

Interferometer Sensing and Control (ISC) CDS Electronics and Beyond

ISC Breakout Presentation
March, 2007 LSC Meeting

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ncedligo AdLIGO ISC What's New?

Much will change

- » Manufacturing and Design
 - With the limited staff, we must effectively use out-sourcing
 - Board level testing done outside
 - Contract design where possible
 - Key design personnel can't become mired in secondary duties
 - Parts research and ordering can't be done by engineers
 - Better use of technicians for fleshing out test plans etc.
 - Creation of a process that allows site personnel to become involved with building subsystems
 - Electronics must be more modular
 - We want to build a mountain of LEGO type chassis with a subsystem rack recipe. Especially useful for common building blocks like AA and AI
 - Pre-fabricated racks that are fully loaded and tested prior to installation
 - Careful attention to the module-level design for efficient racks and cabling
 - Remember, there are no more "cross-connects"



More What's New

- Monitors on designs to facilitate commissioning and repair
 - Permits cabling from the back of the rack
 - Discourages wear-and-tear on critical connections
- More up-front work, less back end commissioning
 - The use of an automated system emulator
 - We must avoid installing equipment with the notion that we can fix it during commissioning. That didn't work last time
- Better planning and documentation
 - System block-diagrams are the norm now
 - Documentation has taken leaps forward
 - Wiki based module test procedures and travelers



Scope of Work

» What are we changing, what needs to be done?

- For the ISC, just about everything
 - With no more cross-connects, almost all of the Euro-card format electronics will be re-designed and re-packaged
 - Default standards are differential signal transmission and 19 inch rack mounted RFI chassis
- Gee Rich, do you mean everything?
 - Yes, here's a smattering
 - » Continued low noise ADC/DAC design and prototyping
 - » LSC photodiode redesign
 - » ASC photodiode redesign
 - » LSC Demodulator board redesign
 - » ASC Demodulator board redesign
 - » RF distribution system specification development
 - » MC/CM Servo
 - » IO RF System



Planning at the block diagram level

Figure 3: HAM6 / ISCT2 ISC Components—Conceptual Electronics Layout Wednesday, March 07, 2007 LSC RFPD QPD LSC RFPD Demod Chassis LSC Whitening Chassis LSC RFPD HAM-6 QPD Interface Chassis ASC AA Chassis QPD1 QPD2 WFS Interfac Chassis WFS Interfac Chassis LSC RFPD LSC RFPD Demod Chassis LSC Whitening Chassis OMC Breadboard QPD2 QPD1 Piezo Thermal PD Field AA Chassis Al Chassis 4 Input / 1 Output

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Planning at the rack level

Figure 4: HAM6 ISI/SUS and HAM6/ISCT2 DC Readout/ISC Controls – Conceptual Rack Layout

Wednesday, March 07, 2007

01	
02	
03	Timing Slave
04	
05	
06	
07	
08	HAM6ISVSUS VO Chassis
09	(2 ADC/3 DAC)
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	SUS SOS Coil Drvr
21	SUS SOS Coil Drvr
22	SUS SOS White / AA Chassis
23	
24	OMC SUS Rovr Chassis
25	OMO 303 NEVI CIIdasis
26	Tip/Tilt SUS Rovr Chassis
27	
28	SUS SOS AI / Dewhite Chassis
29	SUS SOS AI / Dewhite Chassis
30	
31	
32	GS-13 / STS-2 Locker / Unlocker
33	
34	ISI Interface HAM6
35	ISI AI Chassis
36	ISI AA Chassis
37	IOI AA OIIdoolb
38	ISI Coil Driver1
39	ISI COII DIIVEI I
40	ISI Coil Driver 2
41	ISI COII DIIVEI 2

01	
02	
03	Timing Slave
04	
05	
06	
07	
08	HAM6 / OMC ISC
09	VO Chassis (3 ADC / 1 DAC)
10	· · · · ·
11	
12	
13	
14	OMC AA Chassis
15	OMC AA Chassis
16	OMC PZT Drvr Chassis
17	OMC AI Chassis
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22	
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24	l
25	ASC Signal AA Chassis
26	Acc digital AA chassis
27	LSC Signal AA Chassis
28	200 0.9.11.7.0.0.11.11.11.11.11.11.11.11.11.11.11.11
29	
30	
31	WFS Demod Chassis
32	WFS Demod Chassis
33	
34	QPD Whitening Chassis
35	
36	
37	LSC RFPD Whitening Chassis
38	LSC RFPD Demode
39	LSC RFPD Demode
40	
41	

Two Racks to be supplied as part of Eligo:

1) One rack to house single stage ISI controls for HAM6, plus Tip/ Till SOS mirror controls. This rack may later be updated in AdvLigo to include controls for ISI in HAM5.

Second rack is for ISC signals. Only items in rack slots 1U thru
 TU are to be installed for Eligo. Remaining parts will be installed in
 AdvLigo (25U thru bottom of rack).

3) Two separate CDS FE computers (not shown) will be provided to control and monitor systems in these racks.