Station Signals PCB 3.4

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You can now have Signals that work prototypically.

Station Signals 3.4
Simply Rail   www.simplyrail.com.au
Adjust VAR 1 to Change signal timing
LED link to set to common LED pin to Positive 5V or GND

1 Distant Signal
2 Home Signal
3 Starting Signal

5V DC
12v DC

1 Switch for Home Signal
2 Switch for Start Signal
3 Express or stop at station.
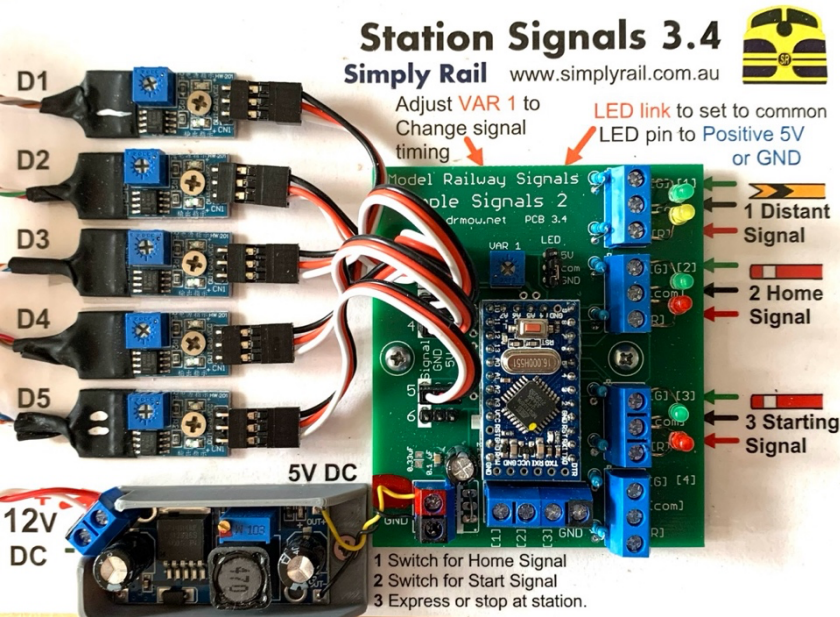
Automate your two position signals.

Your signal respond to the movement of your trains.

Searchlight or Semaphore Signals.
Additional controller required for Semaphore Signals.

Designed for track with a single direction of travel.

Timing is also user selected.

No programming required.

Optical detectors placed below the track monitor your trains movement.
(indicated with the blue arrow in the diagrams).

Station Signal

Starting Signal   Home Signal   Distant Signal

Station

D5   D4   D3   D2   D1
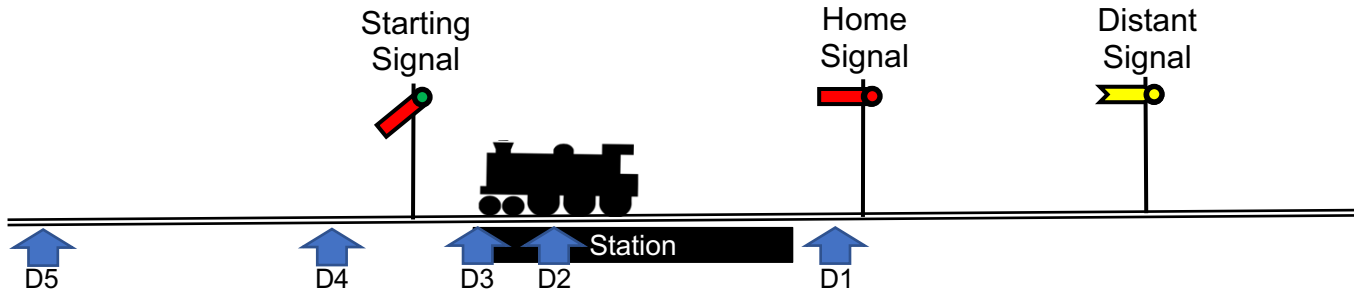
Two Modes of operation

Express Train to run through the station –
    All of the signals will indicate the movement of the train through the station to indicate to coming trains the station is occupied, then clear
        Switch 3 Off (or not connected).
        Switch at Input 2 ON - To manually signal trains to stop until the switch is clear.
            2 OFF – (Default) as above

Train to stop at the station for a set time and then proceed.
    The Start signal will indicate for the train to stop at the station for between 10-120 seconds (set by you using **VAR 1 timpot**).
    All of the signals will indicate the movement of the train through the station to indicate to coming trains the station is occupied, then clear
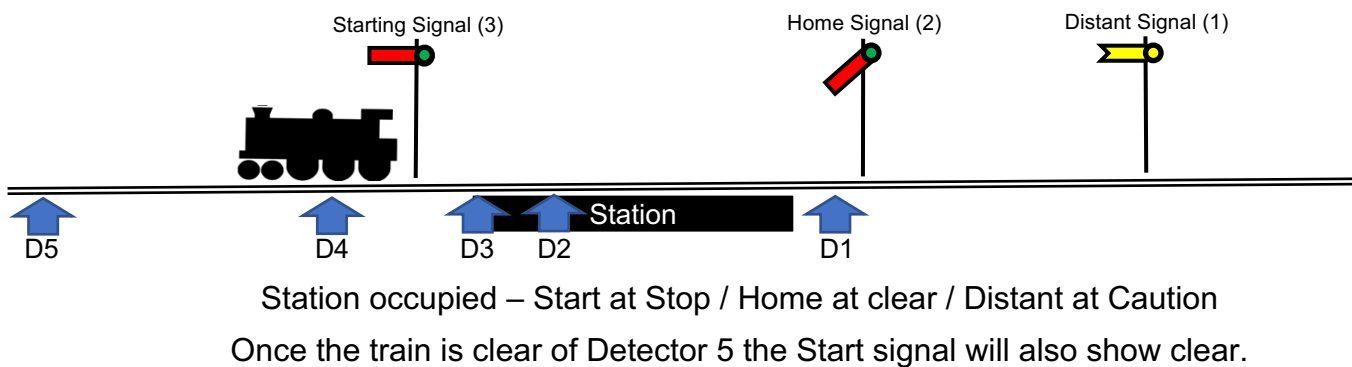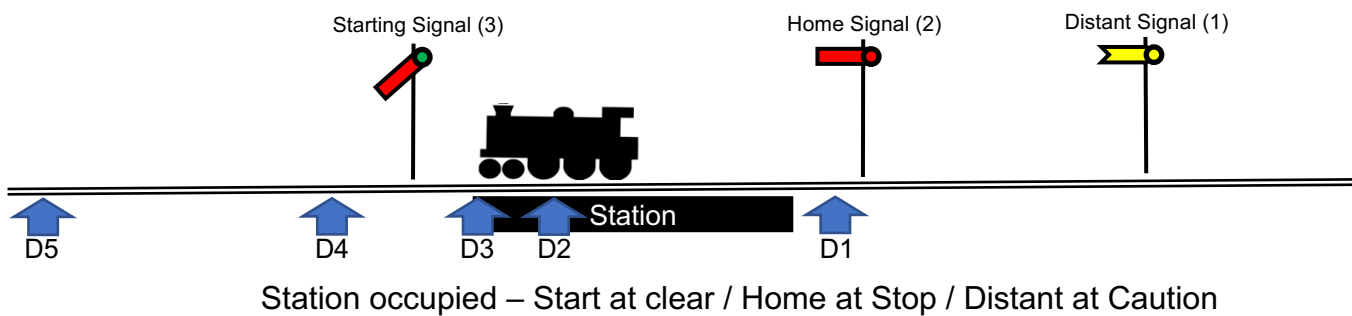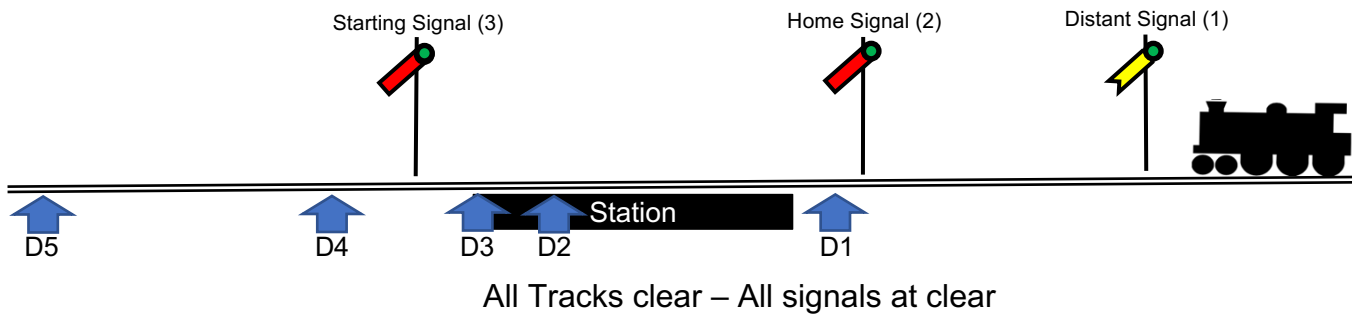   **Switch 3 On** (or link to ground).
        Switch at Input 2 ON - To manually signal trains to run express through the station.
            2 OFF – (Default) as above

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Starting Signal (3)   Home Signal (2)   Distant Signal (1)

D5   D4   D3   D2   Station   D1

All Tracks clear – All signals at clear

Starting Signal (3)   Home Signal (2)   Distant Signal (1)

D5   D4   D3   D2   Station   D1

Station occupied – Start at clear / Home at Stop / Distant at Caution

Starting Signal (3)   Home Signal (2)   Distant Signal (1)

D5   D4   D3   D2   Station   D1

Station occupied – Start at Stop / Home at clear / Distant at Caution

Once the train is clear of Detector 5 the Start signal will also show clear.

Express Train   Switch at Input **3 Off**

The All signal will indicate clear for the train to proceed (if the track is clear).
The Home Signal will display Stop when the train is at the station until it is clear of D4
The Start signal will be at Stop from when the train reaches D4 until the train is past D5.
    The Distant signal will display Caution when either the Start or Home Signals are at Stop.

The Home signal can be held at Stop with an On/Off switch connected to input 1 (Link 1 to Ground).
The Start signal can be held at Stop with an On/Off switch connected to input 2   (Link 2 to Ground).

Train to stop at the station   Switch at Input **3 On**

The Home Signal will indicate clear for the train to proceed into the station.
The Start signal will indicate for the train to stop at the stations for a set time.
The stop time is controlled with VR1 from 10 to 120 seconds.
After the set time the Start signal will indicate clear for the train to proceed (if the track is clear).
The Start signal will be at Stop from when the train reaches D4 until the train is past D5.
    The Distant signal will display Caution when either the Start or Home Signals are at Stop.
    The Home Signal will display Stop when the train is at the station until it is clear of D4

The Home signal can be held at Stop with an On/Off switch connected to input 1 (Link 1 to Ground).
The Start signal can be held at clear with an On/Off switch connected to input 2   (Link 2 to Ground).
This will allow the user to signal for express trains to proceed as required.

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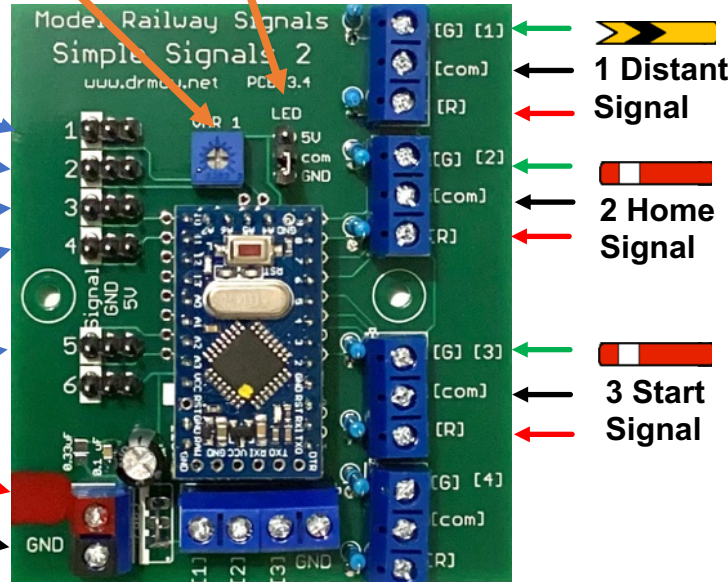## Wiring Diagram

Adjust VAR 1 to change the Start signal timing to between ↶ 10 to 120 seconds

LED link set to COM &GND
If you are using common positive LEDs in the signal change the link to 5V & COM

Detector 1
Detector 2
Detector 3
Detector 4
Detector 5

5 V (DC)
0 V (Ground)

[G] [1] → ◤
[com] ←
[R] ← **1 Distant Signal**

[G] [2] →
[com] ←
[R] ← **2 Home Signal**

[G] [3] →
[com] ←
[R] ← **3 Start Signal**

[G] [4]
[com]
[R]

Toggle Switches 1 to 3 may be connected to in Inputs 1,2 or 3 if required
(centre pin to GND and one to the required input)

LED Resistors - Each of the Green and Red Signal outputs has a 220r resister that at 5v will limit the LED current to 14mA. No further resister is needed for LED signals.

If your RED LED is much brighter than the GREEN add a 100r to 4k7 resister between the RED output and the RED LED wire on the signal.

For **Semaphore Signals**

If using my **Simply Rail Servo drivers** for Semaphore Signals, the Signal Controller the common pin must be set to ground. See above LED Link set Com to **GND**
For Simply Rail **Servo 8** the Signal controller RED signal pin to the input pin {1,2,3 or 4}
     And input power ground pins on both board joined for a common ground.
For Simply Rail **Servo 7** the Signal controller RED signal pin to the input pin {1 or 4}
     And input pins 3 or 6 connected to ground on the Station Signal board.
The Signal Controller and the Simple Servo boards must also have a common GND, gust a wire from one boards GND input to the other boards GND input.

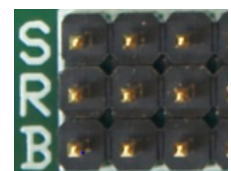If using **Tam Valley** servo drivers connect the
On the Signal Controller the common pin must be set to ground
See above LED Link set Com to **GND**
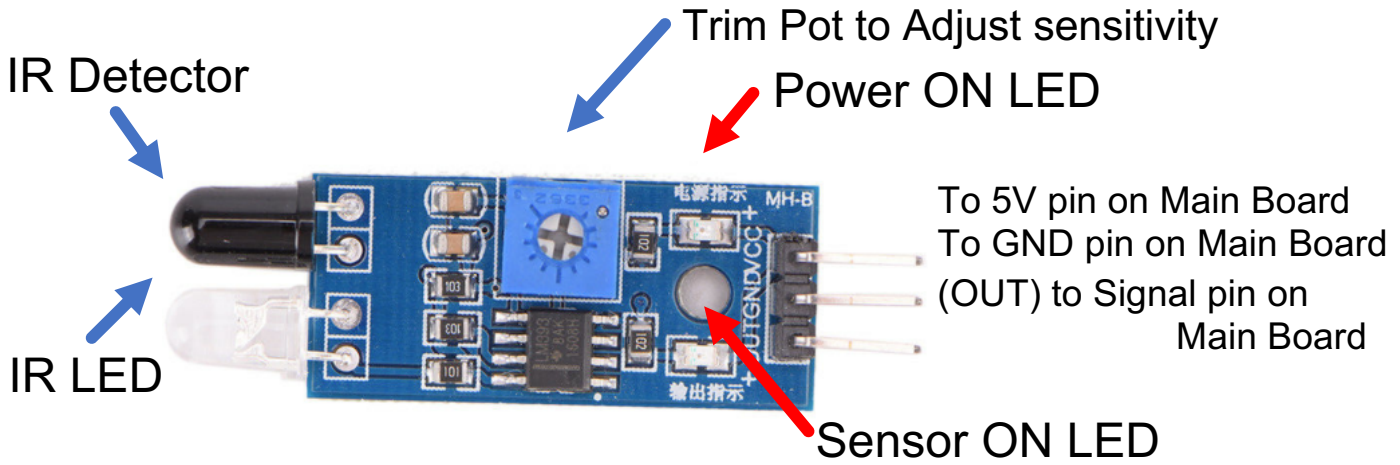The Signal controller RED signal pin to the {S} pin on the Tam Valley
The Signal controller Black [Com] pin to the {B} pin on the Tam Valley

The Tam Valley controller will need to be set for Toggle switch input.

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IR Detectors

Trim Pot to Adjust sensitivity

Power ON LED

IR Detector

IR LED

To 5V pin on Main Board
To GND pin on Main Board
(OUT) to Signal pin on
                Main Board

Sensor ON LED

Detectors are connected to main Board is with 3 pin cables,

(these can be extended with servo extension cables if required).

Take care to match the **OUT** pin of the Detector with the **Signal** pin on the main Board. It has been assembled with the **WHITE** wire for **OUT** to **Signal** pins The small red Power ON LED will be on.

(If the Power ON LED does not come on, check you have the three pin connector cable Pins correct)

Adjust the trim pot so the Sensor ON LED is only on when a train (or your hand) is directly above the sensor.
The Sensor ON LED is off when there is no train above the sensor.

Please note on the IR Detectors supplied with your kit the 5mm IR LED and 5mm IR Detector are on a separate boards to make it easier to place these between the tracks and have the Trimpot where it can be easily adjusted.

Drill two 5mm holes beside each other (in HO this can be between sleepers on the track) for the 5mm IR LED and 5mm IR Detector, place them so the top of the detector and LED are level with the top of your sleepers.