c

CHANGE: I2C pins on backpack header are different

IC1
TMS320F28034PNT

CHANGE: GP_BUTTON is now on GPIO5

TODO: choose new pin for LED1
CHANGE: MOVE GP_BUTTON TO GPIO11

CHANGE: remove 12V_SW_CTRL
CHANGE: LED0 is now on GPIO22
CHANGE: LED1 is now on GPIO23
CHANGE: CAN_RESET is deleted

| Signal | Pin | Left pin function |
|---|---|---|
| GPIO0 | 69 | GPIO0/EPWM1A |
|  | 68 | GPIO1/EPWM1B/COMP1OUT |
|  | 67 | GPIO2/EPWM2A |
|  | 66 | GPIO3/EPWM2B/SPISOMIA/COMP2OUT |
| GP_BUTTON | 63 | GPIO4/EPWM3A |
| GPIO5 | 62 | GPIO5/EPWM6B/LINRXA/HRCAP2 |
|  | 50 | GPIO6/EPWM4A/EPWMSYNCI/EPWMSYNCO |
|  | 49 | GPIO7/EPWM4B/SCIRXDA |
|  | 43 | GPIO8/EPWM5A/ADCSOCAO |
| GPIO9 | 39 | GPIO9/EPWM5B/LINTXA/HRCAP1 |
|  | 65 | GPIO10/EPWM6A/ADCSOCBO |
| GPIO11 | 61 | GPIO11/EPWM6B/LINRXA/HRCAP2 |
|  | 47 | ↑GPIO12/TZ1/SCITXDA/SPISOMIB |
| SPI_SOMI | 76 | ↑GPIO13/TZ2/SPISOMIB |
| SPI_CLK | 77 | ↑GPIO14/TZ3/LINTXA/SPICLKB |
| SPI_CS | 75 | ↑GPIO15/TZ1/LINRXA/SPISTEB |
| GP1 | 46 | ↑GPIO16/SPISOMIA/TZ2 |
| GP0 | 42 | ↑GPIO17/SPISOMIA/TZ3 |
|  | 41 | ↑GPIO18/SPICLKA/LINTXA/XCLKOUT |
|  | 55 | ↑GPIO19/XCLKIN/SPISTEA/LINRXA/ECAP1 |
|  | 78 | ↑GPIO20/EQEP1A/COMP1OUT |
|  | 79 | ↑GPIO21/EQEP1B/COMP2OUT |
| LED0 | 1 | ↑GPIO22/EQEP1S/LINTXA |
| LED1 | 4 | ↑GPIO23/EQEP1I/LINRXA |
| SPI_SIMO | 80 | ↑GPIO24/ECAP1/SPISIMOB |
|  | 44 | ↑GPIO25/SPISOMIB |
|  | 37 | ↑GPIO26/HRCAP1/SPICLKB |
|  | 31 | ↑GPIO27/HRCAP2/SPISTEB |
| SERIAL_RX/I2C_SDA | 40 | ↑GPIO28/SCIRXDA/SDAA/TZ2 |
| SERIAL_TX/I2C_SCI | 34 | ↑GPIO29/SCITXDA/SCLA/TZ3 |

| Right pin function | Pin | Signal |
|---|---|---|
| GPIO30/CANRXA↑ | 33 | CAN-RX |
| GPIO31/CANTXA↑ | 32 | CAN-TX |
| GPIO32/SDAA/EPWMSYNCI/ADCSOCAO↑ | 2 |  |
| GPIO33/SCLA/EPWMSYNCO/ADCSOCBO↑ | 3 |  |
| GPIO34/COMP2OUT/COMP3OUT↑ | 74 | GPIO34 |
| GPIO35/TDI↑ | 59 | TDI |
| GPIO36/TMS↑ | 60 | TMS |
| GPIO37/TDO↑ | 58 | TDO |
| GPIO38/TCK/XCLKIN↑ | 57 | TCK |
| GPIO39↑ | 56 |  |
| GPIO40/EPWM7A↑ | 64 |  |
| GPIO41/EPWM7B↑ | 48 |  |
| GPIO42/COMP1OUT↑ | 5 |  |
| GPIO43/COMP42OUT↑ | 6 |  |
| GPIO44↑ | 45 |  |
| ADCINA0 | 18 | ADCINA0 |
| ADCINA1 | 17 | ADCINA1 |
| ADCINA2/COMP1A/AIO2 | 16 | ADCINA2 |
| ADCINA3 | 15 | ADCINA3 |
| ADCINA4/COMP2A/AIO4 | 14 | ADCINA4 |
| ADCINA5 | 13 | ADCINA5 |
| ADCINA6/COMP3A/AIO6 | 12 | PWROUT_INT |
| ADCINA7 | 11 | ADCINA7 |
| ADCINB0 | 23 | ADCINB0 |
| ADCINB1 | 24 | ADCINB1 |
| ADCINB2/COMP1B/AIO10 | 25 | ADCINB2 |
| ADCINB3 | 26 | ADCINB3 |
| ADCINB4/COMP2B/AIO12 | 27 | ADCINB4 |
| ADCINB5 | 28 |  |
| ADCINB6/COMP3B/AIO14 | 29 | ADCINB6 |
| ADCINB7 | 30 | ADCINB7 |
| VREFHI | 19 |  |
| VREFLO | 22 |  |
| XRS | 9 | XRS |
| TRST | 10 | TRST |
| X1 | 52 |  |
| X2 | 51 |  |
| VREGENZ | 73 | GND |
| TEST2 | 38 |  |

| Pin | Power |
|---|---|
| 8 | VSS |
| 35 | VSS |
| 53 | VSS |
| 71 | VSS |
| 21 | VSSA |
| 20 | VDDA |
| 7 | VDD |
| 54 | VDD |
| 72 | VDD |
| 36 | VDDIO |
| 70 | VDDIO |

GND

GND

+3V3

L3   choke here

L4

BLM21PG221SN1D

C1
2.2 uF

C4  C3  C2

GND   GND

L2
L5

+3V3

BKP2125HS600-T

C6  C5

GND

↑ symbol indicates pin is pulled up at boot
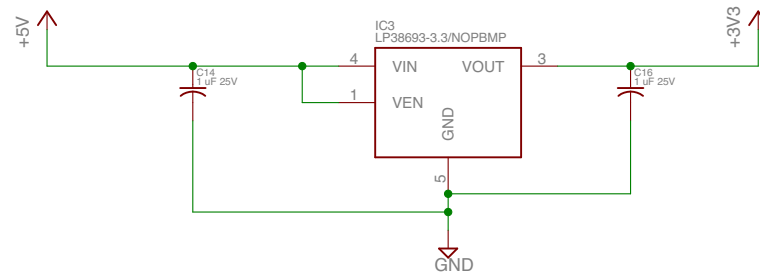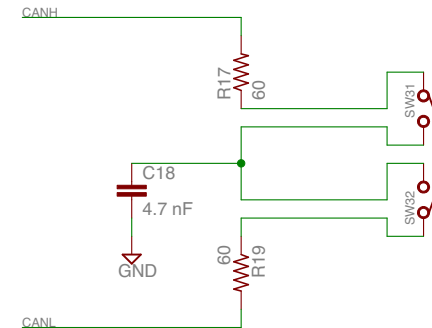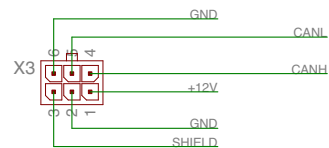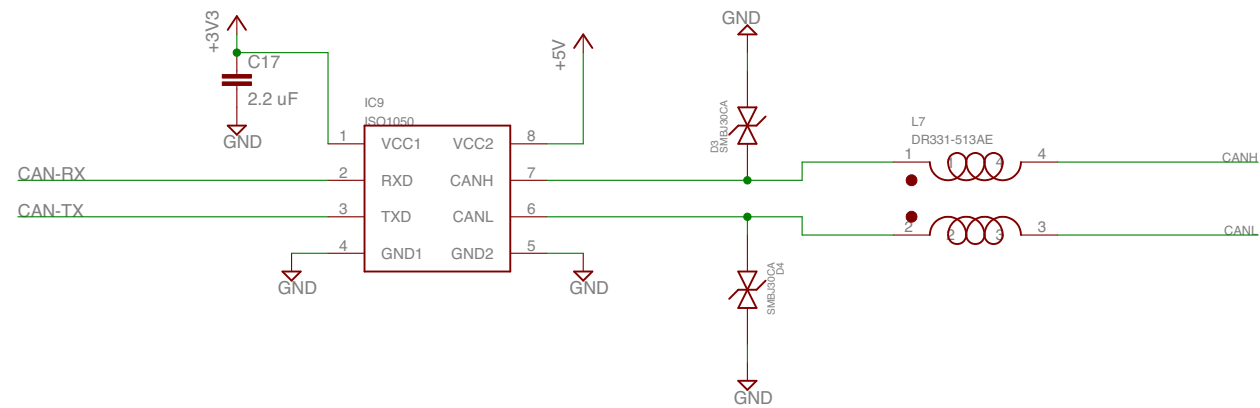
F28035 power and signal connections

Board: Magic CAN Node
Drawn by: Aaron Bonnell-Kangas
Revision date: v2-beta - 2014-12-01
Last modified date: 12/1/14 1:37 PM

TDO

+3V3

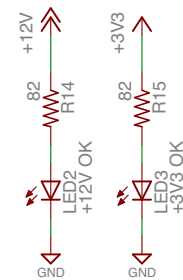BOOT1 BOOT0: bootloader select
00 Parallel IO
01 SCI
10 Wait
11 GetMode (usually flash boot)

R43
BOOT1

+3V3

GPIO34

R44
BOOT0

GND

JTAG_HEADER

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

X6

+3V3
+5V
+12V

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

AIN-5
AIN-6

20              11

10               1

X5
SENSORS

AIN-7
AIN-8

GND

AIN-12
AIN-11

AIN-9
AIN-10

GP0
GP1

BETA

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+12V

D2

R47
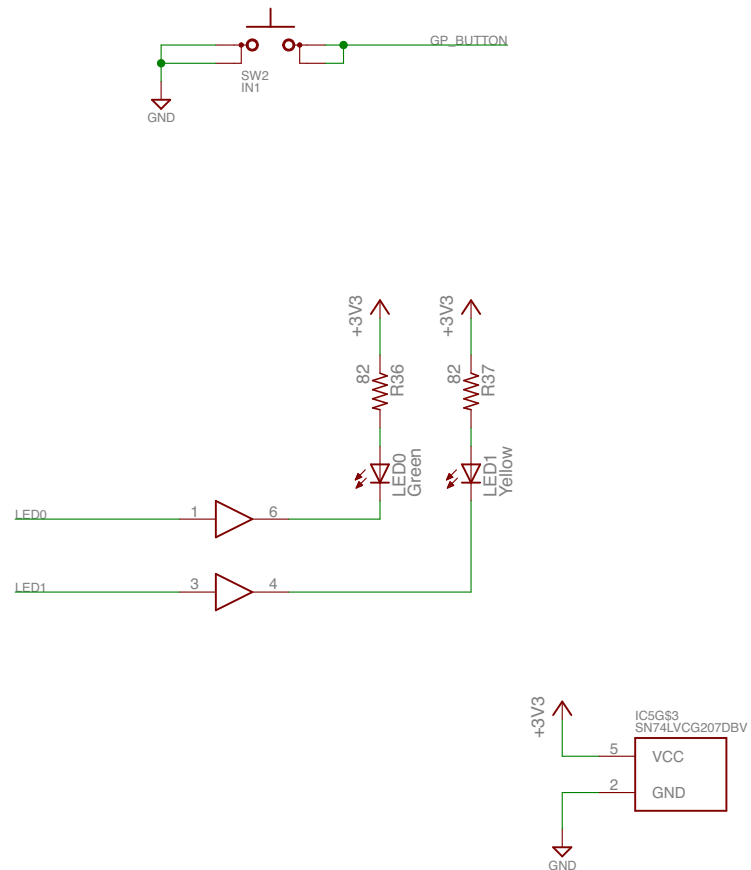36k

PWROUT_INT

R46
10k

GND

C29
1 uF 25V

GND

IC2
LMR14206

| | | |
|---|---|---|
| 5 | VIN | CB | 1 |
| 4 | SHDN | SW | 6 |
| 2 | GND | FB | 3 |

C32
0.1 uF

L6
18 uH

D1

GND

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

**TODO: CHECK TOLERANCES**

+5V

C14
1 uF 25V

IC3
LP38693-3.3/NOPBMP

| | | |
|---|---|---|
| 4 | VIN | VOUT | 3 |
| 1 | VEN | | |
| | | GND | |
| | | 5 | |

C16
1 uF 25V

+3V3

GND

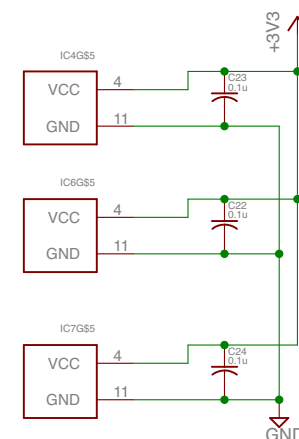**BETA**
5V and 3V3 power

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+3V3

C17
2.2 uF

GND

IC9
ISO1050

| 1 | VCC1 | VCC2 | 8 |
| 2 | RXD | CANH | 7 |
| 3 | TXD | CANL | 6 |
| 4 | GND1 | GND2 | 5 |

CAN-RX

CAN-TX

GND

GND

+5V

GND

D3
SMBJ30CA

L7
DR331-513AE

1  4  CANH
2  3  CANL

SMBJ30CA
D4

GND

CANL

CANH

+12V

GND

SHIELD

X3

GND

CANH

R17
60

SW31

C18
4.7 nF

SW32

GND

60
R19

CANL

BETA
Auxiliary analog input filters

GP_BUTTON

SW2
IN1

GND

+3V3    +3V3

82   R36    82   R37

LED0    LED1
Green   Yellow

LED0    1    6

LED1    3    4

+12V    +3V3

82   R14    82   R15

LED2    LED3
+12V OK   +3V3 OK

GND    GND
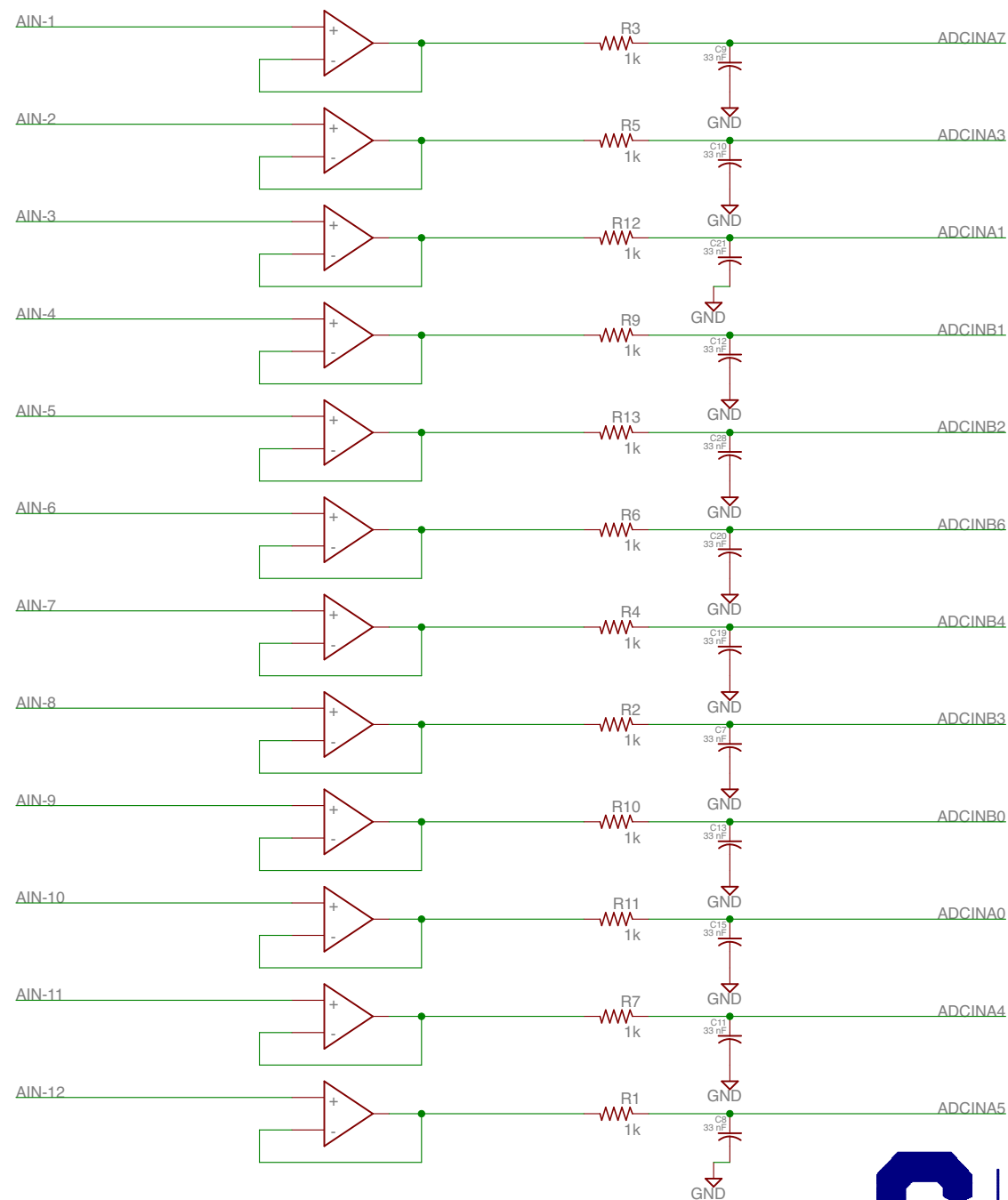
+3V3

IC5G$3
SN74LVCG207DBV

5    VCC

2    GND

GND

BETA
12V switching, LEDs, buttons

C

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AIN-1    R3 1k    C9 33 nF    ADCINA7    GND

AIN-2    R5 1k    C10 33 nF    ADCINA3    GND

AIN-3    R12 1k    C21 33 nF    ADCINA1    GND

AIN-4    R9 1k    C12 33 nF    ADCINB1    GND

AIN-5    R13 1k    C28 33 nF    ADCINB2    GND

AIN-6    R6 1k    C20 33 nF    ADCINB6    GND

AIN-7    R4 1k    C19 33 nF    ADCINB4    GND

AIN-8    R2 1k    C7 33 nF    ADCINB3    GND

AIN-9    R10 1k    C13 33 nF    ADCINB0    GND

AIN-10    R11 1k    C15 33 nF    ADCINA0    GND

AIN-11    R7 1k    C11 33 nF    ADCINA4    GND

AIN-12    R1 1k    C8 33 nF    ADCINA5    GND

+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

**BETA**
Sensor input filters

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X2

1 2 3 4 5 6 7 8 9 10

+12V
SPI_SIMO
ADCINA2
N$42
SPI_CLK
SPI_SOMI
SPI_CS
GPIO0
GPIO5
GPIO11

X1

ADCINB2
SHIELD
SERIAL_TX/I2C_SCL
N$2Z
GPIO9
SERIAL_RX/I2C_SDA
+3V3
+5V
GND

1 2 3 4 5 6 7 8 9 10

BETA
Sensor connector and backpack headers

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