Plug n Play INFRARED Grade Crossing Detection

Installation & User Manual

Signalogic Systems

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Covers CR-2 and MT-2 installations

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Introduction to Signalogic Systems Infrared Detection

Signalogic Systems provides users with a sophisticated infrared detection option. The CR-2 crossing controller and MT-2 multi-track module can be made to operate with advanced Plug n Play capability. This manual describes the use of the XIR/IRSB infrared nodes with the CR-2 / MT-2. A minimum of four (4) sensor nodes are required.

The CR-2 and MT-2 have an optical sensor mode which helps to simulate prototypical train detection with discrete optical sensors. A train can activate the crossing and then pass between the sensor and the crossing for a period. If the train doesn't arrive within a set period (30 sec), the crossing deactivates. Using our XIR/IRSB sensor controller pairs, many track arrangements and even motion-sensing can be achieved.

IR DETECTION MODULES

CR-IR2

The CR-IR2 plugs onto the CR-2 controller to allow Plug N Play detection.

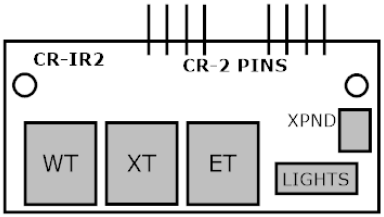

Figure 1: CR-IR2 Module

WT: Modular Connector to West Approach IR sensor
XT: Modular Connector to Island XT sensors
ET: Modular Connector to East Approach IR sensor
LIGHTS: Signal lighting connector extended from CR-2
XPND: Power Connector to option MT-IR2 boards.
CR-2 PINS: Connections to connect to the DETECT & LIGHTS connectors of the CR-2.

MT-IR2

The MT-IR2 plugs onto the MT-2 controller to allow Plug N Play detection. The MT-IR2 also comes with a spacer board to allow multiple MT-2s to be linked together when necessary.

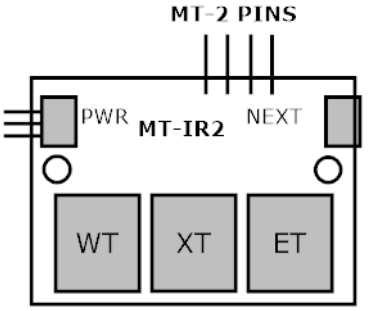

Figure 2 – MT-IR2 Module

WT: Modular Connector to West Approach IR sensor
XT: Modular Connector to Island XT sensors
ET: Modular Connector to East Approach IR sensor
LIGHTS: Signal lighting connector extended from CR-2
XPND: Power Connector to option MT-IR2 boards.
CR-2 PINS: Connections to connect to the DETECT & LIGHTS connectors of the CR-2.

XIR

The XIR connects to the CR-2 or MT-2 through standard modular connectors. XIRs can be daisy-chained where more than one sensor is needed such as for islands where two sensors are always used.

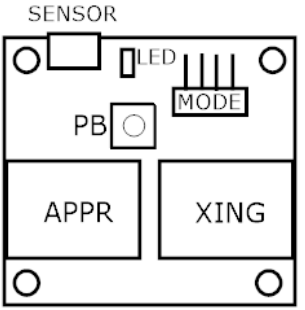

Figure 3 – XIR Module

SENSOR: IRSB Infrared sensor ribbon cable connector.
XING: Modular Connector to CR-2/MT-2 or previous XIR in sensor chain.
APPR: Modular Connector to additional XIRs further from crossing.
PB: Calibration Pushbutton
MODE: Jumper mode selector

IRSB

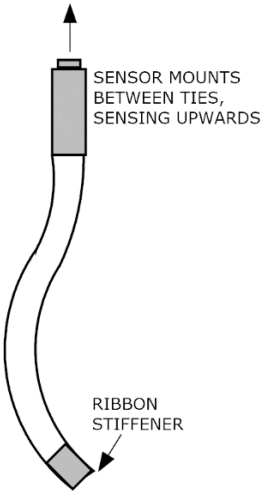

Figure 4 – IRSB Sensor

The IRSB is a sophisticated yet tiny reflective-type infrared sensor. The IRSB sensed a series of light pulses up from the track where it is installed. If equipment passes over the sensor, the infrared light is reflected by the sensor and declares that a train is present.

The sensor is attached to a flexible ribbon cable which is intended to be connected to XIR boards in crossing applications.

The IRSB can detect surfaces with average reflective properties at 1.5 inches (35 mm) and can be calibrated to operate at different closer ranges if false detections occur.

Installing the IR Detection System

Installation Differences for the CR-2 and MT-2

The following sections highlight the differences required to installing the CR-2/MT-2 with the IR detection system.

DETECTION CONNECTOR

Ignore the sections of the CR-2 and MT-2 manuals pertaining to the detection connector. These connectors mate with the CR-IR2 and MT-IR2 boards respectively.

LIGHTS CONNECTOR

The LIGHTS connector of the CR-2 is brought forward onto the CR-IR2 and the instructions in the CR-2 connections apply to the connector on the CR-IR2.

MT-2

If an MT-2 is required for multi-track operation, additional steps are required. The MT-2 is normally plugged directly into the CR-2. Due to the MT-IR2 connections interfering with the edge of the CR-2, the MT-2 needs to be connected a small distance away with the provided cables. The CR-IR2 XPND port also needs to be connected to the MT-IR2 PWR port which provides power to all MT-2 IR sensors.

SETTINGS

CR-2s and MT-2s will have these settings applied from factory when purchased as an IR kit. These are listed in case settings are accidentally changed. See CR-2 manual for settings details.

- Track Input Type: DIGITAL/ACTIVE LOW (DL)
- Track LOS: 0.5 seconds
- Track Input Mode: OPTIC (OPTC)
- Lighting Voltage: INPUT POWER VOLTAGE

Mounting

CR-IR2

Slide the CR-IR2 pins onto the CR-2 DETECT and LIGHTS connector. Tighten screws if desired. Signal lamps are connected to the CR-IR2 instead of the CR-2.

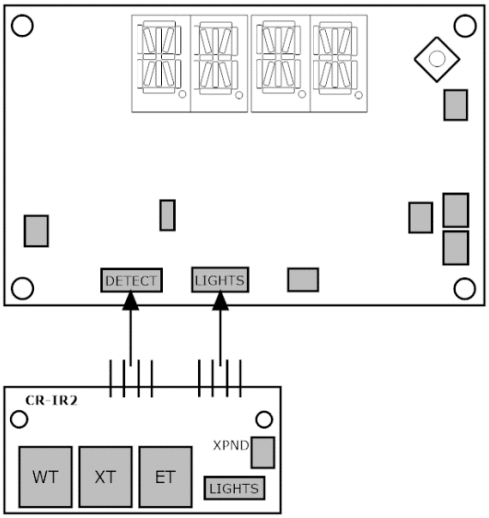

Figure 5 – Connecting the CR-IR2 to the CR-2

MT-IR2

Slide the MT-IR2 pins onto the MT-2 DETECT connector, like the CR-IR2 above. Tighten screws if desired. Using the included cables with the CR-IR2, connect the MT-2/MT-IR2 to the CR-2/CR-IR2 assembly as shown below.

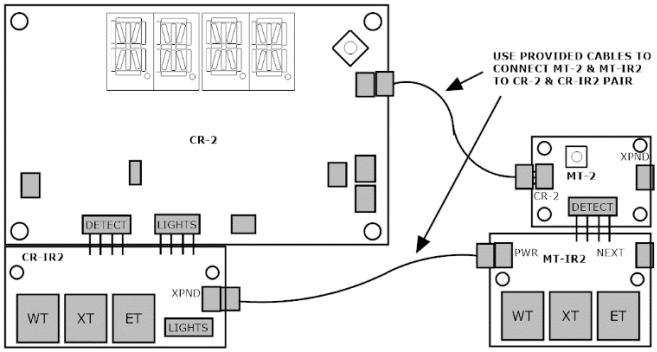

Figure 6 – Connecting MT-2/MT-IR2 to CR-2/CR-IR2

IRSB SENSORS

Determine the location of each IR sensor required.
Four sensor nodes are required for each track.

- One approach sensor, placed on one side of the road at a distance to give your crossing the amount of warning time desired. (WT)
- One approach sensor, placed on the opposite side of the road at a distance to give your crossing the amount of warning time desired (ET)
- Two sensors, one on each edge of the road make up the island of XT. These sensor nodes are connected in a series/daisy-chain fashion.

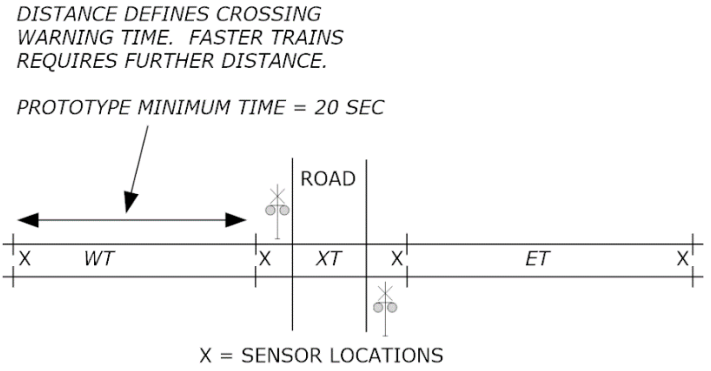

Figure 7 – Sensor Locations

To pass the IRSB through the track bed, a 5/16” round hole needs to be drilled. Alternatively, use a 1/8” milling bit in a power drill to make a 1/8”x5/16” slot for the sensor. Making a slot will reduce the amount of track that needs to be disturbed.

6” of ribbon cable is provided. Feed the ribbon cable down to the bottom of the track support. This will connect to the sensor’s associated XIR module.

XIR

Using #4 wood screws, mount each XIR board next to where the IRSB ribbon cable will drop from the track. It may be beneficial to mount the XIR after the IRSB ribbon cable is connected.

Holding the ribbon cable carefully by the blue stiffener side up/away from the XIR, line up the ribbon cable to the IRSB ribbon cable connector on the XIR. The IRSB ribbon cable will insert about 1/8" into the connector.

XIR SETTINGS

XIR modules have four settings.

MODE	JUMPER POSITION	Description
ISLAND	None	Used for sensors at edge of road (XT/island). Remove jumper for XT sensor pairs.
ADC	1-2	Normal Approach Sensor. Crossing will ring indefinitely if train is on the sensor. Crossing will timeout 30 sec after train leaves sensor.
ATO	2-3	Time-Out Mode. Sensor will send an occupancy pulse toward the crossing. Even with train present, crossing will time out if train does not reach another sensor in the approach or XT after 30 seconds.
AMS	3-4	Motion Sense Mode: Sensor will send occupancy toward the crossing if changes in reflection are detected. Motion detected after the train has departed the crossing will not cause the crossing to restart.

Table 1 – XIR Modes

Cabling

Connect the provided modular cables in accordance with the figure below. XIRs have two modular jacks. Always plug cables leading to the crossing controllers into the XING jack, with sensors further from the CR-2/MT-2 into the APPR jack.

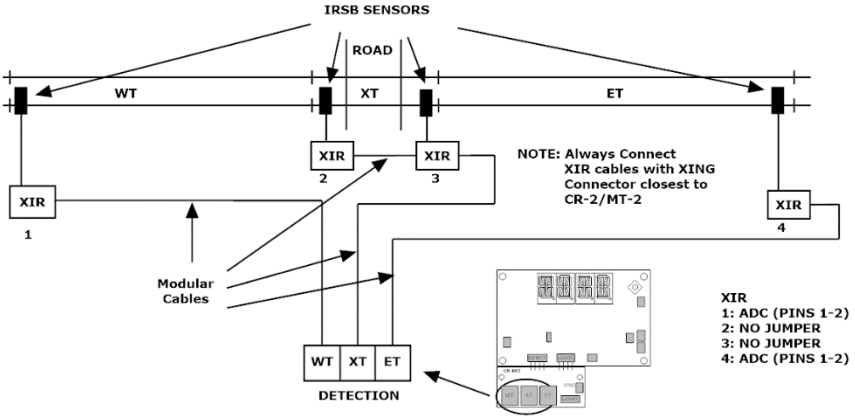

Figure 8 – Connecting XIRs to CR-IR2/MT-IR2s

If you have turnouts near your crossing, read the XIR-ROUTER manual for how to add functionality for different types of trackwork near your crossing.

NOTE: A small screwdriver is handy if you need to remove a modular cable after boards have been fixed in play. Slide the screwdriver under the connector tab and push up toward the connector while pulling the cable out.

STANDARD WARRANTY TERMS AND CONDITIONS

See www.signalogicsystems.com for complete details.