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## Change notes:

- 1.0 7 Jan 2005 First issue after discussion
- 1.1 17 Jan 2005 Update to change order of  $V_{ss}$  and  $V_{dd}$  switch on after discussion with JPL
- 1.2 25 Jan 2005 Change to start heater power from 2 to 1.5 V based on analysis by Kalyani Sukhatme of minimum power required to heat up membrane

## 0 Scope

Two switch-on procedures are specified that allow for the safe operation of the JFETs. The first is to switch on the JFETs without using the heater. In the event the JFETs do not self start there is a possibility that current will be drawn through the detectors causing the 300-mK stage to heat up. This will be tested during the PFM1 test campaign – if the JFETs consistently “self start” then the heater will not be used. The second procedure is to be used if it is found that the JFETs do not self start. At present we do not know the minimum heater voltage required to allow the JFETs to start under normal operational circumstance and an initial test is required to find the best operating point.

## 1 Procedure to switch on without heater

### Prerequisites

- Verification that LIA switch-on does not cause voltage spikes at JFET outputs
- Verification that DCU switch does not cause voltage spikes across JFET bias supplies
- Cooler has been recycled and detectors are at or near nominal operating temperature – as shown by evaporator temperature.

### Procedure

- Switch on LIAs
- Switch on detector biases at nominal frequency setting and 1 mV to allow data transmission and small bias across detector to see change in signal
- Set up QLA to monitor detector signals
- Set up QLA to monitor sub-K temp
- Switch on  $V_{ss}$  at -1.5 V – for test only – once optimum voltage established we will use this
- Immediately send command to switch on  $V_{dd}$  to all JFETS
- Load into stack but do NOT activate commands to switch off  $V_{dd}$  and  $V_{ss}$ .

Detector signals should show immediate response with step and/or drift and start to look like noise

- Sub-K temp should not show any response
- Wait at least 3 minutes

**If detectors show response then leave JFETs on and remove commands from stack**



JFET Switch on procedures for PFM1  
B. Swinyard

**If detector signals do not respond (flatline) and/or temperature response shows significant response then send commands to switch off  $V_{dd}$  and  $V_{ss}$ .**

**Do NOT switch on JFET for another three minutes.**

## 2 Procedure to switch on with heater

Prerequisites as for section 1

### Procedure

Switch on LIAs

Switch on detector biases at nominal frequency setting and 1 mV to allow data transmission

Set up QLA to monitor detector signals

Set up QLA to monitor sub-K temp

Switch on JFET heater at 1.5 V

Wait 1 minute

Switch off JFET heater

Immediately send command to switch on  $V_{ss}$  at -1.5 V

Immediately send command to switch on  $V_{dd}$  to all JFETS

Load into stack but do NOT activate commands to switch off  $V_{dd}$  and  $V_{ss}$ .

Detector signals should show immediate response with step and/or drift and start to look like noise

Sub-K temp should not show any response

Wait at least 3 minutes

**If detectors show response then leave JFETs on and remove commands from stack**

**If detector signals do not respond (flatline) and/or temperature response shows significant response then send commands to switch off  $V_{dd}$  and  $V_{ss}$ .**

**Do NOT switch on JFET for another three minutes.**

If this test fails then repeat with heater voltage increase in 0.25 V steps until either good switch on characteristics are found or 3 V is reached.

**Do not exceed 3V on heater – if 3 V reached and JFETs have not switched on then stop test and refer to JPL.**