CRYOSTAT – FFTS Detector Electronics Electronic Interface

Interface Document: LN-MPIFR-FDR-INT-205		Issue: 1.2
Relevant Documents: LN-MPIFR-FDR-ELEC-001, LN-MPIA-FDR-AIT-002		
Brief Description: Mechanical interface between cryostat and FFTS Detector Electronics		
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Interface Description

The FFTS detector electronics are mounted directly to the LN cryostat. There are two connectors with all the electrical signals to the fanout board with the HAWAII-1 detector inside the cryostat. The FFTS detector electronics have one additional connector cable to the detector electronics power supply, located in the cabinet TBD (see interface document LN-MPIFR-FDR-INT-241). The digitized raw detector data goes via a single fiber optics cable to the data interface, located near the FFTS workstation (see interface document LN-MPIA-FDR-INT-407).

Interface Specification

1. Mechanical mounting of the FFTS detector electronics to the cryostat

Free space on the cryostat wall: plane surface of 442 mm x 220 mm
Mounting threads: 10 M5-threads of 12 mm depth[1]
Electrical vacuum connectors: 2 holes of 54 mm diameter[1]
[1] For details, see mechanical drawing, Fig. 1

The dimensions of the FFTS detector electronics housing are shown in Fig. 2

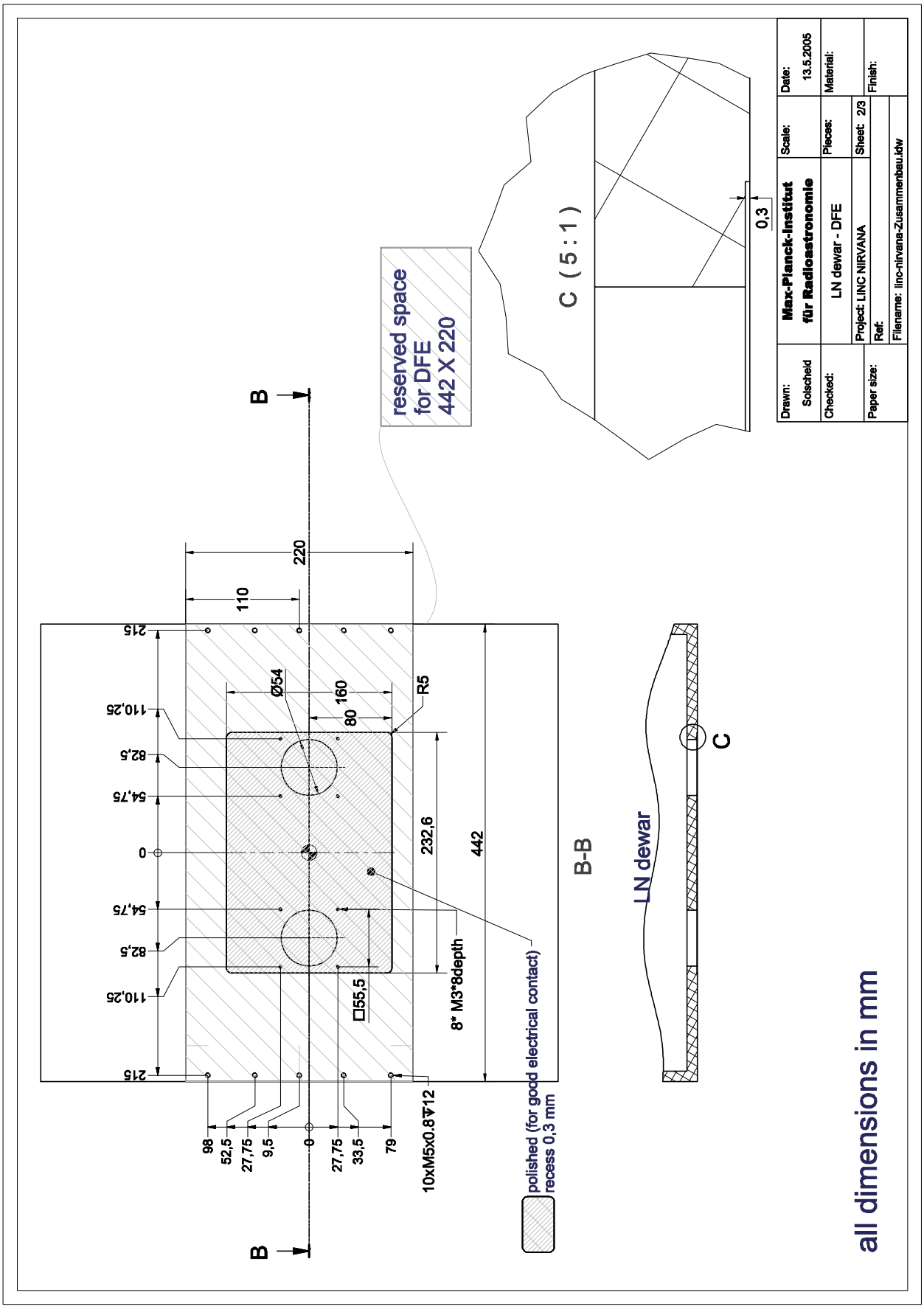

Fig. 1: FFTS Detector electronics housing, mechanical interface

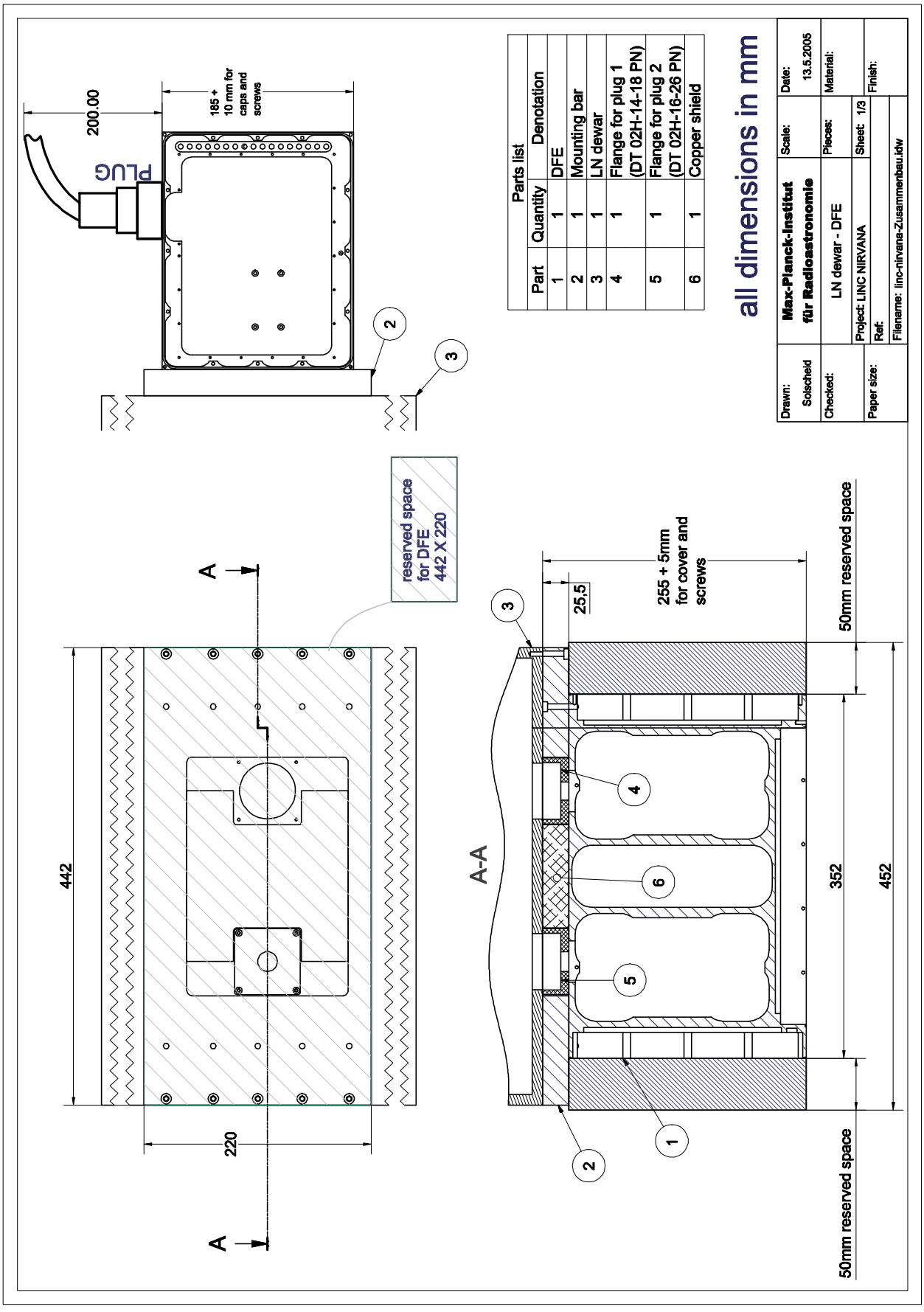

Fig. 2: FFTS Detector Electronics housing, mechanical dimensions

2. Electrical connectors on the cryostat

Connectors:

Connector 1: Detronics DT2H-14-18PN (clock signals and digital power)

Connector 2: Detronics DT2H-16-26PN (analog detector outputs and analog power)

The pin assignments of the two connectors as well as the wiring from these connectors to the fanout board to the FFTS head inside the cryostat are listed in Fig. 4.

Signal	Plug outside (on cryostat)	Cables in the warm part of the cryostat	Plug and socket connection on the z-stage		Cables from the cold to the warm part through the pin			Plug on fanout board	Notice
	Detoronics DT2H-14-18PN		MDM 31 S	MDM 31P		Heat dissipation for l = 10 cm	MDM 31 S	MDM 31 P	
Fsync	A	Copper 0.25 mm²	15	15	Copper ∅ 0.08 mm	8 mW	21	21	Twisted pair impedance 200Ω
Fsync Return	M	Copper 0.25 mm²	16	16	Copper ∅ 0.08 mm		22	22	
Lsync	B	Copper 0.25 mm²	31	31	Copper ∅ 0.08 mm	8 mW	31	31	Twisted pair impedance 200Ω
Lsync Return	N	Copper 0.25 mm²	30	30	Copper ∅ 0.08 mm		30	30	
Pixel Clock	C	Copper 0.25 mm²	12	12	Copper ∅ 0.08 mm	8 mW	12	12	Twisted pair impedance 200Ω
Pixel Clock Return	P	Copper 0.25 mm²	27	27	Copper ∅ 0.08 mm		27	27	
Line Clock	D	Copper 0.25 mm²	14	14	Copper ∅ 0.08 mm	8 mW	23	23	Twisted pair impedance 200Ω
Line Clock Return	R	Copper 0.25 mm²	29	29	Copper ∅ 0.08 mm		24	24	
Reset Clock	E	Copper 0.25 mm²	13	13	Copper ∅ 0.08 mm	8 mW	13	13	Twisted pair impedance 200Ω
Reset Clock Return	S	Copper 0.25 mm²	28	28	Copper ∅ 0.08 mm		28	28	
Read Clock	F	Copper 0.25 mm²	11	11	Copper ∅ 0.08 mm	8 mW	11	11	Twisted pair impedance 200Ω
Read Clock Return	T	Copper 0.25 mm²	26	26	Copper ∅ 0.08 mm		26	26	
Digital Power	G	Copper 0.5 mm²	10	10	Copper ∅ 0.13 mm	20 mW	10	10	Twisted pair impedance 200Ω
Digital Ground	H	Copper 0.5 mm²	25	25	Copper ∅ 0.13 mm		25	25	
n. c.	J								
n. c.	K								
n. c.	L								
n. c.	U								
	Detoronics DT2H-16-26PN								
Coax1 Out-	C	Coax RG188	2	2	Coax Type SS	10 mW	2	2	coaxial
	M	shield	3	3	shield		3	3	
Coax2 Out+	D	Coax RG188	4	4	Coax Type SS	10 mW	4	4	coaxial
	L	shield	5	5	shield		5	5	
Coax3 Unused	E	Coax RG188	6	6	Coax Type SS	10 mW	6	6	coaxial
	K	shield	7	7	shield		7	7	
Coax4 Vref	F	Coax RG188	8	8	Coax Type SS	10 mW	8	8	coaxial
	J	shield	9	9	shield		9	9	
Analog Power	A	Copper 0.5 mm²	18	18	Copper ∅ 0.13 mm	20 mW	14	14	Twisted pair impedance 200Ω
Analog Ground	B	Copper 0.5 mm²	19	19	Copper ∅ 0.13 mm		29	29	
Bias Gate	H	Copper 0.25 mm²	20	20	Constantan ∅ 0.13 mm	2 mW	16	16	Twisted pair impedance 200Ω
Bias Gate Return	X	Copper 0.25 mm²	21	21	Constantan ∅ 0.13 mm		15	15	
Vreset	G	Copper 0.25 mm²	17	17	Constantan ∅ 0.13 mm	2 mW	17	17	Twisted pair impedance 200Ω
Vreset Return	W	Copper 0.25 mm²	1	1	Constantan ∅ 0.13 mm		1	1	
Ground	b, c	Copper 0.5 mm²	22	22	Copper ∅ 0.13 mm	10 mW	20	20	
Vdriver Pos	T	Copper 0.5 mm²	23	23	Copper ∅ 0.13 mm	20 mW	19	19	Twisted pair impedance 200Ω
Vdriver Neg	U	Copper 0.5 mm²	24	24	Copper ∅ 0.13 mm		18	18	
n. c.	N								
n. c.	P								
n. c.	R								
n. c.	S								
n. c.	V								
n. c.	Y								
n. c.	Z								
n. c.	a								
						162 mW			

Fig. 4: FFTS detector electronics, pin assignment for connectors 1 and 2

Special Requirements

For mounting and dismounting the FFTS detector electronics, special care has to be taken concerning the ESD risks for the FFTS HAWAII-1 detector inside the cryostat (see Chapter 10: Alignment, Setup, and Calibration, 8.1.1 FFTS Assembly and Integration with Cryostat, FDR document LN-MPIA-FDR-AIT-002). The FFTS detector electronics itself does not need any special protection.