

includes enemy vehicles, Electric Power Grids, SCADA, Telecommunications, Transport Systems (Airplanes, Trains, & Buses) etc, so as to make their electronic circuits to terminate its functionality and cause catastrophic malfunctioning in their circuitry, which would either damage them permanently or temporally or reduce their lifespan. EMP Devices are classified under Directed Energy Weapons (DEW's) category. A directed-energy weapon (DEW) emits energy in an aimed direction without the means of a projectile. EMP Devices can be utilized as effective means of attack against type of system, vehicle or communication system containing microelectronics in it. Which form the Pillars of the initial attack strategy of any nation just before the full attack is commenced. The simple EMP system consists of a capacitor, transformer, trigger, and coil of copper wire. This, when triggered, would produce an intense magnetic field for a brief period, similar to a coil gun. In small area, this would be enough to reset a calculator or electronic clock, but not enough to be of any use. But it is easy to make effective one, with a few more components, and time. We will be going over important components in this article, and discussing which are most applicable to an EMP. A small amount of Electro-Magnetic Pulse can be prevented by current EMP shields developed.

IV. HARDWARE REQUIREMENTS

Some important components used in our proposed system are follows:

- ✓ Rectifier
- ✓ ADC
- ✓ Micro controller AT89S52
- ✓ Power supply
- ✓ Inverter
- ✓ MAX Generator
- ✓ Step Up Transformer
- ✓ Capacitor (3kv)

1. Rectifier

Arrangement of four diodes like a bridge to achieve full wave rectification is called as Bridge rectifier. It is used in both with individual diodes wired and with single component bridges, where the diode bridge is wired internally. Because of this, ripple or voltage variations on a direct DC voltage by connecting capacitors across the load can be reduced. Here, two diodes are used, one for each half of wave. Then transformer is used whose secondary winding is split equally into two halves with a common center tapped connection. So, it produces an output during both half-cycles. Very flexible configuration compared to that of half wave rectifier.

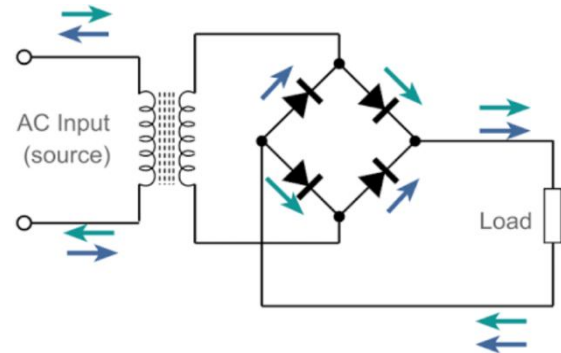


Fig.2 Circuit of bridge rectifier

2. ANALOG TO DIGITAL CONVERTER

In our system, the ADC0809 is used. It is a monolithic CMOS device and has an 8-bit analog-to-digital converter, 8-channel multiplexer and microprocessor compatible control logic. In that, the 8-bit A/D converter uses successive approximation as conversion technique. The converter has high impedance chopper stabilized comparator, a 256R voltage divider with analog switch tree. The 8-channel MUX can directly access any of 8-single-ended analog signals.

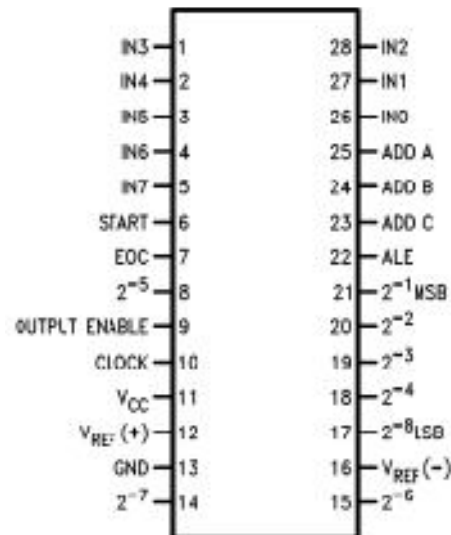


Fig.3 Pin Diagram of ADC 0809

To provide Interfacing to microprocessors is done with ease, which is provided by the latched and decoded MUX address inputs and latched TTL TRI-STATE outputs. It offers high speed, high accuracy, minimal temperature dependence, excellent long-term accuracy and repeatability, and consumes minimal power.

Multiplexer

In MUX, a particular input channel is selected using address decoder. Below table shows the input states for the

address lines to select any channel. The address is latched into the decoder on the low-to-high transition of the address latch enable signal.

SELECTED ANALOG CHANNEL	ADDRESS LINE		
	C	B	A
IN0	L	L	L
IN1	L	L	H
IN2	L	H	L
IN3	L	H	H
IN4	H	L	L
IN5	H	L	H
IN6	H	H	L
IN7	H	H	H

Table: Address line of ADC

In the ADC0809, comparator is inbuilt, which converts the DC input signal into an AC signal. Then, amplification is done using high gain AC amplifier for AC signal. Finally, it converts AC to DC signal. It limits the drift component of the amplifier, because the drift is a DC component and it is not amplified by the AC amplifier. This makes the ADC extremely insensitive to temperature, long term drift and input offset errors.

3. MICRO CONTROLLER AT89S52

The AT89S52 microcontroller is a low-power and high-performance CMOS 8-bit controller. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 provides a highly-flexible and cost-effective solution to many embedded control applications.

Further, the AT89S52 is structured with static logic to do operation down to zero frequency and supports two software selectable power saving modes. In the Idle Mode, the function of CPU stopped while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. Micro controller saves the RAM contents but freezes the oscillator, that means disabling all other chip functions until the next interrupt or reset in Power-down mode.

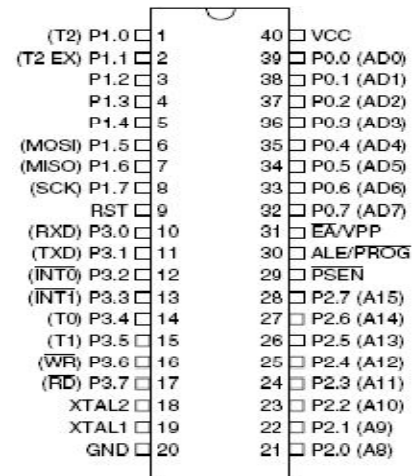


Fig4. Pin Configuration

4. POWER SUPPLY

Power supply refers to source of electrical power. A device, which supplies electrical or other types of energy to an output load is called a power supply unit or PSU. It is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others.

To perform our function, a 230v, 50Hz Single phase AC power supply is given to a step down transformer to get 12v supply. After that, this voltage is converted to DC voltage using a rectifier. The converted voltage is given to 7805 regulator to get constant 5v supply as output. This is given to all the components in our system. To discharge all the capacitors quickly, RC time constant circuit is added. A LED is connected for indication purpose to ensure the power supply

5. INVERTER

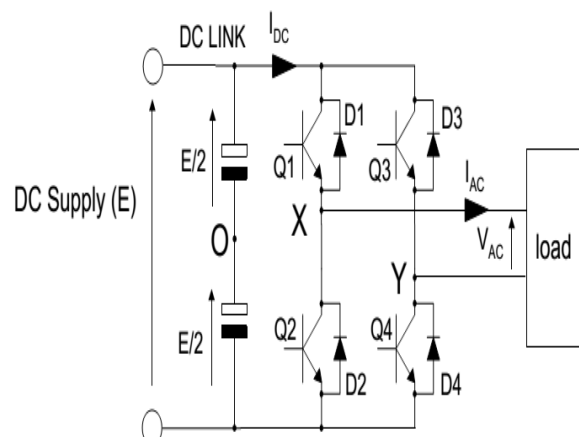


Fig.5 Inverter Circuit Diagram

A power inverter, or inverter, is an electronic device or circuitry that changes direct current (DC) to alternating current (AC). The given voltage as input, output load voltage,

frequency, and overall power handling, follows the design of specific circuitry. A power inverter can be entirely electronic or may be a combination of mechanical effects (such as a rotary apparatus) and electronic circuitry.

6. MAX232

MAX 232 converts signals from RS-232 serial port to signals suitable for use in TTL logic circuits. It has a dual driver/receiver and usually converts the CTS, RTS, Receiver and Transmitter signals. The drivers provide RS-232 voltage level outputs (approx. ±7.5 V) from a single +5 V supply via on-chip charge pumps and external capacitors. Because of this, it is useful for implementing RS-232 in devices that don't need any voltages outside the 0 V to + 5 V range.

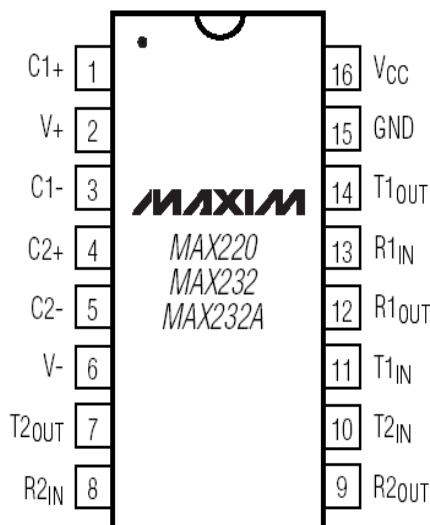


Fig.6 Pin diagram of MAX232

It has two receivers, which is used to convert RS-232 to TTL voltage levels and two drivers to convert TTL logic to RS-232 voltage levels.

7. STEP-UP TRANSFORMER

To store the available power, we need a transformer. Transformer takes electricity as input and then shifts around the V:I ratio. In a transformer, there is a primary winding and a secondary winding. It transforms electricity into a magnetic field with help of coil of copper, then back into electricity again using another coil. We need powerful high voltage transformer to fill our capacitor bank in quick manner, which needs a DC voltage source to charge your capacitor bank, so ensure you have a diode. The circuit for step-up transformer looks like this:

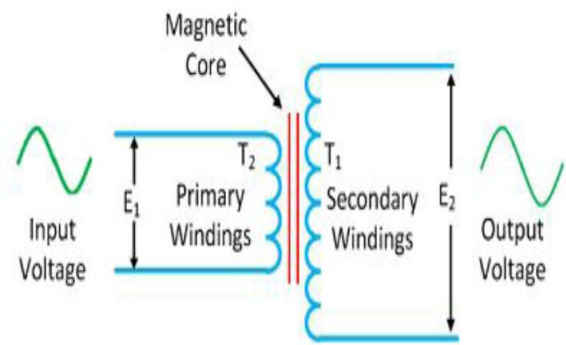


Fig.7 Step-up Transformer

8. CAPACITORS

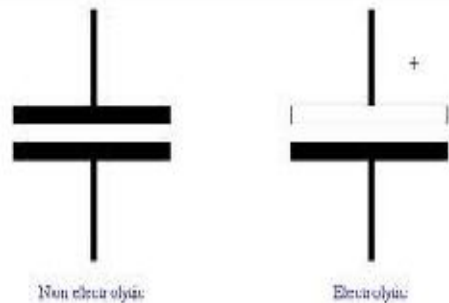


Fig.8 Types of capacitors

Capacitors are quite similar to batteries. It only STORE electrons, never produce them. Inside, it has terminals connected to two metal plates, which is separated by a non-conducting substance, or dielectric. Depends on voltage rating and capacitance rating, capacitors can be as small as a grain of rice, or as large as a garbage can and bigger.

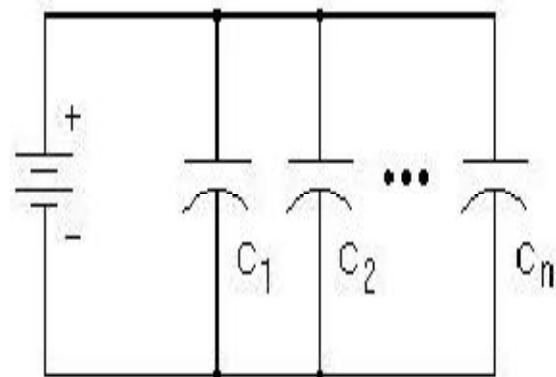


Fig.9 Capacitors in parallel

For an EMP, capacitor bank should have capacitors linked together in parallel as shown in below figure, which increases the capacitance and reduces electrolyte damage. This means that the voltage does not change, but the capacitance increases. The above image is a circuit diagram representation of capacitors in parallel. The capacitor bank should be similar in design. The electrolyte capacitors have a positive and a

negative polarity. The white line on an electrolyte capacitor represents negative, ensure your capacitor bank has an orderly, constant polarity.

V. RESULT

Our proposed system can be utilized as effective means of attack against type of system, vehicle or communication system containing microelectronics in it. The diagram below shows photograph of our proposed system.

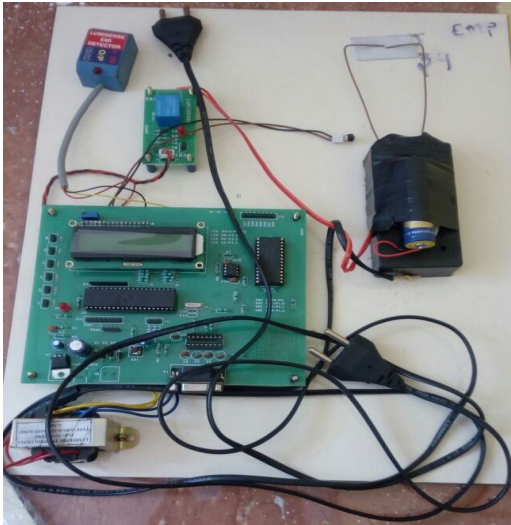


Fig.10 Proposed System

ADVANTAGES

- EMP devices play effective role in termination of burglar devices
- Technically feasible with new applications
- Easy to identify the target
- Highly automated and detection is precise

APPLICATIONS

- Trial rooms in textile shops
- Smart cities
- Banking sectors
- Military warfare
- Medical applications

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- [10] REMCOM Xfdtd 7, <http://www.remcom.com/xf7> 315 South Allen Street, Suite 416, State College, PA 16801 USA