

Nordic Semiconductor ASA

Direction Finding Antenna Board (PCA20054)

- | | |
|----------|-------------------|
| Sheet 1: | Cover Page |
| Sheet 2: | Block Diagram |
| Sheet 3: | Antenna Switches |
| Sheet 4: | Power and Control |
| Sheet 5: | Connectors |

DESIGN NOTES LEGEND

DESIGN NOTE:
Informational notes are Text Frames
with a grey medium frame.
Use 20 mil Text Margin.

DESIGN NOTE:
Cautionary notes are Text Frames
with a yellow medium frame.
Use 20 mil Text Margin.

DESIGN NOTE:
Debug notes are Text Frames
with an orange medium frame.
Use 20 mil Text Margin.

DESIGN NOTE:
Critical notes are Text Frames
with a red large frame.
Use 10 mil Text Margin.

DESIGN NOTE:
Critical layout notes are Text Frames
with a blue medium frame.
Use 20 mil Text Margin.



PCA20054 - Cover

Size A3	Project Number 4467	Revision 1.0.0
Date: 2020-02-19	Sheet 1 of 5	
File: pca20054_sheet1_cover.SchDoc		Drawn By: KJP



nRF52833-DK

Antenna Array Board

VDD	3V3RF
GND	GND
RESET_PIN	RESET_PIN

Power and Control

DESIGN NOTE:
This is a power indicator LED, a reset button and a DC/DC converter from +3.3 V to -3.3 V.

A0 / P0.02	ANT_SEL_0
A1 / P0.03	ANT_SEL_1
A0 / P0.04	ANT_SEL_2
A3 / P0.05	ANT_SEL_3
Antenna	ANT

Antenna Switches

DESIGN NOTE:
Antenna select mapping

Antenna | ANT_SEL[3:0] | Note

ANT_12	0 (0000)	
ANT_10	1 (0001)	
ANT_11	2 (0010)	
---	3 (0011)	Not used. 50 Ohm load.
ANT_3	4 (0100)	
ANT_1	5 (0101)	
ANT_2	6 (0110)	
---	7 (0111)	Not used. 50 Ohm load.
ANT_6	8 (1000)	
ANT_4	9 (1001)	
ANT_5	10 (1010)	
---	11 (1011)	Not used. 50 Ohm load.
ANT_9	12 (1100)	
ANT_7	13 (1101)	
ANT_8	14 (1110)	
---	15 (1111)	Not used. 50 Ohm load.

The mapping is weird, but this is according the data sheet for the antenna switches.

Antenna Array

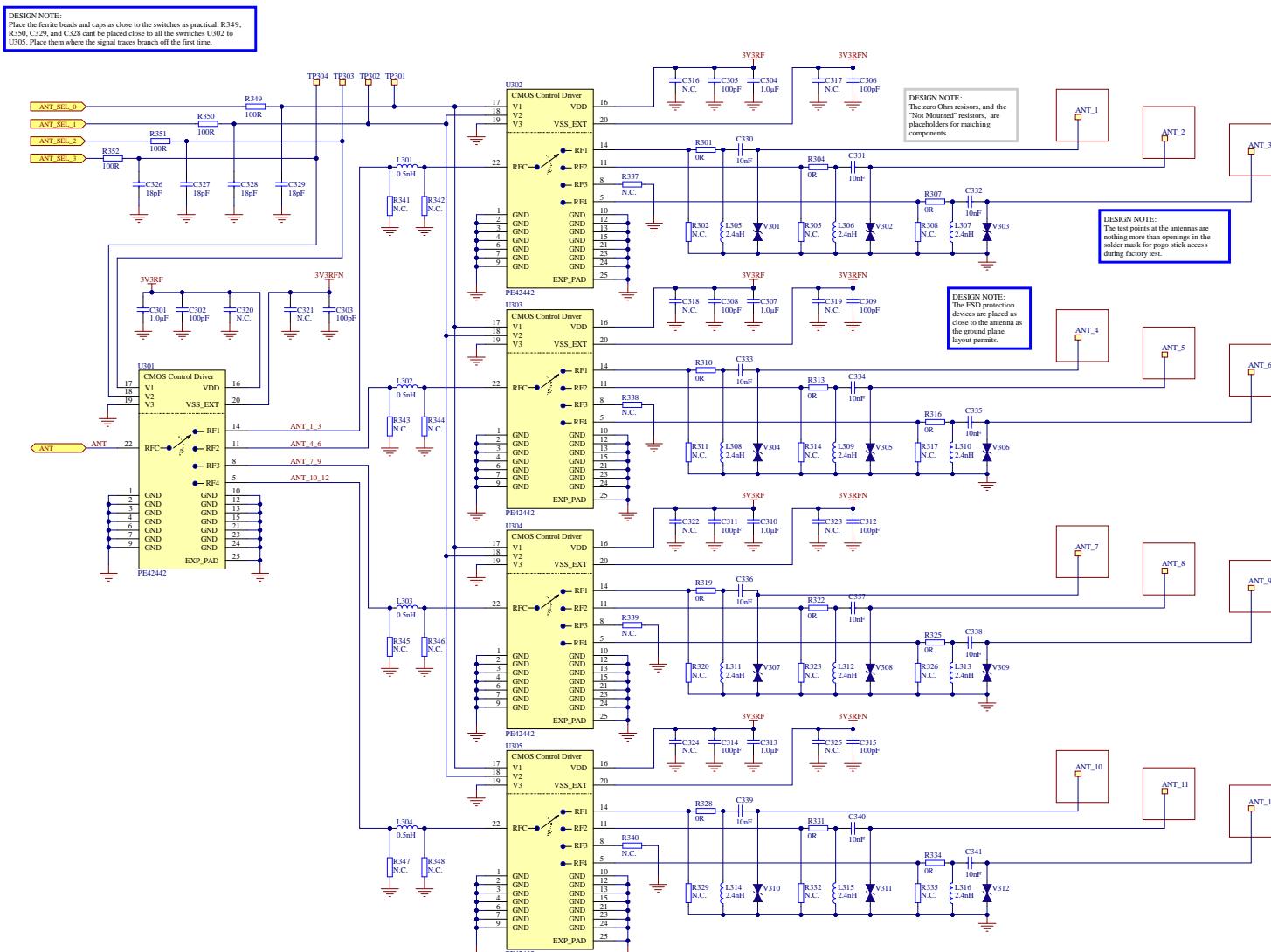
DESIGN NOTE:
See the PCB layout for geometric info about the antenna array

ANT_1
ANT_2
ANT_3
ANT_4
ANT_5
ANT_6
ANT_7
ANT_8
ANT_9
ANT_10
ANT_11
ANT_12

PCA20054 - Block Diagram

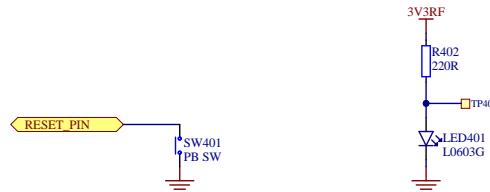


Size	Project Number	Revision
A3	4467	1.0.0
Date: 2020-10-28	Sheet 2 of 5	
File: pca20054_sheet2_block_diagram.SchDoc	Drawn By: KJP	



A

A



B

B

DESIGN NOTE:
Parts above the line go on the top of the PCB, and parts below the line go on the bottom side.

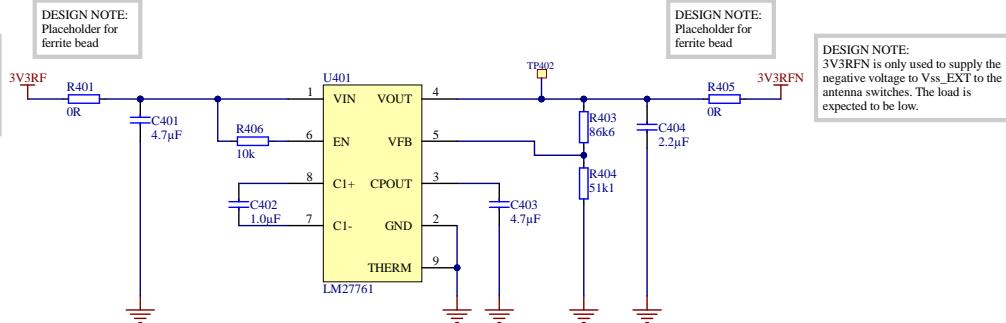
PCB top side

PCB bottom side

C

C

DESIGN NOTE:
3V3RF \approx 3.1 V from the DK board. We use it to supply the RF switches. It's fine. They work down to 2.3 V
See also [05] Connectors sheet, pos B3



DESIGN NOTE:
Placeholder for ferrite bead

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Placeholder for ferrite bead

DESIGN NOTE:
3V3RFN is only used to supply the negative voltage to Vss_EXT to the antenna switches. The load is expected to be low.

D

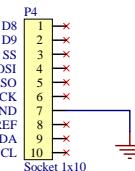
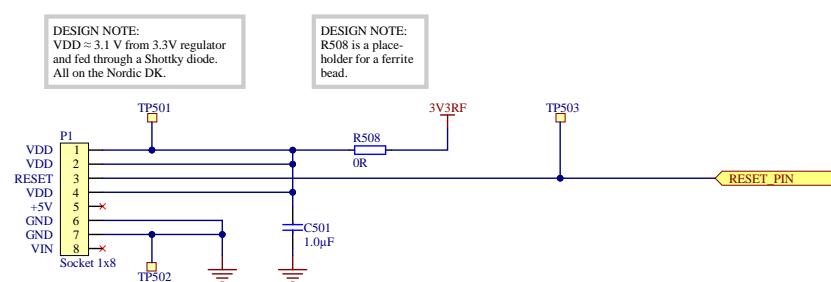
D

PCA20054 - Power and Control

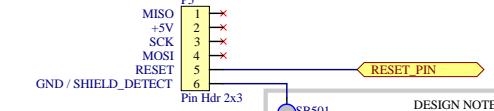
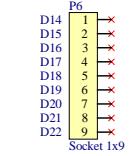
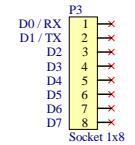
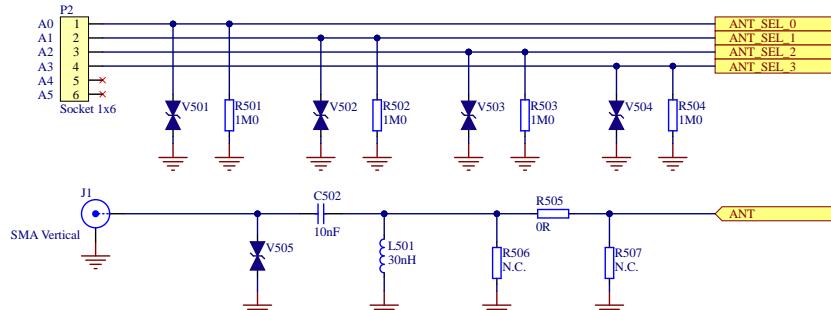


Size	Project Number	Revision
A3	4467	1.0.0
Date: 2020-02-19	Sheet 4 of 5	
File: pca20054_sheet4_power_control.SchDoc	Drawn By: KJP	

A



B



C

