



**SPIRE**  
INSTRUMENT BLOCK DIAGRAM

Doc #: SPIRE-RAL-DWG-000646  
Issue: 3.7  
Date: 8/1/02 8:37 AM  
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Subject: **SPIRE BLOCK DIAGRAM**

**PREPARED BY:** J. DELDERFIELD ..... **Date:** .....

**APPROVED BY:** K. KING..... **Date:** .....



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## CHANGE RECORD

| ISSUE | DATE     | CHANGE(S) MADE  |
|-------|----------|---|
| 2.0   | 7/6/01   | First Controlled Issue after IIDR   |
| 2.1   | 18/6/01  | Deleted S/C Synchronisation.<br>Added Master Clock Lines<br>Split FCU into Modules, avoiding mixing Prime and Redundant connections via same motherboard, and requiring BSM module to be split Prime/Redundant, TBC.<br>Re-ordered signal channels into harnesses to get breaks between BDAs to better align with LIA divisions.<br>Removed last vestiges of showing Fast and Slow I/Fs separately as they are linked by W1-W6.<br>Fix FCU J26 duplication. |
| 2.2   | 29/6/01  | Put BDA connector numbers in line with JPL's that indicate which of the six geometric positions are used.<br>Bundle back-harness wires as per JPL diagram.<br>Define LCL names.   |
| 2.3   | 7/7/01   | Rearrange JFETs to stress "modularity"  |
| 2.4   | 7/8/01   | Increase FCU J21 and J22 to 25way...to take calibrator heater wires that were omitted.<br>Swop JFETs to using 37way filters with partially populated contacts.  |
| 2.5   | 8/8/01   | Put in FPU clamshell connectors as harness name "breaks". Delete TBD.   |
| 2.6   | 7/9/01   | Update SMEC connectors on FPU from 50 way to 2x37way each side.   |
| 2.7   | 9/10/01  | Put in fully updated HSFCU  |
| 2.8   | 12/10/01 | Correct way I harness tails split on to FCU...in error in version 2.7<br><br>Remove branch from F12A and route 300mK temperature "detectors" via HSJFS J7 AND J8 and new F 28. Correct PMW BDA Allocation. Add note to F20 and F21 so clear that each has one "Cernox" that is actually a 300Mk heater.<br><br>Put in HSDCU with connectors drawn to scale.   |
| 2.9   | 18/10/01 | Correct errors with W3-6 labels that crept into issue 2.8   |
| 3.0   | 30/10/01 | Swop numbers on connector lines for DCU redundant bias generator so they fit with harness definition document, and connectors 29-34 remain if generators were to be put on one module or otherwise reconfigured.  |
| 3.1   | 31/10/01 | Remove Filter Modules from JFET racks, thus adopting JPL's intention to use filter connectors and spliced harness.  |
| 3.2   | 9/11/01  | Reduce HSDCU Bias module front panel sizes and house them in one double sided module. Call S4 T1 as per Doug's drawings.  |
| 3.3   | 21/11/01 | Add last few connector IDs to JFET racks.   |
| 3.4   | 11/12/01 | Got J1-J4 on FCU the correct way around [SCU to MCU!]   |
| 3.5   | 18/12/01 | Move Connectors around on HSFPFU to match CEA's v0.5 HSFPFU ICD. Keep JTAG connectors shown elsewhere in DRCU ICD/Spec..but renumber as J37 and J38<br>Combine HSFCU SCU's DPU I/F and Cooler/Stimulus Modules<br>Re-jig Shutter DRCU connectors to not be wired via HSFCU Modules  |



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|     |          |  |
|-----|----------|--|
|     |          | <p>Reduce J25/J26 Connector sizes as moving shutter wiring removes some pins from them.<br/>Change 1553 buses to A &amp; B rather than Prime &amp; Redundant<br/>Change J23 and J24 sizes because of HSFCU PCB frame restrictions.<br/>Move HSFCU Connectors to be in correct physical layout.<br/>Add J29 and J30 to shutter wiring to accommodate non-shutter launch latch confirm inputs. Change J15 and J16 to 25way as Doug's given the shutter more wires.<br/>Change HSFCU Shutter J17 and J18 to 21way MDM to match.<br/>Show power links on DRCU unit because these are not internal.<br/>Update HSFCU Bias connectors J29/32 to use 78-way HD triple row connectors after their acceptance by ESA.</p> |
| 3.6 | 20/12/01 | Frederic's comments on J22 and 3TCs implemented.   |
| 3.7 | 1/1/02   | HSFCU Duplicate J29/30 Fixed, bumping numbers for JTAGs  |



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### ACRONYM LIST

| Term  | Meaning  |
|-------|--|
| ADC   | Analogue to Digital Converter                            |
| AIV   | Assembly, Integration and Verification                   |
| AME   | Absolute Measurement Error                               |
| AOCS  | Attitude and Orbit Control System                        |
| APART | Arizona's Program for the Analysis of Radiation Transfer |
| APE   | Absolute Pointing Error                                  |
| ASAP  | Advanced Systems Analysis Program                        |
| AVM   | Avionics Model   |
| BDA   | Bolometer Detector Array                                 |
| BFL   | Back Focal Length  |
| BRO   | Breault Research Organization                            |
| BSM   | Beam Steering Mirror                                     |
| CDMS  | Command and Data Management System                       |
| CDMU  | Command and Data Management Unit                         |
| CDR   | Critical Design Review                                   |
| CMOS  | Complimentary Metal Oxide Silicon                        |
| CPU   | Central Processing Unit                                  |
| CVV   | Cryostat Vacuum Vessel                                   |
| DAC   | Digital to Analogue Converter                            |
| DAQ   | Data Acquisition   |
| DCU   | Detector Control Unit = HSDCU                            |
| DPU   | Digital Processing Unit = HSDPU                          |
| DSP   | Digital Signal Processor                                 |
| DQE   | Detective Quantum Efficiency                             |
| EDAC  | Error Detection and Correction                           |
| EGSE  | Electrical Ground Support Equipment                      |
| EMC   | Electro-magnetic Compatibility                           |
| EMI   | Electro-magnetic Interference                            |
| ESA   | European Space Agency                                    |
| FCU   | FCU Control Unit = HSFCU                                 |
| FIR   | Far Infrared   |
| FIRST | Far Infra-Red and Submillimetre Telescope                |
| FOV   | Field of View  |
| F-P   | Fabry-Perot  |
| FPGA  | Field Programmable Gate Array                            |
| FPU   | Focal Plane Unit   |
| FTS   | Fourier Transform Spectrometer                           |
| FWHM  | Full Width Half maximum                                  |
| GSFC  | Goddard Space Flight Center                              |
| HK    | House Keeping  |
| HOB   | Herschel Optical Bench                                   |
| HPDU  | Herschel Power Distribution Unit                         |
| HSDCU | Herschel-SPIRE Detector Control Unit                     |
| HSDPU | Herschel-SPIRE Digital Processing Unit                   |
| HSFCU | Herschel-SPIRE FPU Control Unit                          |
| HSO   | Herschel Space Observatory                               |
| IF    | Interface  |
| IID-A | Instrument Interface Document - Part A                   |



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| Term  | Meaning   |
|-------|---|
| IID-B | Instrument Interface Document - Part B  |
| IMF   | Initial Mass Function   |
| IR    | Infrared  |
| IRD   | Instrument Requirements Document  |
| IRTS  | Infrared Telescope in Space   |
| ISM   | Interstellar Medium   |
| JFET  | Junction Field Effect Transistor  |
| ISO   | Infrared Space Observatory  |
| LCL   | Latching Current Limiter  |
| LIA   | Lock-In Amplifier   |
| LVDT  | Linear Variable Differential Transformer  |
| MAC   | Multi Axis Controller   |
| LWS   | Long Wave Spectrometer (an instrument used on ISO)  |
| MCU   | Mechanism Control Unit = HSMCU  |
| M-P   | Martin-Puplett  |
| NEP   | Noise Equivalent Power  |
| NTD   | Neutron Transmutation Doped   |
| OBS   | On-Board Software   |
| OMD   | Observing Modes Document  |
| OPD   | Optical Path Difference   |
| PACS  | Photodetector Array Camera and Spectrometer   |
| PCAL  | Photometer Calibration source   |
| PID   | Proportional, Integral and Differential (used in the context of feedback control loop architecture) |
| PLW   | Photometer, Long Wavelength   |
| PMW   | Photometer, Medium Wavelength   |
| POF   | Photometer Observatory Function   |
| PROM  | Programmable Read Only Memory   |
| PSW   | Photometer, Short Wavelength  |
| PUS   | Packet Utilisation Standard   |
| RMS   | Root Mean Squared   |
| SCAL  | Spectrometer Calibration Source   |
| SCUBA | Submillimetre Common User Bolometer Array   |
| SED   | Spectral Energy Distribution  |
| SMEC  | Spectrometer Mechanics  |
| SMPS  | Switch Mode Power Supply  |
| SOF   | Spectrometer Observatory Function   |
| SPIRE | Spectral and Photometric Imaging Receiver   |
| SRAM  | Static Random Access Memory   |
| SSSD  | SubSystem Specification Document  |
| STP   | Standard Temperature and Pressure   |
| SVM   | Service Module  |
| TBC   | To Be Confirmed   |
| TBD   | To Be Determined  |
| TC    | Telecommand   |
| URD   | User Requirements Document  |
| UV    | Ultra Violet  |
| WE    | Warm Electronics  |
| ZPD   | Zero Path Difference  |

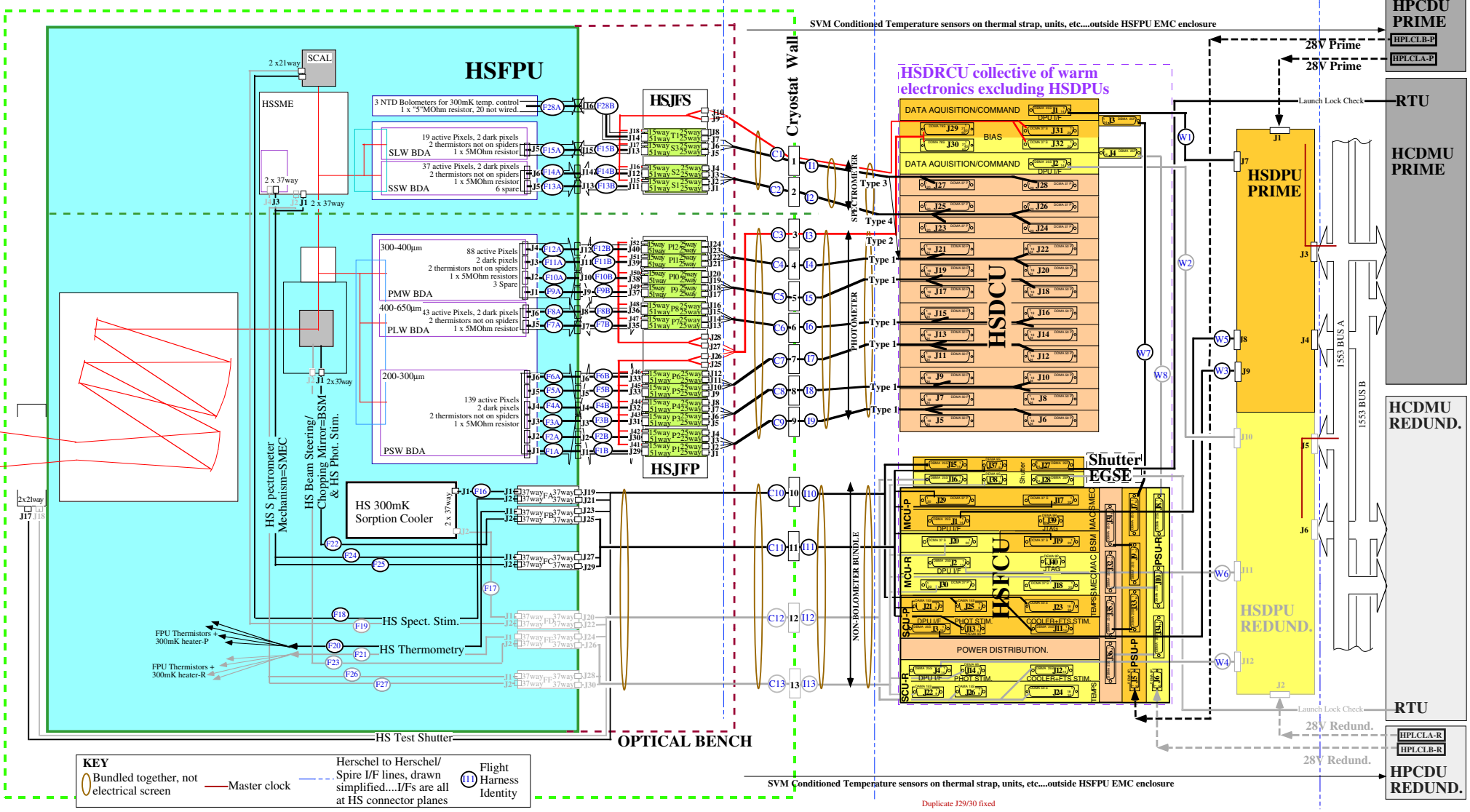


### HERSCHEL-SPIRE(HS)

### HERSCHEL

### HERSCHEL-SPIRE(HS)

### HERSCHEL



**KEY**  
 Bundled together, not electrical screen  
 Master clock  
 Herschel to Herschel/Spire I/F lines, drawn simplified...I/Fs are all at HS connector planes  
 Flight Harness Identity

SVM Conditioned Temperature sensors on thermal strap, units, etc...outside HSFCU EMC enclosure

Duplicate J29/30 fixed

HPCDU PRIME  
 HPLCLB-P  
 HPLCLA-P  
 RTU  
 HCDMU PRIME  
 HCDMU REDUND.  
 RTU  
 HPLCLA-R  
 HPLCLB-R  
 HPCDU REDUND.