CAN CONTROLLER + TRANSCEIVER

ICSP Header

Use with something like a PICkit4.

J101
1 — PIC1_MCLR   +5V
2
3
4 — PIC1_PGD
5 — PIC1_PGC   GND

5V POWER

External Power

This is minimal input voltage protection (reverse polarity). When breadboarding, it's easy to make mistakes, so ideally, you'd use more protection — clamp diodes to ground, p-channel mosfet reverse-polarity protection, a fuse, etc.

VPP
SW101
SW_SPDT

D101 D_Schottky

U101 L7805
IN OUT
GND

C103 0.1uF
C104 10uF
R101 4.7k
D102 LED
GND

51 ohm resistor in series /w MCLR important! Seen videos where PICKit 4 bricks uCs because of voltage spikes on MCLR.

R102 10K
R103 51
PIC1_MCLR

L101 100nH   +5VA
C107 1uF
C108 10nF
GND

C111 1uF
C112 10nF
GND

Y102 10MHz
PIC1_OSC1   PIC2_OSC2
C113 20pF   C114 20pF
GND

U104 PIC18F4620-IP

Pin			Pin	
1	VPP/RE3/MCLR		40	RB7/KBI3/PGD — PIC1_PGD
2	RA0/AN0 — ENG_SPD_POT		39	RB6/KBI2/PGC — PIC1_PGC
3	RA1/AN1		38	RB5/KBI1/PGM
4	RA2/AN2/VREF-/CVREF		37	RB4/KBI0/AN11
5	RA3/AN3/VREF+		36	RB3/AN9/CCP2
6	RA4/T0CKI/C1OUT		35	RB2/INT2/AN8
7	RA5/AN4/HLVDIN/C2OUT/SS		34	RB1/INT1/AN10
8	RE0/AN5/RD — SW1		33	RB0/INT0/FLT0/AN12 — CAN1_INT
9	RE1/AN6/WR — SW2		32	VDD
10	RE2/AN7/CS		31	VSS
11	VDD		30	RD7/PSP7/P1D
12	VSS		29	RD6/PSP6/P1C
13	OSC1/CLKI/RA7 — PIC1_OSC1		28	RD5/PSP5/P1B
14	OSC2/CLKO/RA6 — PIC2_OSC2		27	RD4/PSP4
15	RC0/T1OSO/T13CKI		26	RC7/RX/DT
16	RC1/T1OSI/CCP2		25	RC6/TX/CK
17	RC2/CCP1/P1A		24	RC5/SDO — PIC1_MOSI
18	RC3/SCK/SCL — PIC1_SCK		23	RC4/SDI/SDA — PIC1_MISO
19	RD0/PSP0		22	RD3/PSP3
20	RD1/PSP1		21	RD2/PSP2 — PIC1_SS

R104 10k   GND
C109 10nF   C110 1uF   GND
R106 4.7k   **Debug LED**   D103 LED   GND

Push buttons whose state is read in by RE0 and RE1 and then sent over SPI.

SW103 SW_Push   +5V
SW1
R107 10k   GND

SW104 SW_Push   +5V
SW2
R108 10k   GND

RV? 10k — ENG_SPD_POT   +5V
GND

NODE 1
Read button states.
Send state over CAN.
Receive command for Debug LED.

CAN Controller + Transceiver

0.1uF C101   GND
0.1uF C102   GND

U103 MCP2515-xSO
14 SI — PIC1_MOSI
15 SO — PIC1_MISO
16 CS — PIC1_SS
13 SCK — PIC1_SCK
18 VDD   +5V
1 TXCAN
2 RXCAN
12 INT — CAN1_INT
11 RX0BF
10 RX1BF
4 TX0RTS
5 TX1RTS
6 TX2RTS
17 RESET
7 OSC2 — CAN1_OSC2
8 OSC1 — CAN1_OSC1
3 CLKOUT/SOF
9 VSS   GND

Y101 40MHz
CAN1_OSC1 — CAN1_OSC2
C105 20pF   C106 20pF
GND

U102 MCP2562-E-P
1 TXD
4 RXD
5 Vio
8 STBY
3 VDD
7 CANH — CANH
6 CANL — CANL
2 VSS
+5V   GND

R? 120

Vio is for what voltage level the logic circuitry is at, which is 5V here.

STBY is for putting the transceiver in standby mode or normal mode. 0V for normal.

R105 10k
SW102 — CAN1_RST
GND

CAN Bus Format: CAN 2.0B Extended Frame
CAN Bus Baud Rate: 250kbps

Sheet: CAN Node 2
File: can_node_2sch.sch

Author: Abdullah Almosalami

This CAN Node will send the state of the two button switches and the engine speed pot and update the debug LED state through CAN messages.

Sheet: /
File: can_test.sch

Title: MCP2515 CAN TEST: Node 1

Size: A4   Date: 2021-11-06   **Rev: 1.0**
KiCad E.D.A. kicad (5.1.7)-1   Id: 1/2

CAN CONTROLLER + TRANSCEIVER

51 ohm resistor in series /w MCLR
Important! Seen videos where PICKit 4
bricks uCs because of voltage spikes
on MCLR.

R201 10K
R202 51
PIC2_MCLR

U203 PIC18F4620-IP

Pin	Name		Name	Pin
1	VPP/RE3/MCLR	RB7/KBI3/PGD	40	PIC2_PGD
2	RA0/AN0	RB6/KBI2/PGC	39	PIC2_PGC
3	RA1/AN1	RB5/KBI1/PGM	38	R203 10k
4	RA2/AN2/VREF-/CVREF	RB4/KBI0/AN11	37	
5	RA3/AN3/VREF+	RB3/AN9/CCP2	36	
6	RA4/T0CKI/C1OUT	RB2/INT2/AN8	35	
7	RA5/AN4/HLVDIN/C2OUT/SS	RB1/INT1/AN10	34	
8	RE0/AN5/RD	RB0/INT0/FLT0/AN12	33	CAN2_INT
9	RE1/AN6/WR	VDD	32	
10	RE2/AN7/CS	VSS	31	
11	VDD	RD7/PSP7/P1D	30	DB7
12	VSS	RD6/PSP6/P1C	29	DB6
13	OSC1/CLKI/RA7	RD5/PSP5/P1B	28	DB5
14	OSC2/CLKO/RA6	RD4/PSP4	27	DB4
15	RC0/T1OSO/T13CKI	RC7/RX/DT	26	
16	RC1/T1OSI/CCP2	RC6/TX/CK	25	
17	RC2/CCP1/P1A	RC5/SDO	24	PIC2_MISO
18	RC3/SCK/SCL	RC4/SDI/SDA	23	PIC2_MOSI
19	RD0/PSP0	RD3/PSP3	22	
20	RD1/PSP1	RD2/PSP2	21	PIC2_SS

PIC2_OSC1, PIC2_OSC2
RS, RW, E
PIC2_SCK
PIC2_DEBUG_LED

C205 1uF
C206 10nF
C203 10nF
C204 1uF

Y202 10MHz
PIC2_OSC1 PIC2_OSC2
C209 20pF C210 20pF

R205 4.7k
PIC2_DEBUG_LED
D201 LED
Debug LED

DS201
+5VL
E
R/W
RS
VDD
DB0 DB1 DB2 DB3 DB4 DB5 DB6 DB7
Vo
LEDA LEDK
VSS
GND
HY1602E
10K RV201

High! In good line to pulldown/
pullsup unused data lines.

HD44780 Driven LCD Display
4-bit Mode Used

ICSP Header
+5VL
PIC2_MCLR 1
2
3 J201
PIC2_PGD 4
PIC2_PGC 5
GND
GND

U202 MCP2515-xSO
18 VDD
14 SI   TXCAN 1
15 SO   RXCAN 2
16 CS
13 SCK
1 OSC2
8 OSC1
3 CLKOUT/SOF
INT 12 CAN2_INT
RXOBF 11
RX1BF 10
TXORTS 4
TX1RTS 5
TX2RTS 6
RESET 17
9 VSS

PIC2_MOSI
PIC2_MISO
PIC2_SS
PIC2_SCK
CAN2_OSC2
CAN2_OSC1

Y201 40MHz
CAN2_OSC1 CAN2_OSC2
C207 20pF C208 20pF
GND

0.1uF C201
GND
+5VL

U201 MCP2562-E-P
1 TXD   VDD 3
4 RXD
5 Vio   CANH 7
8 STBY   CANL 6
2 VSS
R? 120
CANH
CANL

0.1uF C202
GND
+5VL

Vio is for what voltage level the logic
circuitry is at, which is 5V here.

STBY is for putting the transceiver in
standby mode or normal mode. 0V for normal.

R204 10k
SW201 CAN1_RST
GND

CAN Bus Format: CAN 2.0B Extended Frame
CAN Bus Baud Rate: 250kbps

5V POWER

External Power
VD
SW202
SW_SPDT
D202 D_Schottky
C211 0.1uF
U204 L7805
1 IN   OUT 3
2 GND
C212 10uF
R206 4.7k
D203 LED
GND

NODE 2
Update LCD with Node 1 button states.
Send debug LED command.

Author: Abdullah Almosalami

This node will update a display with the state of Node 1's buttons as well as the engine
speed signal and also send commands for Node 1's Debug LED state.