Motor Drive

DRIVE{A+ A− B+ B− C+ C−}
SENSE{A B C VBUS}
INV_OUT{A B C}

File: drive.kicad_sch

Microcontroller

CAN{DATA+ DATA−}

DRIVE{A+ A− B+ B− C+ C−}
SENSE{A B C VBUS}

ISOSPI{CS SCK MISO}
SPI{CS SCK MISO MOSI}

File: mcu.kicad_sch

CAN.DATA+
CAN.DATA−

INV_OUT.A   1   J101
Solder Pad
INV_OUT.B   1   J102
Solder Pad
INV_OUT.C   1   J103
Solder Pad

J108
Molex Micro−Fit+
2
1

J107
Molex Micro−Fit+
2
1

+5V U102
SN75176AD
8
3 DE VCC
4 D
2 RE B 7
1 R A 6
5 GND

ISOSPI.SCK   VDD
VDD
ENC.SCK−
ENC.SCK+
GND

+5V U103
SN75176AD
8
3 DE VCC
4 D
2 RE B 6
1 R A
5 GND

GND
GND
ISOSPI.MISO   GND
ENC.MISO−
ENC.MISO+
GND

J104
Solder Pad   1
+48V   L101
2.2uH   VBUS   U106
K78UXX
1 VI VO 3
2 GND
GNDPWR
+12V   U105
AZ1117−5.0
3 VI VO 2
1 GND
GND
+5V

C104
220uF
R101
1
C101
220uF

C112
10uF   C113
100nF   C114
100nF

J105
Solder Pad   1

GNDPWR   GNDPWR   GND   GND   GND   GND

C110
10uF   C107
10uF   U104
AZ1117−3.3
3 VI VO 2
1 GND
GND
VDD

C111
10uF

GNDPWR   GNDPWR   GND   GND

J106
Molex Micro−Fit+
ENC.MISO−   +5V   1   4   GND   ENC.MISO+
ENC.SCK−   2   5   ENC.SCK+
3   6

VDD   U101
AS5047D
11 VDD
SPI.MOSI   4 MOSI   A 7
SPI.MISO   3 MISO   B 6
SPI.SCK   2 CLK   I/PWM 14
SPI.CS   1 CS
U 10
V 9
VDD   12 VDD3V3   W/PWM 8
5 TST   GND
GND   13
GND

VBUS   VBUS
C102
10uF   C103
10uF
GNDPWR   GNDPWR

VBUS   VBUS
C105
10uF   C106
10uF
GNDPWR   GNDPWR

VBUS   VBUS
C108
10uF   C109
10uF
GNDPWR   GNDPWR

NT101
NetTie_2
GNDPWR   GND
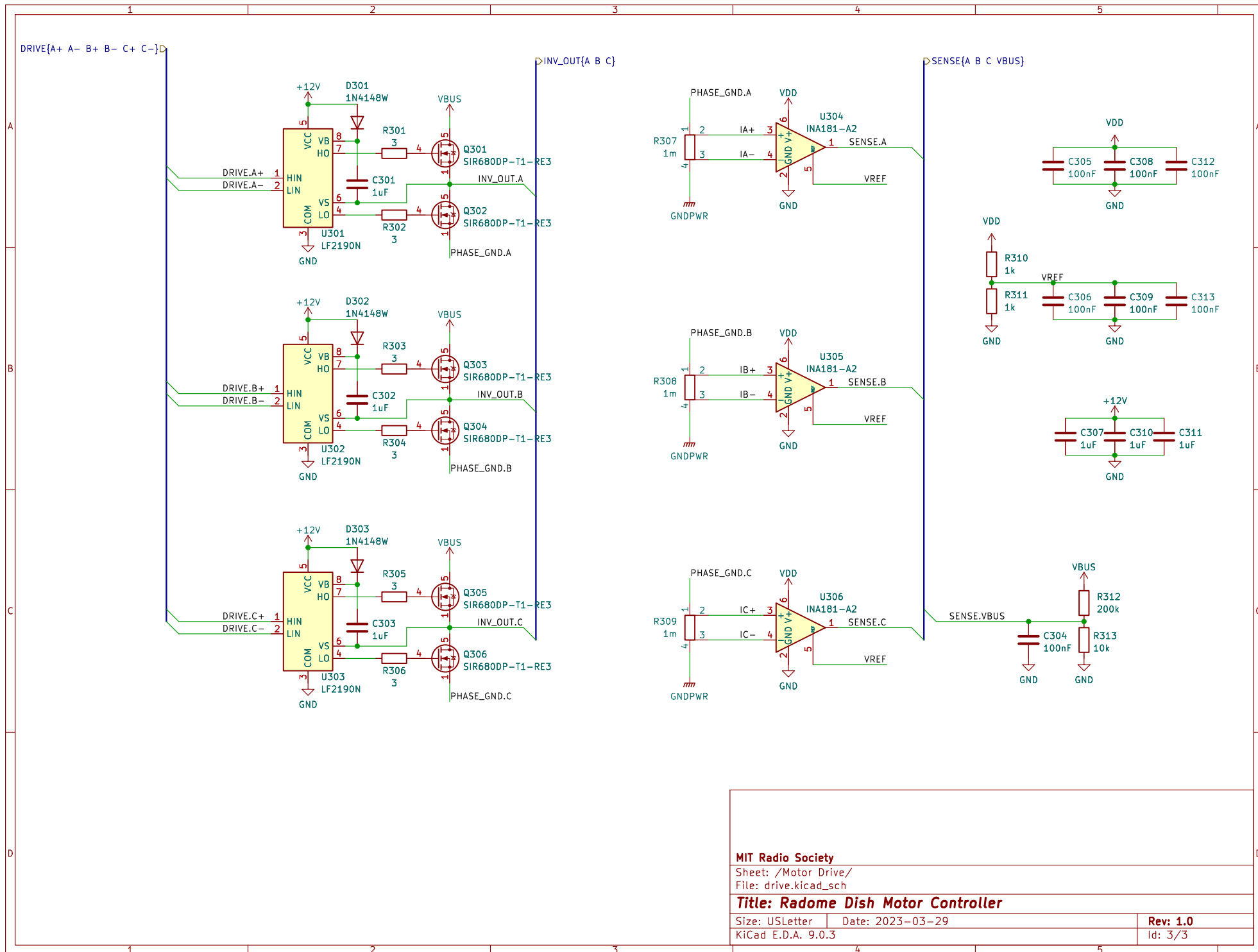
MIT Radio Society
Sheet: /
File: radome_dish_controller.kicad_sch
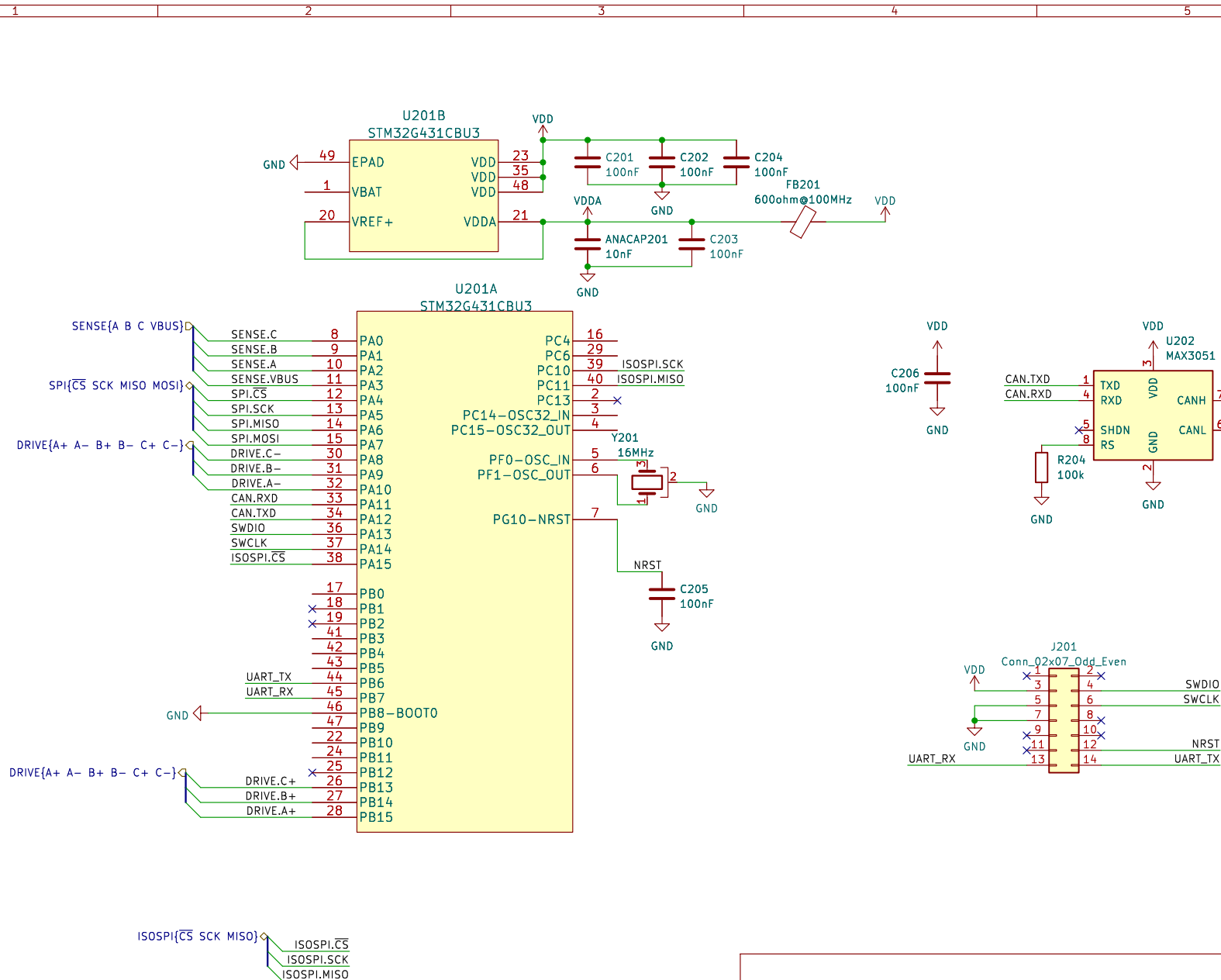Title: Radome Dish Motor Controller
Size: USLetter   Date: 2023−03−29   Rev: 1.0
KiCad E.D.A. 9.0.3   Id: 1/3

DRIVE{A+ A− B+ B− C+ C−}

INV_OUT{A B C}

SENSE{A B C VBUS}

+12V
D301
1N4148W

VCC
VB
HO
HIN
LIN
VS
LO
COM
GND

R301
3
Q301
SIR680DP-T1-RE3

C301
1uF

R302
3
Q302
SIR680DP-T1-RE3

VBUS

INV_OUT.A

PHASE_GND.A

DRIVE.A+ 1
DRIVE.A− 2

U301
LF2190N

PHASE_GND.A
R307
1m

VDD
U304
INA181-A2
IA+ 3
IA− 5
SENSE.A
VREF

GNDPWR
GND

VDD
C305
100nF
C308
100nF
C312
100nF
GND

+12V
D302
1N4148W

VCC
VB
HO
HIN
LIN
VS
LO
COM
GND

R303
3
Q303
SIR680DP-T1-RE3

C302
1uF

R304
3
Q304
SIR680DP-T1-RE3

VBUS

INV_OUT.B

PHASE_GND.B

DRIVE.B+ 1
DRIVE.B− 2

U302
LF2190N

PHASE_GND.B
R308
1m

VDD
U305
INA181-A2
IB+ 3
IB− 5
SENSE.B
VREF

GNDPWR
GND

VDD
R310
1k
VREF
R311
1k
C306
100nF
C309
100nF
C313
100nF
GND
GND

+12V
C307
1uF
C310
1uF
C311
1uF
GND

+12V
D303
1N4148W

VCC
VB
HO
HIN
LIN
VS
LO
COM
GND

R305
3
Q305
SIR680DP-T1-RE3

C303
1uF

R306
3
Q306
SIR680DP-T1-RE3

VBUS

INV_OUT.C

PHASE_GND.C

DRIVE.C+ 1
DRIVE.C− 2

U303
LF2190N

PHASE_GND.C
R309
1m

VDD
U306
INA181-A2
IC+ 3
IC− 5
SENSE.C
VREF

GNDPWR
GND

SENSE.VBUS

VBUS
R312
200k

C304
100nF
R313
10k
GND
GND

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U201B
STM32G431CBU3

Pin	Signal
49	EPAD
1	VBAT
20	VREF+
23	VDD
35	VDD
48	VDD
21	VDDA

GND

VDD
C201 100nF
C202 100nF
C204 100nF
FB201 600ohm@100MHz
VDD

VDDA
ANACAP201 10nF
C203 100nF
GND

U201A
STM32G431CBU3

SENSE{A B C VBUS}
SENSE.C 8 PA0
SENSE.B 9 PA1
SENSE.A 10 PA2
SENSE.VBUS 11 PA3
SPI{CS SCK MISO MOSI}
SPI.CS 12 PA4
SPI.SCK 13 PA5
SPI.MISO 14 PA6
SPI.MOSI 15 PA7
DRIVE{A+ A− B+ B− C+ C−}
DRIVE.C− 30 PA8
DRIVE.B− 31 PA9
DRIVE.A− 32 PA10
CAN.RXD 33 PA11
CAN.TXD 34 PA12
SWDIO 36 PA13
SWCLK 37 PA14
ISOSPI.CS 38 PA15

17 PB0
18 PB1
19 PB2
41 PB3
42 PB4
43 PB5
UART_TX 44 PB6
UART_RX 45 PB7
GND 46 PB8−BOOT0
47 PB9
22 PB10
24 PB11
25 PB12
DRIVE.C+ 26 PB13
DRIVE.B+ 27 PB14
DRIVE.A+ 28 PB15

PC4 16
PC6 29
PC10 39
PC11 40 ISOSPI.SCK ISOSPI.MISO
PC13 2
PC14−OSC32_IN 3
PC15−OSC32_OUT 4
Y201 16MHz
PF0−OSC_IN 5
PF1−OSC_OUT 6
GND
PG10−NRST 7
NRST
C205 100nF
GND

VDD
C206 100nF
GND

U202
MAX3051

CAN.TXD 1 TXD
CAN.RXD 4 RXD
VDD 3
5 SHDN CANH 7 CAN.DATA+
8 RS CANL 6 CAN.DATA−
R204 100k
GND 2
GND
CAN{DATA+ DATA−}

ISOSPI{CS SCK MISO}
ISOSPI.CS
ISOSPI.SCK
ISOSPI.MISO

J201
Conn_02x07_Odd_Even

VDD
1 2
3 4 SWDIO
5 6 SWCLK
7 8
9 10
GND
11 12 NRST
UART_RX 13 14 UART_TX

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