

**Adding occupancy detection and sequencing**

The TT 301 can be used on conjunction with a block occupancy detector the TT 302. This allows prototypical operation using real occupancy detection. Please ask Traintronics for further information and a leaflet

**Sections which have been omitted here are included in the full user guide. Available at [www.traintronics.co.uk](http://www.traintronics.co.uk)**

**TT 301 Signal requirements**

As previously mentioned, the TT 301 has been designed with the use of the Traintronics type 100 range of signals in mind. For other manufacturers' signals – or if you are constructing your own – please bear the following points in mind:-

- **The signal "lamps" MUST be light emitting diodes (LEDs).** The TT 301 does not supply sufficient current for other types of indicators (note, however, that The TT 301 provides a "soft" turn on/off characteristic in order to simulate the filament lamps used on most full-size signals).
- Each LED must have its *anode* connected to the relevant "lamp" terminal on the TT 301 (i.e. "Red" or "LYe" or "Grn" or "UYe" or "RtA" or "RtB"). The LED *cathodes* must be connected together (i.e. *in common*) and then connected to the TT 301 "GND" terminal on the *output connector* (see figs.1 & 3).
- Route indicator(s) – if required – should use white LEDs. You can use up to three white LEDs *in series* for each route indicator.

**Troubleshooting**

The following table should give guidance on resolving the main problems that you may encounter when becoming familiar with the TT 301. Before using this table, please ensure that:-

- You have followed all the above instructions that are relevant (i.e. for DCC or non\_DCC operation).
- The unit is wired exactly as shown in these instructions, as appropriate for your application.
- All electrical connections are sound.
- All wiring is un-damaged.

PROBLEM	PROBABLE CAUSE(ES)	SOLUTION(S)
No signal lamps illuminated.	Power supply, or DCC system, faulty or turned off.	Turn on power supply or DCC!
	Power supply or DCC system shut down due to fault (e.g. short circuit) elsewhere on layout.	Connect and test TT 301 and signal independently from layout. Correct layout fault.
	"Signal type" incorrectly set.	Check, and correct, setting of CV2.
Some, but not all, signal lamps working.	Non-working signal LED(s) connected wrong way round.	Correct signal wiring error(s).
	Faulty signal LED(s).	Replace faulty LED(s).
	"Signal type" incorrectly set.	Check, and correct, setting of CV2.
Signal will not respond to DCC commands.	Incorrect address set.	Check, and correct, setting of CVs 1 & 9. Use an address between 1 and 255. Ensure CV9 is set to 0. (See the Full User Guide for addresses higher than 255)
	Invalid accessory command being sent.	Consult your DCC system manual for the correct operation of accessories.
	Signal being overridden by In0 and/or In1 input(s).	Remove any connections from In0 and In1 terminals. (Refer to the Full User Guide for use of this feature)
Green and/or yellow aspects will not flash.	"Signal type" incorrectly set.	Check, and correct, setting of CV2.

### Non-DCC Operation

Provided that the TT 301 has not had any settings changed under DCC programming, it will operate on a layout using "traditional" (i.e. DC or analogue) control as follows:-

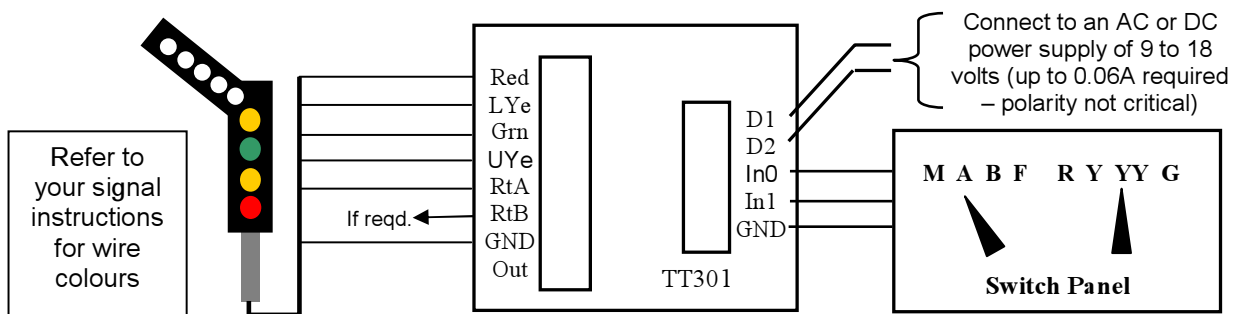


Figure 3 : Non DCC (analogue) wiring for the TT 301

### Power Supply

As shown in Fig. 3, a power supply must be connected to the "D1 and D2" terminals. It may be an *alternating current* (AC) or *direct current* (DC) type and it may be connected either way round (even if DC). The characteristics of the power supply must be:-

- Voltage between 9 to 18V. **DO NOT EXCEED 19V UNDER ANY CIRCUMSTANCES**
- Available current 0.06amp (60mA) for each TT 301 connected to the supply (e.g. sixteen TT 301s could be powered from a supply rated at 1 amp).

A few examples of suitable power sources are:-

- "Gaugemaster" transformer, type M1 or T1 or WM1.
- "Hornby" type C990 wall plug transformer or the 16V AC output from the R965 controller (when used with the C990).
- "Maplin Electronics" wall plug supply – stock code GS75S or MG81C.

### Signal Control

Using a switch panel (or a home-constructed version) - connected as shown in Fig. 3 - you simply rotate the switches to the desired aspect, route or flashing indication. Note, however, that a RED aspect will not flash and will extinguish the route indicator (in accordance with British signalling practice).

See the "Troubleshooting" table if you experience any difficulty.

#### "Modeller's mode"

Modeller's mode allows you to select every possible signal aspect, route and flashing from your DCC controller. It works, as described above, by "sequencing" the aspects using "point NORMAL" commands and sequencing the route indications (along with flashing) using "point REVERSED" commands. Upon applying power (DCC) to the TT301 a steady GREEN aspect, with no route indications, is selected. Modeller's mode enables the most basic system to be implemented but you will probably find that signal control soon becomes tedious! We therefore recommend that you consider "Signalman's mode" described below.

#### "Signalman's mode"

Signalman's mode is intended to simulate "real life" (*prototypical*) operation of colour light signals. It allows you to switch between STOP and PROCEED aspects using your DCC controller but the specific aspect displayed when "proceed" is selected is controlled by the "In0" *manual override* input on the TT 301. Further information on this mode of operation is available in an extended version of this guide. Please call Traintronics for a copy

### DCC Operation

#### Initial testing above the base board

- Wire the signal as shown in Fig. 2, turn on your DCC controller. After a short delay, the signal should indicate STEADY GREEN. Note, however, that if you are using a signal without a green lamp (e.g. 2-aspect red/yellow) then the signal will be BLANK at this stage.