PWRandPRG

PROGRAM_TXD — PRG_TX
PROGRAM_RXD — PRG_RX
PROGRAM_RTSD
PROGRAM_DSRD
PROGRAM_DTRD
PROGRAM_CTSD
PROGRAM_DCDD
PROGRAM_RID

+5V
R2 10k
MCU_RESET
TBD C1
R1 10k
C2 TBD
GND

SDCARD_CS_5VD — SD_CS
ETHERNET_CS_5VD — ETHER_CS
SPI_SCLK_5VD — SPI_SCLK
SPI_MOSI_5VD — SPI_MOSI
SPI_MISO_3V3D — SPI_MISO

SECURITY_SDA — IOTSEC_SDA
SECURITY_SCL — IOTSEC_SCL

IMU_INT2D
IMU_INT1D
SDCARD_DETD
ETHERNET_INTD — ETHER_INT
ETHERNET_RST_5VD — ETHER_RST

File: PWRandPRG.kicad_sch

+5V
FB1 FerriteBead_Small

C5 10uF   C6 100nF   C7 100nF   C8 100nF   C9 100nF
GND   GND

SW1 RST_BTN
GND
MCU_RESET

R3 1M
Y1 16Mhz
C3 Var   C4 Var
GND

U1 ATmega2560-16A

RESET 30
XTAL1 34
XTAL2 33
AREF 98 MCU_AREF_IN
VCC 10
AVCC 100

PA0 78 PIN_D22
PA1 77 PIN_D23
PA2 76 PIN_D24
PA3 75 PIN_D25
PA4 74 PIN_D26
PA5 73 PIN_D27
PA6 72 PIN_D28
PA7 71 PIN_D29

PB0 19 PIN_D53
PB1 20 PIN_D52
PB2 21 PIN_D51
PB3 22 PIN_D50
PB4 23 PIN_D10
PB5 24 PIN_D11
PB6 25 PIN_D12
PB7 26 PIN_D13

PIN_D49 35 PL0
PIN_D48 36 PL1
PIN_D47 37 PL2
PIN_D46 38 PL3
PIN_D45 39 PL4
PIN_D44 40 PL5
PIN_D43 41 PL6
PIN_D42 42 PL7

PIN_A8 89 PK0
PIN_A9 88 PK1
PIN_A10 87 PK2
PIN_A11 86 PK3
PIN_A12 85 PK4
PIN_A13 84 PK5
PIN_A14 83 PK6
PIN_A15 82 PK7

PC0 53 PIN_D37
PC1 54 PIN_D36
PC2 55 PIN_D35
PC3 56 PIN_D34
PC4 57 PIN_D33
PC5 58 PIN_D32
PC6 59 PIN_D31
PC7 60 PIN_D30

PIN_D15 63 PJ0
PIN_D14 64 PJ1
65 PJ2
66 PJ3
67 PJ4
68 PJ5
69 PJ6
79 PJ7

PD0 43 PIN_D21
PD1 44 PIN_D20
PD2 45 PIN_D19
PD3 46 PIN_D18
PD4 47
PD5 48
PD6 49
PD7 50 PIN_D38

PIN_D17 12 PH0
PIN_D16 13 PH1
14 PH2
PIN_D6 15 PH3
PIN_D7 16 PH4
PIN_D8 17 PH5
PIN_D9 18 PH6
27 PH7

PE0 2 PIN_D0
PE1 3 PIN_D1
PE2 4
PE3 5 PIN_D5
PE4 6 PIN_D2
PE5 7 PIN_D3
PE6 8
PE7 9

PIN_D41 51 PG0
PIN_D40 52 PG1
PIN_D39 70 PG2
28 PG3
29 PG4
PIN_D4/CS2 1 PG5

PF0 97 PIN_A0
PF1 96 PIN_A1
PF2 95 PIN_A2
PF3 94 PIN_A3
PF4 93 PIN_A4
PF5 92 PIN_A5
PF6 91 PIN_A6
PF7 90 PIN_A7

GND 11
GND

A1 A000067

SCL SCL PIN_D21 IOTSEC_SCL
SDA SDA PIN_D20 IOTSEC_SDA
AREF MCU_AREF_IN
NC NC GND3
IOREF0 IOREF
IOREF1 GND3
MCU_RESET RESET 13 PIN_D13
+3V3 3V3 12 PIN_D12
+5V_1 11 PIN_D11
GND1 GND1 10 PIN_D10 ETHER_CS
GND2 GND2 9 PIN_D9
VIN 8 PIN_D8

+5V
+3V3
GND

PIN_A0 AD0 7 PIN_D7 ETHER_RST
PIN_A1 AD1 6 PIN_D6
PIN_A2 AD2 5 PIN_D5
PIN_A3 AD3 4 PIN_D4/CS2 SD_CS
PIN_A4 AD4 3 PIN_D3
PIN_A5 AD5 2 PIN_D2
PIN_A6 AD6 1 PIN_D1 PRG_RX
PIN_A7 AD7 0 PIN_D0 PRG_TX

PIN_A8 AD8 21 PIN_D21
PIN_A9 AD9 20 PIN_D20
PIN_A10 AD10 19 PIN_D19
PIN_A11 AD11 18 PIN_D18
PIN_A12 AD12 17 PIN_D17
PIN_A13 AD13 16 PIN_D16
PIN_A14 AD14 15 PIN_D15
PIN_A15 AD15 14 PIN_D14 +5V

+5V_3 +5V_2
PIN_D22 23 22 PIN_D23
PIN_D24 25 24 PIN_D25
PIN_D26 27 26 PIN_D27
PIN_D28 29 28 PIN_D29
PIN_D30 31 30 PIN_D31
PIN_D32 33 32 PIN_D33
PIN_D34 35 34 PIN_D35
PIN_D36 37 36 PIN_D37
PIN_D38 39 38 PIN_D39
PIN_D40 41 40 PIN_D41
PIN_D42 43 42 PIN_D43
PIN_D44 45 44 PIN_D45
PIN_D46 47 46 PIN_D47
PIN_D48 49 48 PIN_D49
SPI_MISO PIN_D50 51 50 PIN_D51 SPI_MOSI
SPI_SCLK PIN_D52 53 52 PIN_D53
GND5 GND4
GND GND

Schematic: MegaEtherBoard

USB Power Input + Programming Interface

J9 PROGRAM_POWER_USBC
- VBUS A4 — USBC_VBUS
- CC1 A5 / CC2 B5 — USBC_CC1, USBC_CC2
- D− A7 / D− B7 — USBC_D−
- D+ A6 / D+ B6 — USBC_D+
- SBU1 A8 / SBU2 B8
- SHIELD S1 / GND A1

F1 Fuse
R4 5.1k, R5 5.1k
R7 5.1k, R8 DNP

U8 AP22804AW5 — IN, EN, GND, OUT, FLG
C13 10uF, C37 100nF, C38 10uF, R11 22.1k, C10 4.7uF, C14 100nF
R12 47.5k, C11 100nF

+5V

U2 CH340C / R232
- V3, VCC, TXD 2 → PROGRAM_TX
- RXD 3 → PROGRAM_RX
- CTS 9 → PROGRAM_CTS
- DSR 10 → PROGRAM_DSR
- RI 11 → PROGRAM_RI
- DCD 12 → PROGRAM_DCD
- DTR 13 → PROGRAM_DTR
- RTS 14 → PROGRAM_RTS
- UD+ 5 / UD− 6 — USBC_D+, USBC_D−
- GND

5V −> 3V3 Switching Converter

LM3281 U5
- VIN A2, EN C1, GND C2, MODE B1, SW B2, FB A1
C23 2.2uF, C24 2.2uF
L1 0.47uH/2A
C31 10uF, C33 10uF, C35 10uF
+3V3

SPI Ethernet Controller −>SPI

J1 RJ45_Amphenol_RJMG1BD3BBK1ANR
- TD+ R1, TCT, TD− R3
- RD+ R3, RCT, RD− R4
- LEDG_A L4, LEDG_K L1 (GREEN)
- LEDY_A L3, LEDY_K L2 (YELLOW)
- SHIELD 13, GND
- XMIT / RCV, 1000pF, 75, 75

R22 10R, R23 49R, R25 49R
R27 33R, R28 33R, R29 33R, R30 33R
R24 82R, R26 82R
C15 6.8nF, C16 6.8nF, C17 22nF, C19 10nF
R18 330R, R20 330R (LINK_LED, ACT_LED)
R17 330R, R19 330R
R21 12.4k
C21 4.7uF, C22 10nF
D5 LED 24 SPDLED
D3 LED 26 LINKLED, DUPLED, ACTLED
LINK_LED, ACT_LED

U4 W5500
- TXN 1, TXP, RXN, RXP
- AVDD, VDD, SCS 32, SCLK 33, MISO 34, MOSI 35, INT 36, RST 37 → ETHERNET_CS, ETHERNET_SCLK, ETHERNET_MISO, ETHERNET_MOSI, ETHERNET_INT, ETHERNET_RST
- PMODE0 45, PMODE1 44, PMODE2 43
- XI/CLKIN 30, XO 31
- RSVD 38,39,40,41,42,23
- EXRES1 10, VBG, TOCAP 20, 1V2O 22
- SPDLED, LINKLED, DUPLED, ACTLED

FB2 FerriteBead_Small
+3V3
C25 100nF, C26 100nF, C27 100nF, C29 100nF, C32 100nF, C34 100nF, C36 10uF
R35 10k, R36 10k, R37 10k
R34 1M
Y2 25Mhz
C28 Var, C30 Var

3V3 SPI<−>5V SPI Interface

ETHERNET_INT → ETHERNET_INT
SDCARD_DET → SDCARD_DET
IMU_INT1 → IMU_INT1
IMU_INT2 → IMU_INT2

ETHERNET_MISO / SDCARD_MISO / IMU_MISO → SPI_MISO_3V3 → SPI_MISO_3V3

C39 100nF
+3V3

U6 74HC244
- 1Y0 18, 1Y1, 1Y2, 1Y3, 2Y0, 2Y1, 2Y2, 2Y3
- 1A0, 1A1, 1A2, 1A3, 2A0, 2A1, 2A2, 2A3
- VCC 20, GND 10, 1OE 1, 2OE 19
- ETHERNET_SCLK / SDCARD_SCLK / IMU_SCK → SPI_SCLK_3V3
- ETHERNET_MOSI / SDCARD_MOSI / IMU_MOSI → SPI_MOSI_3V3
- ETHERNET_CS / SDCARD_CS →
- SPI_SCLK_5V → SPI_SCLK_5V
- SPI_MOSI_5V → SPI_MOSI_5V
- ETHERNET_RST_5V → ETHERNET_RST_5V
- ETHERNET_CS_5V → ETHERNET_CS_5V
- SDCARD_CS_5V → SDCARD_CS_5V

SDCARD with Active High Detect −>SPI

J11 Micro_SD_Card_Det_Hirose_DM3AT
- SHIELD 11
- DET_B 9, DET_A 10 → SDCARD_DET
- DAT1 8, DAT0 7 → SDCARD_MISO
- VSS 6, CLK 5 → SDCARD_SCLK
- VDD 4, CMD 3 → SDCARD_MOSI
- DAT3/CD 2 → SDCARD_CS, DAT2 1
R10 10k
C12 100nF
+3V3, GND

IoT Edge Security Coprocessor

U7 SE050C2HQ1
- VOUT 15, VIN 12, VCC 18
- ISO14443 1, ISO14443_LA 17
- SDA 9 → SECURITY_SDA
- SCL 10 → SECURITY_SCL
- ENA 11 → SECURITY_ENA
- ISO7816_IO1/AUX_SDA 3
- ISO7816_CLK 13
- ISO7816_RST 14
- ISO7816_IO2/AUX_SCL 16
- SDO_Aux, OCS_Aux
- VSS 19, EPAD 21
R38 4.7k, R39 4.7k, R40 4.7k
C40 100nF, C41 100nF
+5V, GND

Inertial Measurment Unit −>SPI

U3 ISM330DHCX
- INT1 4 → IMU_INT1
- INT2 5 → IMU_INT2
- SCL 13 → IMU_SCL
- SDA 14 → IMU_SDA
- VDD_IO, VDD, CS 12
- ISM_I2C_MASTER_SCL, SCx
- ISM_I2C_MASTER_SDA, SDx
- SDO/SA0, SDO_Aux, OCS_Aux
- GND
R6 10k
C18 100nF, C20 100nF
+3V3, GND

SECURITY_SDA → SECURITY_SDA
SECURITY_SCL → SECURITY_SCL

Designed as a direct replacement for similar Arduino Mega boards with integrated Ethernet
Design by: Daniel J Manla

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File: PWRandPRG.kicad_sch
Title: MegaEtherBoard
Size: A3 | Date: 2022−02−19 | Rev: A0
KiCad E.D.A. 9.0.2 | Id: 3/2