



**Aerospace
Systems Division**

Flight #3 HFE
Transient Test

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High levels of noise were measured on the HFE/Central Station power and data interface lines during Flight #3 Integration Tests. Subsequent system tests including a special noise susceptibility test proved that the HFE induced noise levels were well below a margin that would adversely affect system performance.

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During conduct of the HFE Integration Test on Flight #3, Discrepancy Reports AB 2120 and AB 2121 documented the existence of excessive noise on the Experiment/Central Station Operate Power and data interface lines. Measurements and associated procedure limits are as follows:

<u>Interface</u>	<u>Measured</u>	<u>Limit</u>
29 V Operate Line	360 mV p-p	150 mV p-p
Data Demand	300 mV p-p	100 mV p-p
Shift Pulse	300 mV p-p	100 mV p-p
Frame Mark	300 mV p-p	100 mV p-p
90th Frame Mark	300 mV p-p	100 mV p-p

The characteristic of the noise was noted as a damped oscillation approximately 5 MHz in frequency at a repetition rate of approximately 12 kHz. It was determined that the source of noise was the HFE power converter switching transient on the 29 volt line and that similar noise was being induced via Crosstalk on the data lines.

Based on system performance with all experiments operating during the remainder of the Test, it was judged that this noise level was not detrimental to the operation of HFE or any other subsystem in the Flight #3 system.

The discrepancy reports were subsequently dispositioned to use the experiment as supplied through all acceptance tests on a limited hold basis. Final acceptance of the experiment performance was based on satisfactory completion of all system acceptance tests including EMI, Crosstalk and Thermal Vacuum. There were no indications during any of the acceptance tests that the excessive noise caused any system or subsystem malfunction.



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In addition to the above, it was decided that a special test be performed on a system level to determine the margin of susceptibility to similar noise levels. This test was performed on the Qual SB system in accordance with troubleshooting instructions on DR AB 2121. The test was implemented as follows:

The HFE experiment was disconnected from the Central Station and the experiment break-out box was connected in its place. All other experiments were connected and placed in operation. An RFI Transient Generator was then connected into the HFE 29 volt operate line and transient noise was injected into the system to simulate the HFE noise.

The system was then monitored for proper performance under levels of noise up to 2 V p-p. No malfunction was noted under these conditions. The circuit connections, instrumentation and transient characteristics are shown in the attached figure.

As a result of satisfactory completion of system acceptance tests, as well as the special susceptibility test, it is concluded that the HFE noise level is well below a margin of noise that would adversely affect system performance. A Specification Change Notice has subsequently been issued to change the experiment specification to be compatible with actual subsystem performance.



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