MAIT

What does it mean ?

- Major Area Integration Team ?
- Multidisciplinary Accident Investigation Team ?
- McCabe‘s Artificially Intelligence Tipper ?
  (www.mymait.com)
- Maintenance Assistance and Instruction Team ?
- Martial Art Instructor / Trainer ? ….

…. best guess :

- **Manufacturing, Assembly, Integration and Testing !**

OK, acronym problem solved. Let’s build an NGC …

… starting with the Manufacturing /Assembly !

Procurement

BOM (Bill of Materials)

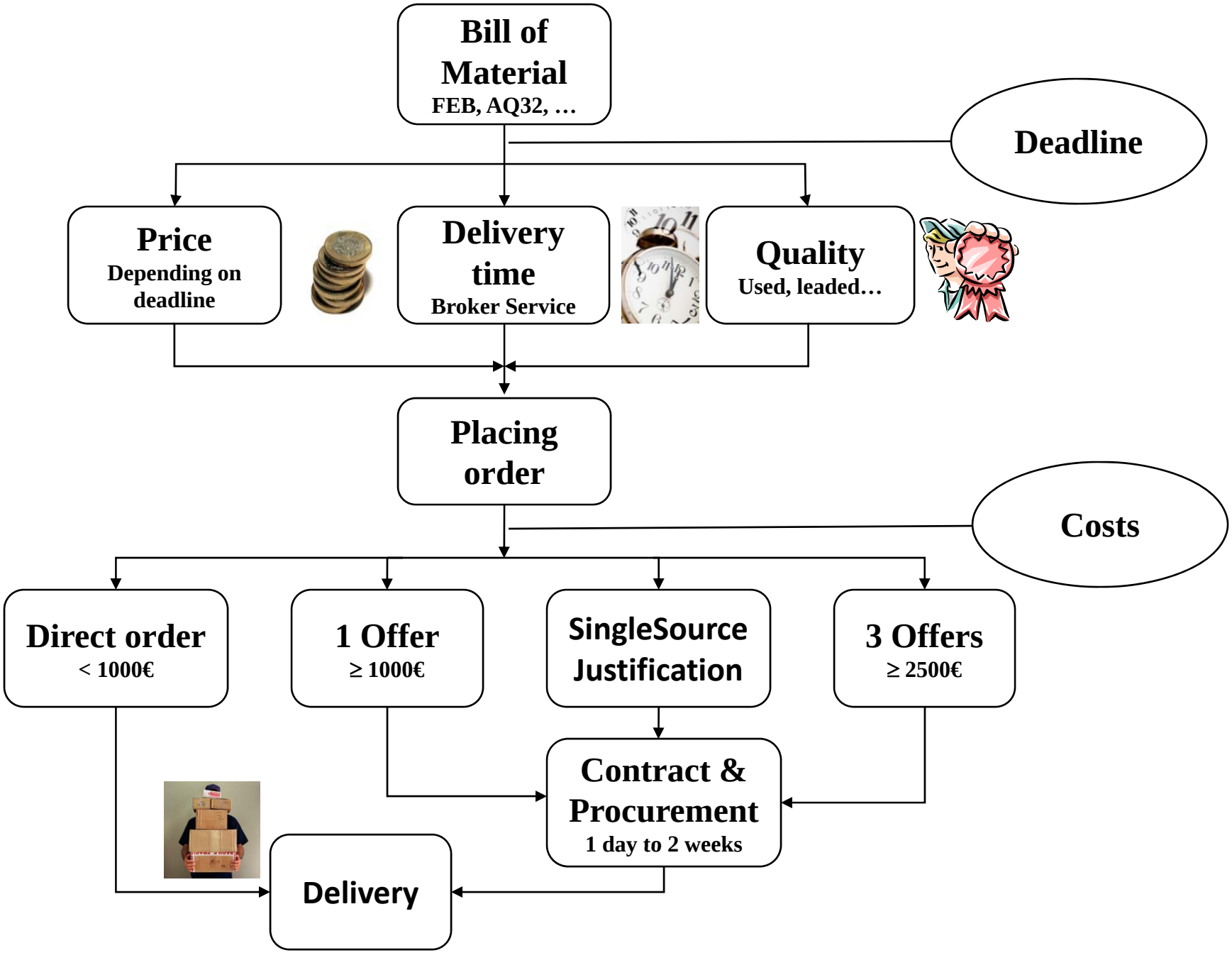
BOM from design file

Designator		Comment	Footprint
C1_BIAS1		100nF	CC2013-0805
C1_BIAS2		100nF	CC2013-0805
C1_BIAS3		100nF	CC2013-0805
C100_VIDEO1		10uF/25V	CC4532-1812
C100_VIDEO2		10uF/25V	CC4532-1812
C100_VIDEO3		10uF/25V	CC4532-1812
C100_VIDEO4		10uF/25V	CC4532-1812
PW_3		LT1963AES8-1.5V	SO-G8

BOM of FEB contains 930 parts

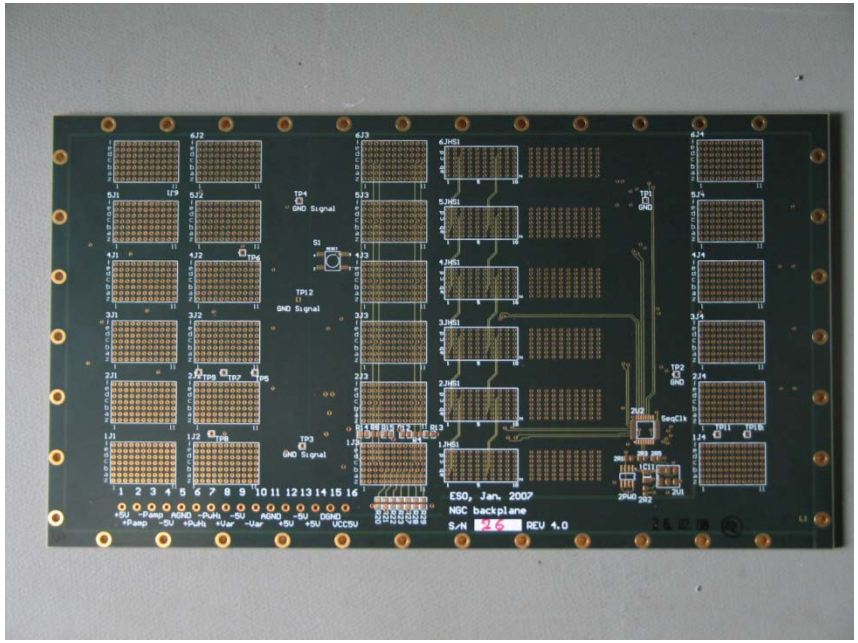
BOM after inspection

Designator	Article No.	Comment	Footprint
C1_BIAS1	A03600	KerKo 100nF ±10% 50V X7R	SMD-0805
C1_BIAS2	A03600	KerKo 100nF ±10% 50V X7R	SMD-0805
C1_BIAS3	A03600	KerKo 100nF ±10% 50V X7R	SMD-0805
C100_VIDEO1	A08085	KerKo 10uF ±10% 25V X7R	SMD-1812
C100_VIDEO2	A08085	KerKo 10uF ±10% 25V X7R	SMD-1812
C100_VIDEO3	A08085	KerKo 10uF ±10% 25V X7R	SMD-1812
C100_VIDEO4	A08085	KerKo 10uF ±10% 25V X7R	SMD-1812
PW_3	2430	LT1963AES8-1.5#PBF	8-SOIC N 1,27mm Pitch

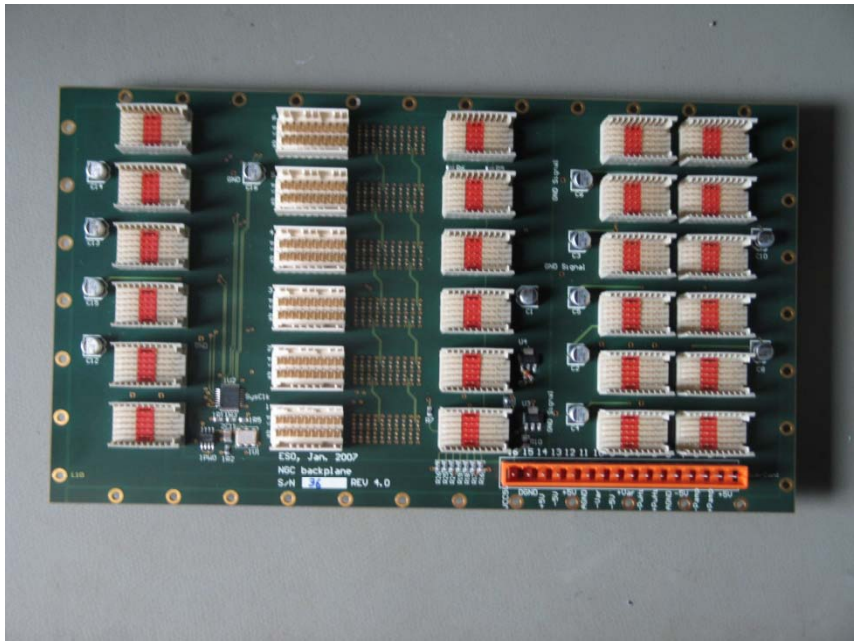

Bill of Material
FEB, AQ32, …
Deadline
Price
Depending on deadline
Delivery time
Broker Service
Quality
Used, leaded…
Placing order
Costs
Direct order
< 1000€
1 Offer
≥ 1000€
SingleSource Justification
3 Offers
≥ 2500€
Contract & Procurement
1 day to 2 weeks
Delivery

Population Assembly

Unpopulated PCB



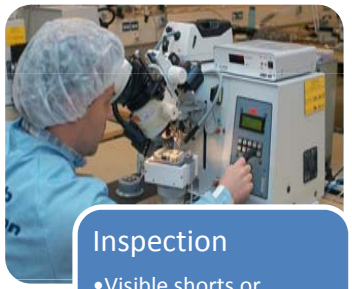
Populated PCB



Population Assembly

Producing PCB

- Providing Population data
- Inhouse Testing of new design



Inspection

- Visible shorts or bridges
- Running DC TEST

Assembly of the Parts

- Providing assembly data
- Providing parts

Inspection

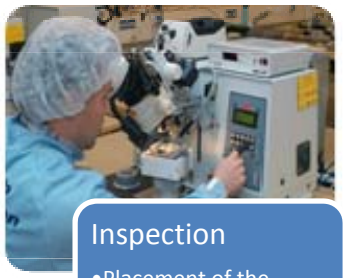
- Visible shorts or bridges
- Placement of components

RoHS

Population Assembly

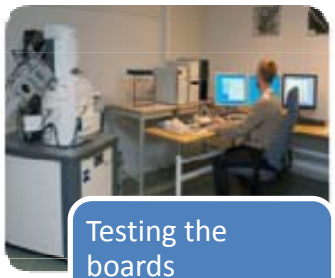
Assembly of the connectors

- Providing assembly data
- Providing connectprs



Inspection

- Placement of the connectors
- Straight pins etc.



Testing the boards

- DC Test
- Running application

Next we need to take a look at the TWIKI pages....

TWIKI contains everything we need

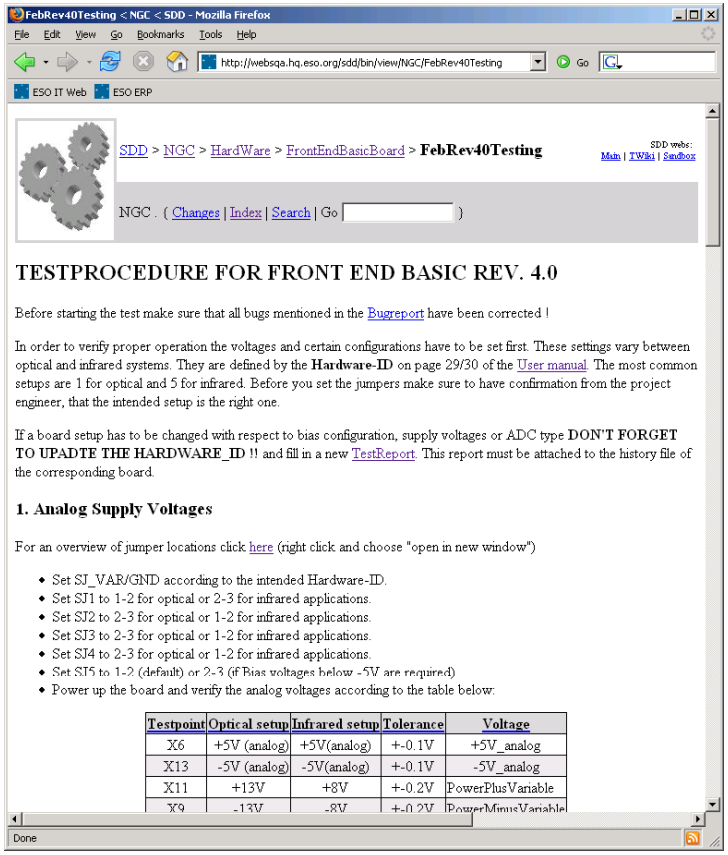
BIGGEST ADVANTAGES:
- HTML based, therefore platform and OS independent. Only browser required.
- No excuse not to use it.
- Accessible from both sides of the Atlantic.
- All NGC related documents are in one place.
- Possibility of creating links instead of keeping redundant information in different places.

Testing step 1: Test procedure

- Detailed test procedures for each board are available from TWIKI.

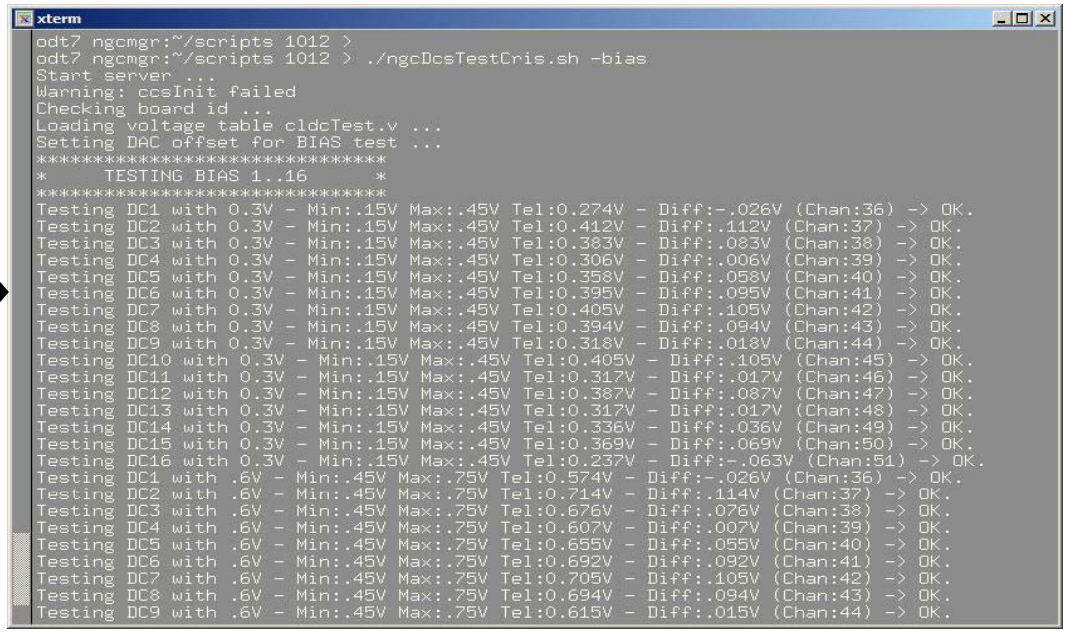
- Designers are not the only ones who can test a board. Also less experienced personnel is enabled to do testing, thus minimizing the risk of single point failures.

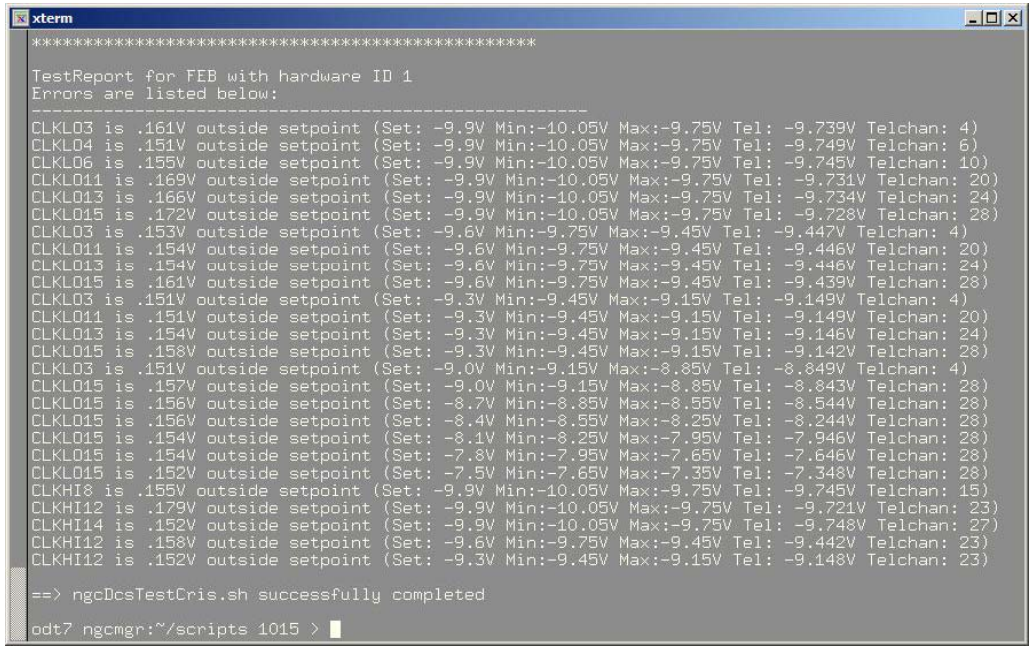
- Instructions how to configure/reconfigure a board for an optical or an infrared system (if applicable) - making it an LRU.



Testing step 2: Board Test tools

- A total of 18 clocks and 20 biases have to be tested over the complete output range.
- Manual test would take several hours.
- Linux test script automates this test cutting down test time to 10-15 minutes without the need for user intervention.
- No additional software is required. Linux has everything you need.



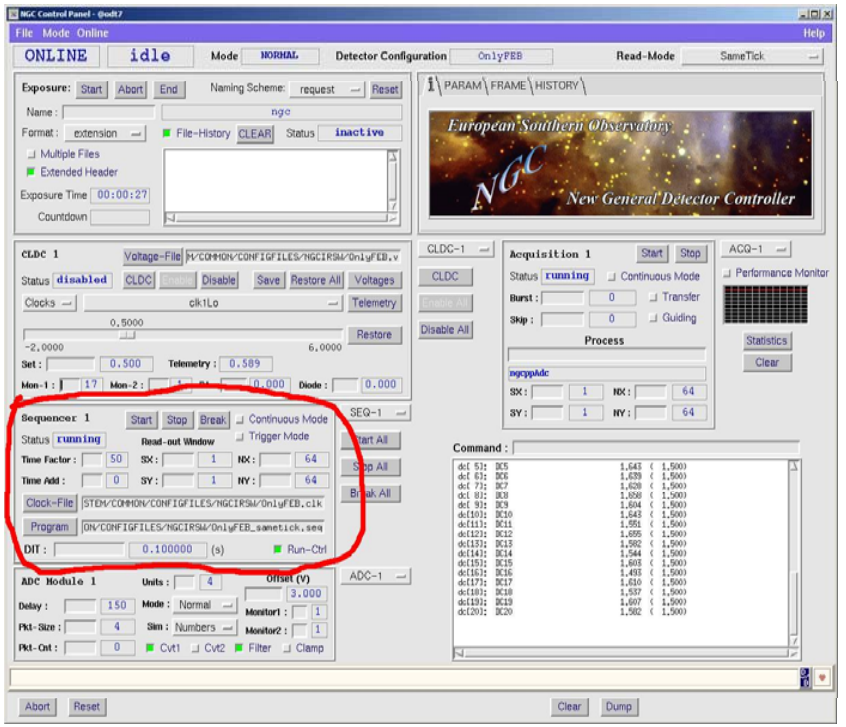


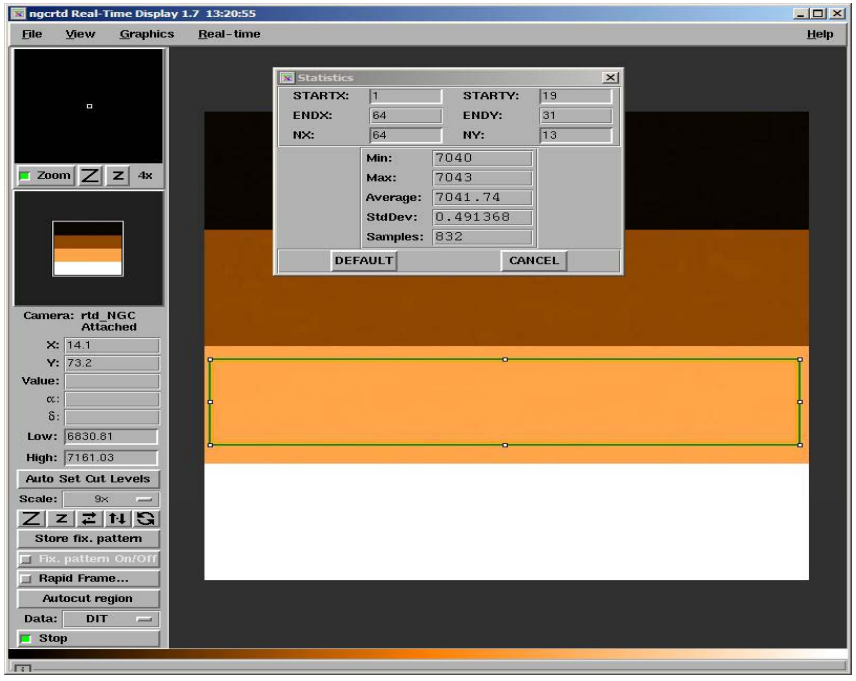
- Errors encountered during test are logged to file for later analysis.

Testing step 2: Board Test tools (cont.)

- End to end noise test for clock/bias and video using the NGC sequencer.

- Requires only a cable between clock/bias connector and video input.

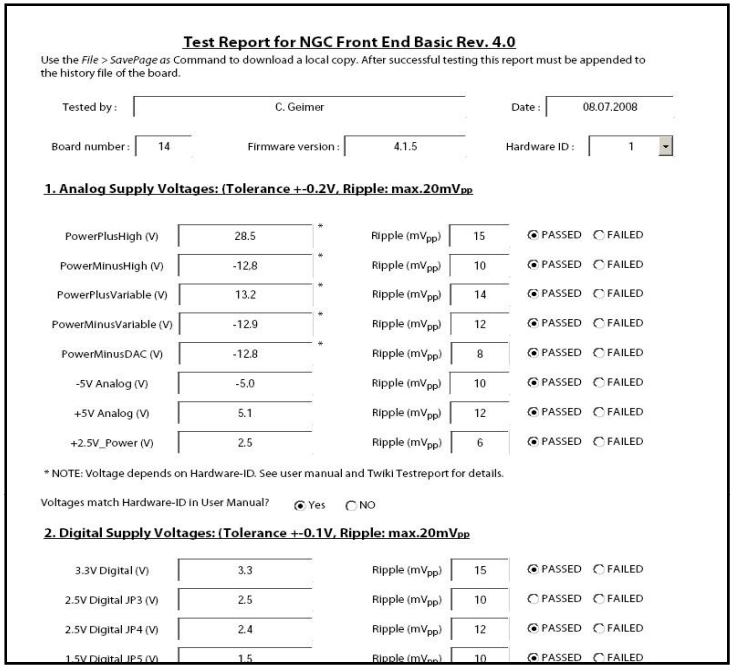




- Any noise problem in either clock/bias or video chain will show up in the RTD.

Testing step 3: Test report

- Test report to be filled out after successful configuration and test of each board.
- Contains detailed information about the configuration of each board (voltages, Bias setup, ADC configuration, Firmware, Hardware-ID etc.)
- Double check of all voltages and settings against the numbers given in the TWIKI test procedure and User manual



Test Report for NGC Front End Basic Rev. 4.0

Use the *File > SavePage as* Command to download a local copy. After successful testing this report must be appended to the history file of the board.

Tested by: C. Geimer Date: 08.07.2008

Board number: 14 Firmware version: 4.1.5 Hardware ID: 1

1. Analog Supply Voltages: (Tolerance +-0.2V, Ripple: max.20mV$_{pp}$

			Ripple (mV$_{pp}$)		
PowerPlusHigh (V)	28.5	*	15	PASSED	FAILED
PowerMinusHigh (V)	-12.8	*	10	PASSED	FAILED
PowerPlusVariable (V)	13.2	*	14	PASSED	FAILED
PowerMinusVariable (V)	-12.9	*	12	PASSED	FAILED
PowerMinusDAC (V)	-12.8	*	8	PASSED	FAILED
-5V Analog (V)	-5.0		10	PASSED	FAILED
+5V Analog (V)	5.1		12	PASSED	FAILED
+2.5V_Power (V)	2.5		6	PASSED	FAILED

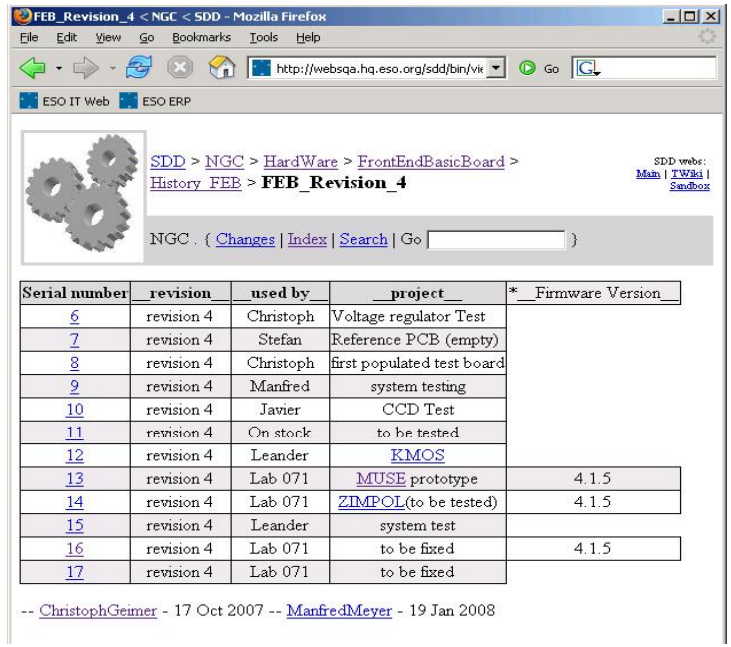
* NOTE: Voltage depends on Hardware-ID. See user manual and Twiki Testreport for details.

Voltages match Hardware-ID in User Manual? Yes NO

2. Digital Supply Voltages: (Tolerance +-0.1V, Ripple: max.20mV$_{pp}$

		Ripple (mV$_{pp}$)		
3.3V Digital (V)	3.3	15	PASSED	FAILED
2.5V Digital JP3 (V)	2.5	10	PASSED	FAILED
2.5V Digital JP4 (V)	2.4	12	PASSED	FAILED
1.5V Digital JP5 (V)	1.5	10	PASSED	FAILED

- To be attached to the history file of each board.



FEB_Revision_4 < NGC < SDD - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://websqa.hq.eso.org/sdd/bin/vi

ESO IT Web ESO ERP

SDD > NGC > HardWare > FrontEndBasicBoard > History_FEB > **FEB_Revision_4**

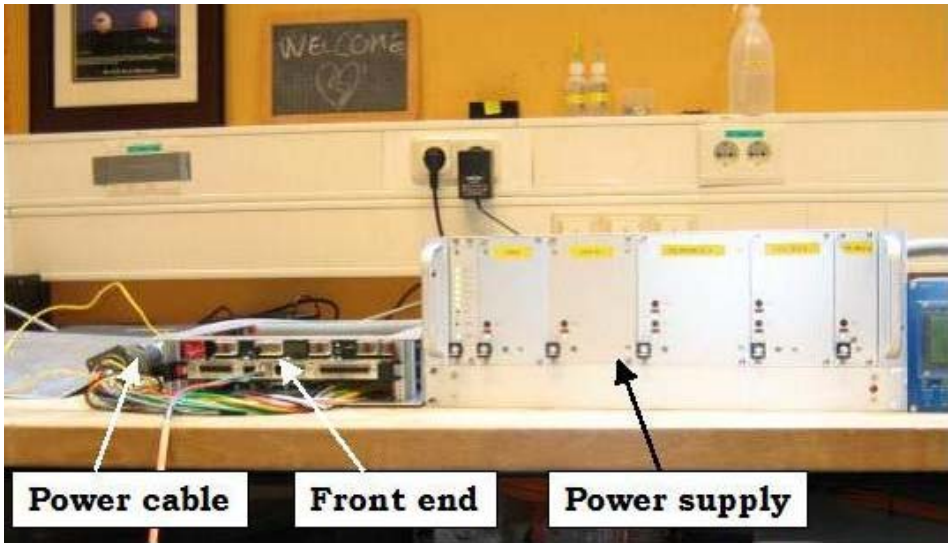
SDD webs: Main | TWiki | Sandbox

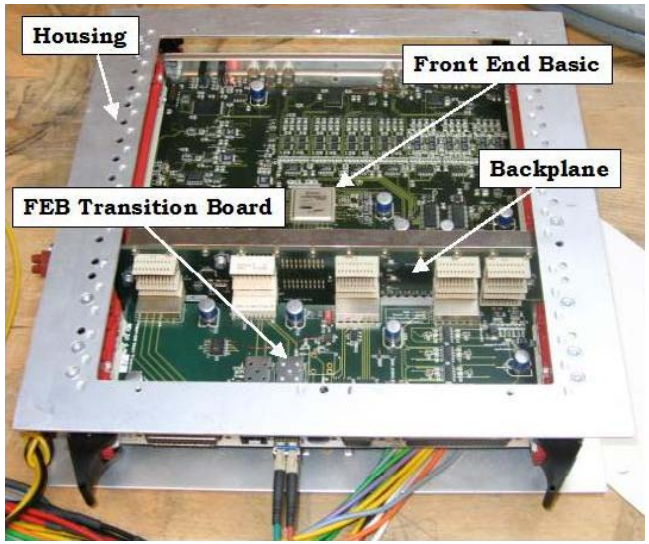
NGC . { Changes | Index | Search | Go }

Serial number	revision	used by	project	*Firmware Version
6	revision 4	Christoph	Voltage regulator Test	
7	revision 4	Stefan	Reference PCB (empty)	
8	revision 4	Christoph	first populated test board	
9	revision 4	Manfred	system testing	
10	revision 4	Javier	CCD Test	
11	revision 4	On stock	to be tested	
12	revision 4	Leander	KMOS	
13	revision 4	Lab 071	MUSE prototype	4.1.5
14	revision 4	Lab 071	ZIMPOL(to be tested)	4.1.5
15	revision 4	Leander	system test	
16	revision 4	Lab 071	to be fixed	4.1.5
17	revision 4	Lab 071	to be fixed	

-- ChristophGeimer - 17 Oct 2007 -- ManfredMeyer - 19 Jan 2008

Integration





MUSE PROTOTYPE SYSTEM

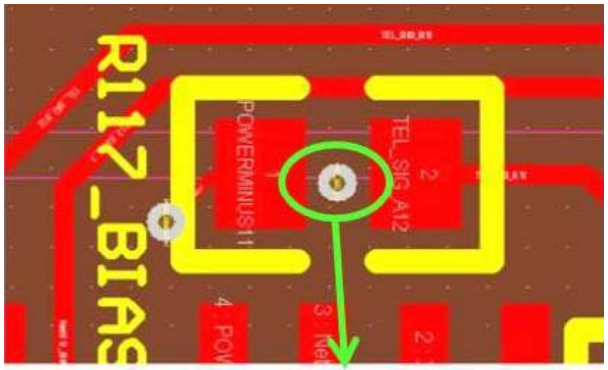
Goals:

- Make sure that all individually tested boards work properly together in the final system.
- Fine-tuning of voltages in the final setup taking into account number of boards and final cable length.
- Verification of clock/bias and video chain. Using the available test tools this test can be done in ~ 30 - 45min.

- TO DO: Create integration test report listing the most important system parameters. To be included in the project's TWIKI page.

Maintenance

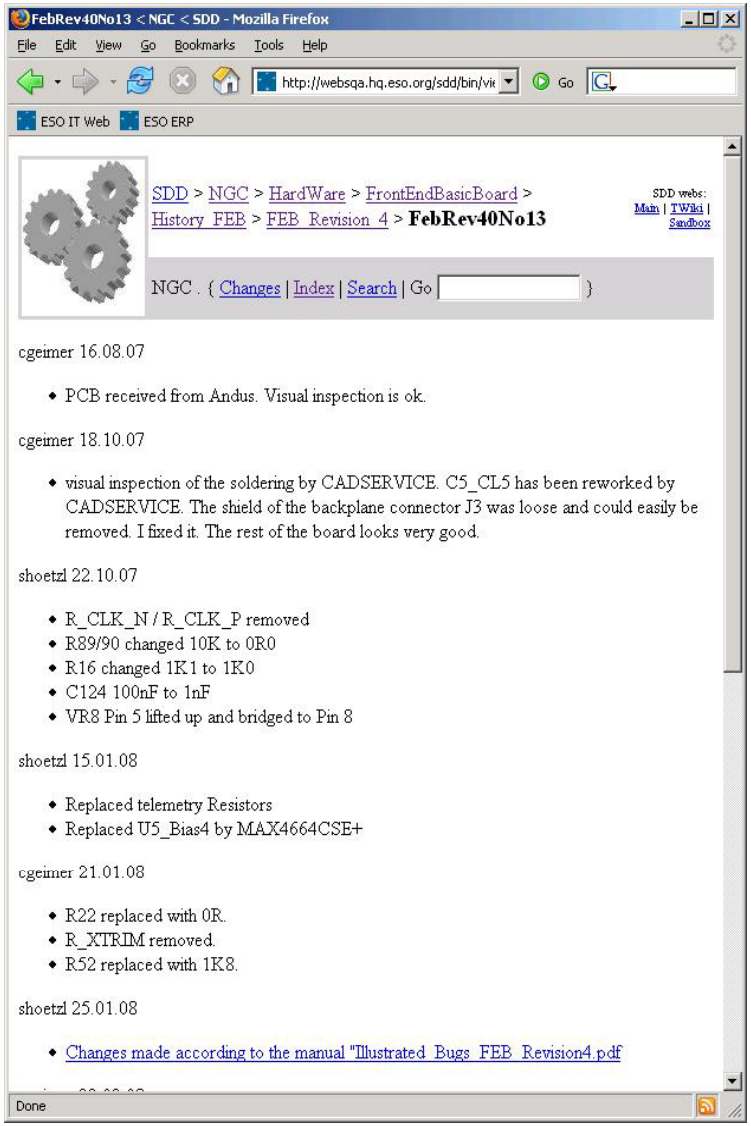
- Basic procedure can be found in the NGC production manual.
- All changes made to a board must be documented in the history file.
-The TWIKI bug report provides useful feed back to designers in order to avoid Problems in new revisions.



Component is 0603 (1,55 x 0.85mm)
Via should not be placed between pads

TO DO:

- Compile a “most common failures” –list for each board based on experience gained during maintenance.
- Prepare list for “preventive maintenance”



Example of a board history file