

ADDITION OF AN OVERDRIVE LOGIC UNIT TO TRIUMPH TR2-6 WITH TYPE A OVERDRIVE UNIT.

(Please note the use of any of my designs/circuits by any other party is purely at their discretion and at their own risk)

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This unit is simply wired in series with the existing O/D relay circuit. No modifications are required to the car if the unit is fitted with Lucas connectors. The unit simply plugs in series with the yellow wire in the existing Lucas O/D wiring harness.

Background:

The existing overdrive unit in TR cars was configured to engage when the driver's on/off switch was turned on, provided the gearbox was in an "overdrive allowed gear" as detected by the gearbox switches. This limited the selection of the O/D to 2nd, 3rd and 4th gears in the TR4 and excluded reverse gear which can be destructive to the unit. The basic problem from the driver's point of view is that the overdrive remains engaged when you change down gears. For example if you are in 4th & O/D and you change down to 3rd gear, the overdrive briefly disengages as you pass through the neutral gate and re-engages when 3rd selects. In most practical instances (except for racing scenarios) the driver selects O/D in 4th gear to lower the engine rpm for motorway driving. It is easy to forget after a while that the O/D is switched on. Then when you pull off the motorway for around town slower driving the O/D remains selected which is quite inconvenient. Some manufacturers such as Humber solved this beautifully in the Sceptre car in the early 1960's by using an additional O/D latching relay and an O/D select switch that was a push to make switch, with a spring return. The O/D would then simply latch out when the gearbox switch disconnected after changing down, and you could only re-select the O/D by pushing on the switch again. Since then a number of relay circuits and electronic add on modules known as O/D Logic Units (OLU's) have been added to various cars to achieve the same effect.

The goal in making an O/D unit for my TR4A was to achieve the following:

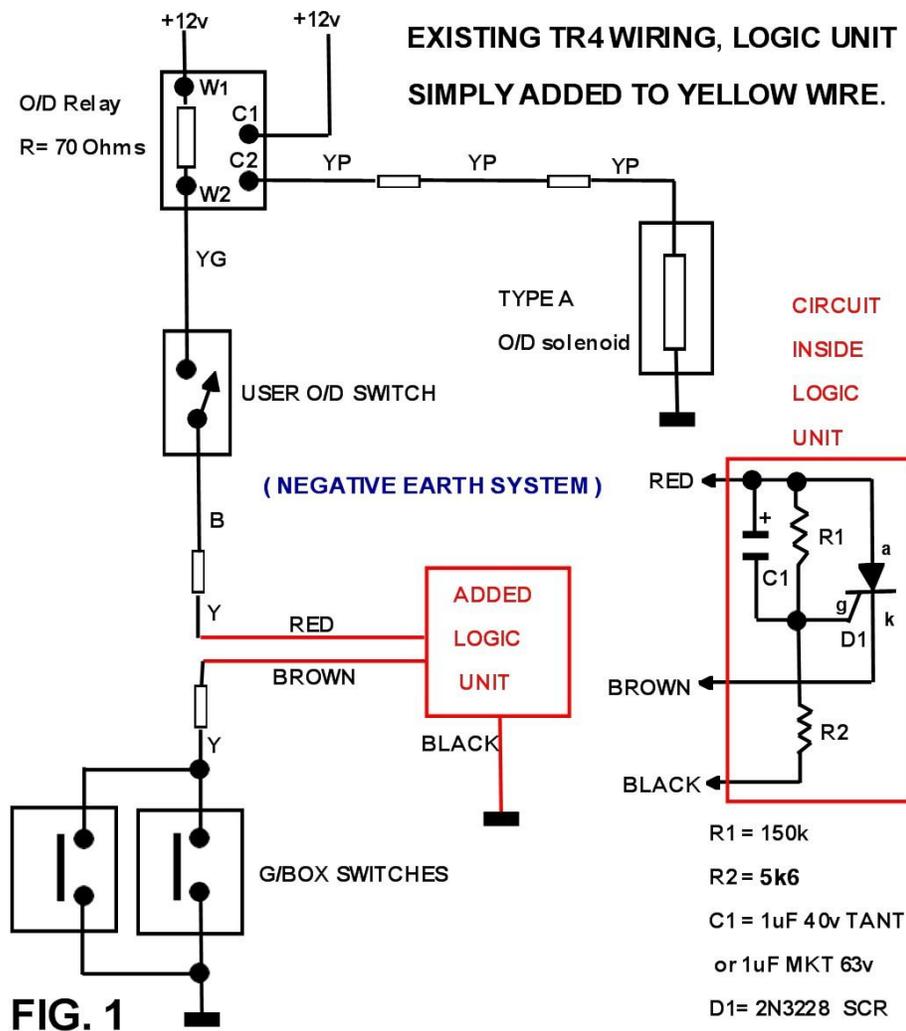
- 1) Make no changes to the car's original wiring system or switches.
- 2) Make a unit that was as simple as possible with no moving parts.
- 3) Make a unit from the types of parts with a similar vintage to the car.
- 4) The unit needs to be easy to make and compact in size.
- 5) Add no additional risk that the O/D could be selected in reverse.

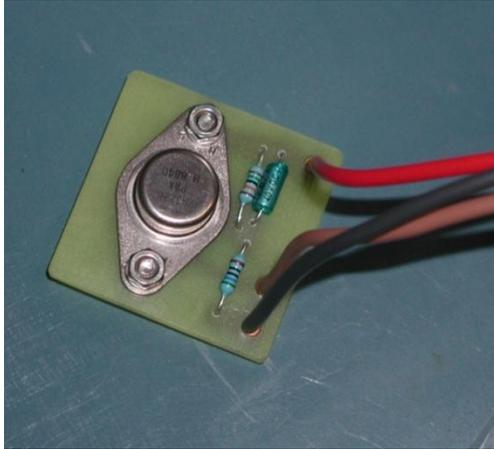
Operation of OLU, refer to figure 1 below:

Provided one of the G/Box switches are closed (allowed gear), the SCR (silicon controlled rectifier) is triggered into conduction by C1's charging current when the driver switches on the O/D select switch. This allows the usual current pathway in the overdrive relay circuit and the overdrive comes in as usual. If the G/Box switch opens (changing gears) the current in the SCR falls to zero and the SCR then stays out of conduction and stays that way when the gear box switch is re-connected, even if the O/D select is still left switched on. To reselect the O/D on again the drive O/D switch must be switched on again (and in an allowed gear). If the driver has forgotten to switch off the O/D in the meantime, then re-selecting it is simply a matter of switching the switch off then on again. This re-triggers the SCR into conduction.

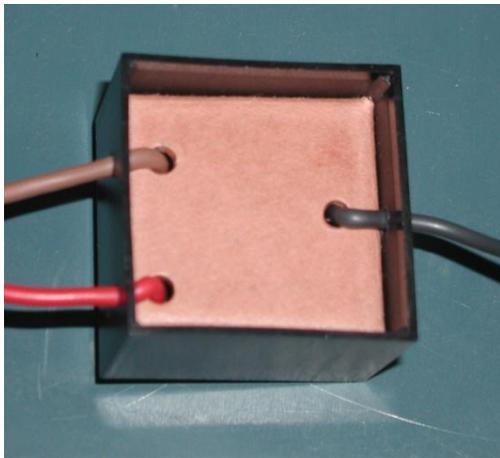
The vintage 2N3228 TO-66 package robust SCR is available from Surplus Sales Nebraska. The photos show the physical unit. If one requires an O/D indicator lamp it could be connected to the O/D relay C2 connection (YP wire) and ground. In practice the lamp is really not required with the OLU fitted as the system looks after itself and if you forget the O/D was engaged it doesn't matter. However a lamp could alert the driver to the O/D being engaged in a failure situation in the G/Box switches.

Adding the OLU provides no additional risk that the overdrive could get engaged in reverse (as it might with a gearbox switch jamming closed for example). In a complete meltdown of the SCR junctions and a full short of the SCR across its anode, cathode and gate, or a shorted capacitor, the current via R2, the 5k6 resistor connected to ground, is not enough to engage the O/D relay, or hold the relay in, and the circuit would behave as though the OLU was "not there". It is important that any OLU's added to your car do not have the capability to simulate a shorted G/Box switch in a failure mode, or the O/D might get selected in reverse. It is wise if you are using any OLU to carefully study the OLU circuit and check for this possibility.





Small simple PCB, made with a pen and ferric chloride etching solution, brass eyelets added where wires are soldered in.



PCB held into small plastic case with a folded cardboard insert with 3 punched holes and 3 holes drilled in the side of the plastic case.



Unit fitted with Lucas connectors and also required is the double female connector so it can plug into the existing wiring under the steering column area and an earth lug to fit under a nearby nut. The unit can then be tied up under the steering column area with cable ties.

Figure 2 shows the basic PCB layout, also the electrical equivalent of the SCR for those unfamiliar with them. The SCR also goes by the name “Thyristor” and they are the electronic analogy of a latching relay. A trigger current pulse is applied to the base of T1 called the gate g. This initiates a current via T1’s collector/emitter and via T2’s emitter/base junction, therefore T2 switches on. T2’s collector then provides additional current to T1’s base, latching both the transistors into conduction. This continues after the initial trigger current pulse disappears. The only way to get the transistors out of conduction after this event is to remove the flow of current in the anode-cathode (a & k) circuit. When this happens the SCR latches open again (drops out of conduction) and awaits the next trigger pulse.

In this system in the OLU the SCR drops out of conduction when the G/Box switch opens, and receives a trigger current pulse only when the driver selects the O/D unit in by switching the O/D select switch on, and a charging current occurs via capacitor C1 in the gate circuit. The network of R2 and C1 result in a pulse being generated to trigger the SCR.

R1 discharges the capacitor when the O/D select switch is off and this takes about half a second to significantly discharge it ready for the next on selection from the O/D switch.

