c

IC1
TMS320F28034PNT

Pin	Signal		Pin	Signal
GPIO0	69	GPIO0/EPWM1A	33	GPIO30/CANRXA↑	CAN-RX
	68	GPIO1/EPWM1B/COMP1OUT	32	GPIO31/CANTXA↑	CAN-TX
	67	GPIO2/EPWM2A	2	GPIO32/SDAA/EPWMSYNCI/ADCSOCAO↑	
	66	GPIO3/EPWM2B/SPISOMIA/COMP2OUT	3	GPIO33/SCLA/EPWMSYNCO/ADCSOCBO↑	
GP_BUTTON	63	GPIO4/EPWM3A	74	GPIO34/COMP2OUT/COMP3OUT↑	GPIO34
GPIO5	62	GPIO5/EPWM6B/LINRXA/HRCAP2	59	GPIO35/TDI↑	TDI
	50	GPIO6/EPWM4A/EPWMSYNCI/EPWMSYNCO	60	GPIO36/TMS↑	TMS
	49	GPIO7/EPWM4B/SCIRXDA	58	GPIO37/TDO↑	TDO
	43	GPIO8/EPWM5A/ADCSOCAO	57	GPIO38/TCK/XCLKIN↑	TCK
GPIO9	39	GPIO9/EPWM5B/LINTXA/HRCAP1	56	GPIO39↑	

CHANGE: GP_BUTTON is now on GPIO4

CHANGE: MOVE GP_BUTTON TO GPIO11

Pin	Signal		Pin	Signal
GPIO11	65	GPIO10/EPWM6A/ADCSOCBO	64	GPIO40/EPWM7A↑	
	61	GPIO11/EPWM6B/LINRXA/HRCAP2	48	GPIO41/EPWM7B↑	
SPI_SOMI	47	↑GPIO12/TZ1/SCITXDA/SPISOMIB	5	GPIO42/COMP1OUT↑	
SPI_CLK	76	↑GPIO13/TZ2/SPISOMIB	6	GPIO43/COMP42OUT↑	
SPI_CS	77	↑GPIO14/TZ3/LINTXA/SPICLKB	45	GPIO44↑	
	75	↑GPIO15/TZ1/LINRXA/SPISTEB			
	46	↑GPIO16/SPISOMIA/TZ2	18	ADCINA0	ADCINA0
	42	↑GPIO17/SPISOMIA/TZ3	17	ADCINA1	ADCINA1
GP1	41	↑GPIO18/SPICLKA/LINTXA/XCLKOUT	16	ADCINA2/COMP1A/AIO2	ADCINA2
	55	↑GPIO19/XCLKIN/SPISTEA/LINRXA/ECAP1	15	ADCINA3	ADCINA3
GPIO20	78	↑GPIO20/EQEP1A/COMP1OUT	14	ADCINA4/COMP2A/AIO4	ADCINA4
	79	↑GPIO21/EQEP1B/COMP2OUT	13	ADCINA5	ADCINA5
LED0	1	↑GPIO22/EQEP1S/LINTXA	12	ADCINA6/COMP3A/AIO6	PWROUT_INT
	4	↑GPIO23/EQEP1I/LINRXA	11	ADCINA7	ADCINA7
SPI_SIMO	80	↑GPIO24/ECAP1/SPISIMOB			
	44	↑GPIO25/SPISOMIB	23	ADCINB0	ADCINB0
GP0	37	↑GPIO26/HRCAP1/SPICLKB	24	ADCINB1	ADCINB1
	31	↑GPIO27/HRCAP2/SPISTEB	25	ADCINB2/COMP1B/AIO10	ADCINB2
SERIAL_RX/I2C_SDA	40	↑GPIO28/SCIRXDA/SDAA/TZ2	26	ADCINB3	ADCINB3
SERIAL_TX/I2C_SCL	34	↑GPIO29/SCITXDA/SCLA/TZ3	27	ADCINB4/COMP2B/AIO12	ADCINB4
			28	ADCINB5	
			29	ADCINB6/COMP3B/AIO14	ADCINB6
			30	ADCINB7	ADCINB7

Pin	Signal
8	VSS
35	VSS
53	VSS
71	VSS

GND

Pin	Signal
19	VREFHI
22	VREFLO

GND   +3V3

+3V3   GND   L3
21   VSSA

L4   20   VDDA
BLM21PG221SN1D

Pin	Signal
9	XRS	XRS
10	TRST	TRST

Pin	Signal
7	VDD
54	VDD
72	VDD

52   X1
51   X2

C1   C4 C3 C2
2.2 uF

73   VREGENZ   GND

L2
L5   36   VDDIO
+3V3   70   VDDIO
BKP2125HS600-T

38   TEST2

GND   GND

C6 C5

GND

↑ symbol indicates pin is pulled up at boot

DRAFT
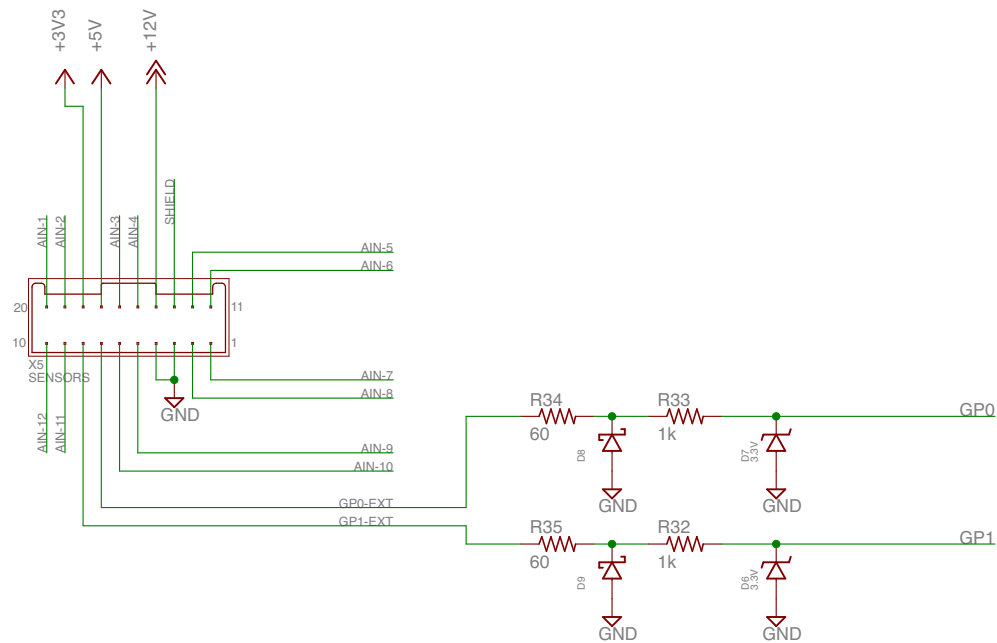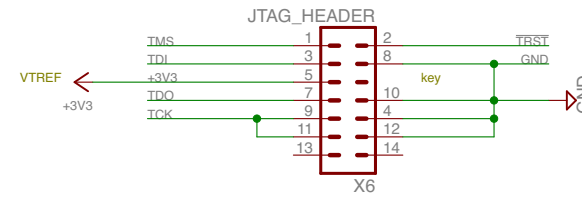F28035 power and signal connections
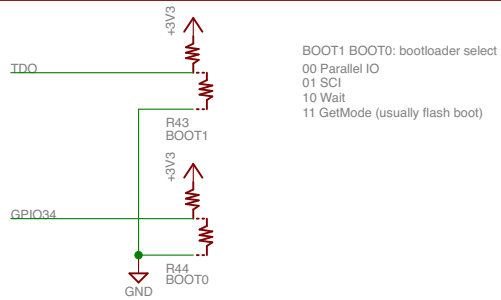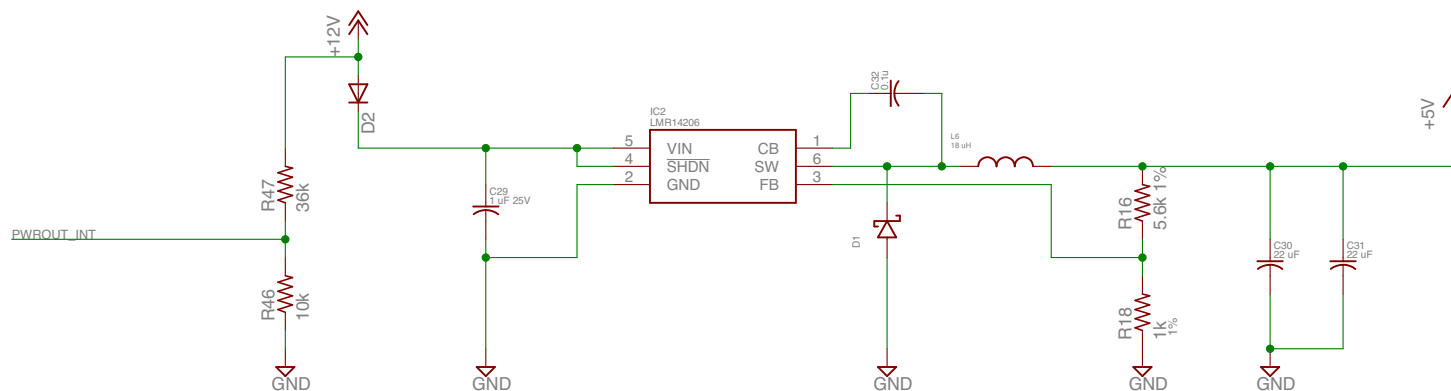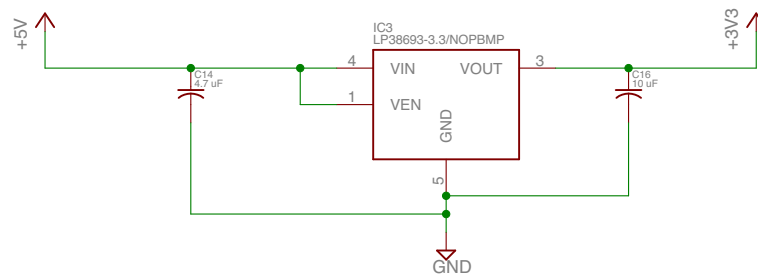
Board: Magic CAN Node
Drawn by Aaron Bonnell-Kangas
Revision date: v2.2.0 - 2015-12-18
Last modified date: 12/21/15 1:36 AM

TDO

+3V3

R43
BOOT1

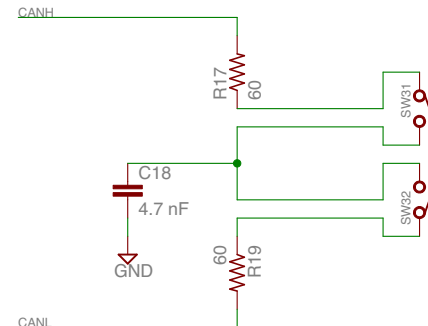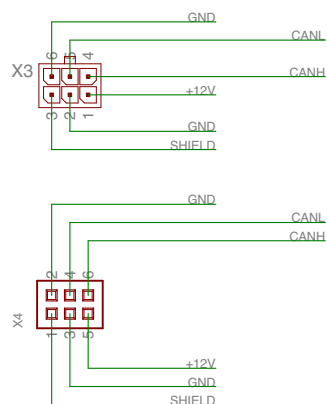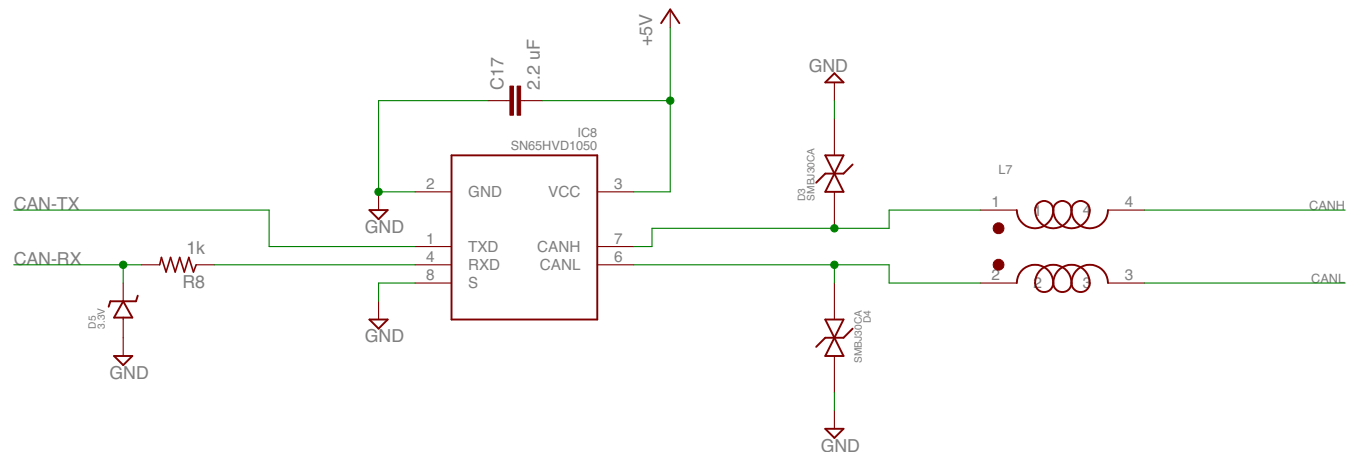+3V3

GPIO34

R44
BOOT0

GND

BOOT1 BOOT0: bootloader select
00 Parallel IO
01 SCI
10 Wait
11 GetMode (usually flash boot)

JTAG_HEADER

TMS	1	2	TRST
TDI	3	8	GND
+3V3	5	key	10
TDO	7	10	
TCK	9	4	
	11	12	
	13	14	

VTREF

+3V3

GND

X6

+3V3 +5V +12V

SHIELD

AIN-1
AIN-2
AIN-3
AIN-4

AIN-5
AIN-6

20   11

10   1

X5
SENSORS

AIN-7
AIN-8

GND

AIN-12
AIN-11

AIN-9
AIN-10

GP0-EXT
GP1-EXT

R34
60

D8

R33
1k

D7
3.3V

GP0

GND

GND

GND

R35
60

D9

R32
1k

D6
3.3V

GP1

GND

GND

GND

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+12V

D2

R47
36k

PWROUT_INT

R46
10k

GND

C29
1 uF 25V

GND

IC2
LMR14206

5 VIN
4 SHDN
2 GND

CB 1
SW 6
FB 3

GND

C32
0.1u

L6
18 uH

D1

R16
5.6k 1%

R18
1k
1%

GND

+5V

C30
22 uF

C31
22 uF

GND

given R2 = 1k
R1 = R2*((5V / 0.765 V) -1)
= 5535.9477
nearest std value 5.6k gives Vout = 5.049 V

+5V

C14
4.7 uF

IC3
LP38693-3.3/NOPBMP

4 VIN
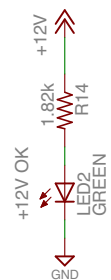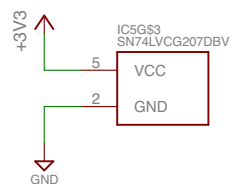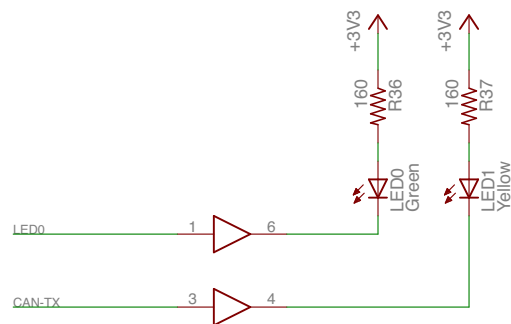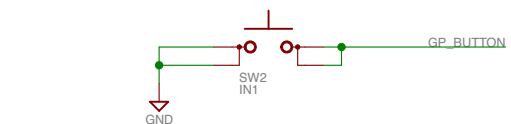1 VEN

VOUT 3
GND 5

+3V3

C16
10 uF

GND

DRAFT
5V and 3V3 power

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CAN-TX

CAN-RX

R8
1k

D5
3.3V
GND

C17
2.2 uF

+5V

IC8
SN65HVD1050

2	GND	VCC	3
1	TXD	CANH	7
4	RXD	CANL	6
8	S		

GND

GND

GND

D3
SMBJ30CA

D4
SMBJ30CA

GND

GND

L7

1 | 4   CANH
2 | 3   CANL

X3

GND
CANL
CANH
+12V
GND
SHIELD

X4

GND
CANL
CANH
+12V
GND
SHIELD

CANH

R17
60

C18
4.7 nF

GND

R19
60

SW31

SW32

CANL

DRAFT
Auxiliary analog input filters
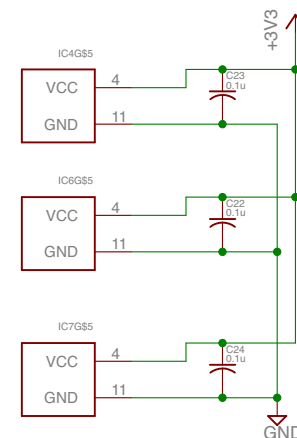
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Last modified date: 12/21/15 1:36 AM

GP_BUTTON

SW2
IN1

GND

+3V3

160
R36

LED0
Green

LED0

1   6

+3V3

160
R37

LED1
Yellow

CAN-TX

3   4

+12V

1,82k
R14

+12V OK

LED2
GREEN

GND

+3V3

160
R15

+3V3 OK

LED3
GREEN

GND

+3V3

IC5G$3
SN74LVCG207DBV
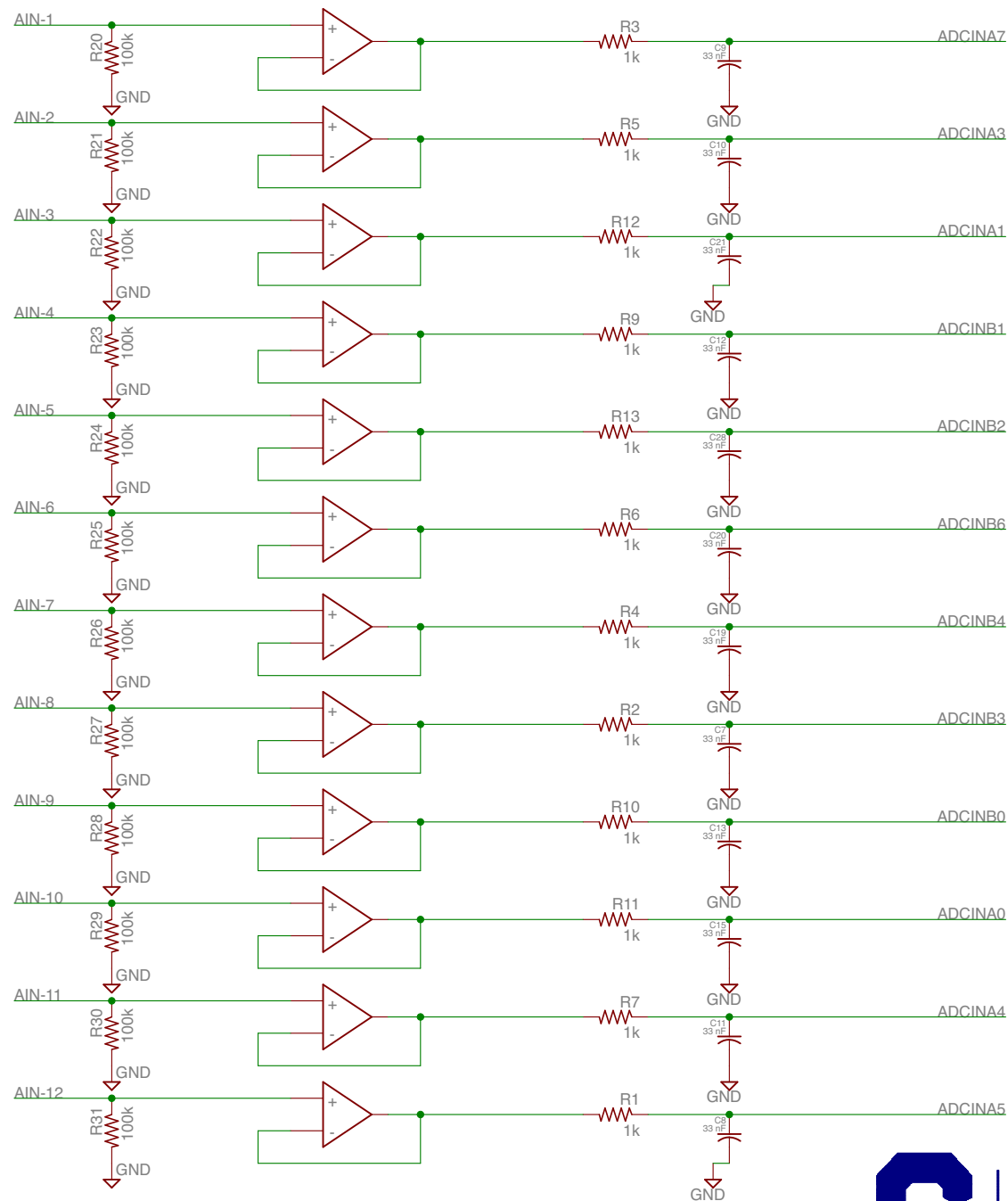
5   VCC

2   GND

GND
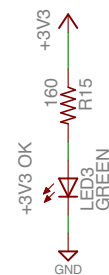
DRAFT
12V switching, LEDs, buttons

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AIN-1 — R20 100k — GND — R3 1k — C9 33 nF — GND — ADCINA7

AIN-2 — R21 100k — GND — R5 1k — C10 33 nF — GND — ADCINA3

AIN-3 — R22 100k — GND — R12 1k — C21 33 nF — GND — ADCINA1

AIN-4 — R23 100k — GND — R9 1k — C12 33 nF — GND — ADCINB1

AIN-5 — R24 100k — GND — R13 1k — C28 33 nF — GND — ADCINB2

AIN-6 — R25 100k — GND — R6 1k — C20 33 nF — GND — ADCINB6

AIN-7 — R26 100k — GND — R4 1k — C19 33 nF — GND — ADCINB4

AIN-8 — R27 100k — GND — R2 1k — C7 33 nF — GND — ADCINB3

AIN-9 — R28 100k — GND — R10 1k — C13 33 nF — GND — ADCINB0

AIN-10 — R29 100k — GND — R11 1k — C15 33 nF — GND — ADCINA0

AIN-11 — R30 100k — GND — R7 1k — C11 33 nF — GND — ADCINA4

AIN-12 — R31 100k — GND — R1 1k — C8 33 nF — GND — ADCINA5

+3V3

IC4G$5 — VCC 4 — GND 11 — C23 0.1u

IC6G$5 — VCC 4 — GND 11 — C22 0.1u
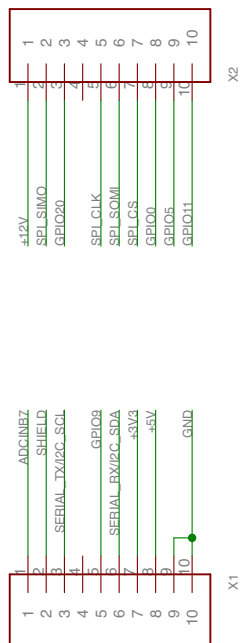
IC7G$5 — VCC 4 — GND 11 — C24 0.1u

GND

DRAFT
Sensor input filters

Board: Magic CAN Node
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Last modified date: 12/21/15 1:36 AM

X2

Pin	Signal
1	+12V
2	SPI_SIMO
3	GPIO20
4	
5	SPI_CLK
6	SPI_SOMI
7	SPI_CS
8	GPIO0
9	GPIO5
10	GPIO11

X1

Pin	Signal
1	ADCINBZ
2	SHIELD
3	SERIAL_TX/I2C_SCL
4	
5	GPIO9
6	SERIAL_RX/I2C_SDA
7	+3V3
8	+5V
9	
10	GND

DRAFT
Sensor connector and backpack headers

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