

INFRARED SINGLE TRAIN SHUTTLE UNIT (ITS1)

The Infrared Single Train Shuttle Unit (ITS1) is used to continually run a single train from point to point on your layout without operator intervention. The ITS1 comes with four Infrared (IR) sensors used to detect a train at different locations around your layout and has the option to control turnouts via a TC-8S turnout controller so more complex routes can be repeated.

The ITS1 is not designed to work with DCC.

What you should have

1 x Sidetracked Electronics Infrared Single Train Shuttle Unit (ITS1).

4 x Infrared (IR) sensors

1 x User manual.

4 x Mounting screws and standoffs

About this manual

Text written in *ITALICS* in this manual represents text as it is written on the ITS1.

Operation

The ITS1 has a red *STATUS* LED that turns on when a train is detected over any of the IR sensors. Each IR sensor has its own set of functions to perform when it detects a train, each one slightly different from the other. Refer to the table below for function details.

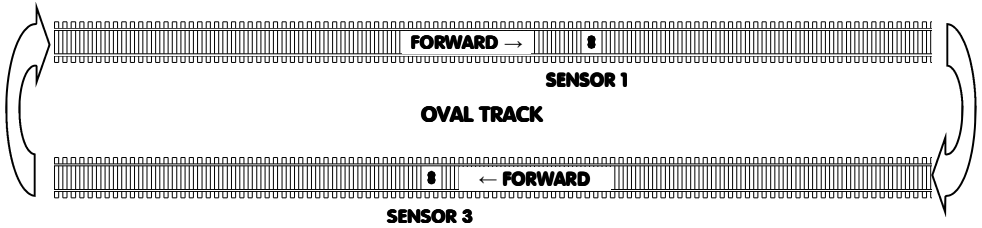
FUNCTION IR SENSOR	STOPS TRAIN FOR DELAY SET BY	CHANGES TRAIN DIRECTION TO	SETS TURNOUTS (IF CONNECTED)
IR SENSOR 1	TIMER 1	FORWARD	TURNOUT 1 STRAIGHT TURNOUT 2 UNCHANGED
IR SENSOR 2	TIMER 1	REVERSE	TURNOUT 1 UNCHANGED TURNOUT 2 SWITCHED
IR SENSOR 3	TIMER 2	FORWARD	TURNOUT 1 UNCHANGED TURNOUT 2 STRAIGHT
IR SENSOR 4	TIMER 2	REVERSE	TURNOUT 1 SWITCHED TURNOUT 2 UNCHANGED

Track Configurations

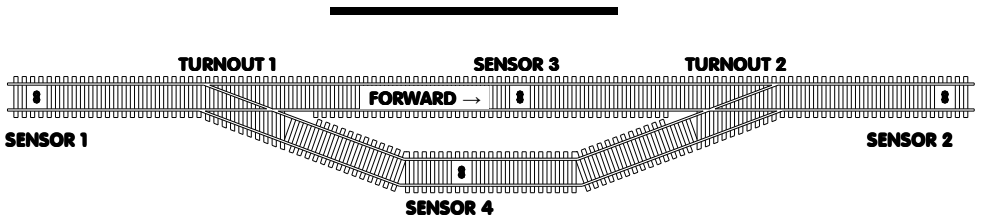


1. Train arrives at IR sensor 1 or 3. Train stops for delay set by *TIMER1* if IR sensor 1 is used or delay set by *TIMER2* if IR sensor 3 is used. Train direction is set to forward.
2. Train arrives at IR sensor 2 or 4. Train stops for delay set by *TIMER1* if IR sensor 2 is used or delay set by *TIMER2* if IR sensor 4 is used. Train direction is set to reverse.

Track Configurations Cont...



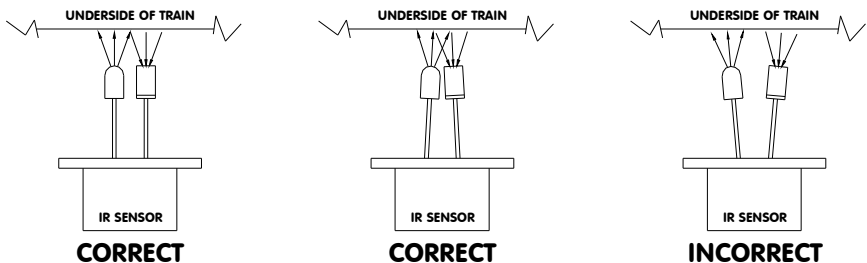
1. Train arrives at IR sensor 1. Train stops for delay set by *TIMER1*. Train direction is set to forward.
2. Train arrives at IR sensor 3. Train stops for delay set by *TIMER2*. Train direction is set to forward.



1. Train arrives at IR sensor 1. Train stops for delay set by *TIMER1*. Turnout 1 is moved to the straight position. Train direction is set to forward.
2. Train arrives at IR sensor 3. Train stops for delay set by *TIMER2*. Turnout 2 is moved to the straight position. Train direction is set to forward.
3. Train arrives at IR sensor 2. Train stops for delay set by *TIMER1*. Turnout 2 is moved to the switched position. Train direction is set to reverse.
4. Train arrives at IR sensor 4. Train stops for delay set by *TIMER2*. Turnout 1 is moved to the switched position. Train direction is set to reverse.

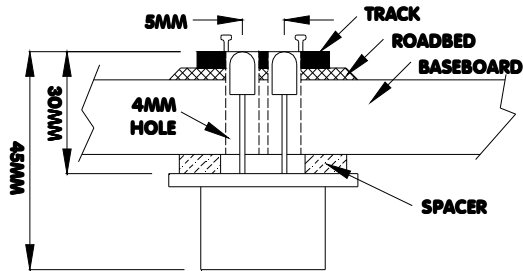
Installing IR Sensors

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 with 5mm between their centres 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 the IR sensor 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 IR sensor has been installed. Do not apply any heat to the rubber tubing as it may distort and affect the operation of the sensor.



Wiring IR Sensors to the ITS1

The ITS1 can have up to four IR sensors connected to it, each one requires three wires. Pins 1, 2 and 3 on the sensor terminal blocks on the ITS1 must be wired to pins 1, 2 and 3 on each IR sensor respectively.

Wiring the Track to the ITS1

Connect two wires from the track output on your transformer to input terminals *IP1* and *IP2* on the ITS1. Connect two wires from output terminals *OP1* and *OP2* on the ITS1 to the track. If the ITS1 is not turned on then you can manually operate your train as normal. When you wire power to the track ensure that power will reach all sections of track used by the ITS1 at all times. If your ITS1 is controlling turnouts, do not use points to switch power on and off to sections of tracks, this is done by the ITS1.

Wiring Power to the ITS1

You require a 9V DC power supply capable of supplying a maximum of 80mA for each ITS1 unit you have connected to it. Ensure that you connect the 9V (+ positive) wire from your power supply to the *9V* terminal on your ITS1 and the ground (- negative) wire from your power supply to the *GND* terminal.

Wiring Turnouts

The ITS1 can control two turnouts by interfacing to a TC-8S turnout controller. Your turnout motors wire to the TC-8S as described in the TC-8S user manual. Instead of wiring the control pins for the turnouts to toggle switches on your control panel they are wired to the output connector on your ITS1. The output connector on the ITS1 has 3 terminals, *OP4*, *OP5* and *GND*. Turnout 1 is controlled by output terminal *OP4* and turnout 2 is controlled by output terminal *OP5*.

For turnout 1, wire from output terminal *OP4* on the ITS1 to the TC-8S control pin of the first turnout you wish to operate (i.e. *T1 CNTL* for turnout 1). Wire your turnout motor to the corresponding driver terminals on the TC-8S as per the TC-8S user manual.

Wiring Turnouts cont..

For turnout 2, wire from output terminal *OP5* on the ITS1 to the TC-8S control pin of the second turnout you wish to operate (i.e. *T2 CNTL* for turnout 2). Wire your turnout motor to the corresponding driver terminals on the TC-8S as per the TC-8S user manual.

Connect a wire from the *GND* terminal on the ITS1 to the TC-8S *GROUND* pin on the control panel connector. If you are controlling turnouts connected to different TC-8S' then make sure you connect the *GND* terminal on the ITS1 to the *GROUND* pin on the control panel connector on both TC-8S'.

Note: all wires going to the TC-8S solder to the control panel connector which then plugs into the TC-8S.

Powering Up the ITS1

Ensure that a train is positioned over a sensor before powering up the ITS1. When you power up the ITS1, there is a preprogrammed delay of approximately 15 seconds before power is applied to the track. This allows the TC-8S (if connected) to go through its initialisation process. Once this delay has elapsed then the ITS1 will set the turnouts and the direction of the train depending on which sensor the train is positioned over.

Controlling Train Speed and Direction

The ITS1 does not control the speed of the train, this is done by an external DC train speed controller connected to input terminals *IP1* and *IP2* on the ITS1.

The ITS1 simply turns the power to the track on and off and sets the direction depending on which sensor last detected the train.

The ITS1 is not designed to work with DCC.

Adjusting Timer Delays

The ITS1 has two separate timers which control the length of time the train is stopped for once it has been detected. These timers can be adjusted for delays between 0 and 327 seconds (5min 27secs). If you set the delay to 0 seconds so that the train does not stop when detected, the turnout settings and train direction will still change.

Timer 1 is used when a train is detected at either IR sensor 1 or 2. Timer 2 is used when a train is detected at either IR sensor 3 or 4. By winding the *TIMER1* control in a clockwise direction you increase the time delay of timer 1 and by winding it in an anti-clockwise direction you decrease it. Timer 2 works in the same manner.

Specifications

Dimensions:	68mm (width) x 86mm (depth) x 30mm (height)
Supply Voltage:	9V DC
Supply Current:	80mA
Maximum Relay (Track) Voltage:	30V
Maximum Relay (Track) Current:	2A

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