

12V Solenoid Driver/Latch

Single Switch Operated, High Current High Side Switch

This circuit has been designed to control a solenoid by the operation of a single push-button switch. It will supply loads of over 1A and can be operated up to a maximum speed of once every 0.6 seconds. When power is first applied to the circuit, the solenoid will always start in it's off position. Other features of the circuit are it's automatic turn-off if the load is shorted, and virtually zero power consumption when off.

When the supply is connected, the 470 Ω and 270 Ω base-emitter resistors ensure all three transistors remain off. The 1 μ F capacitor charges up to a value approaching that of the supply rail. If the push-button switch is then closed, the charge is transferred to the bias network of the ZTX300, turning it on. This, through the 100 Ω and 270 Ω bias resistors of the ZTX550s turn these devices on which energises the load. This action also holds the ZTX300 on (via the two 560 Ω resistors), irrespective of the decaying charge on C1.

Since the ZTX300 is now on, when the push-button is released the 1 μ F capacitor will be discharged through the transistor via the bleed resistor.

If the push-button is operated again it will connect this discharged capacitor to the bias network of the ZTX300 turning it and thus the output off. Any excess energy stored in the solenoid will be

dissipated in the 1N4000 protection diode.

When the push-button switch is released, the 1 μ F capacitor will charge up ready to trigger the latch on again when the switch is operated. The 0.1 μ F capacitor inhibits false triggering due to transient voltages.

This circuit was originally designed for an Automotive application, but similar circuits should also find use in industrial control systems. Similar circuits for higher current applications are possible with a change to the output device. For example, the ZTX751 2A rated PNP, or the high gain ZTX790A could be used for load currents of up to 2A, while the ZTX951 allows operation to over 3A.

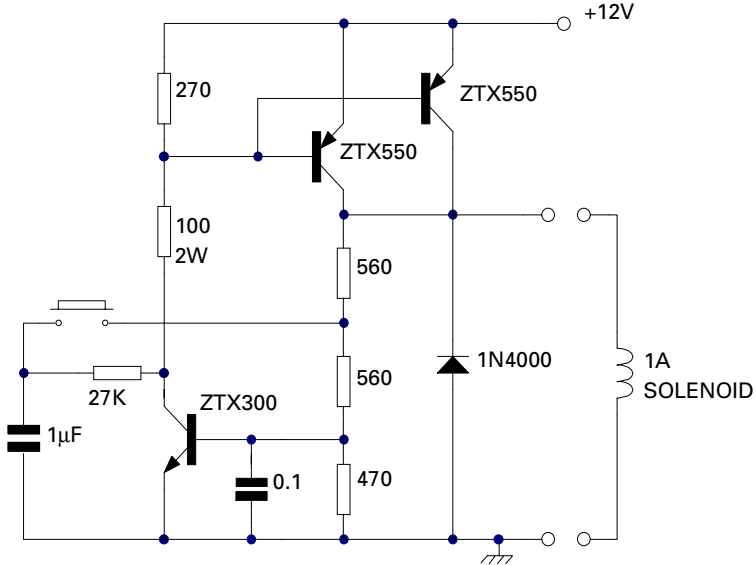


Figure 1
12V Latch Circuit.