# DUAL TRACK LEVEL CROSSING (ILC2)

The Dual Track Level Crossing (ILC2) is used to fully automate a level crossing. Using Infrared (IR) sensors the ILC2 detects trains approaching and leaving a level crossing. It directly controls the flashing signals at the crossing as well as having the ability to operate boom gates.
The ILC2 caters for different track configurations entering and exiting the level crossing. Multiple units can be connected together to handle any number of tracks passing through the level crossing.

**What you should have**
1 x Sidetracked Electronics Dual Track Level Crossing (ILC2).
4 x Infrared Sensors
1 x User manual.
4 x Mounting screws and standoffs
1 x Spare shorting link
Crossing signals, LEDs and resistors are not included in this kit.

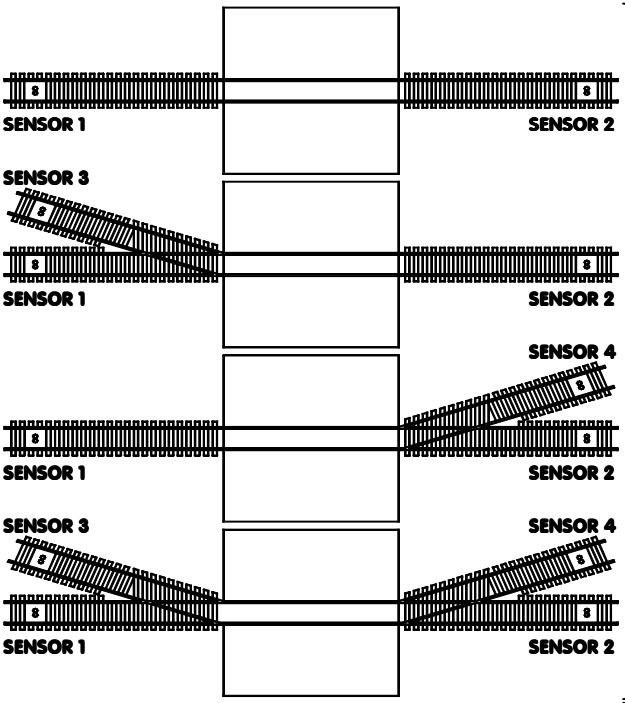
**About this manual**
Text written in *ITALICS* in this manual represents text as it is written on the ILC2.

**Operation**
When you apply power to the ILC2, if a train is not detected over any of the IR sensors it will assume there is no train within the level crossing area. If a train is over one of the IR sensors when you apply power to the ILC2 it will assume the train is entering the crossing. It is recommended that you always have trains parked completely outside the level crossing area before applying powering to the ILC2.
Whenever a train is detected at any of the four IR sensors the *STATUS* LED on the ILC2 will come on.
The level crossing will be activated when a train is detected at any of the IR sensors as it approaches the level crossing. When activated the signal LEDs will flash and the boom gates will be lowered (if connected). It doesn't matter which side the train approaches the level crossing from as long as it exits on the other side. i.e. a train cannot enter the crossing, stop between the two IR sensors and then reverse out the way it came.
When a train exits the crossing the signal LEDs will stop flashing and boom gates will be raised 2 seconds after the end of the train has passed over the exit IR sensor. The reason for the delay is as the train passes over the exit IR sensor it is possible for the ILC2 to stop detecting the train at the gap between carriages causing the level crossing to be deactivated prematurely. By having an exit delay that it is longer than the time taken for the gap between carriages to pass over the IR sensor, the level crossing will be deactivated at the correct time.

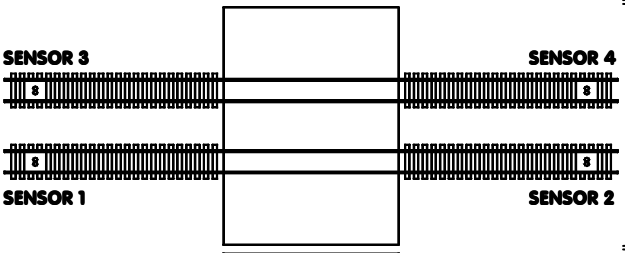
**Configurations**

Every track that enters or exits the level crossing area must have an IR sensor. The following diagrams show the different track configurations and which sensors are required for each one. For all single track configurations *LK1* must be inserted and *LK2* removed. For dual track configuration *LK1* must be removed and *LK2* inserted.

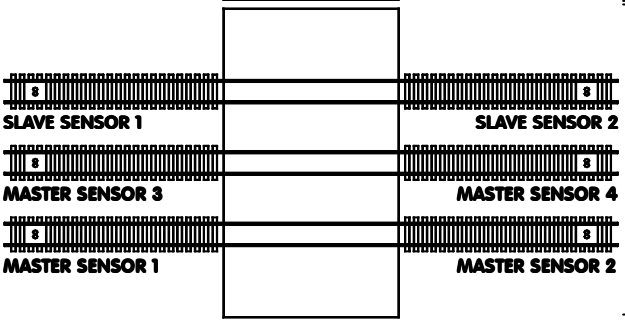
Note: whenever the link settings are changed the power to the ILC2 must be turned off then on again in order for them to take affect.




Single track configurations. Place black shorting link across *LK1*.

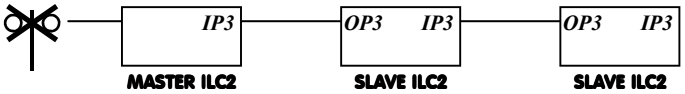




Dual track configuration. Place black shorting link across *LK2*.

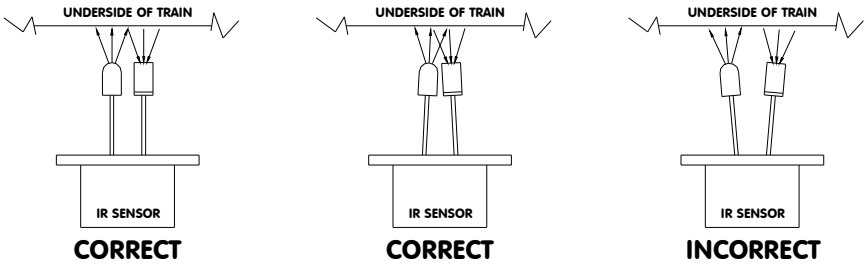

Three track configuration.
Master must be configured for dual track.
Slave must be configured for single track.

If more than two tracks pass through the level crossing then multiple ILC2 units can be wired together to cater for any number of tracks. Only one ILC2 unit is required to be connected to the signal LEDs and boom gates, this is called the master and all other units are called slaves. Wire from the input terminal *IP3* on the master to the output terminal *OP3* on the slave. The *IP3* terminal on the slave connects to the *OP3* terminal on the next slave ILC2 on so on.
The IR sensors are wired to the slave units exactly the same way as they are to the master.
All ILC2 units must be powered from the same 9V power supply.

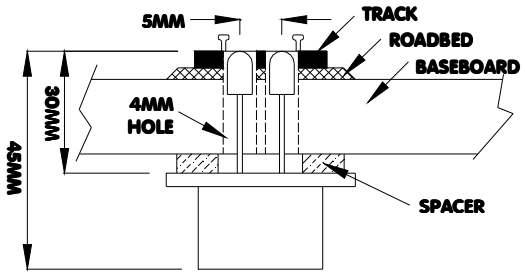



**Installing IR Sensors**

There is two parts to each IR sensor, a transmitter and a receiver. When mounting an IR sensor make sure that these two components are pointing directly up or slightly bent in towards each other. The train acts like a reflector when it passes over the IR sensor so if they are pointing away from each other the train may go undetected.




It is recommended that the IR sensors are mounted under your layout and pushed up between the sleepers in the centre of your track. Drill two 4.0mm (5/32 inch) holes 5mm apart or make a 4.0mm x 9.0mm slot, being careful not to damage the track. Screw the IR sensor in place, adding a spacer if necessary so that the top of it sits level with the top of your ballast or sleepers.
**IMPORTANT:** Make sure nothing covers the top of the IR sensor and that the rubber tubing that surrounds one of the sensors stays intact once the sensor has been installed.



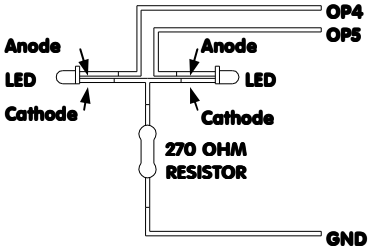

**Wiring IR Sensors to the ILC2**

The ILC2 can have up to four IR sensors connected to it, each one requires three wires. Pins *1*, *2* and *3* on each sensor terminal block on the ILC2 must be wired to pins *1*, *2* and *3* on the IR sensor board respectively.

## Wiring Level Crossing LEDs to the ILC2

LEDs have to be connected in a certain way in order for them to work. They are polarised, meaning they have a positive (anode) and a negative (cathode) pin. The cathode pin is easily identified as it is either the shorter of the two leads and/or its marked by a flat spot on the body of the LED.

Connect a wire from the *GND* terminal on the ILC2 to one side of a 270 ohm resistor. From the other side of the resistor wire to the cathodes of the two LEDs in your signal. Then wire from output terminal *OP4* to the anode of the first LED, and from output terminal *OP5* to the anode of the second LED. This circuit must be duplicated and wired to the same terminals on the ILC2 for every flashing signal.




## Wiring a Boom Gate Motor to the ILC2

The ILC2 has the ability to control a slow motion stall motor to operate boom gates. Connect the power to operate the motor to the input terminals marked *IP1* and *IP2* on the ILC2. Now connect two wires from output terminals *OP1* and *OP2* to the boom gate stall motor. When the level crossing is activated the power to the motor is reversed and the boom gates will close. Once the level crossing has been cleared, the power to the motor will be reversed again and the boom gates will open. The power you supply to the *IP1* and *IP2* terminals will always be applied directly to the motor even when the ILC2 is turned off. The ILC2 only reverses the power to the motor, not turn it on and off.

## Wiring Power to the ILC2

You require a 9V DC power supply capable of supplying a maximum of 70mA for each ILC2 unit you have connected to it. Ensure that you connect the 9V (+ positive) wire from your power supply to the *9V* terminal on your ILC2 and the ground (- negative) wire from your power supply to the *GND* terminal.

## Controlling the LED Flash Rate

The ILC2 allows you to control the rate at which the level crossing LEDs flash. By winding the *TIMER1* control in a clockwise direction you increase the flash rate, by winding it in an anti-clockwise direction you slow the flash rate.

## Specifications

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|---|---|
| Dimensions: | 68mm (width) x 86mm (depth) x 30mm (height) |
| Supply Voltage: | 9V DC |
| Supply Current: | 70mA (with 2 signals and tortoise stall motor connected) |
| Maximum Boom Gate Motor Voltage: | 30V |
| Maximum Boom Gate Motor Current: | 2A |

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