

Atacama Large Millimeter Array

Draft only

Interface Control Document

Between:

Band 4 Cartridge

and:

IF Switch Sub-System

FEND- 40.02.04.00-40.08.01.00-A-ICD

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Change Record

Version	Date	Affected Section(s)	Change Request #	Reason/Initiation/Remarks
A	2004-09-17	all		first issue

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1 Purpose and scope

The electrical and physical interfaces between the Band 4 cartridge and the IF switch are described. This includes connector types and pin-outs. The interface is located between the connectors at the Band 4 warm cartridge assembly and the cables to the IF switch. This document was drafted with reference to [RD1].

2 Related Documents and Drawings

2.1 Applicable Documents

The following documents are part of this document to the extent specified herein. If not explicitly stated differently, the latest issue of the document is valid.

<i>Reference</i>	<i>Document title</i>	<i>Document ID</i>
[AD1]	ALMA System: Electromagnetic Compatibility (EMC) Requirements	ALMA-80.05.01.00-001-A-SPE
[AD2]	Band 4 Cartridge Technical Specifications	FEND-40.02.04.00-001-A-SPE
did not obtain → [AD3]	Front End IF Technical Specifications	FEND-40.08.00.00-001-A-SPE (in preparation)
[AD4]	Band 4 warm cartridge assembly specifications	(in preparation)
[AD5]	Band 4 cartridge to warm cartridge assembly ICD	(in preparation)

In the event of a conflict between one of the before mentioned applicable documents and the contents of this document, the contents of the applicable document shall be considered as a superseding requirement.

2.2 Reference documents

The following documents contain additional information and are referenced in this document.

<i>Reference</i>	<i>Document title</i>	<i>Document ID</i>
[RD1]	ICD between Band 9 cartridge and IF switch sub-system	FEND- 40.02.09.00-40.08.01.00-A-ICD

2.3 Abbreviations and Acronyms

A limited set of basic acronyms used in this document is given below.

ALMA	<u>A</u> ta <u>c</u> ama <u>L</u> arge <u>M</u> illimetre <u>A</u> rray
DSB	<u>D</u> ouble- <u>S</u> ide <u>B</u> and
ICD	<u>I</u> nterface <u>C</u> ontrol <u>D</u> ocument
IF	<u>I</u> ntermediate <u>F</u> requency
IO	<u>I</u> nput / <u>O</u> utput
LSB	<u>L</u> ower <u>S</u> ide <u>B</u> and
NAOJ	National Astronomical Observatory of Japan
SIS	<u>S</u> uperconductor- <u>I</u> nsulator- <u>S</u> uperconductor
SSB	<u>S</u> ingle- <u>S</u> ide <u>B</u> and
USB	<u>U</u> pper <u>S</u> ide <u>B</u> and
VSWR	<u>V</u> oltage <u>S</u> tanding <u>W</u> ave <u>R</u> atio
2SB	<u>S</u> ide <u>B</u> and separating

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3 Interface Design

3.1 Physical System Interfaces

3.1.1 Mechanical Interface

The IF switch cabling interfaces to the Band 4 cartridge via standard SMA type connectors. Four IF outputs will be provided. Each connector and connector mounting structure shall provide enough mechanical stability hold a 1.5 m long coaxial cable.

The SMA connector shall be of the stainless steel or gold-plated BeCu type, allowing for a minimum of 500 connecting operations.

The connectors shall be located at the warm cartridge assembly. The location shall be defined in a document describing the warm cartridge assembly [AD5].

The connectors shall be female.

3.1.1.1 Drawing

A detailed drawing describing the warm cartridge assembly including the connector location is included in [AD5]

3.1.2 Electronic Interface

The electronic interface shall have the following parameters at the reference plane of the connectors:

Parameters of the electronic interface	
(valid for all IF signals of the Band 4 cartridge)	
Minimum frequency	4 GHz
Maximum frequency	8 GHz
Total power range @ 4-8 GHz ¹	-37 dBm to -24 dBm
Maximum total power @ 10 MHz – 18 GHz ¹	< -22 dBm
Power variations @ 4-8 GHz	6 dB (peak-to-peak)
Power variations in any 2 GHz portion of the band	4 dB (peak-to-peak)
VSWR	≤ 1.4 on both sides of the interface
Impedance	50 Ω

¹ The power shall be measured with an input signal of 300 K.

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3.1.2.1 List of connectors

List of Electronic Connectors Issue: 1 Date: 2003-11-17 Subsystem/Module/Unit /Item: Band 4 cartridge
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Connectors #	Connector Reference	Function	Comment
0	SMA type female 50 Ohms	Polarisation 0 USB	This connector is polarisation 0
1	SMA type female 50 Ohms	Polarisation 1 USB	This connector is polarisation 1
2	SMA type female 50 Ohms	Polarisation 0 LSB	This connector is polarisation 0
3	SMA type female 50 Ohms	Polarisation 1 LSB	This connector is polarisation 1

4 Interface handling

The connectors shall be tightened with a torque of 100 Ncm by the use of the appropriate torque wrench. The interface is sensitive to static discharges. Precautions such as wearing grounded wristbands shall be applied before touching the interface. The interface is sensitive to dust/particles. A protective cover shall be used on connectors during storage and transport.