

### Tip of the month - Nov 2018

#### How to not blow up your project

As we mention a lot, most problems with kits arise from poor soldering – either solder blobs causing shorts or dry joints causing bad or no connections.

Sometimes, when the faults are corrected, the module works perfectly from then on. On other occasions, the fault destroys a component or two.

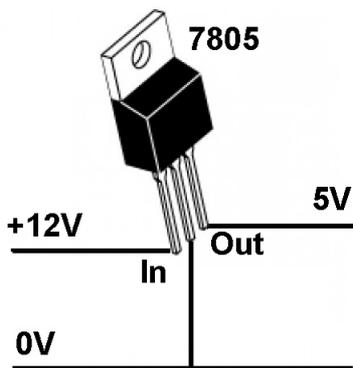
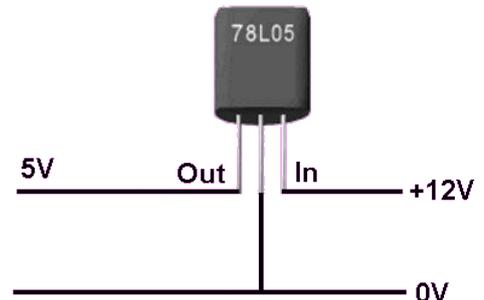
A few modules have been looked at recently where all the main chips have been fried.

This is usually the result of reversing the power leads or from apply too high a voltage.

#### How regulators work

Many kits use chips that work on a maximum of 5V. To allow them to be powered from your 12V bus, the modules use a 'voltage regulator' to convert the 12V down to 5V.

All regulators are checked prior to being included in kits and they are simple devices – 12V in and 5V out.



The 78L05 shown above is used where smaller currents are needed – up to 100mA.

For higher currents, the 7805 is used. It is also a three-pin device.

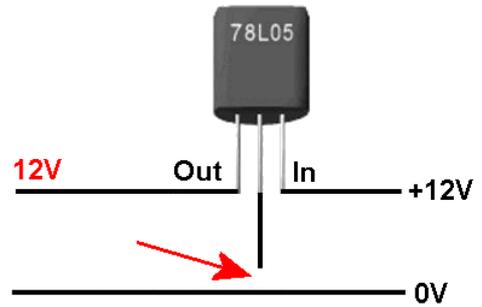
In both cases, the third lead is connected to 0V.

It is very rare for a faulty regulator to be supplied; I recently tested two hundred 78L05s and one hundred 7805s and none were found to be faulty.

## What can go wrong

The correct orientation and proper soldering of the voltage regulator can prevent a nasty accident.

If you forget to solder the third lead, or make a dry joint or intermittent connection, the output voltage will rise to the input voltage – i.e. 12V and **12V out**.



If you mistakenly solder in the regulator the wrong way round, you also end up with 12V being applied to the rest of circuit.

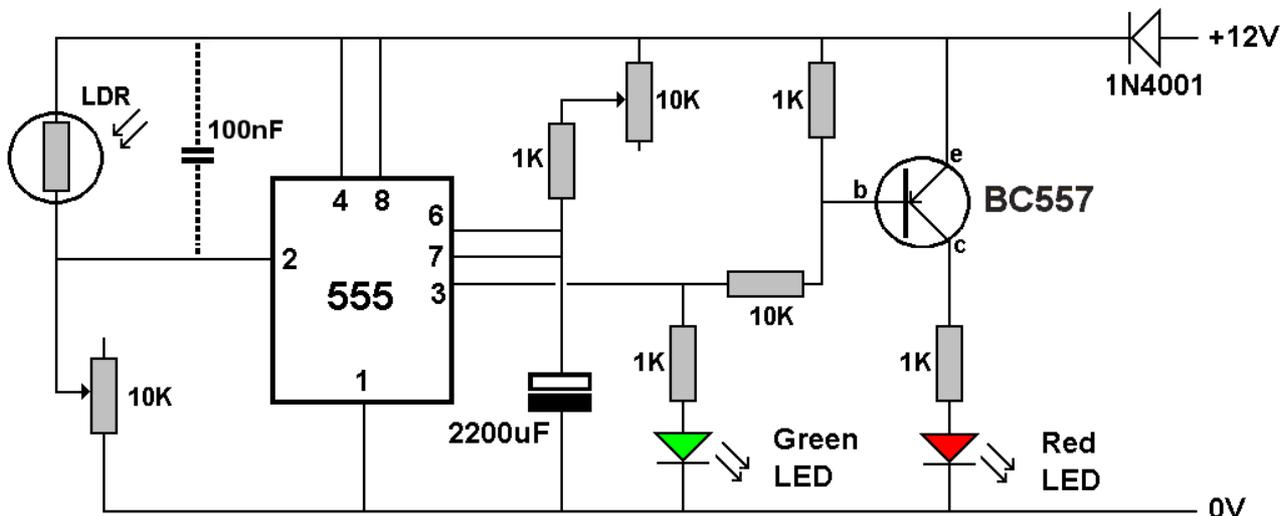
So, make sure you:

- have the regulator fitted the correct way round.
- have good soldered joints on the regulator's leads
- check the voltage coming out of the regulator before plugging in the module's chips.

## Reverse problems

To prevent problems caused by connecting the power supply the wrong way, the module can be fitted with an 'idiot diode'.

Some kits, such as PMP17 Automatic Signals, have a 1N4001 diode in series with the incoming supply voltage.



The diode only allows current to pass in one direction.

If you connect the power supply the correct way round, current is allowed to pass and the circuit works as normal.

If, however, you mistakenly connect the power the wrong way round, the diode prevents current from flowing and saves the circuit.

Not that we would be so careless as to connect the power in reverse!!!!

You could, of course, be building the kit while someone else could be fitting it to the layout.

You can always fit a diode to a kit that does not have one on its board,

This image shows a 1N4001 diode connected to the incoming power lead on the PMP 20 Timer module.

