Root

Input DC Power: (9V – 36V)
XT30(2+2) connector
Polarity inversion handled by connector

J2
XT30(2+2)

GND

Power Management

VIN
12VOUTD
3.3VOUTD

R1
0R
+12V

R2
0R
+3.3V

+12V

J1
XT30(2+2)

GND

LiDAR Connection:
– Power cable (XT30(2+2) connector)
– Ethernet cable (RJ–45 connector)
– Function cable (Not required)

RJ45 jack connector
LED resistors for approximately 4–5mA

+3.3V

R3
300R

+3.3V

R4
300R

J3
G7LX–A88S7–BP–G/Y

LEDG_A
LEDG_K
GREEN
LEDY_A
LEDY_K
YELLOW

TD+
TCT
TD–
RD+
RCT
RD–
C1
C2
C3
C4
C5
C6
C7
C8
C9

R1
R2
R3
R4

SHIELD
SH

CHASSIS_GND

+3.3V

LiDAR Interface

VDD
SCLK
MOSI
MISO
SCS
INT
RST
ACTLEDD
LINKLEDD
TXPD
TCT
TXND
RXPD
RCT
RXND

+3.3V

Microcontroller

VDD

SPI2_SCKD
SPI2_MOSID
SPI2_MISO
SPI2_NSSD
ETHERNET_INT
ETHERNET_RSTD

TP1
TP2
TP3
TP4

R5
75R
R6
75R
R7
75R
R8
75R

C1
4.7nF

CHASSIS_GND

Place close to magnetics connector

RJ45 connector interface component selection based on Renesas' application note: R19AN0015ED0102

C2
1nF

GND

CHASSIS_GND

GND Isolation

SPI1_SCKD
SPI1_MOSID
SPI1_MISO
SPI1_NSSD
CAN_INT
CAN_RSTD
CAN_GPIO1
CAN_GPIO2
CAN_WKRQ

TP5
TP6
TP7
TP8

+3.3V

+12V

CAN Interface

VIO
VSUP
SCLK
SDI
SDO
CS
INT
RST
GPIO1
GPIO2
WKRQ
CAN+D
CAN–D

Standard termination, filtering and ESD protection for CAN bus.

R9
59R
R10
59R

C5
4.7nF

GND

C3
100pF

GND

C4
100pF

GND

D1
NUP2105L

J4
XT30(2+2)

CAN–FD bus XT30PW(2+2) connector

Mechanicals

FID1
Fiducial
FID2
Fiducial
H1
MountingHole
H2
MountingHole
H3
MountingHole

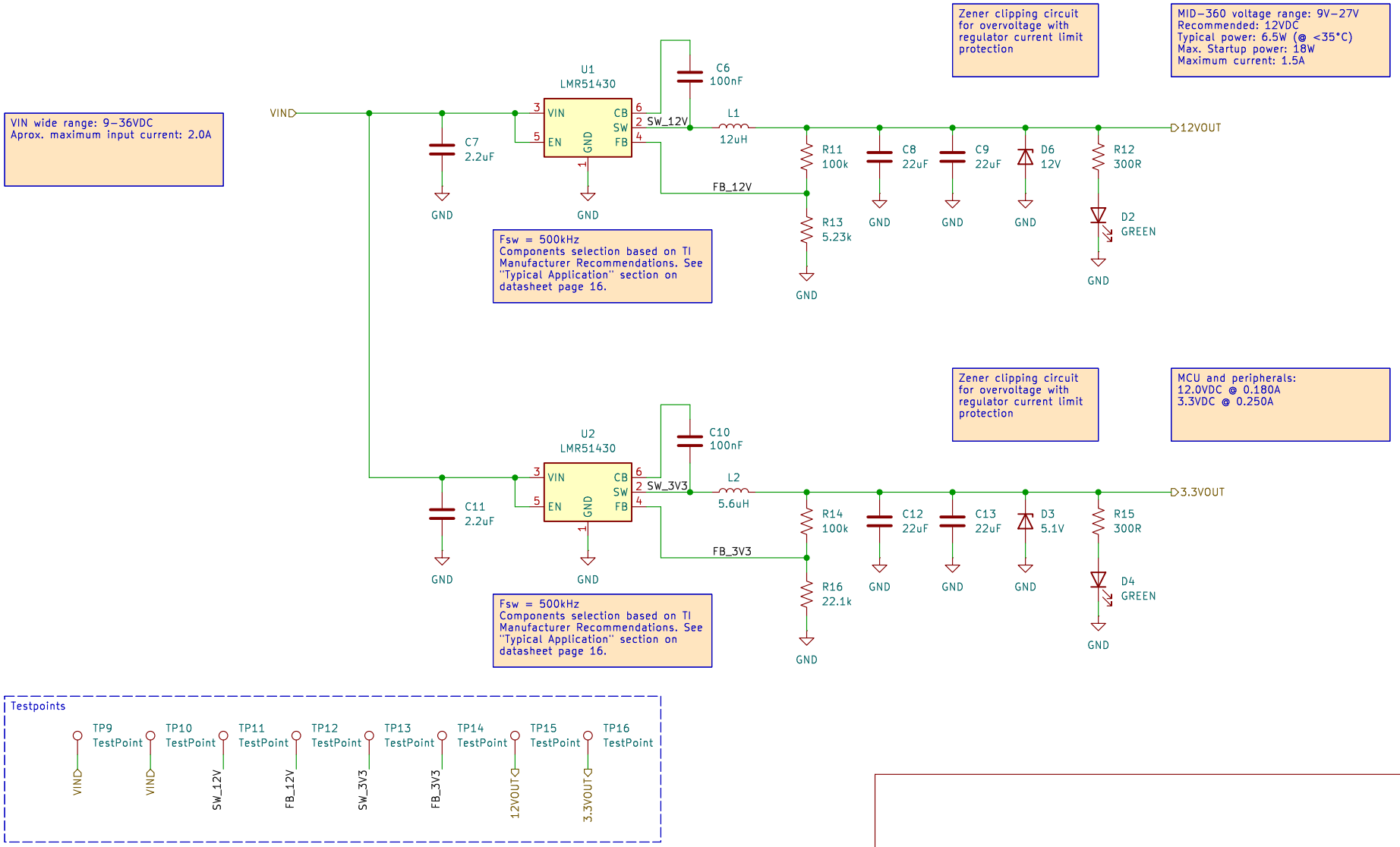
Robot.com

Sheet: /
File: LiDAR–CAN.kicad_sch

Title: LiDAR–CAN Interface

Size: A3	Date: 2025–08–05	**Rev: 2**
KiCad E.D.A. 9.0.0		Id: 1/5

Power Management



Robot.com		
Sheet: /Power Management/		
File: POWER–MANAGEMENT.kicad_sch		
Title: LiDAR–CAN Interface		
Size: A4	Date: 2025–08–05	**Rev: 2**
KiCad E.D.A. 9.0.0		Id: 2/5

LiDAR Interface

Typical VDD/AVDD: 3.3V
Typical IDD: 132mA

Place close to VDD pins

FB1
MH1608-800Y

VDD
AVDD

C14 10uF
C15 100nF
C16 100nF
C17 10uF
C18 100nF
C19 100nF
C43 100nF

GND

Connector interface component selection based on Renesas' application note: R19AN0015ED0102

U3
W5500

R17 49.9R
R18 49.9R
R19 49.9R
R20 49.9R

Z100_DIFF_PAIR
TXN
TXP
RXN
RXP

Place close to PHY interface

R21 10R
R22 10R

TCT
RCT

C20 10nF
C21 10nF

Place close to magnetics connector

PMODE compatible with all modes and auto-negociation enabled. See page 10 of W5500 datasheet.

R23 10k
R24 10k
R25 10k

RST have internall pull-up

SCS
SCLK
MISO
MOSI
INT
RST

PMODE0
PMODE1
PMODE2

XI/CLKIN
XO

C22 8pF
C23 8pF
Y1 25MHz
XI
XO

RSVD

SPDLED
LINKLED
DUPLED
ACTLED

LINKLED
ACTLED

EXRES1
VBG
TOCAP
1V20

C24 10nF
C25 4.7uF
R26 12.4k

Load capacitance calculated for Cs=2pf with ECS manufacturer's online calculator.

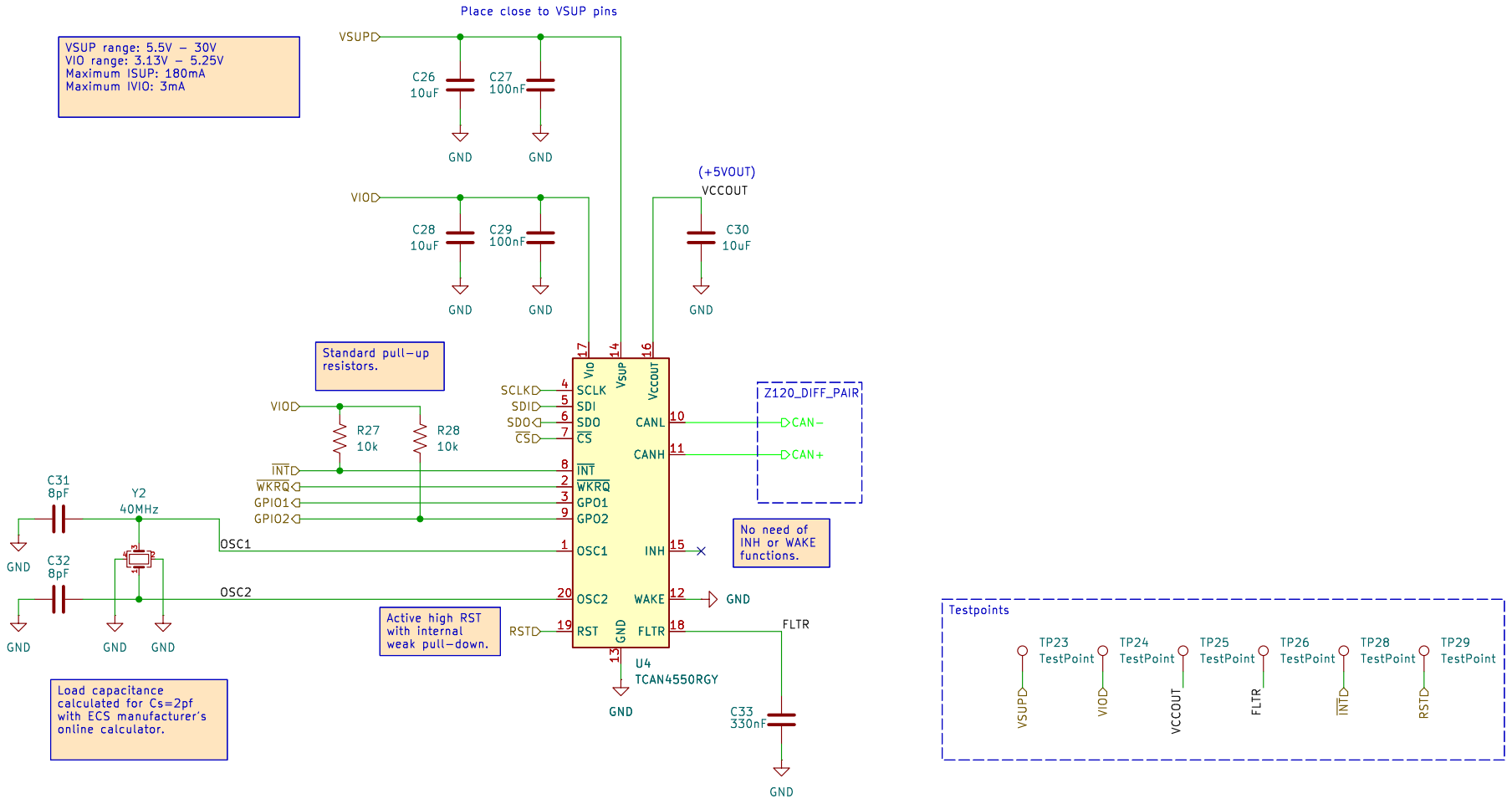
Testpoints
TP17 TestPoint VDD
TP18 TestPoint AVDD
TP19 TestPoint 1V20
TP21 TestPoint INT
TP22 TestPoint RST

Robot.com
Sheet: /LiDAR Interface/
File: LIDAR-INTERFACE.kicad_sch

Title: LiDAR-CAN Interface

Size: A4	Date: 2025-08-05	Rev: 2
KiCad E.D.A. 9.0.0		Id: 3/5

CAN Interface



Robot.com

Sheet: /CAN Interface/
File: CAN-INTERFACE.kicad_sch

Title: LiDAR-CAN Interface

Size: A4	Date: 2025-08-05	**Rev: 2**
KiCad E.D.A. 9.0.0		Id: 4/5

Microcontroller

VDD/VBAT range: 1.7V – 3.6V
Maximum IDD: 25mA
Arm Cortex-M4 84MHz core speed

Place close to VDD pins

VDD
C34 10uF
C35 100nF
C36 100nF
C37 100nF
C38 100nF
GND
R30 0R
R29 0R
VBAT
VDD 19
VDD 32
VDD 48
VDD 64

R31 10k
Boot from main flash memory
GND

MCU_RST 7 NRST
BOOT0 60 BOOT0
VREF+ 13 VREF+
OSC_IN 5 PH0
OSC_OUT 6 PH1
54 PD2
8 PC0
9 PC1
10 PC2
11 PC3
24 PC4
CAN_INT 25 PC5
37 PC6
38 PC7
39 PC8
40 PC9
51 PC10
52 PC11
53 PC12
2 PC13
3 PC14
4 PC15
30 VCAP1

PA0 14
PA1 15
PA2 16 ULED
PA3 17
PA4 20 SPI1_NSS
PA5 21 SPI1_SCK
PA6 22 SPI1_MISO
PA7 23 SPI1_MOSI
PA8 41
PA9 42 ETHERNET_RST
PA10 43 ETHERNET_INT
PA11 44
PA12 45
PA13 46 SWDIO
PA14 49 SWCLK
PA15 50
PB0 26 CAN_WKRQ
PB1 27 CAN_GPIO2
PB2 28 CAN_GPIO1
PB3 55
PB4 56
PB5 57
PB6 58
PB7 59
PB8 61
PB9 62
PB10 29 CAN_RST
PB12 33 SPI2_NSS
PB13 34 SPI2_SCK
PB14 35 SPI2_MISO
PB15 36 SPI2_MOSI

C41 4.7uF
GND
VSS 18
VSSA 12
U5
STM32F401RBT6
GND

Crystal Clock Circuit

Load capacitance calculated for Cs=2pf with ECS manufacturer's online calculator.

C39 8pF
Y3 25MHz
C40 8pF
GND

User LED

R32 300R
D5 GREEN
GND

SWD Programmer Circuit

SWD interface for standard STLINK connector

MCU_RST 1
SWDIO 2
SWCLK 3
VDD 4
5
J5 61300511121
GND

Testpoints

TP30 TestPoint VDD
TP31 TestPoint VDD
TP32 TestPoint VREF+
TP33 TestPoint MCU_RST
TP34 TestPoint BOOT0

Reset Circuit

Standard RC low-pass filter for Reset signal pin

VDD
R33 10k
R34 22R
MCU_RST
SW1 RST
C42 10nF
GND

Decoupling capacitors and general MCU connections based on STM32F401xB/C Reference Manual.

Robot.com		
Sheet: /Microcontroller/		
File: MCU.kicad_sch		
Title: LiDAR-CAN Interface		
Size: A4	Date: 2025-08-05	**Rev: 2**
KiCad E.D.A. 9.0.0		Id: 6/5