

## Long, JA (Judy)

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**From:** Aramburu, AA (Asier)  
**Sent:** 22 February 2006 09:44  
**To:** 'Christophe CARA'  
**Cc:** Sawyer, EC (Eric); AUGUERES Jean-Louis DAPNIA; Renato Orfei; Sergio Molinari ((E-mail)); TRIOU Henri DAPNIA; Pinsard Frederic; Matt Griffin; Swinyard, BM (Bruce); Griffin, DK (Doug); Smith, DL (Dave); King, KJ (Ken); Long, JA (Judy); Polehampton, ET (Edward); Sidher, SD (Sunil)  
**Subject:** RE: Investigations on the SPIRE Warm units.



summary.doc (65  
KB)

Hello all,

I attach un updated table that includes 'HK only' tests and the correction for the SCU events also (apologies for that). I've included some general remarks in the table also. We have been performing some more tests were the Nominal HK request repeat interval is varied from the nominal 1000ms to 900ms,800ms,700ms and 300ms, respec, while a 0.5Hz PCAL flash is running on top. The results are still being checked, they will be included in the table after they are analyzed.

Regards,  
Asier.

Asier Abreu Aramburu  
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-----Original Message-----

**From:** Christophe CARA [mailto:ccara@cea.fr]  
**Sent:** 20 February 2006 09:41  
**To:** Aramburu, AA (Asier); Sidher, SD (Sunil)  
**Cc:** Sawyer, EC (Eric); AUGUERES Jean-Louis DAPNIA; Renato Orfei; Sergio Molinari ((E-mail)); TRIOU Henri DAPNIA; Pinsard Frederic; Matt Griffin; Swinyard, BM (Bruce); Griffin, DK (Doug); Smith, DL (Dave); King, KJ (Ken); Long, JA (Judy); Polehampton, ET (Edward)  
**Subject:** Re: Investigations on the SPIRE Warm units.

Hello Asier and Sunil,

In order to make some progress here are suggestions:

- in your table we give results for tests with various setups but always with the flash process running - do you have similar results for tests with flash off ?
- in the same table the column SCU errors is filled with 0 but in the same time you write in your e-mail you are currently checking SCU response error - please precise the status

We may envisage to start new VHDL simulations. To do that we need:

in Get HK only (no Flash)

- the list of the commands (Get HK only ?) AND PARAMETERS (hk channel) sent to the DRCU S/S
- the command code(s) for which the DPU generates an event

**Summary of tests performed:**

Day (time)	SCU sampling	DCU sampling	PCAL Flash	Test Duration	HK running	Nb of DCU events	Nb of SCU events	Missing flashes
10/02/06	80Hz	~ 50Hz	1ms delay	~ 2h	<b>Yes</b>	<b>2</b>	0	<b>Yes</b>
10/02/06	80Hz	~ 13Hz	1ms delay	~ 2h	<b>Yes</b>	<b>2</b>	0	<b>Yes</b>
10/02/06	80Hz	~ 13Hz	2ms delay	~ 12h	<b>Yes</b>	<b>12</b>	0	No
			2ms delay	~ 12h	<b>No</b>	<b>0</b>	0	No
13/02/06	80Hz	~ 13Hz	1ms delay	2h 10 min	<b>Yes</b>	<b>5</b>	0	No
			1ms delay	2h 10 min	<b>No</b>	<b>0</b>	0	No
			2ms delay	2h 10 min	<b>Yes</b>	<b>3</b>	0	No
			2ms delay	2h 10 min	<b>No</b>	<b>0</b>	0	No
14/02/06	No data	No data	No Flash	~ 15h	<b>Yes</b>	<b>8</b>	<b>1</b>	N/A
14/02/06	80Hz	~ 18Hz	1ms delay	2h 10 min	<b>Yes</b>	<b>2</b>	0	No
			1ms delay	2h 10 min	<b>No</b>	<b>0</b>	0	No
			2ms delay	2h 10 min	<b>Yes</b>	<b>1</b>	0	No
			2ms delay	2h 10 min	<b>No</b>	<b>0</b>	0	No
15/02/06	No data	No data	No Flash	~ 7h	<b>Yes</b>	<b>7</b>	<b>0</b>	N/A
15/02/06	80Hz	~ 18Hz	1ms delay	2h 10 min	<b>Yes</b>	<b>2</b>	<b>1</b>	<b>Yes</b>
			1ms delay	2h 10 min	<b>No</b>	<b>0</b>	0	No
			2ms delay	2h 10 min	<b>Yes</b>	<b>1</b>	0	No
			2ms delay	2h 10 min	<b>No</b>	<b>0</b>	0	No
16/02/06	No data	No data	No Flash	~ 10h	<b>Yes</b>	<b>11</b>	<b>0</b>	N/A

### General remarks:

- **The current PCAL command lists do NOT implement command acknowledgement.**
- **The DCU response errors are errors in response to GET commands not to SET commands (executed during PCAL flash or normal DCU SET commanding). The events do NOT occur during normal/anomaly PCAL flashes, the fact that they appear in the table under PCAL flash tests only means that during the entire time of the that test we received that number of DCU response errors to get HK commands.**
- **The number of DCU response errors seems to increment when the 1ms command list is running. To put other way, the increase of rate in SET commanding seems to affect the GET commanding.**
- **The PCAL flash column in the table shows the delay in between the commands executed during each half cycle.**
- **Blue font indicates a period of HK generation without PCAL flashes.**
- **There is only 1 SCU wrong frame ID error (red) which occurred during a PCAL flash.**
- **The rest of the SCU events are SCU response errors which do NOT occur during a PCAL flash and/or normal HK requests and are the result of:**
  - **The accidental DRCU switch OFF on Friday 10<sup>th</sup> while the HK was running.**
  - **“Condition cleared” events (i.e. the subsystem is responding back again) as a result of HK request restart after the nominal DRCU switch ON procedure is executed.**

- rate (300 per s ?)

Additionally we suggest (if you confirm that the DCU only is faulty) to increase the command rate (and probably the error rate) to limit housekeeping collection to the DCU.

Regards

Christophe and Frederic

Le 17 févr. 06 à 19:34, Aramburu, AA ((Asier)) a écrit :

>  
>  
> \_\_\_\_\_  
>  
> From: Aramburu, AA (Asier)  
> Sent: Fri 17/02/2006 17:42  
> To: 'Christophe CARA'  
> Cc: Sawyer, EC (Eric); AUGUERES Jean-Louis DAPNIA; Renato Orfei;  
> 'Sergio Molinari (E-mail)' ; TRIOU Henri DAPNIA; Pinsard Frederic;  
> Matt Griffin; Swinyard, BM (Bruce); Griffin, DK (Doug); Sidher, SD  
> (Sunil); Smith, DL (Dave); King, KJ (Ken); Long, JA (Judy);  
> Polehampton, ET (Edward)  
> Subject: RE: Investigations on the SPIRE Warm units.  
>  
>  
>  
> Hello Christophe and others,  
>  
> In summary the key questions to asked for are:  
>  
> 1) Why do we get DCU and SCU response errors?  
> 2) Why do the DCU errors increase when HK generation is on and the  
> PCAL flash comman list executing?  
> 3) Why do we get SCU Frame ID error at the time of the anomalous  
> flash on 15th Feb 19:52?  
> 4) Why is it that we cannot boot up the MCU in the current setup?  
>  
> In addition to these we urgently need the SCAL temperature range to  
> be extended by having measurements made between ~60-150 Ohms. I  
> understand from Henri that the test setup for the measurements at  
> CEA was only valid for a resistance range between ~150-500 Ohms.  
> For the maximum SCAL temperature of ~100K we need the results of  
> resistance meaurments down to ~65 Ohms. These measurements can  
> only be made at RAL since we have the Warm Units here.  
>  
> Just another point which I forgot to mention in our previous email  
> but I think is important from the instrument operation point of view:  
>  
> We need some clear specification (in the form of a table) on the  
> DCU QM2 test report of the new bias amplitude ranges (different for  
> each array in these electronics) or any other changes to bias  
> commanding parameters. I can't guess changes or implement  
> calibration curves on the basis of values appearing on a plot.  
>  
>  
>  
> In response to your comments:  
>  
> First comment:  
> Yes,at that time were the graph shows a gap before the high level  
> stays on the DPU generated a "wrong SCU frame ID" error report and  
> also the  
>  
> so called transparent telemetry data packets type/subtype(21,4)  
> SID=0xcc02. No normal SCU frames were generated during this short  
> period, only

>  
> the transparent ones.  
>  
> Second comment:  
> We have performed during this week both tests (only Get HK  
> process and Get HK + flash process) with both flash command lists.  
> One with a delay of 1 ms delay in between commands and another with  
> a 2ms delay in between them.  
>  
> I attach a table of the summary of the PCAL flash tests performed.  
> We found that the DCU response errors occur even when there is  
> ONLY Get HK process running and that the number of these events  
> increases when on  
>  
> top of the GetHK there is a PCAL flash running. We also found  
> there were more events in general when we used the 1ms delay  
> command list than when we used the 2 ms delay one.  
>  
> I'm currently checking the SCU response errors.  
>  
> Third comment:  
> The command list has been implemented that way so far. Ken is the  
> best person to answer this question.  
>  
> Fourth comments:  
> The current readings from the LTU power display are nominal.  
> When the LTU secondary power (green button on the LTU is pressed)  
> the display reads 0.4A.  
> When the command is sent to the SCU (SetDRelOnOff) to power up  
> the MCU the display shows 0.8A.  
> Both these readings are the same as during last test campaign.  
>  
> Regards,  
> Asier& Sunil  
>  
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> <<summary.doc>>  
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>  
> -----Original Message-----  
> From: Christophe CARA [<mailto:ccara@cea.fr> <<mailto:ccara@cea.fr>> ]  
> Sent: 17 February 2006 08:21  
> To: Aramburu, AA (Asier)  
> Cc: Sawyer, EC (Eric); AUGERES Jean-Louis DAPNIA; Renato Orfei;  
> 'Sergio Molinari (E-mail)' ; TRIOU Henri DAPNIA; Pinsard Frederic;  
> Matt Griffin; Swinyard, BM (Bruce); Griffin, DK (Doug); Sidher, SD  
> (Sunil); Smith, DL (Dave); King, KJ (Ken); Long, JA (Judy);  
> Polehampton, ET (Edward)  
>  
> Subject: Re: Investigations on the SPIRE Warm units.  
>  
>  
> Hello Asier,  
>  
> Thank you for all these details.

>  
> First comment:  
>  
> The zoomed graph shows that during the PCAL remains apparently at  
> high level the measured is noisy except a short period before  
> 19:52:28. I suppose that during this period no frame are generated  
> by the SCU (or wrong frames as mentioned in your e-mail).  
>  
>  
> Second comment:  
>  
> Up to now it was assumed that the Get HK process was running correctly  
> (see Ken note). It seems to be no more the case from last tests.  
> Have you already perform long term test with the Get HK process  
>  
> running but without the flash sequence ? If yes did you notice  
> generation of event report (NO xCU RESPONSE ERROR) ?  
>  
> Further comments will come later  
>  
> Christophe  
>  
>  
> Le 16 févr. 06 à 21:18, Aramburu, AA ((Asier)) a écrit :  
>  
>> Hello all,  
>>  
>> Here is a brief summary of all the "known" problems:  
>>  
>> 1). Problem  
>>  
>> - Missing commands or failure of commands during the execution  
>> of a command list.  
>>  
>> Symptoms  
>>  
>> - Of the 15 cycles(high PCAL bias/low PCAL bias) executed  
>> during a standard PCAL flash sequence, the complete series of  
>> cycles (high + low) are not always set properly,  
>>  
>> i.e., PCAL bias stays at either high or low value.  
>>  
>> - These problems were also present during PFM2 campaign when  
>> we were using the AVM2 DPU with OBS (v2.0.C) and the QM2 DCU+SCU  
>> electronics (see HR-SP-RAL-NCR-137)  
>>  
>> - The anomalous flashes are only seen very occasionally.  
>>  
>> Tests  
>>  
>> - Repeatedly performed 0.25Hz PCAL flash sequences at ~ 18Hz  
>> detector sampling frequency, bias frequency 130Hz, with and without  
>> HK generation. Each sequence lasts 15  
>>  
>> cycles.  
>>  
>> The attached plots show an anomalous PCAL flash generated  
>> using a Command List with 1ms interval between commands (same  
>> Command List as used for PFM2) on Wednesday 15th Feb.  
>>  
>> with HK generation on: 1st plot shows a timeline of PCAL  
>> current during three standard PCAL flashes, the middle one showing  
>> the anomaly. 2nd plot is a zoom at the high levels of the  
>>  
>> anomalous PCAL flash. As can be seen the PCAL current remains  
>> at the high level when it should be switching between low and high  
>> levels.  
>>  
>> During the period of this anomalous flash 7 packets were  
>> received with APID = 508 type = 21 subtype = 4 SID = 0xcc02.

```

>> The APID, type and subtype
>>
>>     of these packets are consistent with an SCU science packet,
>> except that the SID value of 0xcc02 is undefined in the SPIRE Data
>> ICD. The SCU
>>
>>     nominal science data correspond to APID = 508  type = 21
>> subtype = 4  SID = 0x0a20.
>>
>>     Interestingly the times of the strange packets appear to
>> coincide exactly with the start of constant high value of the PCAL
>> current.
>>
>>
>> 2). Problem
>>
>>     - Event reports (NO DCU RESPONSE ERROR) are generated while
>> the DRCU is ON and commanding is in progress.
>>
>>     - Occasionally we also get event reports (NO SCU RESPONSE
>> ERROR).
>>
>>     Symptoms
>>
>>     Error reports are generated by the DPU indicating no response
>> from the DCU to different GET HK commands. These get cleared within
>> a second.
>>
>>
>>     SCU response error reports are also generated but not as
>> frequently.
>>
>>     There seems to be some correlation between the commanding (in
>> particular PCAL flash command list execution) and the occurrence of
>> these event reports.
>>
>>     These errors were also present during PFM2 campaign but the
>> correlation has not been checked there.
>>
>>     Note that the error report and the corresponding clearance of
>> error report have identical contents.
>>
>>     Tests
>>
>>     Swapped the DCU and SCU harnesses on the DPU-DRCU interface to
>> rule out a harness problem. No results available yet.
>>
>>
>> 3). Problem
>>
>>     - MCU cannot be booted up. The same boot sequence was used for
>> PFM2. It fails now with the commands sent to the MCU being rejected.
>>
>>     Symptoms
>>
>>     Commands sent to the MCU are rejected with LS_INHIBITED_COMMAND
>> (error code 0x81C).
>>
>>     Tests
>>
>>     a. Stopped the HK request before issuing the SetDRelOnOff
>> command to switch on the MCU (0xA0870004)
>>
>>         Then Started the HK and continued with the boot sequence
>> as normal. --> All boot commands rejected as before
>>
>>     b. Stopped HK request before issuing the SetDRelOnOff command
>> to switch on the MCU (0xA0870004) and throughout the boot sequence
>> --> All boot commands still rejected as before.
>>
>>

```

>>  
>> 4). Problem  
>>  
>> Instrument mode configurations are not correctly implemented in  
>> the current OBS version (v2.1.E)  
>>  
>> Symptoms  
>>  
>> As soon as the OBS is started using the FORCE\_BOOT\_PRIMARY  
>> command the mode parameter is set to DRCU\_ON when it should be  
>> DPU\_ON.  
>>  
>> This problem is probably related to the MCU problem as the OBS  
>> does not recognize a configuration where the SCU and DCU are  
>> switched ON but the MCU is not.  
>>  
>> So when the MCU is switched ON the OBS considers this as a  
>> subsystem failure and causes the rejection of MCU commands.  
>>  
>> Tests  
>>  
>> None so far  
>>  
>>  
>> Regards,  
>> Asier and Sunil  
>>  
>> <<pcal\_15feb\_1952.png>> <<pcal\_15feb\_1952\_zoom.png>>  
>>  
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>>  
>>  
>> -----Original Message-----  
>> From: Sawyer, EC (Eric)  
>> Sent: 16 February 2006 16:41  
>> To: 'AUGUERES Jean-Louis DAPNIA'; 'Renato Orfei'; 'Sergio  
>> Molinari (E-mail)'; 'CARA Christophe SMTP'; 'TRIOU Henri DAPNIA';  
>> Pinsard Frederic  
>>  
>> Cc: 'Matt Griffin'; Swinyard, BM (Bruce); Griffin, DK (Doug);  
>> Aramburu, AA (Asier); Sidher, SD (Sunil); Smith, DL (Dave); King,  
>> KJ (Ken); Long, JA (Judy)  
>>  
>> Subject: Investigations on the SPIRE Warm units.  
>>  
>>  
>> Dear all,  
>>  
>> As you probably know we are having some difficulties testing the  
>> warm units, DRCU QM2 and DPU CFM, in preparation for the test cold  
>> test campaign.  
>>  
>> We need to get these problem resolved before we start the test  
>> campaign, in fact before we plug in the Flight unit FPU.  
>>  
>> I would like to request that IFSI and CEA come to RAL next Tuesday  
>> for a day or two of testing and fault finding.  
>> It is very important that these problems are resolved not just  
>> because they are delaying the start of testing, but also we need to  
>> give the go ahead to blow the flight FPGAs in the DRCU.  
>>  
>> Asier and Sunil are preparing a list of problems that need to be



>> tackled and will send that out tomorrow, in preparation for next  
>> week. In the mean time we will continue investigating.  
>>  
>> Please let me know if this is acceptable to you and also who will  
>> be coming to RAL.  
>>  
>> Thanks  
>>  
>>  
>> Eric  
>>  
>>  
>> Eric Sawyer  
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