A Research on Electronic Component Wrecker Using Electro-Magnetic Pulse (EMP)

T. Tamilselvi1, K. Kayalvizhi, B. Rajapandian, N.NithyaRani



ABSTRACT--- An EMP (Electro-Magnetic Pulse) has the destructive tendency to destroy any electronic equipment in its specified range, causing electronic equipment to malfunction. This makes the Electro-Magnetic Pulse one of the most devastating weapon in the world causing huge damage to any devices. We include all the bases of Electro-Magnetic Pulse generation and its possible causes & amp; effects on the nearby electronic components within its specified range capability. We introduced a novel system to destroy this kind of hidden cameras in the dressing rooms. In our project, using an application of we can eradicate the issues of the hidden camera for the women and children falling victims. The EMP will devastate any devices which it encounters on its range. We can also use this technology for military defense purpose in order to deactivate the hidden nuclear weapons.

Keywords—EMP(Electro-magnetic pulse), Direct Energy Weapons(DEW). safety, deactivate ,hidden electronic components, specified range.

I INTRODUCTION

The Electro-Magnetic pulse is used in various applications such as military, defense and safety purposes. Electromagnetic pulse is produced by rapid changing of electric magnetic fields which couples electronic equipment causing damaging current and voltage fluctuations. EMP pulse can be generated from any of these three technology namely Geomagnetic solar system, Nuclear Missile Detonation, EMP discharge device.

Various research are going on in shielding of electronic components or devices from EMP attack. A perfect shielding for EMP attack is still not devised, however Ferro-Magnetic cages provide protective shield but they are not used often because of its difficulty in installation and huge capital cost.

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T. Tamilselvi1*, Assistant Professor, Srisairam Engineering College, Department of EIE, Tamil Nadu, India.

(Email: tamilselvi.ei@sairam.edu.in)

K. Kayalvizhi, Research Scholar, SRM Valliammai Engineering College, Department of ECE, Tamil Nadu, India. (Email: kayal_sacet@yahoo.co.in)

B. Rajapandian, Assistant Professor, Srisairam Engineering College, Department of EIE, Tamil Nadu, India.

(Email: rajapandian..ei@sairam.edu.in)

N. Nithya Rani, Assistant Professor, Srisairam Engineering College, Department of EIE, Tamil Nadu, India.

(Email: nithyarani.ei@sairam.edu.in)

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The main objective of this paper is to analyze and design the electro-magnetic pulse device with detection, scanning, filtering and demolishing of electrical/electronic components. In this modern era, every device is made up of micro electronics in it. The idea behind this paper is electromagnetic pulse(EMP) tends to strike on any electronic components having micro-electronic which include hidden camera in trial rooms, telephone and mobile phones, vehicles and aircrafts, electric power grids and transformers, substations and satellites, computers and all inter connected devices, broadcast equipments etc..When an EMP pulse strikes any electric/electronic components, it would either damage them permanently/ temporarily or reduce their life span upto 30percent or less. The EMP device used in this project comes under the category of Direct Energy Weapon (DEW). Direct Energy Weapon (DEW) produces radiation in one particular direction without the use of projectile.

II. SHIELDING

There are several techniques to shield devices during EMP attack they are listed below:

By building a Faraday cage – a shield that covers /wraps entire device and redirecting the power to the ground by using a conductive metal container.

By grounding a shell around them and isolating them from EMP radiation.

By using a industrial grade ground fault isolation.

There are certain other protection technique based on period of time whether it is short-term, long term or global event they are:

In this technique, the device has to be wrapped with double layer aluminum foil and ensure that the wrap is well grounded this forms a simple Faraday cage.

The most cheapest Faraday cage can be made by using a steel garbage can with a couple of grounding rods. the steel of garbage can couples with EMP waves while under attack and discharges by grounding thus safeguarding the device inside the can.

A metal roof can be used to safeguard house or building from electro-magnetic pulse attack. During lightning or any other attack this shield interacts with EMP and redirect voltage and current surges to ground by heavy ground wires.

A purpose made containers electro-magnetic protection can be used to hold individual items (small electronic devices).



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Fig 1.Faraday cage

III. LITERATURE SURVEY

According to literature survey, novel hidden electronic component (camera) cannot be identified specifically. It can be identified only through the jamming the frequency signal of hidden camera. After jamming is switched off, a novel hidden camera starts to work. It is temporarily jammed and it is not very effective for all wireless camera device. To overcome this problem the electro-magnetic pulse is used to knock down the device invariably. It is constructive for ordinary citizen and military purpose.

Disadvatages

1. After the jamming signal is switched off, its starts to work.

2. Highly exorbitant.

3. Jamming the frequency signal for wireless camera only.

IV. PROPOSED METHOD

In our proposed system, this paper is used to analyze the electro-magnetic pulse devices for shielding mechanisms and detection purposes to counter the warning as well. The main proposed action to strike an electrical/electronic component to discontinue its functionality and calamitious malfunctioning in their design which would demolish its device permanently or reduce their stability. Electromagnetic pulse work under their category of Direct Energy Weapons (DME). This Direct Energy Weapon inflicts a damage at the target emission of highly focused energy including laser, microwaves and particulate beams. This effect may not cause to human beings. This paper lies in the designing, analyzing, constructing on the behavior with electronic component devices. This major for the women safety purposes in trail rooms, hotels and rest rooms. Scanning:

Micro scanner is unfold which is not needed by an infrared scanning system. On which an array of infrared detector is moved up. Radiation is concentrated on the array of analyser by a lens system and the member is shifted to scan the scene of engrossment.

Another side of the carry member an array of emitters is fixed and it is important to interface detector array with the emitter array is fixed on the outer surface of the carry member.

The middle part of the carry member also includes a very low temperature mechanical refrigerator for cooling analysers array. A Broadcast diaphragm is concentrated on the ejectors array to build a broadcast resemblance of the scene scanned.

A scanner system for scanning scene of regard contain an image turning fellow including a couple of visual columnar lens elements location in a focal manner.

An array of frequency wave analyser in the way of the turning image of the scene, told that the detector having a large number of electron tube required order in a established pattern.

Filtering

To separate the AC elements or filter them out in a rectifier loop, a filter loop is recycled. A Filter loop that is a gadget which is used to separate the A.C elements of the rectifier result, where as it enable the DC elements to maintain the range of the load. A filter loop is in the mixture of inductor (L) and capacitor (C) namely called as LC filter circuit. A capacitor permits AC only and inductor permits only to pass.

A filter loop which as the passive loop element it consists of inductors, capacitors, resistors combination of these three elements its setup made. The action of the filter mainly depends on the electrically properties of the passive loop elements. The rise of voltage cycle which gets charged when capacitor filter is connected across the load after this the charge is supplied to the load while there is decrease in the voltage cycle. For each cycle the mechanism is repeated and the repeal is decreased near the load.

EMP filters are arranged in such a way that the prejudicial and screw up the property of an EMP as well as feeding security across the surges formed by solar flares, nuclear weapons and fulmination sock. The uniquely arranged standard filters, which can be observed in work for electromagnetic pulse carrying out can be refined for homeland bond, military, public favour or commercial application.

V. CAMERA DETECTION

The camera can be detected by luminence EMI detecting sensor. Detecting electronic component via RF can be even easier. Most detectors will beep when they find a signal, giving an audible indication when you get near a potential camera. After detecting, it will display in the LCD . The ADC signal receives from the electro-magnetic pulse (sinusoidal signal converts to digital).



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Fig 2.Camera Detection

VI. HAEDWARE DESCRIPTION

In our project, we mainly used the Maxwell Generator to deactivate the hidden electronic components. This specification mainly used in military and civilian purposes. Faraday law is applied. This type of EMP can deactivate critical pieces of electrical/electronic components. It can damage by an EMP and shield from an EMP attack. The EMP device used in this project comes under the category of Direct Energy Weapon (DEW). Direct Energy Weapon (DEW) produces radiation in one particular direction without the use of projectile. The below block diagram shows overview of detecting and deactivating:



Fig 3. Overview block diagram of this project

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VII. WORKING

The main working of EMP device is to produce high intensity electro-magnetic spark. This spark is used to destroy the device partially or completely. This device comprises of two main units namely,

- Power supply unit
- Control unit

la.Power supply unit

Initially, the 230V AC power from the main supply is reduced to 12V by use of stepdown transformer. The stepdown transformer consists of moreprimary winding than secondary winding turns. Ac voltage is stepped down and current is stepped up, thus reduces the voltage from primary to secondary winding. This 12V AC power is then connected to the kit, but it cannot be connected to the controller and other device directlyas it is 12V AC which is converted to digital pulse. In order to convert analog to digital pulse, Bridge rectifier is used. Bridge rectifier comprises of four or more diodes which produces unidirectional or direct current at the load by conducting a set of diodes for every half cycle of the input signal. During negative half cycle of the input AC waveform, diodes D3 and D4 are forward biased and diodes D1 and D2 are reverse biased. The current starts flowing through D3 and D4 diodes. Duringpositive half cycle of the input AC waveform, diodes D1 and D2 are forward biased and diodes D3 and D4 are reverse biased. The current starts flowing through D1 and D2 diodes. Thus 12V AC is converted to 12V DC waveform.

The 12V DC power from the bridge rectifier is fed to smoothing capacitor. The smoothing capacitor in the range of 1000 micro Farad which helps to reduce noise signals in 12V DC waveform. Smoothing capacitors are used to suppress voltage ripples by practically storing and replenishing energy. The below Figure shows the resultant output waveform of smoothing capacitors in case of full bridge rectifier.



Fig 4. Output waveform

The noise free signal from the smoothing capacitor does not contain 12V DC power, as it passes several components there may be some loss in the power signal. This power loss can be rectified by using voltage regulator.



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A voltage regulator is a voltage stabilizer that automatically stabilize a constant voltage level by using a simple feed-forward design or negative feedback circuit. This circuits consists of four parts namely reference voltage circuit, error amplifier, series pass transistor, feedback network. Thus constant 12V DC power supply is obtained.



Fig 6 Power supply unit

This 12V DC power is fed to jumpers. Jumpers are used to separate the power from 12V DC to +12V and +5V. The kit consists of three +12V and three +5V jumpers which then this power supply is fed to several components in the device. A jumper is a tiny metal connector that conducts electricity, and is sheathed in a nonconductive plastic block to prevent accidental short circuits. A sleeve or shunt is draped over the pins to allow current to pass other circuit points. Power supply unit is completed and moving on to control unit.





1b.Control unit

The Pic micro controller(16F877a) is used as the controlling unit for EMP device. This controller consists of 40 pins out oft his 33 pins are used for input/output operation and four ports namely port-A, port-B, port-C, port-D. In this device port-A is used for I/O connection. The signal from the EMI detector is fed to controller kit. This signal is controlled by using a special camera detection algorithm. The detector signal is passed to ADC (Analog to digital converter) which consists of eight channels. This digital pulse is fed to the controller via port-A. Then the control signal is fed to 2*relay. This relay acts a switch that opens and closes the

circuits electromechanically or electronically. The EMP device consists of generator, inverter, battery, etc. The EMP spark or waves can be produced by using two types of generators namely,

- Vandy craftgenerators
- Maxwell generators

Here in this device, the digital pulse is again converted to Analog pulse. This pulse is then fed to Maxwell generator. Maxwell generator is used which converts 9V AC to 3000V, 4000V. The interior circuit comprises of series of capacitance and step up transformer. This generator is connected with battery that can be charged and discharged easily from two electrodes are connected. This two electrodes are normally open. The 3000V power starts to dissipate from this electrodes and this power breaks the resistance in air and creates conductivity. Thus the air around the electrode get ionised, and searches a way to ground. This ranges from 5 to 10 meter circumference.



Fig 8. Maxwell Genarator

Thus, any hidden electrical/electronic devices can be deactivate by using Electro-magnetic pulse (EMP) its shielding.

VIII. RESULTS

Thus in this we can destroy the electronic component. This device can be used like handheld by using technology called Surface Mounted Device (SMD). The future of EMP technology in modern welfare looks really bright indeed due to its destructive effects which destroys any system containing micro electronics. It can detect the devices with over a range 10 metres. It produce a voltage of more than 3000V and frequency range of 12mhz. This voltage cannot affect human beings it deactivate the hidden devices.



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Fig 9 Output of deactivating novel hidden devices

IX. CONCLUSION

The idea behind this paper is electro-magnetic pulse(EMP) tends to strike on any electronic components having micro-electronic which include hidden camera in trial rooms, telephone and mobile phones, vehicles and aircrafts, electric power grids and transformers, substations and satellites, computers and all inter connected devices, broadcast equipments, military and civilian purposes etc..This device can be used like handheld by using technology called Surface Mounted Device(SMD).

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