**INTELLIGENT BREAKING SYSTEM**

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**Abstract:**

While driving on highways, motorists should not exceed the maximum speed limit permitted for their vehicle. However, accidents keep occurring due to speed violations since the drivers tend to ignore their speedometers.

This speed checker will come handy for the highway traffic police as it will not only provide a digital display in accordance with a vehicle’s speed but also sound an alarm if the vehicle exceeds the permissible speed for the highway.

The system basically comprises two laser transmitter-LDR sensor pairs, which are installed on the highway 100 meters apart, with the transmitter and LDR sensor of each pair on the opposite sides of the road. The installation of lasers and LDRs is shown in fig.1. the system displays the time taken by the vehicle in crossing this 100m distance from one pair to the other with a resolution of 0.01 second, from which the speed of the vehicle can be calculated as follows:

Speed (kmph) = Distance/Time

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= 0.1 km/(Reading\*0.01)/3600

**CIRCUIT DIAGRAM:-**

**Circuit description:**

Fig shows the circuit of the speed of the speed checker. It has been designed assuming that the maximum permissible speed for highways is either 40 kmph or 60 kmph as per the traffic rule.

The circuit is built around five NE555 timer ICs (IC1 through IC5), four CD4026 counter ICs (IC6 through IC9) and four seven segment displays (DISI through DIS4). IC1 through IC3 function as monostables, with IC1 serving as count-start mono, IC2 as count-stop mono and IC3 as speed limit detector mono, controlled by IC1 and IC2 outputs. Bistable set-reset IC4 is also controlled by the outputs of IC1 and IC2 and it (IC4), in turn, controls switching on/off of the 100Hz (period= 0.01 second)astable timer IC5.

The time period of timer NE555 (IC1) count-start mono-stable multivibrator is adjusted using preset VR1 or VR2 and capacitor C1. for 40kmph limit the time period is set for 9 seconds using preset VR1, while for 60kmph limit the time period is set for 6 seconds using preset VR2. Slide switch S1 is used to select the time period as per the speed limit (40 kmph and 60 kmph, respectively). The junction of LDR1 and resistor R1 is coupled to pin 2 of IC1. Normally, light from the laser keeps falling on the LDR sensor continuously and thus the LDR offers a low resistance and pin 2 of IC1 is high. Whenever light falling in the LDR is interrupted by any vehicle, the LDR resistance goes high and hence pin 2 of IC1 goes low to trigger the monostable. As a result, output pin 3 goes high for the preset period (9 or 6 seconds) and LED1 glows to indicate it. Reset pin 4 is controlled by the output of NAND gate N3 at power-on or whenever reset switch S2 is pushed. For IC2, the monostable is triggered in the same way as IC1 when the vehicle intersects the laser beam incident on LDR2 to generate a small pulse for stopping the count and for use in the detection. LED2 glows for the duration for which pin 3 of IC2 is high.

The outputs of IC1 and IC2 are fed to input pins 2 and 1 of NAND gate N1, respectively. When the outputs of IC1 and IC2 go high simultaneously (meaning that the vehicle has crossed the preset speed limit), output pin 3 of gate N1 goes low to trigger mono-

stable timer IC3. The output of IC3 is used for driving piezobuzzer PZ1, which alerts the operator of speed-limit violation. Resistor R9 and capacitor C5 decide the time period for which the piezobuzzer sounds.

The output of IC1 triggers the bistable (IC4) through gate N2 at the leading edge of the count-start pulse. When pin 2 of IC4 goes low, the high output at its pin 3 enables astable clock generator IC5. Since the count-stop pulse output of IC2 is connected to pin 6 of

IC4 via diode D1, it resets clock generator IC5. IC5 can also be reset via diode D2 at power-on as well as when reset switch S2 is pressed.

IC5 is configured as an astable multivibrator whose time period is decided by preset VR3, resistor R12 and capacitor C10. Using preset VR1, the frequency of the astable multivibrator is set as 100 Hz. The output of IC5is fed to clock pin 1 of decade counter/7-segment decoder IC6 CD4026.

IC CD4026 is a 5-stage Johnson decade counter and an output decoder that converts the Johnson code into a 7-segment decoded output for driving DIS1 display. The counter advances by one count at the positive clock signal transition.

The carry-out (Cout) signal from CD4026 provides one clock after every ten clock inputs to clock the succeeding decade counter in a multidecade counting chain. This is achieved by connecting pin 5 of each CD4026 to pin 1 of the next CD4026.

A high reset signal clears the decade counter to its zero count. Pressing switch S2 provides a reset signal to pin 15 of all CD4026 ICs and also IC1 and IC4. Capacitor C12 and resistor R14 generate the power-on-reset signal.

**BLOCK DIAGRAM OF POWER SUPPLY**

***INPUT***

***AC***

***SUPPLY***

***REGULATED***

***IC***

***STEP DOWN***

***TRANSFORMER***

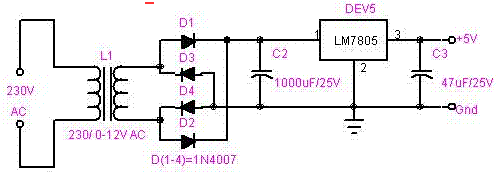
***RECTIFIER***

***CIRCUIT***

***FILTER***

***CIRCUIT***

**CIRCUIT DIAGRAM OF THE POWER SUPPLY**

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**WORKING OF POWER SUPPLY**

**STEP DOWN TRANSFORMER**

Transformers are static device which convert the electrical energy from one circuit to another circuit without any change in frequency and power. Step down transformer means the transformer which reduces the supply voltage to the desired value. In our project we need 12 volt DC supply, therefore in this project 12-0-12, 500mA transformer is used.

**RECTIFIER CIRCUIT**

Rectifier is a circuit which converts the AC electrical energy into Dc electrical energy. For operating of semiconductor devices used in this project we need regulated DC supply. In this project we use centre tap full wave rectifier.

**FILTER CIRCUIT**

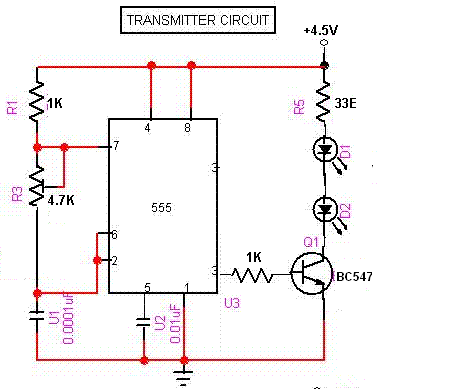
It is seen that the output of the rectifier is not pure DC, because it contain some amount of AC component which is called as ripple factor which gives the fluctuation and hence to minimize the ripple in the output the filter circuit is used. This circuit is connected after the rectifier circuit. In our project capacitor input filter is used. The circuit is as shown in the figure. The capacitor is connected in parallel to minimizethe ripple factor.

**REGULATOR CIRCUIT**

In our project for the operation of IC we need +5 volt regulated supply is necessary therefore a voltage regulator circuit is used. A voltage regulator is a circuit that supplies constant voltages regardless of change in the load current. IC voltage regulators are versatile and generally used. The 78xx series consist of three terminal positive voltage regulators. These ICs are designed as fixed voltage regulator and adequate heat sink. It can be deliver output current in access of 1A. These devices do not required external component.

These ICs has internal terminal overload protection and internal short circuit and current limiting protection.

IR TRANSMITTER



IC 555 is used as an Multivibrator. This is a free running oscillator and the frequency can be adjusted using 100k preset (variable resistor). Free running oscillator means, it is itself starting circuit which outputs a waveform that repeats itself without being either triggered or re-triggered. The output of the oscillator is periodic (i.e. repeats itself regularly) pulse or wave train. In a periodic signal the wave repeats itself indefinitely until the circuit is either turned off or otherwise inhibited.

In this mode of operation, the capacitor charges and discharges between 1/3 Vcc and 2/3 Vcc. As in the triggered mode, the charge and discharge times and therefore the frequency are independent of the supply voltage. In this circuit value of capacitor C = 0.1μf is constant because we cannot vary the value of capacitor whereas 100k is a variable resistor with the help of this frequency.

**IR RECEIVER CIRCUIT**

when IR signals does not falls on the TSOP 1738 its output pin no.3 goes high. R14 resistance is used to limit the current at the output of the TSOP and fed to pin1 of the NOT gate ic which has internal 6 not gate. 1st not gate invert its output and its output is again inverted by another not gate and increases its output current to switch the switching transistor 2N2222A or SL100 which is NPN switching transistor. the ground signal is generated by the transistor is fed.

Receiver circuit operated at 5V DC and it is drive from power supply circuit. Transformer converts 230V AC to 12V AC and the 12V AC is converted into DC by Diode D1 & D2 it filtered by Capacitor C1, IC3 gives. Regulated 5V DC to other circuit. Infra-red receiver module detected 38 kHz signal this is transmitted from transmitter circuit. When transmitter is on I/R sensor does not generate signal and its out put go to high level. This out put level is fed to Computer Circuit.

**MICROCONTROLLER**



Microcontrollers are used in automatically controlled products and devices, such as automobile engine control systems, remote controls, office machines, appliances, power tools, and toys. By reducing the size and cost compared to a design that uses a separate microprocessor, memory, and input/output devices, microcontrollers make it economical to digitally control even more devices. Mixed signal microcontrollers are common, integrating analog components needed to control non-digital electronic systems.

The Light control of street is very crucial especially in applications where precision are of importance. This work investigates and implements a microcontroller-based adjustable system for a energy. The theory of the armature voltage control algorithm in a closed loop system has been successfully implemented. An relay switch is used in buck configuration to control the light . The signal that controls the is generated from a ATMEL AT80C52 microcontroller. The signal is measured by a circuit directly fed to the microcontroller along with a speed reference signal. A data acquisition routine reads and the reference digital format and generates the error value signal. The error value signal is directly fed into the proportional controller routine to commute the controller output. Finally, the controller output is used to generate a signal, which completes the loop by controlling the switch. To protect the circuit from high current, a current routine is implemented to read the status of light through a sensor. If the current is higher than its rated current halting generation routine will stop it. Experimental results obtained have supported the idea of the design.

**REFERENCE**

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