

SOLAR B EIS Spacecraft Interface Specification

Alec McCalden MSSL-UCL 19 Nov 98

EIS-System Eng-Sys Design-Spacecraft Interface Spec-0.1

1.0 Introduction

This document is a set of suggestions for forming the EIS electrical interface to the spacecraft. It covers some aspects of the electrical interface but makes no attempt to look at thermal or mechanical details.

2.0 Data Uploads

2.1 Use USB standard?

2.2 Connector

2.3 Electrical Characteristics

Differential 5V signals

Serial data and frame with embedded clock

Impedance

2.4 Data Structure

Variable length packets (0 -> 1024 bytes?)

2.5 Timings and Protocols

2.6 Virtual Channels

2.6.1 Commands

2.6.2 On board time

2.6.3 Telemetry Frame Synchronisation

2.7 Error Protection

Implement as part of operator console to instrument link

3.0 Data Downloads

(Use same physical connector as the data uploads, and use bi-directional signals?)

3.1 Use USB standard?

3.2 Connector

3.3 Electrical Signals

3.4 Data Structure

3.5 Timings and Protocols

3.6 Virtual Channels

3.6.1 Science data

3.6.2 Engineering Data

3.7 Error Protection

Use spacecraft system

4.0 Power - Main Bus

4.1 Voltage

4.2 Current

SOLAR B EIS Spacecraft Interface Specification

4.3 Connector

4.4 Overload Protection

4.5 Isolation

The instrument will be electrically isolated with a switched mode power converter.

4.6 Converter Frequency

About 500kHz, synchronisation signal not required.

4.7 EMC

5.0 Power - Keep Alive

5.1 Voltage

5.2 Current

5.3 Connector

5.4 Overload Protection

5.5 EMC

6.0 High Power Commands

(Pulse commands for driving latching relays directly)

7.0 Systems Powered by the Spacecraft

7.1 Temperature monitors

Driven by spacecraft telemetry system

7.2 Standby Heaters

These heaters are used with the instrument powered off to prevent excessively low temperatures.

8.0 Redundancy

Use full redundancy for each electrical interface with individual switching.

Use separate connectors for prime and redundant interfaces.

9.0 EMC

Overall points to consider.

10.0 Data Structure

10.1 Science Data Packet Structure

- Time tag
- Packet count
- Mirror position
- Exposure duration
- Automatic exposure control value
- Calibration lamp on flag
- Number of packets in data set
- Packet position in data set
- Single image or movie flag
- Movie frame number
- Movie key frame identification
- Science data

10.2 Packet Grouping

Image sizes may vary from near zero to much greater than the maximum packet size.

If an image plus the header is equal to or less than the maximum packet size, then the packet size is set to efficiently include no more than the image plus header.

If the image plus header is larger than the maximum packet size, then the image is spread over more than one packet as appropriate. Each packet would contain the same header information except for an incrementing 'packet position in data set' value.