

Product Assembly Document

Receiver Unit 2 High
(RCU2H)

PCB nr.: 03120

| | Organisatie / Organization | Datum / Date |
|--|----------------------------|--------------|
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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 RCU2H. More information about the production of the RCU2H can be found in [AD-1]. In section 2 an overview of the most important applicable standards are given. Section 4 describes the assembly steps to complete the module.

1.2 List of Terms and acronyms

| | |
|-------|---|
| BOM | Bill Of Material |
| IPC | Association Connecting Electronics Industries |
| PCB | Printed Circuit Board |
| PCBA | Printed Circuit Board Assembly |
| RCU2H | Receiver Unit 2 High |
| EMS | Electronics Manufacturing Services, Assembly company. |

1.3 Applicable documents (AD)

| Ref.nr. | Doc. number | Title | Author |
|---------|-------------|--|--------------------|
| AD-1 | PMS00050 | RCU2H Product Manufacturing Specifications | Gijs Schoonderbeek |

1.4 Reference documents (RD)

| Ref.nr. | Doc. number | Title | Author |
|---------|-------------|---------------------------------|--------------------|
| RD-1 | TPR00024 | RCU2H Test plan | Henri Meulman |
| RD-2 | 015372-01 | Mechanical drawing RCU2H module | Jeroen Herrewijnen |

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, see section 4.8. The labels shall be equal and must contain the items:

Product name → RCU2H (6-digits)
 Batch number → YY (last 2 digits year) WW (week nr.) D (day)
 Serial number → 5-digits, starting with 00000

Basic; RCU2H -YYWWD-XXXXX
 Example: RCU2H -22091-00100

Example:



RCU2H -YYWWD- XXXXX

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 |

2.2 Assembly

| IPC requirement | Comment |
|-----------------|---|
| IPC-A-610 | Class 2 Dedicated Service Electronic Products |

Production tests are described in [RD-1]

3 Description

A functional description for the RCU2L module can be found in the "Product Manufacturing Specification" document (AD-1).

4 Items to assemble

| Item nr. | Amount | Description | Remarks |
|----------|--------|--------------------------------------|-----------------|
| #1 | 1 | RCU2H board assembly | SMD components |
| #2 | 3 | Press fit | See section 4.3 |
| #3 | 8 | Non SMD components (connectors) | See section 4.4 |
| #4 | 4 | Light-pipes | See section 4.5 |
| #5 | 3 | Place jumpers | See section 4.6 |
| #6 | 1 | Front panel | See section 4.7 |
| #7 | 2 | Place ASTRON serial number (QR-code) | See section 4.8 |

The following instructions are required for the RCU2H 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. Press fit connectors correct press-in force, see section 4.3.
5. Solder through hole components like jumpers and connectors, see section 4.4 for more details about the mounting of the F-connectors.
6. Place light pipes, see section 4.5.
7. Place jumpers, see section 4.6.
8. Mount front panel, see section 4.7.
9. Place QR label on PCB and front panel, see 4.8.
10. Functional testing, see [RD-1]

Photos of the assembled board is shown in Figure 1 and Figure 2. The assembly drawing are shown in Section 7.1. On request a STEP-model of the assembly can be supplied by ASTRON.

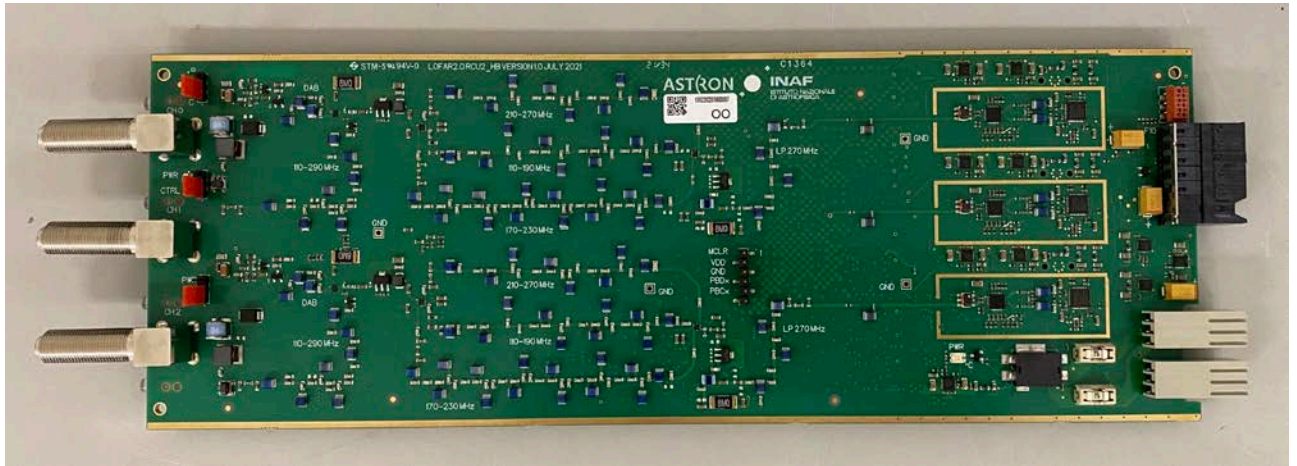


Figure 1 Photo of RCU2H PCBA TOP VIEW

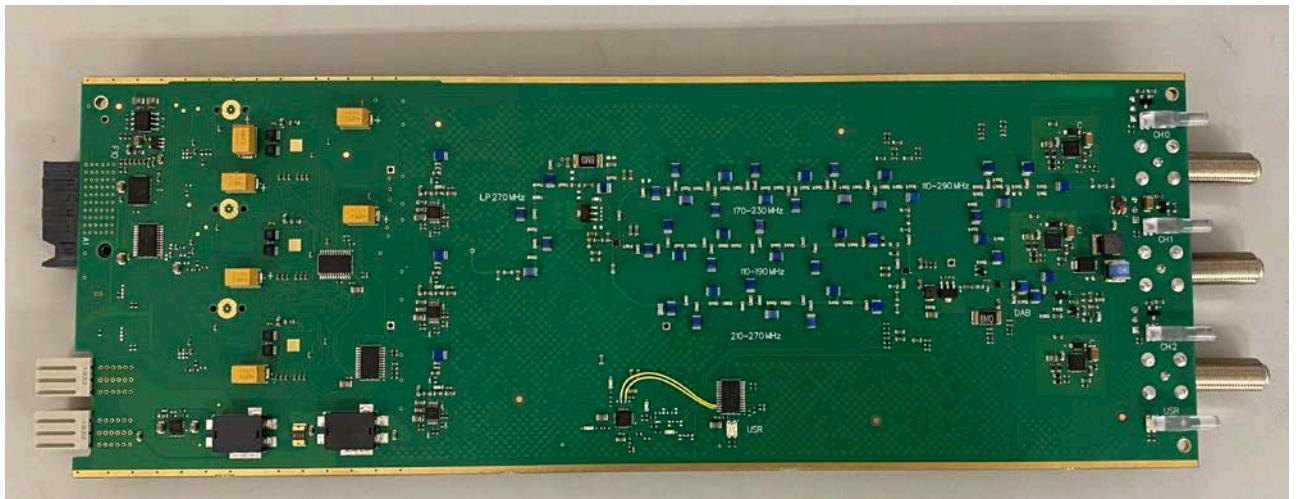


Figure 2 Photo of RCU2H PCBA BOTTOM VIEW

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 RCU2-LB the locations are shown, see Figure 3.

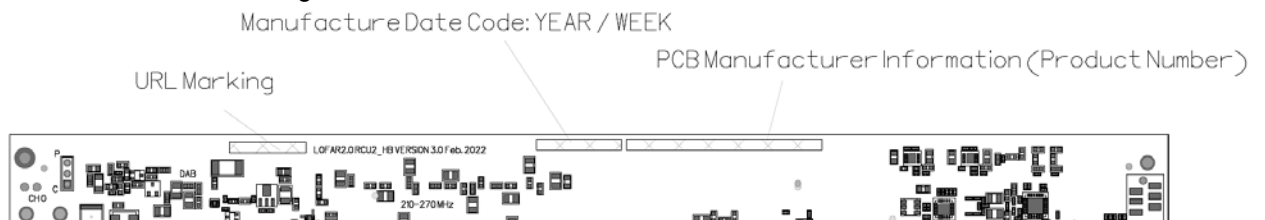


Figure 3 Location for PCB manufacturer and assembly company serial numbers.

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 APSCT Test plan [RD-1].

4.3 Press-fit

An overview of the press-fit connectors is shown in Table 1.

Table 1 Overview of the press-fit connectors.

| Type | ASTRON | Refdes | Force |
|-----------------|----------|----------|---|
| MOLEX 764603020 | AST02151 | P9 | 1.8kgf per pin (108 kgf per connector) |
| TE 120943-1 | AST02367 | P14, P15 | According datasheet |

Remarks:

- Information about the press-fit tools can be found here:
https://www.molex.com/pdm_docs/ats/TM-622018799-001.pdf
- Use a support pallet to support the PCBA during press-fit.
- Use press-in tools suitable for each independent corrector.
- The screws has to be tighten with an ESD safe screwdriver with a torque of 0.3 Nm (30.0 Ncm)

4.4 F-Connectors

Special care has to be taken soldering the F-connectors at the front of the assembly. A jig might be needed to ensure that:

- Connectors make a 90° angle with the front edge of the PCB (left picture of Figure 1)
- Connectors are parallel to the PCB top side (right picture of Figure 1)
- Connectors are not soldered with too much heat, melting the inside of the connector.

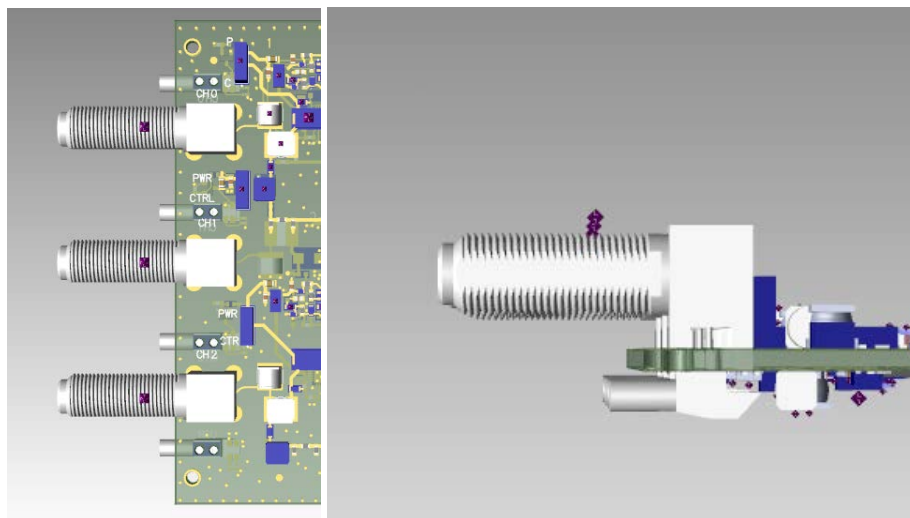


Figure 4 F-connector orientation on RCU2H, top view (left) and side view (right).

If the F-connectors are not placed correctly, the front panel will not fit.

4.5 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 5. Make sure that the bottom of the PCB is supported while pressing the light-pipe into the PCB.

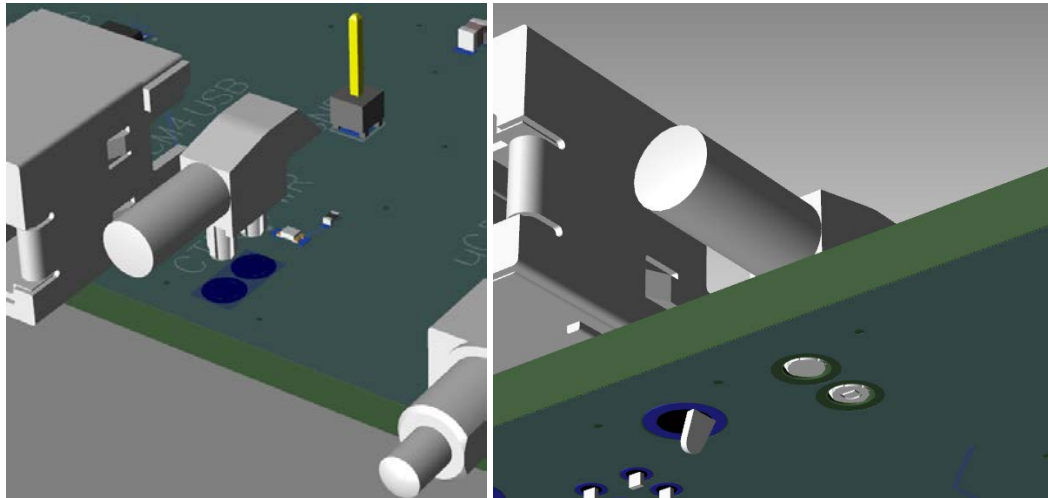


Figure 5 Mounting instruction for light-pipes.

4.6 Jumpers

On the RCU2H, 3 jumpers have to be placed, J4, J5 and J6n between pin 1 and 2 as indicated in the silkscreen CTR.

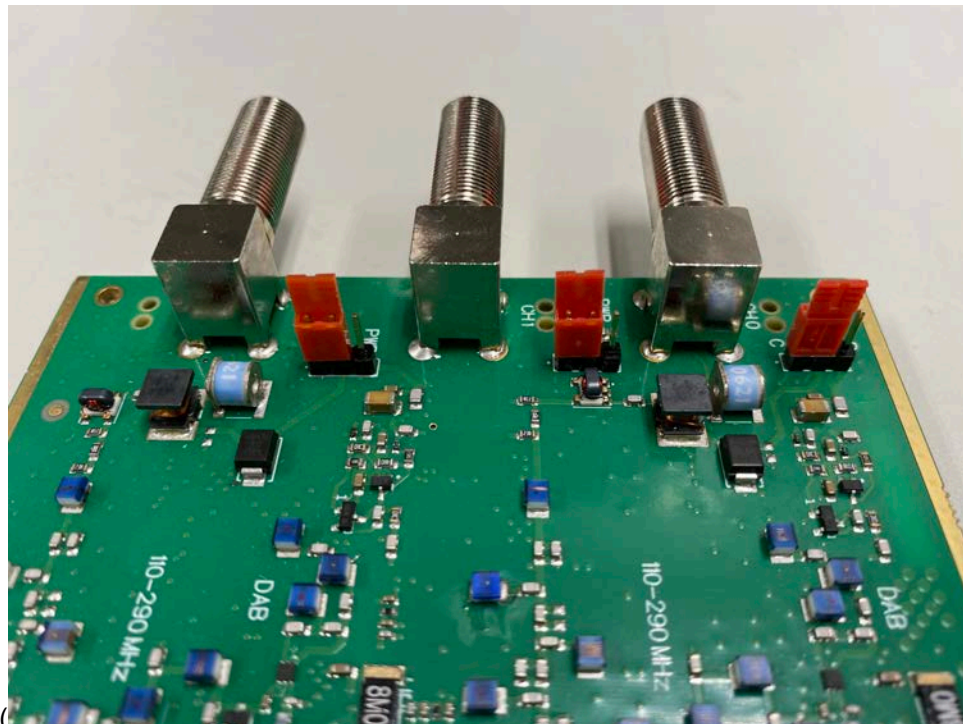


Figure 6 Jumpers placement on the RCU2H

4.7 Mounting of front panel

A drawing of the mounting of the front panel is shown in Figure 5. The following steps have to be taken to mount the front panel:

- Mount the PCB metal brackets (Schroff 60807181) the PCBA such that movement is possible.
- Place on all three F-connectors a nut close to the body of the connector.
- Place the front panel.
- Fasten the screws of the front panel to the PCB metal brackets with 0.3 Nm torque.
- Fasten the screws on the PCB with 0.3 Nm torque.
- Fasten the F-connector nuts to the backside of the front panel, hand tight.
- Place a washer on all three F-connectors close to the front panel.
- Place an F-connector nut on all three F-connectors.
- Fasten the F-connector nuts on the front side with a torque of 1 Nm.

See mechanical drawing in [RD-2] for more details.

All screws have to be tightened, with an ESD safe screwdriver with a torque as indicated on the mechanical drawing.

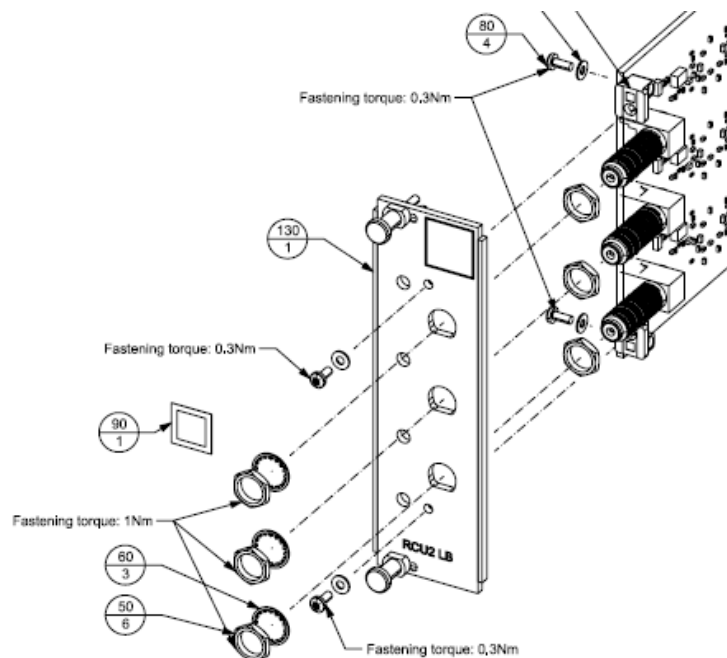


Figure 7 Drawing showing the mounting of the front panel.

4.8 Serial number placement

Two equal serial number stickers, including QR-codes, have to be placed on the assembly. One serial number has to be placed on the top side of the PCB as indicated in silkscreen on the PCB by "QR-CODE", see Figure 8

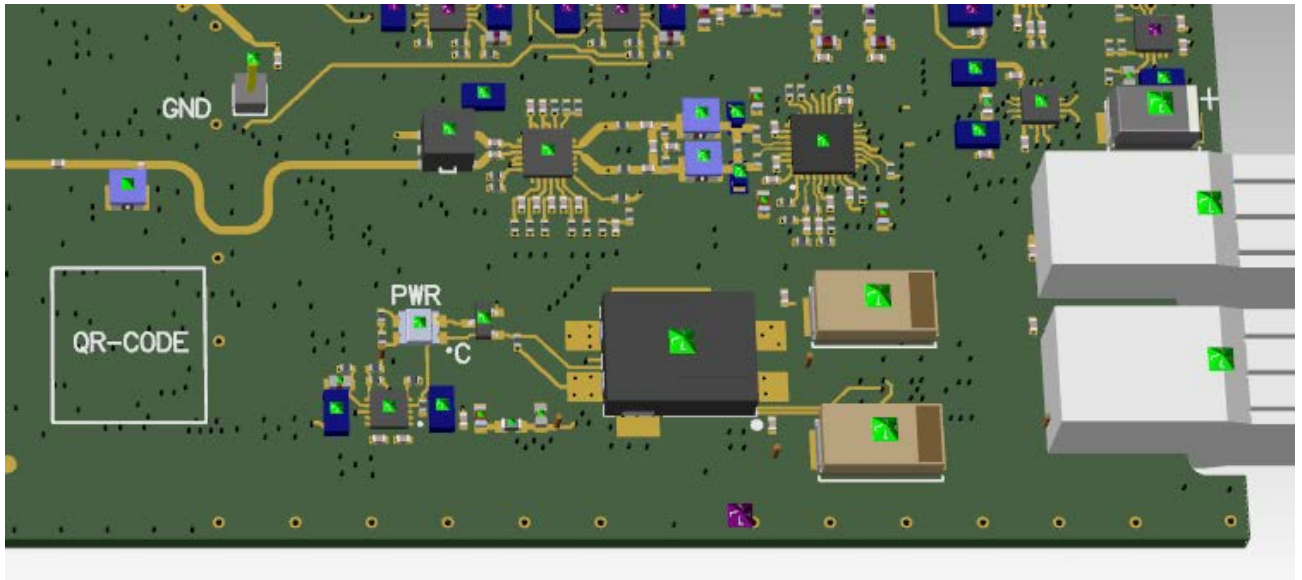


Figure 8 QR-Code location on the top side of the RCU2H PCBA.

The second serial number sticker has to be placed on the front panel at the indicated location, see [RD-2].

5 Precautions

The following precautions are applicable during production and assembly:

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).
2. F-Connector soldering see section 4.4

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.

Top Components, odb_board_outline, sst

