

ALMA

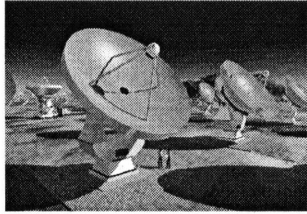
Front End Internal Interfaces

Gie Han Tan / Charles Cunningham

ALMA Front End IPT

FE Specs & Reqs Workshop

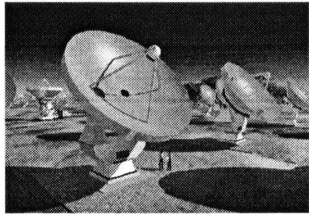
Charlottesville / 2002-11-22



Introduction

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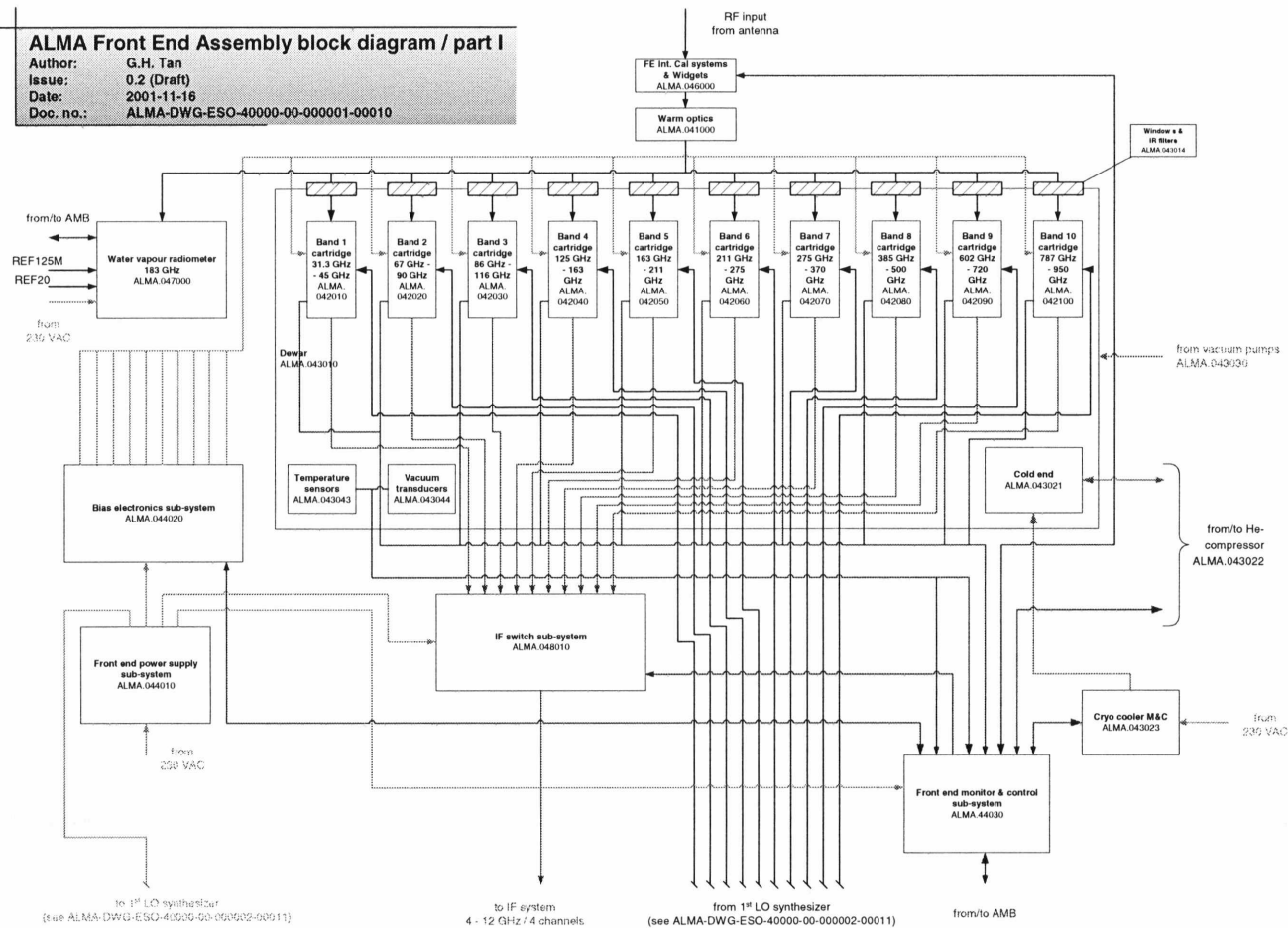
- The purpose of this meeting is to identify all ‘major’ front end internal interfaces
- ‘Major’ meaning an interface between two products inside the front end which are under the responsibility of different development groups
- This workshop doesn’t allow to prepare an Interface Control Document for all these interfaces (100+)
- Instead we should agree on a plan to prepare draft ICDs. This plan includes:
 - Who prepares the draft ICD: representatives of the two development groups involved
 - The dead line when the draft ICD is available: 13 December ‘02
 - Drafts to be submitted to Bob Freund (rfreund@nrao.edu) and Hans Rudolf (hrudolf@eso.org)

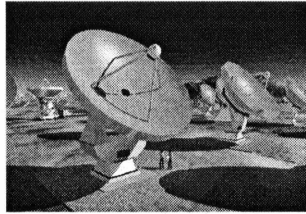


Front End Block Diagram (1)

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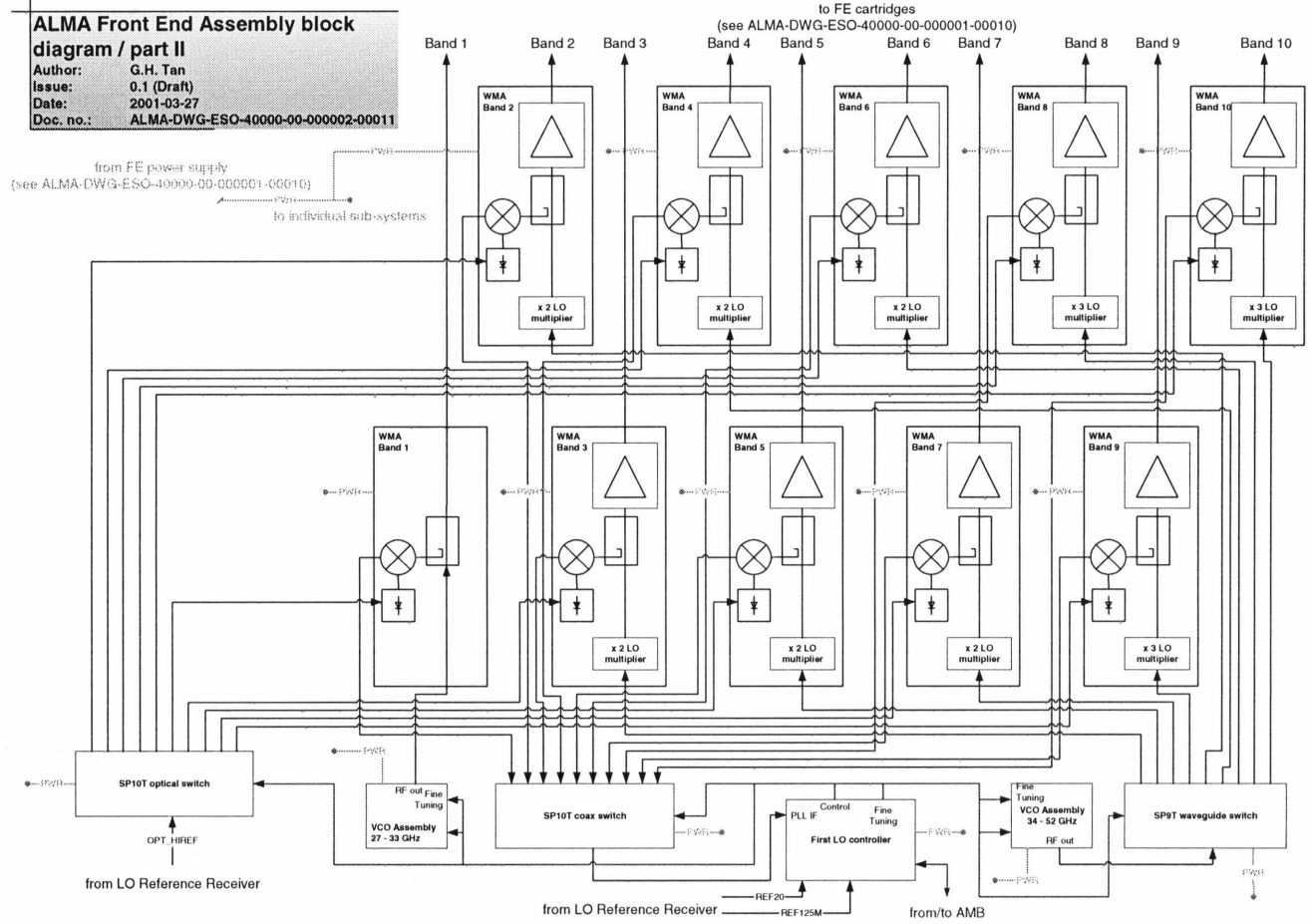
ALMA Front End Assembly block diagram / part I
 Author: G.H. Tan
 Issue: 0.2 (Draft)
 Date: 2001-11-18
 Doc. no.: ALMA-DWG-ESO-40000-00-000001-00010

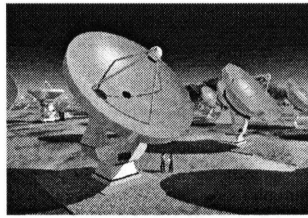




Front End Block Diagram (2)

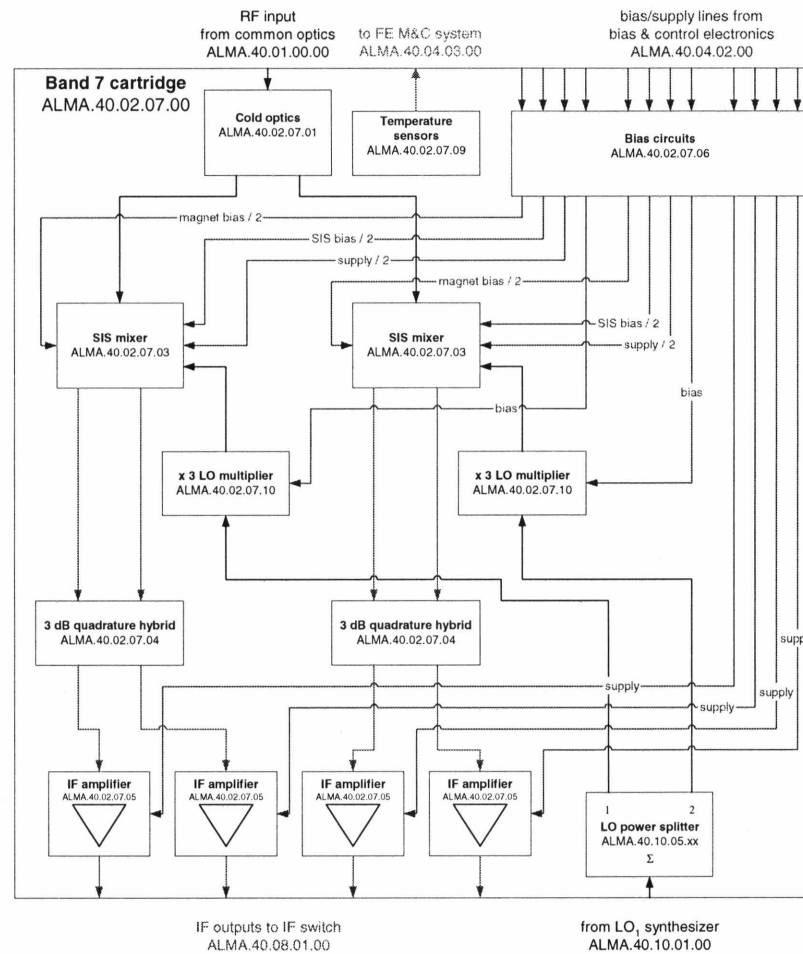
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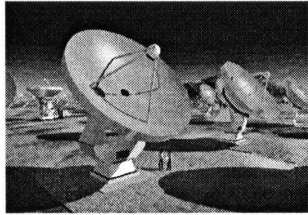




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Band 7 Cartridge Block Diagram

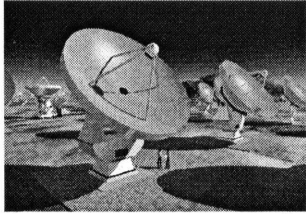




Interfaces to Warm Optics

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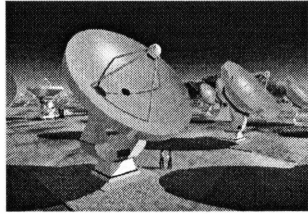
		<i>Doc</i>	<i>PT#</i>	<i>PT#</i>	<i>Rev</i>	
<i>From</i>	<i>To</i>	<i>Name</i>	<i>From</i>	<i>To</i>	<i>Let</i>	
Warm optics	Band 3 cold optics	ALMA-	40.01.00.00	40.02.03.01	A	ICD
Warm optics	Band 6 cold optics	ALMA-	40.01.00.00	40.02.06.01	A	ICD
Warm optics	Band 7 cold optics	ALMA-	40.01.00.00	40.02.07.01	A	ICD
Warm optics	Band 9 cold optics	ALMA-	40.01.00.00	40.02.09.01	A	ICD
Warm optics	Vacuum vessel	ALMA-	40.01.00.00	40.03.01.01	A	ICD
Warm optics	Vane Calibration sub-system	ALMA-	40.01.00.00	40.06.01.00	A	ICD
Warm optics	Water vapour radiometer	ALMA-	40.01.00.00	40.07.00.00	A	ICD



Interfaces to Band 3 Cartridge

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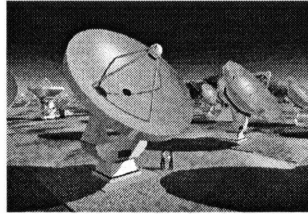
<i>From</i>	<i>To</i>	<i>Doc Name</i>	<i>PT# From</i>	<i>PT# To</i>	<i>Rev Let</i>
Band 3 cartridge	Dewar	ALMA-	40.02.03.07	40.03.01.00	A ICD
Band 3 cartridge	SIS Mixer bias circuits	ALMA-	40.02.03.07	40.04.02.01	A ICD
Band 3 cartridge	IF amplifier bias circuits	ALMA-	40.02.03.07	40.04.02.02	A ICD
Band 3 cartridge	Magnet bias circuits	ALMA-	40.02.03.07	40.04.02.04	A ICD
Band 3 cartridge	Heater bias circuits	ALMA-	40.02.03.07	40.04.02.05	A ICD
Band 3 cartridge	Front end M & C sub-system	ALMA-	40.02.03.07	40.04.03.00	A ICD
Band 3 cartridge	Power supply cabling	ALMA-	40.02.03.07	40.05.02.02	A ICD
Band 3 cartridge	Monitor & control cabling	ALMA-	40.02.03.07	40.05.02.03	A ICD
Band 3 cartridge	IF switch sub-system	ALMA-	40.02.03.07	40.08.01.00	A ICD
Band 3 cartridge	First LO frequency sources	ALMA-	40.02.03.07	40.10.01.00	A ICD



Interfaces to Band 6 Cartridge

ALMA

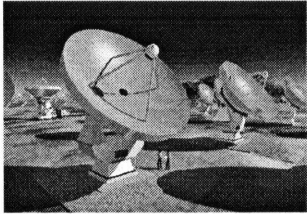
<i>From</i>	<i>To</i>	<i>Doc Name</i>	<i>PT# From</i>	<i>PT# To</i>	<i>Rev</i>	<i>Let</i>
Band 6 LO injection	Band 6 cryo frequency multiplier	ALMA-	40.02.06.02	40.02.06.11	A	ICD
Band 6 cartridge	Dewar	ALMA-	40.02.06.08	40.03.01.00	A	ICD
Band 6 cartridge	SIS Mixer bias circuits	ALMA-	40.02.06.08	40.04.02.01	A	ICD
Band 6 cartridge	IF amplifier bias circuits	ALMA-	40.02.06.08	40.04.02.02	A	ICD
Band 6 cartridge	Multiplier bias circuits	ALMA-	40.02.06.08	40.04.02.03	A	ICD
Band 6 cartridge	Magnet bias circuits	ALMA-	40.02.06.08	40.04.02.04	A	ICD
Band 6 cartridge	Heater bias circuits	ALMA-	40.02.06.08	40.04.02.05	A	ICD
Band 6 cartridge	Front end M & C sub-system	ALMA-	40.02.06.08	40.04.03.00	A	ICD
Band 6 cartridge	Power supply cabling	ALMA-	40.02.06.08	40.05.02.02	A	ICD
Band 6 cartridge	Monitor & control cabling	ALMA-	40.02.06.08	40.05.02.03	A	ICD
Band 6 cartridge	IF switch sub-system	ALMA-	40.02.06.08	40.08.01.00	A	ICD
Band 6 cartridge	First LO frequency sources	ALMA-	40.02.06.08	40.10.01.00	A	ICD



Interfaces to Band 7 Cartridge

ALMA

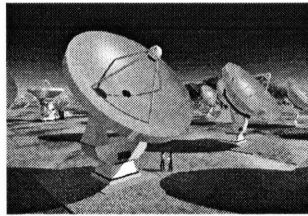
<i>From</i>	<i>To</i>	<i>Doc Name</i>	<i>PT# From</i>	<i>PT# To</i>	<i>Rev</i>	<i>Let</i>
Band 7 LO injection	Band 7 cryo frequency multiplier	ALMA-	40.02.07.02	40.02.07.10	A	ICD
Band 7 cartridge	Dewar	ALMA-	40.02.07.07	40.03.01.00	A	ICD
Band 7 cartridge	SIS Mixer bias circuits	ALMA-	40.02.07.07	40.04.02.01	A	ICD
Band 7 cartridge	IF amplifier bias circuits	ALMA-	40.02.07.07	40.04.02.02	A	ICD
Band 7 cartridge	Multiplier bias circuits	ALMA-	40.02.07.07	40.04.02.03	A	ICD
Band 7 cartridge	Magnet bias circuits	ALMA-	40.02.07.07	40.04.02.04	A	ICD
Band 7 cartridge	Heater bias circuits	ALMA-	40.02.07.07	40.04.02.05	A	ICD
Band 7 cartridge	Front end M & C sub-system	ALMA-	40.02.07.07	40.04.03.00	A	ICD
Band 7 cartridge	IF cabling	ALMA-	40.02.07.07	40.05.02.01	A	ICD
Band 7 cartridge	Power supply cabling	ALMA-	40.02.07.07	40.05.02.02	A	ICD
Band 7 cartridge	Monitor & control cabling	ALMA-	40.02.07.07	40.05.02.03	A	ICD
Band 7 cartridge	First LO frequency sources	ALMA-	40.02.07.07	40.10.01.00	A	ICD



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Interfaces to Band 9 Cartridge

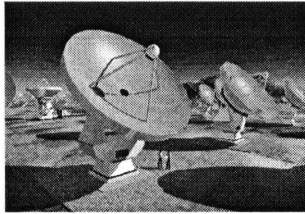
<i>From</i>	<i>To</i>	<i>Doc Name</i>	<i>PT# From</i>	<i>PT# To</i>	<i>Rev Let</i>
Band 9 LO injection	Band 9 cryo frequency multiplier	ALMA-	40.02.09.02	40.02.09.09	A ICD
Band 9 cartridge	Dewar	ALMA-	40.02.09.06	40.03.01.00	A ICD
Band 9 cartridge	SIS Mixer bias circuits	ALMA-	40.02.09.06	40.04.02.01	A ICD
Band 9 cartridge	IF amplifier bias circuits	ALMA-	40.02.09.06	40.04.02.02	A ICD
Band 9 cartridge	Multiplier bias circuits	ALMA-	40.02.09.06	40.04.02.03	A ICD
Band 9 cartridge	Magnet bias circuits	ALMA-	40.02.09.06	40.04.02.04	A ICD
Band 9 cartridge	Heater bias circuits	ALMA-	40.02.09.06	40.04.02.05	A ICD
Band 9 cartridge	Front end M & C sub-system	ALMA-	40.02.09.06	40.04.03.00	A ICD
Band 9 cartridge	IF cabling	ALMA-	40.02.09.06	40.05.02.01	A ICD
Band 9 cartridge	Power supply cabling	ALMA-	40.02.09.06	40.05.02.02	A ICD
Band 9 cartridge	Monitor & control cabling	ALMA-	40.02.09.06	40.05.02.03	A ICD
Band 9 cartridge	First LO frequency sources	ALMA-	40.02.09.06	40.10.01.00	A ICD



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Interfaces to Cryostat

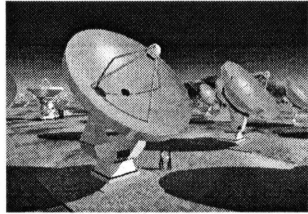
<i>From</i>	<i>To</i>	<i>Doc Name</i>	<i>PT# From</i>	<i>PT# To</i>	<i>Rev Let</i>	
Vacuum vessel	Front end mounting ring	ALMA-	40.03.01.01	40.05.01.02	A	ICD
Mounting plates	Vane Calibration sub-system	ALMA-	40.03.01.03	40.06.01.00	A	ICD
Cold end	Front end M & C sub-system	ALMA-	40.03.02.01	40.04.03.00	A	ICD
Cold end	Power supply cabling	ALMA-	40.03.02.01	40.05.02.02	A	ICD
Cold end	Monitor & control cabling	ALMA-	40.03.02.01	40.05.02.03	A	ICD
Cryo compressor	Front end M & C sub-system	ALMA-	40.03.02.02	40.04.03.00	A	ICD
Cryo compressor	Power supply cabling	ALMA-	40.03.02.02	40.05.02.02	A	ICD
Cryo compressor	Monitor & control cabling	ALMA-	40.03.02.02	40.05.02.03	A	ICD
Cryo cooler monitoring & control	Front end M & C sub-system	ALMA-	40.03.02.03	40.04.03.00	A	ICD
Cryo cooler monitoring & control	Power supply cabling	ALMA-	40.03.02.03	40.05.02.02	A	ICD
Cryo cooler monitoring & control	Monitor & control cabling	ALMA-	40.03.02.03	40.05.02.03	A	ICD
High vacuum pump	Front end M & C sub-system	ALMA-	40.03.03.02	40.04.03.00	A	ICD
High vacuum pump	Power supply cabling	ALMA-	40.03.03.02	40.05.02.02	A	ICD
High vacuum pump	Monitor & control cabling	ALMA-	40.03.03.02	40.05.02.03	A	ICD
Vacuum meters	Front end M & C sub-system	ALMA-	40.03.03.03	40.04.03.00	A	ICD
Vacuum meters	Power supply cabling	ALMA-	40.03.03.03	40.05.02.02	A	ICD
Vacuum meters	Monitor & control cabling	ALMA-	40.03.03.03	40.05.02.03	A	ICD
Electrical feed-throughs	Front end M & C sub-system	ALMA-	40.03.04.01	40.04.03.00	A	ICD
Electrical feed-throughs	Power supply cabling	ALMA-	40.03.04.01	40.05.02.02	A	ICD
Electrical feed-throughs	Monitor & control cabling	ALMA-	40.03.04.01	40.05.02.03	A	ICD



Interfaces to FE Auxiliary SS

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<i>From</i>	<i>To</i>	<i>Doc Name</i>	<i>PT# From</i>	<i>PT# To</i>	<i>Rev Let</i>	
Front end power supply sub-system	Bias electronics sub-system	ALMA-	40.04.01.00	40.04.02.00	A	ICD
Front end power supply sub-system	Front end M & C sub-system	ALMA-	40.04.01.00	40.04.03.00	A	ICD
Front end power supply sub-system	Front end frame	ALMA-	40.04.01.00	40.05.01.01	A	ICD
Bias electronics sub-system	Front end CAN bus interface	ALMA-	40.04.02.00	40.04.03.01	A	ICD
Bias electronics sub-system	Front end frame	ALMA-	40.04.02.00	40.05.01.01	A	ICD
Front end M & C sub-system	Front end frame	ALMA-	40.04.03.00	40.05.01.01	A	ICD
Front end embedded processor	Front end integrated calibration & widgets	ALMA-	40.04.03.02	40.06.00.00	A	ICD
Front end embedded processor	IF switch sub-system	ALMA-	40.04.03.02	40.08.01.00	A	ICD
Front end embedded processor	First LO frequency sources	ALMA-	40.04.03.02	40.10.01.00	A	ICD
Front end embedded processor	Warm frequency multipliers	ALMA-	40.04.03.02	40.10.02.00	A	ICD
Front end embedded processor	First LO PLL unit	ALMA-	40.04.03.02	40.10.03.00	A	ICD
Front end embedded processor	Band selection	ALMA-	40.04.03.02	40.10.04.00	A	ICD
Front end embedded processor	First LO interconnects	ALMA-	40.04.03.02	40.10.05.00	A	ICD
Front end embedded software	Front end integrated calibration & widgets	ALMA-	40.04.03.03	40.06.00.00	A	ICD
Front end embedded software	IF switch sub-system	ALMA-	40.04.03.03	40.08.01.00	A	ICD
Front end embedded software	First LO frequency sources	ALMA-	40.04.03.03	40.10.01.00	A	ICD
Front end embedded software	Warm frequency multipliers	ALMA-	40.04.03.03	40.10.02.00	A	ICD
Front end embedded software	First LO PLL unit	ALMA-	40.04.03.03	40.10.03.00	A	ICD
Front end embedded software	Band selection	ALMA-	40.04.03.03	40.10.04.00	A	ICD
Front end embedded software	First LO interconnects	ALMA-	40.04.03.03	40.10.05.00	A	ICD



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Interfaces to Front End Chassis

<i>From</i>	<i>To</i>	<i>Doc Name</i>	<i>PT# From</i>	<i>PT# To</i>	<i>Rev</i>	<i>Let</i>
IF cabling	Water vapour radiometer	ALMA-	40.05.02.01	40.07.00.00	A	ICD
IF cabling	IF switch sub-system	ALMA-	40.05.02.01	40.08.01.00	A	ICD
Power supply cabling	Water vapour radiometer	ALMA-	40.05.02.02	40.07.00.00	A	ICD
Power supply cabling	IF switch sub-system	ALMA-	40.05.02.02	40.08.01.00	A	ICD
Power supply cabling	First LO frequency sources	ALMA-	40.05.02.02	40.10.01.00	A	ICD
Monitor & control cabling	Water vapour radiometer	ALMA-	40.05.02.03	40.07.00.00	A	ICD
Monitor & control cabling	IF switch sub-system	ALMA-	40.05.02.03	40.08.01.00	A	ICD
Monitor & control cabling	First LO frequency sources	ALMA-	40.05.02.03	40.10.01.00	A	ICD