H1 H2 H3 H4
Mounting_Hole_Pad Mounting_Hole_Pad Mounting_Hole_Pad Mounting_Hole_Pad
GNDD

U7
MCP120-xxxxTT
VDD
RST
NRST
VSS

C1
0.1uF
GNDD

BOOT0 138
PWR_FLAG
PWR_FLAG
VCAP1 71
VCAP2 106
VREF+ 32

C47 2.2uF
C48 2.2uF
GNDD

+3.3V
R30 10k
J10 BootJumper
BOOT0
GNDD

Sheet: Analog Input
File: Analog Input.sch

Sen1 ... Sen22
VREF+

+3.3V   +3.3VA

25 NRST
143 PDR_ON
BOOT0
VCAP1
VCAP2
VREF+

VBAT 6
VDD 17 30 39 52 62 72 84 108 121 144 131 95 33
VDD33_USB
VDDA

PA0 34 Sen10
PA1 35 Sen11
PA2 36 Sen12
PA3 37 Sen9
PA4 40 Sen8
PA5 41 Sen7
PA6 42 Sen6
PA7 43 Sen5
PA8 100 TP26 TestPoint_Small
PA9 101 TP27 TestPoint_Small VBUS_SENSE
PA10 102
PA11 103 USB_OTG_FS_D-
PA12 104 USB_OTG_FS_D+
PA13 105 JTMS
PA14 109 JTCK
PA15 110 JTDI

PH0 23
PH1 24

PB0 46 Sen2
PB1 47 Sen1
PB2 48
PB3 133 JTDO
PB4 134 JNTRST
PB5 135
PB6 136
PB7 137
PB8 139
PB9 140
PB10 69 USART3_TX
PB11 70 USART3_RX
PB12 73
PB13 74
PB14 75 USART1_TX
PB15 76 USART1_RX

PG0 56
PG1 57
PG2 87
PG3 88
PG4 89
PG5 90
PG6 91
PG7 92
PG8 93 TP23 TestPoint_Small
PG9 124 TP24 TestPoint_Small
PG10 125
PG11 126
PG12 127
PG13 128
PG14 129
PG15 132

PF0 10
PF1 11
PF2 12
PF3 13 Sen22
PF4 14 Sen21
PF5 15 Sen20
PF6 18 Sen19
PF7 19 Sen18
PF8 20 Sen17
PF9 21 Sen16
PF10 22 Sen15
PF11 49
PF12 50
PF13 53
PF14 54
PF15 55

PC0 26 Sen14
PC1 27 Sen13
PC2_C 28
PC3_C 29
PC4 44 Sen4
PC5 45 Sen3
PC6 96
PC7 97
PC8 98 TP28 TestPoint_Small
PC9 99 TP29 TestPoint_Small
PC10 111 LED4
PC11 112
PC12 113 LED3
PC13 7
PC14 8
PC15 9

PE0 141 LED2
PE1 142 LED1
PE2 1
PE3 2
PE4 3
PE5 4
PE6 5
PE7 58
PE8 59
PE9 60
PE10 63
PE11 64
PE12 65
PE13 66
PE14 67
PE15 68

PD0 114
PD1 115
PD2 116
PD3 117
PD4 118
PD5 119 USART2_TX
PD6 122 USART2_RX
PD7 123
PD8 77
PD9 78
PD10 79
PD11 80
PD12 81
PD13 82
PD14 85
PD15 86

VSS 16 38 51 61 83 94 107 120 130
VSSA 31
U0 STM32H743IIK
GNDD   GNDA

+5V
J7 AltPowerInput
GNDD

+3.3V
C33 4.7uF DC6
C34 DC17
C35 DC30
C36 DC39
C37 DC52
C38 DC62
C39 DC72
C40 DC8
C41 DC108
C42 DC121
C43 DC131
C44 DC141
C45 DC95
C46 DC33

+3.3VA
C32
GNDD   GNDA

+3.3V
LED4 LED3 LED2 LED1
D5 LED D1 LED D2 LED D3 LED D4 LED
R25 CL R55 CL R56 CL R57 CL R58 CL
GNDD

USB_VBUS
R23 2200
TP26 TestPoint_Small
VBUS_SENSE
R24 4300
GNDD

when power is off, PA9 can't exceed 4V.
this brings a 5.25V VBUS down to 3.47V.

J9 USART2
1 USART2_RX
2 USART2_TX
GNDD

J3 USART3
1 USART3_RX
2 USART3_TX
3
GNDD

J4 USART1
1 USART1_RX
2 USART1_TX
3
GNDD

Sheet: RS485
USART3_RX UART_RX
USART3_TX UART_TX
File: RS485.sch

We feed 3.3V back to the programmer so they
know what voltage we run at, and whether or
not we're live.
+3.3V

J2 ST-LINK/V2
JNTRST 3
JTDI 5
JTMS 7
JTCK 9
JTDO 13
NRST 15
17
19
1 2
4 6 8 10 12 14 16 18 20
GNDD

J5 UE27AC5410H
VBUS 1
D+ 3
D- 2
Shield GND 5

J11 USB Header

U9 USBLC6-2SC6
USB_D+ USB_OTG_FS_D+
USB_D- USB_OTG_FS_D-
GNDD

FB1 MPZ2012S601AT000
USB_VBUS
+5V
J8 USBPowerJumper
USB_VBUS

Monolithic switching regulator ~5V->3.3V
+5V
U13 3.3V Reg
IN OUT
GND
+3.3V
C55 DC
C5 ECA-GA1V100
10uF
C56 DC
C54 DC
22uF ECE-A1HKA220
GNDD

JP0 PWR_FLAG
SolderJumper_2_Bridged
1 2
GNDD   GNDA
Represents single connection between GNDD and GNDA
near the 5V regulator. Could be cut and choke inserted.

Reference STMicroelectronics Application Note AN4938
for details on basic STMH74x circuits

Sheet: /
File: ADC Board.sch
Title: ADC Board
Size: A3   Date: Rev: A0
KiCad E.D.A. kicad (5.1.7)-1   Id: 1/3

+3.3V

U14
ISL83490

+5V

Note that ethernet cables don't flip pins.
Main board MUST connect different pins to the receptacle.

R61
120

A

1	VCC	
2	RO	
3	DI	
4	GND	

C60
DC

UART_RX
UART_TX

GNDD

A	8	
B	7	
Z	6	
Y	5	

B

Z

Y

PWR_FLAG
PWR_FLAG

8
7
6
5
4
3
2
1

J6
54601-908WPLF

GNDD

U6C
Opamp_Quad_Generic
+3.3VA
10
8
9
GNDA

U6D
Opamp_Quad_Generic
+3.3VA
12
14
13
GNDA

The resistors here set the gain of the transimpedance amplifiers.
They should be (max expected current) * R = VREF+

+3.3VA

C26
1uF

U1E
Opamp_Quad_Generic
V+ V− 11
U2E
Opamp_Quad_Generic
4 V+ V− 11
U3E
Opamp_Quad_Generic
4 V+ V− 11
U4E
Opamp_Quad_Generic
4 V+ V− 11
U5E
Opamp_Quad_Generic
4 V+ V− 11
U6E
Opamp_Quad_Generic
4 V+ V− 11

GNDA

U1B
Opamp_Quad_Generic
VREF+ 5
Sen1R 6
7
TestPoint
Sen1
1800
R1

U1A
Opamp_Quad_Generic
VREF+ 3
Sen2R 2
1
TestPoint
Sen2
1800
R2

U1D
Opamp_Quad_Generic
VREF+ 12
Sen3R 13
14
TestPoint
Sen3
1800
R3

U1C
Opamp_Quad_Generic
VREF+ 10
Sen4R 9
8
TestPoint
Sen4
1800
R4

U2B
Opamp_Quad_Generic
VREF+ 5
Sen5R 6
7
TestPoint
Sen5
1800
R5

U2A
Opamp_Quad_Generic
VREF+ 3
Sen6R 2
1
TestPoint
Sen6
1800
R6

U2D
Opamp_Quad_Generic
VREF+ 12
Sen7R 13
14
TestPoint
Sen7
1800
R7

U2C
Opamp_Quad_Generic
VREF+ 10
Sen8R 9
8
TestPoint
Sen8
1800
R8

U3B
Opamp_Quad_Generic
VREF+ 5
Sen9R 6
7
TestPoint
Sen9
1800
R9

U3A
Opamp_Quad_Generic
VREF+ 3
Sen10R 2
1
TestPoint
Sen10
1800
R10

U3D
Opamp_Quad_Generic
VREF+ 12
Sen11R 13
14
TestPoint
Sen11
1800
R11

U3C
Opamp_Quad_Generic
VREF+ 10
Sen12R 9
8
TestPoint
Sen12
1800
R12

U4B
Opamp_Quad_Generic
VREF+ 5
Sen13R 6
7
TestPoint
Sen13
1800
R13

U4A
Opamp_Quad_Generic
VREF+ 3
Sen14R 2
1
TestPoint
Sen14
1800
R14

U4D
Opamp_Quad_Generic
VREF+ 12
Sen15R 13
14
TestPoint
Sen15
1800
R15

U4C
Opamp_Quad_Generic
VREF+ 10
Sen16R 9
8
TestPoint
Sen16
1800
R16

U5B
Opamp_Quad_Generic
VREF+ 5
Sen17R 6
7
TestPoint
Sen17
1800
R17

U5A
Opamp_Quad_Generic
VREF+ 3
Sen18R 2
1
TestPoint
Sen18
1800
R18

U5D
Opamp_Quad_Generic
VREF+ 12
Sen19R 13
14
TestPoint
Sen19
1800
R19

U5C
Opamp_Quad_Generic
VREF+ 10
Sen20R 9
8
TestPoint
Sen20
1800
R20

U6B
Opamp_Quad_Generic
VREF+ 5
Sen21R 6
7
TestPoint
Sen21
1800
R21

U6A
Opamp_Quad_Generic
VREF+ 3
Sen22R 2
1
TestPoint
Sen22
1800
R22

+3.3VA

J1
BHR−44−HUA
44 43 Sen22R
42 41 Sen21R
40 39 Sen20R
38 37 Sen19R
36 35 Sen18R
34 33 Sen17R
32 31 Sen16R
30 29 Sen15R
28 27 Sen14R
26 25 Sen13R
24 23 Sen12R
22 21 Sen11R
20 19 Sen10R
18 17 Sen9R
16 15 Sen8R
14 13 Sen7R
12 11 Sen6R
10 9   Sen5R
8   7   Sen4R
6   5   Sen3R
4   3   Sen2R
2   1   Sen1R

C27
1uF

GNDA

VREF+
VREF+

U29
AP2114HA−3.3TRG1
+5V 1 VI VO 3 +3.3VA
2 GND
C29   C28
4.7uF   4.7uF
GNDA

U10
MCP1501T−20E/CHY
VREF+
1 OUT   VDD 6 +3.3VA
2 GND   GND 5
3 GND   SHDN 4
C3   C2
220pF   2.2uF
GNDA   GNDA

GNDA