L-BAND DIGITAL RECEIVER

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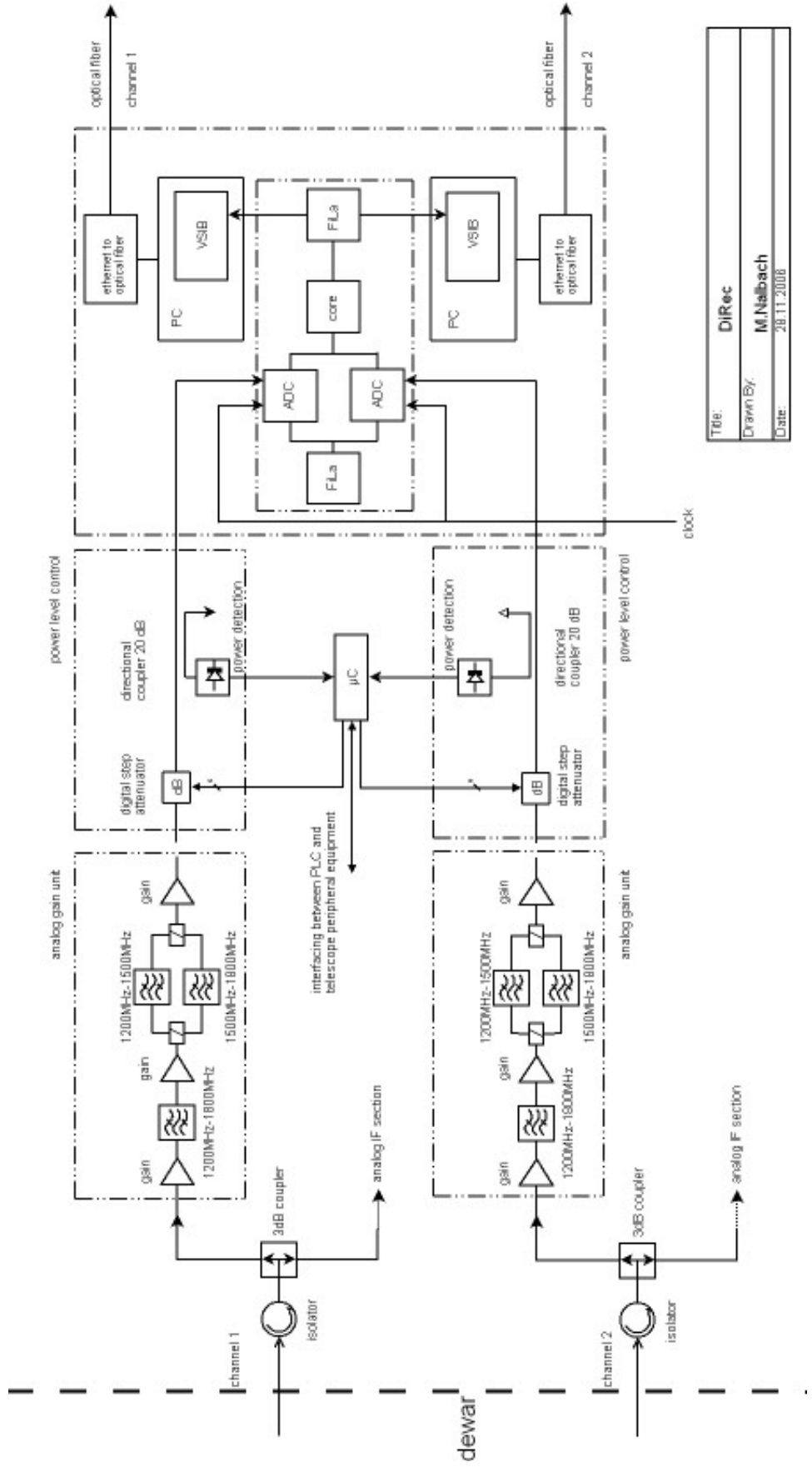
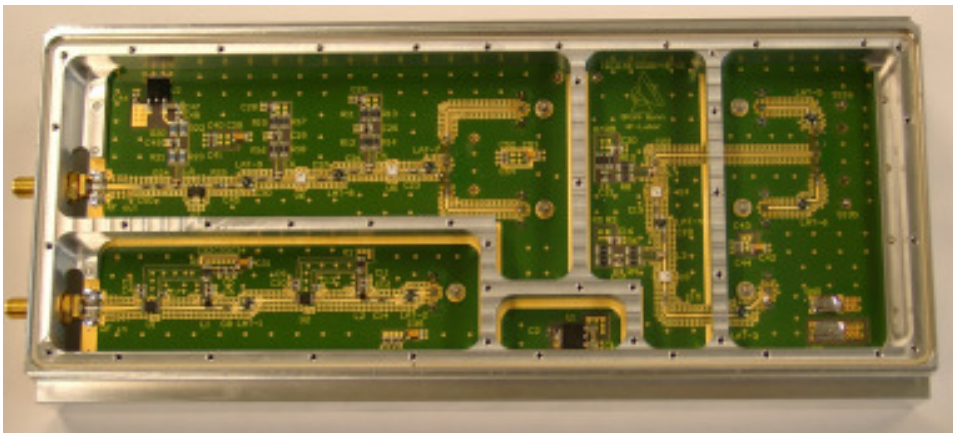
Bonn, 30.11.2006

block diagram

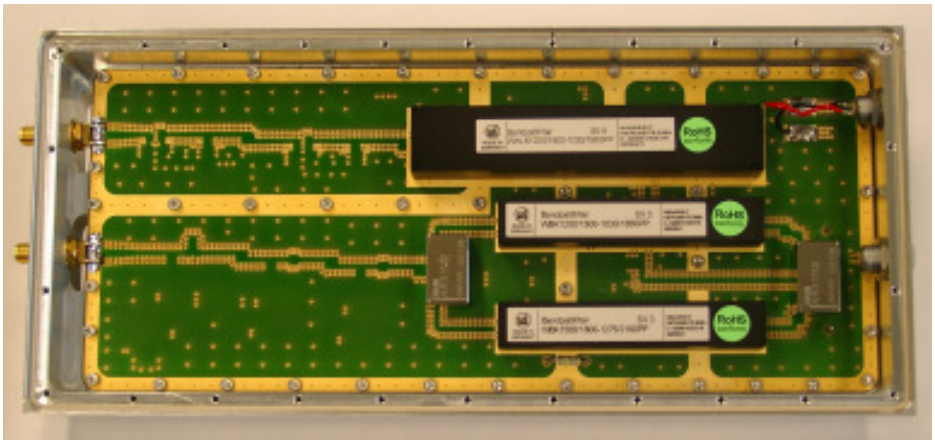


analog gain unit:

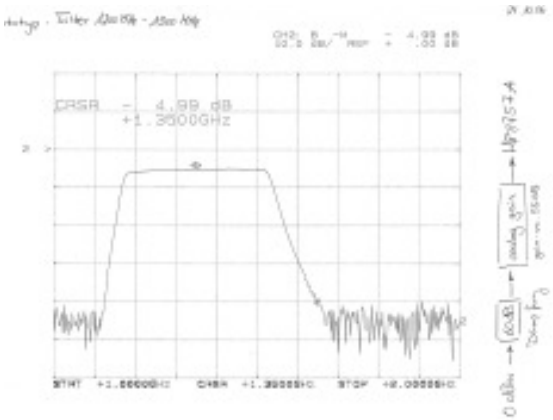
status: Prototype is manufactured and measured.
PCB's and components for all units are delivered.
Housings for all units are manufactured and ready to be assembled.

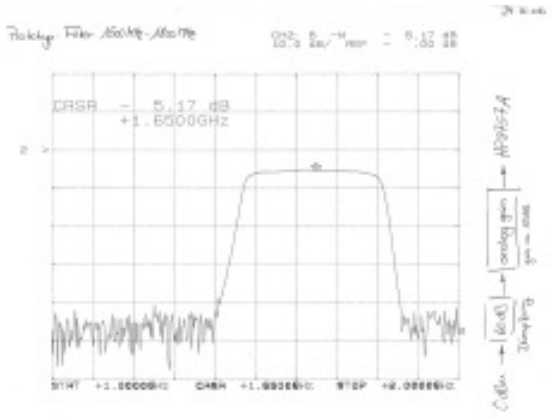


analog gain unit – Top Layer



analog gain unit – Bottom Layer

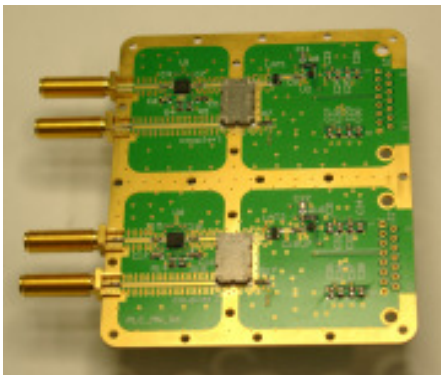




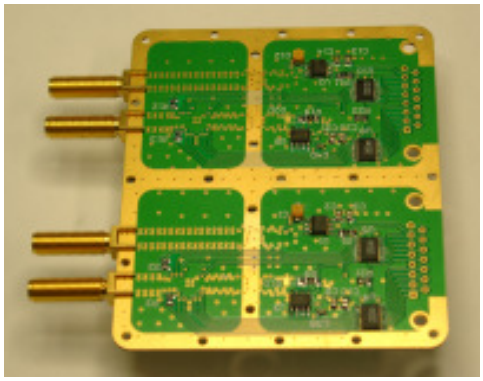
properties: Filter 1: 1200MHz - 1500MHz
Filter 2: 1500MHz – 1800MHz
gain: 55dB
connectors: SMA (pcb mount)
DC: 15V / 400mA

power level control:

status: A prototype-board with a digital step attenuator was designed. The function was tested with a commercial micro-controller-board (controller: Atmel AtMega8535).
A non-commercial controller-board was designed, manufactured but not tested yet. Housings are manufactured and ready to be assembled.



PLC – Top Layer



PLC – Bottom Layer

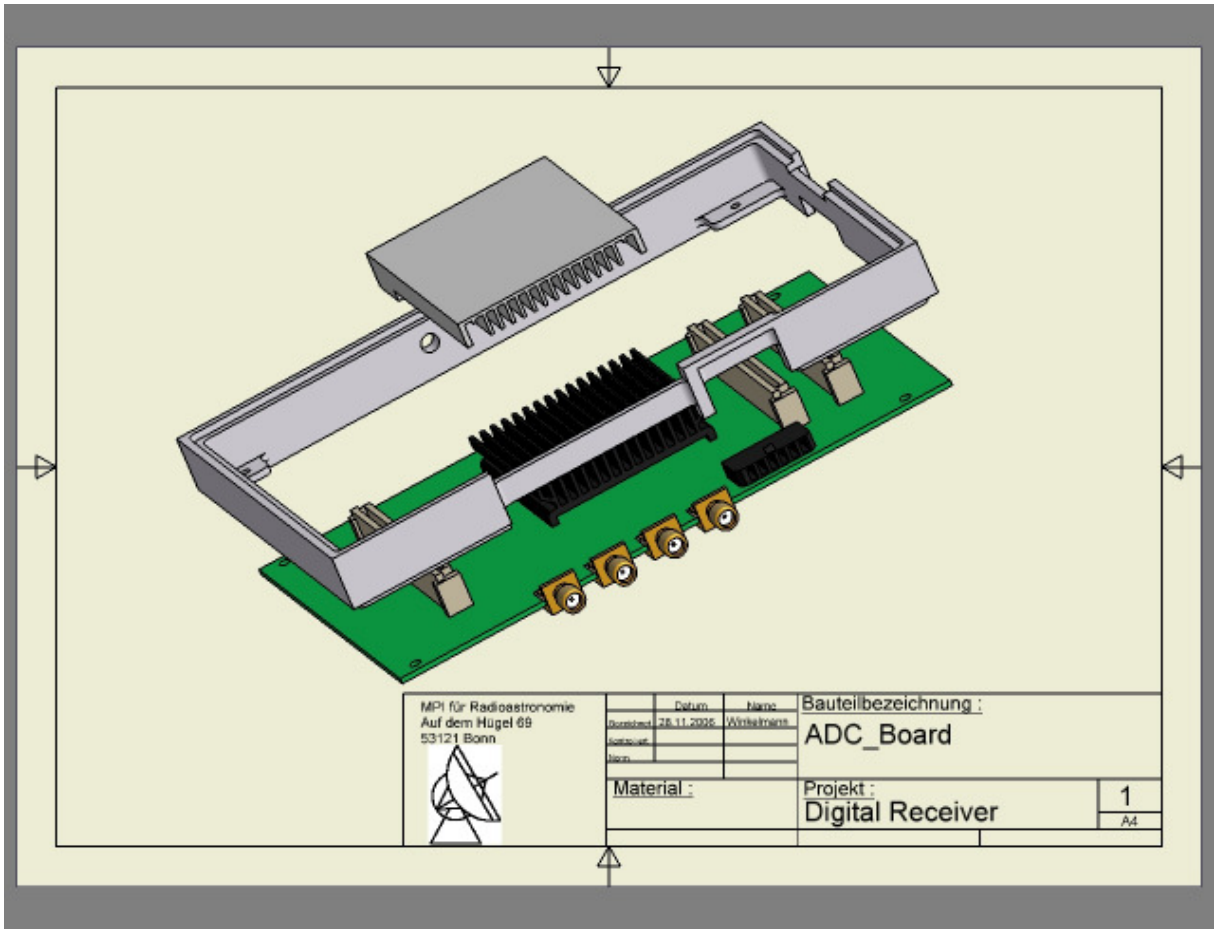
properties: the PCB was designed to control the power level of 2 channels. The signal is led from the input through a digital step attenuator and a 20dB coupler (1GHz-2GHz coupling) to the output. A small part of the signal energy coupled over to a detector that produces a DC-voltage proportional to the measured signal power in dBm. The DC-voltage is AD-converted and rated by a micro -controller. The micro-controller also switches the step attenuator in the range of insertion loss to 31,5dB in 0,5dB steps and communicates with the telescope peripheral equipment.

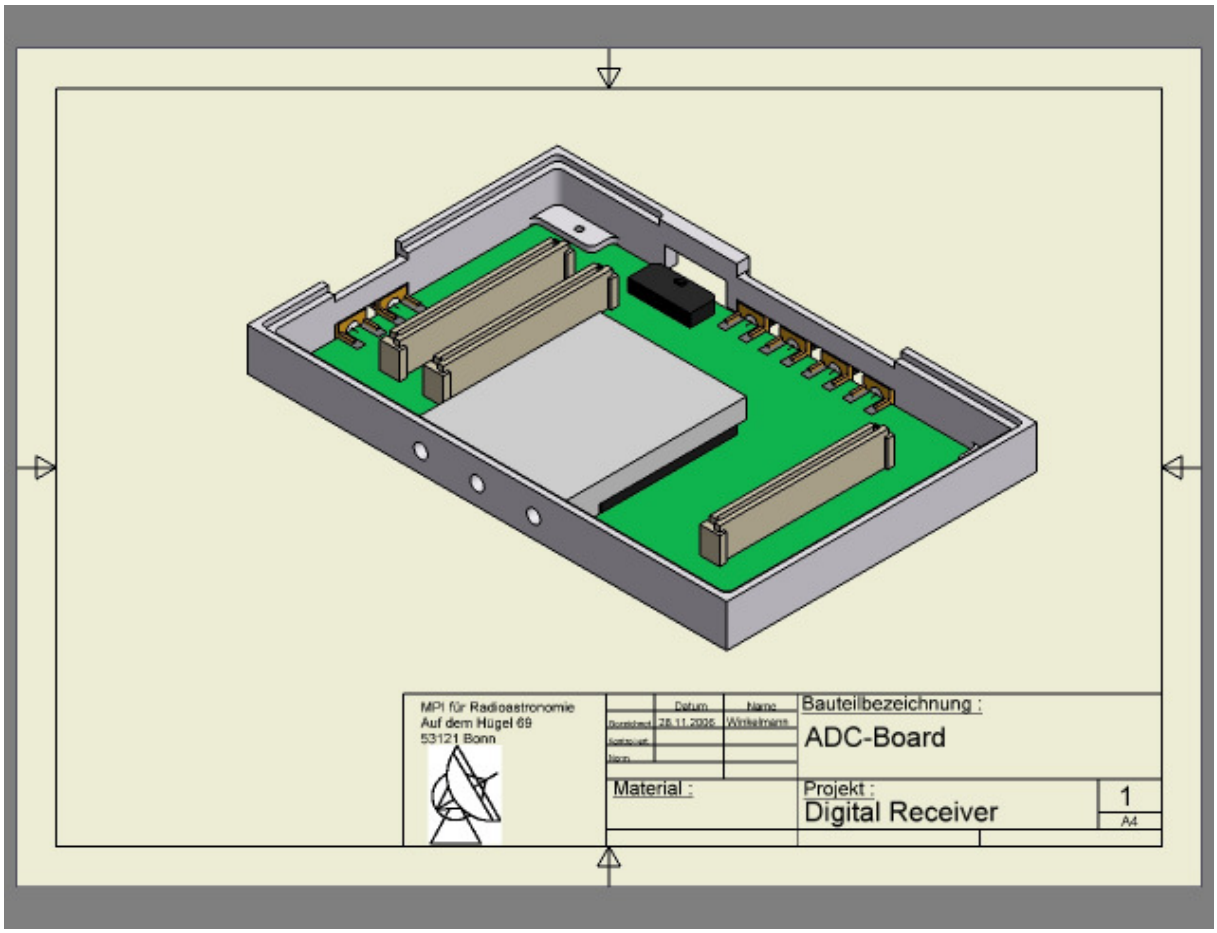
to do: designing a single board containing power level control and micro-controller. programming a software interface between controller and telescope equipment.

Housing for the digital signal processing boards:

The whole digital electronic (ADB, Core module, FiLa, VSIB, PC and Ethernet to optical fiber converter) will be encased in a large, 19” rack compatible box. Every single component in the box will be shielded to avoid irradiation and interferences between the individual digital devices.
The box will only have inputs for the analog signal (receiver channel 1 and 2), clock signal and power supply. The only output will be optical fiber connectors. In respect of the closed housing it’s not reasonable to use air-cooling (fan) to cool heat producing components. Heatsinks and heatpipes for passiv cooling are required.

In the following pictures a concept for the boards is shown. Each board is mounted in a metallic frame (heatsink included). Different frames can be assembled to a stack.





MPI für Radioastronomie
Auf dem Hügel 69
53121 Bonn

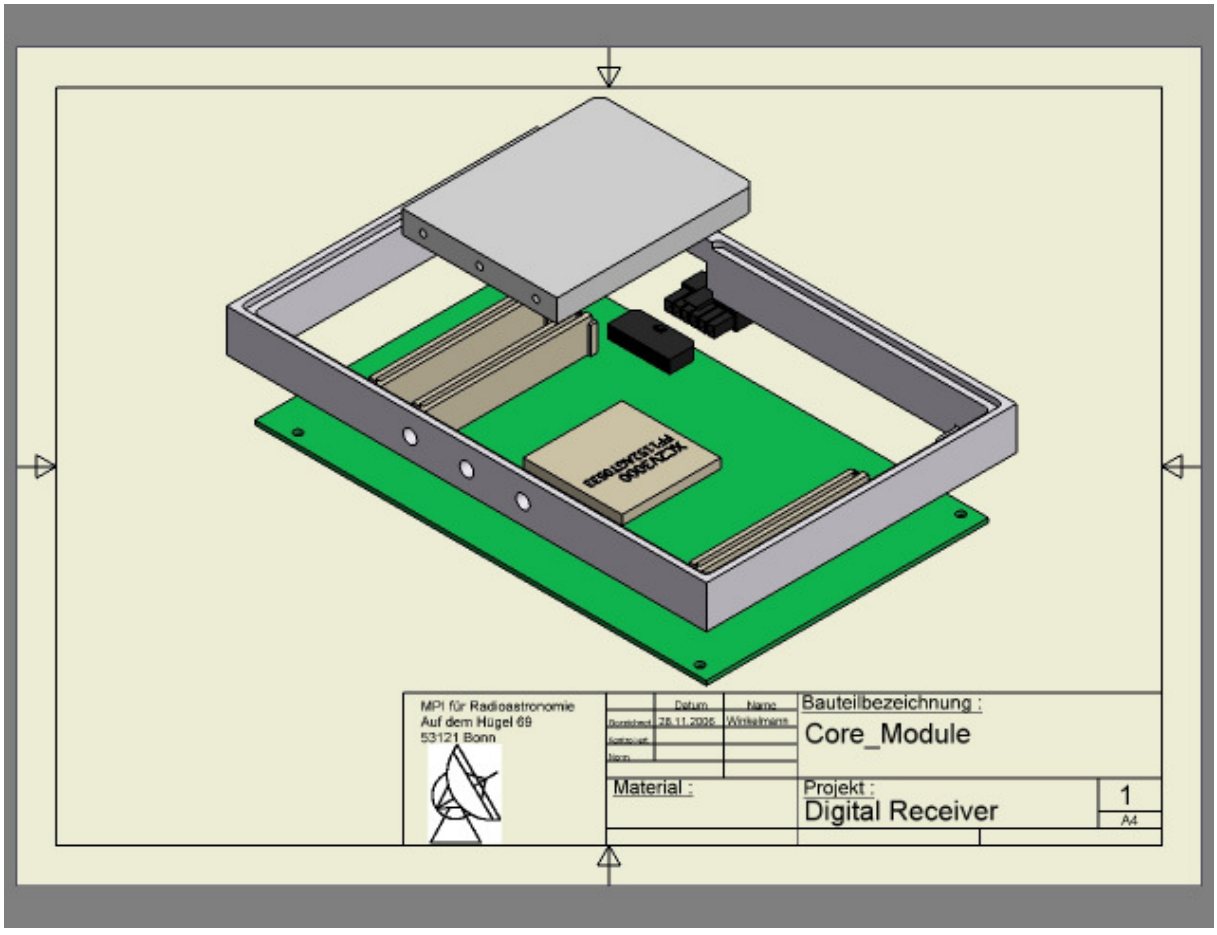
	Datum	Name
Bearbeitet	28.11.2006	Winkelmann
Kontrolliert		
Norm		

Bauteilbezeichnung :
ADC-Board

Material :

Projekt :
Digital Receiver

1
A4



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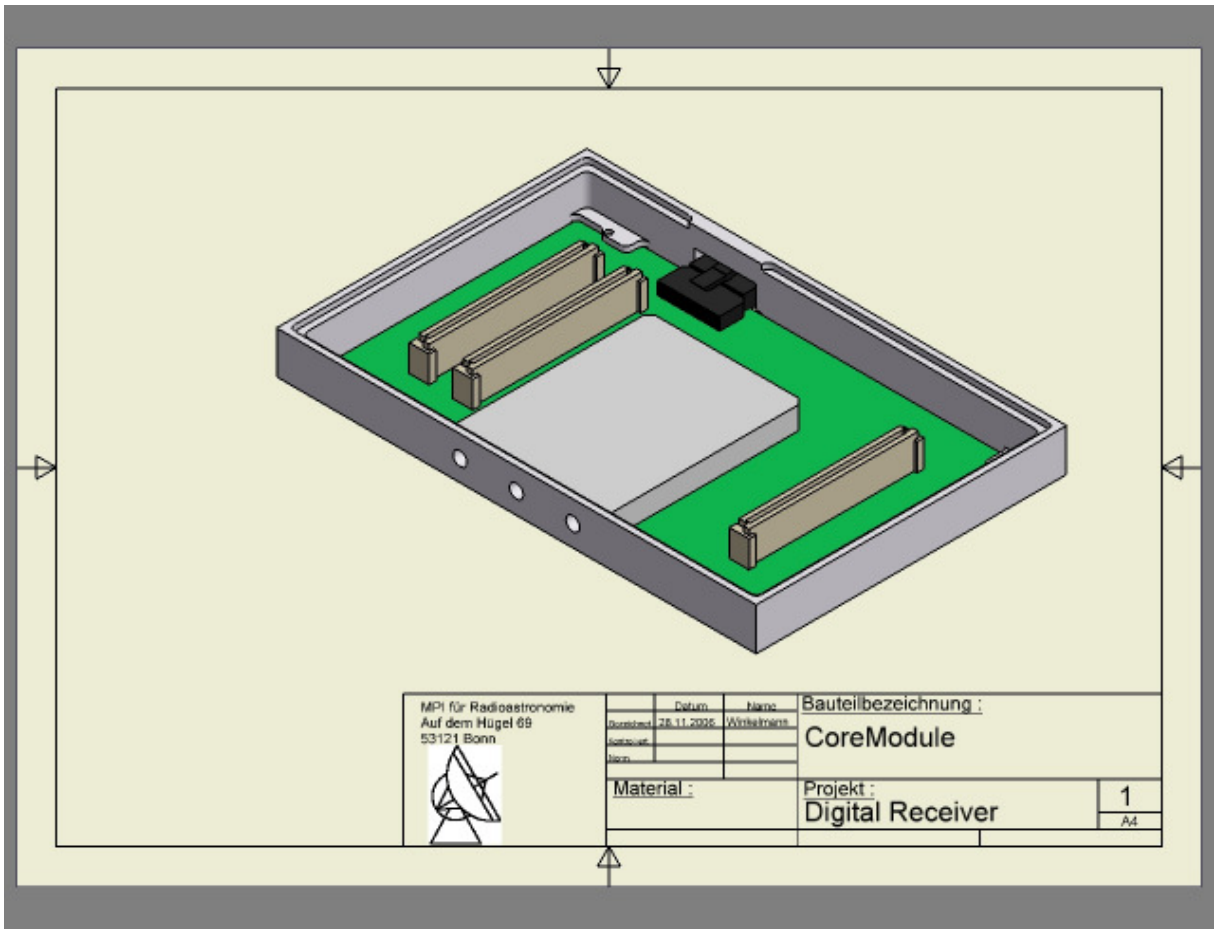
	Datum	Name
Bearbeitet	28.11.2006	Winkelmann
Kontrolliert		
Norm		

Bauteilbezeichnung :
Core_Module

Material :

Projekt :
Digital Receiver

1
A4



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53121 Bonn

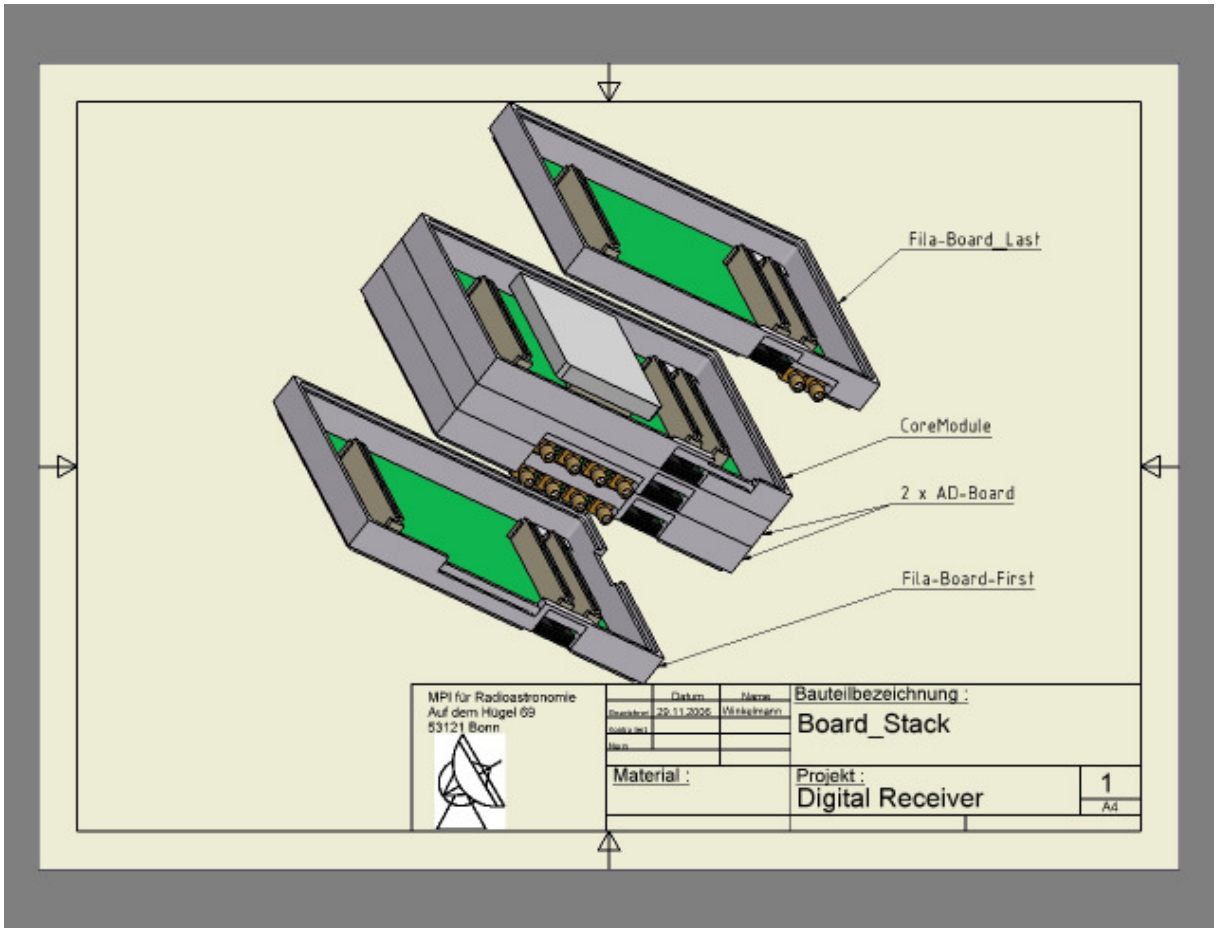
	Datum	Name
Bearbeitet	28.11.2006	Winkelmann
Geprüft		
Norm		

Bauteilbezeichnung :
CoreModule

Material :

Projekt :
Digital Receiver

1
A4



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53121 Bonn

	Datum	Name
Bearbeitet	29.11.2006	Winkelmann
Geprüft		
Norm		

Bauteilbezeichnung :
Board_Stack

Material :

Projekt :
Digital Receiver

1
A4

The PC unit including the VSIB-board will also be enclosed in an RFI-shielded housing similar to the DBBC hardware.

PC for VSIB board:

986 LCD-M/mITX with Intel Core Duo 1,66 GHz processor and up to 2GB RAM. The board was chosen after consulting Jan Wagner from Metsähovi Radio Observatory. You can find more details of the board in the datasheet attached to this handout.

Processors, PC-board and Gbit ethernet to optical fiber converters will be ordered in the next days.