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An Electric Vehicle Charge using Capacitive Plates Wireless Power Transfer [WPT] and Accident detection Sensor

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Abstract **The wireless charging in Electric vehicles is the development trends of EV.In this project electric vehicles can be defaultly charged with battery setup and its charging system based on wireless power transfer using two capacitive plates,as vehicle chasis and the earth ground work as two plates in the conventional four plate CPT system.Therfore only two External plates are required.It shows that the voltage on vehicle chasis can be reduced through switching frequency when it switches to particular voltage it redirects the battery set up to charge through capacitive plates,which produce inductive capacitance to promote the power to charge from the external grid or station with supply of power to the plates which embedded on the road. Both of the plates produce sufficient energy to the vehicle to run Eco-friendly with this additionaly the accident detection sensor between two vehicles can be introduced with IOT based technologies**

1. INTRODUCTION:

Capacitive Power Transfer (CPT) is a promising technology to achieve wireless power transfer (WPT) . It utilizes high-frequency electric fields to transfer power, which can also be called electrical resonance. In recent years, different circuit topologies have been proposed to realize both short- and long-distance CPT systems and promote the practical applications. Conventionally, a CPT system utilizes four metal plates, horizontally [4] or vertically [7] arranged, forming two capacitive couplers to transfer power. Two plates are installed on the primary side as a transmitter, and the other two are at the secondary side as a receiver. There are coupling capacitances between plates, allowing the displacement currents to flow through.

2. SYSTEM STRUCTURE:

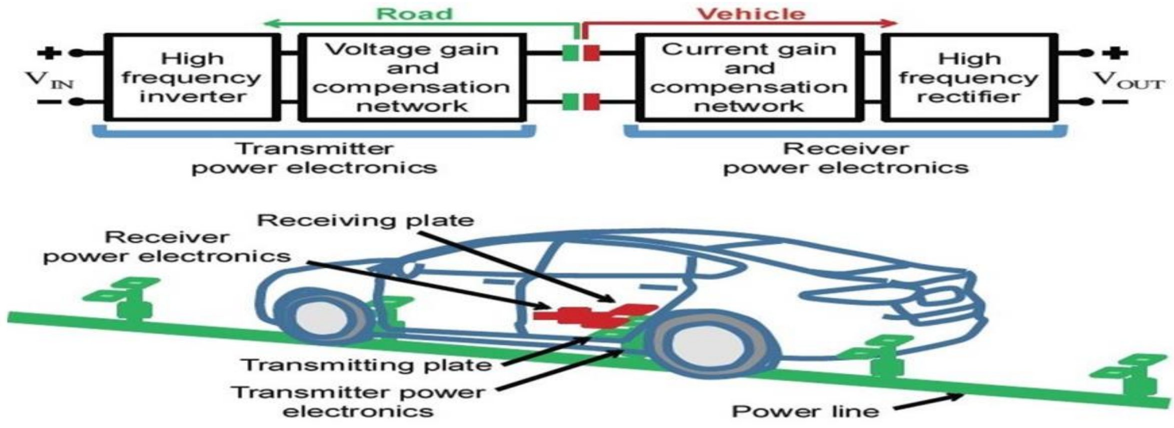

Figure1 power transfer using plates

To simplify the capacitive coupler structure in vehicle charging applications, this letter proposes a two-plate capacitive power transfer system. The vehicle chassis and the earth ground work as two plates in the conventional four-plate CPT system. Therefore, only two external plates are required. The stray capacitance between the chassis and the ground is used as the current-flowing path,

resulting in a compact system structure.

In this proposed CPT system, the voltage on the vehicle chassis should be reduced for safe operation

The structure of a two-plate CPT system for electric vehicle charging applications is shown in Fig. 1.

On the primary side, an inverter is used to provide an AC excitation, followed by a compensation circuit. The earth ground P1 and a metal

plate P2 work as the transmitter here is an insulation layer between them.

The parasitic capacitance between the vehicle chassis and the earth ground is used as the current returning path. In practical applications, the earth ground can also be connected with a metal plate to further reduce the conductive loss. It needs to be emphasized that this ground-side plate is optional. If it is used, it should have a good connection with the earth ground. For example, it can be buried into the ground to maintain a good connection. Then, as long as the connection with the ground is good enough, the size of the ground-side plate can be much smaller than the vehicle chassis

1.Sensor Unit: While the implementation of computation and communication modules changes depending on the resource requirements of the application, it is definitely the case that the most application- specific part of a sensor node is its sensing module. A given application will be required to monitor certain physical parameters or detect specific events. This in turn requires specific sensor units that have the ability to fulfill these application demand

2.Power Unit: Underlying all other node module is the power module. Its main task is as simple as it is important, namely in providing as table power supply to all active components of the sensor node system. This means it converts the input fromthe energy source into acceptable levels in order to power the connected devices. How this conversion actually appears will generally depend on the type of energy source used for the sensor nodes. In some cases the sensor node might be able to receive power from the main power supply ,requiring some kind of AC-DC conversion. However, especially in EM-WSN applications

3.Sensor Node Design:

Since IoT applications may require large numbers of sensor nodes, their specifications are very important for application performance, e.g., the in situ distributed wildfire detection selected as reference for the reusable WSN platform design. One of the most important requirements is the sensor node cost reduction. Also, for low application cost the sensor nodes should have a long, maintenance-free service time and support a simple and reliable deployment procedure. Their physical size and weight is also important, especially if they are transported in backpacks for deployment. Node energy source can influence several of its characteristics. Batteries can provide a steady energy flow but limited in time and mayrequire costly maintenance operations for replacement. Energy harvesting sources can provide potentially endless energy but unpredictable in time, which mayimpact node operation. Also, the requirements of these sources may increase node, packaging and deployment costs. Considering all these, the battery powe nodemay improve application cost and reliability if their energy consumption can be satisfied using a small battery that does not require replacement during node lifetime. The sensor node energy consumption can be divided into:

- RF communication, for data and network maintenance.
- Processing, e.g., transducer data, self-checks.
- Sensing, e.g., transducer supply, calibration.
- Safety devices, e.g., watchdog timer, brown-out detector. Power down energy required by the node components in their lowest power consumption mode.

4.Buzzer Section:

This section consists of a Buzzer.

It is sometimes used to indicate the start of the embedded system by alerting during the buzzer is used to alert indicate the completion of process.

3. PIC CONFIGURATIONS:

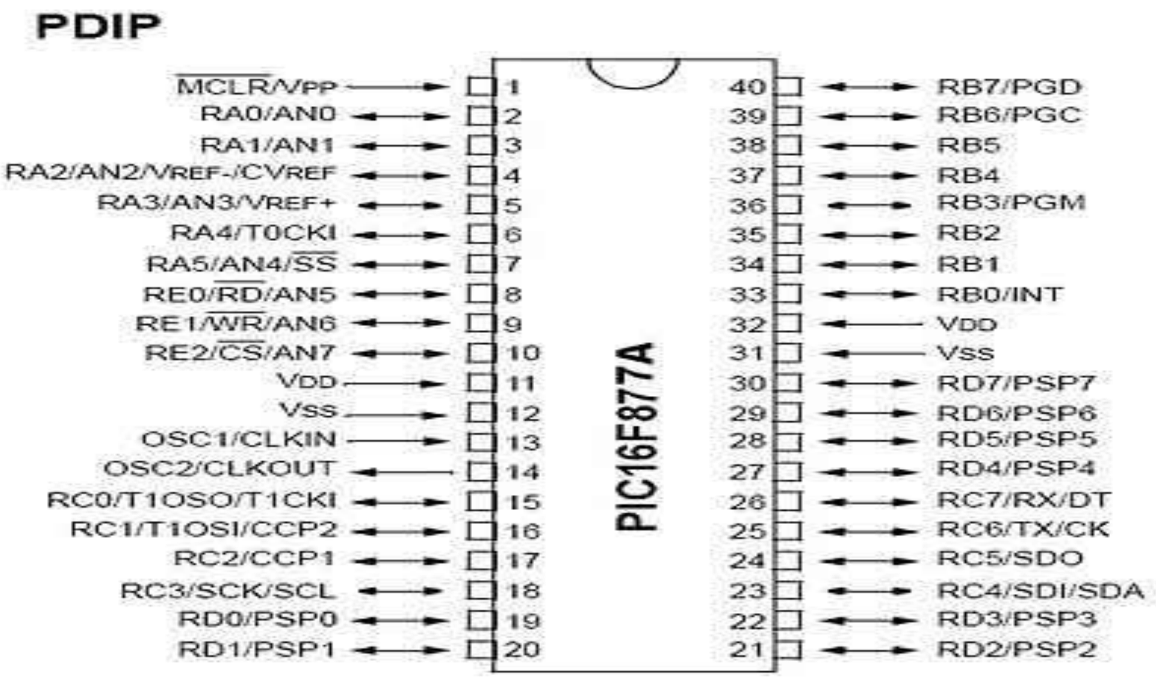

Figure 1: Pin configuration of PIC16F877A

PIC:

In this project, PIC16F877A is used. This is used because it has all the peripherals like Timer, ADC, PSP, USART, SPI, I2C, EEPROM, CCP, etc

RISC has 35 instructions and the peripherals here to be enabled are USART and PSP.

Since the ground-side plate directly connects with the compensation circuit, all the parasitic displacement currents from the chassis to the earth ground will be aggregated to this ground-side

It is a 40 pin RISC machine of Hardware architecture with following specifications:

- Operating frequency : 4 MHz
- ROM : 8 kb
- Operating voltage :8V

USART:

USART is a serial communication of 9600 bps.The receiver gets the information from the NFC tag Here, it is used to control the NFC and the IOT device.

and the transmitter sends the information to the IOT.

For the IOT transmission, two MAX232 IC's are used. One for the connection from PIC controller to the IOT interface's MAX232. Two IC's are used because of the variation in the operating voltage. IC provides 5 V and the IOT operates on 3.3 V. To compensate these conversions these IC's are interfaced.

PSP:

The Parallel Slave Port is used for the interfacing of LCD display to see the status of the kit.

LCD:

LCD is used here for displaying the current progress of the system. Here used is the 16*2 character display of 5*7 Dot-matrix boa

4. CONCLUSION

This letter proposes a two-plate compact CPT system for electric vehicle charging applications. The vehicle chassis and the earth ground are exploited to transfer power, which can simplify the structure of the CPT system. The voltage on the vehicle chassis is studied, which provides three methods to reduce the chassis voltage for safe operation. A 3.0 kW two-plate CPT system is designed for an electric vehicle. When the switching frequency is 6.78MHz and the compensation circuit is well designed, the chassis voltage can be limited to 8.35V, which is safe for humans. Also, a downsized 350 W downsized prototype is implemented with a 132V chassis voltage. In the future prototype design, the switching frequency will be increased and the compensation circuit will be improved to further reduce the chassis voltage

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