

Block Post Simulator

Wiring Information

Several power supplies are required to operate the simulator. They should be regulated. I bought mine from Maplin.

PIC 5 Volt power supply: I use a 7805 Voltage regulator chip, powered from a regulated 12 V supply. It would also be possible to use a 5 V regulated supply and by-pass the regulator. Indeed this may be preferable – just as long as you don't connect a 12 V supply by mistake!

Block Shelf Supplies: It is essential that the PIC circuits above are isolated from the block shelf circuits. The PCB design allows for this, and so you should use two more supplies to provide, say, +12 V and -12 V to the block shelf. The circuit boards were designed with +12 V and -12 V in mind, although you should be aware that some types of block instruments – those with several resistances in the block line – may need a higher voltage.

Track Circuit Indicator Supplies: You may wish to use another, regulated, supply for these.

Block Bell Wiring – Important!

The bell connections in my simulator differ from a conventional block bell. There was a good reason for this, which concerned the earlier designs of the simulator circuit. Although the constraints caused by the earlier circuits no longer apply, the wiring arrangement was kept to maintain consistency with the block shelves I had put together at home.

contact	my simulator	conventional bell
tapper	0 V	line
normally closed, to solenoid, and then to:	ring bell line (power applied to ring bell line to ring the bell)	ground
normally open (i.e. only connected to tapper when tapper pressed)	tapper detection line (this line grounded when tapper is pressed)	to battery

If you want to use my simulator with a conventionally wired block bell, you will need an interface relay (a simple change-over relay will do).

PIC Pin Assignments

Timetable Chip

+5V	1 MCLR	notch	28 RB7-output	DOWN trigger
	2 RA0-output		27 RB6-output	short to ground
	3 RA1-output		26 RB5-input	DOWN ack
	4 RA2-output		25 RB4-output	UP trigger
short RA3 and RA4	5 RA3-output		24 RB3-output	short to ground
	6 RA4-input		23 RB2-input	UP ack
	7 RA5		22 RB1-output	
GND	8 VSS		21 RB0-output	
	9 OSC1		20 VDD	+5V
N/C	10 OSC2		19 VSS	GND
button 1 advance 1 hour	11 RC0-input		18 RC7-output	
button 2 advance 5 min	12 RC1-input		17 RC6-output	
button 3 reset	13 RC2-input		16 RC5-output	green LED
button 4 start	14 RC3-input		15 RC4-output	

Timetable Chip – Button Functions

	button 1	button 2	button 3	button 4
setup mode	advance 1 hour	advance 5 mins	reset time	switch to run mode
run mode				jump to next train

PIC Pin Assignments

Block Post Chip

+5V	1 MCLR	notch	28 RB7-special	busy
UP/DOWN trigger	2 RA0-input		27 RB6-input	LC detect
UP/DOWN ack	3 RA1-output		26 RB5-input	inbound tapper
T-ON-data	4 RA2-output		25 RB4-output	ring outbound bell
T-ON ack	5 RA3-input		24 RB3-output	line clear release
short RA2 and RA4	6 RA4-input		23 RB2-output	send block TOL
	7 RA5		22 RB1-output	send block LC
GND	8 VSS		21 RB0-output	ring inbound bell
	9 OSC1		20 VDD	+5V
N/C	10 OSC2		19 VSS	GND
T-ON-clock	11 RC0-output		18 RC7-input	spare
T-OFF-clock	12 RC1-input		17 RC6-input	spare
T-OFF-data	13 RC2-input		16 RC5-input	spare
T-OFF-ack	14 RC3-output		15 RC4-input	spare

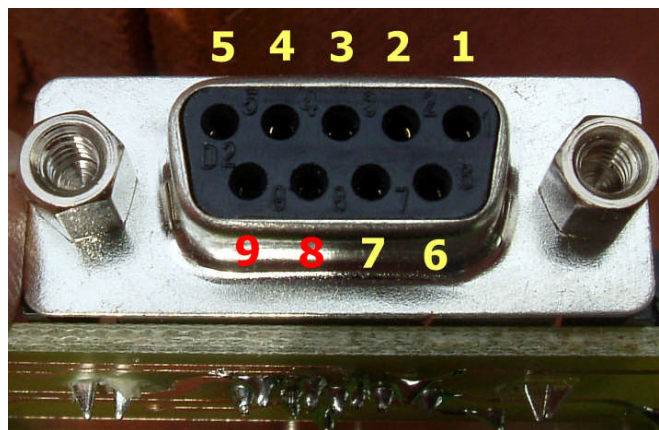
T-ON/OFF refer to train going on/off TC chip. **CANNOT HAVE RA4 AS OUTPUT**

2 x 5 IDC plugs Block Post Chip to Block Shelf Interface

tapper	pegging block	line clear release	line clear release	0 V
ring		non-pegging block	-ve	+ve
		NOTCH		

The two 'line clear release' pins are connected when the advance section block is at line clear.

Block Post D-connector pin assignments



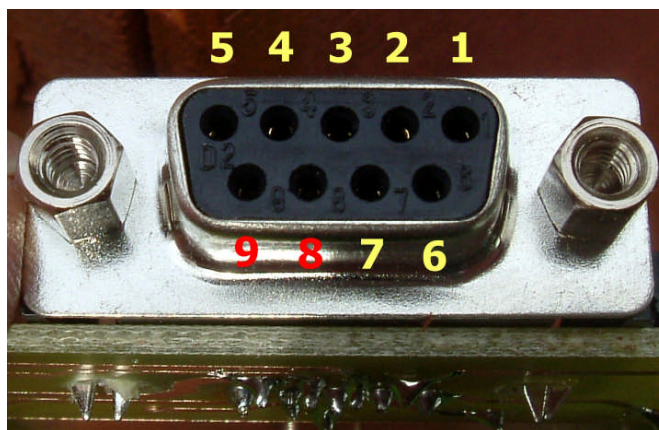
1	0 V	
2	bell tapper	input to PCB line grounded when bell tapper pressed
3	pegging block	input to PCB
4		
5	+ ve	
6	non-pegging block	output from PCB
7	ring bell	output from PCB
8	- ve	
9		

PIC Pin Assignments

Simple Track Circuit Chip

+5V	1 MCLR	notch	28 RB7-output	TC 6
signal 1	2 RA0-input		27 RB6-output	TC 1
signal 2	3 RA1-input		26 RB5-output	TC 2
signal 3	4 RA2-input		25 RB4-output	TC 3
signal 4	5 RA3-input		24 RB3-output	TC 4
signal 5?	6 RA4-input		23 RB2-output	TC 5
signal 6?	7 RA5-input		22 RB1-output	TC 7
GND	8 VSS		21 RB0-output	TC8?
	9 OSC1		20 VDD	+5V
N/C	10 OSC2		19 VSS	GND
	11 RC0-output		18 RC7-input	T-OFF-ack
TC 9	12 RC1-output		17 RC6-input	T-ON-clock
T-ON-ack	13 RC2-output		16 RC5-output	T-OFF-clock
T-ON-data	14 RC3-input		15 RC4-output	T-OFF-data

Track Circuit Module : D connector (track circuit indicator) outputs

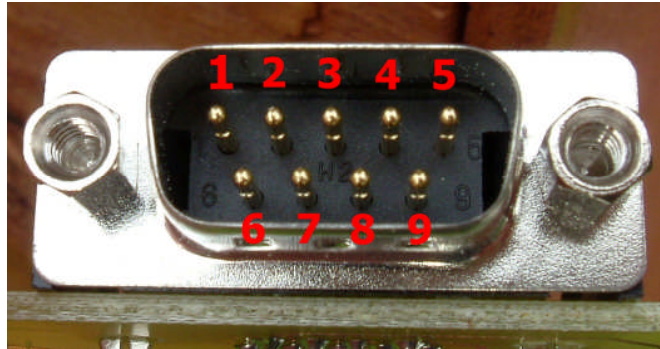


At present there are only 3 track circuits – I intend to add more in due course.

pin 1	TC 1
pin 2	TC 2
pin 3	TC 3
pin 9	lamp common

The track circuit indicator circuits were designed to be separate from the PIC digital circuitry. If you want to use LEDs for track circuit indicators, then you may connect the two circuits and thereby save an additional power supply (but note that LEDs, especially if you have a lot of them, can still draw a significant amount of current!).

Track Circuit Module : D connector (signal) inputs



At present there is only one signal! – I intend to add more in due course.

pin 1	signal 1
pin 9	ground

The signal input lines are normally pulled up to the 5V rail via 10 k Ω (or similar) resistors; they can be taken low by connecting them to pin 9.

0 Volts = Line LOW = signal ON

5 Volts = Line HIGH = signal OFF

NB signal 'ground' refers to the 5V digital circuits, and is not necessarily the same as the lamp circuits.