

Product Assembly Document

Cabinet Clock Distribution (CCD)

PCB nr.: 03124

	Organisatie / Organization	Datum / Date
Auteur(s) / Author(s): Gijs Schoonderbeek Sieds Damstra	ASTRON	30-06-2022
Controle / Checked: M. Gerbers	ASTRON	
Goedkeuring / Approval: N. Ebbendorf	ASTRON	
Autorisatie / Authorisation: W. van Cappellen Handtekening / Signature	ASTRON	

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S. Damstra G.W. Schoonderbeek N. Ebbendorf	A. v. Duin

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1 Introduction

1.1 Document Scope

This document is intended for PCB assembly manufacturers and test facilities. It describes the assembly of a LOFAR2.0 CCD. More information about the production of the CCD can be found in [AD-1]. In section 2 an overview of the most important applicable standards are given and special requirements/treatments if needed. Section 4 describes the assembly steps to complete the PCB / module.

1.2 List of Terms and acronyms

BOM	Bill Of Material
CCD	Cabinet Clock Distribution
IPC	Association Connecting Electronics Industries
PCB	Printed Circuit Board
PCBA	Printed Circuit Board Assembly
EMS	Electronics Manufacturing Services, Assembly company
t.b.d.	To be defined

1.3 Applicable documents (RD)

Ref.nr.	Doc. number	Title	Author
AD-1	PMS00049	CCD Product Manufacturing Specifications	Gijs Schoonderbeek

1.4 Reference documents (RD)

Ref.nr.	Doc. number	Title	Author
RD-1	TPR00022	CCD Test plan	Gijs Schoonderbeek

1.5 Label information

A small readable label has to be placed onto the designated area of the assembled board and a label on the front panel. The labels shall be equal and must contain the items:

Product name → CCD (3-digits)
 Batch number → YY (last 2 digits year) WW (week nr.) D (day)
 Serial number → 5-digits, starting with 00000

Basic; CCD -YYWWD-YYYYY
 Example: CCD-22091-00100

Example



CCD -YYWWD-YYYYY

The information has to be printed in readable text at least 5mm high together with a QR-code pointing to the ASTRON database.

2 IPC Quality standards

2.1 Assembly

IPC requirement	Comment
IPC 2221B	Class 2 Dedicated Service Electronic Products
IPC 2222B	Type 3, Multilayer Printed Board without blind and buried via's
IPC-A-610	Class 2 Dedicated Service Electronic Products

Production tests are described in [RD-1]

3 Description

A functional description for the LOFAR2.0 CCD can be found in the "Product Manufacturing Specification" document [RD-1].

4 Items to assemble

Item nr.	Amount	Description	Remarks
#1	1	CCD board assembly	SMD components
#2	~25	Non SMD components (connectors)	
#3	5	Light-pipes	See section 4.3
#4	1	Mount CCD in housing	See section 4.4
#5	1	Mount Raspberry Pi CM4 module	See section 4.5
#6	2	Set DIP switches	See section 4.6
#7	2	Place ASTRON serial number (QR-code)	See section 4.7

The following instructions are required for the CCD assembly. The assembly order may be changed for efficiency and/or quality reason for the working flow. Any change in the assembly order must be discussed and agreed with the design engineer.

Assembly order:

1. Place Manufacturer Serial Number, see section 4.1
2. SMD component reflow assembly, see section 4.2
3. Verify assembly (AOI, AXI), see [RD-1] for more details
4. Solder Through hole components (jumpers, connectors)
5. Place Light pipes, see section 4.3.
6. Mount CCD in housing, see section 4.4.
7. Mount Raspberry Pi CM4 module, see section 4.5.
8. Set switches and place jumper, see section 4.6.
9. Place QR label on PCB and back side of the housing, see section 4.7
10. Functional testing, see [RD-1]

A photo of the assembled board is shown in Figure 1. The assembly drawing are shown in Section 7.1. On request a STEP-model of the assembly can be supplied by ASTRON.

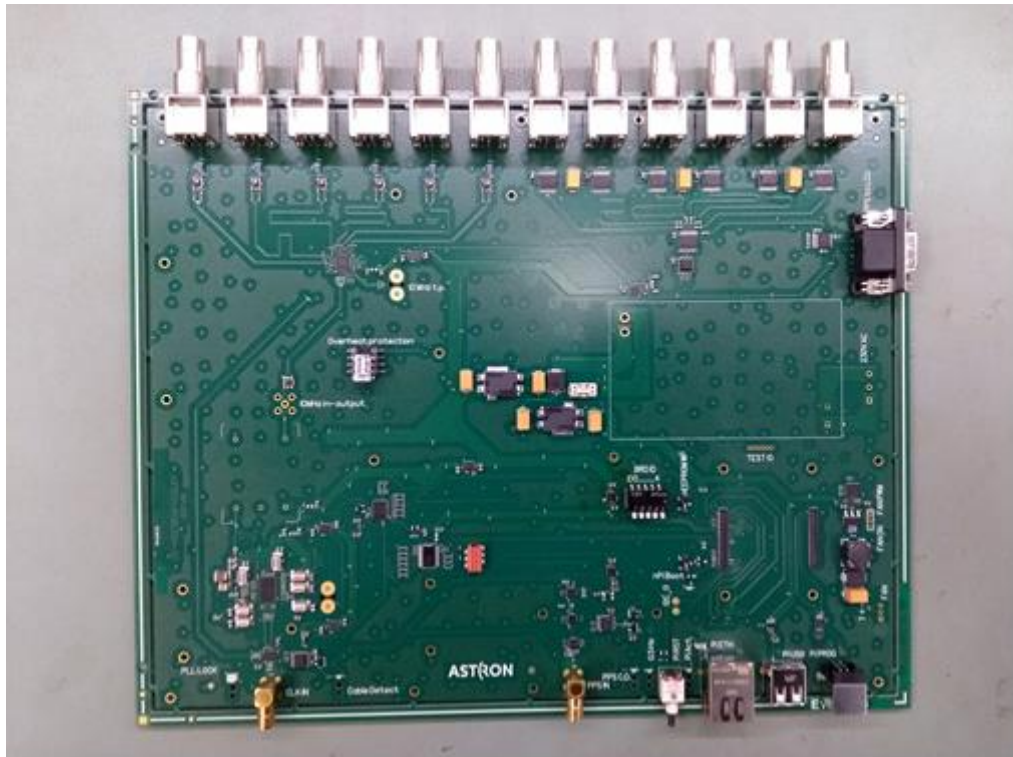


Figure 1 Photo of the CCD PCBA.

4.1 PCB Manufacturer and EMS serial / lot number

Both the PCB manufacturer and the EMS have to place a serial and or lot number on the PCB in order to track issues during the guarantee period of the PCBA. In the ODB++ and in the PSF of the CCD the locations are shown, see Figure 2.

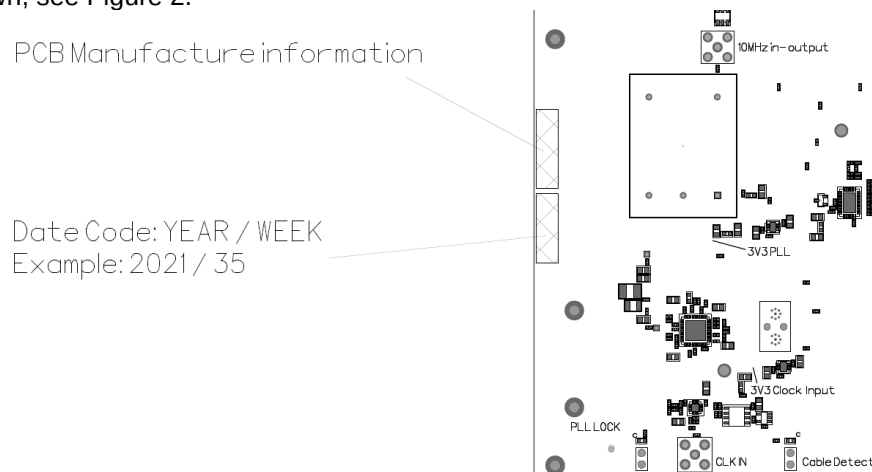


Figure 2 Location for PCB manufacturer and EMS serial or lot numbers.

4.2 SMD Assembly

A component placement file and polarity drawing can be found in section 7.1. All assembly verification steps, like SPI and AOI are described in CCD Test plan [RD-1].

4.3 Light-pipes

The light-pipes are press-fit stile light pipes which have to be pressed in the holes from the top side of the PCBA, see Figure 3. Make sure that the bottom of the PCB is supported while pressing the light-pipe into the PCB.

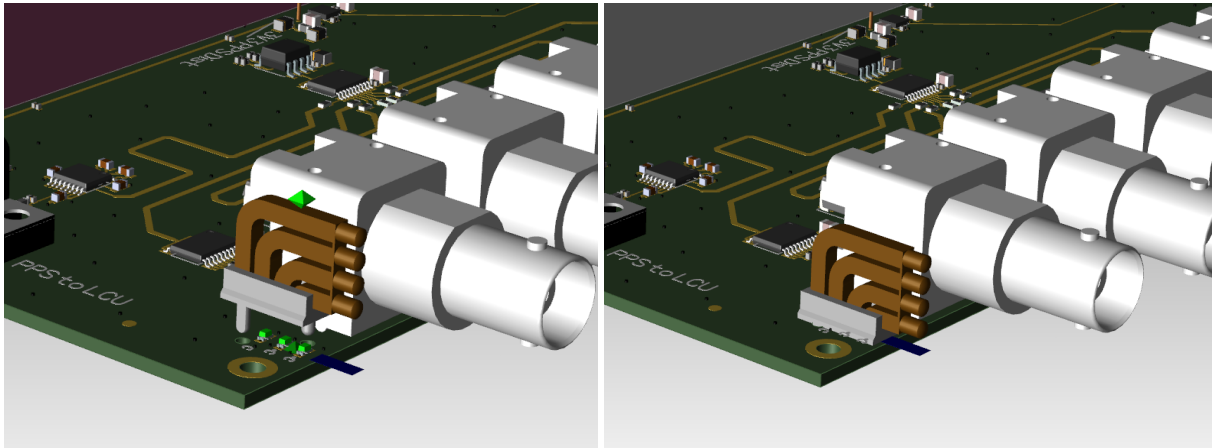


Figure 3 Mounting instruction for light-pipes.

4.4 Mounting CCD in 19" Housing

A mechanical drawing (t.b.d.) will be supplied showing the mounting of CCD inside the 19" housing and the cabling that has to be placed.

All screws have to be tighten, with an ESD safe screwdriver with a torque with a torque of 0.3 Nm (30 Ncm).

4.5 Mounting of Raspberry Pi CM4 module

The orientation of the pre-configured Raspberry Pi CM4 module is shown in Figure 4. The CM4 should be plugged in the connector. Screws are not needed to secure the CM4 to CCD. The configuration of the Raspberry Pi CM4 module is described in the CCD Production Test Procedure [RD-1].

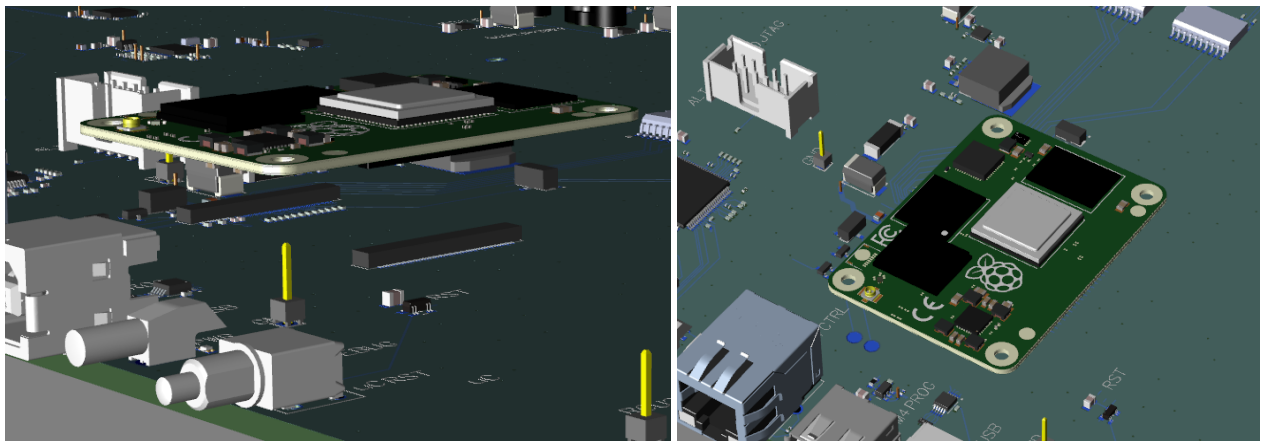


Figure 4 Mounting instruction for the Raspberry Pi CM4 (Needs update)

4.6 Set switches and place jumpers

The switches SW7 and SW8 have to be set according the red arrows shown in Figure 5.

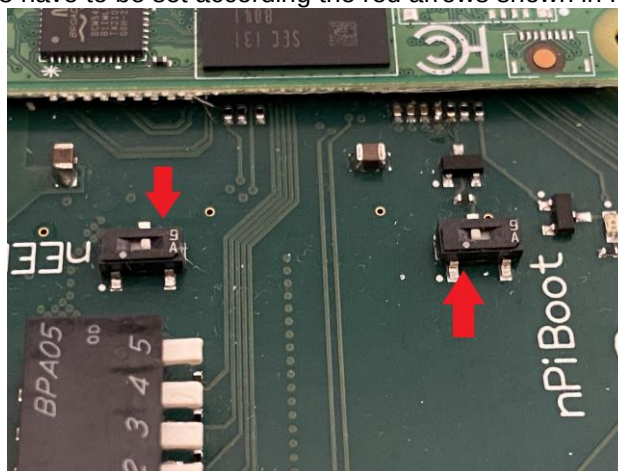


Figure 5 DIP-Switch setting on CCD

On CCD no jumpers have to be placed.

4.7 Serial number placement

Two equal serial numbers stickers, including QR-codes, have to be placed on the CCD-product. One serial number has to be placed on the top side of the PCBA as indicated in silkscreen on the PCB by "QR-CODE", see Figure 6.

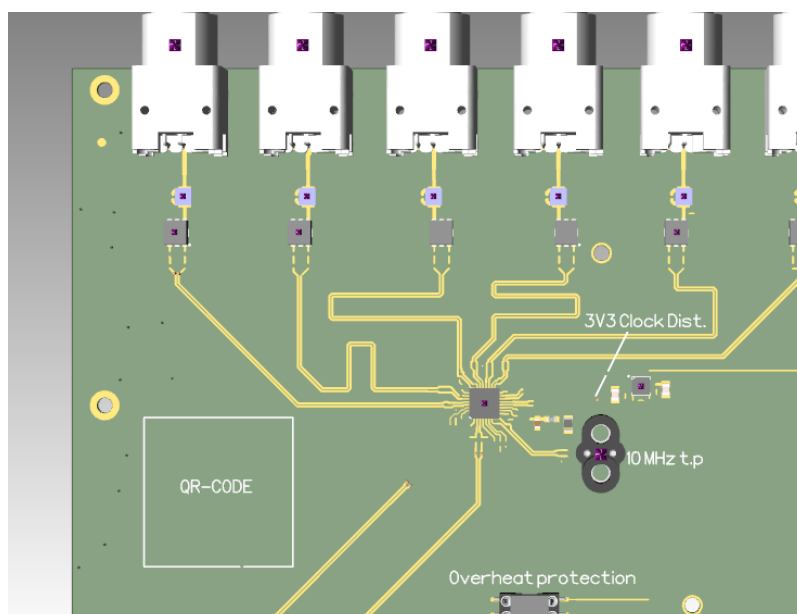


Figure 6 Location of the QR-Code on the top side of the CCD PCBA.

The second QR-code has to be placed on the backside of the CCD-housing near the AC input as indicated with the red arrow in Figure 7.



Figure 7 Location of the QR-Code at the back of the housing.

5 Precautions

A list of precautions are given, which are important during production.

1. The PCBA is ESD sensitive. ESD precautions must be taken at any time during the assembly and handling of the PCBA or individual components (use a wrist strap connected to a ground terminal).

6 Delivery and logistics

Delivery and logistic information is provided in the procurement documentation.

7 Annexes

7.1 Assembly drawing

An assembly drawing of the top and bottom will be added to the next pages.

