

## SIMPLE AUTOMATIC SHUTTLE SAS1



### Shuttle Train Controller with Flexible Options

- Automatically operates a train backwards and forwards along a single line
- Waiting time at either end is adjustable or can be set to random.
- Trains can be set to wait at either or both ends until a button pressed (Dispatch Control) with an led to indicate a train is waiting.
- Optional Route Indication leds can be connected to show train waiting at either end, or in transit up or down the line.
- Optional 2-aspect signals can be connected, and will switch to green three seconds before train departs, and back to red two seconds later.

The BLOCKsignalling Simple Automatic Shuttle is designed to automate a DC model train running backwards and forwards along a single length of track.

At each end of the track, a diode is fixed across an insulated rail gap to stop the train until the track current is reversed and the train can automatically start travelling in the reverse direction.

The module is fully programmable, to select fixed or random waiting time at one or both ends of the line, and to set the maximum waiting time.

There is a option, where the train will not set off until manually dispatched by pressing a push button placed on the control panel (departure control).

## Power Supply

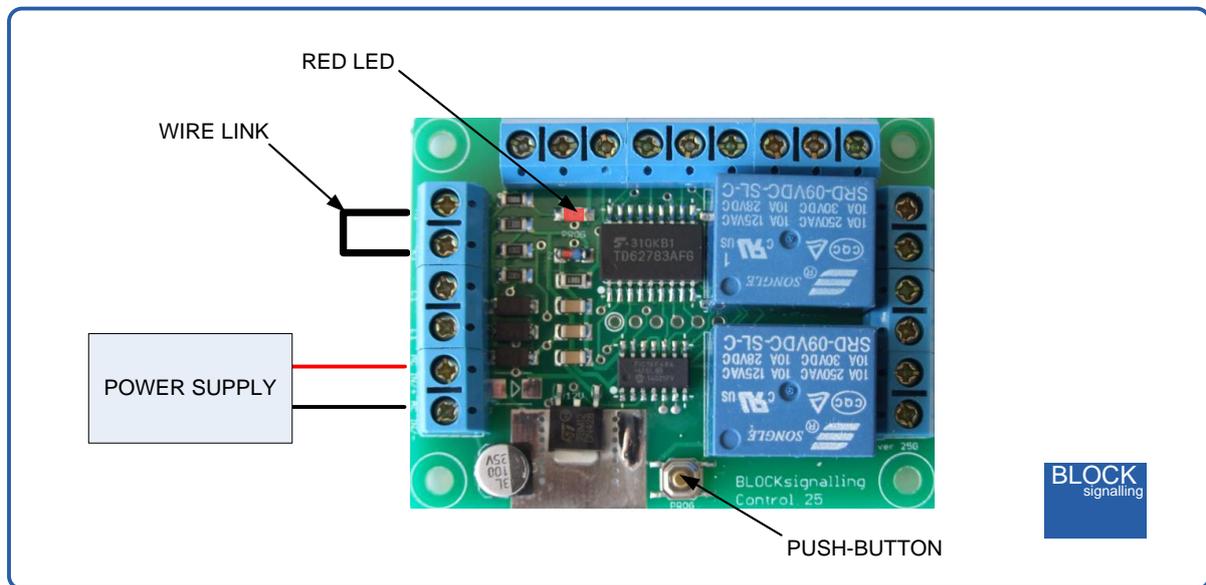
The controller is designed for use with a DC power supply of between 10V and 25V, or an AC power supply of between 10V and 16V.

Where there is a choice, the recommended power supply is 12V DC.

## Programming

Programming for the particular application can be completed before or after finishing the wiring.

This is performed by **holding down the Push Button when switching on the power.**



For each program there are two values to be stored.

The red led on the PCB flashes at 1 second intervals. When the required number of flashes is seen (see later for the list of possible choices) the button is released to store the first value. At this point the led comes on for five seconds to confirm the value is stored.

The led then starts flashing again, and this time the button needs to be pressed to store the second value. Once both values have been entered, the led flashes 10 times rapidly, and the module starts operating. Each value entered can be up to 255 flashes. If more are seen, or the programming is aborted by switching off, then the programming must be repeated.

## Factory Reset

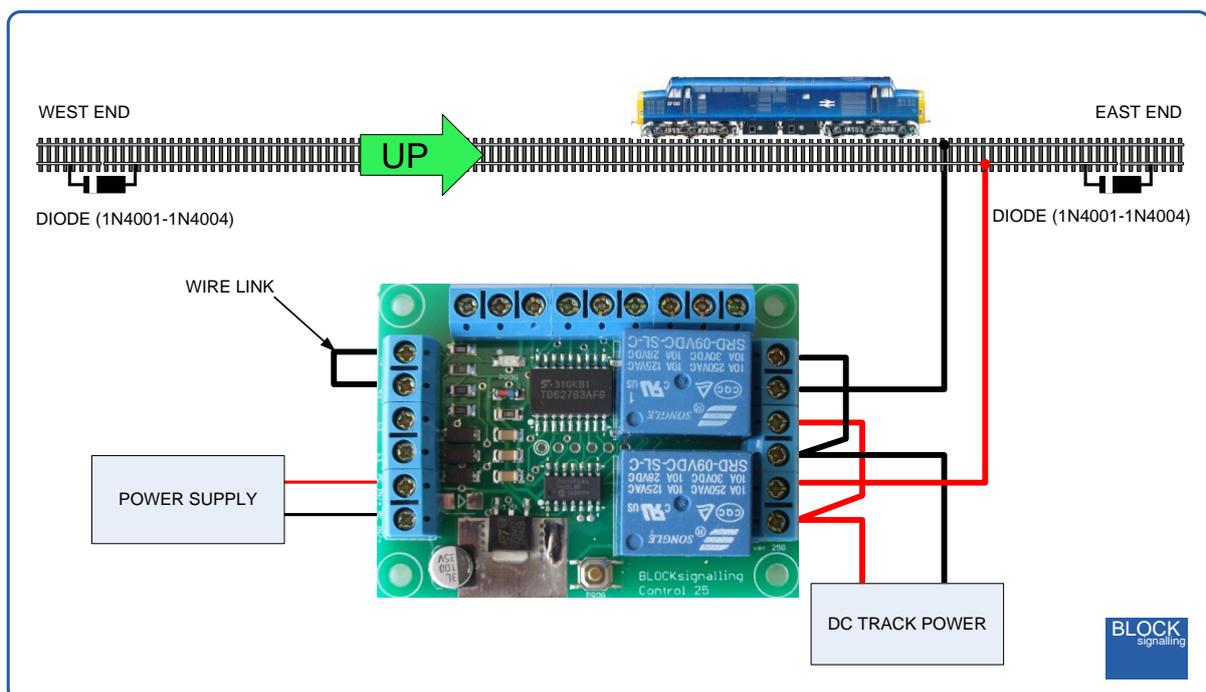
To reset the module back to factory settings, switch off the power to the module and hold down the Push Button. Apply the power and continue holding the push button until 1 flash of the led is seen. At this point, release the button. You will see a long flash of five seconds.

The led will begin flashing again. When you have seen 1 flash press the button. You will see a long flash of five seconds and then 10 rapid flashes. The reset procedure is then complete and the module will restart running program 2. If you make a mistake programming, simply repeat the process.

## Wiring - Basic

The diagram below shows the connections from the DC Track Power (Throttle) wired via the shuttle module. The two relays on the module control the switching of the polarity of the power feed to the track and hence the direction of the running.

Diodes are required at each end to isolate a section of track. This will hold the locomotive until the track polarity is reversed. Suitable general purpose diodes are part number 1N4004.



As supplied, the controller is set program 2 with a fixed waiting time of 5 seconds at the west end, a fixed waiting time of 10 seconds at the east end, and 20 seconds to completely traverse the track section.

When the throttle is opened, the train will depart the west end after 5 seconds. Providing 20 seconds is sufficient to reach the other end of the track, the

train will cross the diode at the east end and the traction current will be blocked from reaching the loco. After 10 seconds of waiting time, the module will reverse the track polarity and the engine will run back towards the west end (the diode will now be able to allow the current to flow). This will repeat continuously.

The time set to traverse the section must exceed the actual time required, otherwise the train will not reach the far end.

If instead of fixed waiting times, random waiting times are preferred, then settings 5 and 7 can be changed. For instance, setting 5 selects the west end waiting time to either fixed, random, or by departure control. Setting 7 changes the waiting time at the east end.

If random waiting time is selected, the minimum waiting time will be approximately 1/4 of the maximum waiting time set. The maximum waiting time that can be programmed is 240 seconds.

To select random timing, switch off the power to the module and hold down the Push Button (either on the PCB or the one connected). Apply the power and continue holding the push button until 5 flashes of the led are seen. At this point, release the button. You will see a long flash of five seconds.

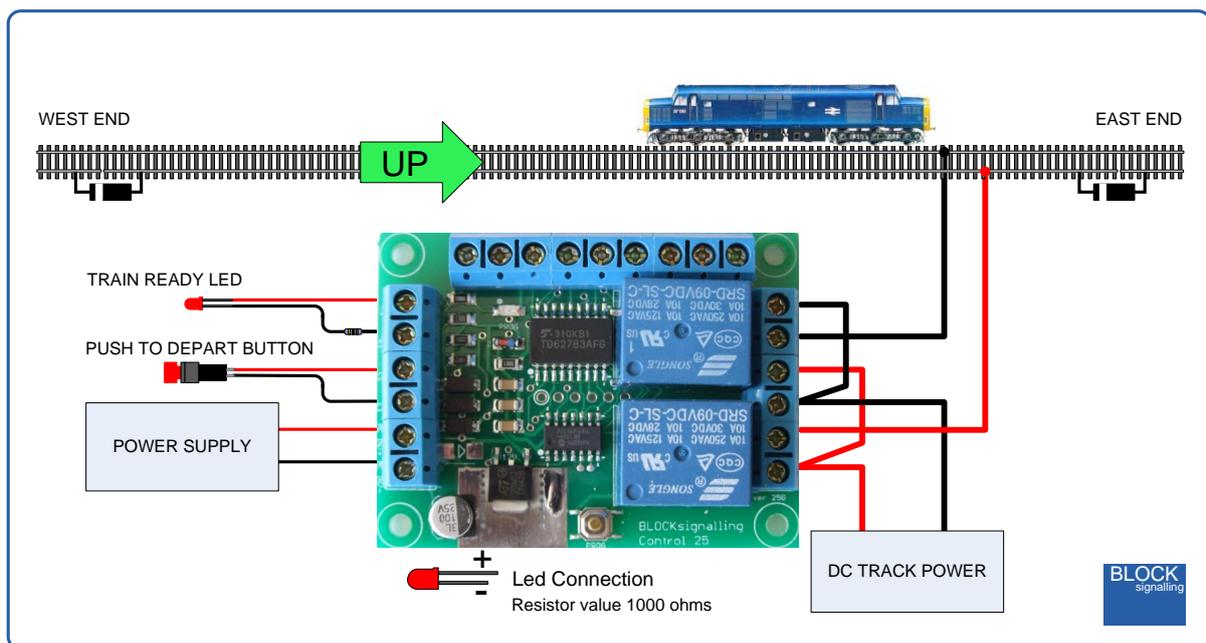
The led will begin flashing again. When you have seen 2 flashes (setting random timing as the selected option), press the button. You will see a long flash of five seconds and then 10 rapid flashes. The programming is then complete and the will start running the program. If you make a mistake programming, simply repeat the process.

## Wiring - Departure Control

An optional push button can be connected to the E1 and C1 terminals. Pressing this button will dispatch a waiting train from the end of the track.

An led connected to A1 and K1 will light when there is a train waiting at the end of the line.

During programming, the train can be set to wait at either or both ends before being despatched by pressing the button.



To select departure control, settings 5 and 7 can be changed. For instance, setting 5 selects the west end waiting time to either fixed, random, or by departure control.

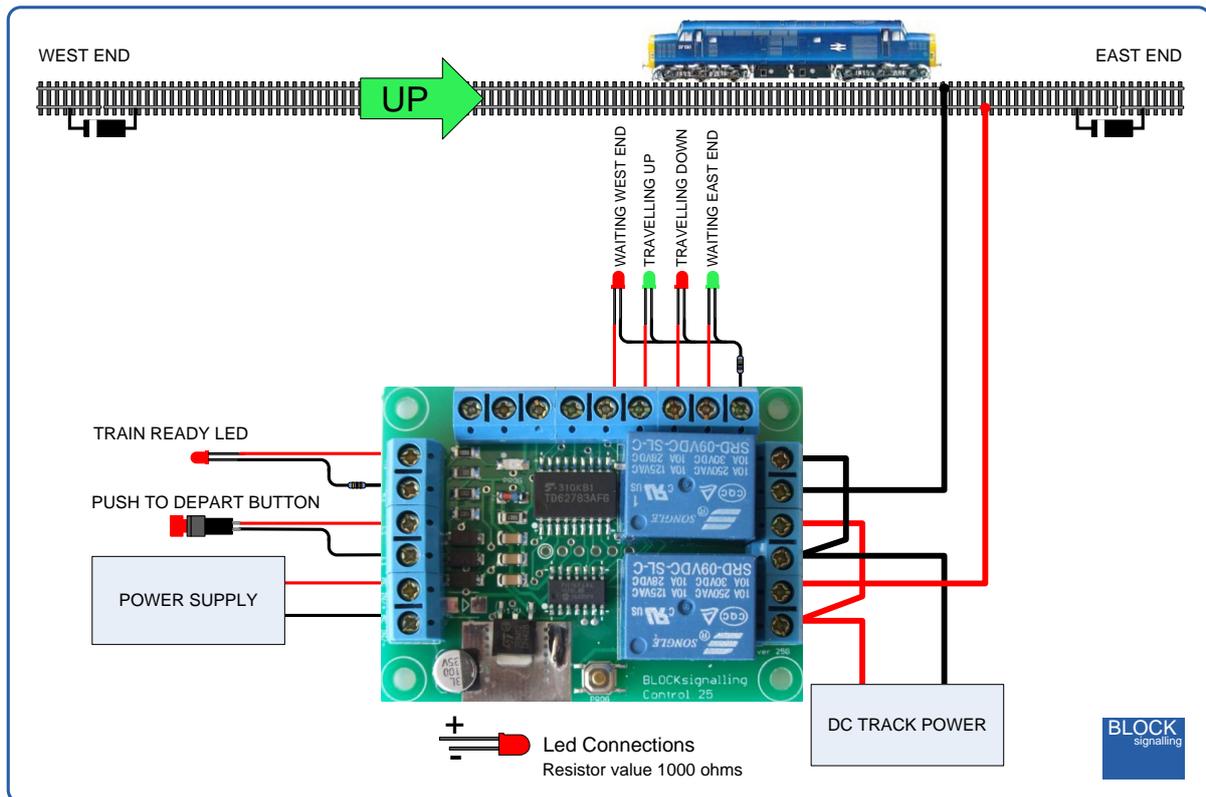
To select departure control, switch off the power to the module and hold down the Push Button (either on the PCB or the one connected). Apply the power and continue holding the push button until 5 flashes of the led are seen (to alter the west end settings). At this point, release the button. You will see a long flash of five seconds.

The led will begin flashing again. When you have seen 3 flashes (setting departure control as the selected option), press the button. You will see a long flash of five seconds and then 10 rapid flashes. The programming is then complete and the will start running the program. If you make a mistake programming, simply repeat the process.

## Wiring - Control Panel Route Leds

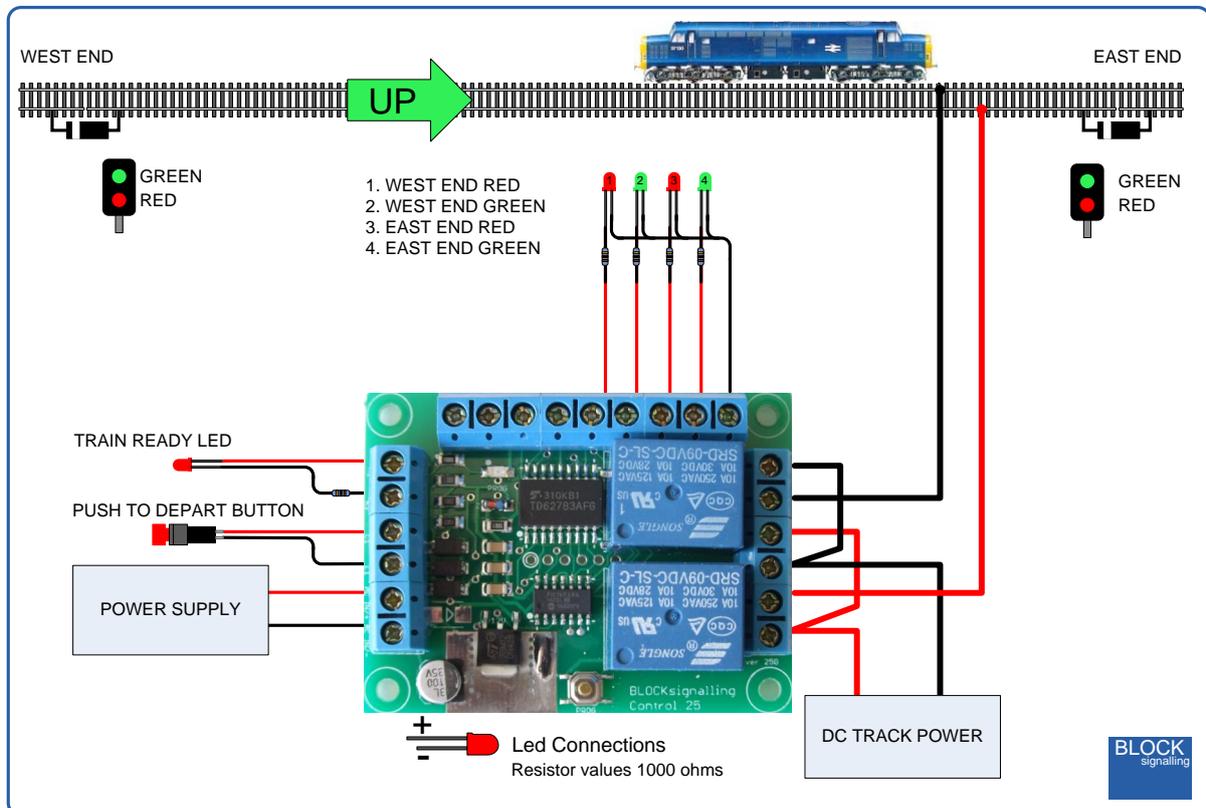
Optional additional leds may be connected to show the operation of the module.

These will be lit when there is a train waiting at the west end of the line, when a train is travelling from the west end of the line to the east, when there is a train waiting at the east end of the line, and when there is a train travelling from east to west.



## Wiring – 2-Aspect Signals

Alternatively two-aspect signals can be connected to these outputs. These will remain at red when a train is stationed at the end of the track and will switch to green 5 seconds before a train departs.



To select control panel leds or route signals, setting 8 can be changed. Setting it to 1 selects route led indications, and setting it to 2 selects the signal mode.

For instance, to select signal mode, switch off the power to the module and hold down the Push Button (either on the PCB or the one connected). Apply the power and continue holding the push button until 8 flashes of the led are seen. At this point, release the button. You will see a long flash of five seconds.

The led will begin flashing again. When you have seen 2 flashes, press the button. You will see a long flash of five seconds and then 10 rapid flashes. The programming is then complete and it will start running the program. If you make a mistake programming, simply repeat the process.

## **Setting the Transit Time and Maximum Times**

Each of the times can be set from 1 second to 240 seconds.

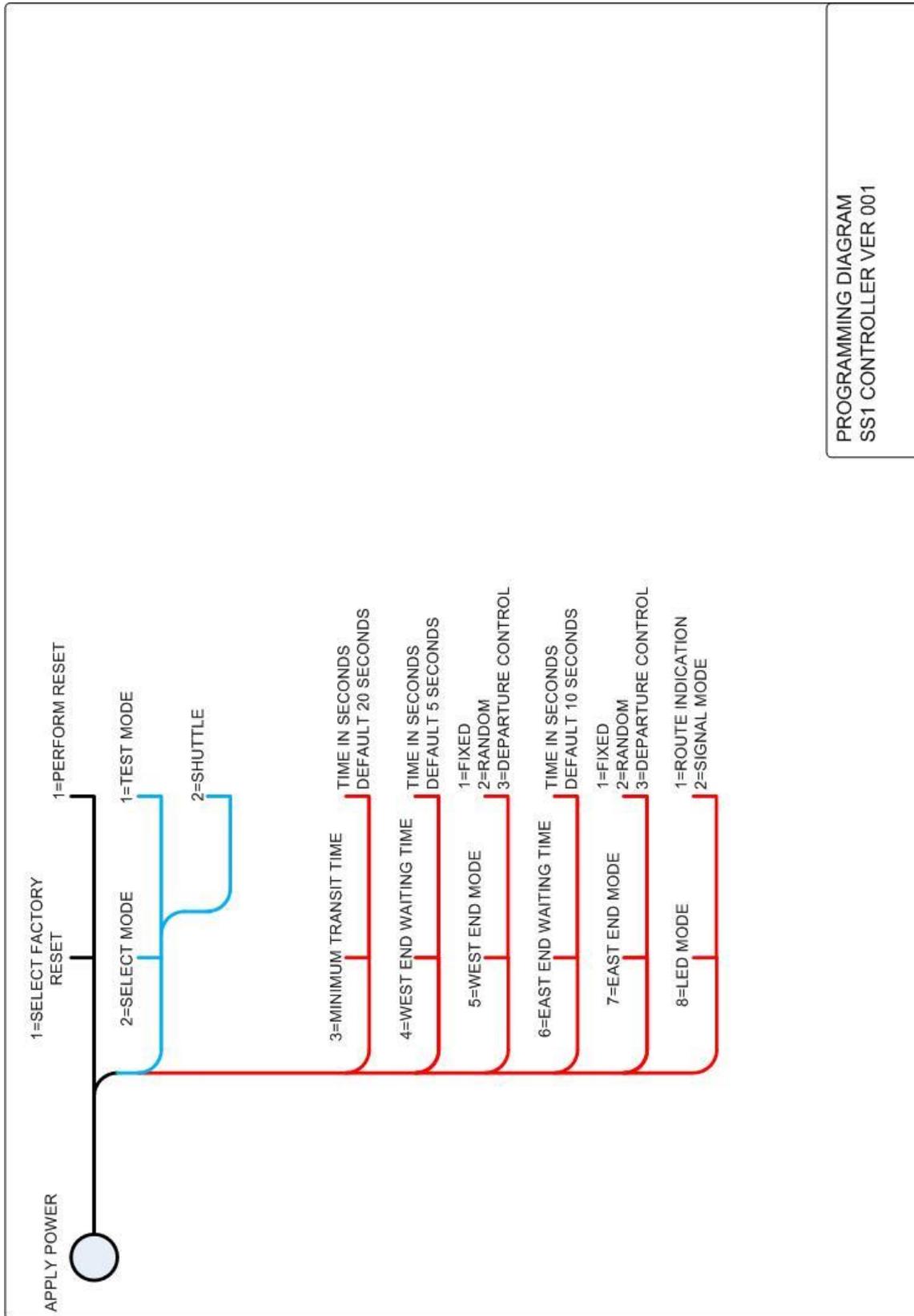
The transit time is set using setting 3, the west end waiting time is set with setting 4 and the east end waiting time is set with setting 6.

For instance, if you want to set the west end maximum waiting time to 20 seconds, switch off the power to the module and hold down the Push Button. Apply the power and continue holding the push button until 4 flashes of the led are seen. At this point, release the button. You will see a long flash of five seconds.

The led will begin flashing again. When you have seen 20 flashes (for 20 seconds waiting time), press the button. You will see a long flash of five seconds and then 10 rapid flashes. The programming is then complete and the will start running the program. If you make a mistake programming, simply repeat the process.

# Program Flow Diagram

The diagram below shows all the programming options.



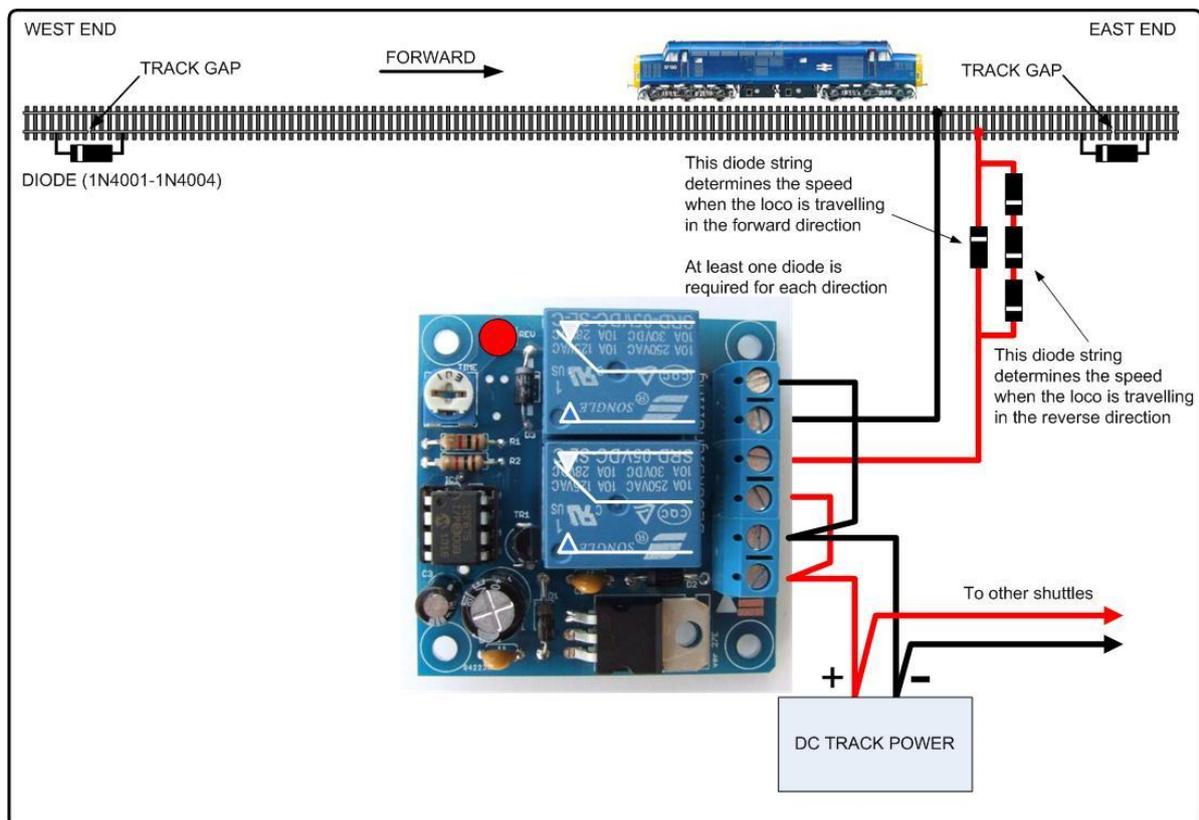
## Other Ideas

You can use one low cost speed controller to run several shuttle units, providing they are within the capacity of the controller.

Trains can be operated at different speeds by inserting one or more diodes in the feed to the track. Each diode has an approximate 0.7V voltage drop.

Use a different number of diodes in each direction to create different speeds in each direction. You need at least one diode for each direction.

We have borrowed the following diagrams from our SS1 controller pages to show how the simple addition of diodes can provide a variety of speed changes along the track.



Creating additional track gaps, with associated diodes, allows differing voltages along a length of track, and so different operating speeds in each section.

Use one diode in each direction to drop the speed in the following section by equal amounts.

Use a different number of diodes in each direction to create different speeds in each direction. You need at least one diode for each direction.

Speed reductions can be removed by shorting across the diodes with a switch.

Different stop points can be created by inserting additional single diodes, and shorting across them when they are not required.

