

Product Assembly Document

LOFAR2 Mid-Plane (LMP)

PCB nr.: 03118

	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 mid-plane (LMP). More information about the production of the LMP 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
IPC	Association Connecting Electronics Industries
LMP	LOFAR2 Mid-plane
PCB	Printed Circuit Board
PCBA	Printed Circuit Board Assembly
EMS	Electronics Manufacturing Services, Assembly company

1.3 Applicable documents (RD)

Ref.nr.	Doc. number	Title	Author
AD-1	PMS00047	LMP Product Manufacturing Specifications	Gijs Schoonderbeek

1.4 Reference documents (RD)

Ref.nr.	Doc. number	Title	Author
RD-1	TPR00021	LMP 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 → LMP (3-digits)
 Batch number → YY (last 2 digits year) WW (week nr.) D (day)
 Serial number → 5-digits, starting with 00000

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

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

Example:



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LMP -YYWWD-YYYYY

2 IPC Quality standards

2.1 Design

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-612	Class 2 Dedicated Service Electronic Products

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 LOFAR2.0 LMP can be found in the "Product Manufacturing Specification" document [AD-1].

4 Items to assemble

Item nr.	Amount	Description	Remarks
#1	138	Press fit	See section 4.1
#2	7	Place jumper(s)	See section 4.3
#3	2	Place bridges	See section 4.4
#4	1	Place ASTRON serial number (QR-code)	See section 4.5

The following instructions are required for the LMP 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. Press fit connectors with correct press-in force, see section 4.2.
3. Place jumpers, see section 4.3.
4. Place bridges, see section 4.4.
5. Verify assembly.
6. Place QR label on PCB, see section 4.5.

A 3D drawing 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.



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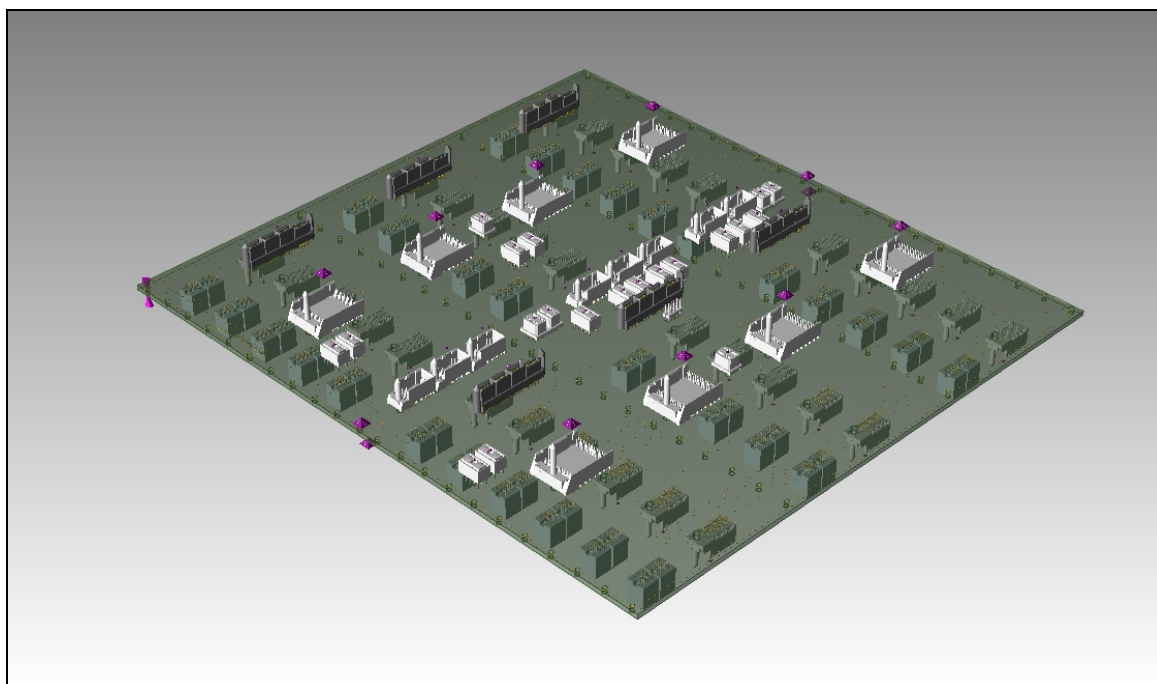


Figure 1 3D-drawing of LMP PCBA

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 LMP the locations are shown, see

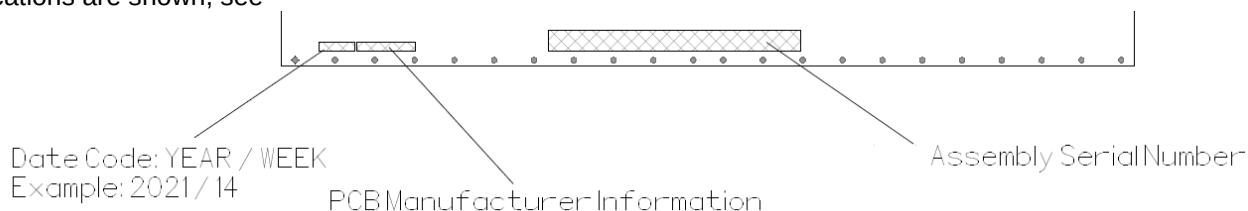


Figure 2 Location for PCB manufacturer and EMS serial or lot numbers

4.2 Press-fit connectors

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

Table 1 Overview of the press-fit connectors.

Type	ASTRON	Refdes	Press-fit information
MOLEX 782121001	AST02182	P1, P10, P11, P12, P13, P36	https://www.molex.com/pdm_docs/ats/TM-622018799-001.pdf
Samtec LPHS-06-16-L-VP1-GP	AST02360	P116, P137, P138, P139, P140, P141	https://suddendocs.samtec.com/products/pecs/lphx.pdf
TE 1645498-1	AST02368	P2, P3, P4, P5, P6, P7, P8, P9, P14, P15, P16, P17, P18, P19, P20, P21, P22, P23, P24, P25, P26, P27, P28, P31, P32, P33, P34, P35, P37, P38, P39, P40, P41, P42, P43, P44, P45,	TE Datasheet



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		P46, P47, P48, P49, P50, P51, P52, P53, P54, P55, P56, P57, P58, P59, P60, P61, P62, P81, P82, P83, P84, P121, P122, P125, P126, P127, P128	
MOLEX 76145-3607	AST02190	P29, P30, P69, P70, P113, P114, P115, P120	https://www.molex.com/pdm_docs/ats/TM-622018799-001.pdf
MOLEX 76455-7107	AST02181	P63, P64, P65, P66, P67, P68, P71, P72, P73, P74, P75, P76, P77, P78, P79, P80, P97, P98, P99, P100, P101, P102, P103, P104, P105, P106, P107, P108, P109, P110, P111, P112, P123, P124, P130, P131, P132, P133, P134, P136	https://www.molex.com/pdm_docs/ats/TM-622018799-001.pdf
MOLEX 0760010010	AST01536	P85, P86, P87, P88, P89, P90, P91, P92, P93, P94, P95, P96, P129, P135	https://www.molex.com/pdm_docs/ats/TM-622018799-001.pdf

Remarks:

- Use a support pallet to support the PCBA during press-fit.
- Use press-in tools suitable for each independent corrector.
- The screws have to be tighten with an ESD safe screwdriver with a torque of 0.3 Nm (30.0 Ncm).
- A component placement file and polarity drawing can be supply on request, see contact details in the PMS [AD-1].

4.3 Place jumpers

Place a jumpers on J1 till J7 is shown in Figure 3.

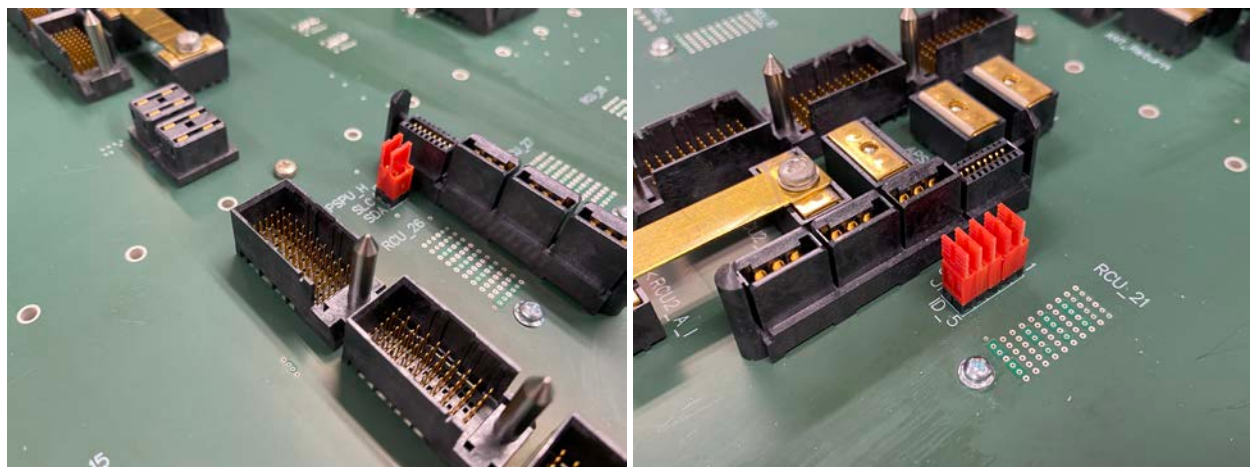


Figure 3 Jumpers placement on LMP.

4.4 Place bridges

On LMP, 2 bridges have to be placed to connect two half of the backplane to each other. In Figure 4 the bridges are shown. These bridges have to be mounted with pan head cross recess zinc plated steel screws M3x8mm, and zinc plated lock washers using a torque of 0.3 Nm (30 Ncm).

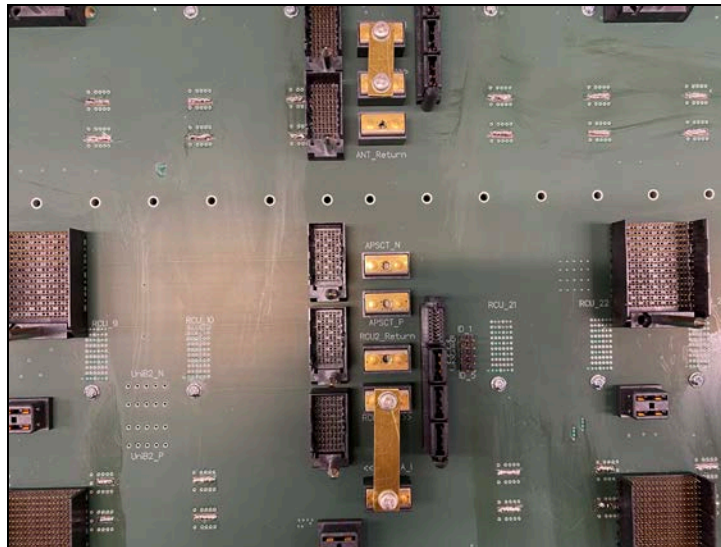


Figure 4 Bridges mounted on LMP

4.5 Serial number placement

One serial numbers sticker, including QR-codes, has to be placed on the assembly. The 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 5.

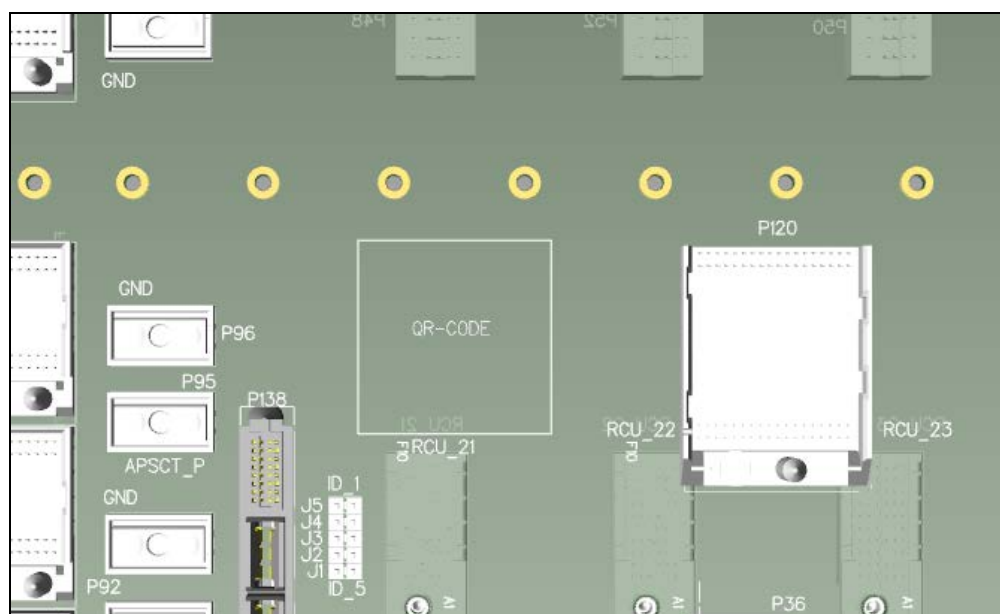


Figure 5 QR-Code location on the top side of LMP.

5 Precautions

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

1. The PCBA has sensitive connector pins which can easily bent making the midplane unusable.
2. The PCBA is big and heavy.

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.



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