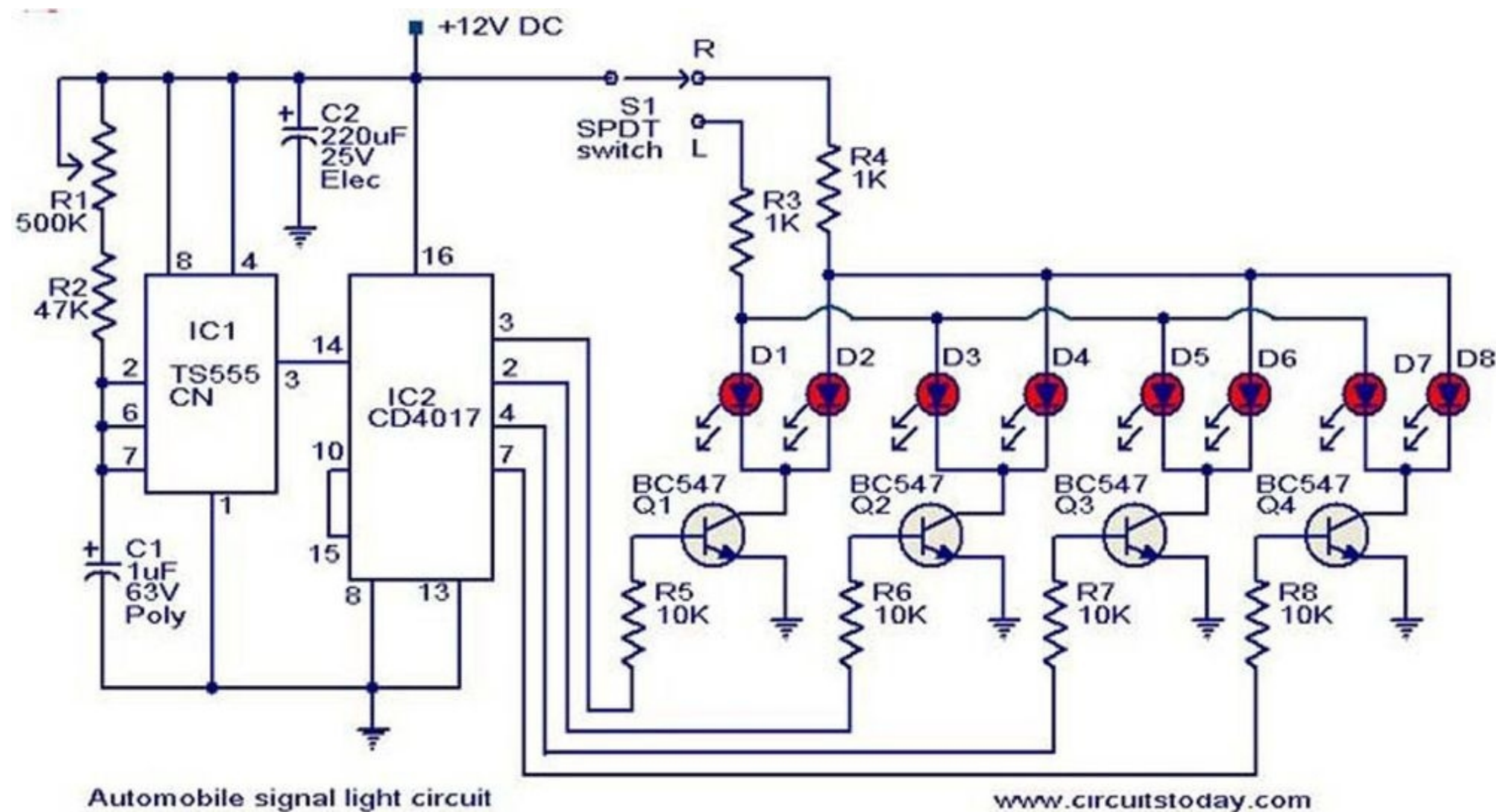


ELECTRONIC SYSTEMS



Electrical & Electronic Systems

One of the most demanding electronic parts of an automobile is the engine control unit. Engine controls demand is one of the highest real-time deadlines & Electronic diagnostic as the engine itself is a very fast and complex part of the automobile. Of all the electronics in any car, the computing power of the engine control unit is typically a 32-bit processor.

Many more engine parameters are actively monitored and controlled in real-time. There are about 20 to 50 sensors that measure pressure, temperature, flow, engine speed, oxygen level, and NOx level including other parameters at different points within the engine. All these sensor signals are sent to the ECU, which . The ECU output is connected to different actuators for the throttle valve, EGR valve, rack (in VGTs), fuel injector (using a pulse-width modulated signal), dosing injector and more. There are about 20 to 30 actuators in all.

Transmission Electronics

These control the transmission system, mainly the shifting of the gears for better shift comfort and to lower torque interrupt while shifting. Automatic transmissions use controls for their operation, and also many semi-automatic transmissions having a fully automatic clutch or a semi-auto clutch (declutching only). The engine control unit and the transmission control exchange messages, sensor signals and control signals for their operation.



Chassis Electronics

The chassis system has lot of sub-systems which monitor various parameters and are actively controlled:

- Anti-lock Braking System (ABS)
- Traction Control System (TCS)
- Electronic Brake Distribution (EBD)
- Electronic Stability Program (ESP)

Active Safety

These systems are always ready to act when there is a collision in progress or to prevent it when it senses a dangerous situation:

- Air Bags
- Hill Descent Control
- Emergency Brake Assist System

Driver Assistance

- Lane Assist System
- Speed Assist System
- Blind Spot Detection
- Park Assist System
- Adaptive Cruise Control System

Passenger Comfort

- Automatic Climate Control
- Electronic Seat Adjustment with Memory
- Automatic Wipers
- Automatic Headlamps - adjusts beam automatically
- Automatic Cooling - Temperature Adjustment

Infotainment Systems

- Navigation System
- Vehicle Audio
- Information Access

All of the above systems forms an infotainment system. Developmental methods for these systems vary according to each manufacturer Mercedes Benz, Lexus, BMW, AUDI, VW, Range Rover, Mini Cooper, Honda. Different tools are used for both hardware and software development.



Functional Safety Requirements

In order to minimize the risk of dangerous failures, safety related electronic systems have to be developed following the applicable product liability requirements.

Disregard for, or inadequate application of these standards can lead to not only personal injuries, but also severe legal and economic consequences such as product cancellations or recalls.

The IEC 61508 standard, generally applicable to electrical/electronic/programmable safety-related products, is only partially adequate for automotive-development requirements. Consequently for the automotive industry, this standard is replaced by the existing ISO 26262, currently released as a Final Draft International Standard (FDIS). ISO/DIS 26262 describes the entire product life-cycle of safety related electrical/electronic systems for road vehicles. It has been published as an international standard in its final version in November 2011. The implementation of this new standard will result in modifications and various innovations in the automobile electronics development process, as it covers the complete product life-cycle from the concept phase until its decommissioning.

