

## Throttled CAB controller functions

<u>SDB</u>	<u>Connection</u>	<u>SDB function</u>	<u>PIC IO</u>	<u>I/O</u>	<u>Throttled CAB controller function</u>
POT1	pin1	+5		Supply rails	5
POT1	pin2	POT1	RA0 / AN0	ADC 1	POWER
POT1	pin3	0v		Supply rails	0v

<u>SDB</u>	<u>Connection</u>	<u>SDB function</u>	<u>PIC IO</u>	<u>I/O</u>	<u>Throttled CAB controller function</u>
J6	Pin 1	Vpp	RA5	1	Enter
J6	Pin 2	+5		Supply rails	5
J6	Pin 3	0v		Supply rails	0v
J6	Pin 4	LED 'D10'/PGD	RB7 / AN6	ADC 1	#1 / PC / #2
J6	Pin 5	PGC	RB6	0	LED

<u>SDB</u>	<u>Connection</u>	<u>SDB function</u>	<u>PIC IO</u>	<u>I/O</u>	<u>Throttled CAB controller function</u>
J7	Pin 1	Tx		not used	
J7	Pin 2	Rx		not used	
J7	Pin 3	Enable_B	RA4 / AN4	ADC 1	Train Type / STOP
J7	Pin 4	P2B		not used	
J7	Pin 5	P2A		not used	
J7	Pin 6	LED 'D10'/PGD		not used	
J7	Pin 7	acD1 sense	RA2 / AN2	ADC 1	Inertia
J7	Pin 8	acD2 sense	RA1 / AN1	ADC 1	Brake
J7	Pin 9	+5		Supply rails	5
J7	Pin 10	0v		Supply rails	0v

**Hardware input/outputs**

Schematic IO

PCB IO

**PortA**

RA0 = POT1  
 RA1 = acD2 sense  
 RA2 = acD1 sense  
 RA3 = Enable\_A (L298)  
 RA4 = Enable\_B (L298)  
 RA5 = Vpp  
 RA6 = P2B  
 RA7 = P2A

**SDB function**

1 ' Analogue In VR1  
 1 ' Sense AC into BR1 D2 / Exp Port.6  
 1 ' Sense AC into BR1 D1 / Exp Port.7  
 0 ' Enable H-Bridge A outputs  
 1 ' Enable H-Bridge B outputs / Exp Port.2  
 1 ' Vpp (12v)  
 0 ' PWM / H-Bridge 2B = output "B" / Exp Port.3  
 0 ' PWM / H-Bridge 2A = output "A" / Exp Port.4  
 TRISA = 0011 0111 = \$37

**PortB**

RB0 = P1A  
 RB1 = Rx  
 RB2 = Tx  
 RB3 = POT2 / Sense\_A  
 RB4 = POT3 / Sense\_B  
 RB5 = P1B  
 RB6 = Green LED / PGC  
 RB7 = Red LED / PGD

**SDB function**

0 ' PWM / H-Bridge 1A = output "C"  
 1 ' RB1 / Serial Comms Receive / Exp Port.1  
 0 ' RB2 / Serial Comms Transmit / Exp Port.0  
 1 ' Analogue In VR2 / Bridge A Current Sense  
 1 ' Analogue In VR3 / Bridge B Current Sense  
 0 ' PWM / H-Bridge 1B = output "D"  
 0 ' Green LED / icsp CLOCK  
 1 ' Red LED / icsp DATA / Exp Port.5  
 TRISB = 1001 1010 = \$9A  
 TRISx Digital IO direction :- 0=Output / 1=Input

**Software input/outputs**

App' IO

SDB IO

**Throttled CAB controller function**

POWER  
 Brake  
 Inertia  
 Enable BOTH H-Bridges  
 Train Type / STOP  
 Enter  
 H-Bridge 2B – train #2 "D"  
 H-Bridge 2A – train #2 "C"

**Throttled CAB controller function**

H-Bridge 1A – train #1 "A"  
 Rx = RS232 / USB  
 Tx = RS232 / USB  
 Current SENSE train #1  
 Current SENSE train #2  
 H-Bridge 1B – train #1 "B"  
 LED  
 #1 / PC / #2

**Train Type & STOP resistor value Calc's**

<u>Res' id</u>	<u>Resister</u>	<u>voltage</u>	<u>delta</u>	<u>8bit 10</u>	<u>8bit 2</u>	<u>Resister Variations!</u>		
R5	10000	pull down	(to 1 below)	base10	base2			
R6	1000	4.57	0.38	233.1	11101001	1100	1000	1000
R7	2200	4.20	0.51	214.0	11010101	2700	2700	2200
R8	4700	3.68	0.41	187.8	10111011	4700	4700	4700
R9	8200	3.27	0.41	166.6	10100110	7500	8200	8200
R10	15000	2.86	0.46	145.7	10010001	15000	18000	15000
R11	39000	2.40	0.40	122.4	1111010	33000	47000	39000
R12 (o/c)	15000	2.00		102.0	1100110	15000	15000	15000
STOP	0	0		0.0	0			