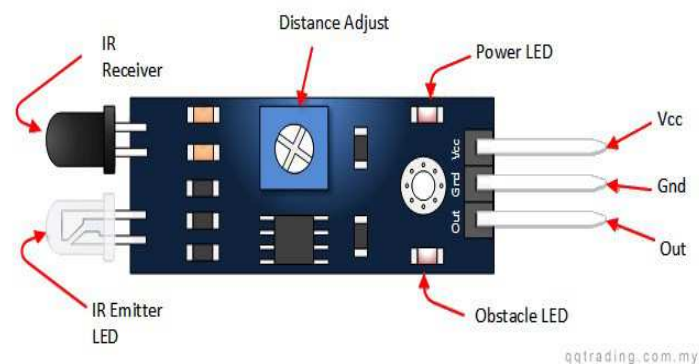# .: Model Railroad Signal Systems

FC-51 Infrared Object Sensor

Optical Sensor FC-51

A different style of Optical Sensor has been provided with your board that needs to be connected differently than the previous style of sensor. The FC-51 sensor also requires calibration when first installed.

Wires have been soldered to the sensors to make the installation easier. The wire colors and their destinations are listed on the next page. Because this sensor was not in use when some of the circuit boards were designed, an additional pig tail wire has been soldered to the bottom of the FCM-1 and FOM-1 boards to provide 5 volts to the sensor.

Installation

Installation of the sensors can be done from under your layout with the IR Transmitter and Receiver facing upwards between the rails of the track or can lay horizontally to reflect the infrared light off the side of the train. Either method will work, however, ensure the distance adjust control is accessible for calibration.

Setup

Once the sensor is mounted in the desired location, connect the wires to the board as listed below. Ensure there are no objects in front of the sensor when performing the calibration and the light level in the room is at it's maximum.

The sensor has two indicator leds. One is a power indicator and the other is an obstacle detect indicator. After the power has been applied to the board, use a small screw driver to adjust the distance sensitivity control until the obstacle led goes out. If your layout or Free-mo module is moved to an area where the light source is significantly different, the sensor may need to be re-adjusted. Otherwise this should be the only time the sensor will require adjustment.

Run some rolling stock over or pass the sensor to ensure the obstacle led comes on when the space in front of the sensor is occupied. Once the set up is complete, turn off the power to the circuit board for a few seconds and then power it back up so the sensors can be properly detected.

Connections

Sensor output lead – White   To OS terminal.

Sensor LED lead – Yellow   To LED terminal.

Sensor ground lead – Black   To GND terminal.

Sensor power lead – Red   5v is supplied to the sensor differently depending on the circuit board you are using.

FTM-2   Sensor red wire to the black stand alone pin jack at U2. (Near Jumper J1)

FCM-1   Sensor red wire to the red pigtail lead soldered to the circuit board.

CSM-2   Sensor red wire to the to 5v terminal.

FOM-1   Sensor red wire to the red pigtail lead soldered to the circuit board.

Auto Infrared sensing

Upon power up, the board will read the optical sensor for external sources of infrared light. (Ensure there are no trains covering the sensors during power up in order for this feature to work properly). If an external source of infrared light is present, the sensor will work in beam break mode. If no external infrared light is present, the sensor will work in beam reflect mode.

Troubleshooting

Listed on the next page are possible problems you may encounter when using this sensor and tips on how to rectify them.

PROBLEM	SOLUTION
Sensor not working (no power)	Ensure black wire is connected to the GND terminal. Ensure red wire is connected to the 5v terminal.
Sensor is powered but not detecting IR light even with sensitivity set to max	Ensure the white wire is connected to the OS terminal. Ensure the yellow wire is connected to the LED or LTx terminals (CSM Boards).
Sensor constantly detects IR light	Adjust the sensitivity screw until the detect led goes out. Place heat shrink over the sensors IR leds to prevent cross interference between the IR transmitter and IR receiver. Be sure to leave the ends expose so IR light can still be transmitted and received.

Remove external sources of IR light. Sunlight or incandescent lights can trigger the sensor. Also read "auto infrared sensing" on the previous page. |

Questions or Comments

If you have any questions or comments please send them to me by using the email address on the Model Railroad Signal Systems Website.