Searchlight Signals For The Model Railway

Searchlight signals are used throughout Victoria and South Australia. In this article we will try to explain how the signals operate and are used. The first part deals with the history and colour combinations used in Victoria and South Australia. Then we will cover building the kits and placing them on the model railway for realistic operation.

When signals came into being everything was mechanically operated and each signal was connected to a unique setting of the track points. For the train driver this meant he could deduce where his train would proceed from which semaphore arm had been cleared. In the signal box point levers (black) and signal levers (red) were connected in an interlocking frame. It was impossible therefore for a train to enter a dangerous situation provided the train driver reacted correctly to the signals.

As railway tracks at junctions became more complicated the mechanical interlocking did too. As electrically operated equipment was invented, the designers set about simplifying the information sent to the driver. The electric searchlight signal had its origins in the USA. The signalling system now told the driver the speed to drive his train over the trackwork ahead. It became possible then to use the searchlight signal to automatically keep trains a safe distance apart so the "blocks" became automatically protected by the signals. This eliminated many signal boxes.

Fig 1 Double target home signal with low speed marker at Keith SA

Each head of the searchlight signal can display red, yellow or green colours. In the metropolitan areas each signal mast has two heads. Where these are one above the other on the mast it is a Home signal. When at danger (both red lights) the train driver cannot proceed without permission from the signaller. Where the heads are on the opposite sides of the mast the signal is an Automatic and can be passed with both reds at extreme low speed after a specified pause. Home signals at junction stations are fitted with a small marker lamp beneath the two heads. This automatic signal replaced the "block post" signal box.

In Victoria the signals can display:-
Green over red - Normal speed.
Yellow over red - Caution normal speed.
Yellow over green - Reduce to medium speed.
Red over green - Clear medium speed.
Red over yellow - Caution medium speed.
Red over red - Stop. If auto signal proceed after pause.
Red over red over yellow - Low speed caution.

If the top head displays a yellow or green light the train proceeds at normal speed. If the lower head displays a yellow or green the driver reduces to a medium speed of 40 kph. If the lowest marker displays a yellow light the train passes at 5 kph.

Where there are junction points then Home signals apply. The top head applies to the straight or main line and the lower head applies to any diverging track. This same principle applies when trailing through points.

Fig 2 Double target signals at Wallan, Vic.

Building Searchlight Signal Kits.

The San Mateo Line signal kits are made with brass etchings and require soldering during assembly. The kits are not difficult to build but the etched parts have to be very fine to look right so care is needed in handling.
Tools required include -
Sharp knife, set of small files,
Drills; 0.8 mm, 1.0 mm, 2.0 mm,
Power tool (Dremel) with cutting wheel,
Vice, small side cutters, pliers,
Small engineer's square.

A small alligator clip is useful for holding the parts threaded on the mast out of the way while soldering the base to the mast.

A small 25 watt soldering iron or variable temperature soldering iron set on 400°C is needed. I use 60/40 0.7 mm resin core solder from electronic stores with liquid flux such as Bakers. The liquid flux applied liberally allows

Article by Mike Saunders & Bill Dick
Diagrams by Mike Saunders
Photos by Bill Dick

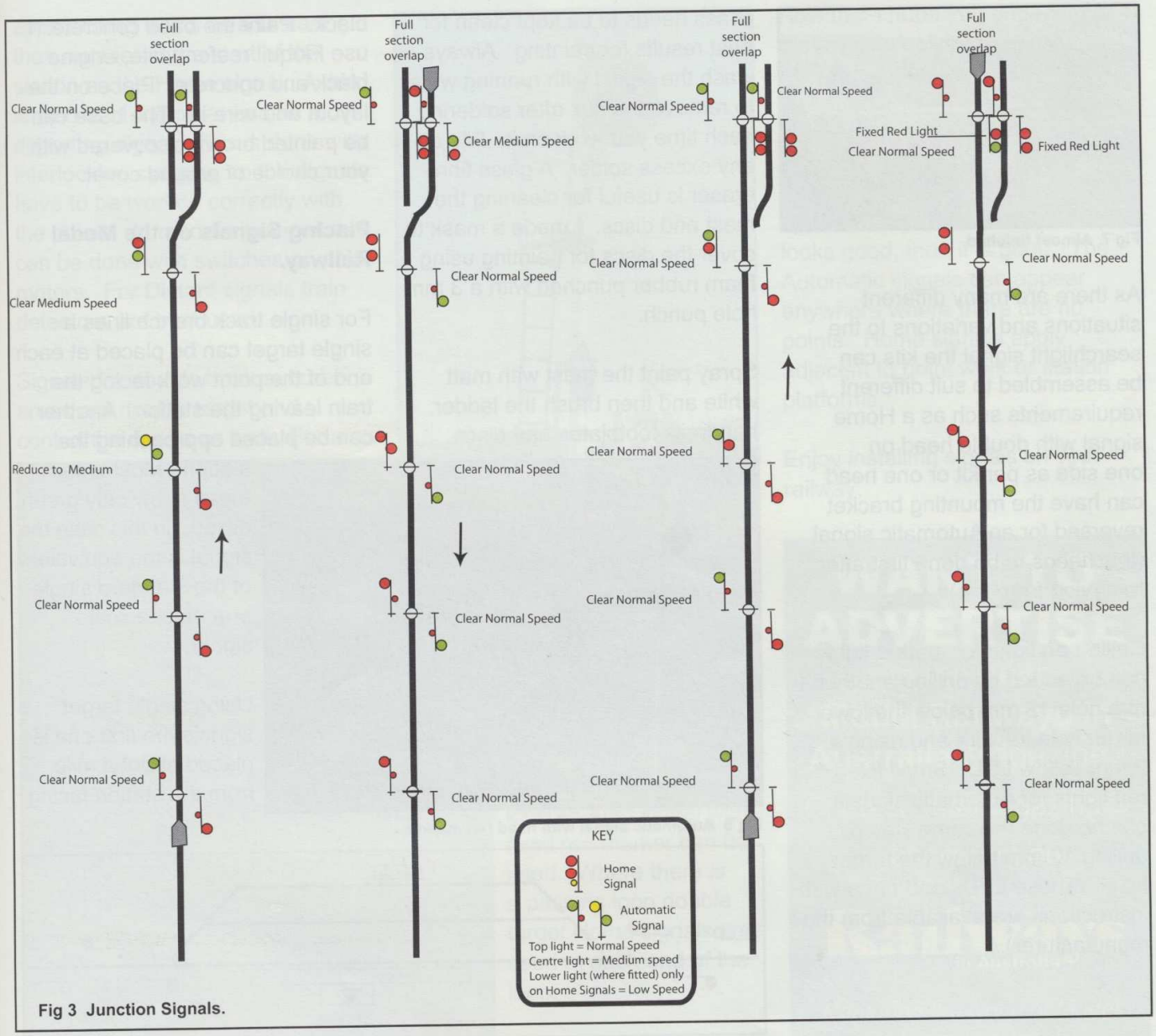

Fig 3 Junction Signals.

the solder to flow easily into the brass parts using the hot soldering iron. Always put a small amount of solder onto the iron and not the model. Have a wet sponge to clean the iron each time you use it. Pay particular attention to keeping everything square; check each part as you go, with soldering you can always reheat and adjust.

Fig 4 Solder shield to disc and U-shaped wire to mast.

Fig 5 Holding mast in vice to solder.

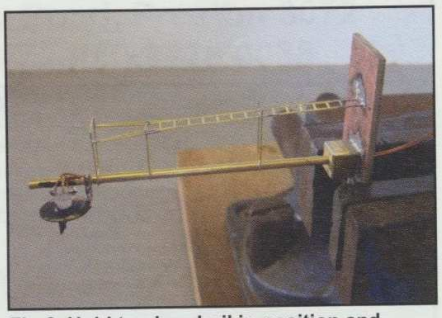

Fig 6 Hold top handrail in position and solder. The ladder is then fitted to it.

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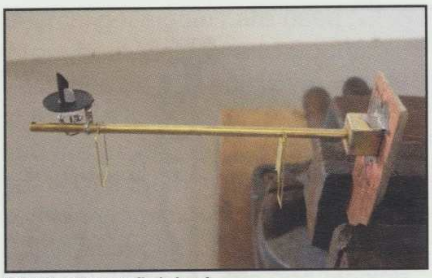

Fig 7 Almost finished.

As there are many different situations and variations to the searchlight signal the kits can be assembled to suit different requirements such as a Home signal with double head on one side as per kit or one head can have the mounting bracket reversed for an Automatic signal (this needs to be done first after removing from fret).

Calling-on lights or marker lights can be added by drilling another 1 mm hole 12 mm below the lower target hole for wire and using a 2 mm yellow LED. Small fixed red lights for Automatic signals can be done the same way by drilling 12 mm below the target hole. (These LEDs and parts with instructions are available from the manufacturer).

Brass needs to be kept clean for best results for painting. Always wash the signal with running water to remove the flux after soldering each time you work on it. File off any excess solder. A glass fibre eraser is useful for cleaning the mast and discs. I made a mask to cover the discs for painting using foam rubber punched with a 3 mm hole punch.

Spray paint the mast with matt white and then brush the ladder, handrails footplates and discs black. Paint the base concrete. I use Floquil reefer white, engine black and concrete. Place on the layout and wire in. The base can be painted brown or covered with your choice of ground cover.

Placing Signals on the Model Railway.

For single track branch lines a single target can be placed at each end of the point work facing the train leaving the station. Another can be placed approaching the station. Most times these show only green or red; in this case the signal is the equivalent of the standard single arm mechanical signal.

Using single target signals the first one is placed about a mile from the station facing

Fig 8 Automatic signal with fixed red marker.

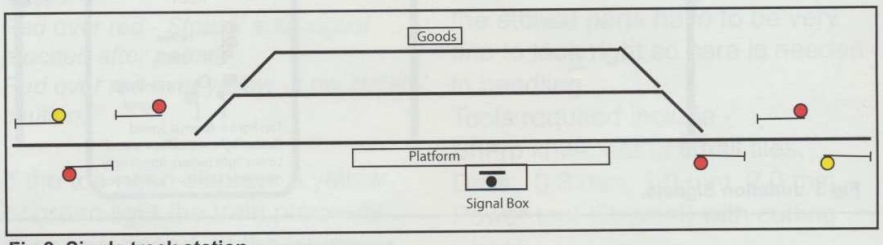

Fig 9 Single track station.

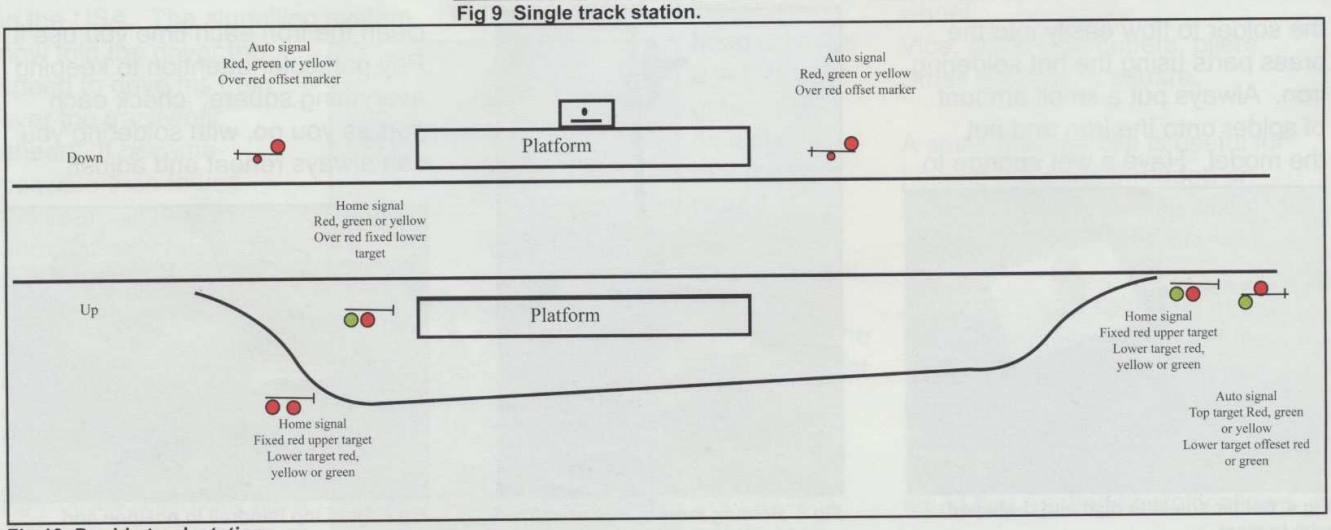

Fig 10 Double track station.

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approaching trains as a Distant then another at the start of the station as the Home signal. A third is placed at the other end as a departing signal. This is done with interlocking systems so the signals have to be worked correctly with the points. In model situations this can be done with switches on point motors. For Distant signals train detectors are best used.

Signals for double track suburban areas are double target and control the speed as well. For a station with no siding or loop an Auto signal with fixed red marker can be used. Where there is a passing loop double target Home signals are used at each end of the loop.

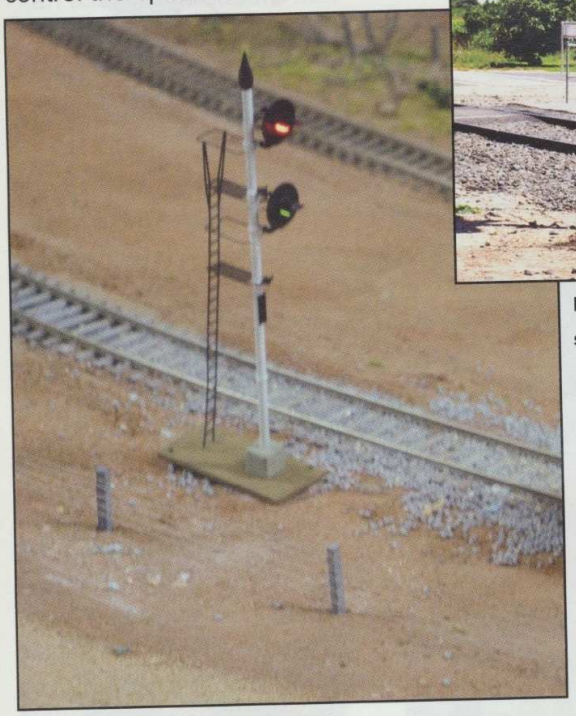

Fig 11 Double target Home signal

Fig 12 Single target Home signal at approach to Red Cliffs.

Now that I hope you understand the basic principles, you will decide how best to place signals on your model railway. Two basic principles apply. First, keep it simple. Don't try to replicate exactly how the real railway would apply the signals. Second, if it looks good, then it is good. The Automatic signals can appear anywhere where there are no points. Home signals apply adjacent to point work or station platforms.

Enjoy installing signals on your railway.