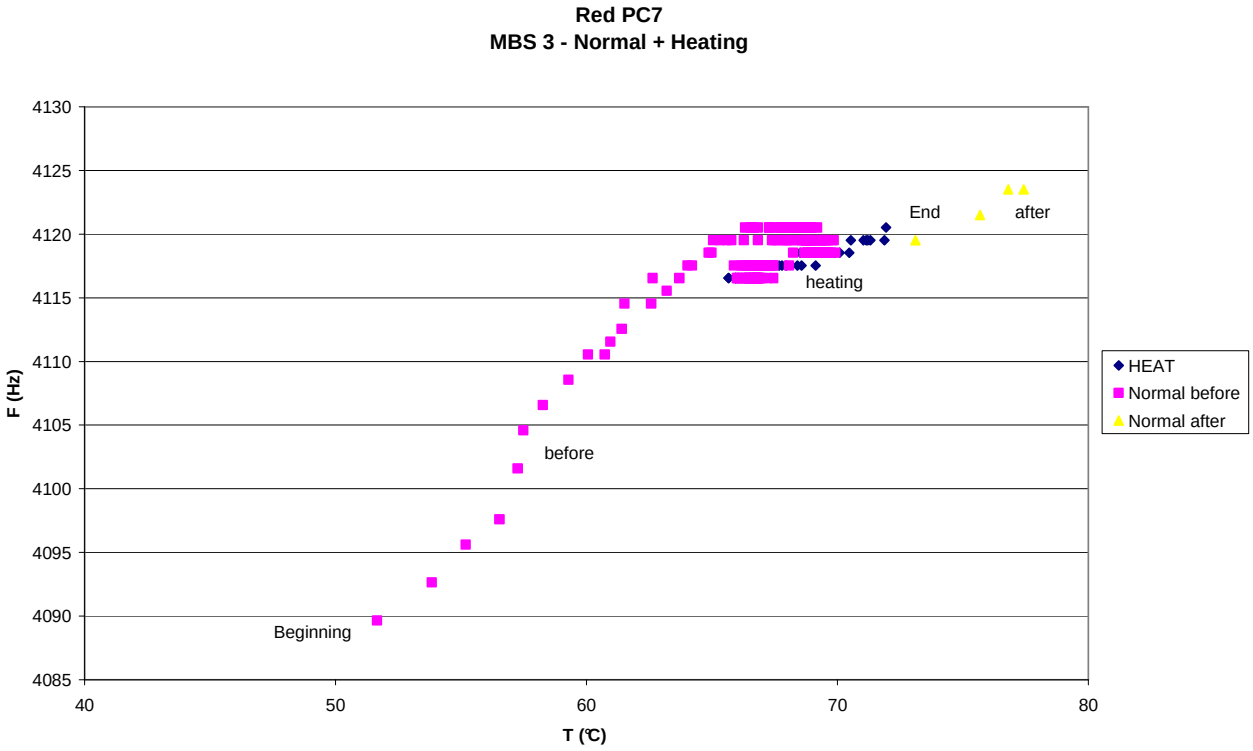


Figure 8.5-15. MBS 4 Frequency vs. Temperature - Red

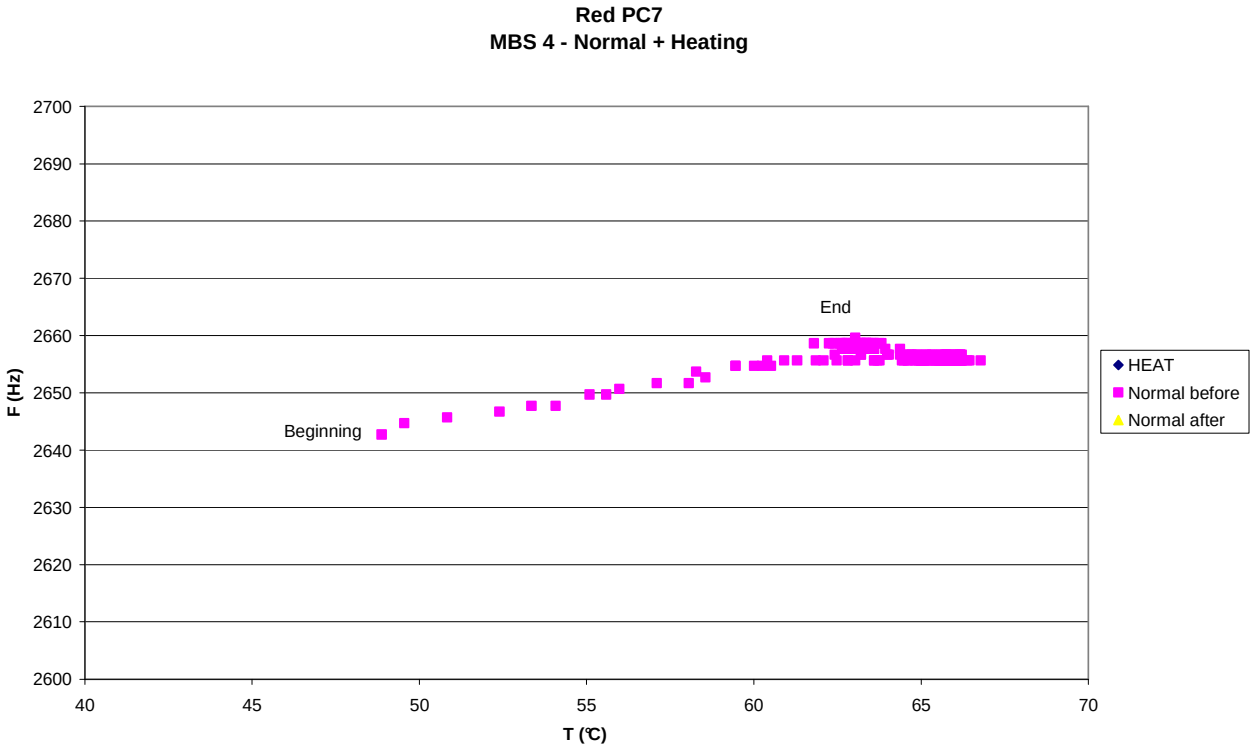
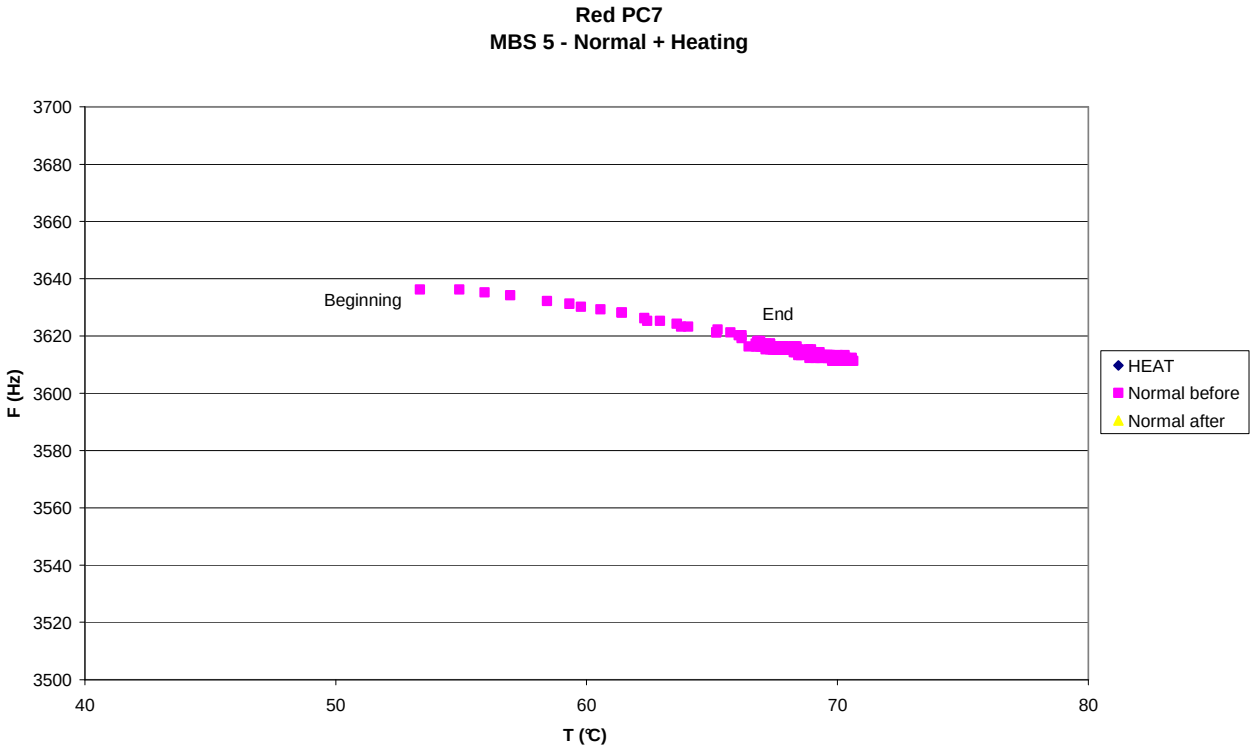


Figure 8.5-16. MBS 5 Frequency vs. Temperature - Red



9. PC7 DATA ANALYSIS – MAIN INTERFACE (CLOSE COVER)

9.1 GIADA STATUS

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

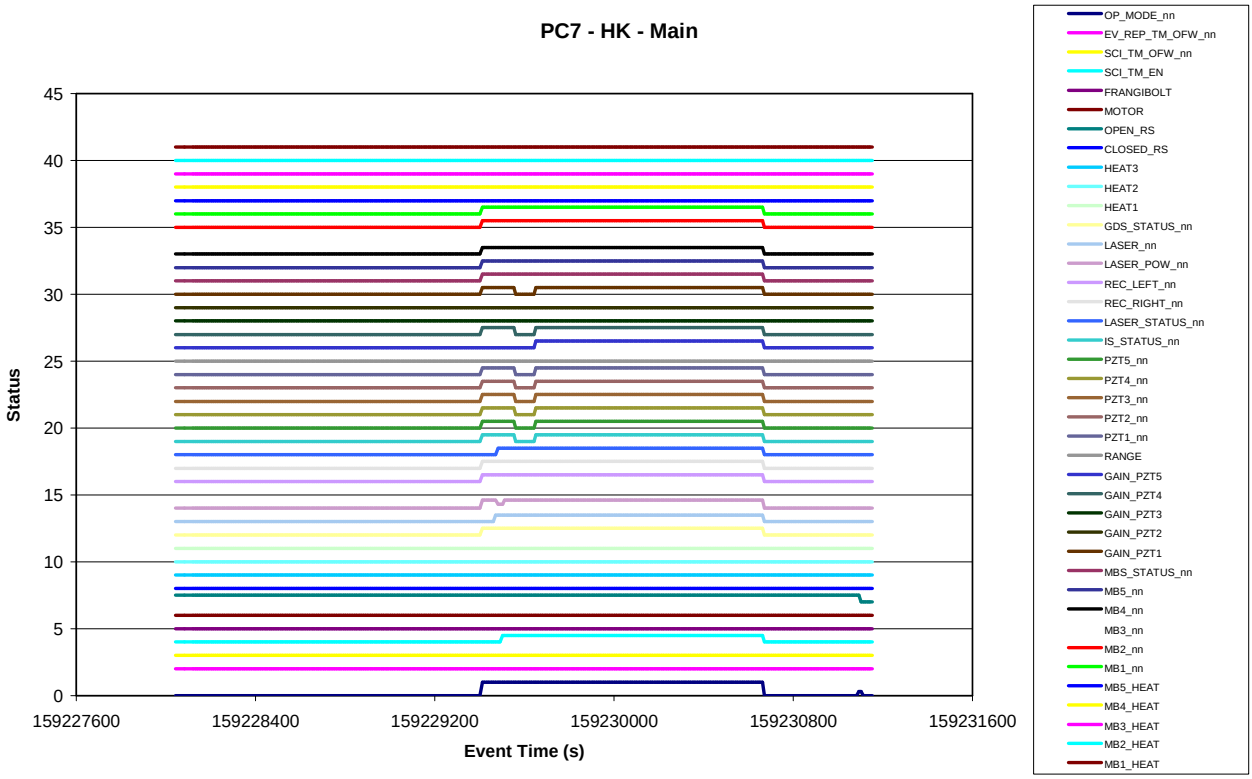


Figure 9.1-2. Evolution of all temperatures vs. time - HK, HK-SCI, SCI - Main

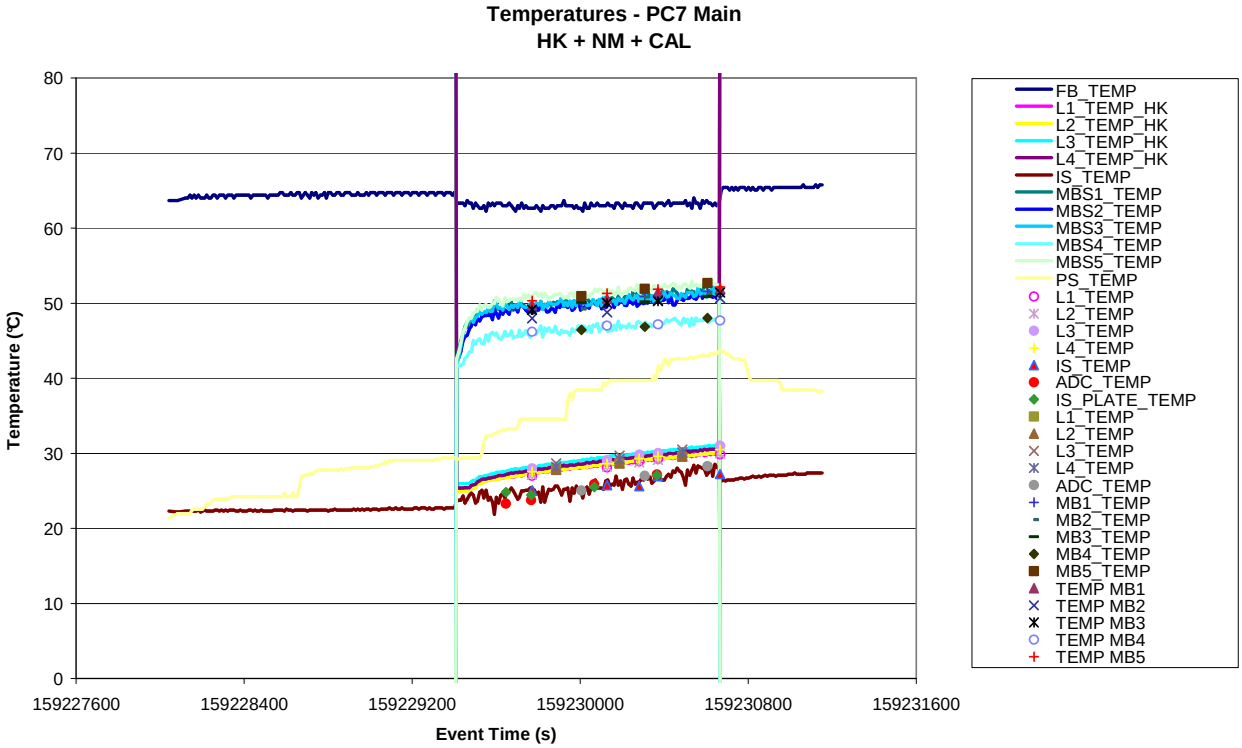


Figure 9.1-3. Evolution of temperatures of system elements vs. time - HK, HK-SCI, SCI - Main

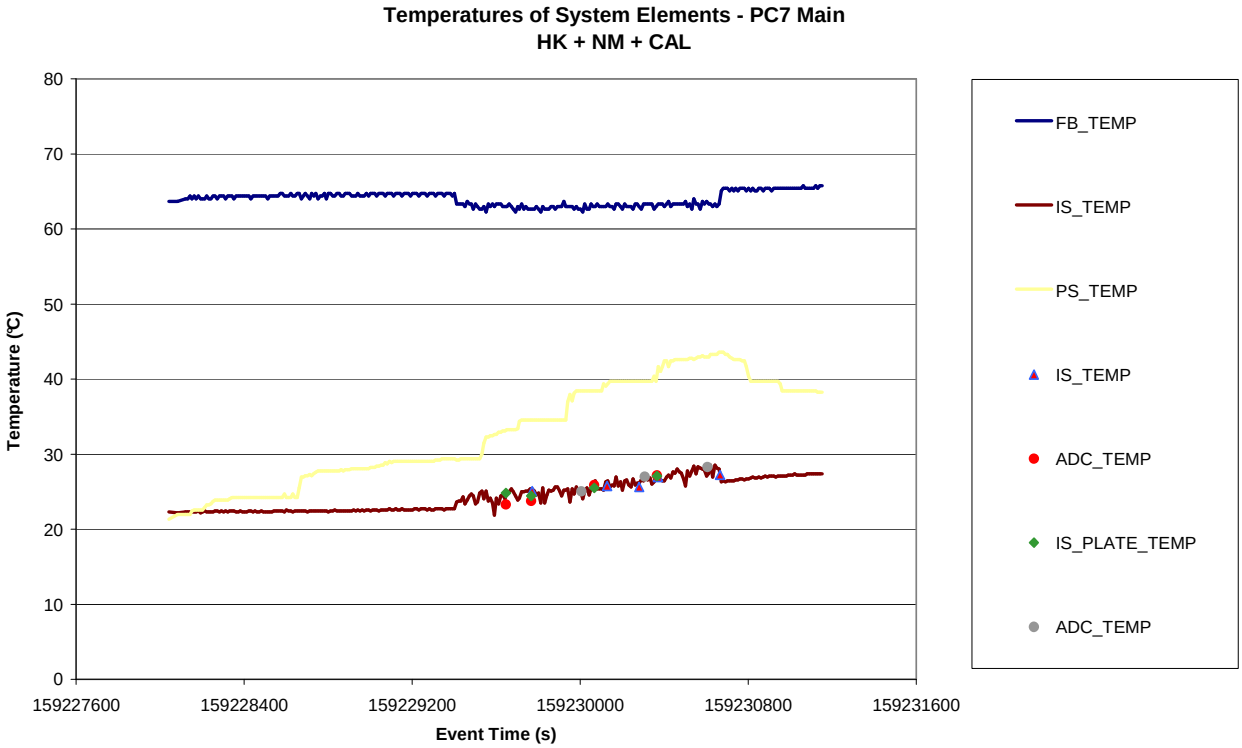


Figure 9.1-4. Evolution of temperatures of sub-systems vs. time - HK, HK-SCI, SCI - Main

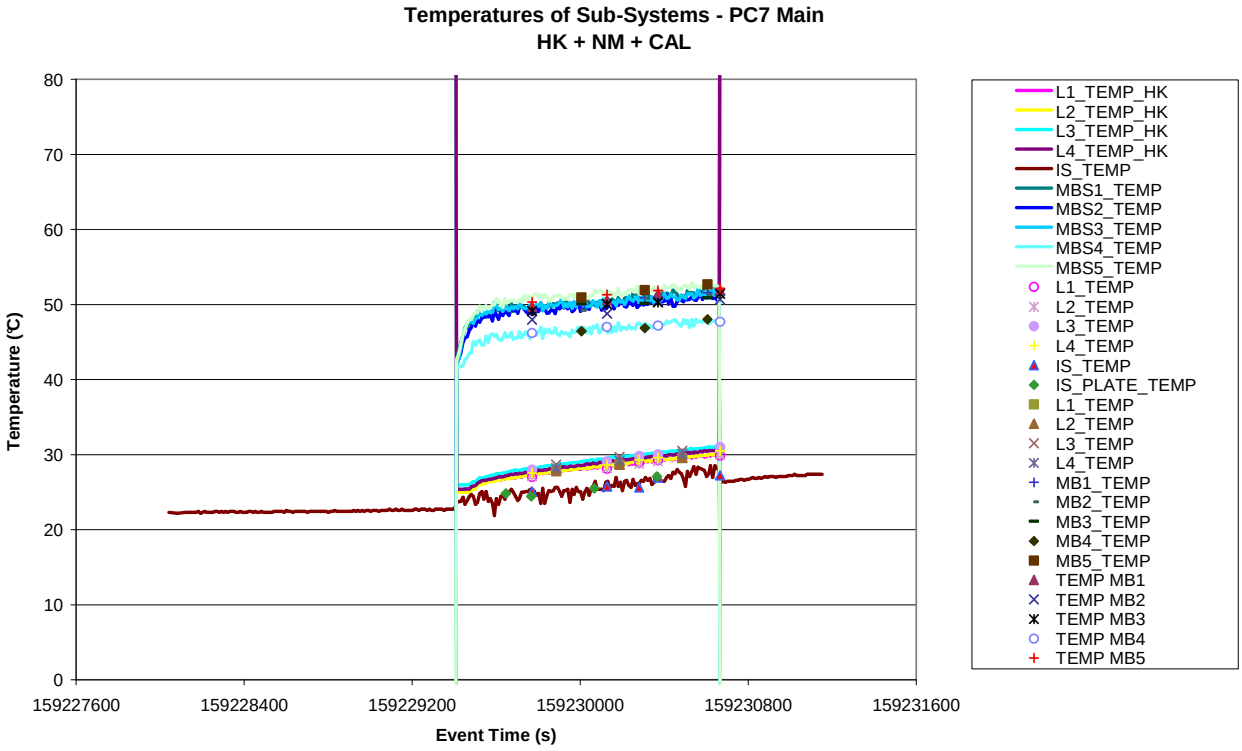


Figure 9.1-5. HK Status versus Temperatures of system elements - Main

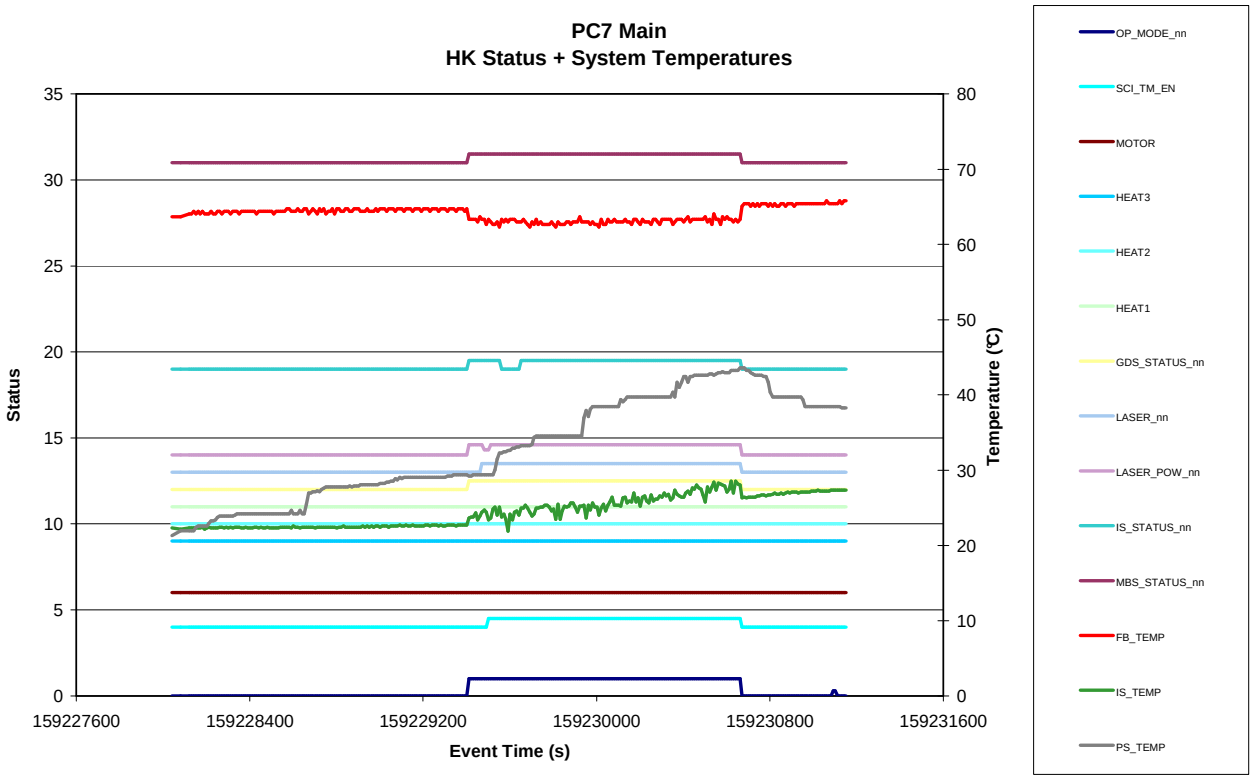


Figure 9.1-6. Operation Status vs. time - Main

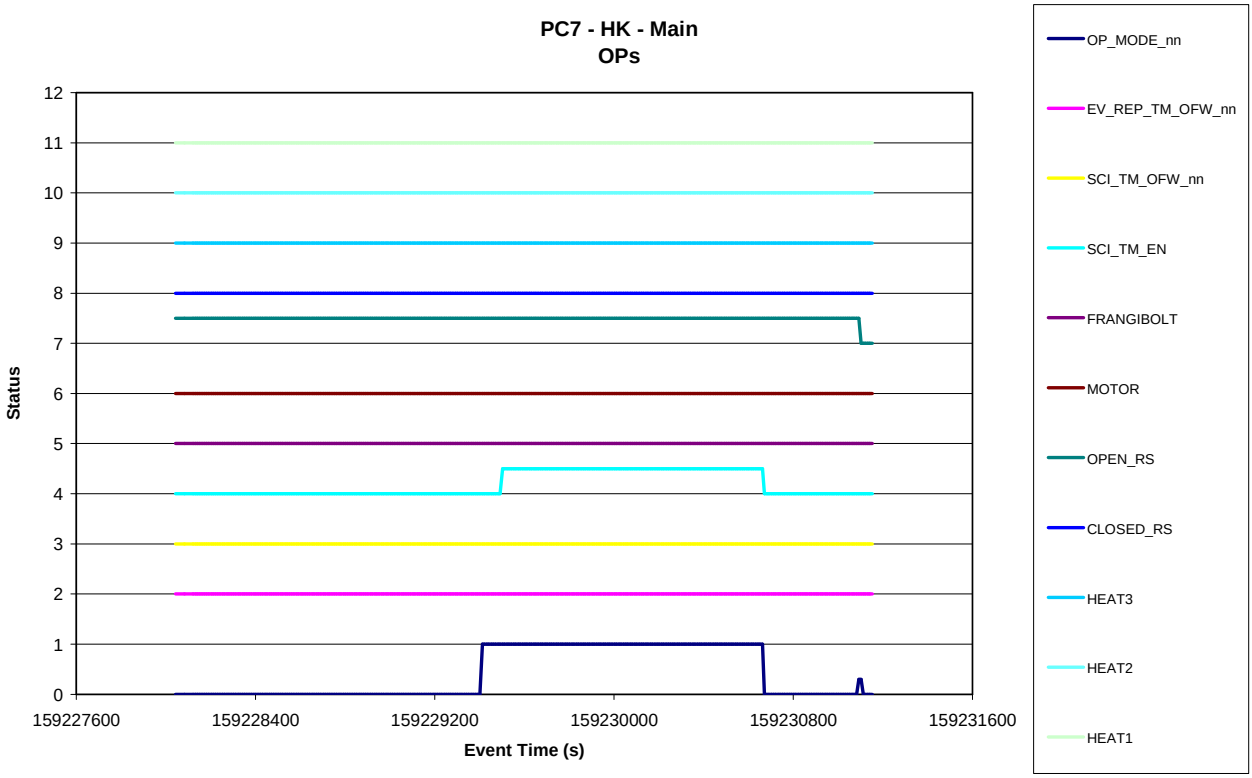


Figure 9.1-7. Operation Status versus Temperatures of system elements - Main

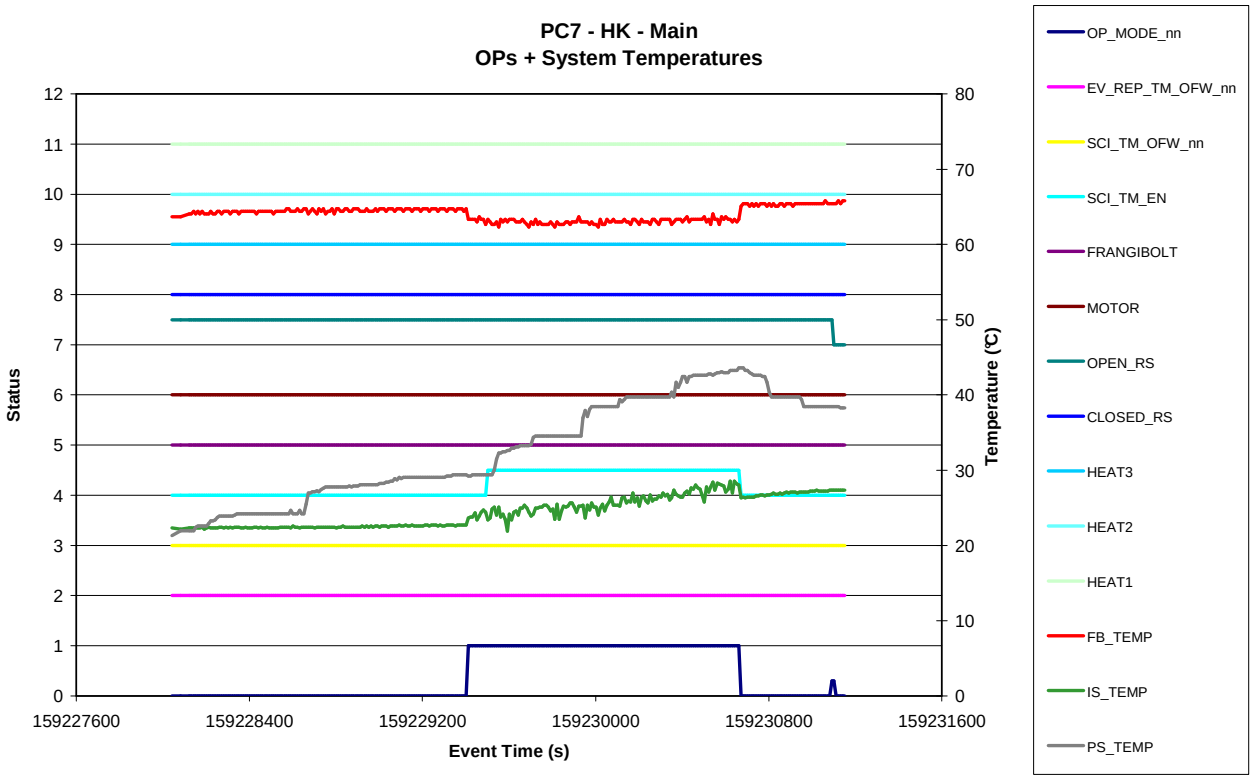


Figure 9.1-8. Power behaviour - Main

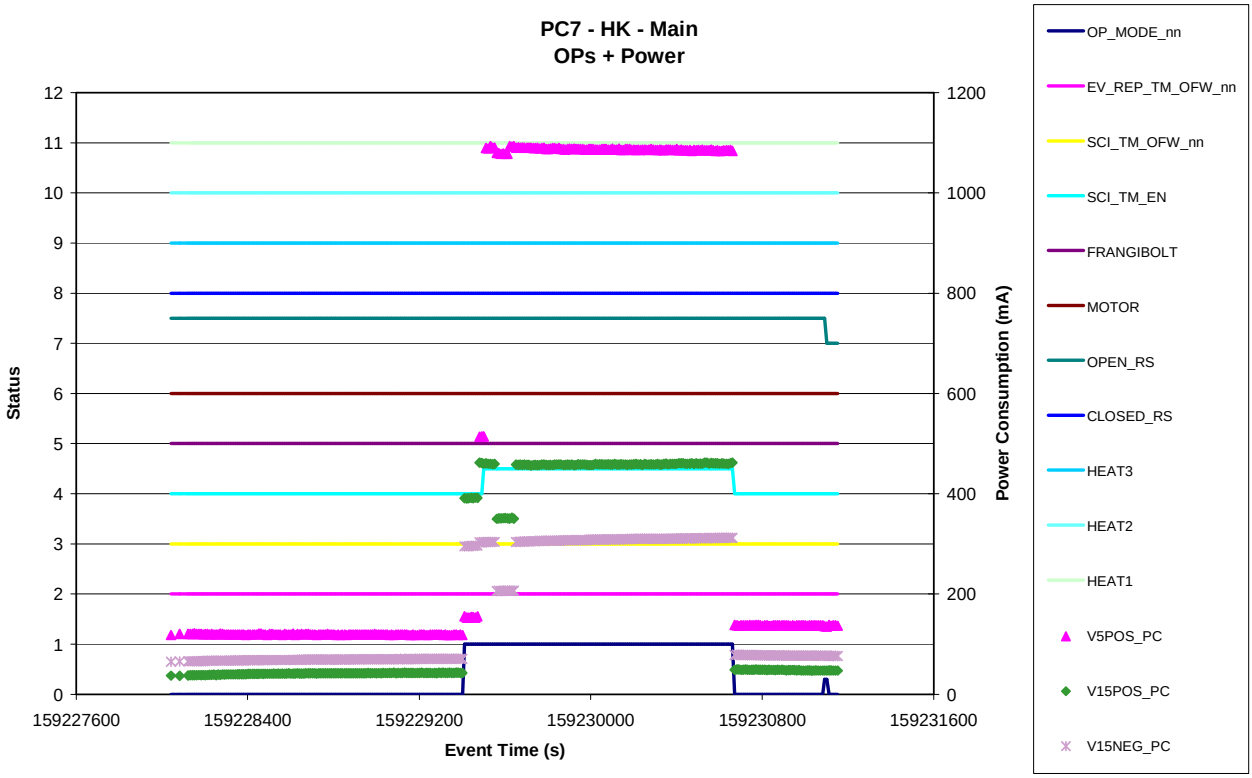


Figure 9.1-9. Power and PS temperature behaviour - Main

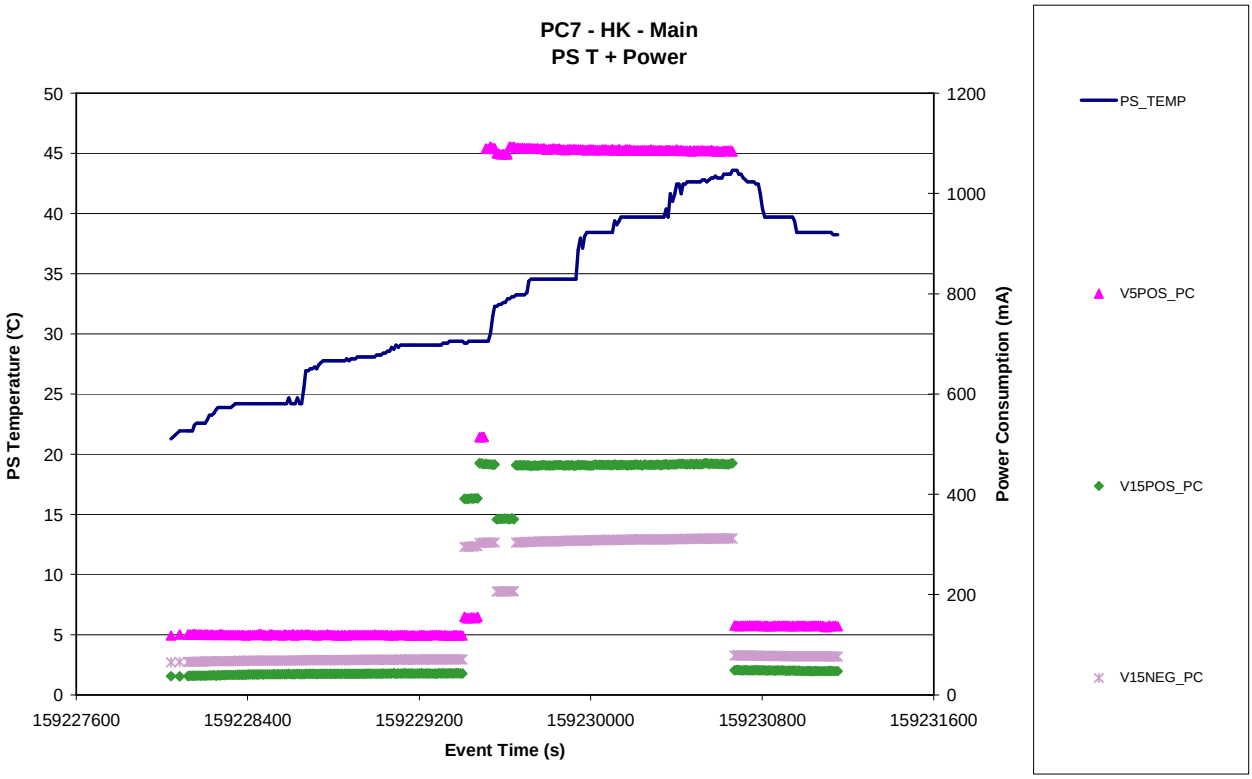


Figure 9.1-10. Source Sequence Count (SSC) of HK Telemetry vs. Time - Main

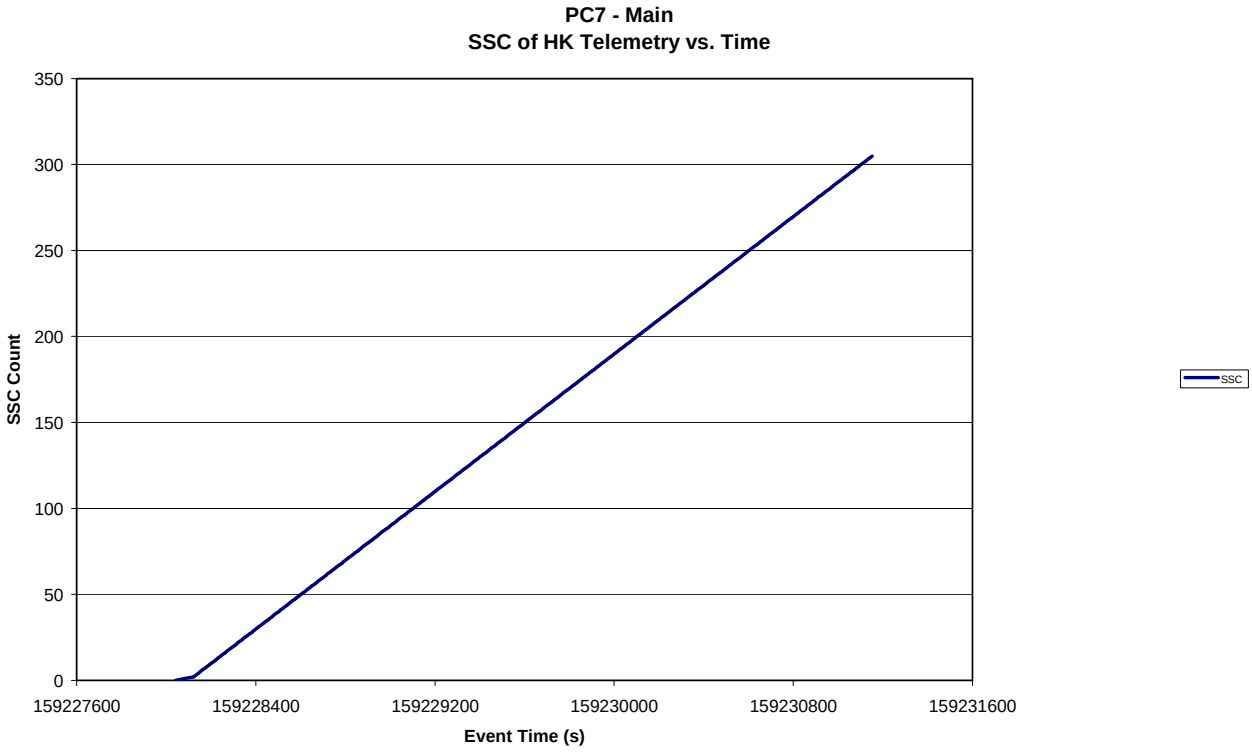


Figure 9.1-11. Source Sequence Count (SSC) of HK Telemetry vs. Number - Main

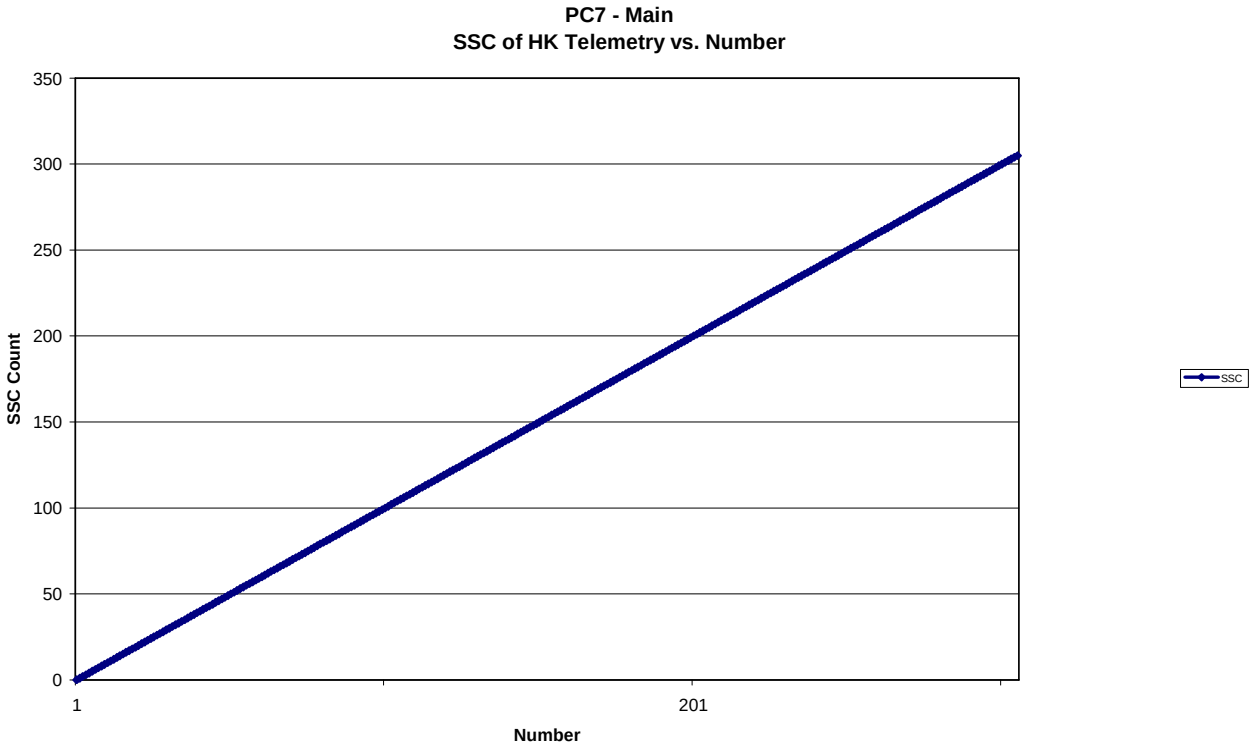


Figure 9.1-12. Source Sequence Count (SSC) of SCI Telemetry vs. Time - Main

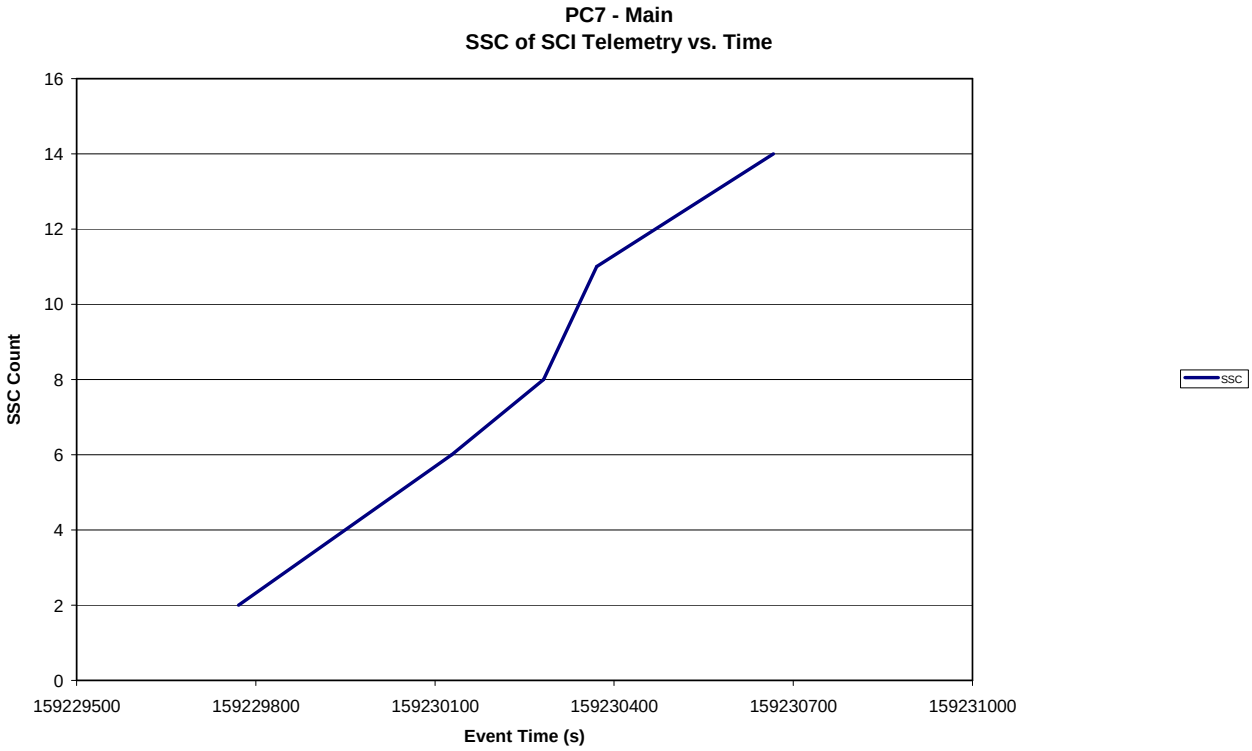
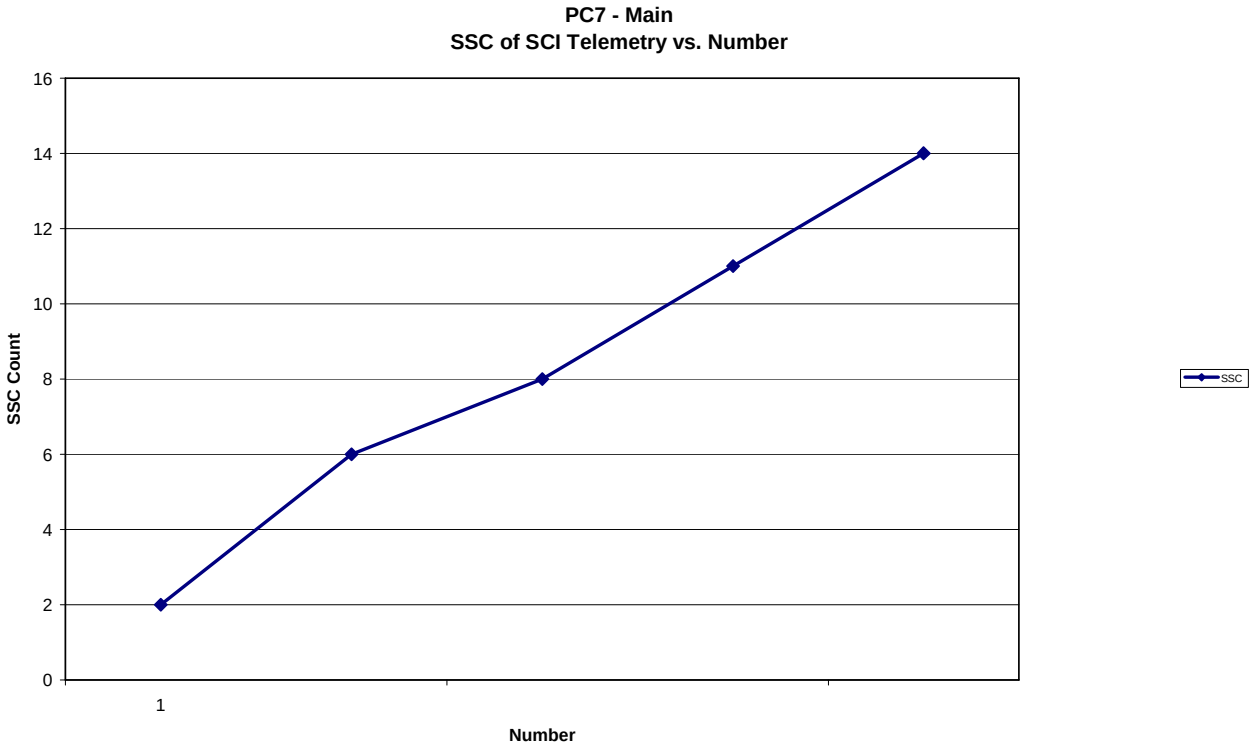


Figure 9.1-13. Source Sequence Count (SSC) of SCI Telemetry vs. Number - Main

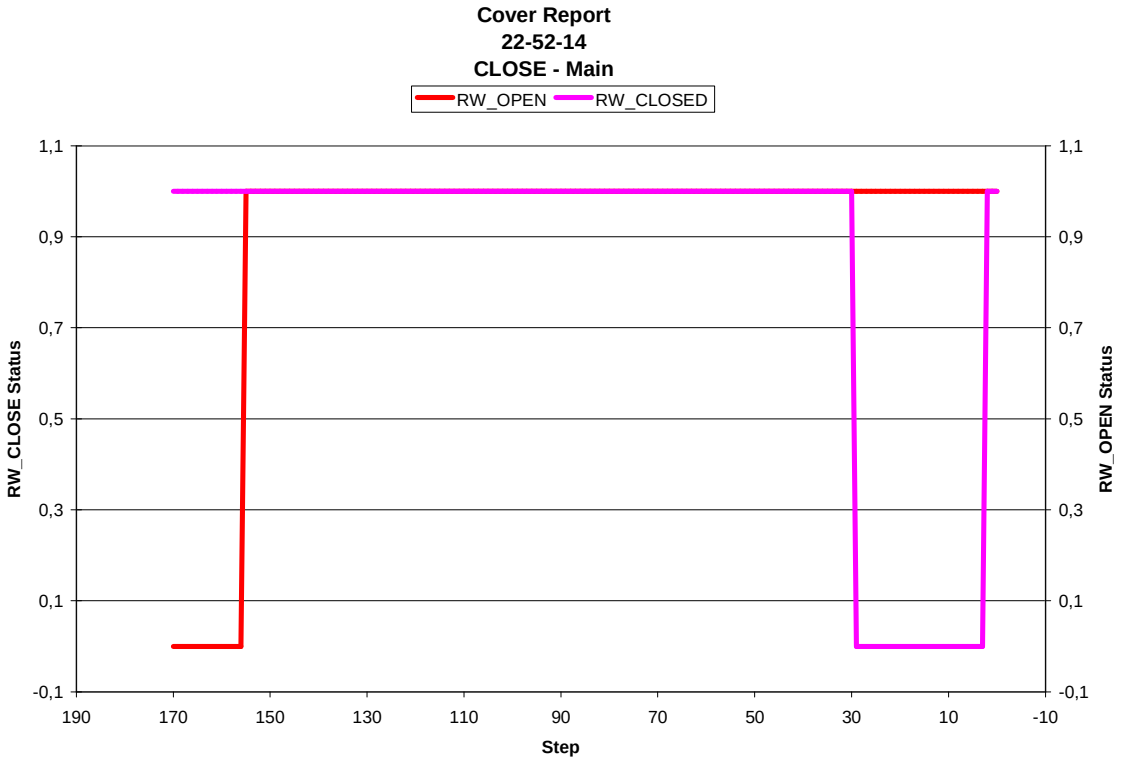


9.2 COVER REPORTS

9.2.1 Close Cover

HEADER_START
CREATION_TIME=2008-01-17T22:52:14Z
USER=giada1
HEADER_END
//
// Generated by 'GIADA_EGSE_SW '
//
MOVEMENT DIRECTION: To close
BEGIN TIME OF OPERATION: 159231088.000000
END TIME OF OPERATION: 159231104.000000

Figure 9.2-1. 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

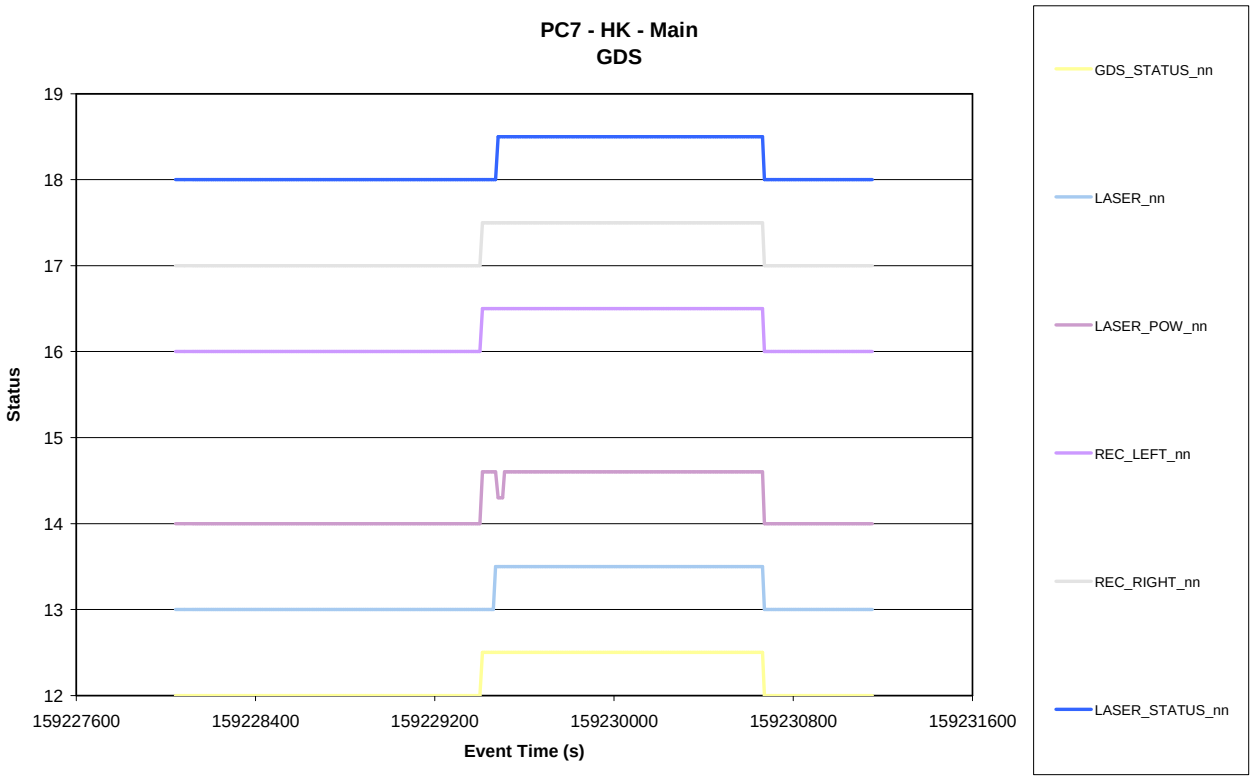


Figure 9.3-2. GDS Thresholds change vs. time - Main

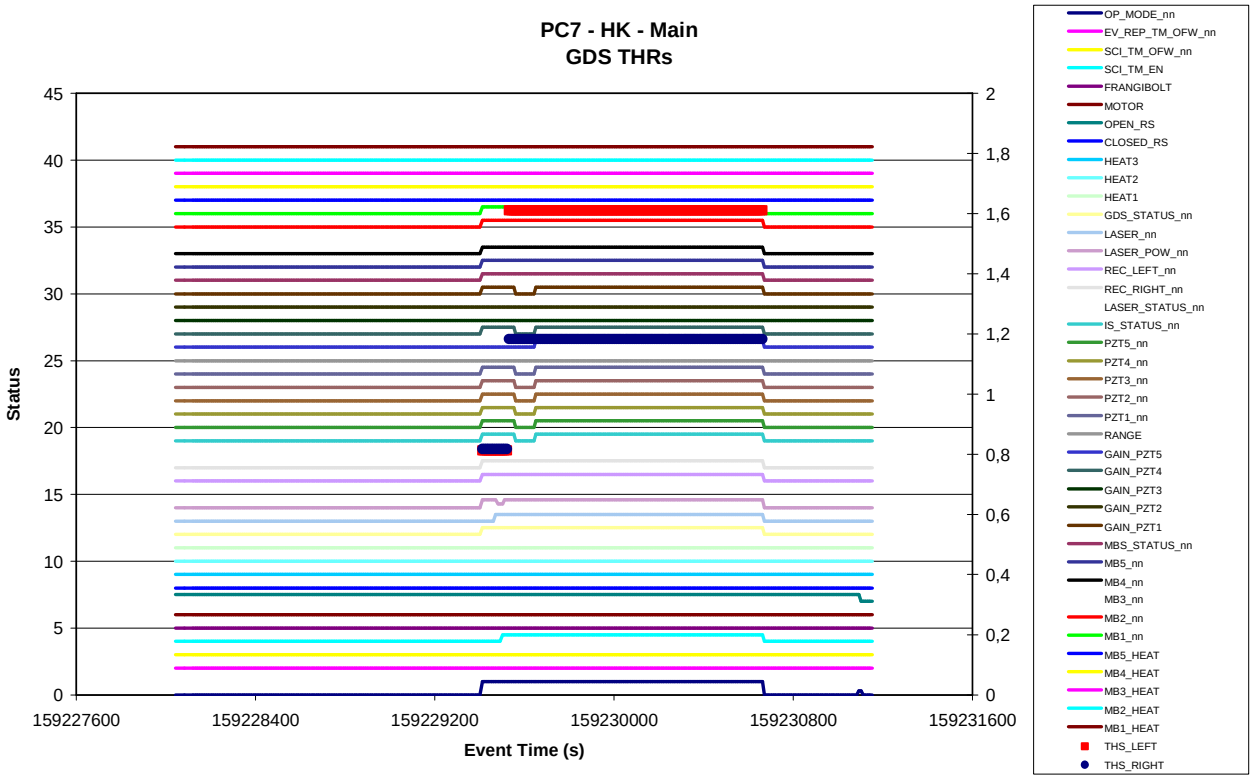


Figure 9.3-3. GDS Laser Temperatures vs. time (HK, HK-SCI, SCI) - Main

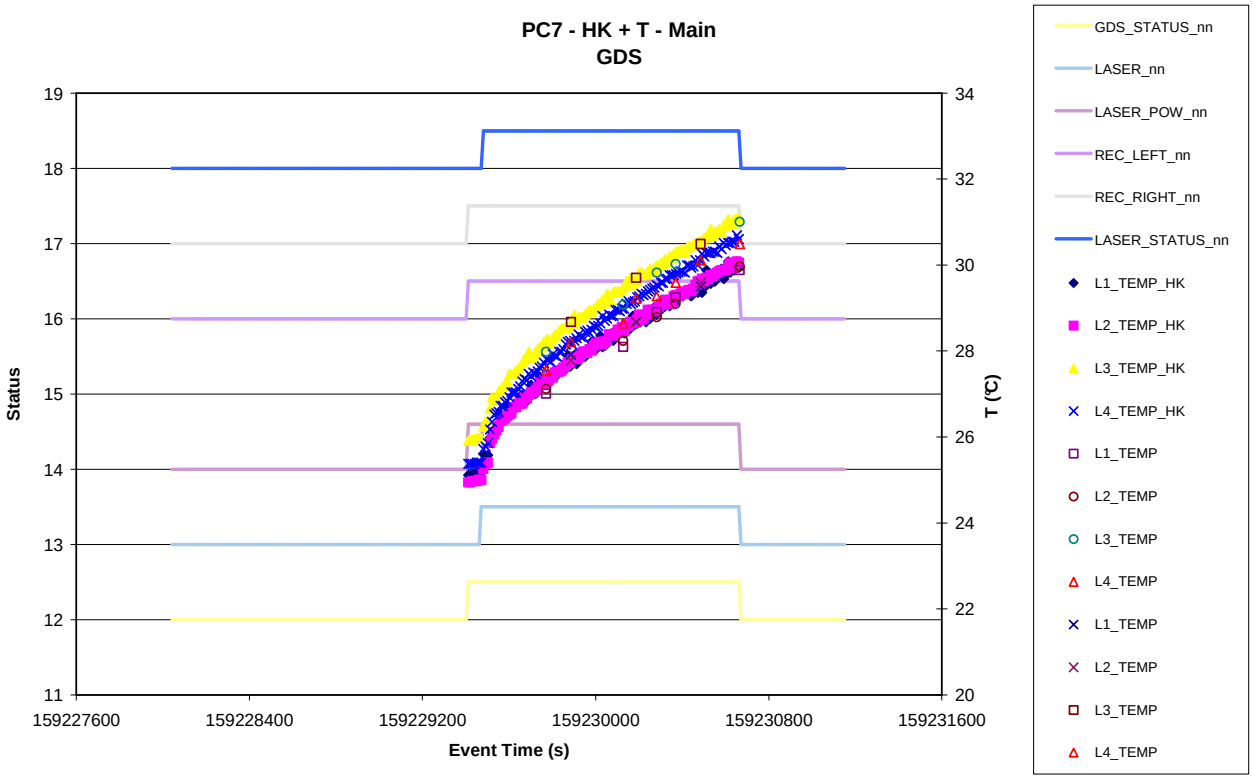


Figure 9.3-4. GDS Laser Monitor vs. time (HK, HK-SCI, SCI) - Main

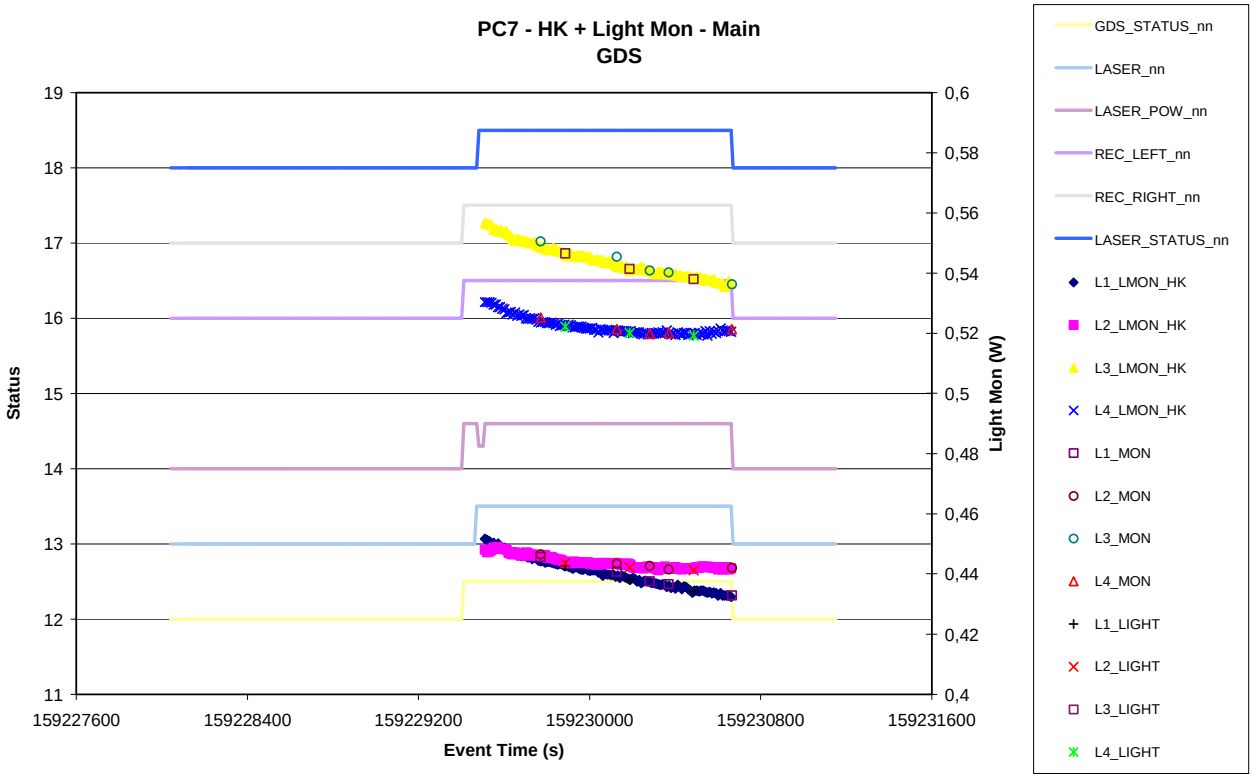


Figure 9.3-5. Laser 1 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main

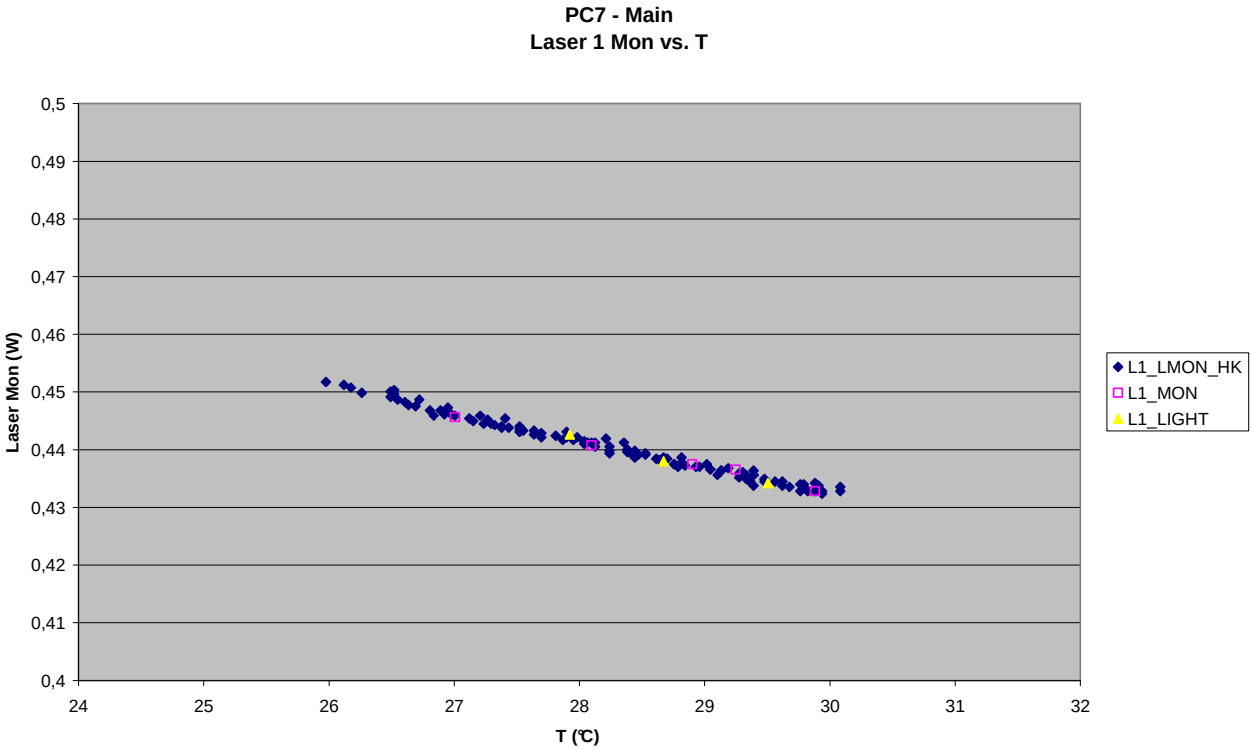


Figure 9.3-6. Laser 2 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main

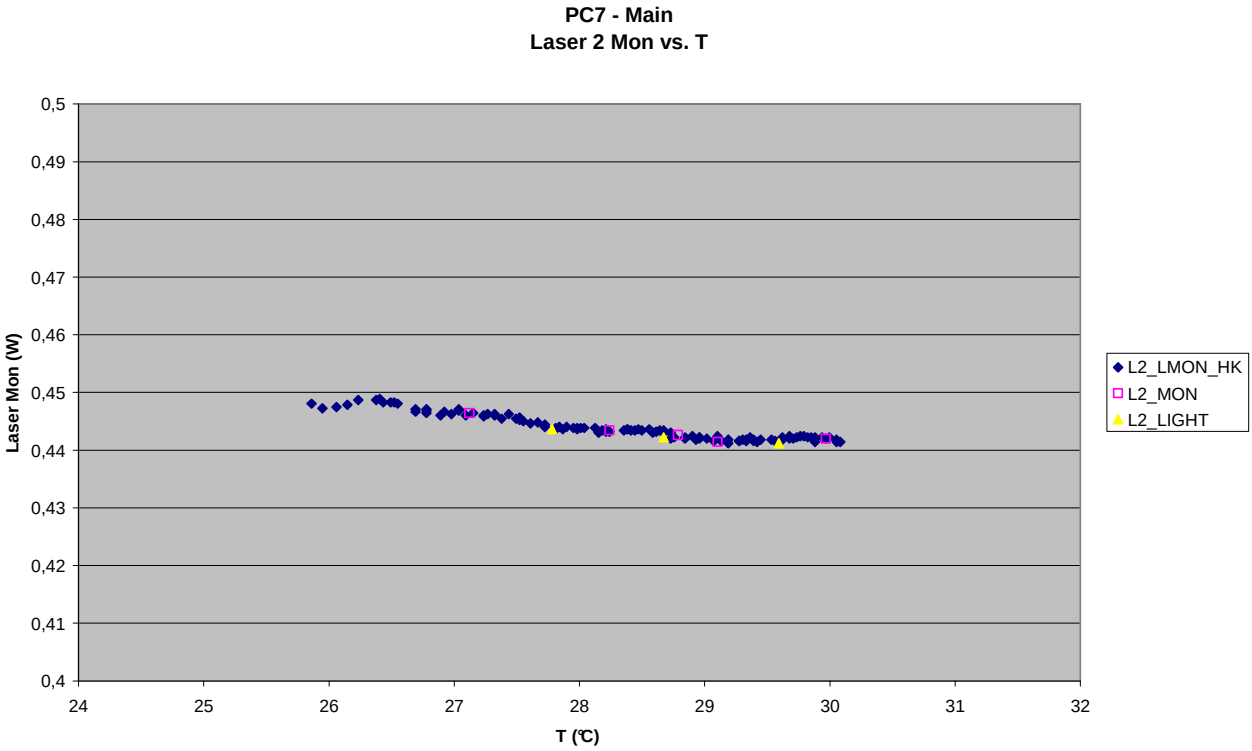


Figure 9.3-7. Laser 3 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main

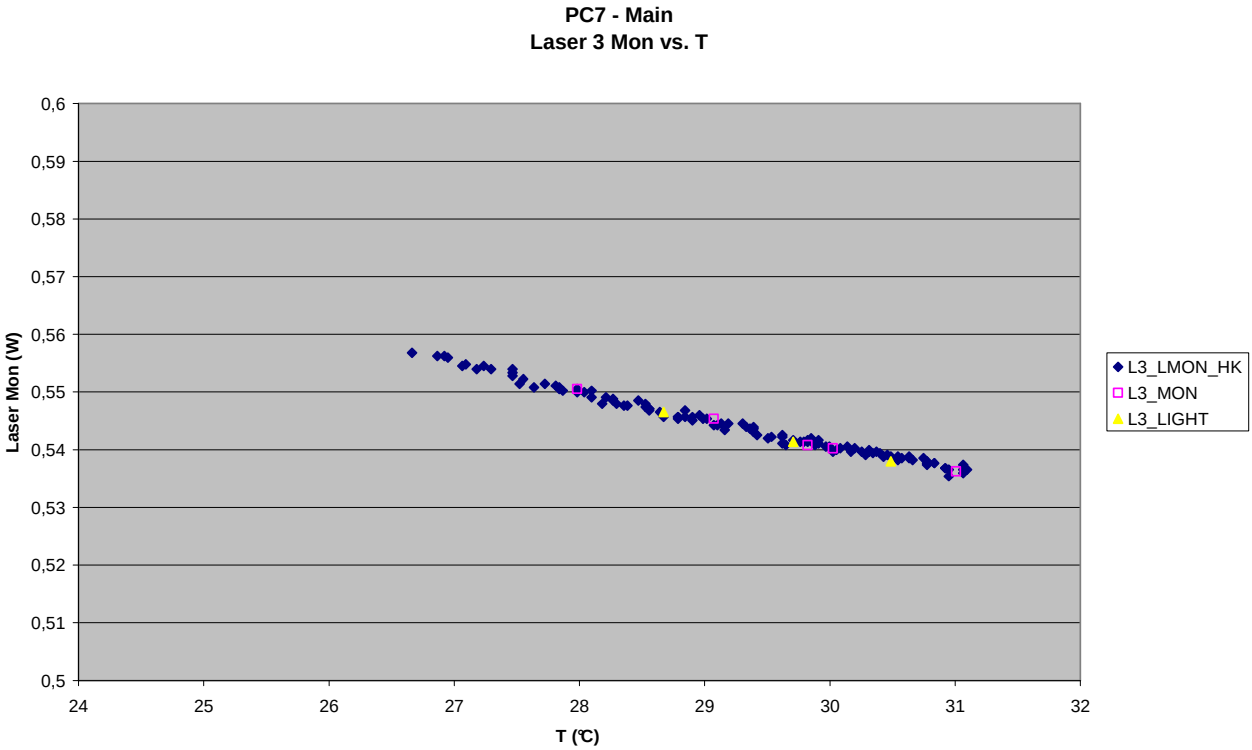
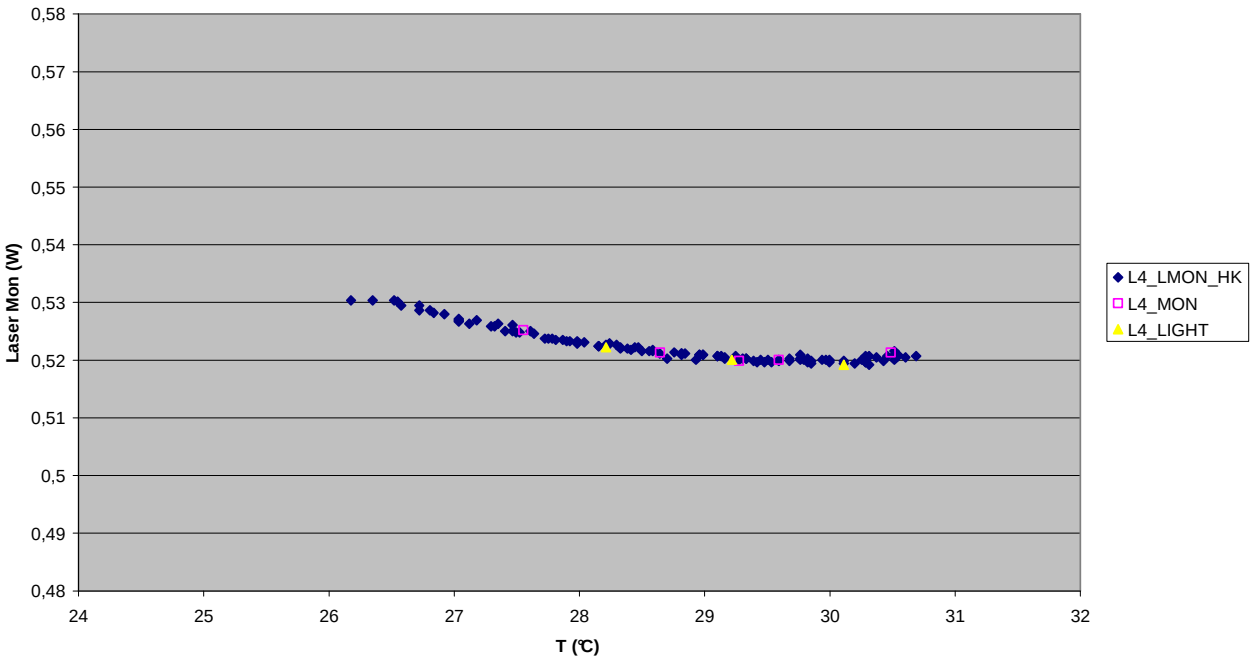


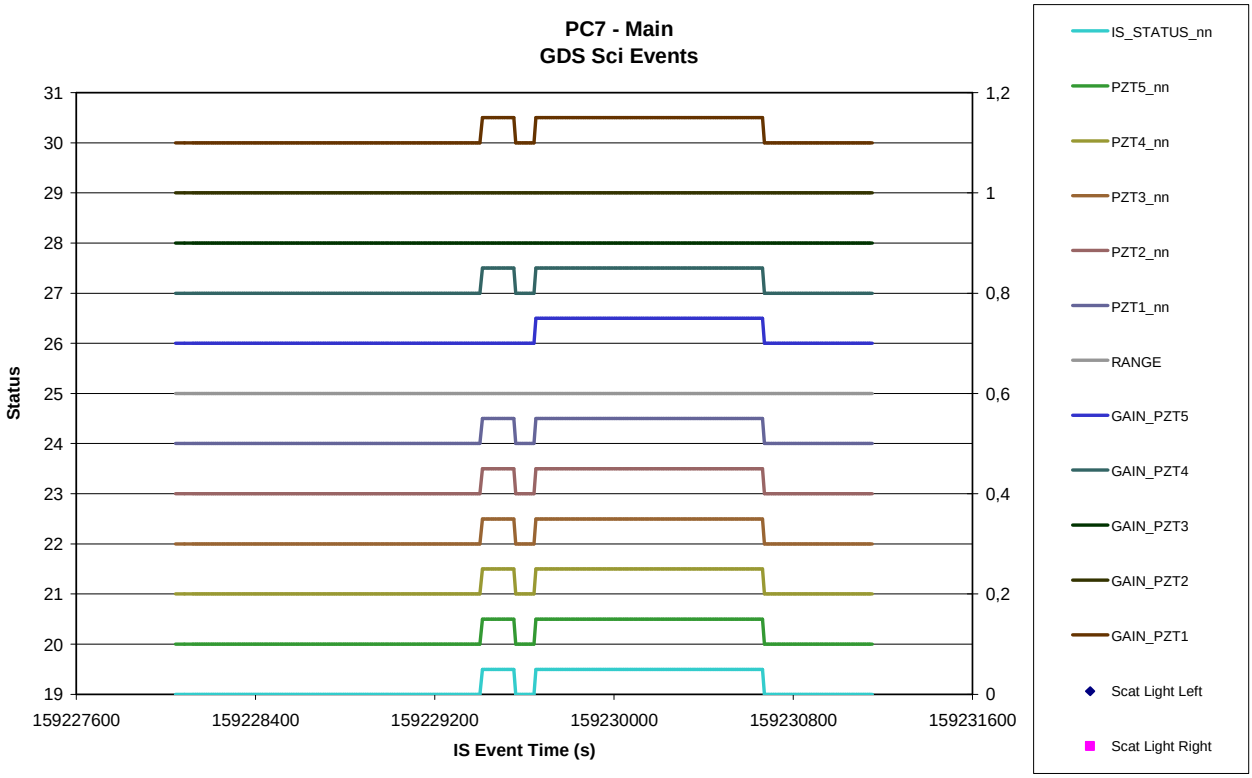
Figure 9.3-8. Laser 4 Light Monitor versus Temperature (HK, HK-SCI, SCI) - Main



9.3.2 GDS – Behaviour

9.3.2.1 Science Events

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

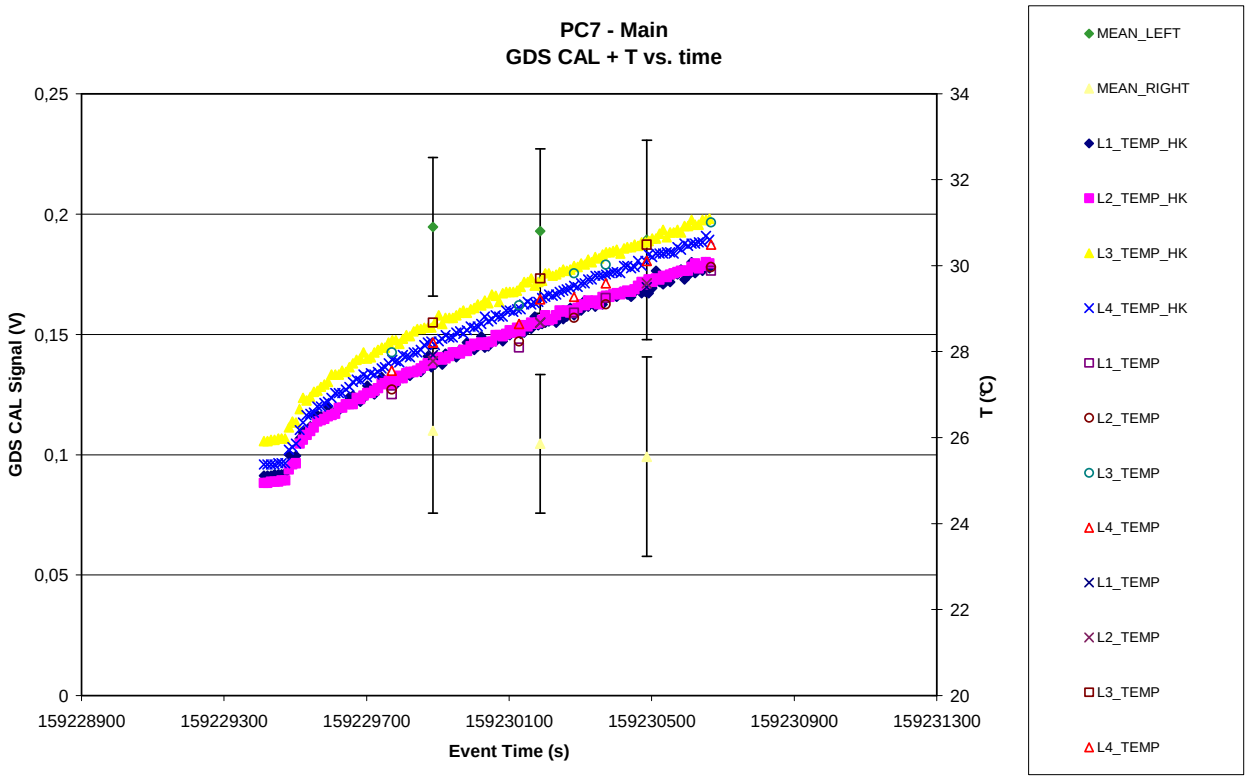


9.3.2.2 Event Rates

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

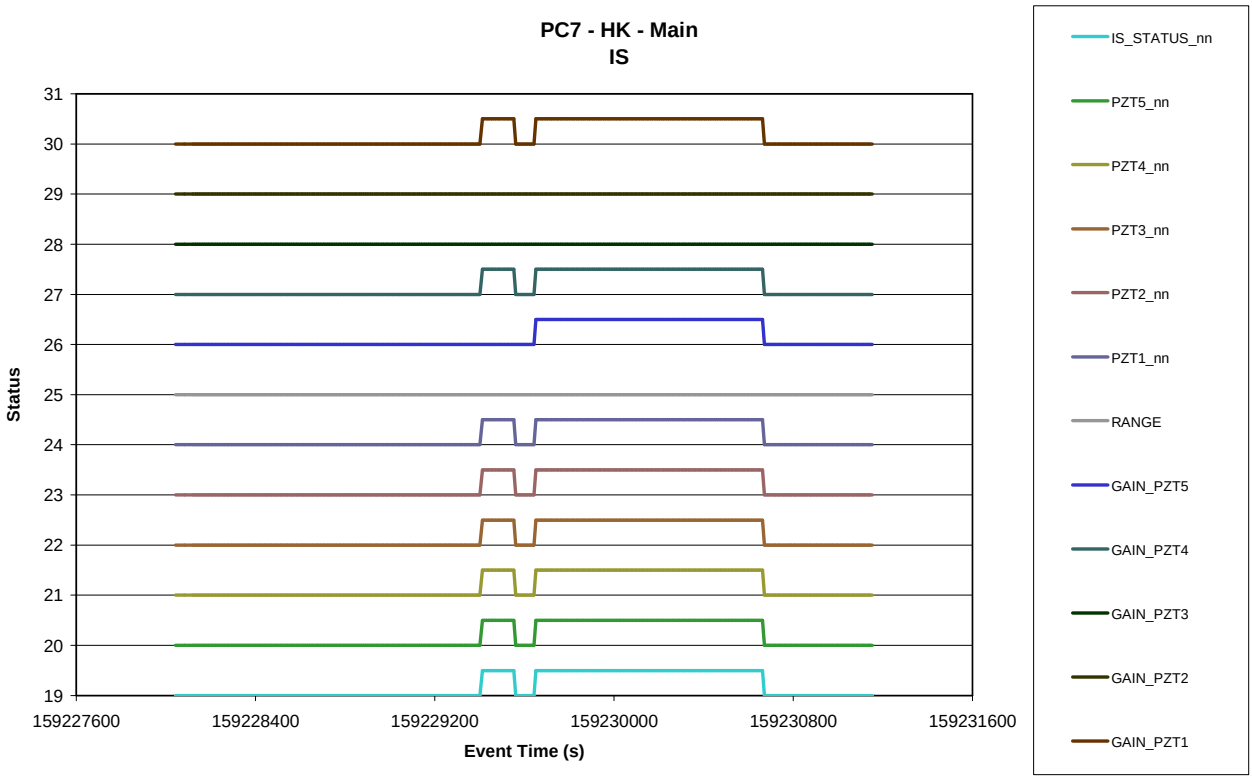


Figure 9.4-2. IS PZT 3 Thresholds change vs. time - Main

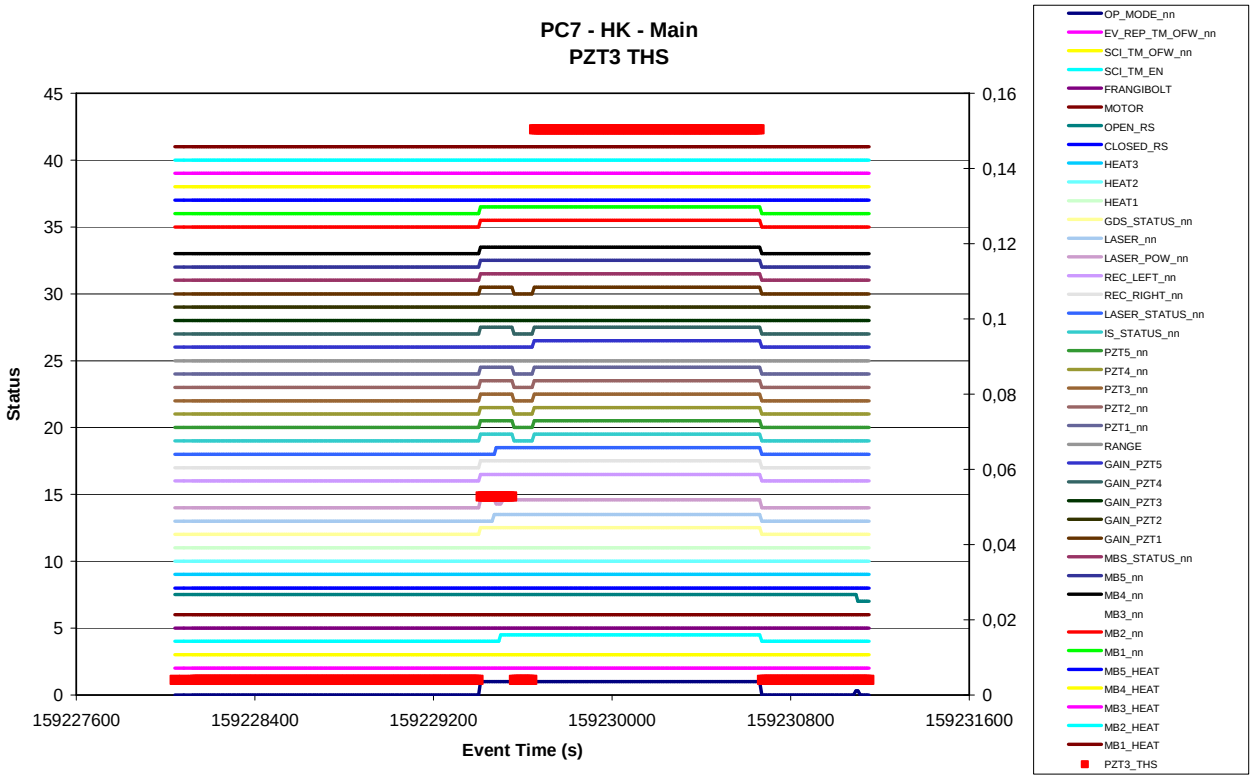


Figure 9.4-3. IS PZT 5 Thresholds change vs. time - Main

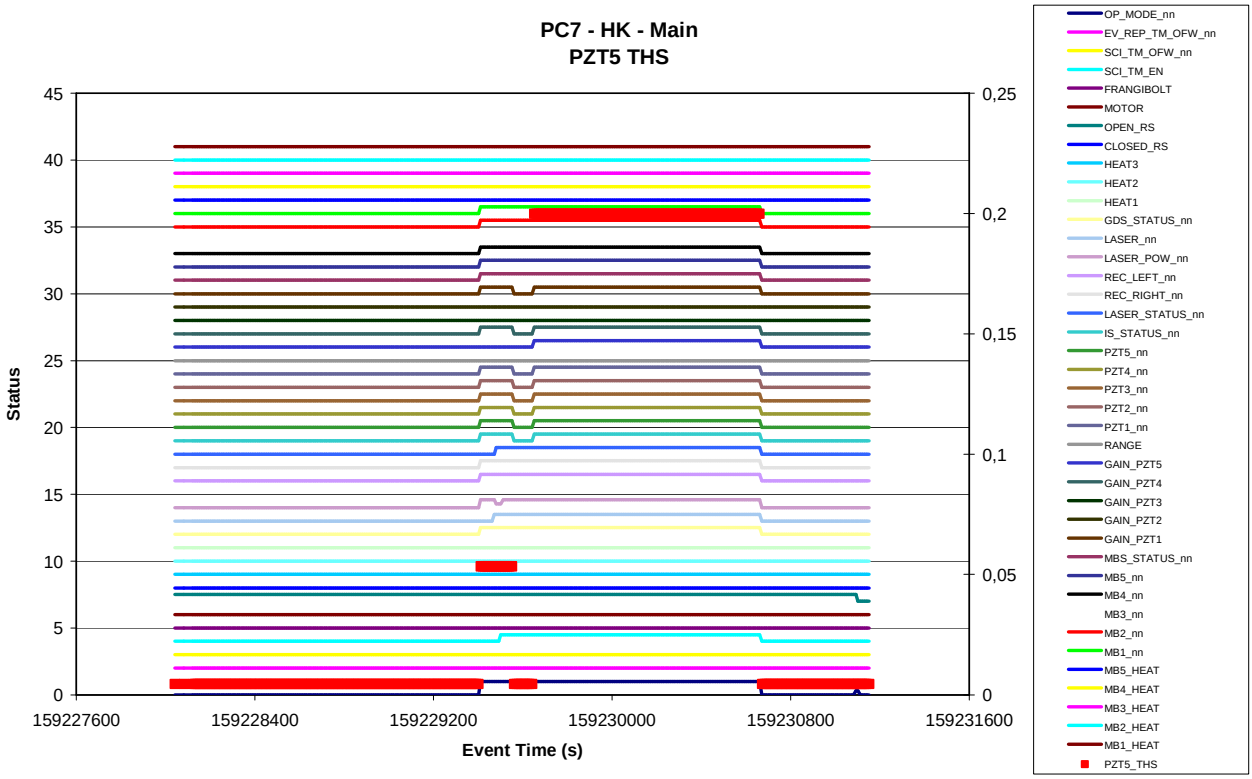
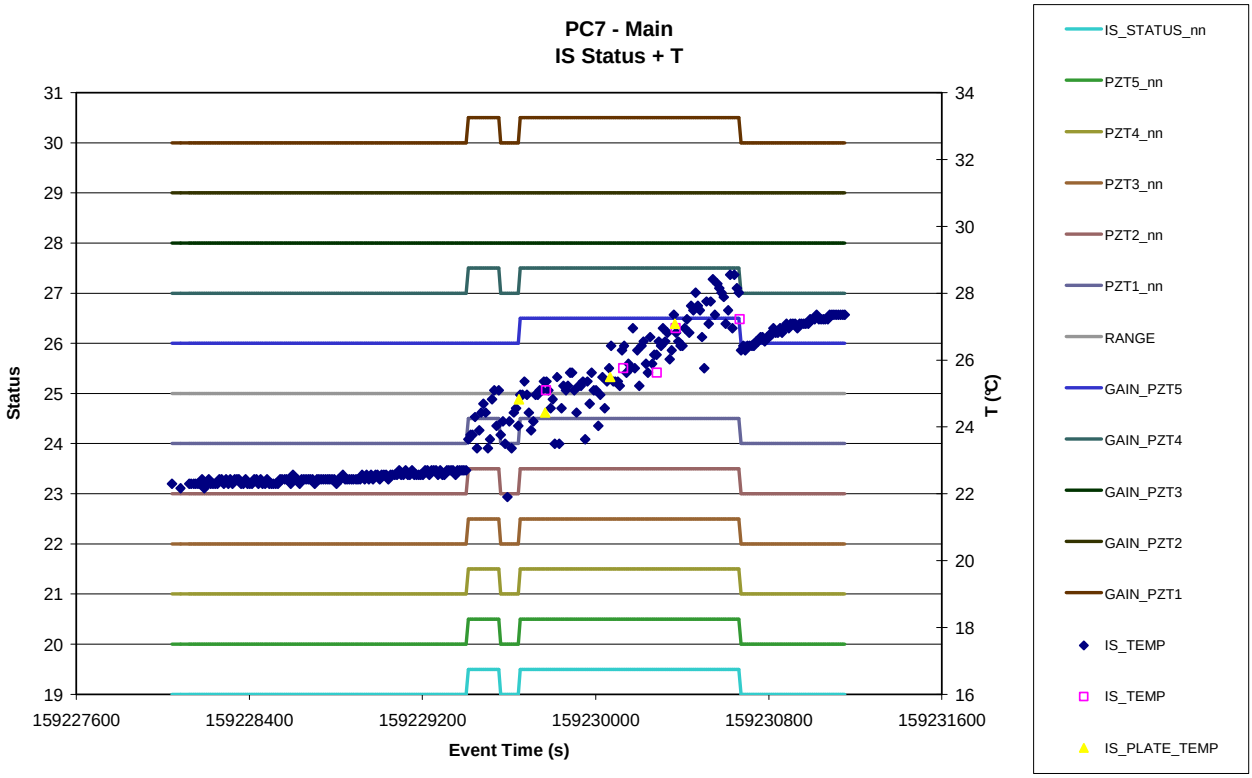


Figure 9.4-4. IS Temperature vs. time (HK, HK-SCI, SCI) - Main



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

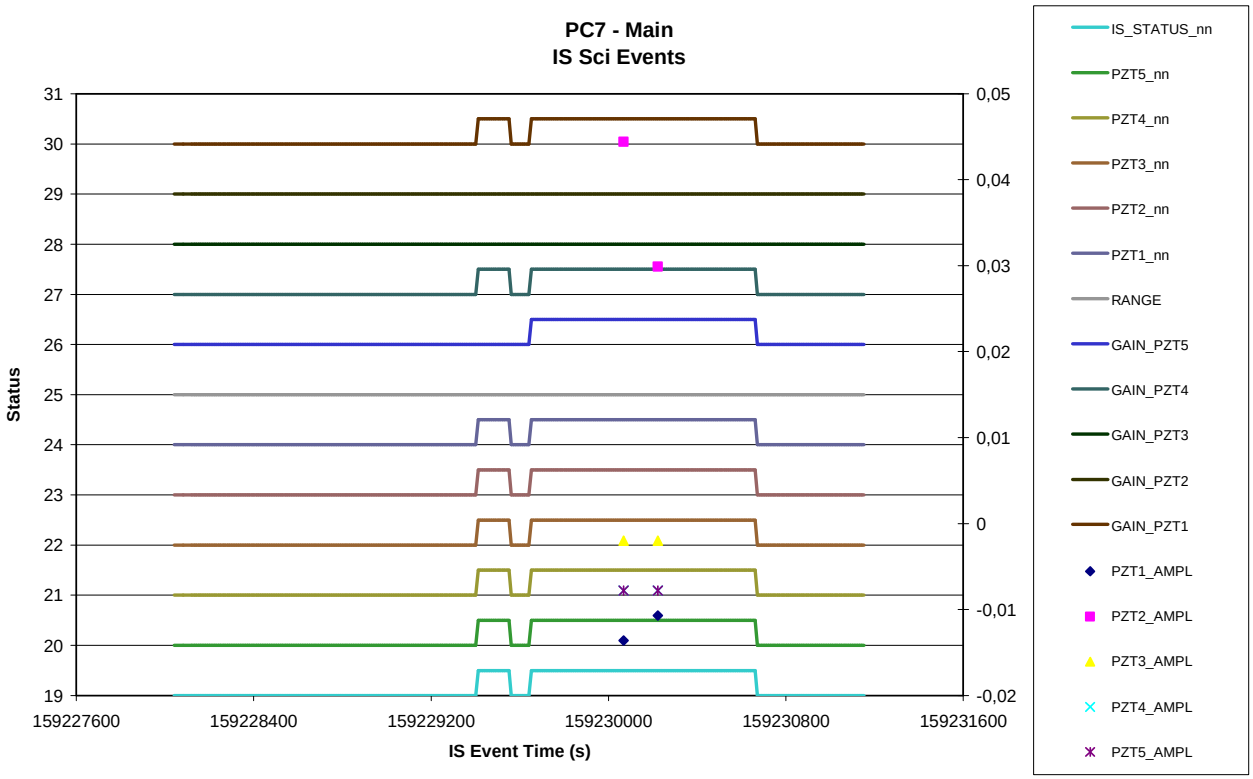


Figure 9.4-6. PZT 1-2-3-4-5 Detected Events vs. time - Main

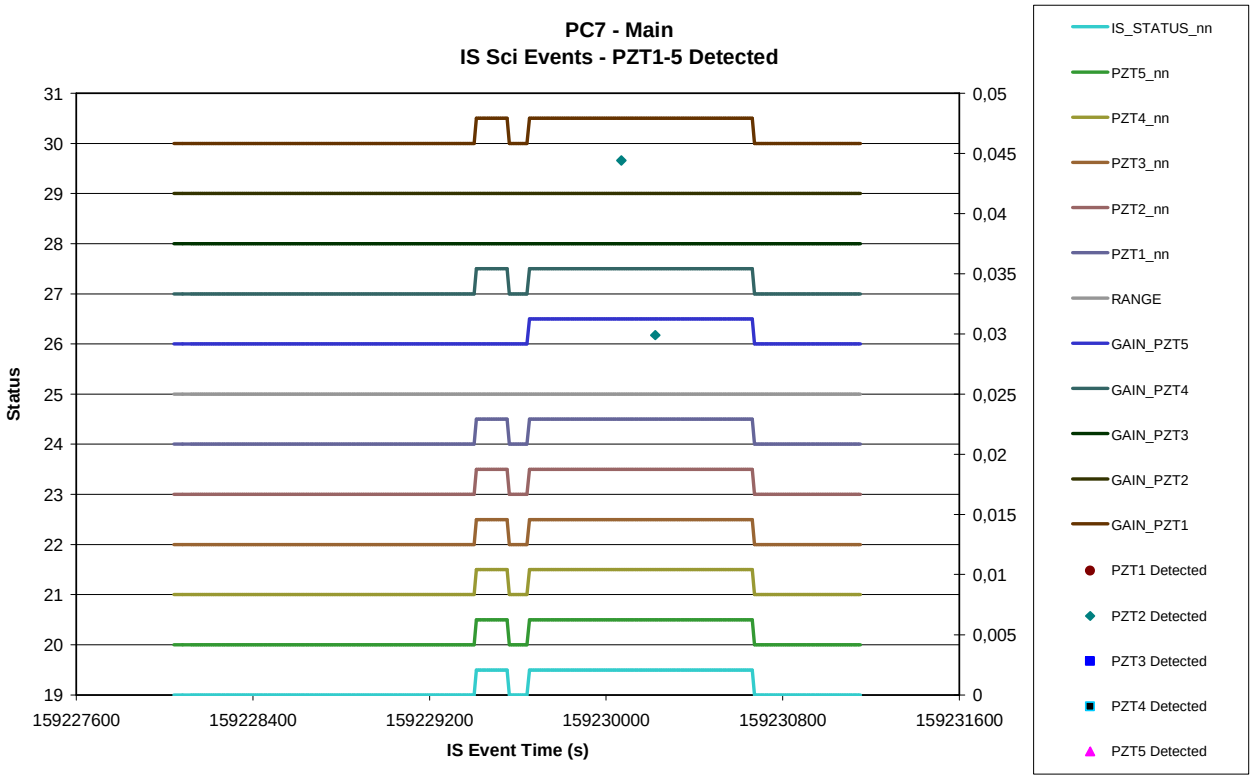


Figure 9.4-7. PZT 1 Detected Events vs. time - Main

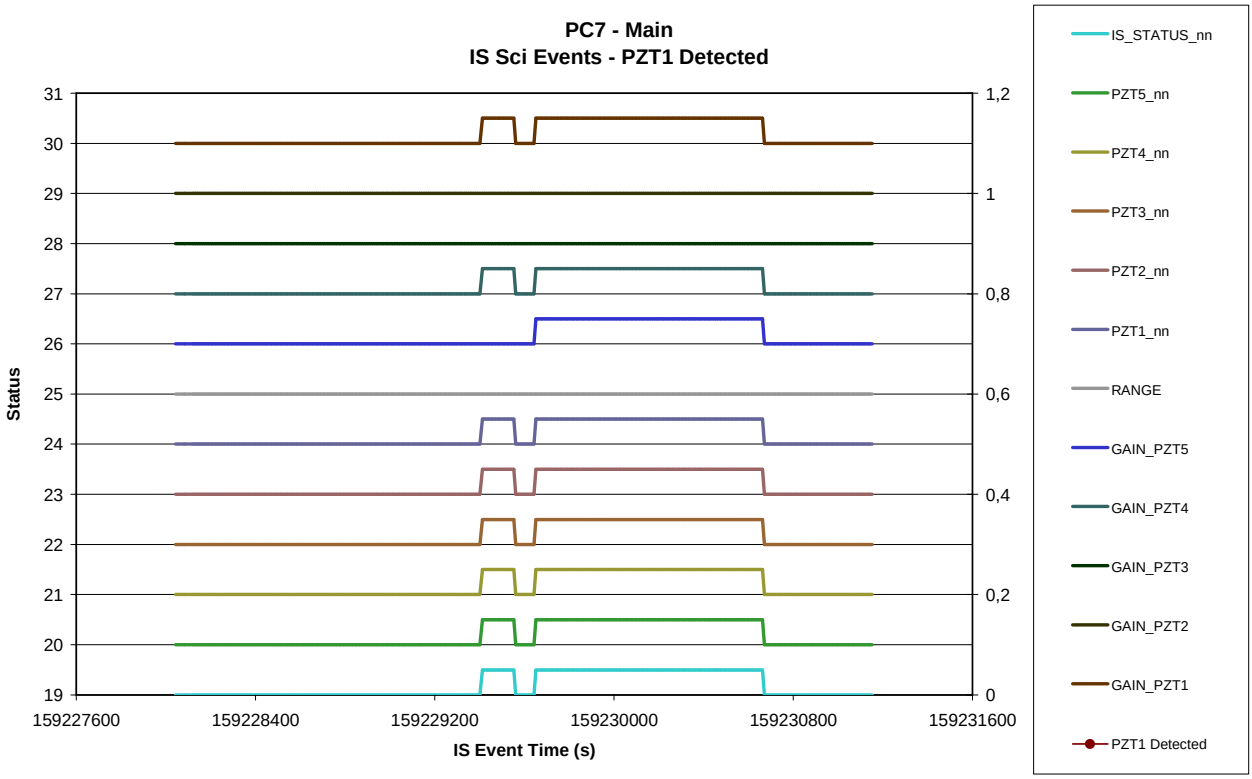


Figure 9.4-8. PZT 2 Detected Events vs. time - Main

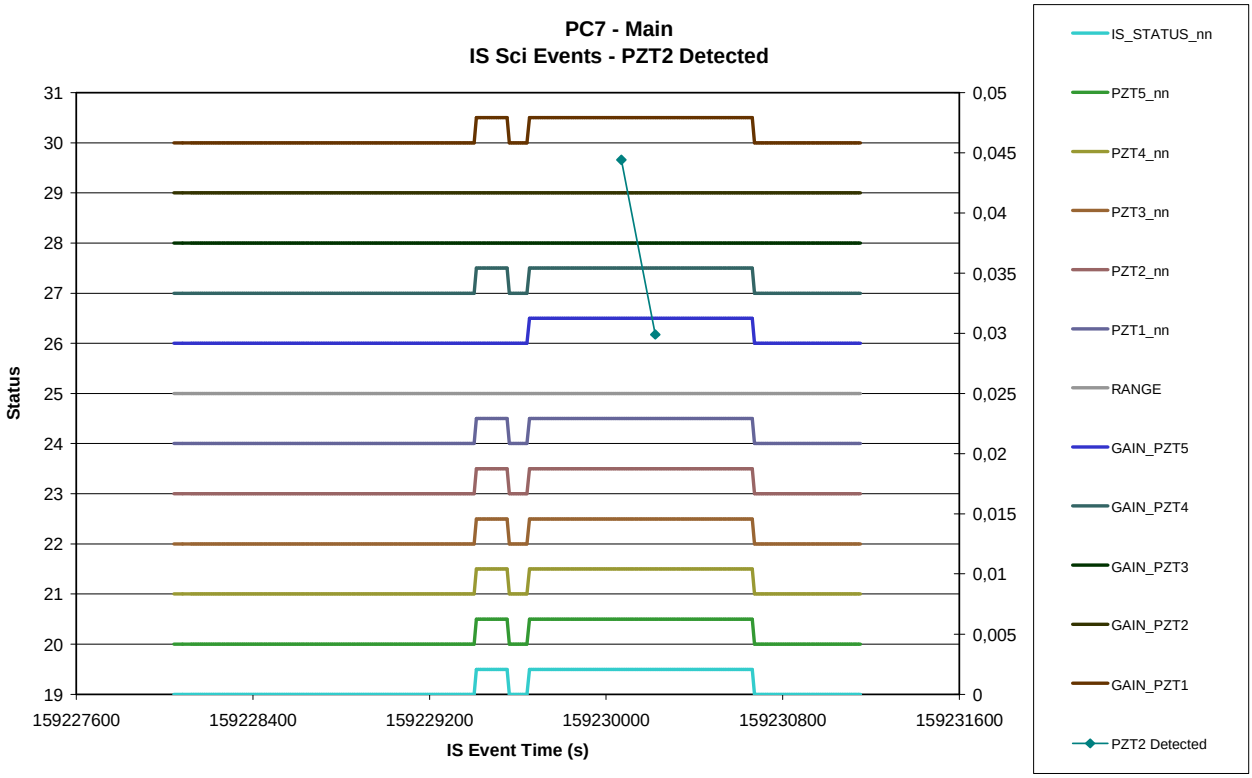


Figure 9.4-9. PZT 3 Detected Events vs. time - Main

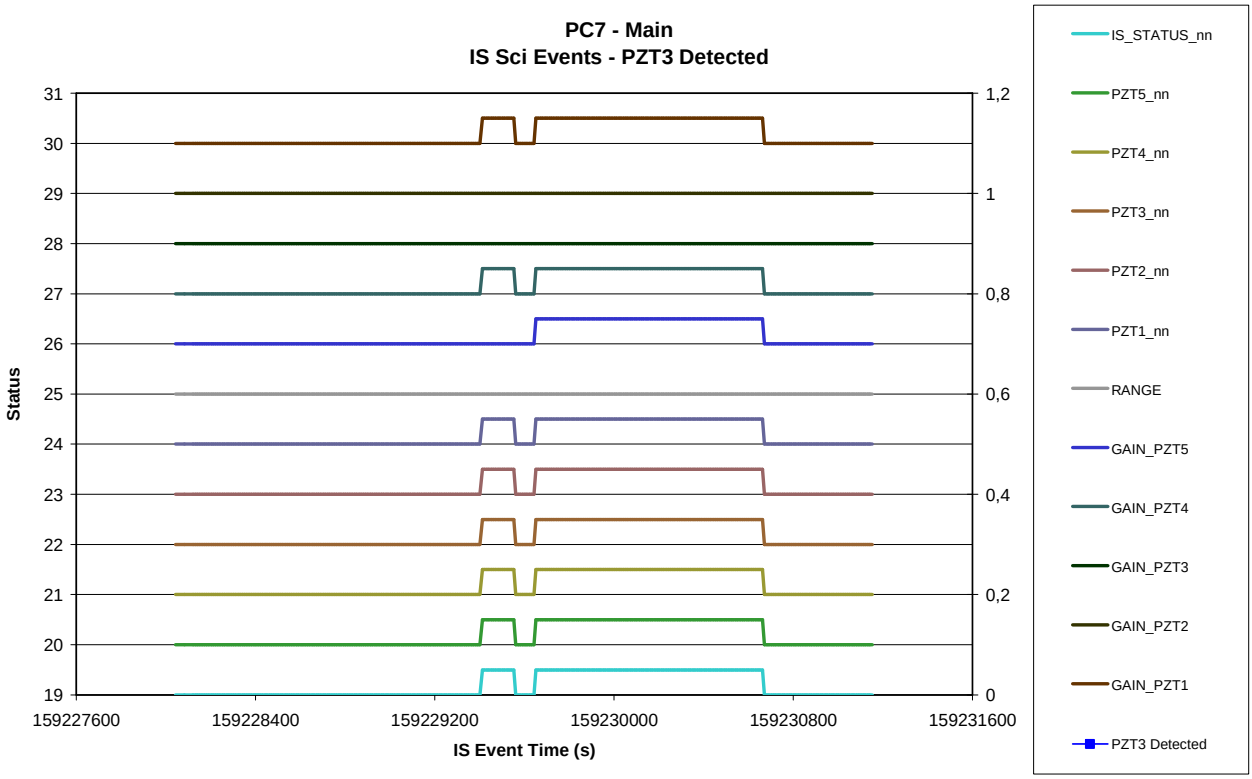


Figure 9.4-10. PZT 4 Detected Events vs. time - Main

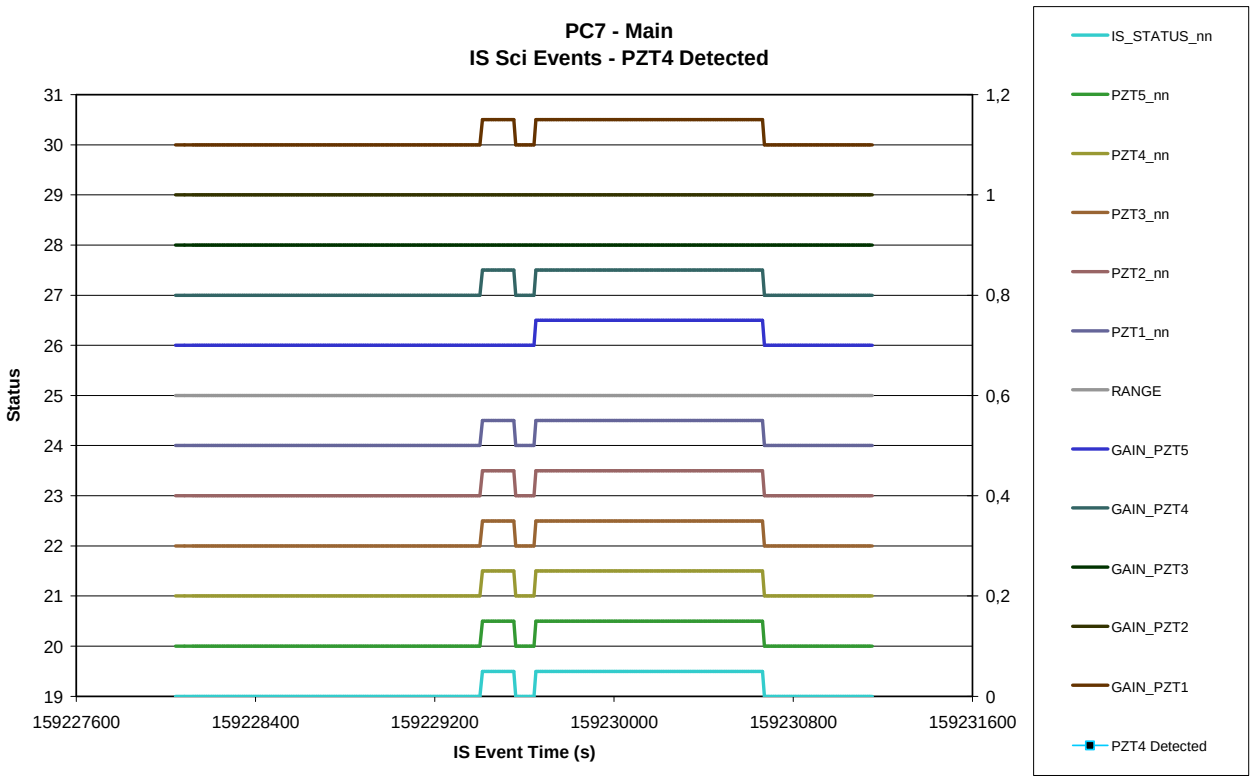


Figure 9.4-11. PZT 5 Detected Events vs. time - Main

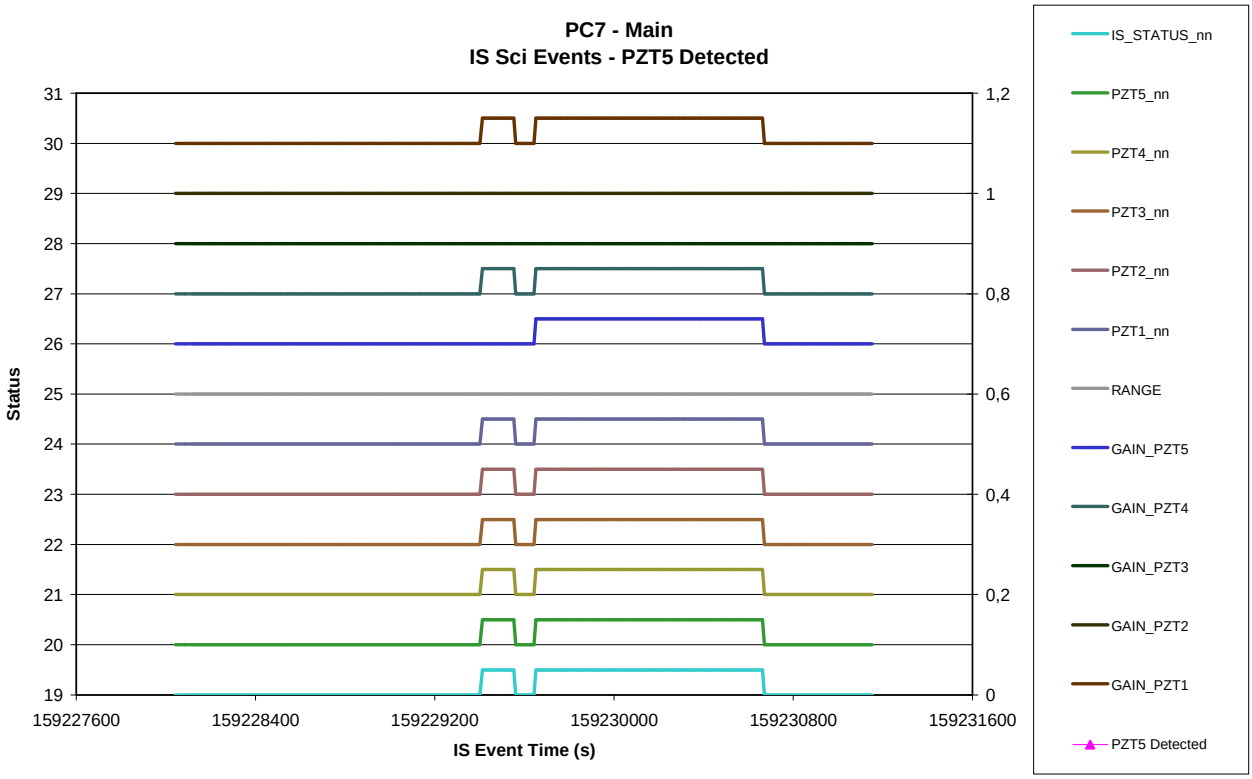
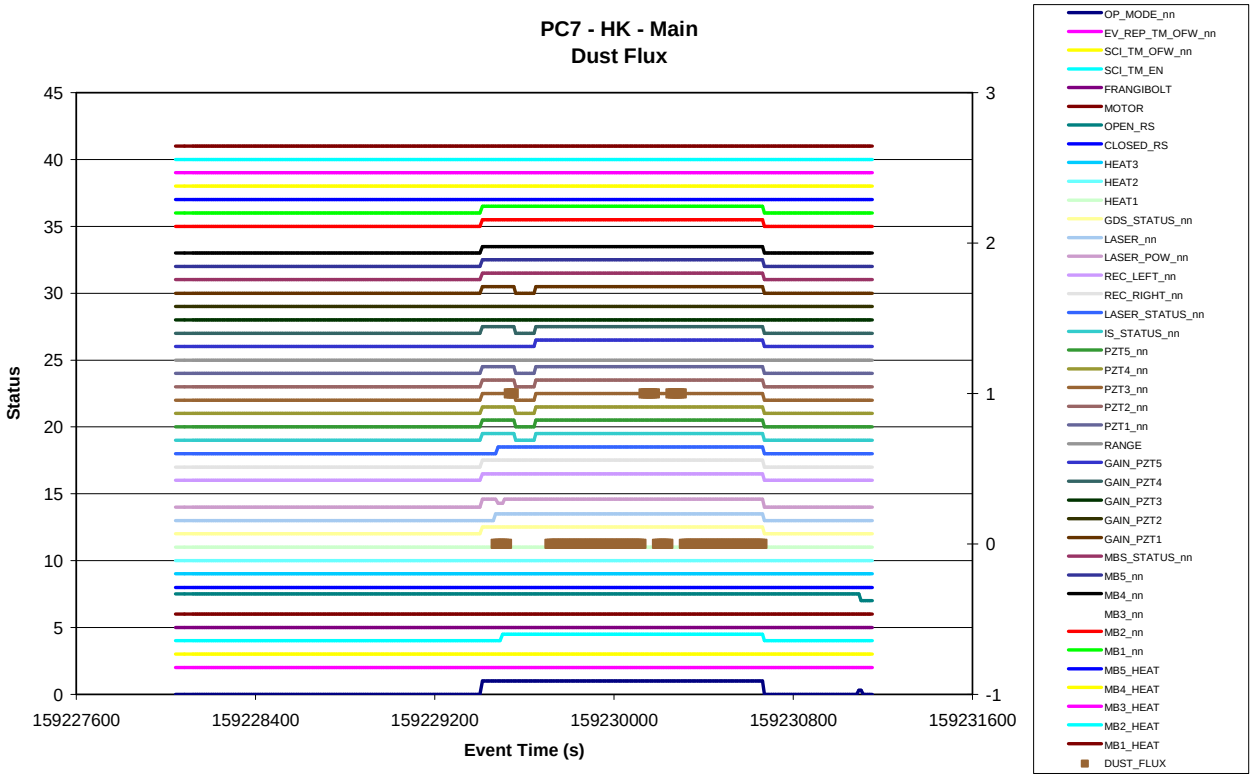


Figure 9.4-12. Dust Flux vs. time - Main



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

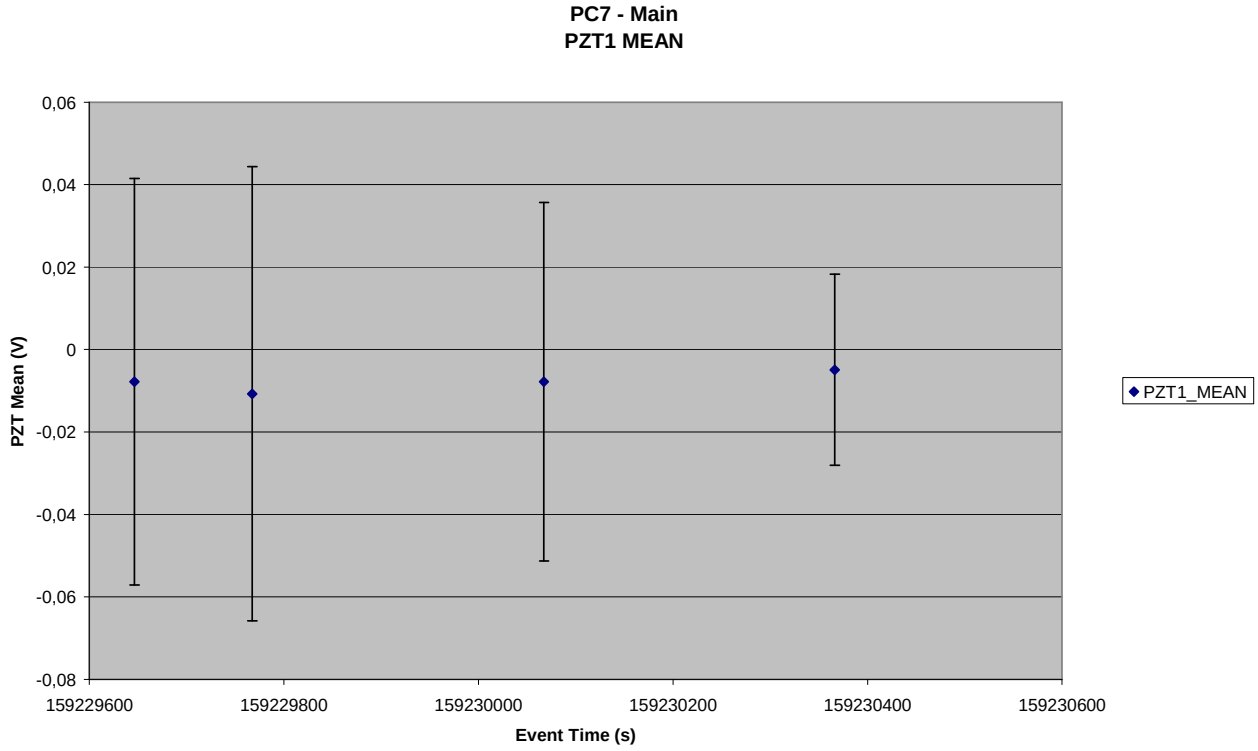


Figure 9.4-14. PZT 2 Mean and St Dev. CAL vs. time - Main

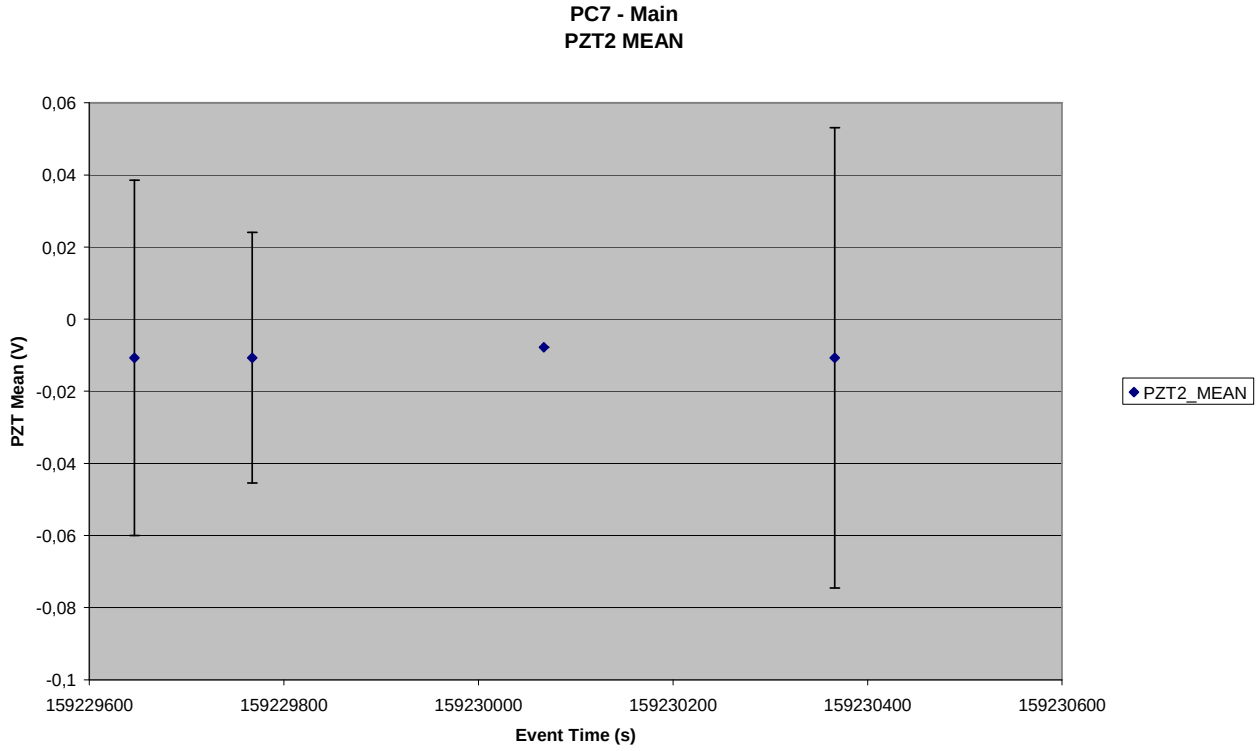


Figure 9.4-15. PZT 3 Mean and St Dev. CAL vs. time - Main

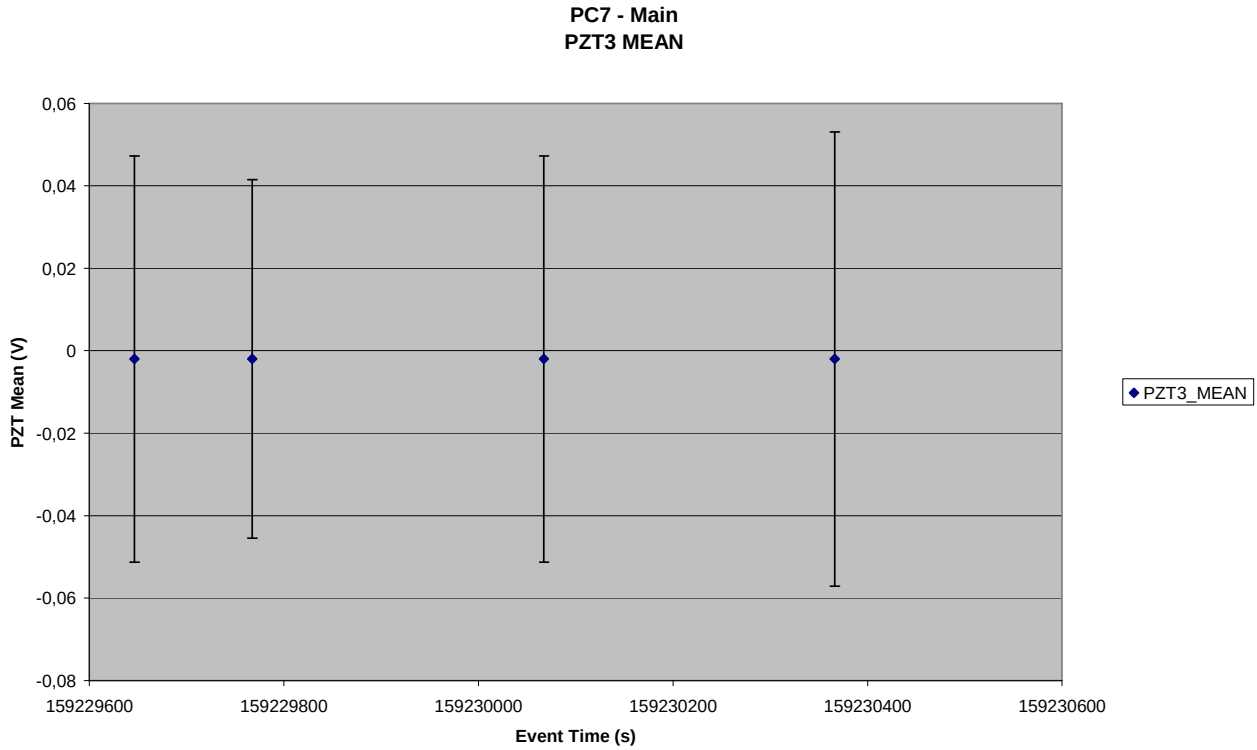


Figure 9.4-16. PZT 4 Mean and St Dev. CAL vs. time - Main

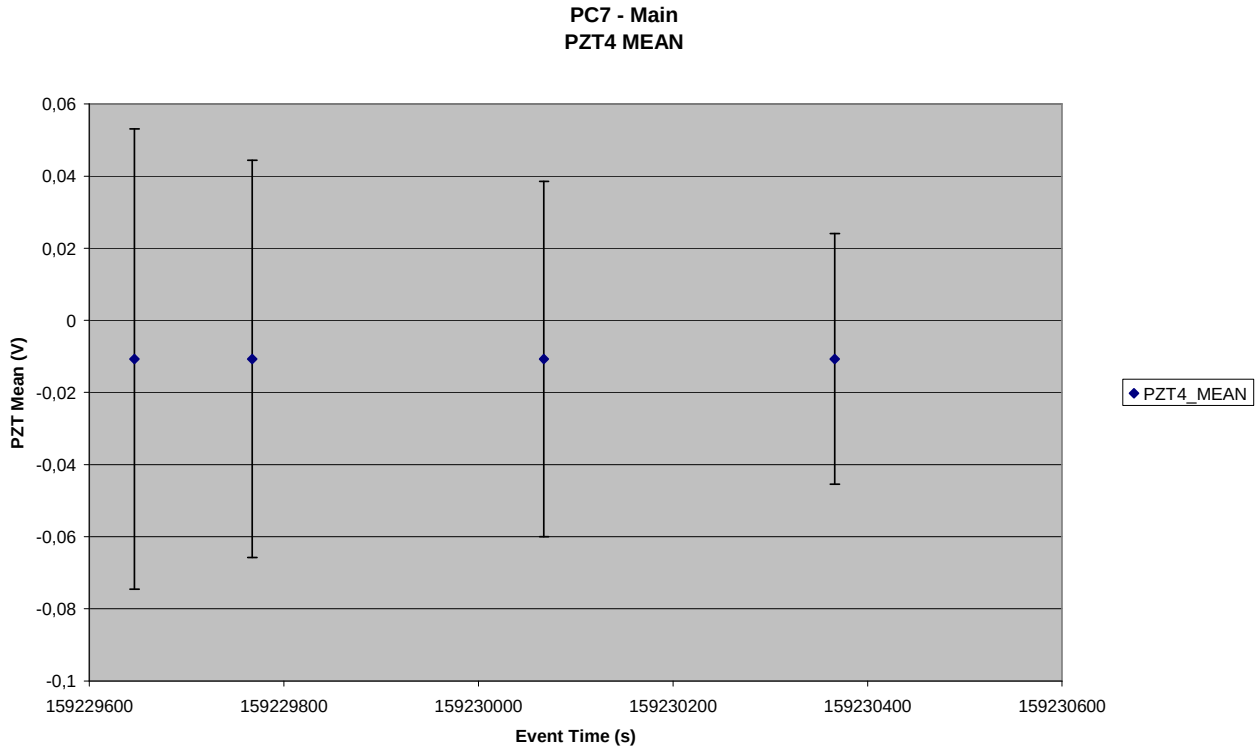


Figure 9.4-17. PZT 5 Mean and St Dev. CAL vs. time - Main

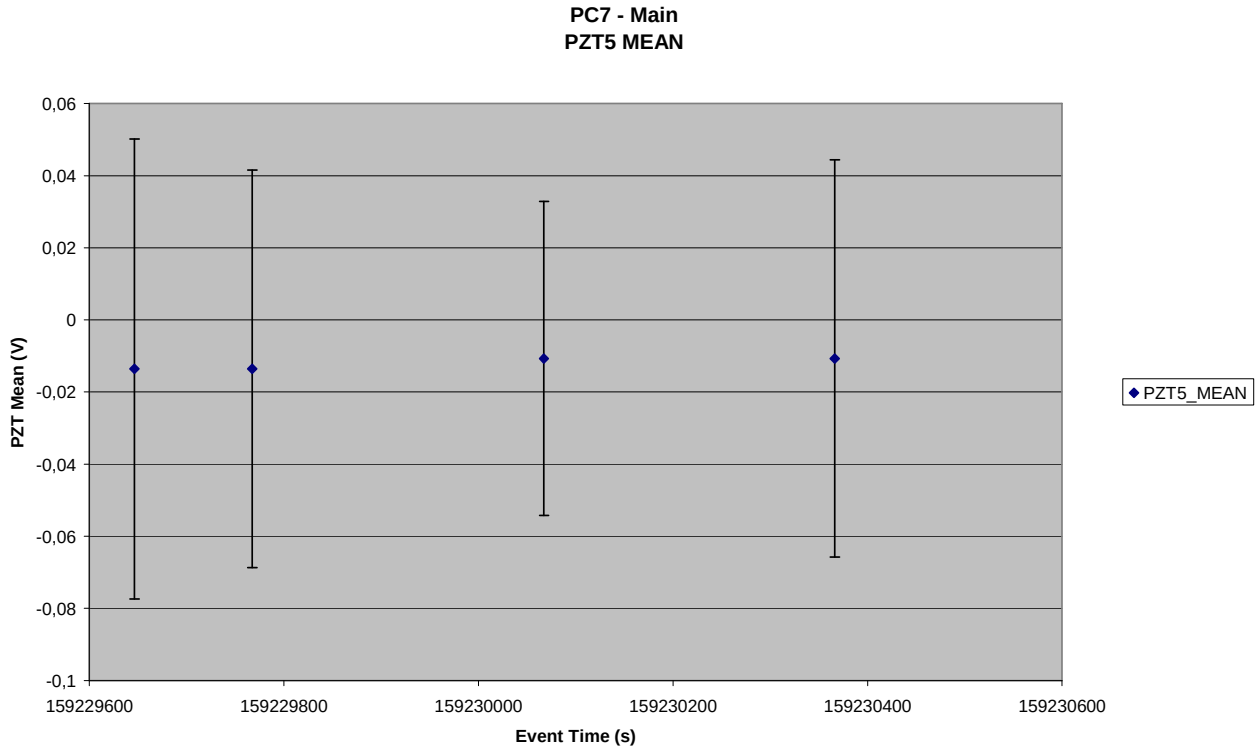


Figure 9.4-18. Reference Voltages for IS calibration vs. time - Main

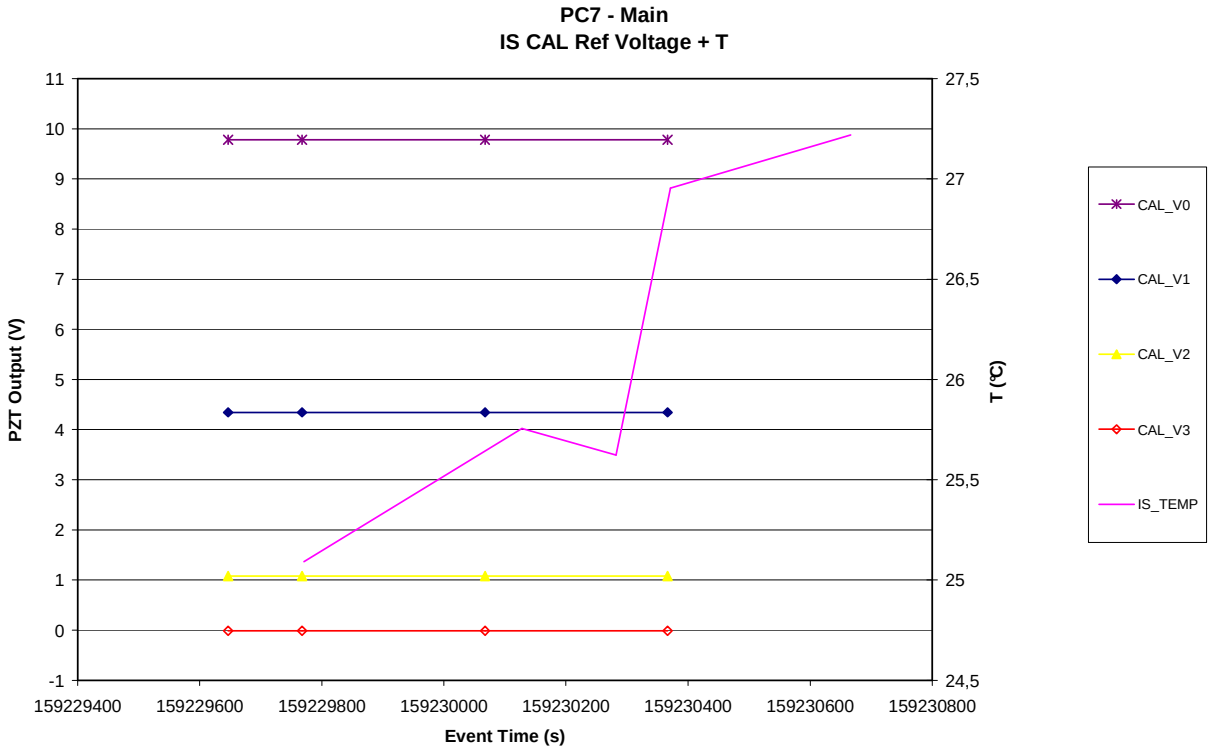


Figure 9.4-19. PZT 1 CAL Signal vs. time - Main

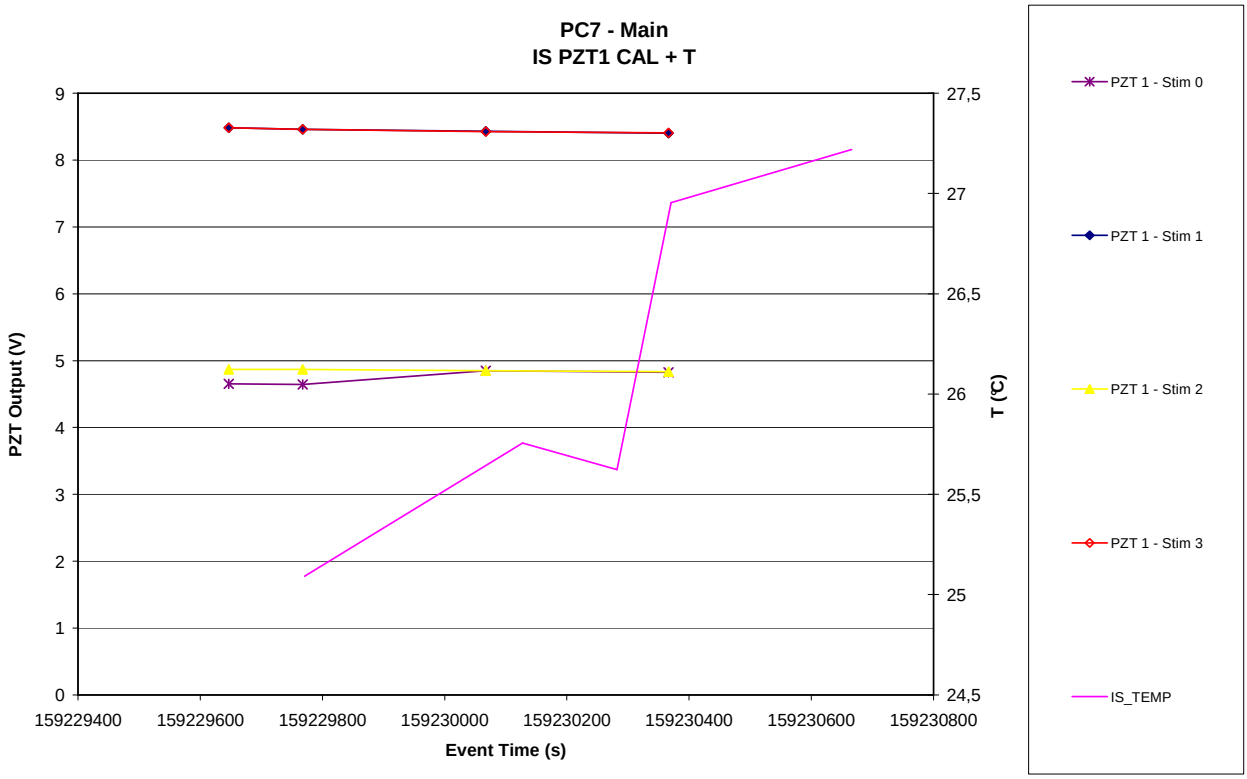


Figure 9.4-20. PZT 2 CAL Signal vs. time - Main

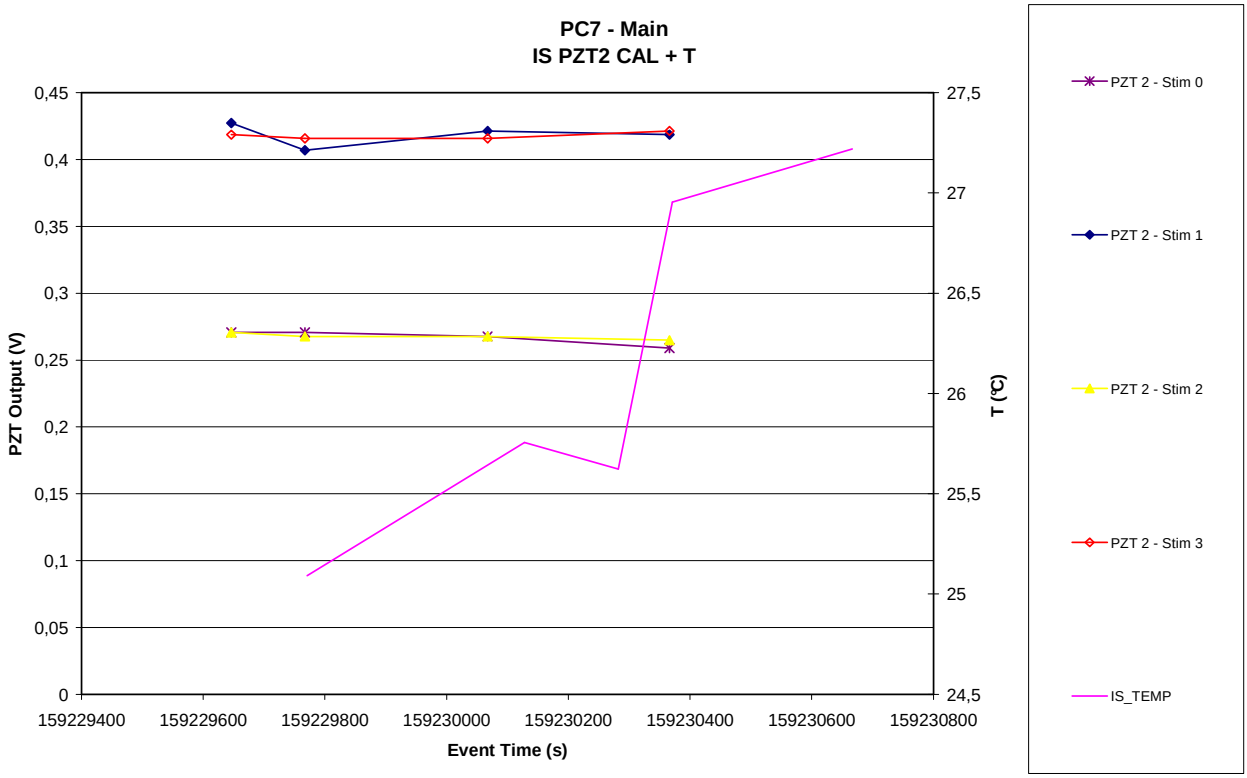


Figure 9.4-21. PZT 3 CAL Signal vs. time - Main

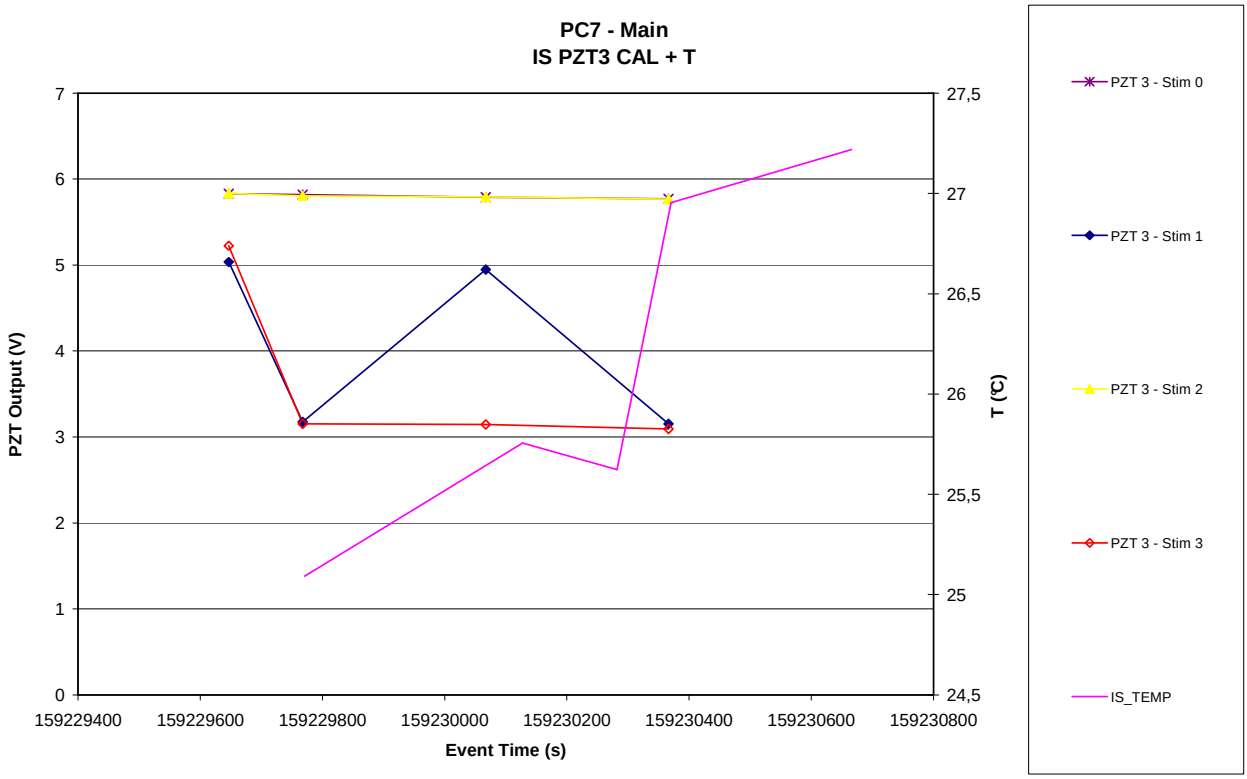


Figure 9.4-22. PZT 4 CAL Signal vs. time - Main

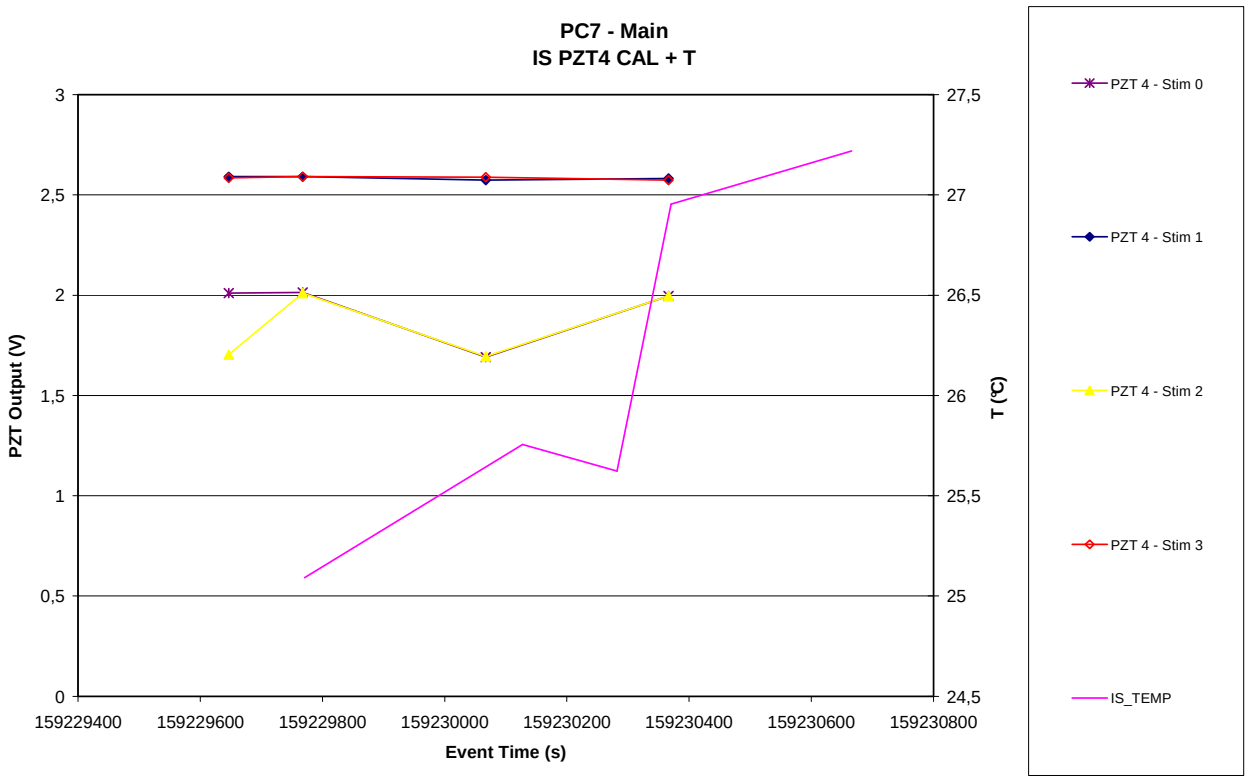


Figure 9.4-23. PZT 5 CAL Signal vs. time - Main

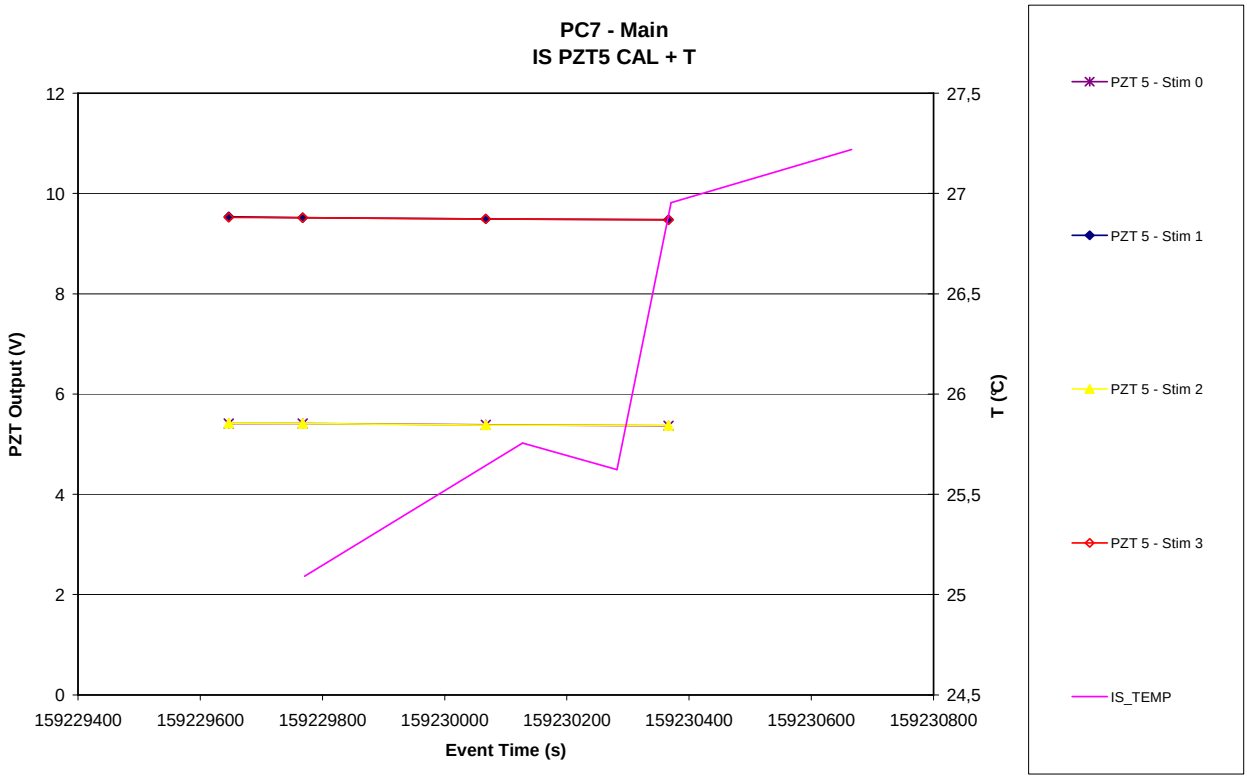


Figure 9.4-24. PZT 1 CAL Time delay vs. time - Main

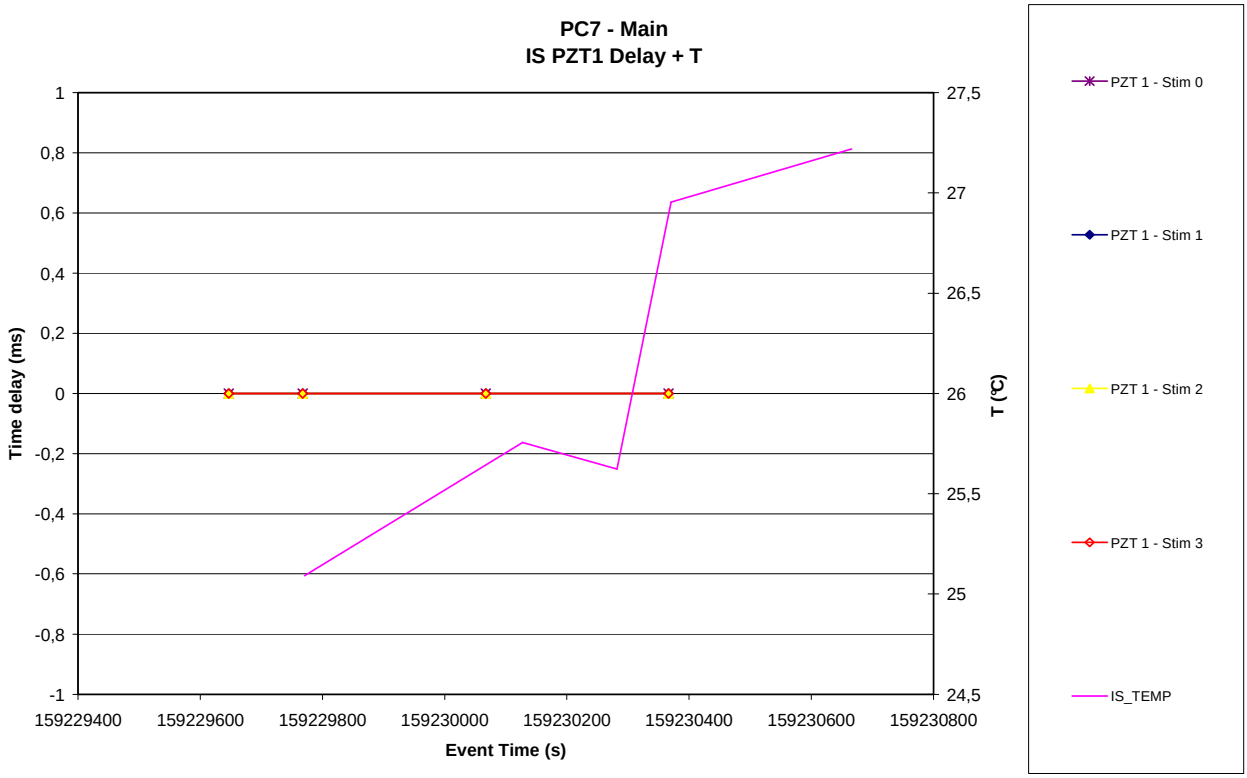


Figure 9.4-25. PZT 2 CAL Time delay vs. time - Main

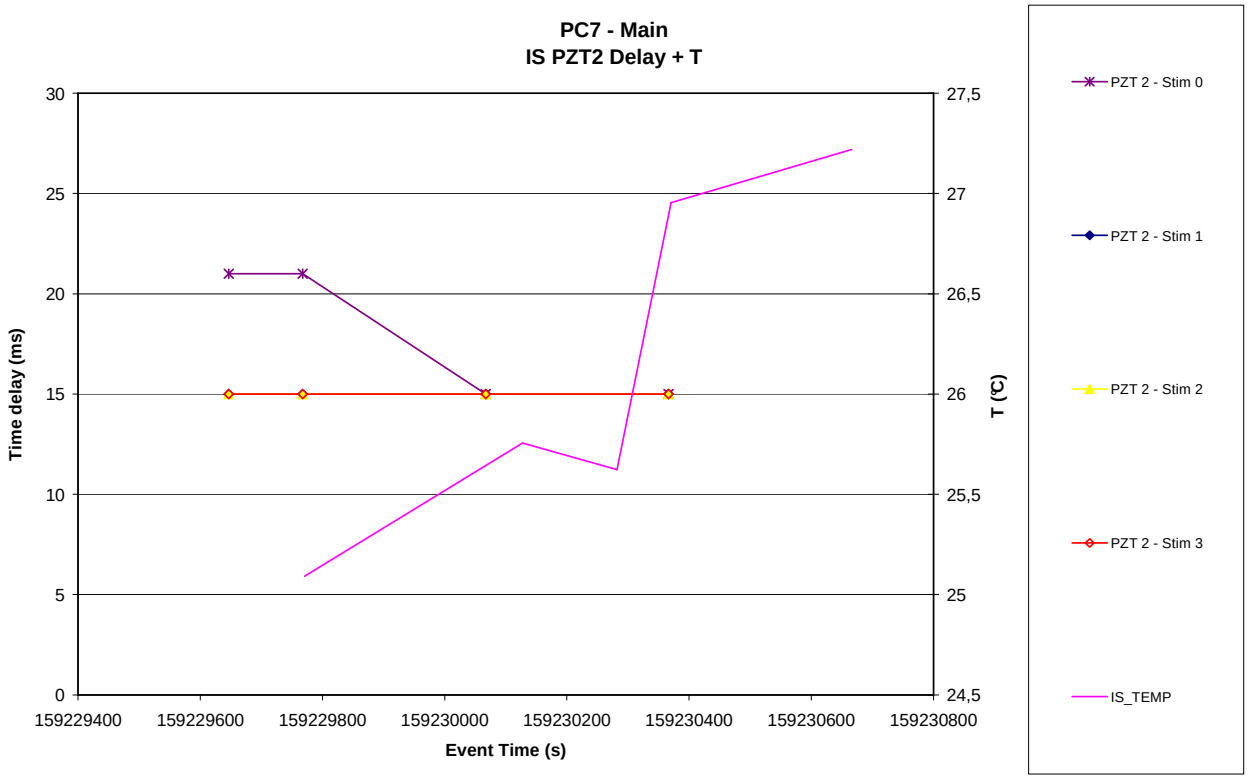


Figure 9.4-26. PZT 3 CAL Time delay vs. time - Main

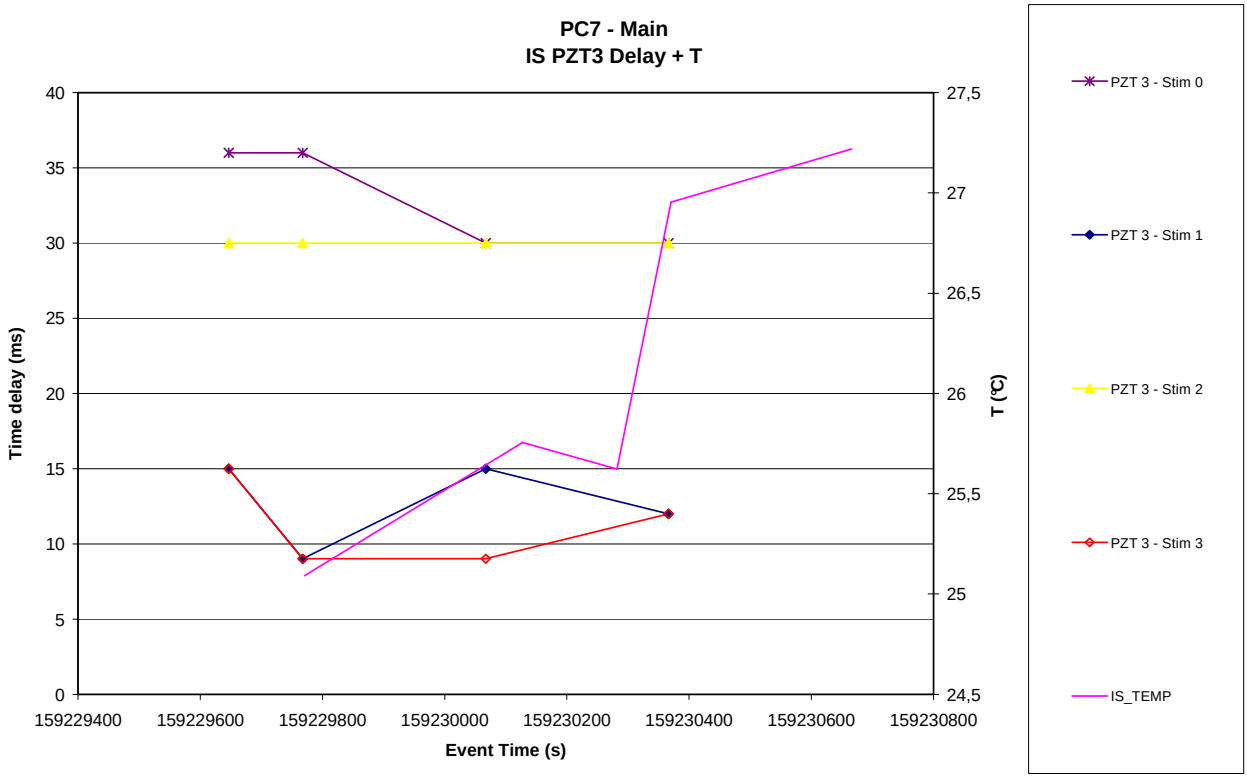


Figure 9.4-27. PZT 4 CAL Time delay vs. time - Main

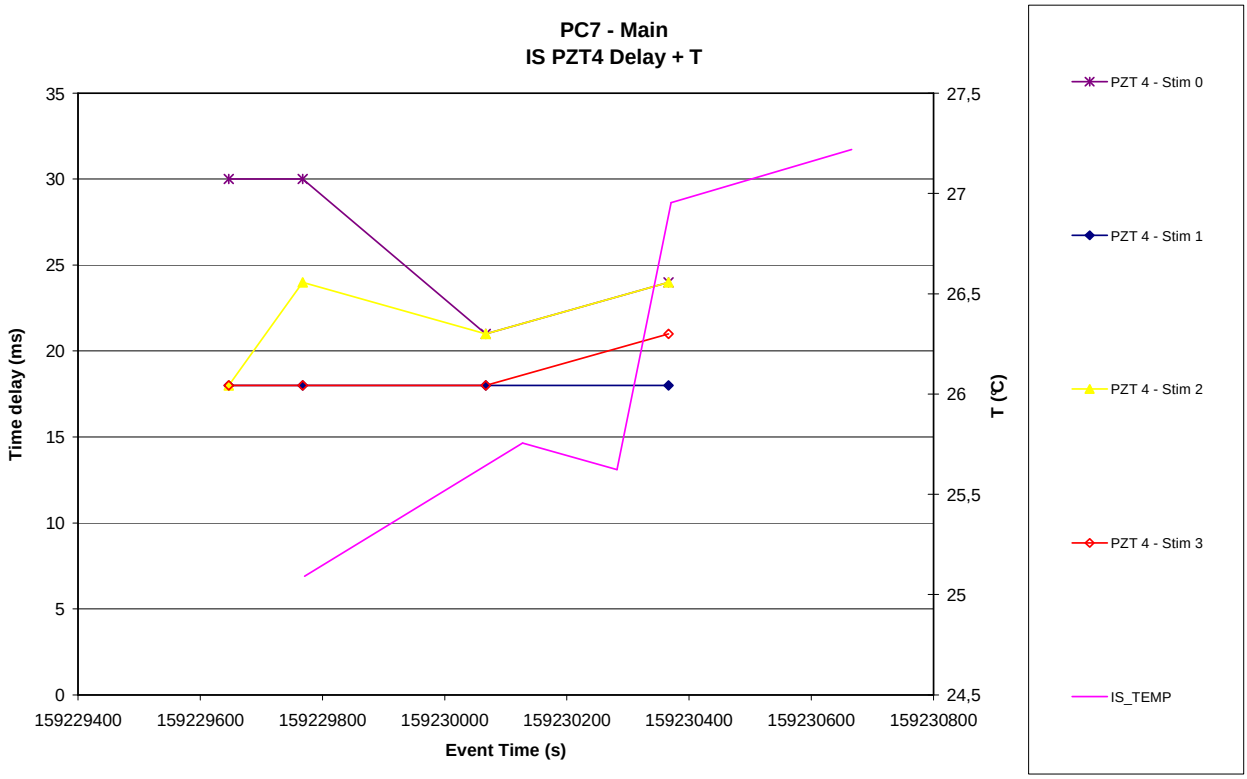


Figure 9.4-28. PZT 5 CAL Time delay vs. time - Main

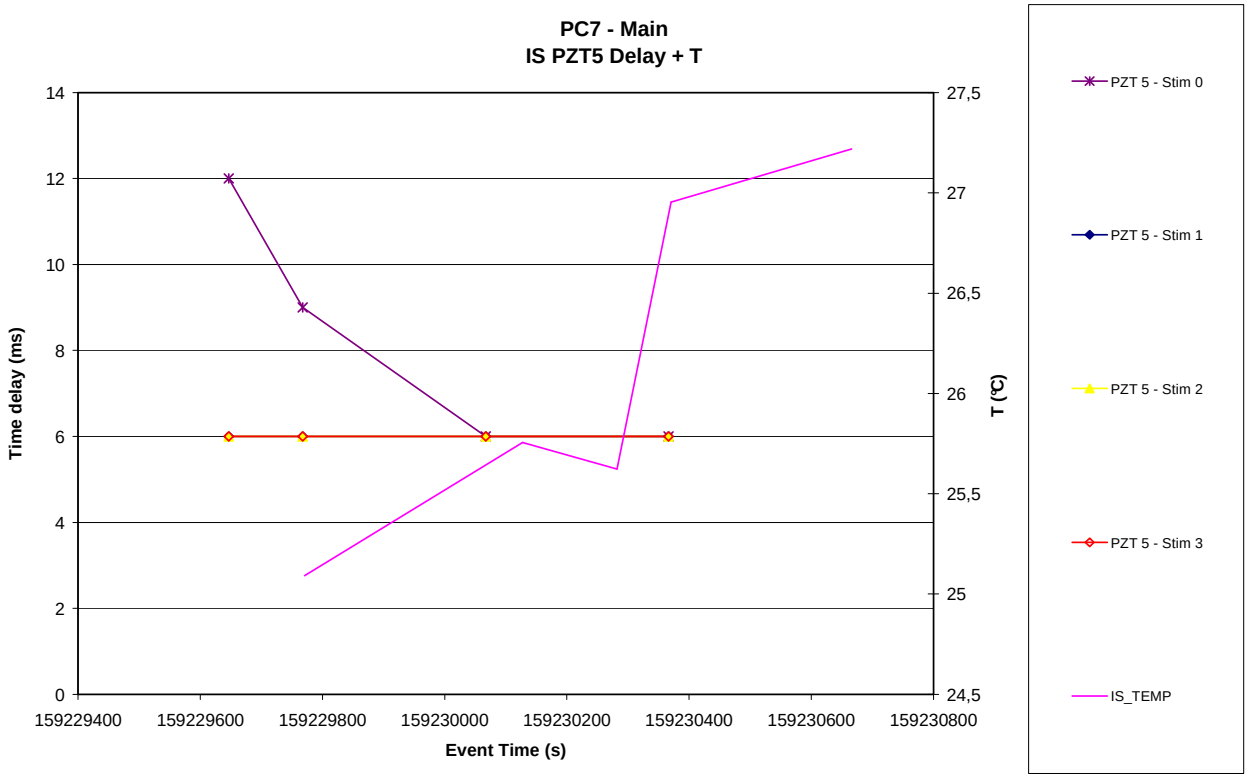


Figure 9.4-29. PZT 1 CAL Signal vs. stimulus – Main

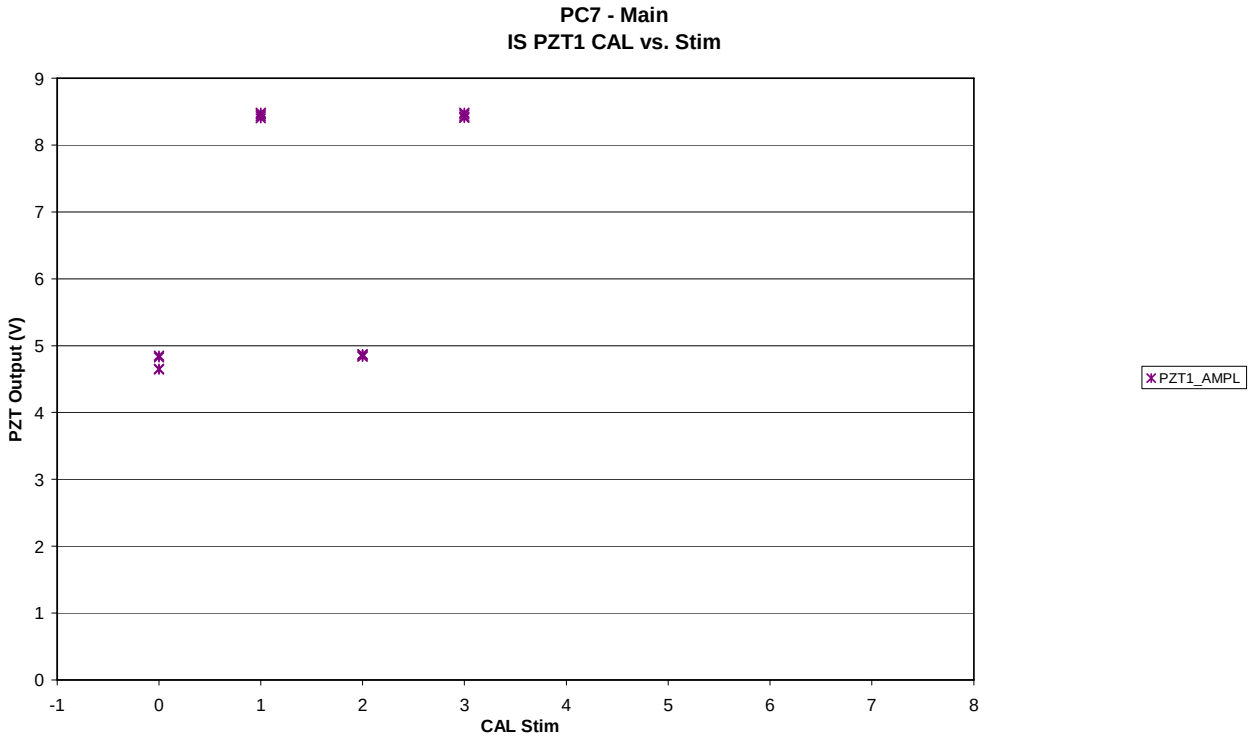


Figure 9.4-30. PZT 2 CAL Signal vs. stimulus – Main

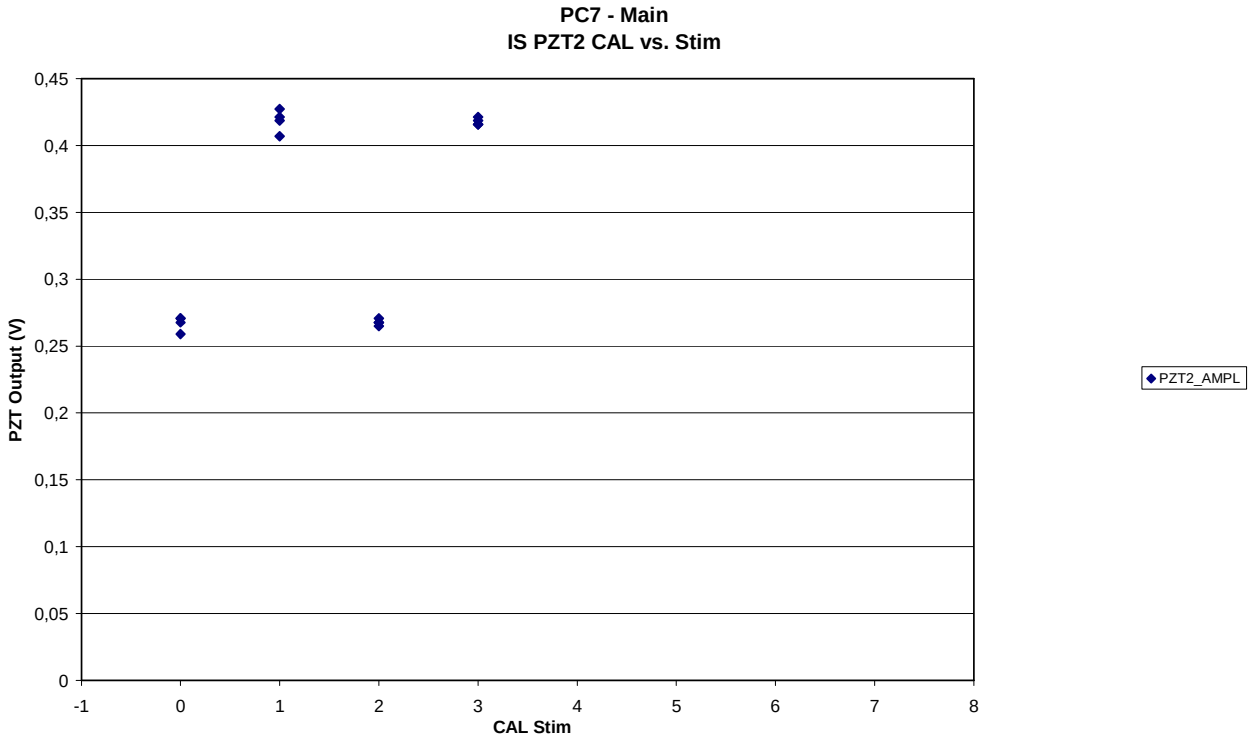


Figure 9.4-31. PZT 3 CAL Signal vs. stimulus – Main

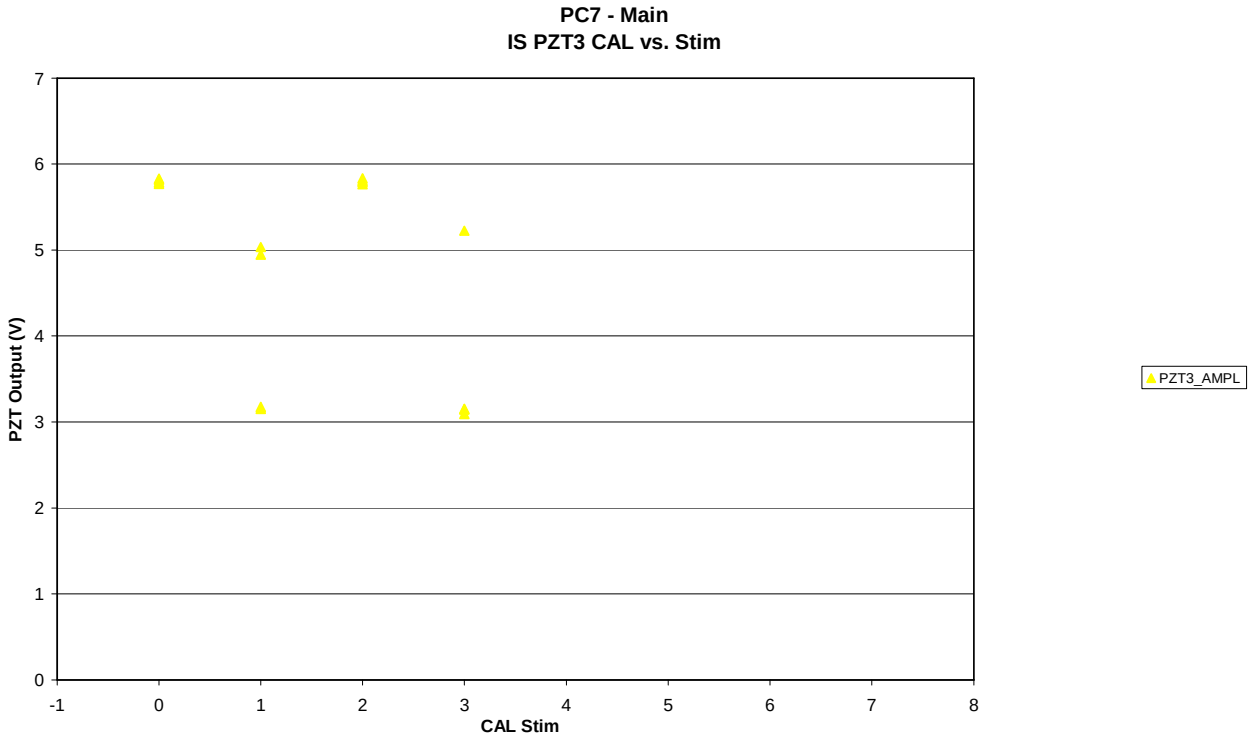


Figure 9.4-32. PZT 4 CAL Signal vs. stimulus – Main

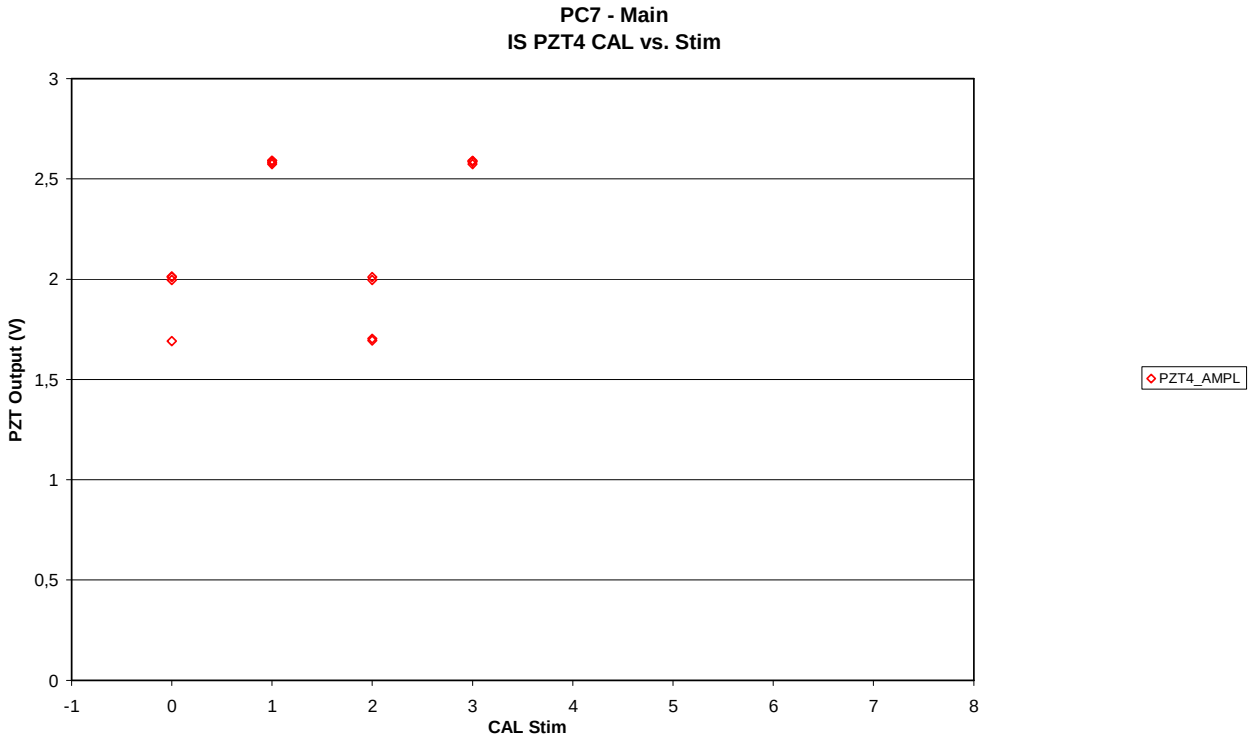


Figure 9.4-33. PZT 5 CAL Signal vs. stimulus – Main

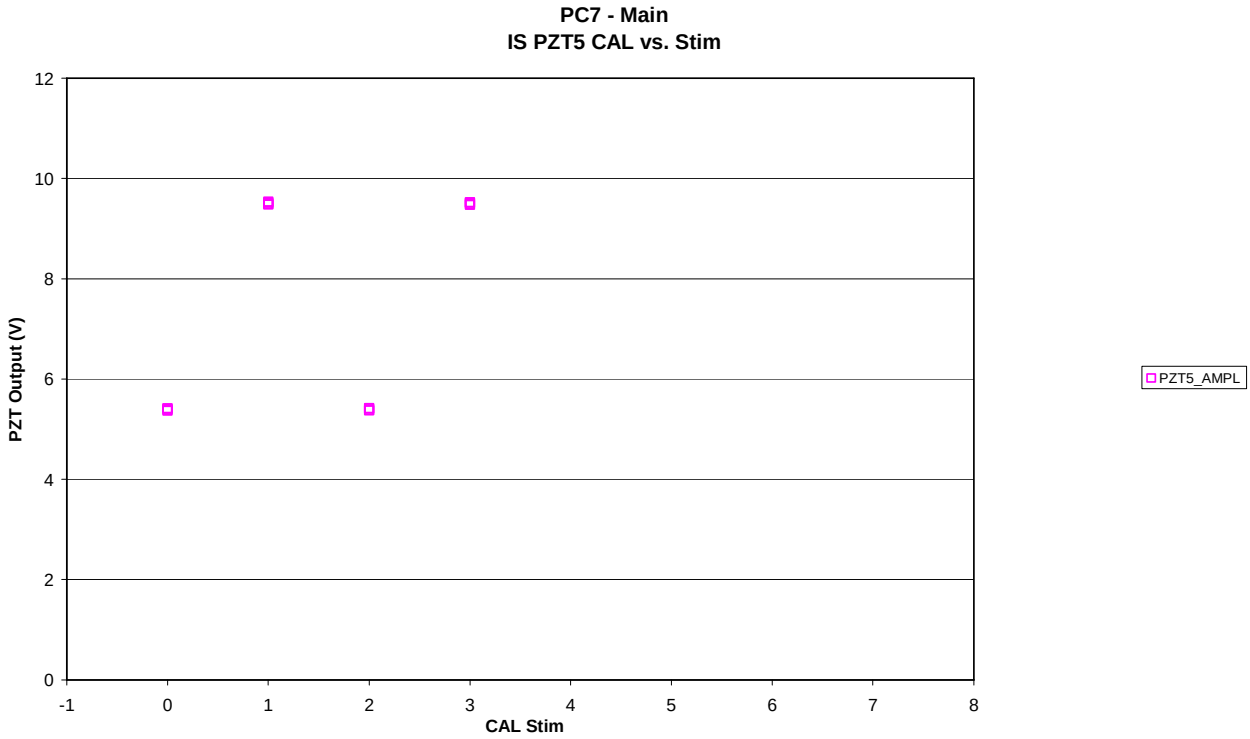


Figure 9.4-34. PZT 1 CAL Time delay vs. stimulus – Main

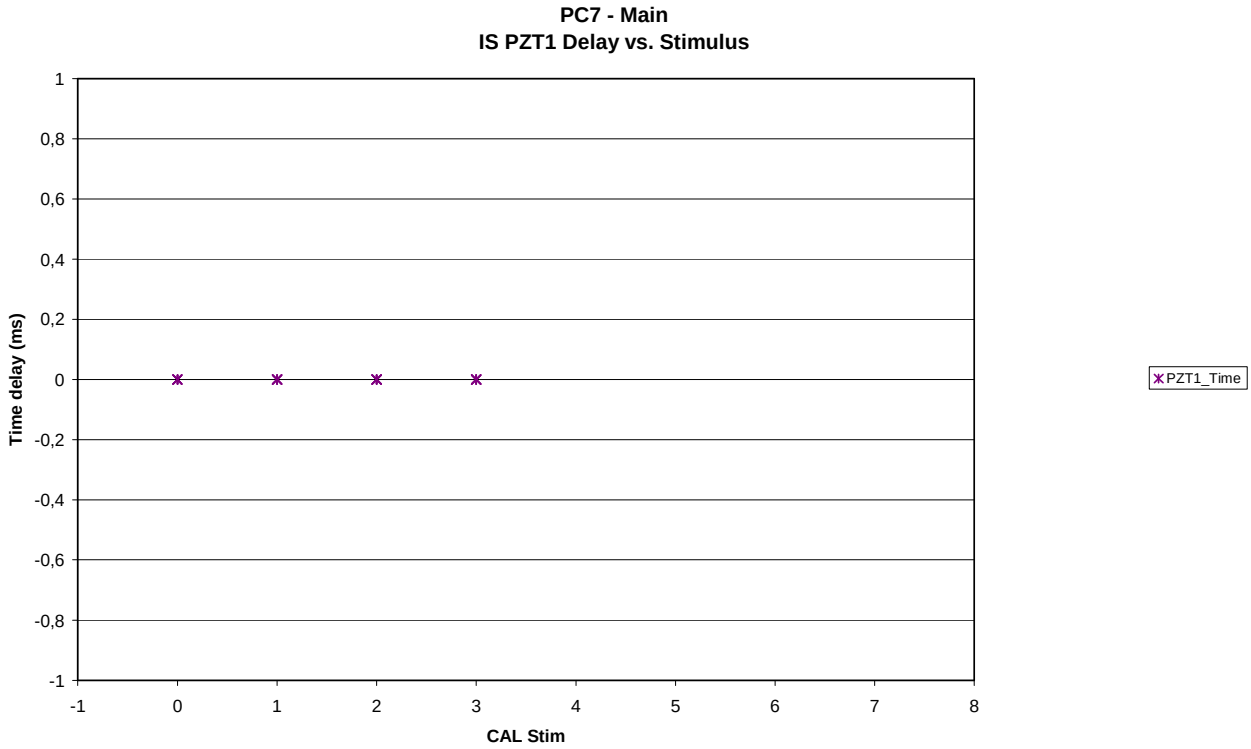


Figure 9.4-35. PZT 2 CAL Time delay vs. stimulus - Main

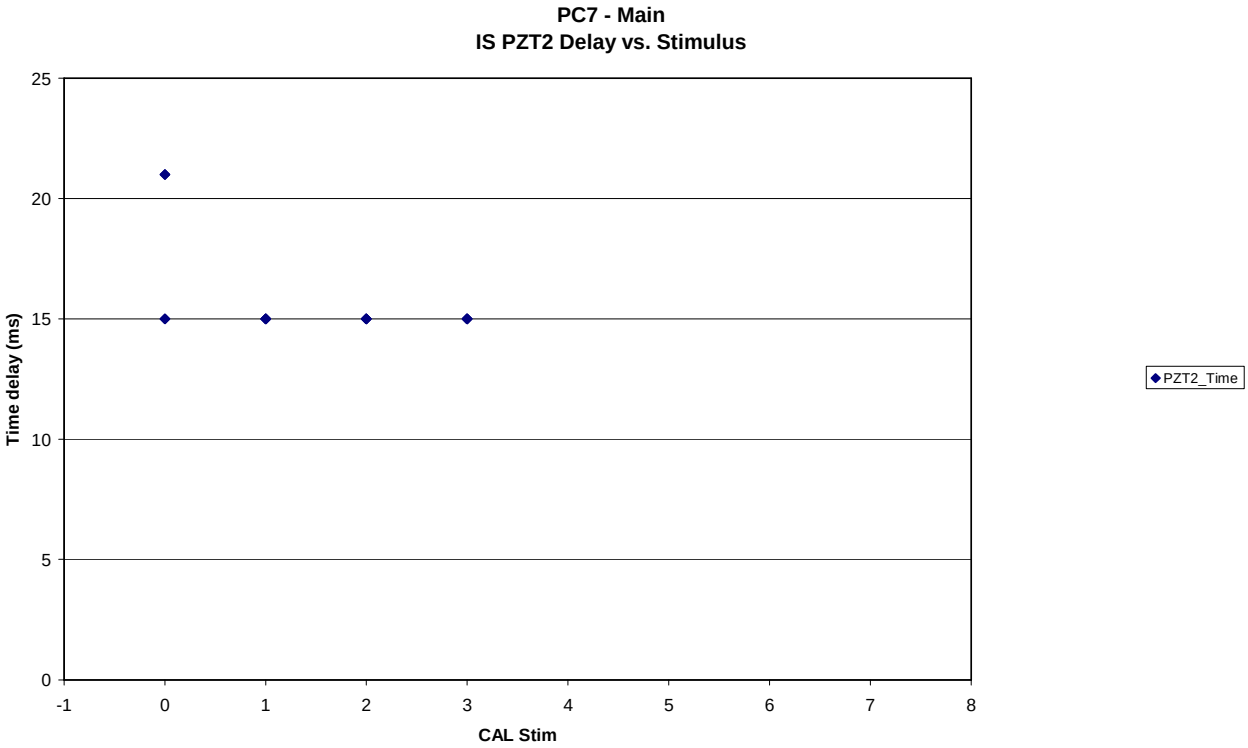


Figure 9.4-36. PZT 3 CAL Time delay vs. stimulus - Main

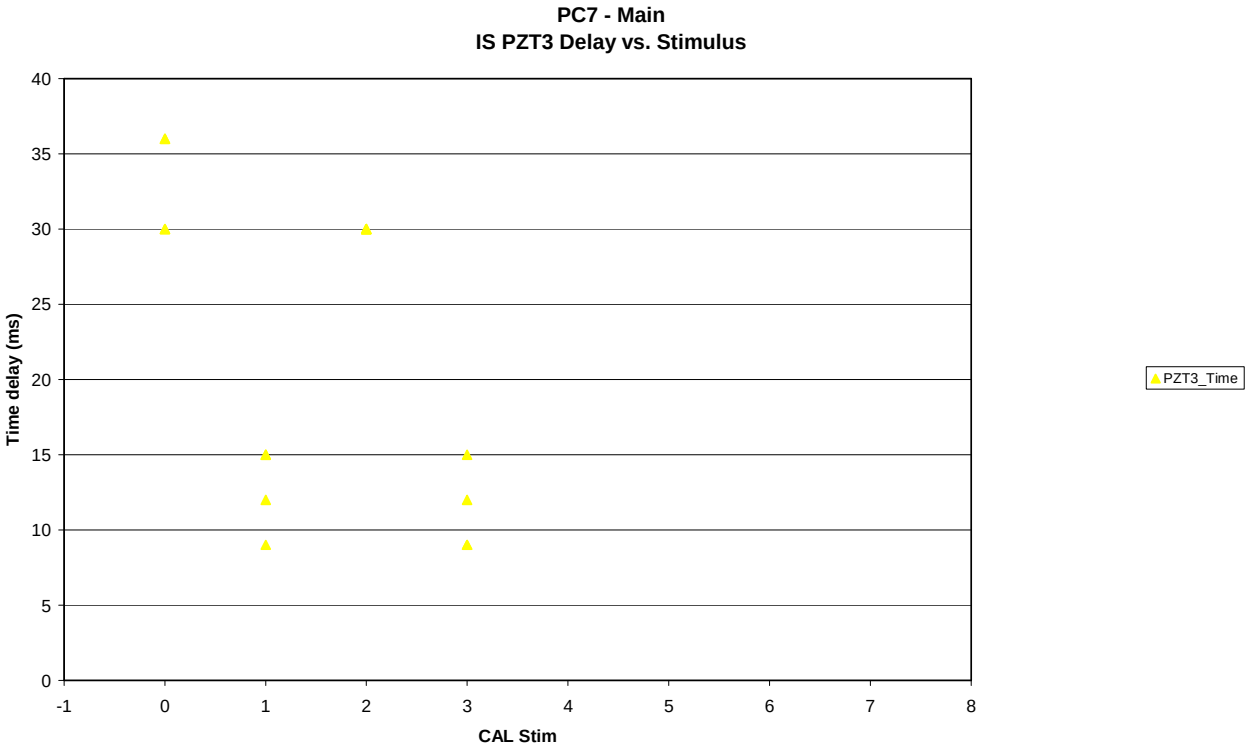


Figure 9.4-37. PZT 4 CAL Time delay vs. stimulus - Main

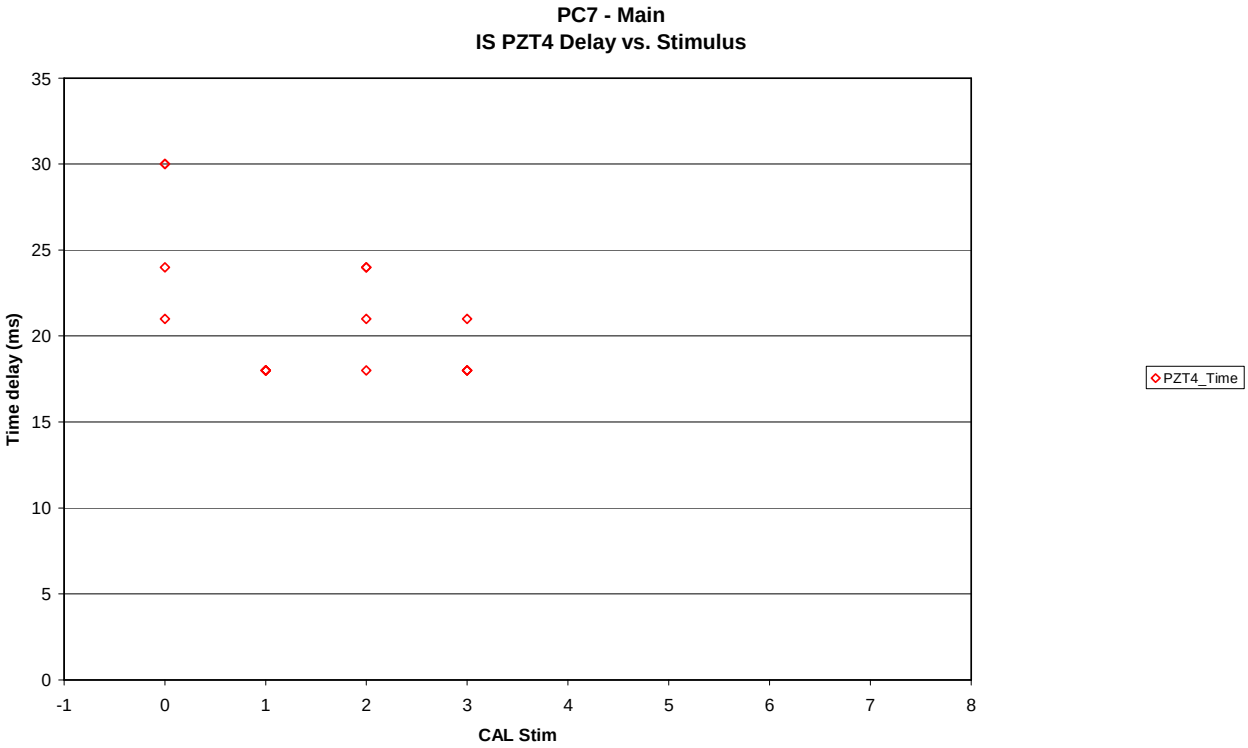
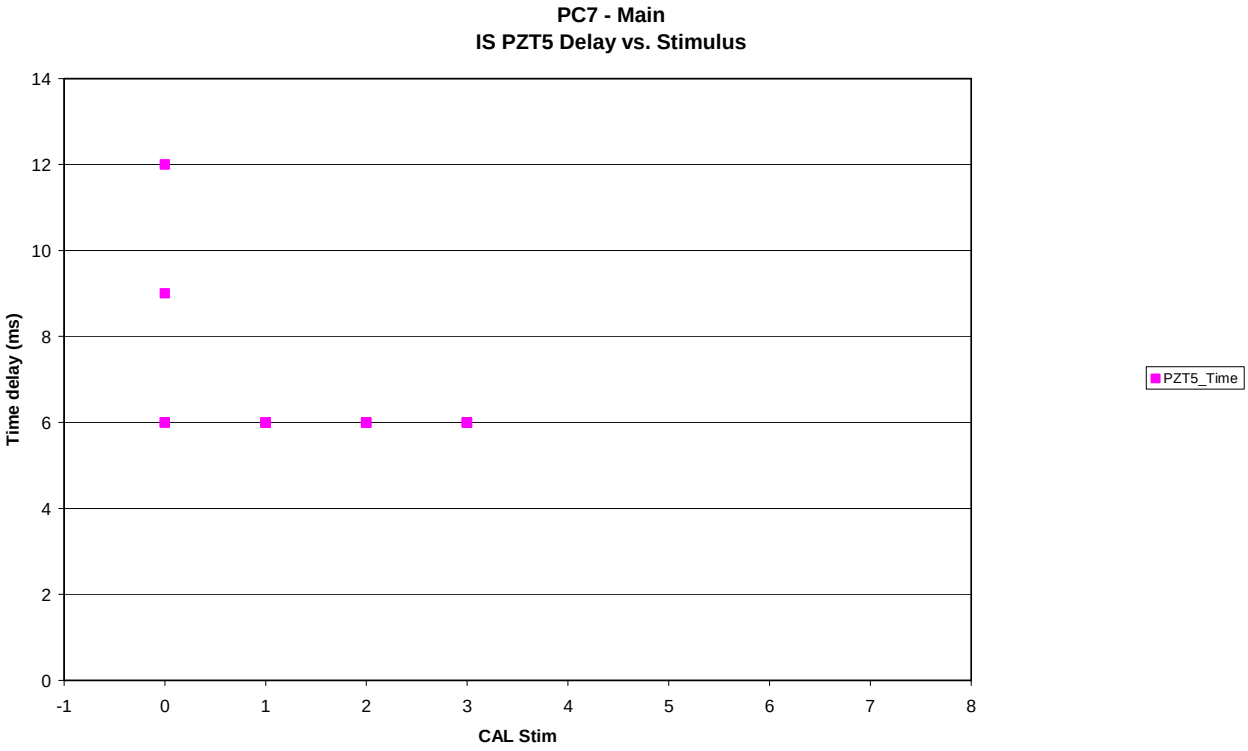


Figure 9.4-38. PZT 5 CAL Time delay vs. stimulus - Main



9.5 MICRO BALANCE SYSTEM (MBS)

9.5.1 MBS – Status

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

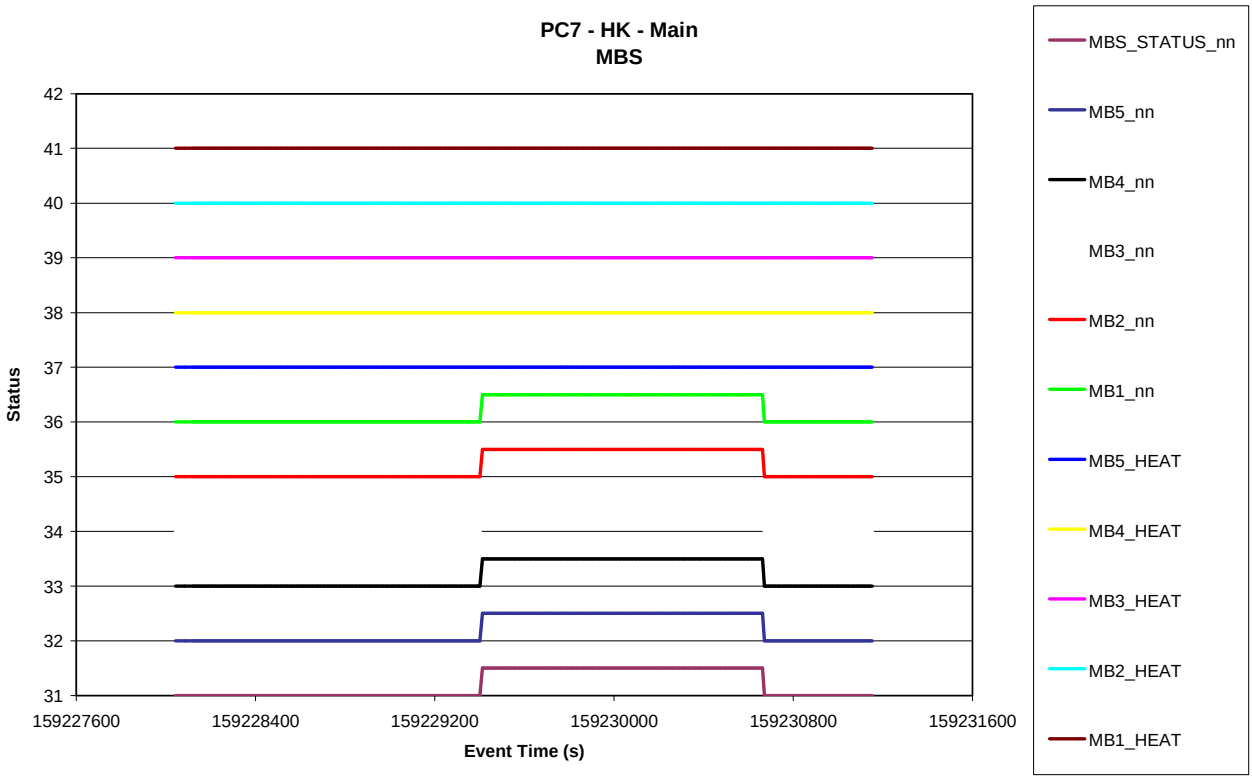


Figure 9.5-2. MBS 1 Temperature vs. time (HK, HK-SCI, SCI) – Main

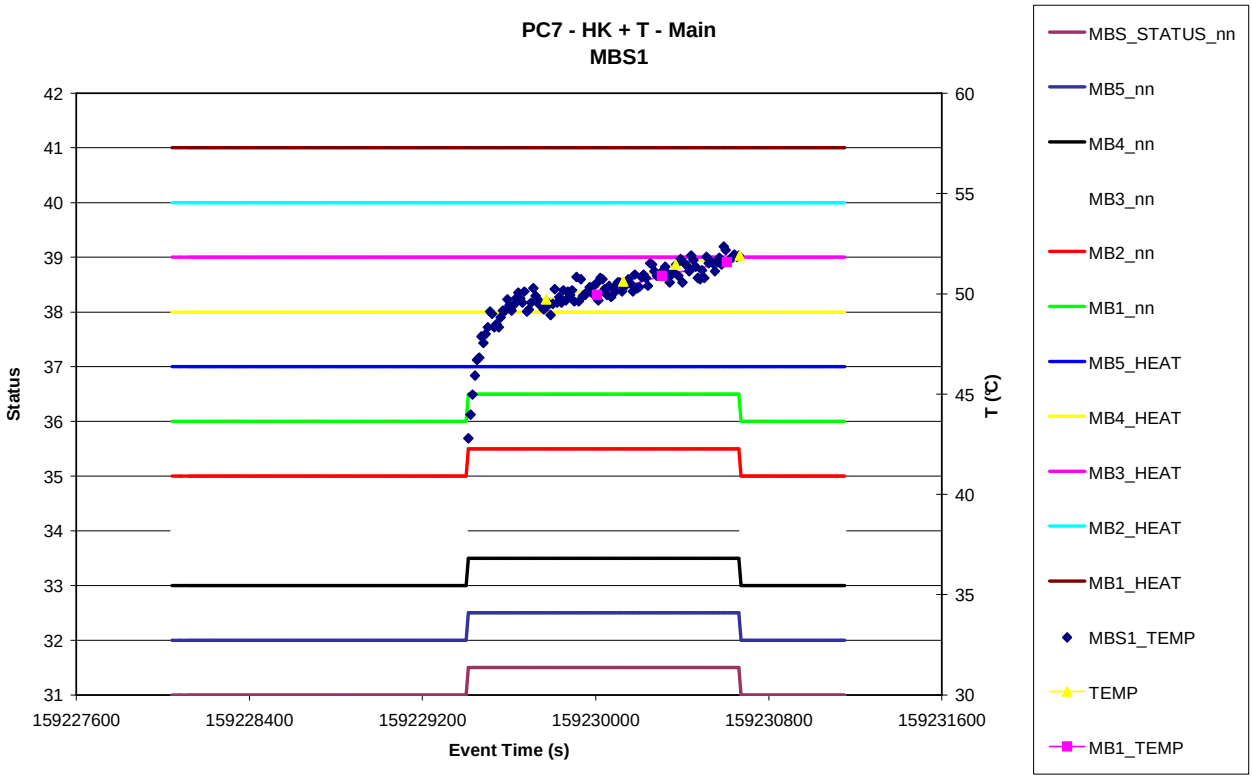


Figure 9.5-3. MBS 2 Temperature vs. time (HK, HK-SCI, SCI) - Main

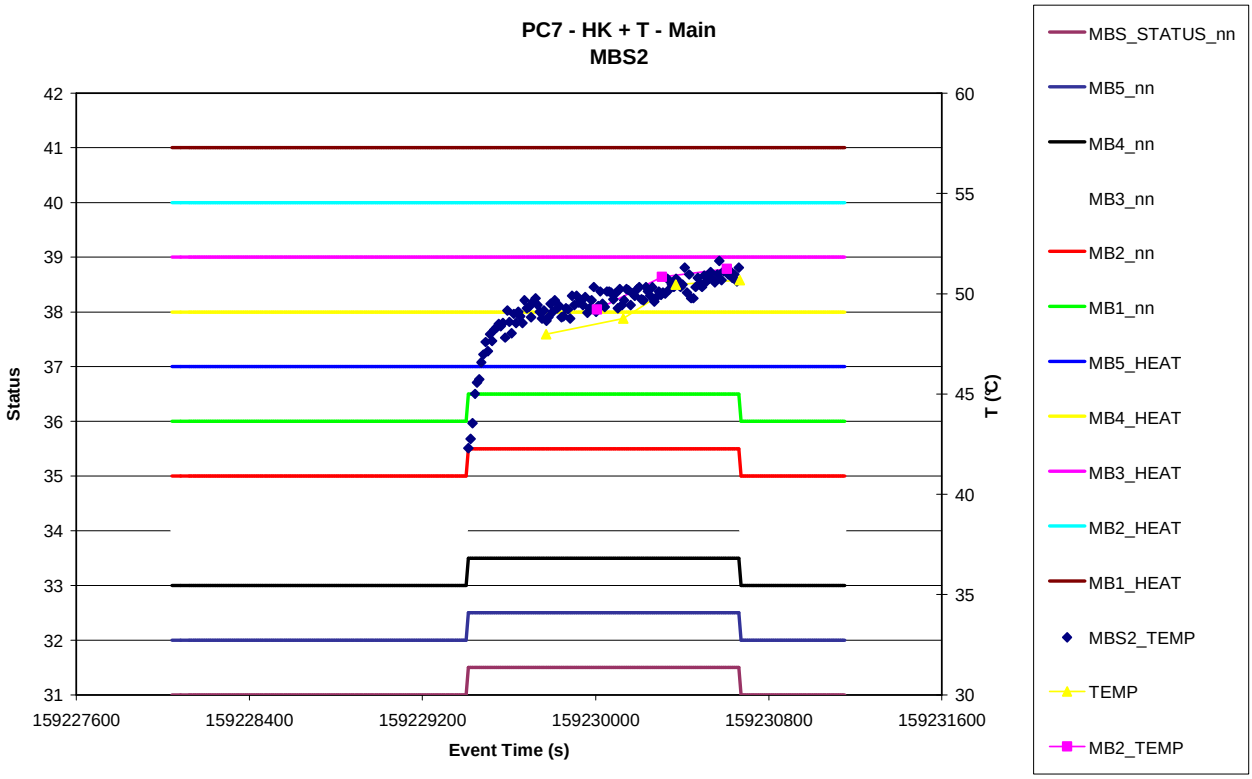


Figure 9.5-4. MBS 3 Temperature vs. time (HK, HK-SCI, SCI) - Main

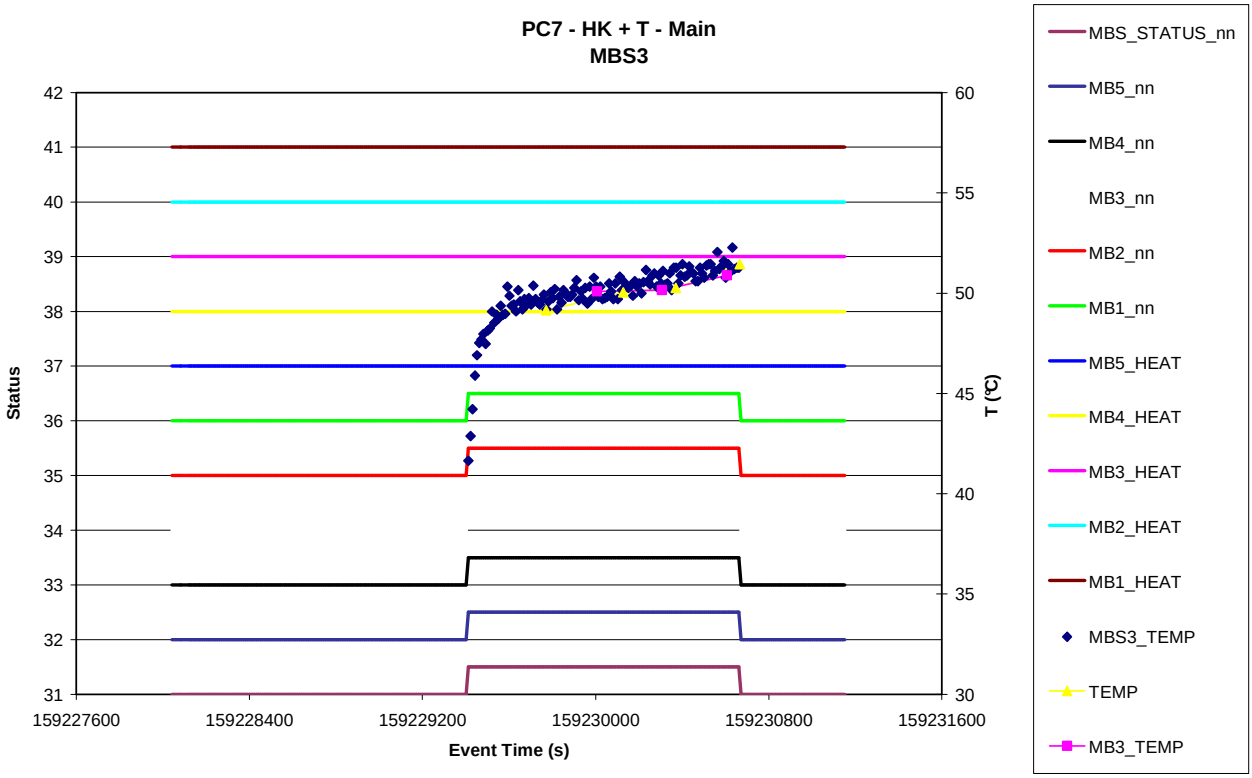


Figure 9.5-5. MBS 4 Temperature vs. time (HK, HK-SCI, SCI) - Main

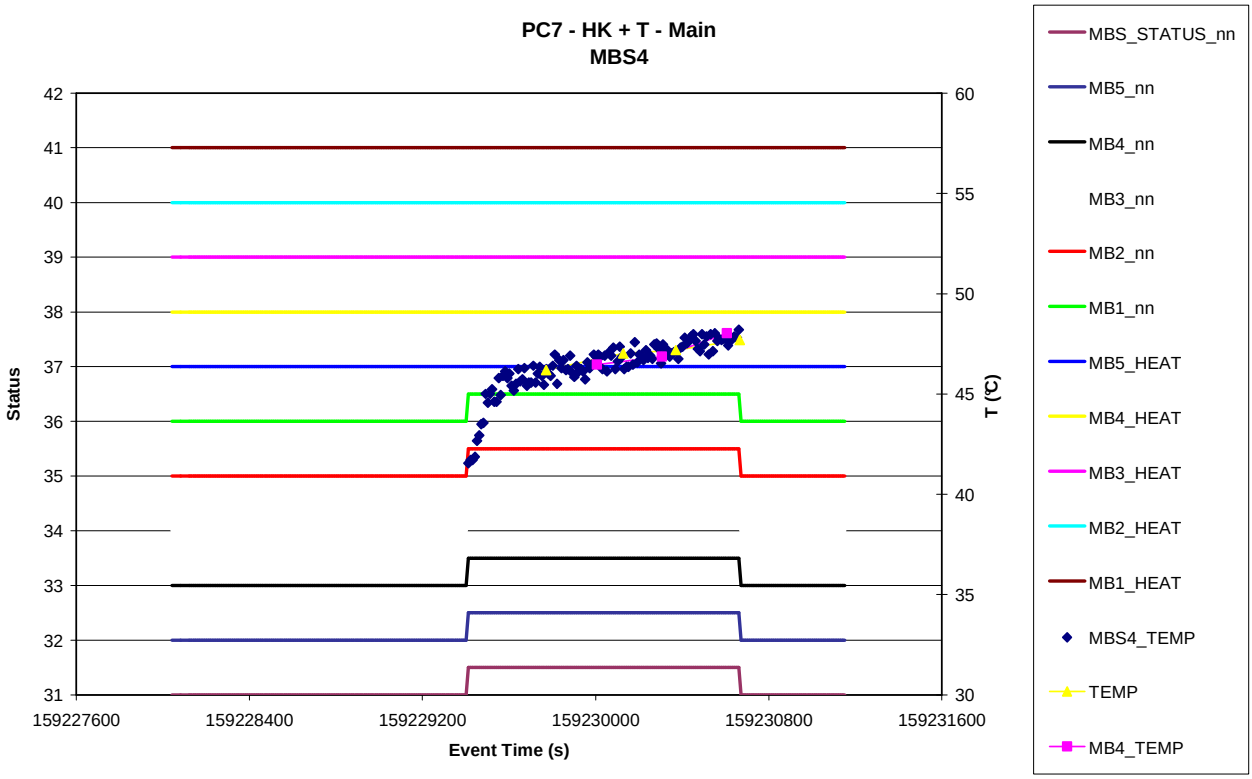
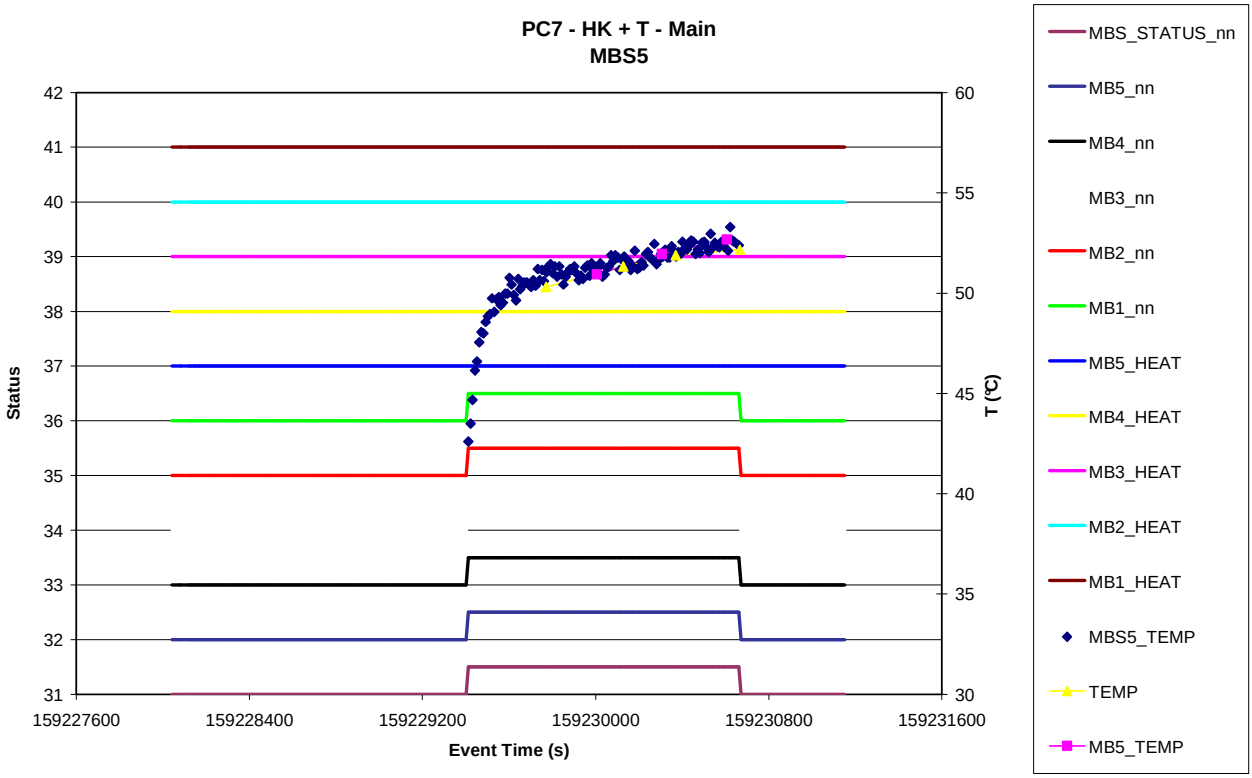


Figure 9.5-6. MBS 5 Temperature vs. time (HK, HK-SCI, SCI) - Main



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

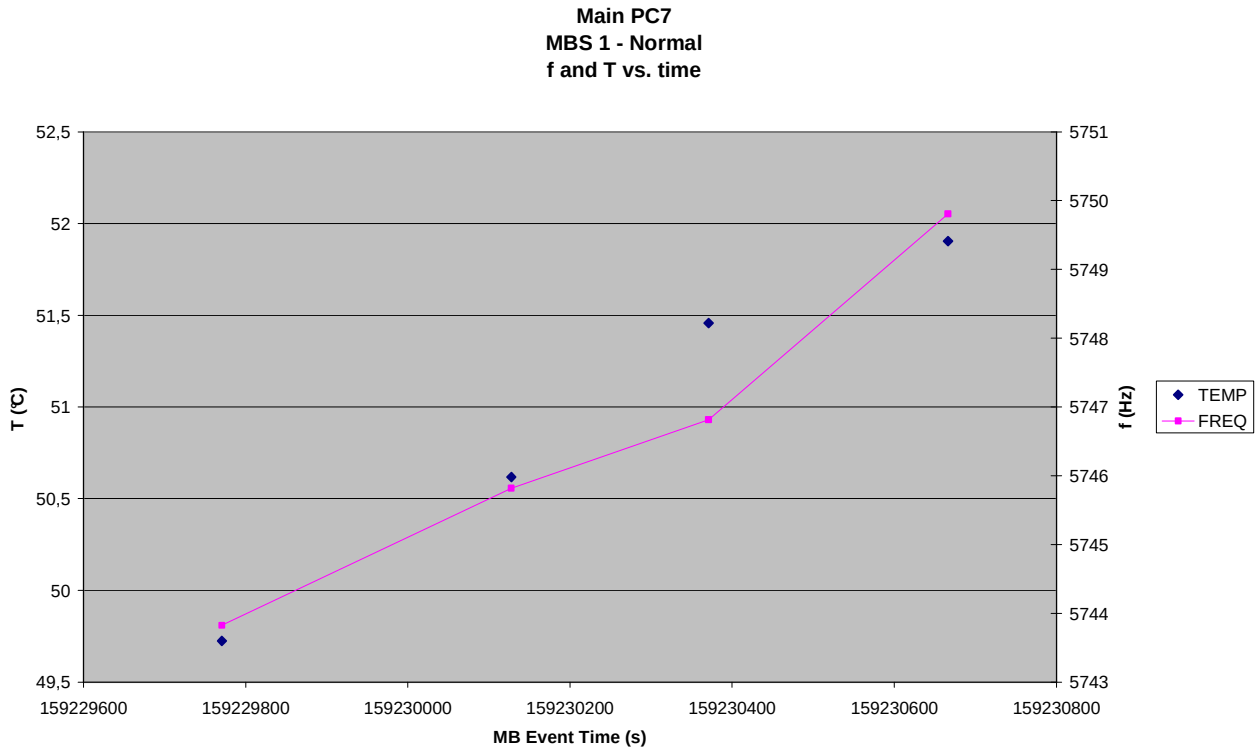


Figure 9.5-8. MBS 2 Frequency and Temperature vs. time - Main

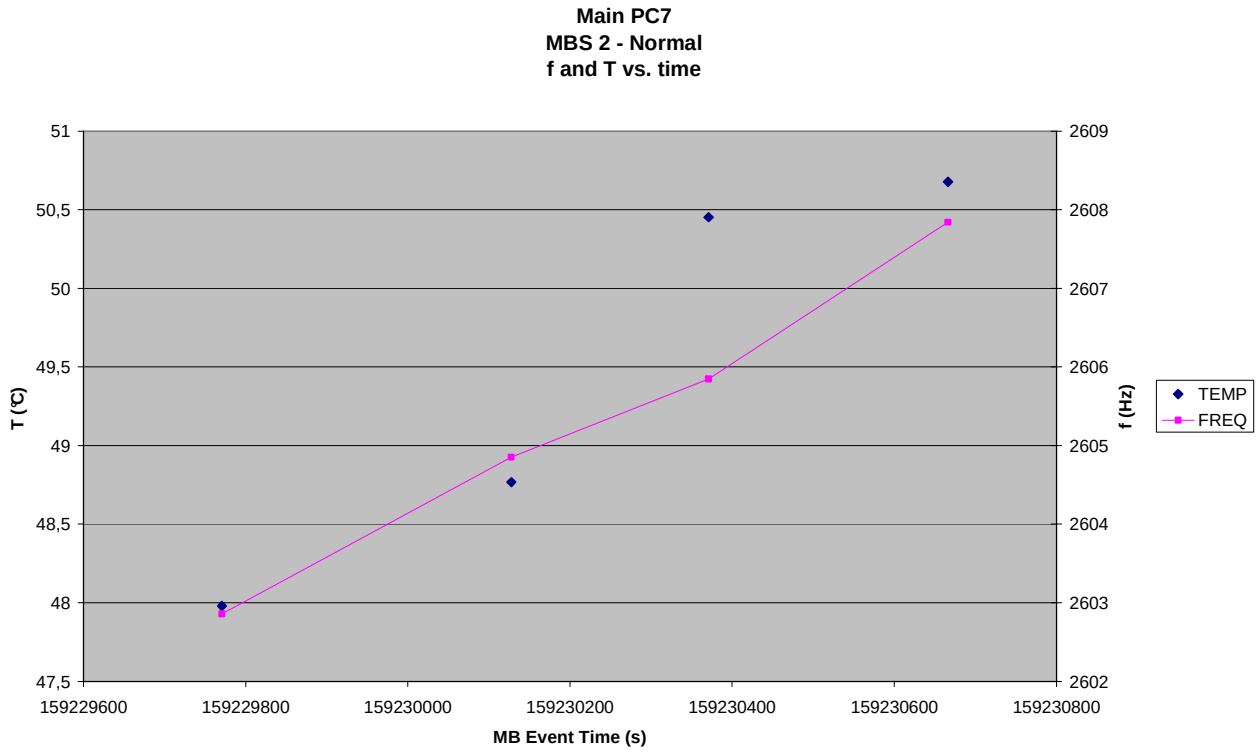


Figure 9.5-9. MBS 3 Frequency and Temperature vs. time - Main

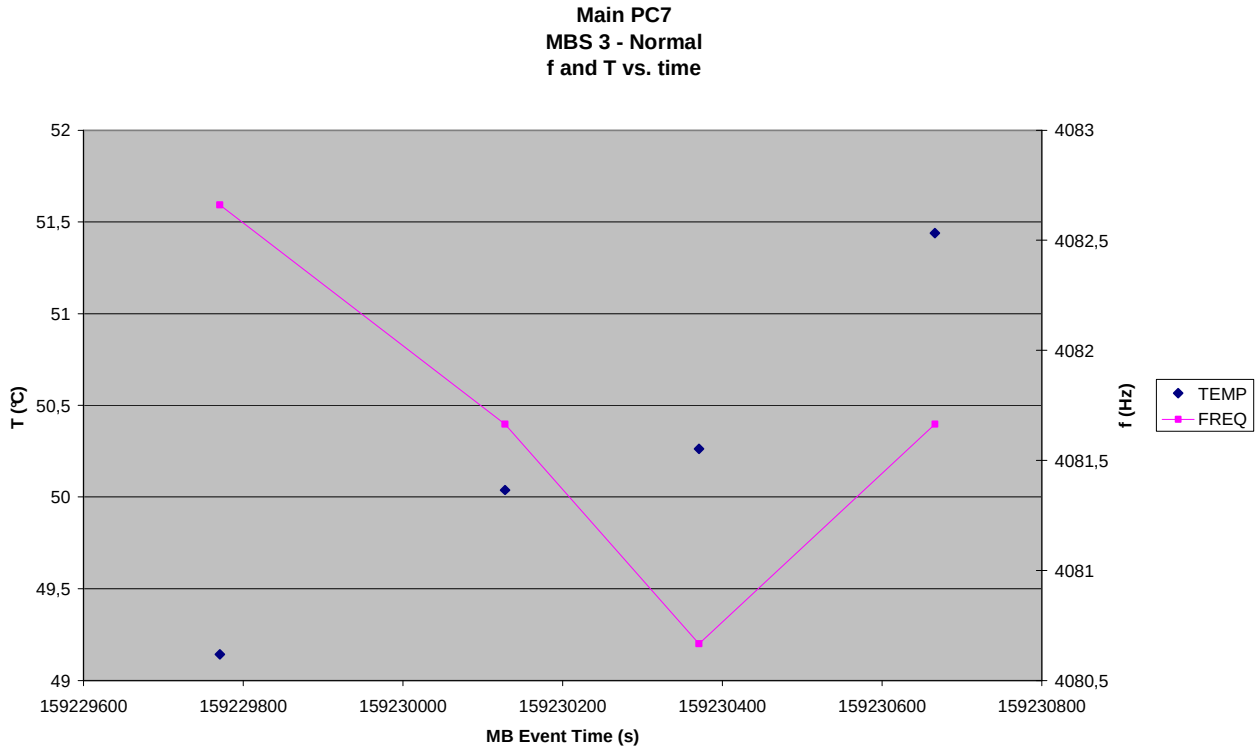


Figure 9.5-10. MBS 4 Frequency and Temperature vs. time - Main

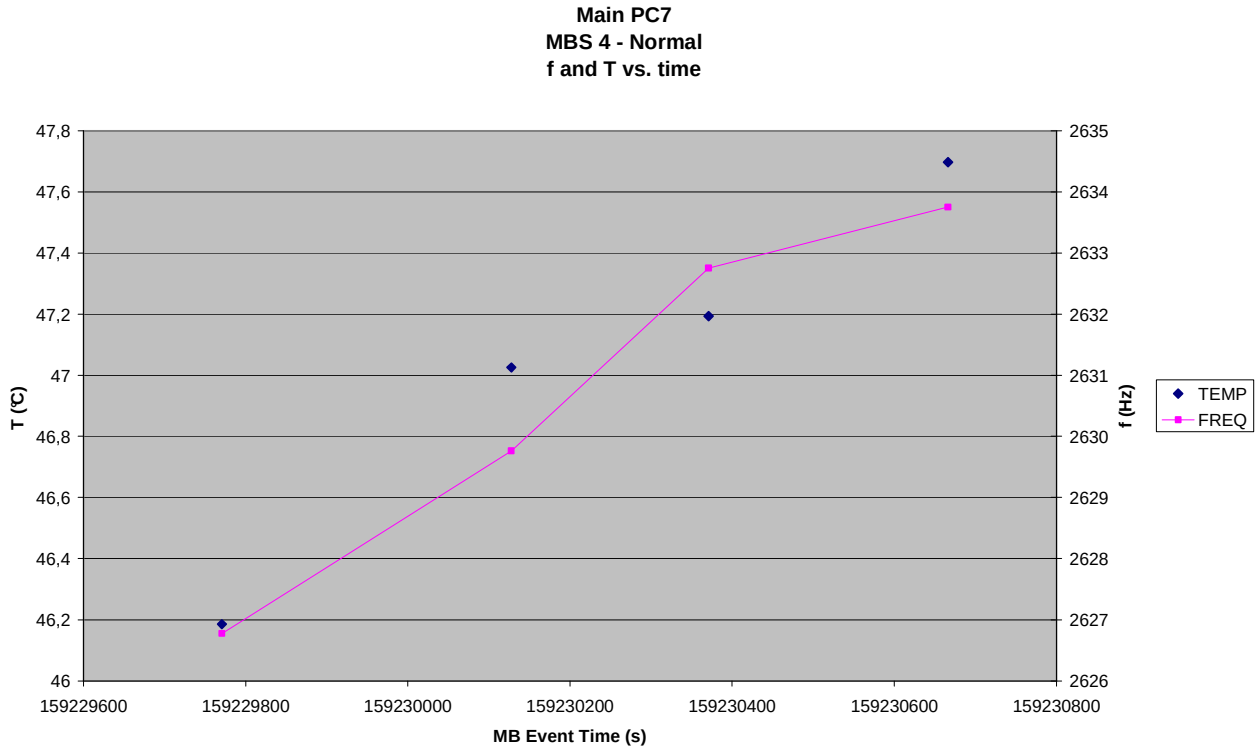
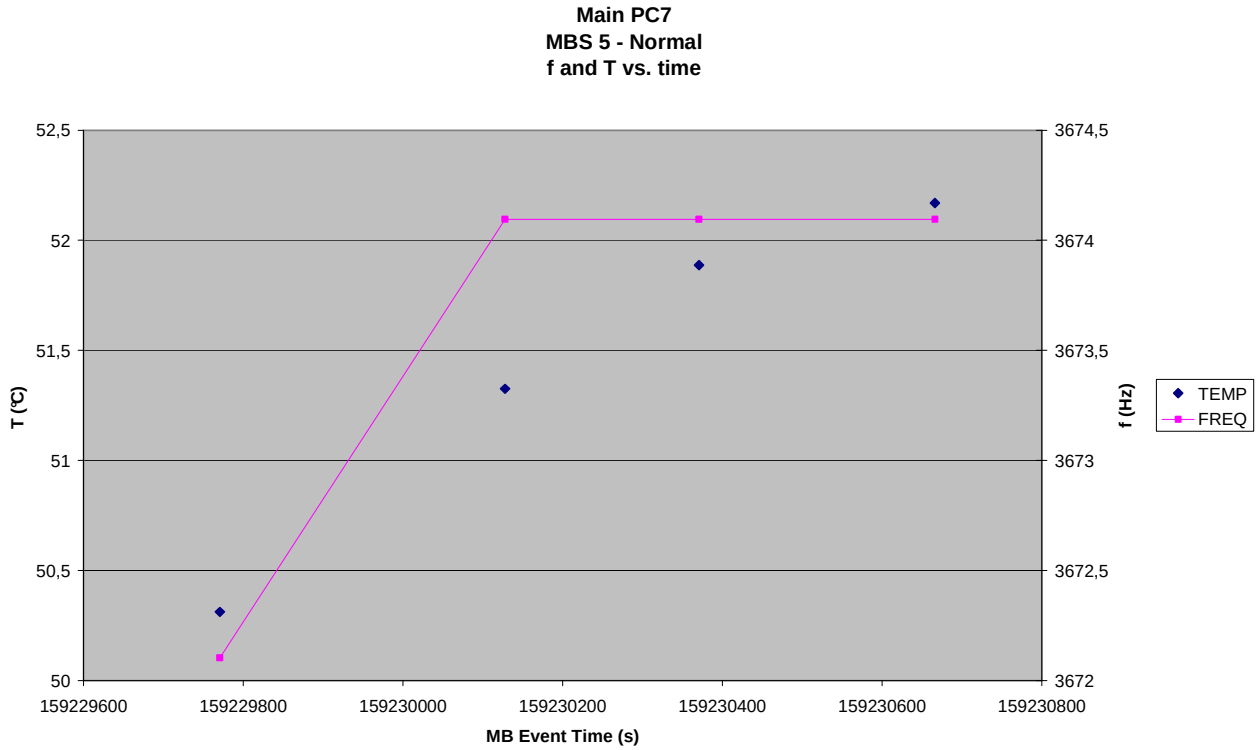


Figure 9.5-11. MBS 5 Frequency and Temperature vs. time - Main



10. COMPARISIONS WITH PREVIOUS TESTS

10.1 GRAIN DETECTION SYSTEM (GDS)

10.1.1 Laser Light Mon vs. Temperature

Figure 10.1-1. GDS Laser 1 Light Mon vs. Temperature (PC7 in orange)

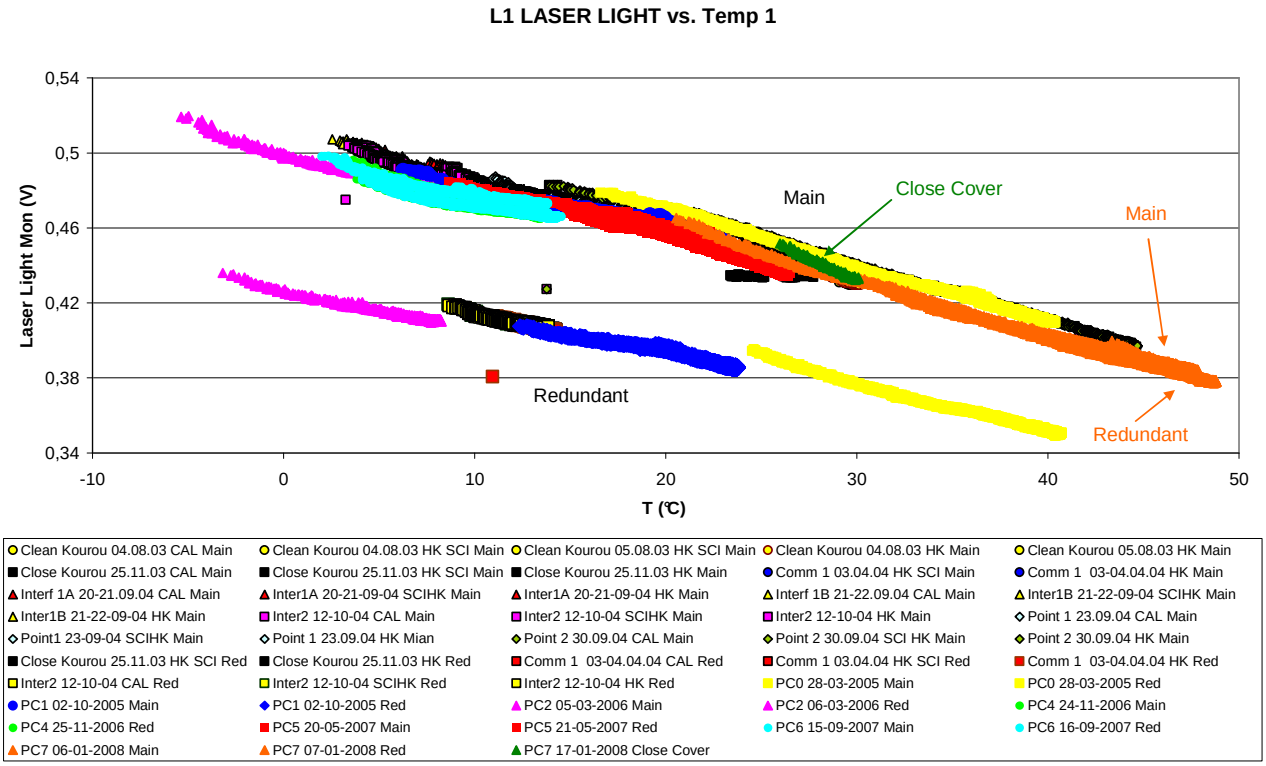


Figure 10.1-2. GDS Laser 2 Light Mon vs. Temperature (PC7 in orange)

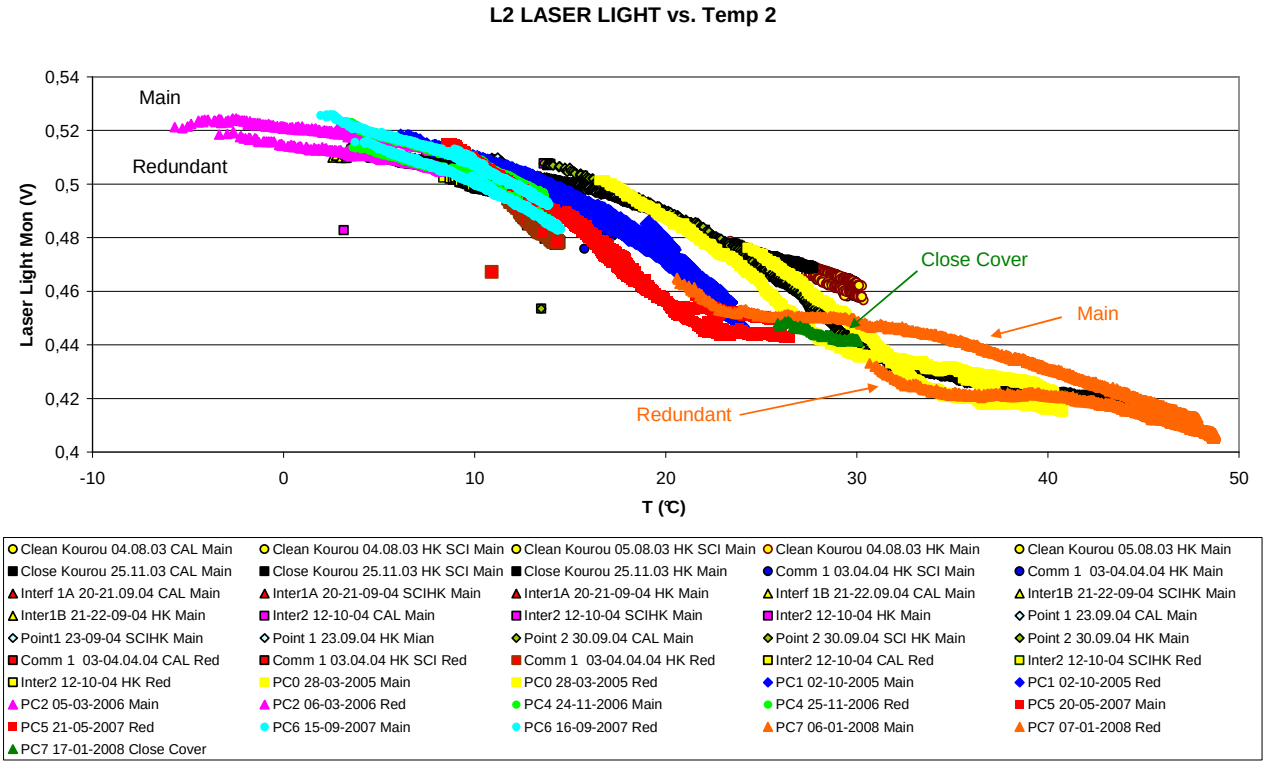


Figure 10.1-3. GDS Laser 3 Light Mon vs. Temperature (PC7 in orange)

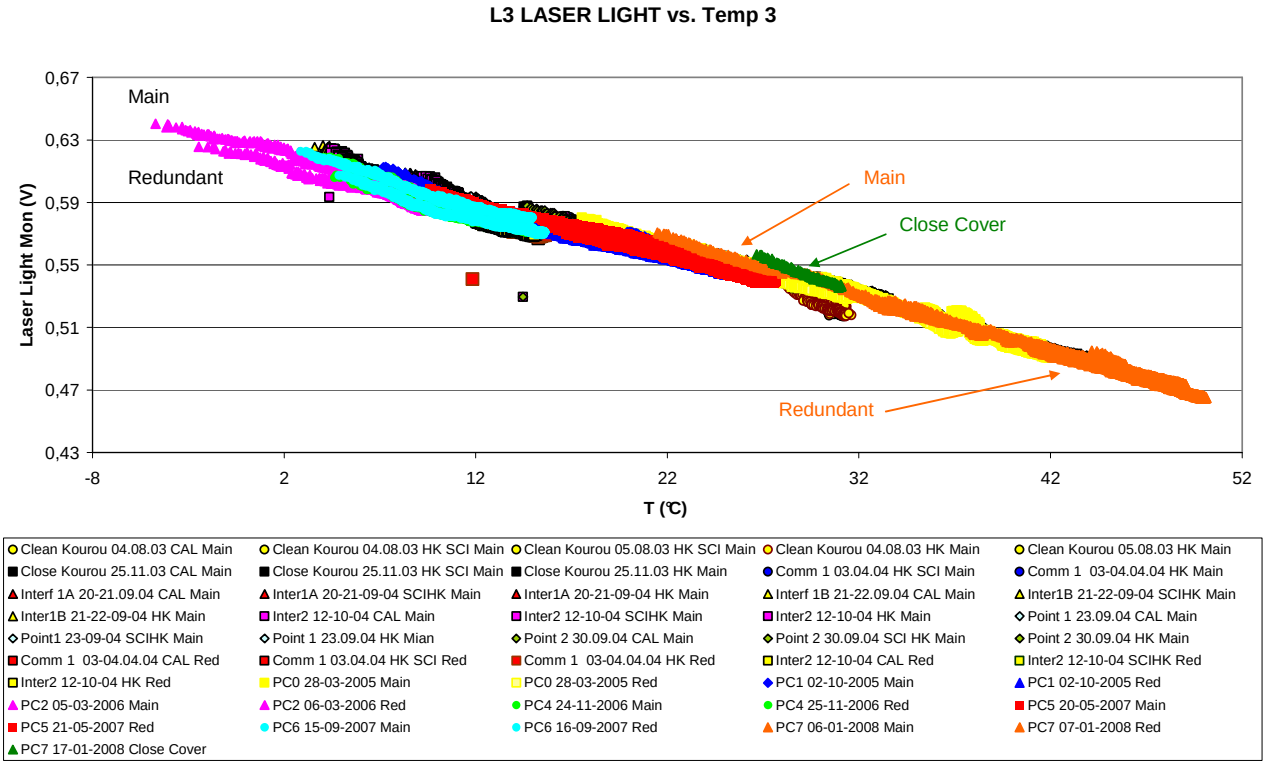
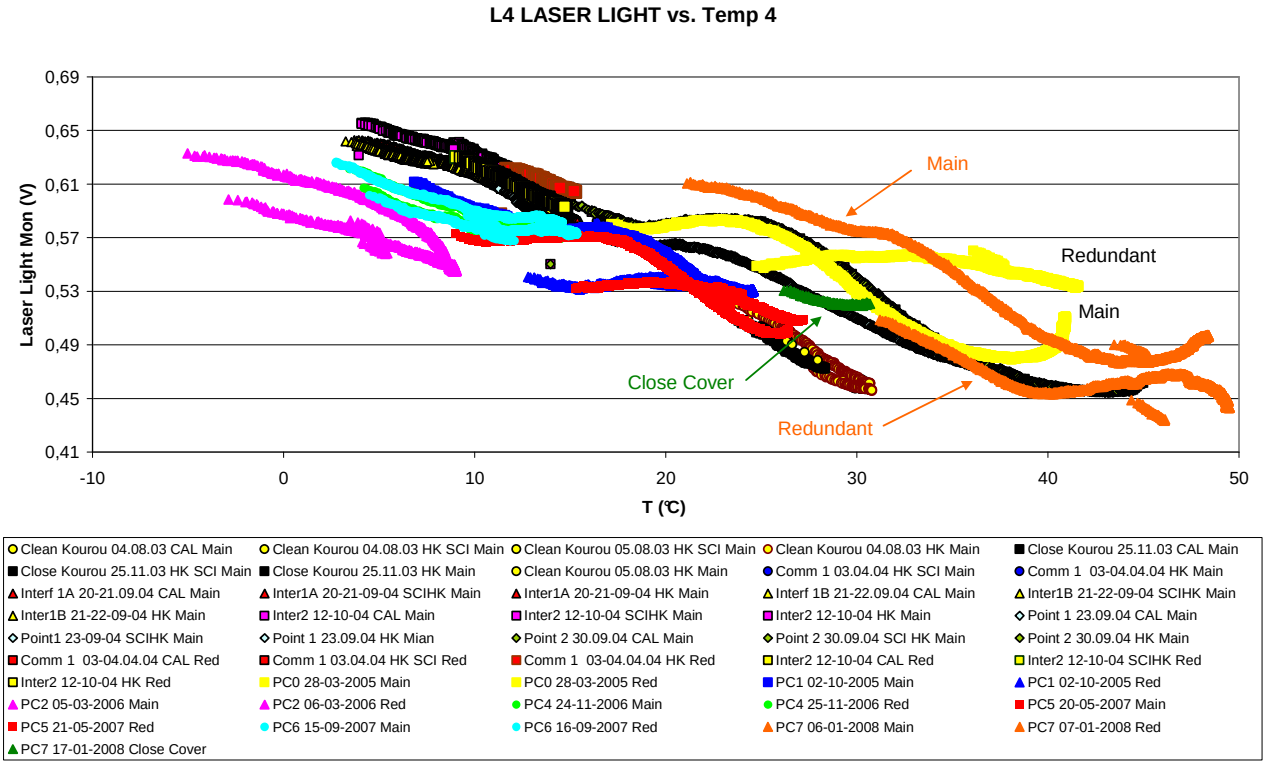


Figure 10.1-4. GDS Laser 4 Light Mon vs. Temperature (PC7 in orange)



10.2 IMPACT SENSOR (IS)

10.2.1 CAL Amplitude vs. Temperature

Figure 10.2-1. IS PZT-1 CAL Amplitude vs. T – High Voltage

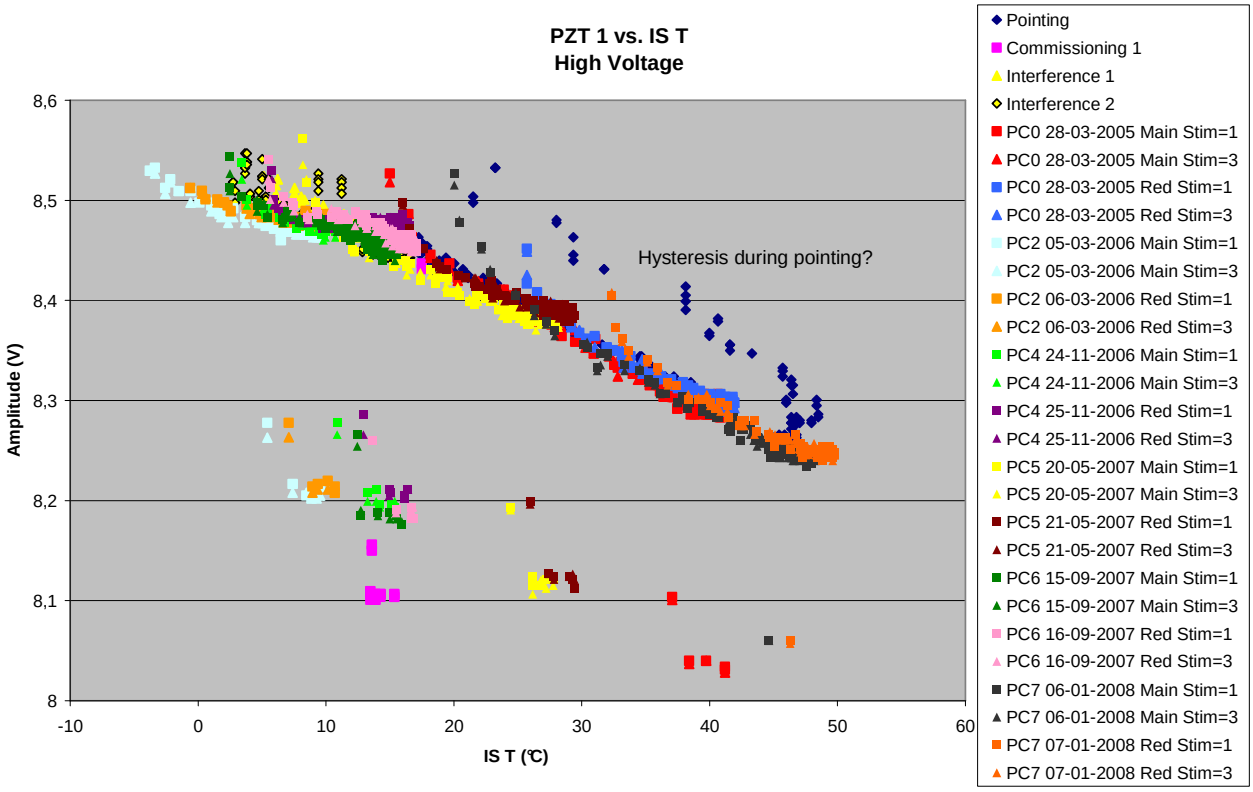
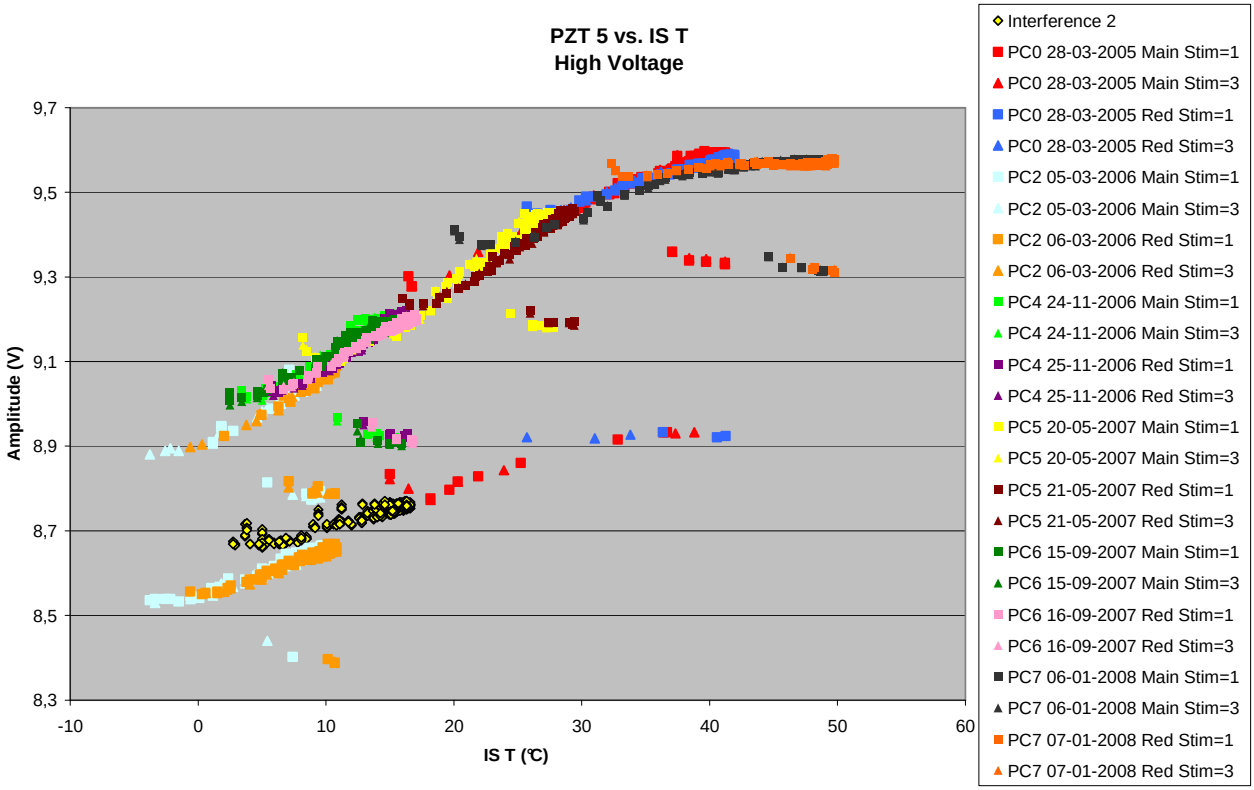


Figure 10.2-2. IS PZT-5 CAL Amplitude vs. T – High Voltage



10.3 MICRO BALANCE SYSTEM (MBS)

10.3.1 Frequency vs. Temperature

Figure 10.3-1. MBS 1 Frequency vs. Temperature

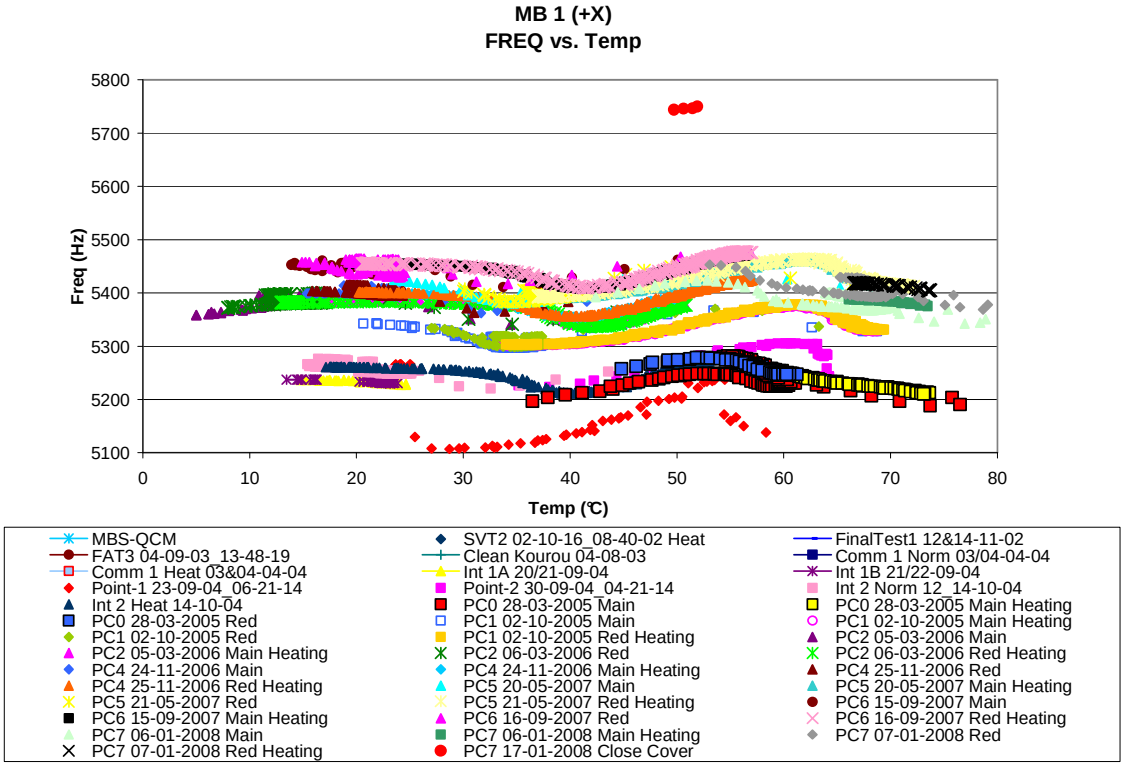


Figure 10.3-2. MBS 2 Frequency vs. Temperature

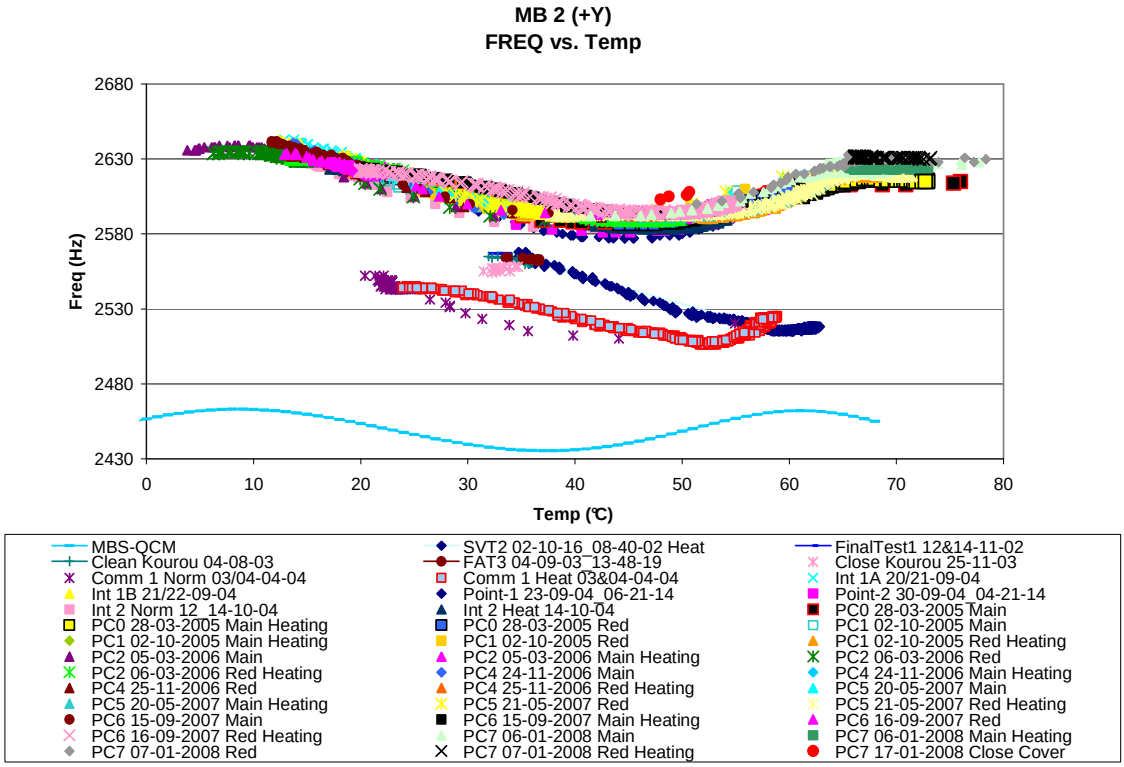


Figure 10.3-3. MBS 3 Frequency vs. Temperature

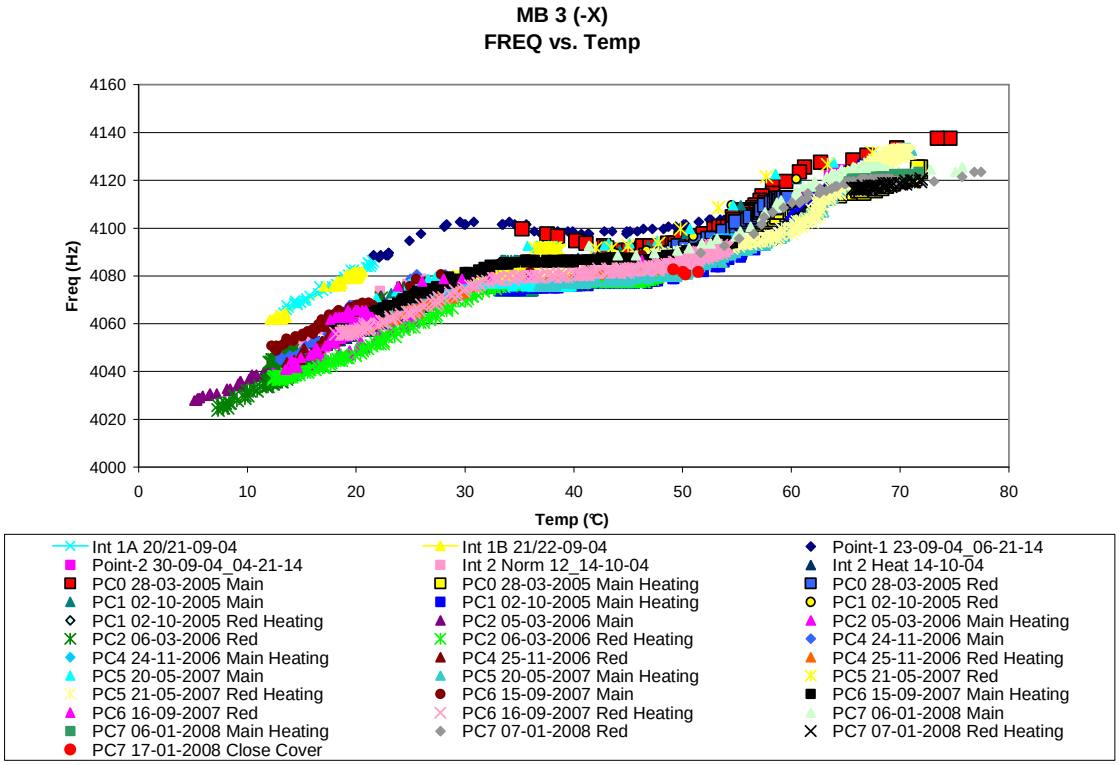


Figure 10.3-4. MBS 4 Frequency vs. Temperature

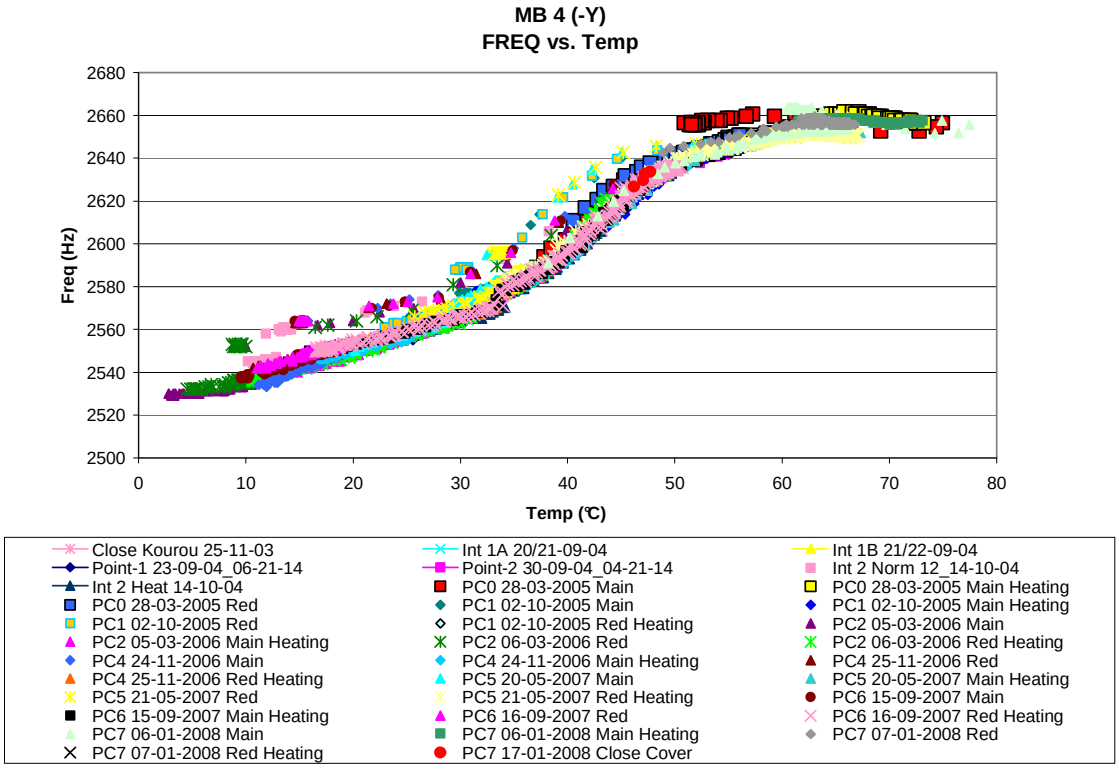
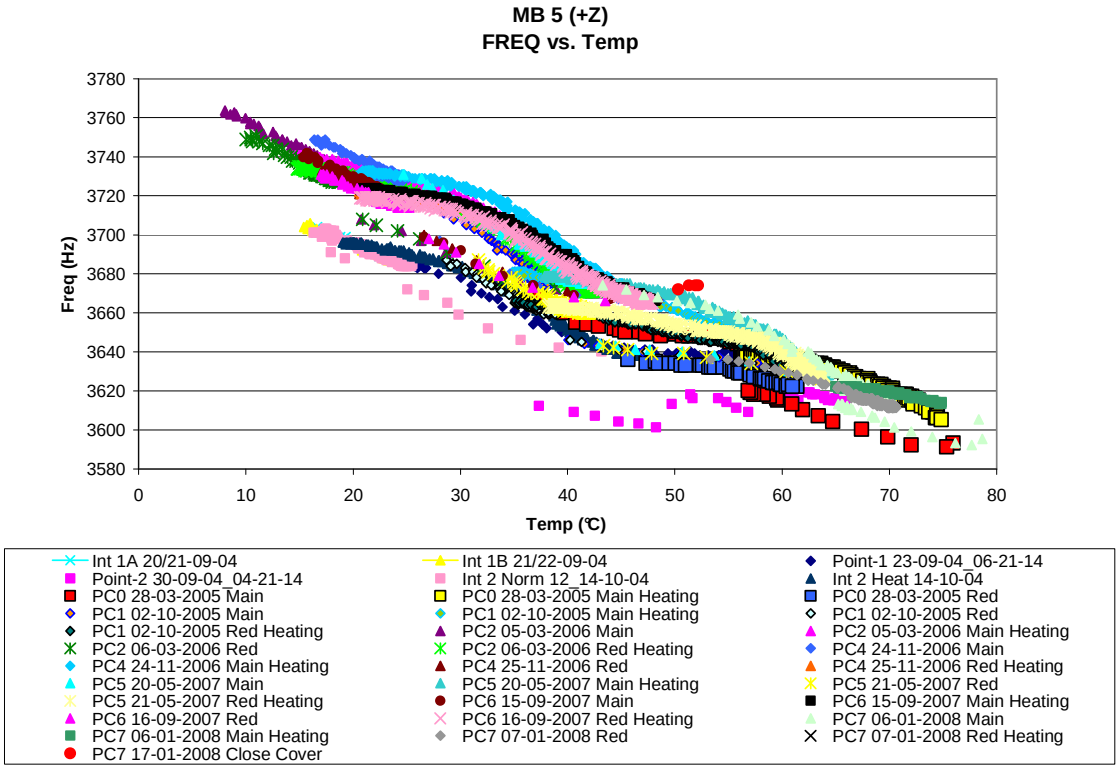


Figure 10.3-5. MBS 5 Frequency vs. Temperature



10.3.2 Frequency vs. Time

Figure 10.3-6. MBS 1 Frequency vs. Time at fixed Temperatures

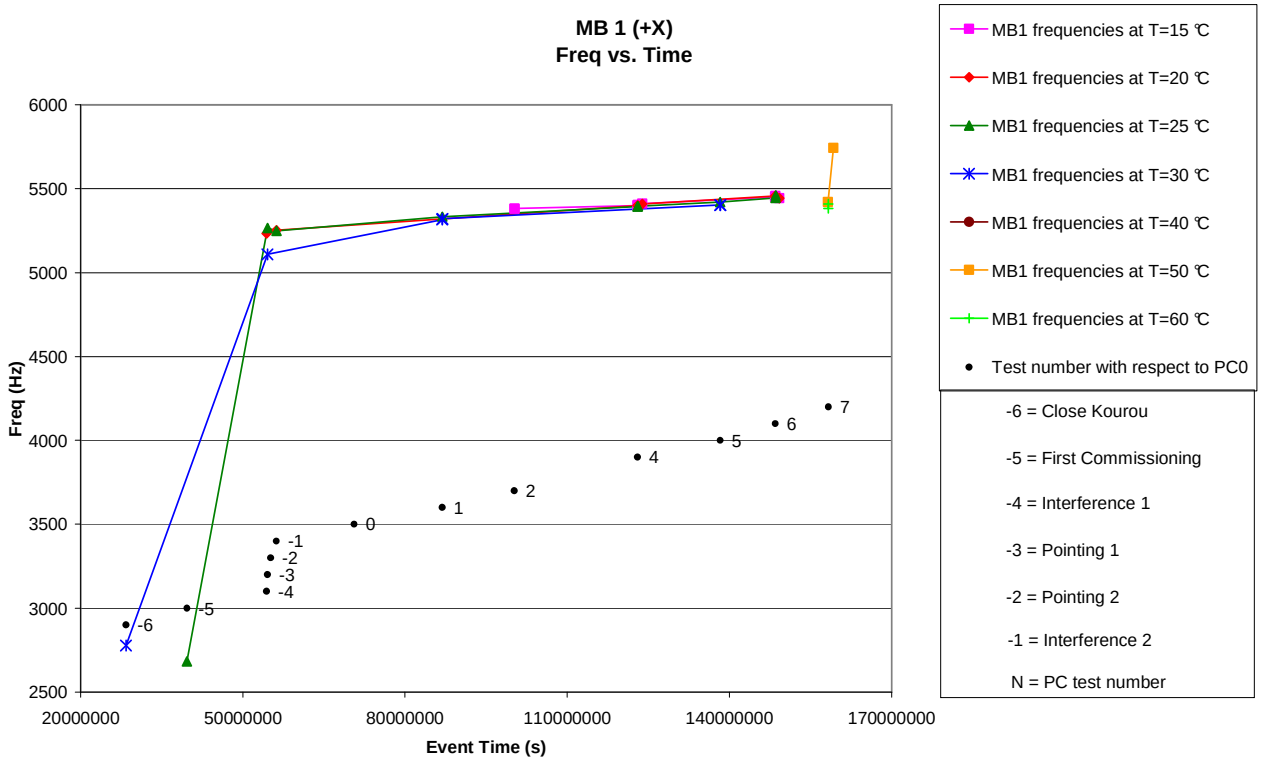


Figure 10.3-7. MBS 1 differently scaled Frequency vs. Time at fixed Temperatures

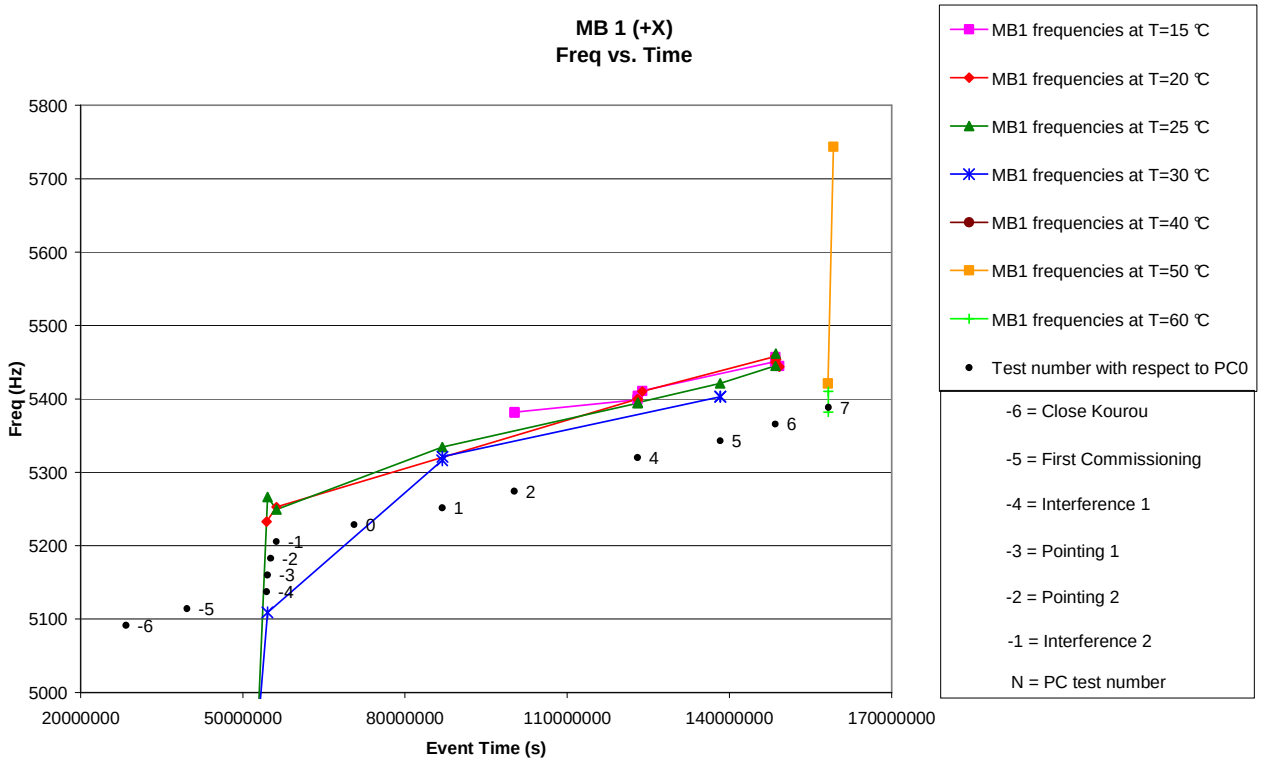


Figure 10.3-8. MBS 2 Frequency vs. Time at fixed Temperatures

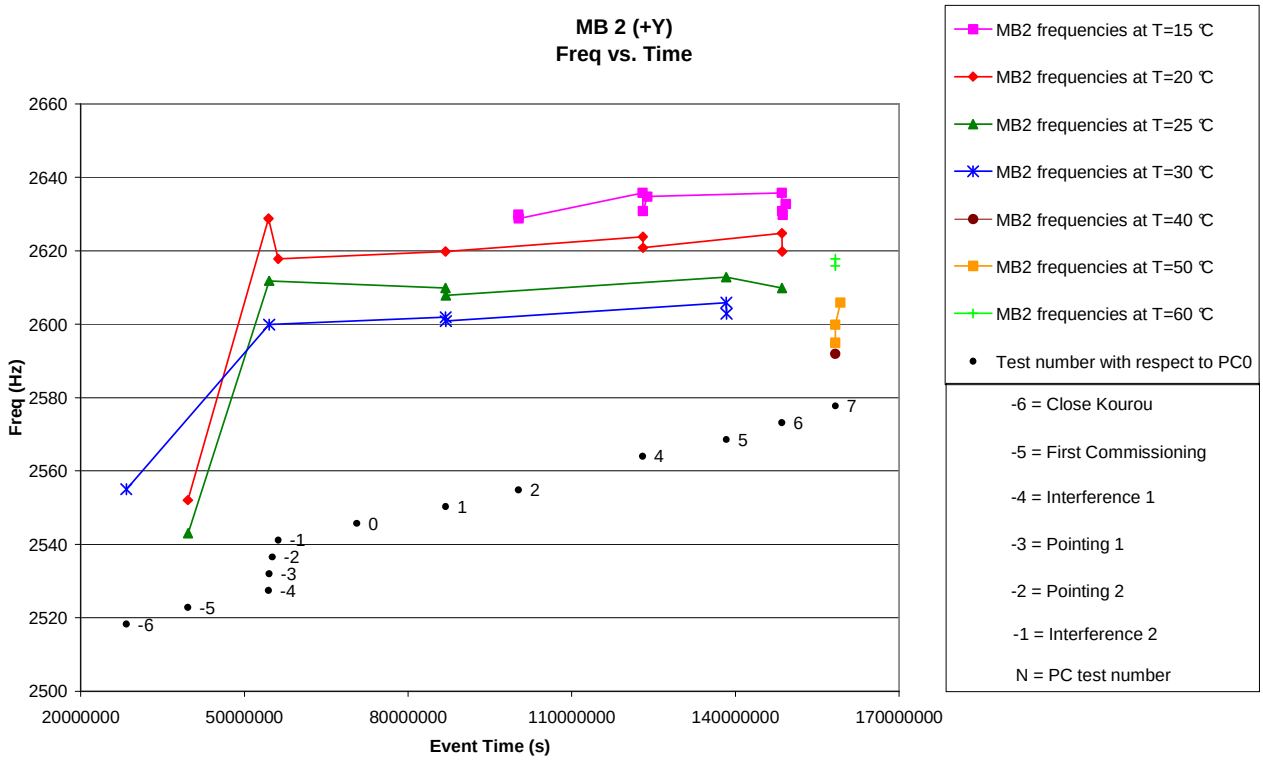


Figure 10.3-9. MBS 3 Frequency vs. Time at fixed Temperatures

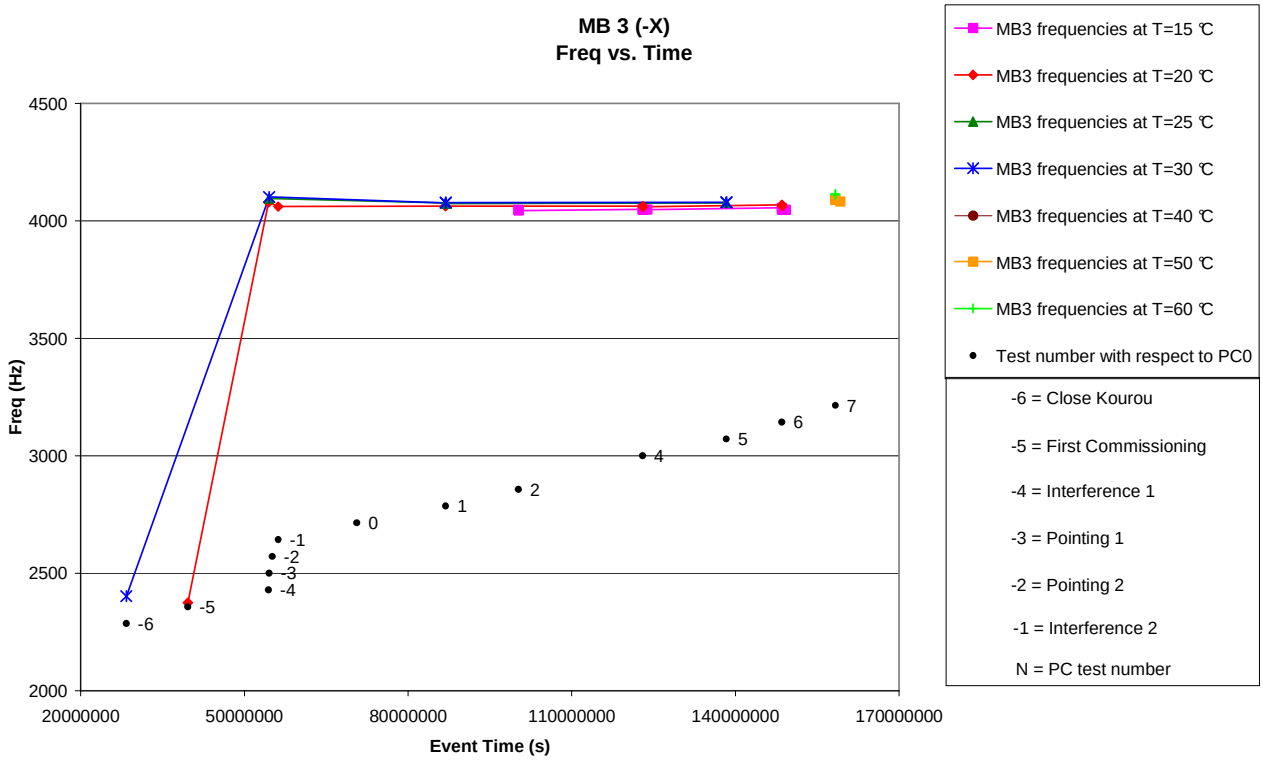


Figure 10.3-10. MBS 4 Frequency vs. Time at fixed Temperatures

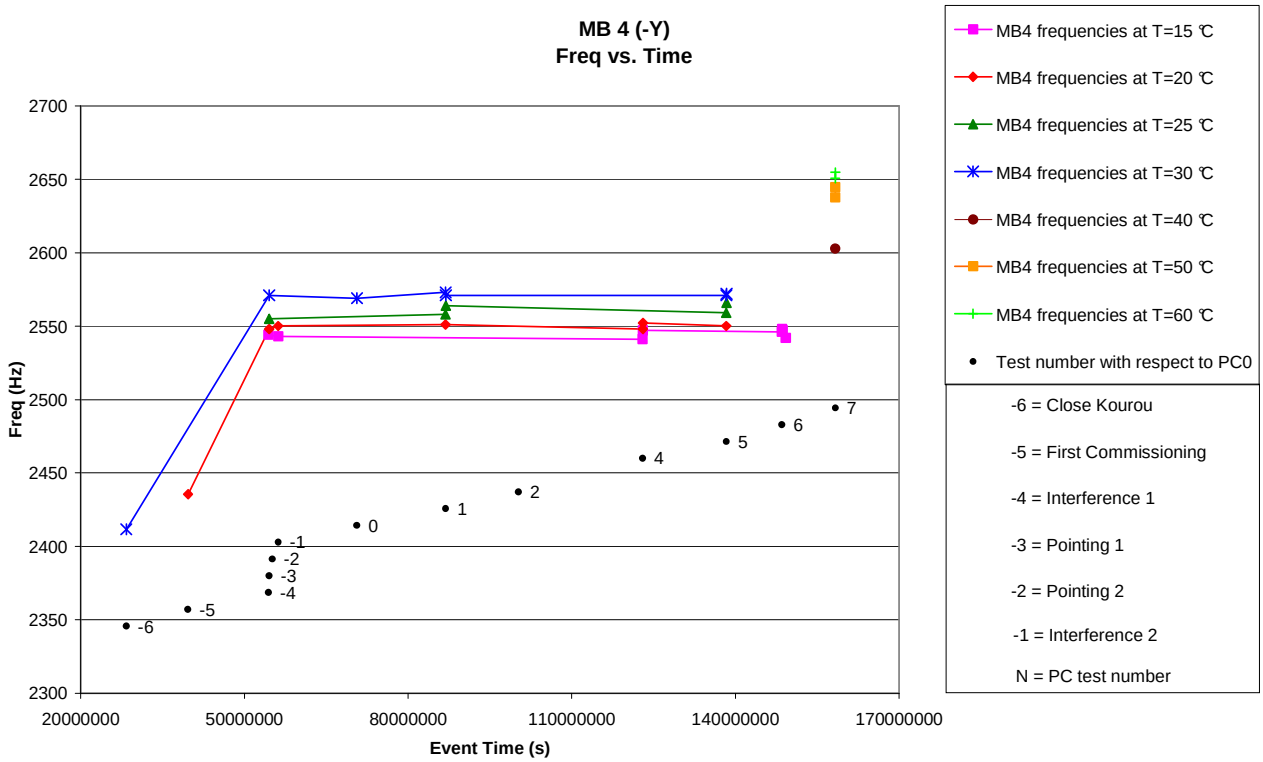


Figure 10.3-11. MBS 5 Frequency vs. Time at fixed Temperatures

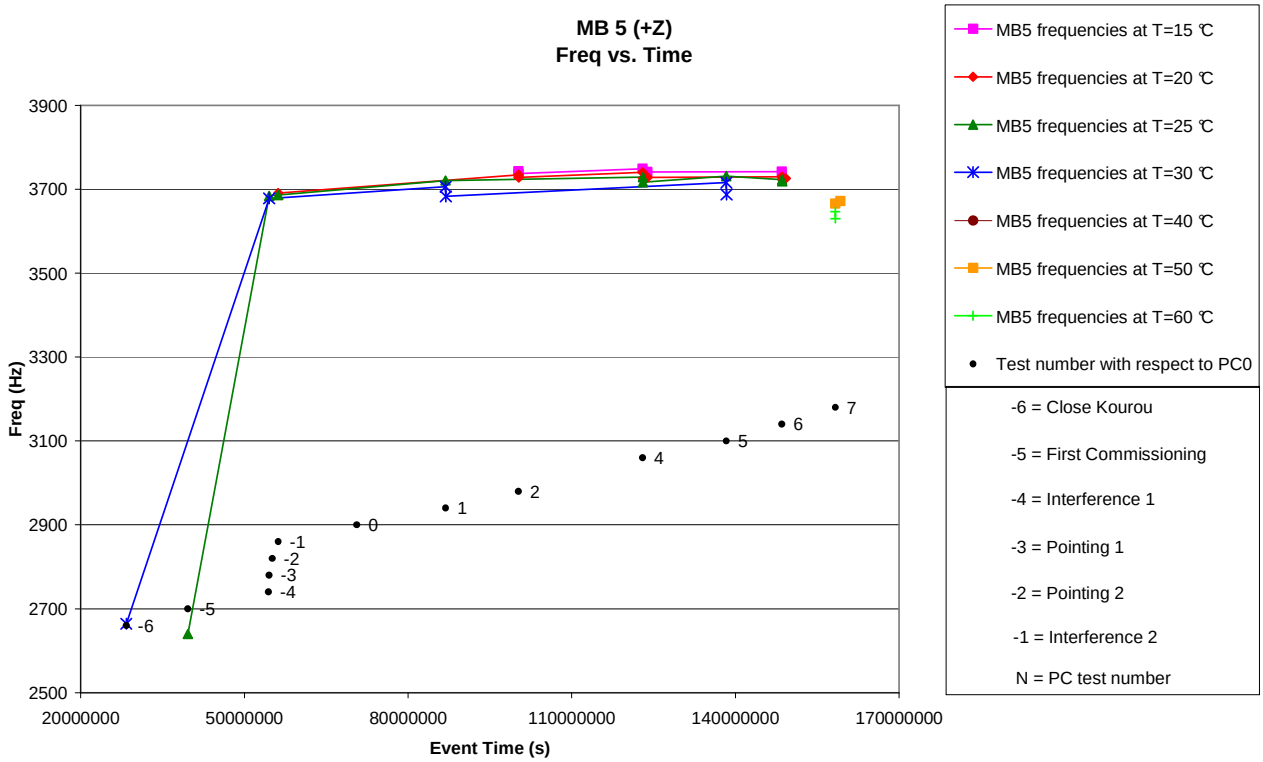
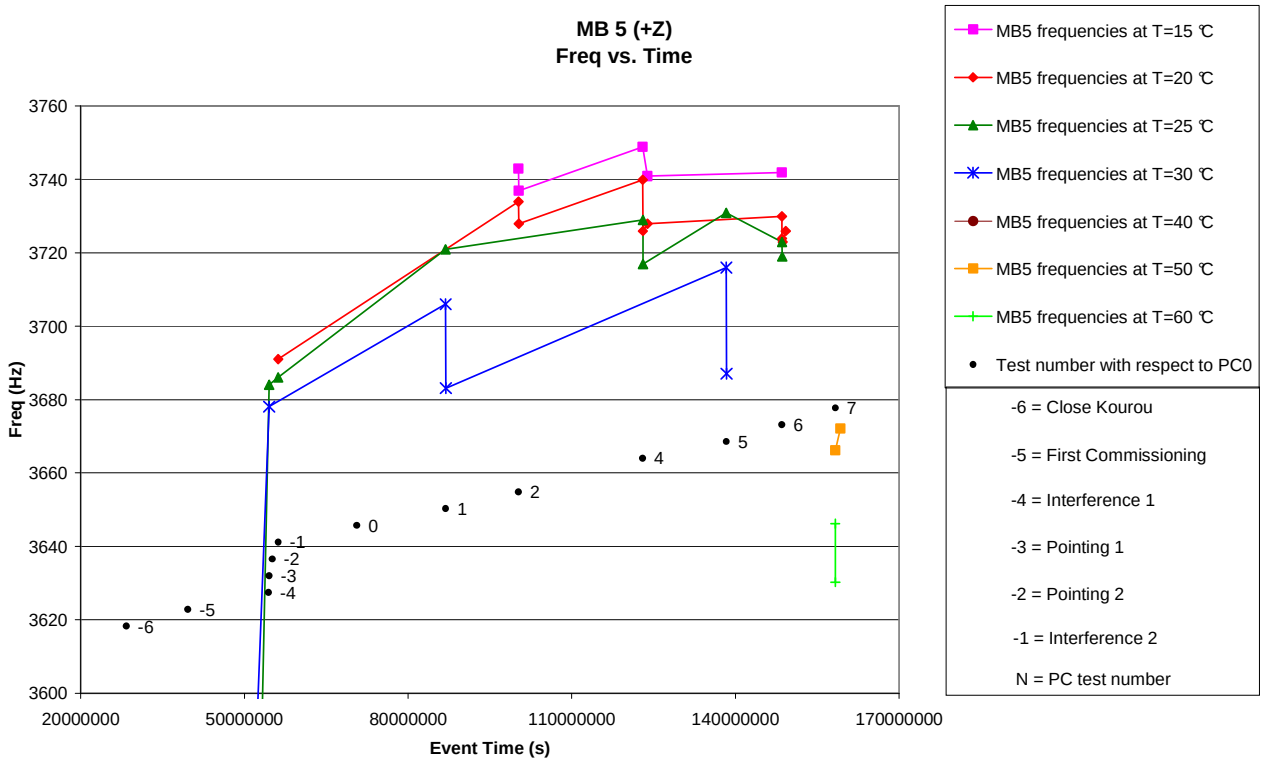


Figure 10.3-12. MBS 5 differently scaled Frequency vs. Time at fixed Temperatures



11. TIMELINES FOR GIADA PC7

11.1 TIMELINE FOR MAIN INTERFACE (GD01)

```
# $Log: OIOR_PIHRSO_D_0000_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_0000_GD_PCA1_300013.ROS
# Type:     Input Timeline file
#
# Description:    Passive Check-Out GD adapted to sequences updating
#
#
# 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: 24-Nov-2006
Start_time: 000_00:00:00
End_time: 000_12:00:00

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

11.2 TIMELINE FOR REDUNDANT INTERFACE (GD01)

```
# $Log: OIOR_PIHRSO_D_0000_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_0000_GD_PCB1_300014.ROS
# Type:     Input Timeline file
#
# Description:    Passive Check-Out GD adapted to sequences updating
#
#
# 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: 24-Nov-2006
Start_time: 000_00:00:00
End_time: 001_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=====================================#
```

11.3 TIMELINE FOR MAIN INTERFACE (CLOSE COVER)

```
# $Log: GIADA_emergency_procedure_close_cover,v $
#
#
#=============================================================================#
# Filename:       GIADA_emergency_procedure_close_cover
# Type:     Input Timeline file
#
# Description:    Procedure to switch-on GIADA, verify its status, close cover (left open
#           by previous activities) and switch it off
#
#
# Author:   PP
#
#           GIADA
#
# Date:           15 January 2008
#
#
# Proposed by GIADA team
#
# (c) ESA/Estec
#
#-----------------------------------------------------------------------------#
#=============================================================================#

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

#Ref_date: asap
Start_time: 000_00:00:00
End_time: 000_01:15:00

#=============================================================================#
# 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  AGDS110A # Go to Normal mode

Description: "GIADA operative in normal mode"

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

+000_00:26:30     GIADA NORMAL      AGDS037A(\
                                            VGDS037A = Off [ENG])   # Set IS On/Off

+000_00:27:00     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_00:27:30     GIADA NORMAL      AGDS037A(\
                                            VGDS037A = On [ENG])    # Set IS On/Off
```

```
+000_00:30:00     GIADA NORMAL      AGDS120A ( \
                                          VGDS0010 = 0xF8 \
                                          VGDS0011 = 0x04 \ # Calibrate IS, GDS, MBS
                                          REPEAT = 3 \
                                          SEPARATION = 00:05:00 )

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

+000_00:45:00     GIADA NORMAL      AGDF060A # go to safe mode & off

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