H1 H2 H3 H4
Mounting Hole Pad / Mounting Hole Pad
GND

+5V
J7
AltPowerInput
2
1
GND

+3.3V
C33 C34 C35 C36 C37 C38 C39 C40 C41 C42 C43 C44 C45 C46 C32
4.7uF DC6 DC17 DC30 DC39 DC52 DC62 DC72 DC8 DC108 DC121 DC131 DC17 DC95 DC33
GND GND
+3.3VA

NRST
C1
0.1uF
GND

BOOT0 138
PWR_FLAG
VCAP1
VCAP2 71
106
VREF+ 32
C47 C48
2.2uF 2.2uF
GND

+3.3V
R30
10k
J10
BootJumper
2
1
BOOT0
GND

TP23
TestPoint_Small
TP24
TestPoint_Small

Analog Input
Sen1 Sen1
Sen2 Sen2
Sen3 Sen3
Sen4 Sen4
Sen5 Sen5
Sen6 Sen6
Sen7 Sen7
Sen8 Sen8
Sen9 Sen9
Sen10 Sen10
Sen11 Sen11
Sen12 Sen12
Sen13 Sen13
Sen14 Sen14
Sen15 Sen15
Sen16 Sen16
Sen17 Sen17
Sen18 Sen18
Sen19 Sen19
Sen20 Sen20
Sen21 Sen21
Sen22 Sen22
VREF+ VREF+
File: Analog Input.kicad_sch

+3.3V +3.3VA
U0
NRST 25
PDR_ON 143
BOOT0
VBAT 6
VDD 17 30 39 52 62 72 84 108 121 131 144
VDD33_USB 95
VDDA 33
BOOT0 138
VCAP1 71
VCAP2 106
VREF+ 32
PH0 23
PH1 24
PG0 56
PG1 57
PG2 87
PG3 88
PG4 89
PG5 90
PG6 91
PG7 92
PG8 93
PG9 124
PG10 125
PG11 126
PG12 127
PG13 128
PG14 129
PG15 132
PF0 10
PF1 11
PF2 12
PF3 13
PF4 14
PF5 15
PF6 18
PF7 19
PF8 20
PF9 21
PF10 22
PF11 49
PF12 50
PF13 53
PF14 54
PF15 55
PE0 141
PE1 142
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

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
PA9 101
PA10 102
PA11 103 USB_OTG_FS_D-
PA12 104 USB_OTG_FS_D+
PA13 105 JTMS
PA14 109 JTCK
PA15 110 JTDI
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
PC0 26 Sen13
PC1 27
PC2_C 28
PC3_C 29
PC4 44 Sen4
PC5 45 Sen3
PC6 96
PC7 97
PC8 98
PC9 99
PC10 111 LED4
PC11 112
PC12 113 LED3
PC13 7
PC14 8
PC15 9
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
STM32H743ZITx
GND GND

TP26 TestPoint_Small
VBUS_SENSE
TP27 TestPoint_Small
USB_VBUS
R23
2200
when power is off, PA9 can't exceed 4V.
this brings a 5.25V VBUS down to 3.47V.
R24
4300
GND

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

RS485
USART3_RX UART_RX
USART3_TX UART_TX
File: RS485.kicad_sch

J9
USART2
1 USART2_RX
2 USART2_TX
GND

J3
USART3
1 USART3_RX
2 USART3_TX
3
GND

J4
USART1
1 USART1_RX
2 USART1_TX
3
GND

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
1 2
JNTRST 3 4
JTDI 5 6
JTMS 7 8
JTCK 9 10
11 12
JTDO 13 14
15 16
NRST 17 18
19 20
GND

J5
UE27AC5410H
VBUS 1
D+ 3
D- 2
Shield
GND 4 5
GND

PWR_FLAG
+5V
JB
2
1
USBPowerJumper
USB_VBUS

FB1
MPZ2012S601AT000
USB_OTG_FS_D+
USB_D+
JP1
SolderJumper_2_Bridged
U9
USBLC6-2SC6
USB_OTG_FS_D-
USB_D-
JP2
SolderJumper_2_Bridged
GND

J11
USB Header
4
3
2
1

These funny solder jumpers allow the
use of alternative parts to the
USBLC6-2SC6. I believe the chosen
part will work with the bridges
intact, but that performance will
be degraded. If you can source
the correct part, then cut the
bridges with a knife.

Monolithic switching regulator ~5V->3.3V
+5V
U13
3.3V Reg
IN 1 OUT 3
GND 2
+3.3V
C55
DC
C54
10uF EEA-GA1V100
C56
DC
C54
22uF ECE-A1HKA220
GND

TP28 TP25
TestPoint_Small

Reference STMicroelectronics Application Note AN4938
for details on basic STMH74x circuits

These caps are
DNP if you use
the MAX8511.

Note we're using the +4V net,
but this will really be +4.5V.

Decoupling caps for the op amps.
Trying them out on the next board
rev.
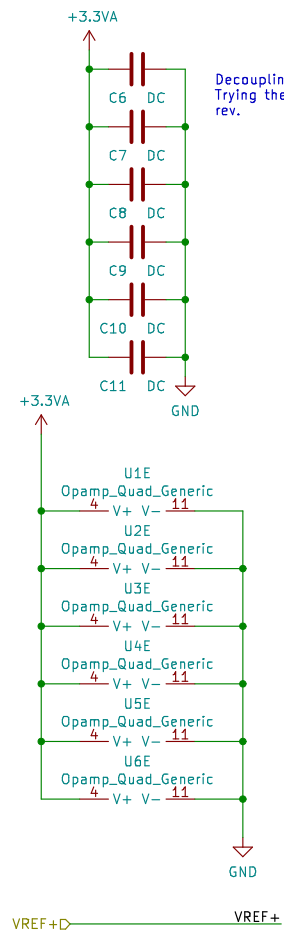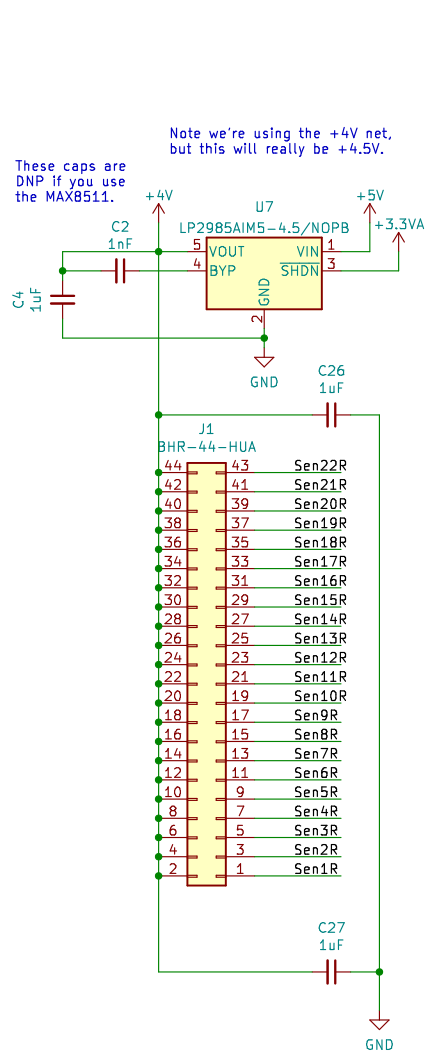
The resistors here set the gain of the transimpedance amplifiers.
They should be (max expected current) * R = VREF+

+4V

+3.3VA

C2
1nF

C4
1uF

U7
LP2985AIM5-4.5/NOPB
5 VOUT   VIN 1
4 BYP   SHDN 3
2 GND

+5V   +3.3VA

GND

C26
1uF

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

GND

+3.3VA

C6 DC
C7 DC
C8 DC
C9 DC
C10 DC
C11 DC

GND

+3.3VA

U1E
Opamp_Quad_Generic
4 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

GND

VREF+   VREF+

+5V

U29
NCP115ASN330T2G
1 VIN   VOUT 5
3 SHDN   BYP 4
2 GND

+3.3VA

+3.3V

C29
1uF

DNP C5

C28
1uF

GND

BYP is just there in case you
want to swap in some other part.

U10
LM4120IM5-2.0/NOPB
5 VREF   VIN 4
    GND   EN 3

VREF+

C3
22nF

GND

Note Pin 1, "REF" is NC.

+3.3VA

U1B
Opamp_Quad_Generic
VREF+ 5 +
Sen1R 6 -
7
TestPoint
TP1
Sen1
1800
R1

U1A
Opamp_Quad_Generic
VREF+ 3 +
Sen2R 2 -
1
TestPoint
TP2
Sen2
1800
R2

U1D
Opamp_Quad_Generic
VREF+ 12 +
Sen3R 13 -
14
TestPoint
TP3
Sen3
1800
R3

U1C
Opamp_Quad_Generic
VREF+ 10 +
Sen4R 9 -
8
TestPoint
TP4
Sen4
1800
R4

U2B
Opamp_Quad_Generic
VREF+ 5 +
Sen5R 6 -
7
TestPoint
TP5
Sen5
1800
R5

U2A
Opamp_Quad_Generic
VREF+ 3 +
Sen6R 2 -
1
TestPoint
TP6
Sen6
1800
R6

U2D
Opamp_Quad_Generic
VREF+ 12 +
Sen7R 13 -
14
TestPoint
TP7
Sen7
1800
R7

U2C
Opamp_Quad_Generic
VREF+ 10 +
Sen8R 9 -
8
TestPoint
TP8
Sen8
1800
R8

U3B
Opamp_Quad_Generic
VREF+ 5 +
Sen9R 6 -
7
TestPoint
TP9
Sen9
1800
R9

U3A
Opamp_Quad_Generic
VREF+ 3 +
Sen10R 2 -
1
TestPoint
TP10
Sen10
1800
R10

U3D
Opamp_Quad_Generic
VREF+ 12 +
Sen11R 13 -
14
TestPoint
TP11
Sen11
1800
R11

U3C
Opamp_Quad_Generic
VREF+ 10 +
Sen12R 9 -
8
TestPoint
TP12
Sen12
1800
R12

U4B
Opamp_Quad_Generic
VREF+ 5 +
Sen13R 6 -
7
TestPoint
TP13
Sen13
1800
R13

U4A
Opamp_Quad_Generic
VREF+ 3 +
Sen14R 2 -
1
TestPoint
TP14
Sen14
1800
R14

U4D
Opamp_Quad_Generic
VREF+ 12 +
Sen15R 13 -
14
TestPoint
TP15
Sen15
1800
R15

U4C
Opamp_Quad_Generic
VREF+ 10 +
Sen16R 9 -
8
TestPoint
TP16
Sen16
1800
R16

U5B
Opamp_Quad_Generic
VREF+ 5 +
Sen17R 6 -
7
TestPoint
TP17
Sen17
1800
R17

U5A
Opamp_Quad_Generic
VREF+ 3 +
Sen18R 2 -
1
TestPoint
TP18
Sen18
1800
R18

U5D
Opamp_Quad_Generic
VREF+ 12 +
Sen19R 13 -
14
TestPoint
TP19
Sen19
1800
R19

U5C
Opamp_Quad_Generic
VREF+ 10 +
Sen20R 9 -
8
TestPoint
TP20
Sen20
1800
R20

U6B
Opamp_Quad_Generic
VREF+ 5 +
Sen21R 6 -
7
TestPoint
TP21
Sen21
1800
R21

U6A
Opamp_Quad_Generic
VREF+ 3 +
Sen22R 2 -
1
TestPoint
TP22
Sen22
1800
R22

+3.3VA
U6C
Opamp_Quad_Generic
10 +
9 -
8

GND

+3.3VA
U6D
Opamp_Quad_Generic
12 +
13 -
14

GND

+3.3V

U14
ISL83490

R61
120

+5V

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

C60
DC

UART_RXD
UART_TXD

1	VCC
2	RO
3	DI
4	GND

A	8
B	7
Z	6
Y	5

A
B
Z
Y

PWR_FLAG
PWR_FLAG

| 8 |
| 7 |
| 6 |
| 5 |
| 4 |
| 3 |
| 2 |
| 1 |

J6
54601-908WPLF

GND

GND