

IR Staging Detection

Overview:

Each staging track is long enough to 'stack' two trains. For each half of the staging track there will be three LEDs to indicate train position. A green indication is no train in that portion of the staging track. A yellow light indicates the entrance sensor is blocked (fouling the turnout or the midpoint of the staging track) and a red light indicates the track is occupied and the train is at the proper position to be stopped. Each staging track will have four IR sensors to detect train location. One will be just beyond the fouling point of the turnout. For a train to safely be staged it must clear this detector. The next detector is for the rearmost point of the front half of the track. The third detector is for the 'fouling point' of the second half of the staging track. The fourth detector is for the absolute stop position just before the barrier at the end of the staging track.

Control:

Control and logic will be handled by an interface circuit using a 16F690 PIC microcontroller. The four detector inputs will be compared and generate output to illuminate the proper LEDs for the conditions. The LEDs will be mounted on the fascia in easy view an operators running trains in and out of staging. There will be one PIC circuit per staging track.

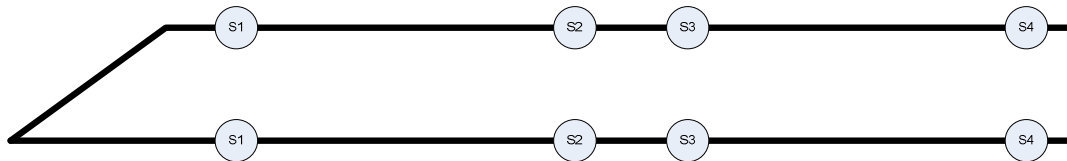
PIC pin assignments:

- RB4: First detector
- RB5: Second detector
- RB6: Third detector
- RB7: Fourth detector
- RC0: First half, Green LED
- RC1: First half, Yellow LED
- RC2: First half, Red LED
- RC3: Second half, Green LED
- RC4: Second half, Yellow LED
- RC5: Second half, Red LED

Arriving train sequence:

Operator will select track with either both sections green or the first section green. As train passes the final turnout, the yellow LED for the selected track will come on. As the train passes the second sensor and clears the first, the red LED will come on. If the second half of the track is already occupied (showing red), the operator will stop the train as soon as the red LED for the first section comes on. If the second half is unoccupied, the operator will continue the train movement. As the third sensor is blocked, the yellow LED for the second section will light. If the train clears the second sensor before tripping the fourth sensor, the green LED for the first section will come on but the second section will still show yellow. When the fourth sensor is covered, the red LED for the second section will come on and the operator will immediately stop the train.

Track Arrangement with Sensors



Fascia Arrangement with LEDs

