

# APPENDIX B

## Electrical Interface Control Document (EICD) according to DRD44-1.

### Introduction

#### – Purpose

The purpose of this document is to establish the Electrical I/F characteristics of JEM-X.

JEM-X consists of:

The Detector Unit (DAE) and the Electronics Unit (DFEE). The two units are delivered integrated as one unit (JEM-X). JEM-X has two different electrical interfaces:

- External from the DFEE to the S/C via the DPE, RTU and PDU
- Internal between the DFEE and the DAE.

#### List of Acronyms

DAE	Detector Analog Electronics
DFEE	Digital Front End Electronics
DPE	Data Processing Electronics
EGSE	Electrical Ground Support Equipment
EICD	Electrical Interface Control Document
EID	Experiment Interface Document
ESA	European Space Agency
HS	High Speed
I/F	Interface
JEM-X	Joint European X-Ray Monitor
LS	Low Speed
PDU	Power distribution Unit
RTU	Remote Terminal Unit
S/C	Spacecraft

#### – Applicable Documents

Experiment Interface Document (EID) - Part A

## – Connector Definition

**3.1** The DFEE has the following connector types:

### **3.1.1 DFEE connectors for external interfaces**

ID.	Connector type	Comments	To
J04	ESA/SCC-3401-002-01B-DDMA-50S-NMB-FO	House Keeping	DPE
J05	ESA/SCC-3401-002-01B-DBMA-25P-NMB-FO	Command	RTU
J06	ESA/SCC-3401-002-01B-DDMA-50S-NMB-FO	Serial Communication	DPE
J07	ESA/SCC-3401-002-01B-DAMA-15P-NMB-FO	Main Power	PDU-M
J08	ESA/SCC-3401-002-01B-DAMA-15P-NMB-FO	Redundant Power	PDU-R

### **3.1.2 DFEE connectors for internal interfaces.**

ID.	Connector type	Comments	To
J01	ESA/SCC-3401-002-01B-DDMA-50S-NMB-FO	Analog Signals	DAE
J02	ESA/SCC-3401-002-01B-DBMA-25S-NMB-FO	Control Signals	DAE
J03	ESA/SCC-3401-002-01B-DEMA-9P-NMB-FO	Test	Test Computer

**3.2** The DAE has the following connector types:

### **3.2.1 DAE connectors for internal interfaces.**

ID.	Connector type	Comments	To
HV	Ceramaseal Hermetic Type FDTH 12 kV	High Voltage	DFEE
J14	Ceramaseal Hermetic D Type	Analog Signals	DFEE
J15	Ceramaseal Hermetic D Type	Control Signals	DFEE

## – Connector Interconnection

The interconnections from the DFEE to the DPE, RTU and PDU are shown in the Interconnection Block Diagram in annex 1.

## – External Interface Pin Allocation

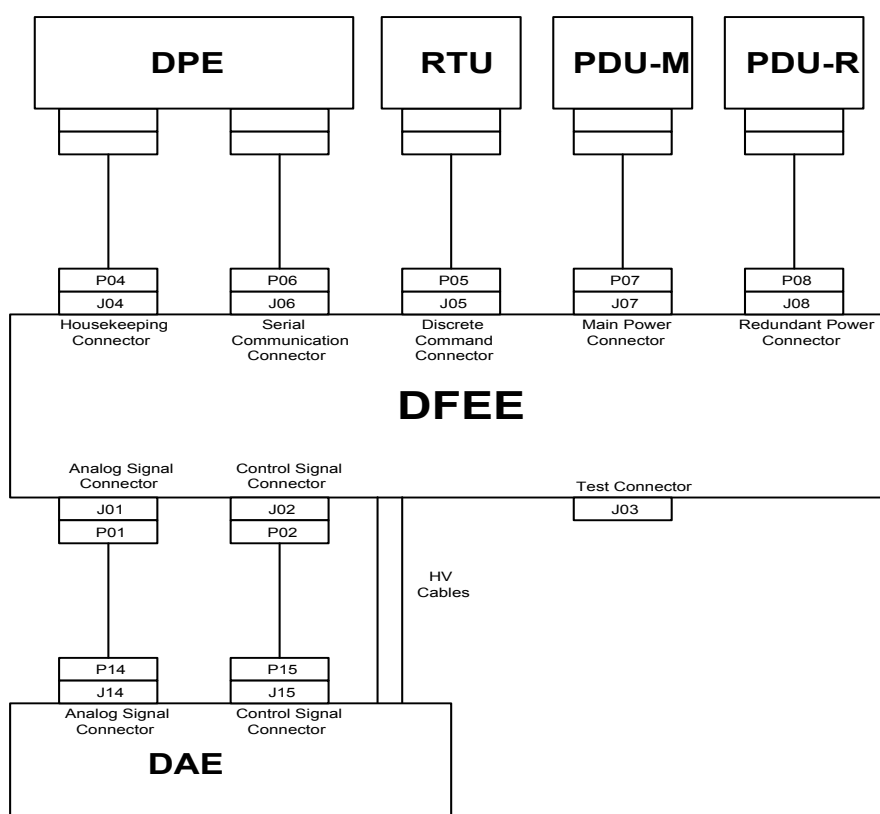
The tables in annex 2 show the pin allocation for the DFEE unit connectors to the DPE, RTU and PDU.

– **Internal Interface Pin Allocation.**

The tables in annex 3 show the pin allocation between the DFEE unit connectors and the DAE.

– **Interface Circuits.**

The Interface Circuits are shown in Annex 4



**Annex 2.      External Interface Pin Allocation.**

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Unit: DF				Function: Main Power				Checked by:				Issue				
Connector Identification: J07				Connector type: ESA/SCC-3401-002-01b-DAMA-15P-NMB-												
Pin Number	Signal Type	Signal Name	Signal Description	Electrical Type	Current (mA)	Source Impedance (Kohm)	Load Impedanc (Kohm)	Frequency (Hz)	Voltage (V)	Load Capacity to GND	Source Capacity to GND	Rise Time (uS)	Pulse Width (uS)	Sensitivity	Specific Harness Requirements	To Unit
1			NC													
2		PBUSN	28V Pow er Bus 1	DC				0	28						TP24	PDU
10		PBUSN_RTN	28V Pow er Bus 1 RTN	DC				0	0						TP24	PDU
3		PBUSN	28V Pow er Bus 1	DC				0	28						TP24	PDU
11		PBUSN_RTN	28V Pow er Bus 1 RTN	DC				0	0						TP24	PDU
4			NC													
5			NC													
6			NC													
7			NC													
8			NC													
9			NC													
12			NC													
13			NC													
14			NC													
15			NC													
Unit: DF				Function: Redundant Power				Checked by:				Issue				
Connector Identification: J08				Connector type: ESA/SCC-3401-002-01b-DAMA-15P-NMB-FO												
Pin Number	Signal Type	Signal Name	Signal Description	Electrical Type	Current (mA)	Source Impedance (Kohm)	Load Impedanc (Kohm)	Frequency (Hz)	Voltage (V)	Load Capacity to GND	Source Capacity to GND	Rise Time (uS)	Pulse Width (uS)	Sensitivity	Specific Harness Requirements	To Unit
1			NC													
2		PBUSR	28V Pow er Bus 2	DC				0	28						TP24	PDU
10		PBUSR_RTN	28V Pow er Bus 2 RTN	DC				0	0						TP24	PDU
3		PBUSR	28V Pow er Bus 2	DC				0	28						TP24	PDU
11		PBUSR_RTN	28V Pow er Bus 2 RTN	DC				0	0						TP24	PDU
4			NC													
5			NC													
6			NC													
7			NC													
8			NC													
9			NC													
12			NC													
13			NC													
14			NC													
15			NC													

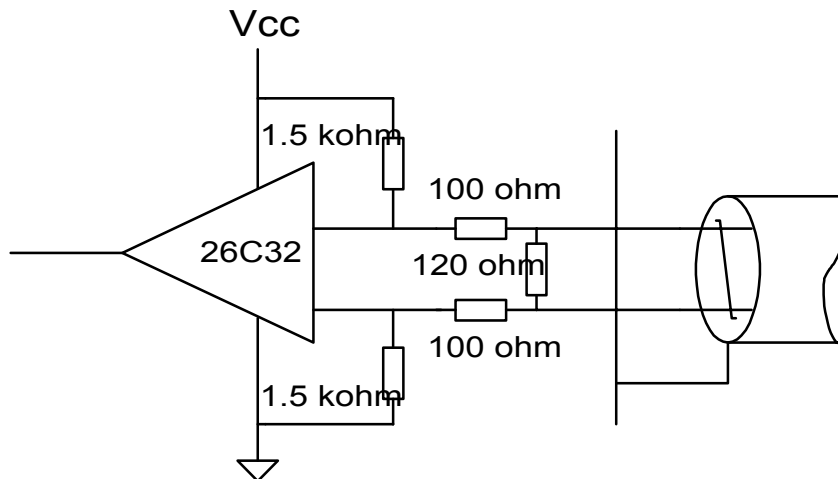
## Annex 3. Internal Interface Pin Allocation.

Unit: DFEE		Function: Analog Signal						Checked by:						Issue					
Connector Identification: J01						Connector type: ESA/SCC-3401-02-01B-DDMA-50S-NMB-FO													
Pin Number	Signal Type	Signal Name	Signal Description	Electrical Type	Current (mA)	Source Impedance	Load Impedanc	Frequency (Hz)	Voltage (V)	Load Cap to GND	Srce Capac to GND	Rise Time (uS)	Pulse Width (uS)	Sensitivity	Specific Harness Requirements	To Unit	Connector	Pin Number	
1		BACK0	Backplane Signal 0	ANA											TP26	DAE	J14		
2		BACK1	Backplane Signal 1	ANA											TP26	DAE	J14		
3		BACK2	Backplane Signal 2	ANA											TP26	DAE	J14		
4		BACK3	Backplane Signal 3	ANA											TP26	DAE	J14		
5		BACK4	Backplane Signal 4	ANA											TP26	DAE	J14		
6		BACK5	Backplane Signal 5	ANA											TP26	DAE	J14		
7		BACK6	Backplane Signal 6	ANA											TP26	DAE	J14		
8		BACK7	Backplane Signal 7	ANA											TP26	DAE	J14		
9		BACK8	Backplane Signal 8	ANA											TP26	DAE	J14		
10		BACK9	Backplane Signal 9	ANA											TP26	DAE	J14		
11		BACK10	Backplane Signal 10	ANA											TP26	DAE	J14		
12		BACK11	Backplane Signal 11	ANA											TP26	DAE	J14		
13		BACK12	Backplane Signal 12	ANA											TP26	DAE	J14		
14		BACK13	Backplane Signal 13	ANA											TP26	DAE	J14		
15		BACK14	Backplane Signal 14	ANA											TP26	DAE	J14		
16		BACK15	Backplane Signal 15	ANA											TP26	DAE	J14		
17		BACK16	Backplane Signal 16	ANA											TP26	DAE	J14		
18		BACK17	Backplane Signal 17	ANA											TP26	DAE	J14		
19		A_GND	Analog Ground	ANA											TP26	DAE	J14		
20		BACK18	Backplane Signal 18	ANA											TP26	DAE	J14		
21		A_GND	Analog Ground	ANA											TP26	DAE	J14		
22		BACK19	Backplane Signal 19	ANA											TP26	DAE	J14		
23		A_GND	Analog Ground	ANA											TP26	DAE	J14		
24		ANOD0	Anode Signal 0	ANA											TP26	DAE	J14		
25		A_GND	Analog Ground	ANA											TP26	DAE	J14		
26		ANOD1	Anode Signal 1	ANA											TP26	DAE	J14		
27		A_GND	Shield	ANA											TP26	DAE	J14		
28		VETO	Veto Signal	ANA											TP26	DAE	J14		
29		A_GND	Analog Ground	ANA											TP26	DAE	J14		
30		PR1	Pressure Transducer 1	ANA											TP26	DAE	J14		
31		A_GND	Analog Ground	ANA											TP26	DAE	J14		
32		PR2	Pressure Transducer 2	ANA											TP26	DAE	J14		
33		A_GND	Analog Ground	ANA											TP26	DAE	J14		
34		CATH0	Cathode signal 0	ANA											TP26	DAE	J14		
35		CATH1	Cathode signal 1	ANA											TP26	DAE	J14		
36		CATH2	Cathode signal 2	ANA											TP26	DAE	J14		
37		CATH3	Cathode signal 3	ANA											TP26	DAE	J14		
38		CATH4	Cathode signal 4	ANA											TP26	DAE	J14		
39		CATH5	Cathode signal 5	ANA											TP26	DAE	J14		
40		CATH6	Cathode signal 6	ANA											TP26	DAE	J14		
41		CATH7	Cathode signal 7	ANA											TP26	DAE	J14		
42		CATH8	Cathode signal 8	ANA											TP26	DAE	J14		
43		CATH9	Cathode signal 9	ANA											TP26	DAE	J14		
44		CATH10	Cathode signal 10	ANA											TP26	DAE	J14		
45		TMP1	Temperature Transducer 1	ANA											TP26	DAE	J14		
46		TMP2	Temperature Transducer 2	ANA											TP26	DAE	J14		
47		DAE+12V	+12V til DAE	DC				0							TP26	DAE	J14		
48		DAE+12V	+12V til DAE	DC				0							TP26	DAE	J14		
49		DAE-12V	-12V til DAE	DC				0							TP26	DAE	J14		
50		DAE-12V	-12V til DAE	DC				0							TP26	DAE	J14		

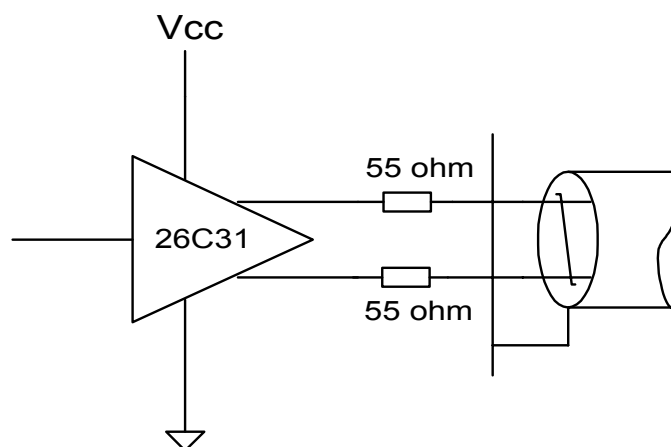
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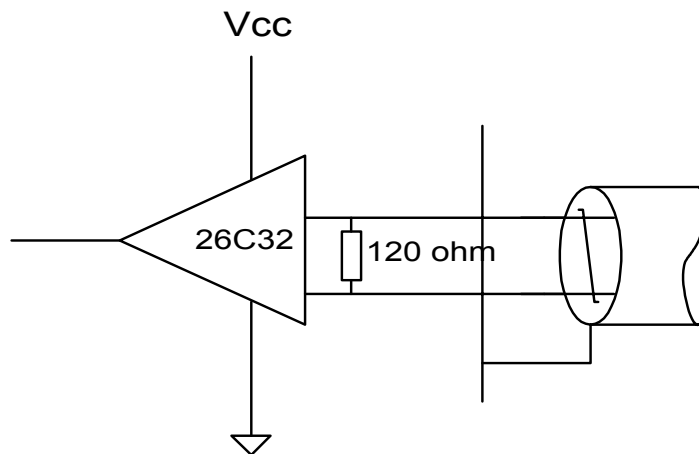
#### Annex 4. Interface Circuits.



### Interface Circuit 1 High Speed Interface Circuit for ENABLE, CLOCK, 4 MHz, 1 Hz, 1/8 Hz, and TEST Signal

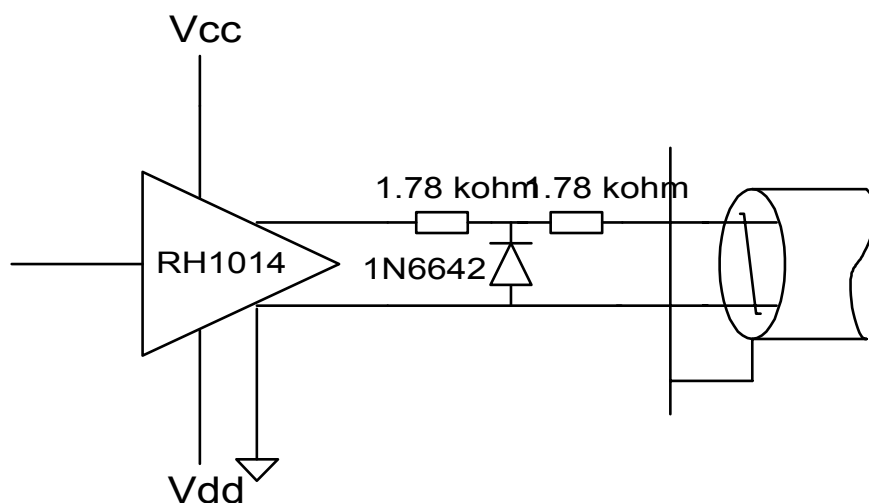


### Interface Circuit 2 Interface Circuit for HS-DATA, LS-TRANSMIT, and TEST Signal



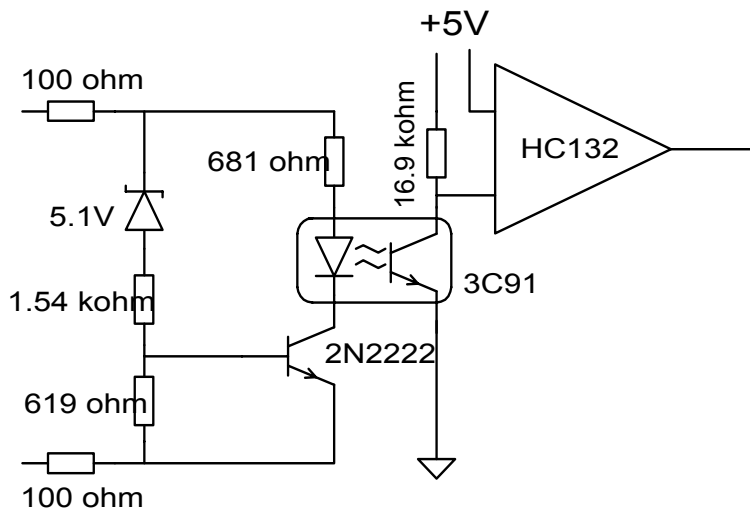
### Interface Circuit 3

#### Low Speed Interface Circuit for RECEIVE, CLOCK, and REQUEST Signal

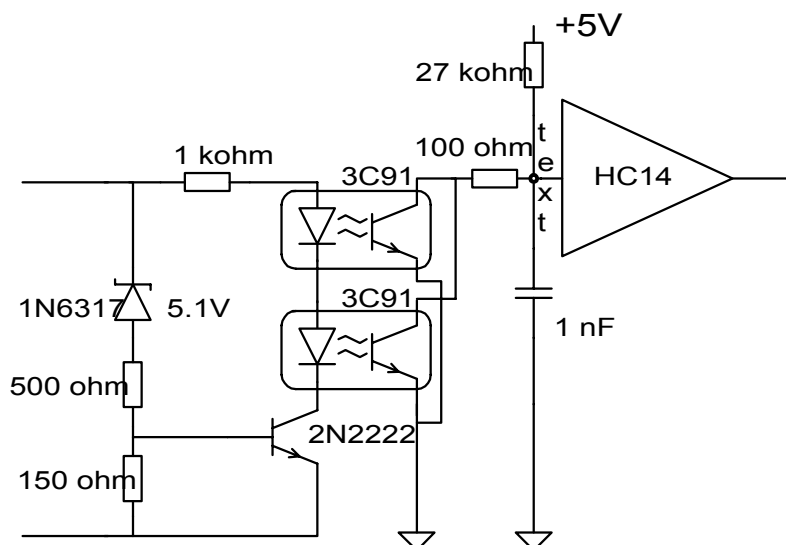


### Interface Circuit 4

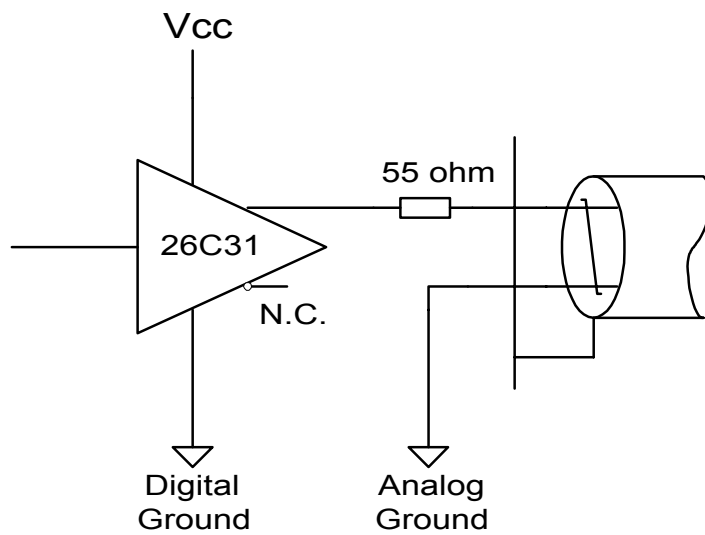
#### Interface Circuit for all ANALOG Signals



**Interface Circuit 5**  
**HV OFF Command Interface from DPE**



**Interface Circuit 6**  
**HV OFF Command Interface from RTU**



**Interface Circuit 7**  
**Interface Circuit for FIFO-FLAG**