MCP2515-xSO CAN controller U3

+5V C4 100n

RXCAN 2 / TXCAN 1 / VDD 18
SI 14 SPI_MOSI
SO 15 SPI_MISO
CS 16 SPI_SS
SCK 13 SPI_SCK

SPI_INT
INT 12
RX0BF 11
RX1BF 10
TX0RTS 4
TX1RTS 5
TX2RTS 6
RESET 17
VSS 9

OSC2 7 / OSC1 8
16 MHz Y1
C6 22p C5 22p

+5V R33 10k CAN_RST

TP0 0v

TXCAN
RXCAN

J6 0v
1 / 2 CBUS0v

Si8622BC-B-IS U4
GND1 A2 A1 VDD1
GND2 B2 B1 VDD2
SOIC8
+5V C7 100n
Galvanic isolated

CBUS0v
RXD
TXD
C10 100n

MCP2562-E-SN U5
+5C
CANH VDD TXD
CANL V55 RXD
Vio STBY
SOIC8

L78L05 SOT-89 U6
IN OUT GND
+12C
C8 10u 1206 Tant 16 V
C9 10u 1206 Tant 16 V
+5C
R34 2k7

CAN-H / CAN-L
D2 SS16-E3 SMA

CBUS
J2
1 CBUS12 CAN-L
2 CAN-L
3 CAN-H
4 CBUS0
CBUS12 CAN-L CAN-H CBUS0
CBUS0v
ESDCAN06-2 D3 SOT-23
D4 Blue
CBUS PWR LED
TH 3.5mm 4way Pluggable

TH 3.5mm 2way Pluggable J1
+12V 0V 1 12Vin
0v 2

F1 MC36242 smd 1812 1.3W 12V 2.6A hold, 5.0A trip

+12V

D1 SS16-E3 SMA

External Regulated PSU
12V nominal
10.8V min
13.0V max
2.6A min

LM1117-ADJ U2
VI VO ADJ SOT-223
C1 1206+ Tant 16 V 10u
R31 470R
R32 2k7
C2 1206 Tant 16 V 10u
8.4V

Arduino compatible module MEGA 2560 PRO (EMBED) U1
VIN 7V to 9V
RST / VIN_1 / VIN_2
AREF / 5V_1 +5V / 5V_2
TX / 3V3_1 +3V3 / 3V3_2
RX

PWM0 D3 / D2 SPI_INT
PWM1 D5 / D4 PWM2
PWM3 D7 / D6 PWM4
PWM5 D9 / D8 PWM6
D11 / D10
D13 / D12
ENCPHB D15 / D14
ENCSW D17 / D16 ENCPHA
I2CSDA D19 / D18 I2CSCL
D21 / D20
D23 / D22
D25 / D24
TP4 NoCAN D27 / D26 CBUSsw TP3
ISRTIME_TP D29 / D28 TP_D30
LEDora D31 / D30
LEDgrn D33 / D32 LEDyel
AWDsig D35 / D34 LEDred
D37 / D36
D39 / D38
D41 / D40
PWM8 D43 / D42 PWM7
D45 / D44 PWM9
D47 / D46
SPI_MOSI D49 / D48 SPI_MISO
SPI_SS D51 / D50 SPI_SCK
D53 / D52 Sense
A1 / A0
A3 / A2
A5 / A4
A7 / A6
A9 / A8
A11 / A10 Sw1 blue
A13 / A12 blue
A15 / A14
NoCAN / GND_1 0v
J8 / GND_2
wire link

Local switch Day/Night.
J7
CBUSsw J9

R1 47R PWM0 / Q1g
R11 1M
Q1 DMN2058U SOT-323 LED1

R2 47R PWM1 / Q2g
R12 1M
Q2 DMN2058U SOT-323 LED2

R3 47R PWM2 / Q3g
R13 1M
Q3 DMN2058U SOT-323 LED3

R4 47R PWM3 / Q4g
R14 1M
Q4 DMN2058U SOT-323 LED4

R5 47R PWM4 / Q5g
R15 1M
Q5 DMN2058U SOT-323 LED5

R6 47R PWM5 / Q6g
R16 1M
Q6 DMN2058U SOT-323 LED6

R7 47R PWM6 / Q7g
R17 1M
Q7 DMN2058U SOT-323 LED7

R8 47R PWM7 / Q8g
R18 1M
Q8 DMN2058U SOT-323 LED8

R9 47R PWM8 / Q9g
R19 1M
Q9 DMN2058U SOT-323 LED9

R10 47R PWM9 / Q10g
R20 1M
Q10 DMN2058U SOT-323 LED10

Sense
R24 2k7
C3 1u $tc = 1.9ms$
R23 0R050 2512 2.0 W
senseR

J3
1 senseR
2 LED+12
3 LED11−
4 LED1−
5 LED2−
6 LED3−
7 LED4−
8 LED5−
9 LED6−
10 LED7−
11 LED8−
12 LED9−
LED10−
+12V
TH 2.54mm 12way header

+3V3
R30 1k2
J4 PS1740P02E PiezoElectric buzzer 3 V, 4 kHz, 17mm dia
AWD
TH 2.54mm 2way header

AWDsig R22 47R Q11g
R21 1M
Q11 DMN2058U SOT-323

Q1–11 DMN2058U
Id max 3.3A Vdss 20V
VgsTh 1.0V
RdsOn 45mΩ @Vgs 4.5V

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10 x 12V LED strings.
Each LED string must have a series resistor(s) to suit its arrangement.
The sum of all currents is 2.6 A max.
Note: LED11 is un-controlled and always On.

There are 2 over current protections...
– MCU detects over current on sense resistor and reduces PWM demand.
But if MCU code fails, then need a backstop...
– 2.6 A poly fuse. Is slow but it gets there.

Future options? J5
+5V 1 ENCSW
3 ENCPHA
ENCPHB
4
5
6 I2CSCL
7 I2CSDA
TH 2.54 7way header

+12V
R29 10k R28 1k2 R27 1k2 R26 1k2 R25 1k2
blue LEDred LEDyel LEDgrn LEDora
D9 red / D8 yel / D7 grn / D6 ora / D5
Blue Red Yellow Green Orange

Blue LED is main 12V power indicator via PolyFuse.
Red LED is Error/Alarm indicator from MCU.
Green LED is SLiM indicator from MCU.
Yellow LED is Online (FLiM) indicator from MCU.
Orange LED is Day time indicator from MCU.

CANlights 10x LED string controller, connected to CBUS

© Dave Harris (MERG M2740) 2021
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All components are SMD 0805, unless shown otherwise.

CANlights module schematic
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v1.1