

PCB Production Specification

Receiver Unit 2 High RCU2H

PCB nr.: 03120

	Organisatie / Organization	Datum / Date
Auteur(s) / Author(s): Gijs Schoonderbeek Sieds Damstra	ASTRON ASTRON	08-04-2022
Controle / Checked:	ASTRON	
Goedkeuring / Approval: Paulus Kruger	ASTRON	
Autorisatie / Authorisation: Handtekening / Signature	ASTRON	

© 2022 ASTRON
All rights are reserved. Reproduction in whole or in part is prohibited without written consent of the copyright owner.



This publication is part of the project DUPLLO (with project number 175.2017.012 of the research programme "InvesteringsNWO-groot" which is (partly) financed by the Dutch Research Council (NWO).

Doc.nr.: PSF00171
Rev: 3.3
Date: 08-04-2022
Class.:

Distribution list:

Group:	Others:
Paulus Kruger Gijs Schoonderbeek Sieds Damstra	N. Ebbendorf A. v. Duin H. Meulman

Document history:

Revision	Date	Chapter / Page	Modification / Change
0.1	04-02-2021	-	Creation
1.0	24-03-2021	-	
2.0	24-01-2022	-	
3.0	25-02-2022	-	Update
3.1	01-03-2022		Update stackup
3.2	11-03-2022		Update after review
3.3	08-02-2022		Update RF-Switch + DAB-filter

Table of contents:

1	Introduction.....	3
1.1	Document Scope	3
1.2	Applicable documents (AD)	3
1.3	Reference documents (RD).....	3
1.4	List of Terms and acronyms	3
2	IPC Quality Requirements.....	3
2.1	Board:	3
2.1.1	Bare board testing	3
3	Specifications	4
4	List of Files	5
5	Filled & capped via	5
6	General.....	5



This publication is part of the project DUPLLO (with project number 175.2017.012 of the research programme "InvesteringsNWO-groot" which is (partly) financed by the Dutch Research Council (NWO).

Doc.nr.: PSF00171
 Rev: 3.3
 Date: 08-04-2022
 Class.:

1 Introduction

1.1 Document Scope

This document presents technical PCB production specification for the RCU2H LOFAR2.0. For all specification is the **ODB++ DATA IS LEADING**

1.2 Applicable documents (AD)

Ref.nr.	Document number	Rev.	Title	File name
AD.1				

1.3 Reference documents (RD)

Ref.nr.	Document number	Title	Author
RD.1	PMS00050	PMS RCU2H LOFAR 2.0_PCB-03120-XX	G.W. Schoonderbeek

1.4 List of Terms and acronyms

BOM	Bill Of Material
IPC	Association Connecting Electronics Industries
PCB	Printed Circuit Board

2 IPC Quality Requirements

The board have the following IPC requirements:

2.1 Board:

IPC requirement	Comment
IPC 2222B	Board type 4 (Multilayer Printed Board with blind and/or buried vias)
IPC 2221A	Performance Class 2 (Dedicated Service Electronic Products). Producibility Level C (High Design Complexity - Standard)
IPC A-600	Class 2 (Dedicated Service Electronic Products)
IPC SM-840	Solder Resist
IPC 4101	Laminate Material

2.1.1 Bare board testing

- Impedances on all impedance layer shall be tested according IPC-TM-650 2.5.5.7. Both single ended and differential impedance will be <10% with the specified impedance. A report showing compliance shall be delivered with the board or send to schoonderbeek@astron.nl



This publication is part of the project DUPLLO (with project number 175.2017.012 of the research programme "InvesteringsNWO-groot" which is (partly) financed by the Dutch Research Council (NWO).

Doc.nr.: PSF00171

Rev: 3.3

Date: 08-04-2022

Class.:

Remarks

PCB supplier should send ASTRON the test results after board testing.

3 Specifications

PCB nr.	03120-01
Title	Receiver Unit 2 High
Number of Layers	8
Size of the PCB	280 X 100 (mm) +/- 0.1 mm
Placement components	SMD Top/Bottom, Through-hole Top/Bottom
Number of signal layers	4
Number of plane layers	4
Number of Non-signal layers	2 (mask)
Silkscreen	top and bottom (user layer)
Number of Pins	3709
Number of Nets	728
Number of Components	1503
Number of Differential Pairs	17
Number of Vias	3042
Vias filling	2986, via in pad is used. Holes < 0.4mm are filled and capped.
Total number of Trough Holes	2495
Smallest hole diameter	0.3 mm Through Hole (finished size)
Smallest route size	0.15 mm
Smallest Isolation / clearance	0.15 mm
PCB material and type	ISOLA FR408HR
Material thickness	Total 2.4mm
Copper thickness	See master drawing.
Etch Tolerance	10%
Via Plating	Through and Buried: >20um
Finishing	Gold (ENIG)
Impedance trace on layer	See section appendix
Hole tolerances	Press fit connectors are placed on the board, see drill drawing for hole tolerances.
Reports	All reports showing correct production have to be delivered. This includes impedances, layer and copper thickness and electrical test reports.
PCB Testing	Electrical test (open circuit/short circuit)



This publication is part of the project DUPLLO (with project number 175.2017.012 of the research programme "InvesteringsNWO-groot" which is (partly) financed by the Dutch Research Council (NWO).

Doc.nr.: PSF00171

Rev: 3.3

Date: 08-04-2022

Class.:

4 List of Files

ODB++	rcu2_hb_rev3_20220408.tgz
Statistics	On request

5 Filled & capped via

The via's should be filled according **IPC4761 TYPE VII** via (filled and capped via), see Figure 1

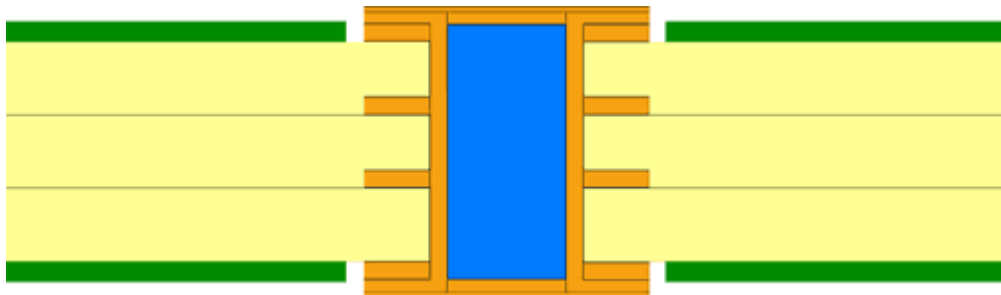


Figure 1 Filled and capped via

6 General

For technical information contact can be made with;

Designer: *Gijs Schoonderbeek (ASTRON)*
 Phone; (+31) (0)521 595 110
 E-mail; schoonderbeek@astron.nl



This publication is part of the project DUPLLO (with project number 175.2017.012 of the research programme "InvesteringsNWO-groot" which is (partly) financed by the Dutch Research Council (NWO).

Doc.nr.: PSF00171
 Rev: 3.3
 Date: 08-04-2022
 Class.:

1 2 3 4 5 6 7 8

A B C D E F

Specifications

[1] Fabricate boards in accordance with IPC6011 / IPC6012 CLASS

[2] Finished boards must meet quality and performance testing and inspection as specified

[3] Drill boards using drill data, drill pattern and hole schedule.

Hole locations may vary within 0.125mm max. about true position.

[4] All holes are plated through unless noted otherwise.

Minimum copper plating in plated holes to be 25um.

Maximum copper plating in plated holes to be 50um.

[5] Plating primary and secondary side: ENIG (>= 0.05um)

[6] Minimum annular ring:

internal: 20um

external: 25um

[7] Bow and twist shall not exceed 0.75% measured in accordance with IPC-TM Method 2.4.22.

[8] All vias shall be filled and capped

[9] Differential pair impedance tolerance less than 10%

[10] Construction to be solder mask over bare copper (SM0BC)

Apply to primary and secondary sides in accordance with IPC-SM-840 (Class T).

[11] Solder mask thickness 5um min. / 30um maximal.

[12] Solder mask to be light green in color and transparent.

[13] PCB Repairs: Repairs of damaged traces is not permitted.

[14] Non-Functional pads can be removed.

Testing

[15] Bare boards shall be electrically tested using CAD generated netlist data.

Electrical testing shall follow the guidelines established by IPC-ET-652.

Guidelines and requirements for electrical testing of unpopulated printed boards.

[16] Thermal testing: Each production panel shall be tested in accordance IPC-TM-650 Method 2.6.27 for a reflow temperature of 260 deg C.

Other

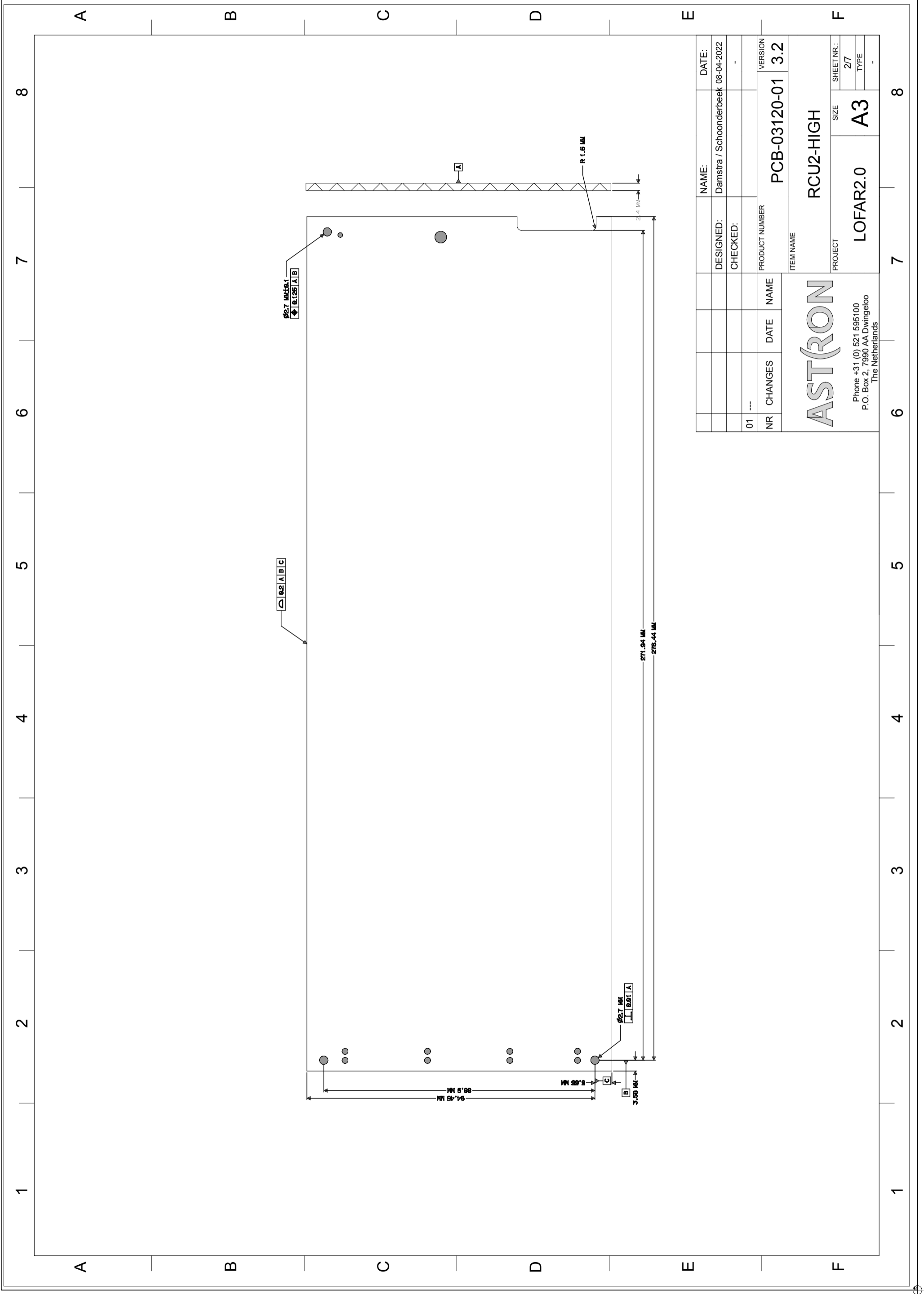
[17] Board fabricator shall apply serial number, date code and UL Marking at the indicated location on the primary side.

DESIGNED:	NAME:	DATE:
CHECKED:	Damstra / Schoonderbeek	08-04-2022
01	---	-
NR	CHANGES	DATE
	NAME	VERSION
PRODUCT NUMBER		PCB-03120-01
ITEM NAME		RCU2-HIGH
PROJECT	LOFAR2.0	SIZE
		A3
SHEET NR.:		1/7
TYPE		-



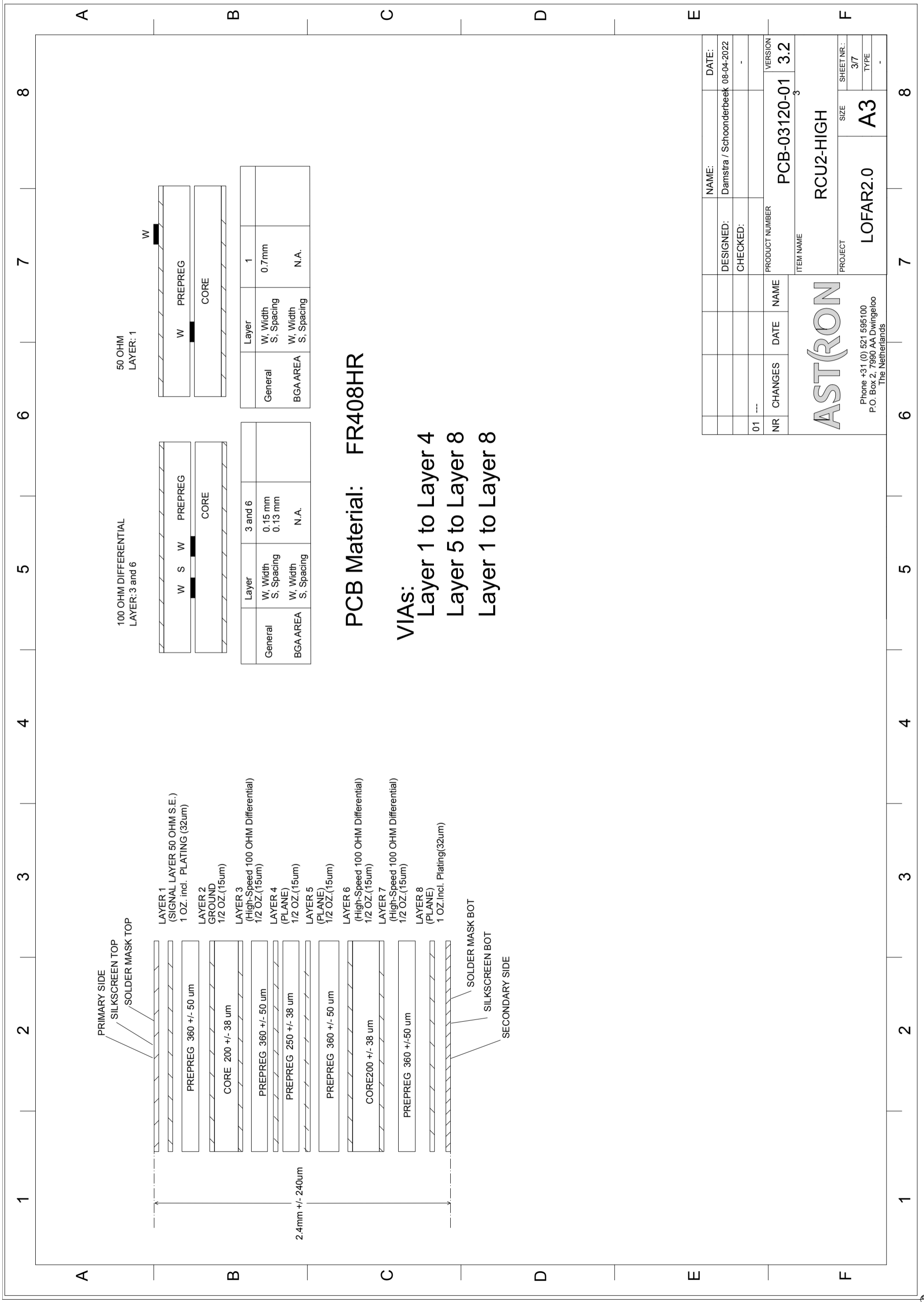
Phone +31 (0) 521 595100
P.O. Box 2, 7990 AA Dwingeloo
The Netherlands

1 2 3 4 5 6 7 8



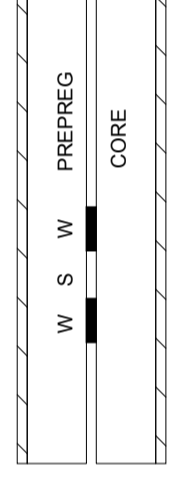
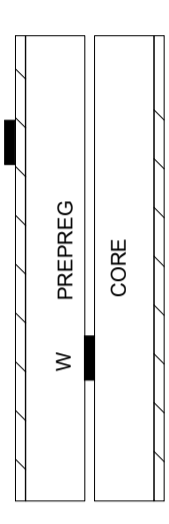
DESIGNED:	Damstra / Schoonderbeek	DATE:	08-04-2022
CHECKED:			
PRODUCT NUMBER	PCB-03120-01	VERSION	3.2
ITEM NAME		RCU2-HIGH	
PROJECT		LOFAR2.0	SIZE
AST(RO)N			A3
Phone +31 (0) 521 595100		SHEET NR.:	
P.O. Box 2, 7990 AA Dwingeloo		2/7	
The Netherlands		TYPE	

NR	CHANGES	DATE	NAME
01	---		



100 OHM DIFFERENTIAL
LAYER: 3 and 6

50 OHM
LAYER: 1



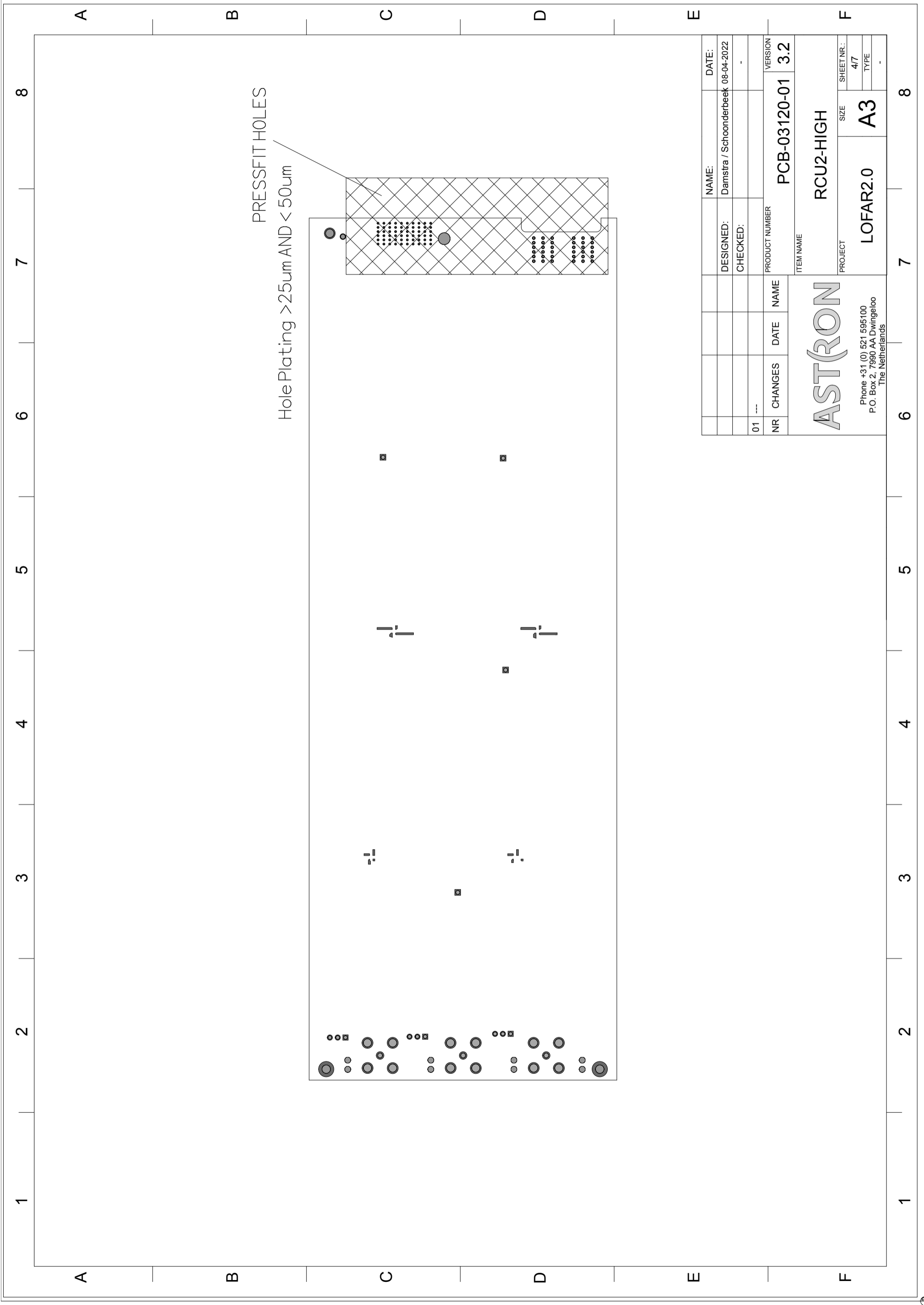
Layer	1
W, Width	0.7mm
S, Spacing	N.A.
General	
BGA-AREA	

Layer	3 and 6
W, Width	0.15 mm
S, Spacing	0.13 mm
W, Width	N.A.
S, Spacing	N.A.
General	
BGA-AREA	

PCB Material: FR408HR

VIAS:
Layer 1 to Layer 4
Layer 5 to Layer 8
Layer 1 to Layer 8

NAME:	Damstra / Schoonderbeek	DESIGNED:	08-04-2022	DATE:	
CHECKED:					
PRODUCT NUMBER	PCB-03120-01	VERSION	3.2		
ITEM NAME	RCU2-HIGH				
PROJECT	LOFAR2.0	SIZE	A3	SHEET NR.:	3/7
				TYPE	
AST(RO)N		Phone +31 (0) 521 595100		P.O. Box 2, 7990 AA Dwingeloo	
		The Netherlands			

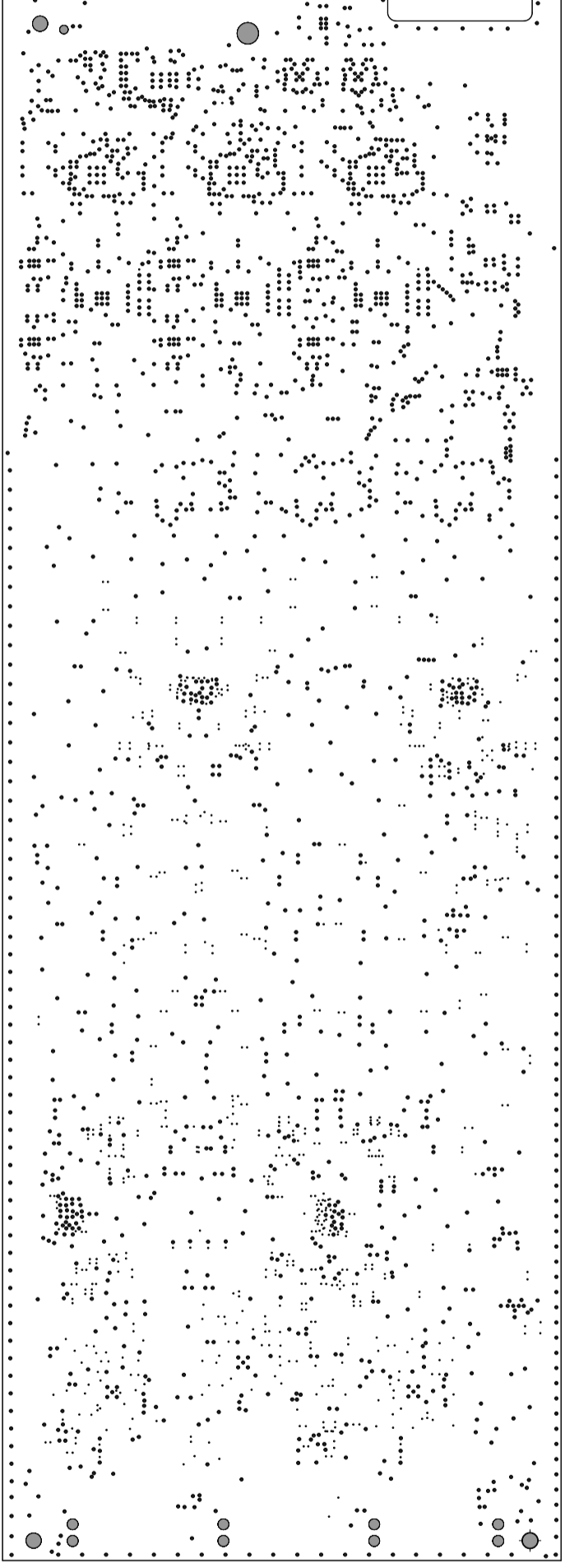


DESIGNED:	Damstra / Schoonderbeek	DATE:	08-04-2022
CHECKED:			
PRODUCT NUMBER	PCB-03120-01	VERSION	3.2
ITEM NAME		RCU2-HIGH	
PROJECT		LOFAR2.0	SIZE
AST(RO)N		A3	SHEET NR.: 4/7
Phone +31 (0) 521 595100			TYPE
P.O. Box 2, 7990 AA Dwingeloo			
The Netherlands			

1 2 3 4 5 6 7 8

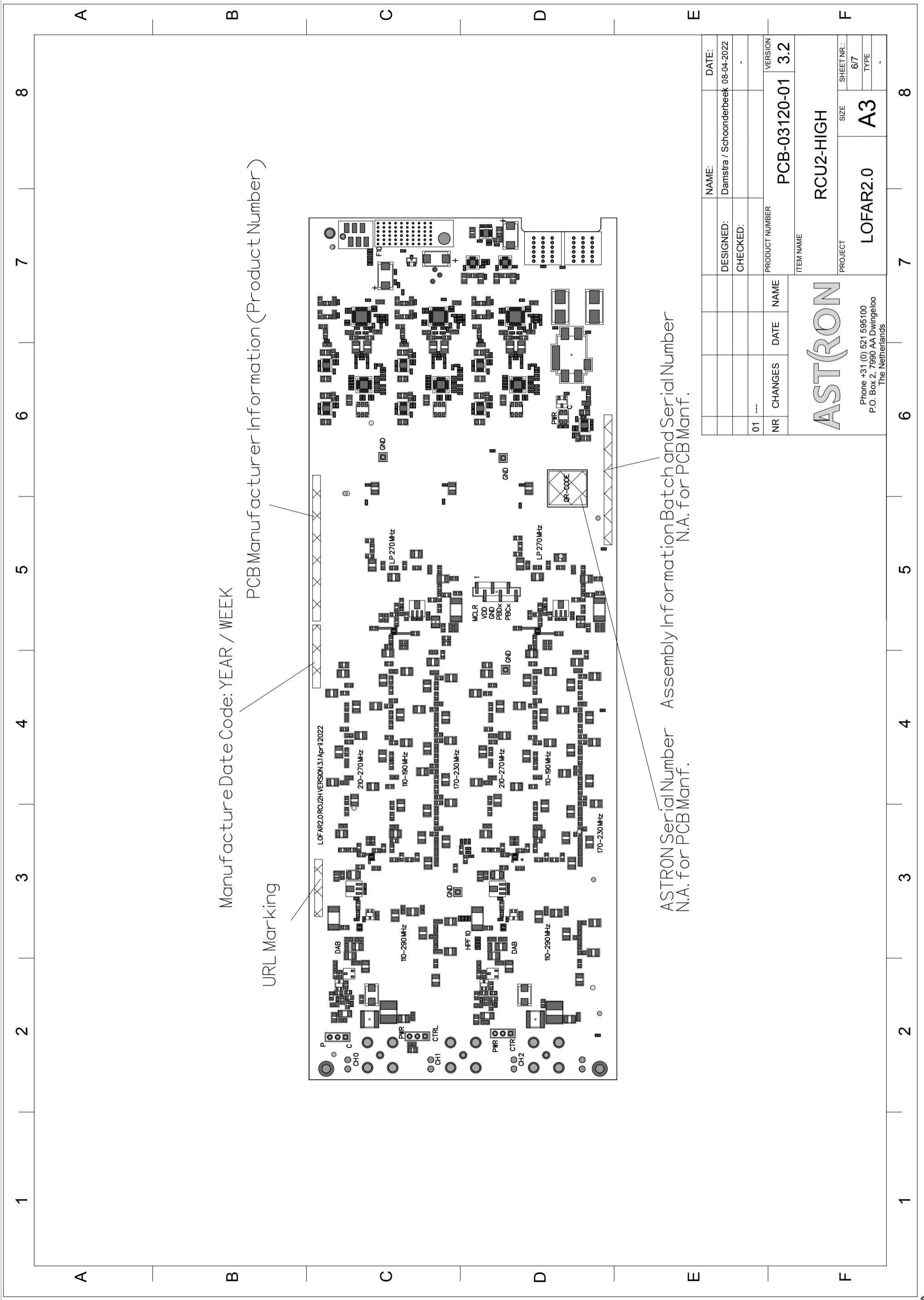
A B C D E F

FILLED VIAS



DESIGNED:	NAME:	DATE:
CHECKED:	Damstra / Schoonderbeek	08-04-2022
01	PRODUCT NUMBER	VERSION
---	PCB-03120-01	3.2
NR	CHANGES	DATE
	NAME	
AST(RO)N		
Phone +31 (0) 521 595100		
P.O. Box 2, 7990 AA Dwingeloo		
The Netherlands		
PROJECT	SIZE	SHEET NR.:
LOFAR2.0	A3	5/7
RCU2-HIGH		TYPE
		-

1 2 3 4 5 6 7 8



Manufacture Date Code: YEAR / WEEK

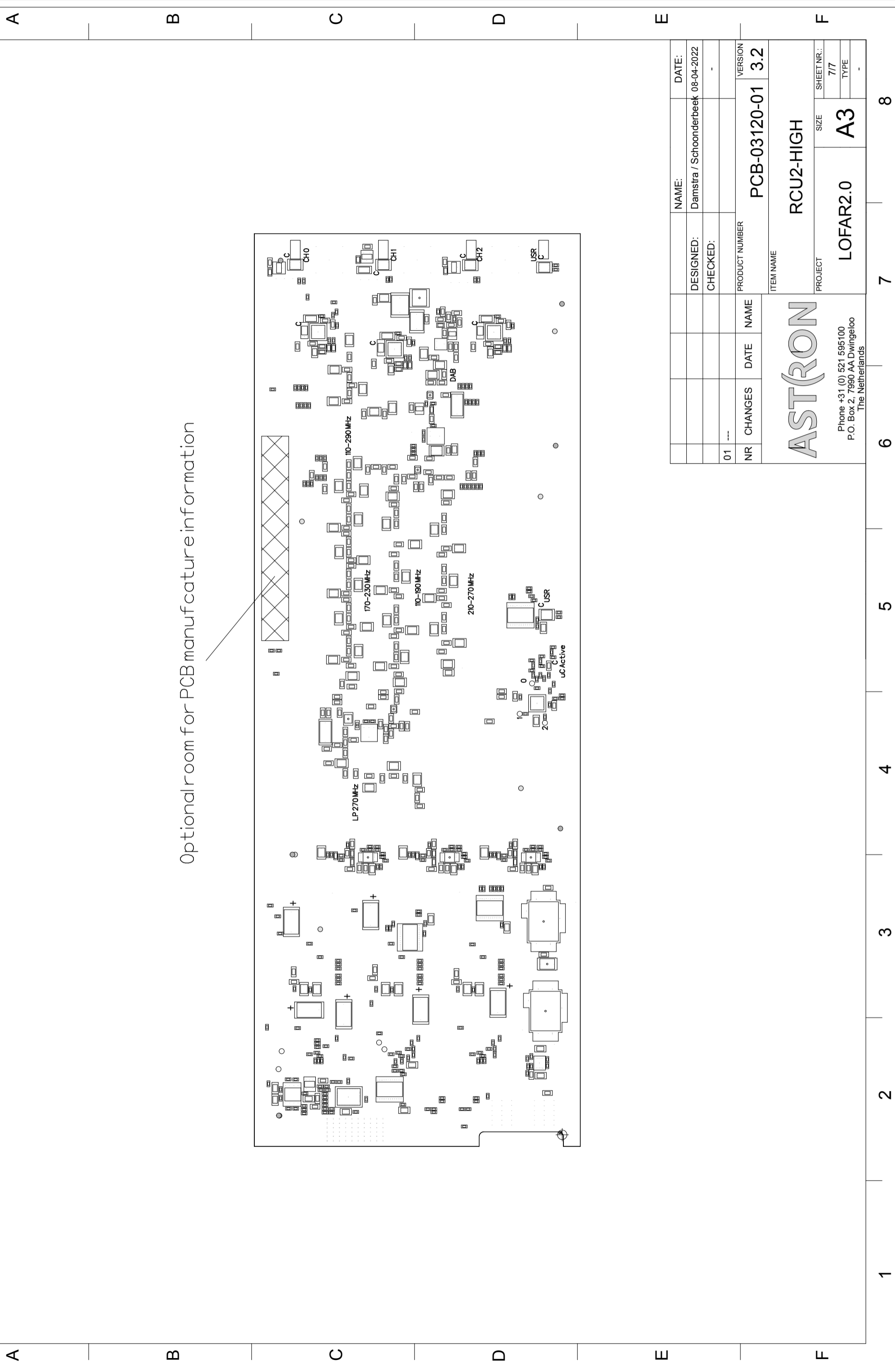
PCB Manufacturer Information (Product Number)

URL Marking

ASTRON Serial Number Assembly Information Batch and Serial Number
N.A. for PCB Manf.

DESIGNED:	Damstra / Schoonderbeek	DATE:	08-04-2022
CHECKED:			
PRODUCT NUMBER	PCB-03120-01		
VERSION	3.2		
ITEM NAME			
RCU2-HIGH			
PROJECT	LOFAR2.0	SIZE	A3
ASTRON		SHEET NR.:	6/7
Phone +31 (0) 521 595100		TYPE	
P.O. Box 2, 7990 AA Dwingeloo			
The Netherlands			
NR	CHANGES	DATE	NAME
01	---		

1 2 3 4 5 6 7 8



Optional room for PCB manufacture information

DESIGNED:	Damstra / Schoonderbeek	DATE:	08-04-2022
CHECKED:			
PRODUCT NUMBER	PCB-03120-01	VERSION	3.2
ITEM NAME		RCU2-HIGH	
PROJECT		LOFAR2.0	SIZE
			A3
AST(RO)N		SHEET NR.: 7/7	
Phone +31 (0) 521 595100		TYPE	
P.O. Box 2, 7990 AA Dwingeloo			
The Netherlands			

NR	CHANGES	DATE	NAME
01	---		

1 2 3 4 5 6 7 8