MainControl
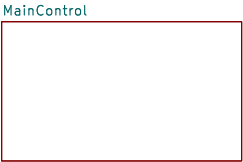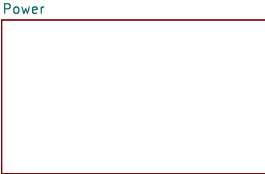
File: MainControl.kicad_sch

Power

File: Power.kicad_sch

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File: UnderwaterGlider.kicad_sch

Title:

Size: A3 | Date:
KiCad E.D.A. 9.0.0

Rev:
Id: 1/3

System Core

Transceiver

CAN1
U4 TJA1042T-3
CAN1_TX, CAN1_RX, CANH, CANL, CAN1_H, CAN1_L
+5V +3.3V_IO
R5 120R
U13 NUP2105L
C7 100n, C10 100n
PD1, PD0, PA14, PA13 — RN6 82R
CAN1_RX, CAN1_L, SWD_CLK, CAN1_H, SWD_DIO
J11 Conn_01x02_MountingPin
CAN1_L, CAN1_H — J12 Conn_01x02_MountingPin

RS485_Bus1
U13 SN75176AD
UART1_DE, UART1_TX, UART1_RX
R10 10k, R11 4k7, R12 120R
D8 SM712, C16 100n
RS485_Bus1_A, RS485_Bus1_B
RN7 82R — PA11 UART1_RX, PA12 UART1_DE, PA9 UART1_TX
C8 100n
J13, J14 Conn_01x02_MountingPin

RS485_Bus2
U14 SN75176AD
UART2_DE, UART2_TX, UART2_RX
R14 10k, R15 4k7, R16 120R, R17 4k7
D9 SM712, C17 100n
RS485_Bus2_A, RS485_Bus2_B
RN8 82R — PA3 UART2_RX, PA2 UART2_TX, PA1 UART2_DE
C11 100n
J15, J16 Conn_01x02_MountingPin

RS485_Bus3
U15 SN75176AD
UART3_DE, UART3_TX, UART3_RX
R18 10k, R19 4k7, R20 120R, R21 4k7
D10 SM712, C18 100n
RS485_Bus3_A, RS485_Bus3_B
RN9 82R — PD12 UART3_DE, PD9 UART3_RX, PD8 UART3_TX
C12 100n
J17, J18 Conn_01x02_MountingPin

RS422
U5 SN75179B
UART5_RX, UART5_TX
RS422_RX+, RS422_RX−, RS422_TX−, RS422_TX+
RN11 82R — PB12 UART5_RX, PB13 UART5_TX
C13 100n
J19 Conn_01x04_MountingPin

U1 STM32H743VITx
+3.3V_MCU
C56 C57 C58 C55 C54 C53 C59 100n
VCAP C60 2.2u, C61 2.2u
C62 100n
L2 220r
VBAT, VDD, VDDA
NRST, BOOT0, VREF+
PA0–PA15, PB0–PB15, PC0–PC15, PD0–PD15, PE0–PE15, PH0, PH1
VCAP, VSS, VSSA

Crystal
Y1 25MHz
PH1, PH0
C6 20p, C9 20p

NRST
R58 330R, R59 10k
C70 100n
SW1 NRST
R85 1k, D32 LED
+3.3V_MCU

BOOT0
R60 330R, R61 10k
C71 100n
SW2 BOOT0
R86 1k, D33 LED
+3.3V_MCU

SBUS
RN14 82R — PE1 UART8_RX, PE0 UART8_TX
C76 10u
J22 SBus
UART8_RX J22
STM32H7有软件反转UART电平功能,不需要反转SBUS电平

ADC
+48V R24 100k, R25 4k7 — PB1
+24V R29 33k, R30 4k7 — PB0
+5V R27 4.7k, R28 4.7k — PC5

Servo
TIM2_CH3 J6, TIM2_CH4 J7, TIM4_CH3 J8, TIM4_CH4 J9
+7.4v_Servo
Conn_01x03
RN17 82R, RN18 82R
PB11, PB10, PD15, PD14
TIM2_CH4, TIM2_CH3, TIM4_CH4, TIM4_CH3

USB-TTL
U16 CH343P
R23 330R
C20 0u1, C27 1u, C46 10u1
R22 1k, D11 LED, NUC1_ACT
VBUS, VDD5, VIO, V3, RXD, TXD, USB_DP, USB_DN, ACT#, DCD, DTR, RTS, DSR, CTS, RI, GND
UART4_RX, UART4_TX, NUC1_DP, NUC1_DN, UART4_RTS, UART4_CTS
U6 TPD4E1U06DCKR
F3 1.2A
J20 Conn_01x04
RN10 82R — PB9, PB8, PB15, PB14
UART4_TX, UART4_RX, UART4_CTS, UART4_RTS

Stepper Motor
RN16 82R — PE11, PE10, PE13, PE12
Pul+, Pul−, Dir+, Dir−
R31 1k, R32 1k
J3 Conn_01x04_MountingPin
+12V_Motor GND
J5 Conn_01x02
步进电机其实也可以自己找驱动芯片,可能可以再缩小一些体积
但是选芯片和迭代也要一定时间,留着引脚后面有必要再做了

SD Card
J1 Micro_SD_Card_Det1
SDMMC1_D2 DAT2, SDMMC1_D3 DAT3/CD, SDMMC1_CMD CMD, VDD, SDMMC1_CLK CLK, VSS, SDMMC1_D0 DAT0, SDMMC1_D1 DAT1, DET
SD_Detect
SHIELD
R1 1M, C72 100n
+3.3V_IO
C73 100n
R2 10k, R3 10k, R4 10k, R6 10k, R7 10k
SDMMC1_D2, SDMMC1_D3, SDMMC1_CMD, SDMMC1_CLK, SDMMC1_D0
RN4 82R — PC10, PC11, PD2, PC12 — SDMMC1_D2, SDMMC1_D3, SDMMC1_CMD, SDMMC1_CLK
RN5 82R — PC8, PC9, PC7 — SDMMC1_D0, SDMMC1_D1, SD_Detect
R8 10k, R9 10k
SDMMC1_D1, SD_Detect

IMU
U2 ICM-42688-P
RN13 82R — PA4 CS_ICM-42688, PA5 SPI1_SCK, PA7 SPI1_MOSI, PA6 SPI1_MISO
RN15 82R — PC4 DRDY_ICM-42688
R26
VDD, VDDIO, INT1/INT, INT2/FSYNC/CLKIN
CS_ICM-42688, SPI1_SCK, SPI1_MOSI, SPI1_MISO
AP_CS, AP_SCL/AP_SCLK, AP_SDA/AP_SDIO/AP_SDI, AP_SDO/AP_AD0
RESV_2, RESV_3, RESV_10, RESV_11, RESV_7
C4 100n, C5 100n
+3.3V_IMU, +3.3V_MCU, DRDY_ICM-42688
这里设计是用的板载IMU
如果需要用别的现成商用IMU再改接口

Satellite Com
RN12 82R — PC8, PE7 — UART7_TX, UART7_RX
UART7_RX, UART7_TX
+3.3V_SatellieCom
C120 10u
J4 Conn_01x04_MountingPin
+5V_SatellieCom
C86 10u
J2 Conn_01x02
卫星通信模块需要隔离3.3v和5v供电 需要用1.5A DCDC和电源管理小信号供电

SWD
J28 SWD
SWD_DIO, SWD_CLK, 3V3_SWD
C121 10u
H1 H2 H3 H4 MountingHole_Pad_MP
R87 10k, D35, K34, D34 3V3 TVS
3V3_SWD, +5V

Sheet: /MainControl/
File: MainControl.kicad_sch
Title:
Size: A3   Date:
KiCad E.D.A. 9.0.0   Rev:
Id: 2/3

可能要出来的线上或者板子后加个开关

+5V

U7 TPS54560BDDA
U17 RY3430
U10 RS3236
U11 RS3236
U3 LT3042EMSE(TOKMAS)
U8 TPS54560BDDA
U9 TPS54560BDDA
U19 TPS54560BDDA
U18 LM5145
U12 LMR516

Conn_01x02 J10
Conn_01x02 J21

F1 Fuse
F2 Fuse

+48V +24V +12V_Motor +5V +3.3V_MCU +3.3V_IO +3.3V_IMU
+3.3V_MCU +3.3V_IO +3.3V_IMU
+3.3V_SatellieCom +5V_SatellieCom +7.4v_Servo
+3.3V_SatellieCom +5V_SatellieCom +7.4v_Servo
+3.3V_IMU
+3.3V_MCU
+5V_SatellieCom
+7.4v_Servo
+12V_Motor
+24V
VAUX
VCC