

Risk report UniBoard² Reliability, Test and Verification

	Organisatie / Organization	Datum / Date
Auteur(s) / Author(s): Gijs Schoonderbeek	ASTRON	21-03-2016
Controle / Checked: Marchel Gerbers	ASTRON	23-03-2016
Goedkeuring / Approval:	ASTRON	
Autorisatie / Authorisation: Handtekening / Signature	ASTRON	

© ASTRON
All rights are reserved. Reproduction in whole or in part is prohibited without written consent of the copyright owner.

Distribution list:

Group:	Others:
Marchel Gerbers Sjouke Zwier Andre Gunst Arpad Szomoru	Ronald Halfwerk

Document history:

Revision	Date	Chapter / Page	Modification / Change
0.1	21-03-2016	-	Creation
1.0	23-03-2016	-	Update after review Marchel

Table of contents:

1	Summary	4
2	Conclusion.....	4
3	Product description.....	4
4	Risk analysis	5
4.1	Information sources	5
4.2	Usage environment	5
5	Risk Table	6

List of figures:

Figure 1	Picture of UniBoard ²	4
----------	--	---

List of tables:

Table 1	Overview of UniBoard ² risks.....	6
---------	--	---

1 Summary

The Astron development process as described in the document “The ASTRON Science Instrument Development Process (SIDP)” follows various phases. This document is a result of a technical risk analysis for the declaration of conformity (CE). The risk analyse is related to Reliability, Availability Maintainability and Safety (RAMS). The risks should be further analysed and minimized during the development.

2 Conclusion

Different risk issues are addresses. The following issues are important:

- Protection of fans (gauze)
- EMC shielded enclosure
- Cooling

The following checks should be executed:

- Inspection of sizes of access holes
- Inspection with IR camera
- EMC measurements

The electronics are designed according the low voltage directive. The highest voltage is 48Volt.

3 Product description

The UniBoard², as the name suggests, is a universal processing platform which will be used on multiple processing application like future EVN correlator and Apertif Radio Transient System. The board exists of 4 processing FPGAs. UniBoard² can process up-to 3TMAC, and can handle up to 312 10Gbps full duplex data streams. The Uniboard² is protected by a metal housing. The Uniboard² is working on 48V DC and dissipated heat is cooled with liquid cooling and fans.

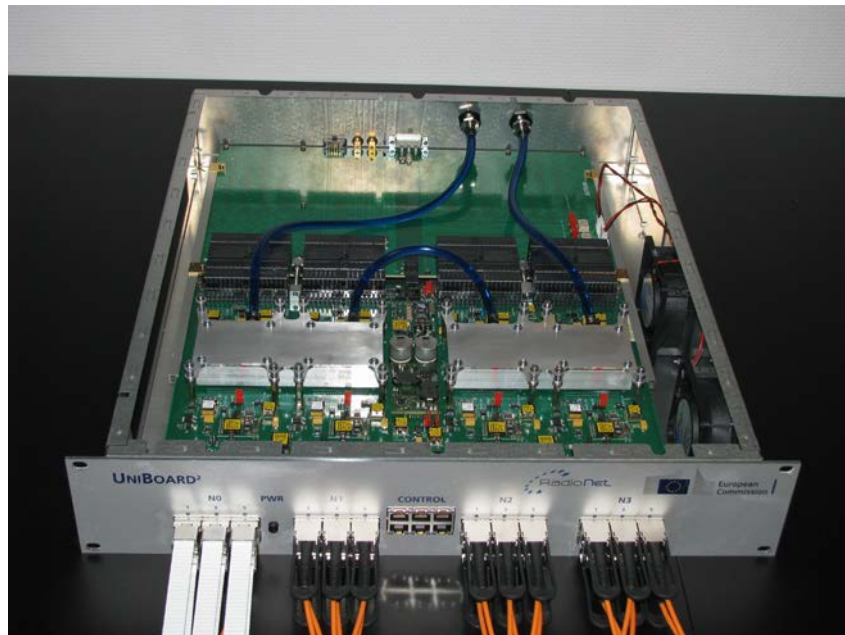


Figure 1 Picture of UniBoard²

4 Risk analysis

The analysis started with collecting knowledge / information about the concept. Background information and (environmental) requirements are collected. The concept of the product is analysed on risks in relation with: reliability, safety and environmental influences.

4.1 Information sources

The information of Uniboard² is available on the following locations

- Project wiki: <http://www.radionet-eu.org/radionet3wiki/doku.php?id=jra:uniboard2>
- ASTRON document server (www.astron.nl/psgdoc/document.php)

4.2 Usage environment

The Uniboard² shall be used in a stationary indoor temperature controlled environment. The Uniboard² will not be subjected to rain or condensation water. The electronics are protected by a metal enclosure. Uniboard² will be used in a static environment. The equipment shall be well protected fore transport.

5 Risk Table

In Table 1 an overview and the action needed on the risks is shown. The result of the actions are described in separate document(s).

Table 1 Overview of UniBoard² risks

No.	Part	Part detail	Failure mode	Effect	Severity			Criticality =A*B*C	Action / Test
					Severity of effect (A)	Probability of effect (B)	Invisibility of failure (C)		
1	PCB		High temperature	Overheating / Fire	5	2	1	10	Fans / Temperature analysis/check or IR camera
			EMC radiated	Influence on other devices	3	2	4	24	Shielded enclosure / EMC test
			EMC conducted	Strange behaviour	3	2	2	12	Shielded enclosure / EMC test
			Voltage / current	Electrification	3	1	3	9	Safe voltage 48V DC / 9.9A
	Fans		Rotating	Fingers	4	1	1	4	Gauze in enclosure openings covers the entrance of fingers
			Voltage / current	Electrification	3	1	3	9	Safe voltage 48V DC / 10A
	Liquid cooling		Leakage	Electrification	3	1	3	9	Safe voltage 48V DC / 10A Short Circuit protection on PCB
			High temperature	High temperature	5	2	1	10	Temperature Sensor on PCB
			Contact with liquid	Intoxication	5	3	1	15	Use coloured liquid (blue)

A) Severity of effect (Ranking from 1-5, 1=Low, 5=High)

B) Probability of effect (Ranking from 1-5, 1=Low, 5=High)

C) Invisibility of failure (Ranking from 1-5, 1=Low, 5=High)