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Electric Vehicle Supply Equipment

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ABSTRACT:
The primary reason why people don't prefer electric vehicles is because of the unavailability of charging stations. Charging stations, unlike petrol bunks, aren't available everywhere. There always exists a fear as to what might happen if the vehicle runs out of battery. People are worried about more straightforward and faster commuting methods in our country rather thansaving the Earth from the ill effects caused by pollution. The project mainly deals with a simple solution to make charging stations more accessible. The solution involves using public electricity and solar panels for the easy and hassle-free charging of Electric Vehicles. This project consists of a scaled down prototype.

Keywords : Electric Vehicle Charging Station, Pic Microcontroller (16F877A), Relay, Energy Meter ,Sensors.

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1. INTRODUCTION

A charging station, also known as a charge point or electric vehicle supply equipment (EVSE), is a piece of equipment that supplies electrical power for charging plug-in electric vehicles (including electric cars, electric trucks, electric buses, neighborhood electric vehicles, and plug-in hybrids).

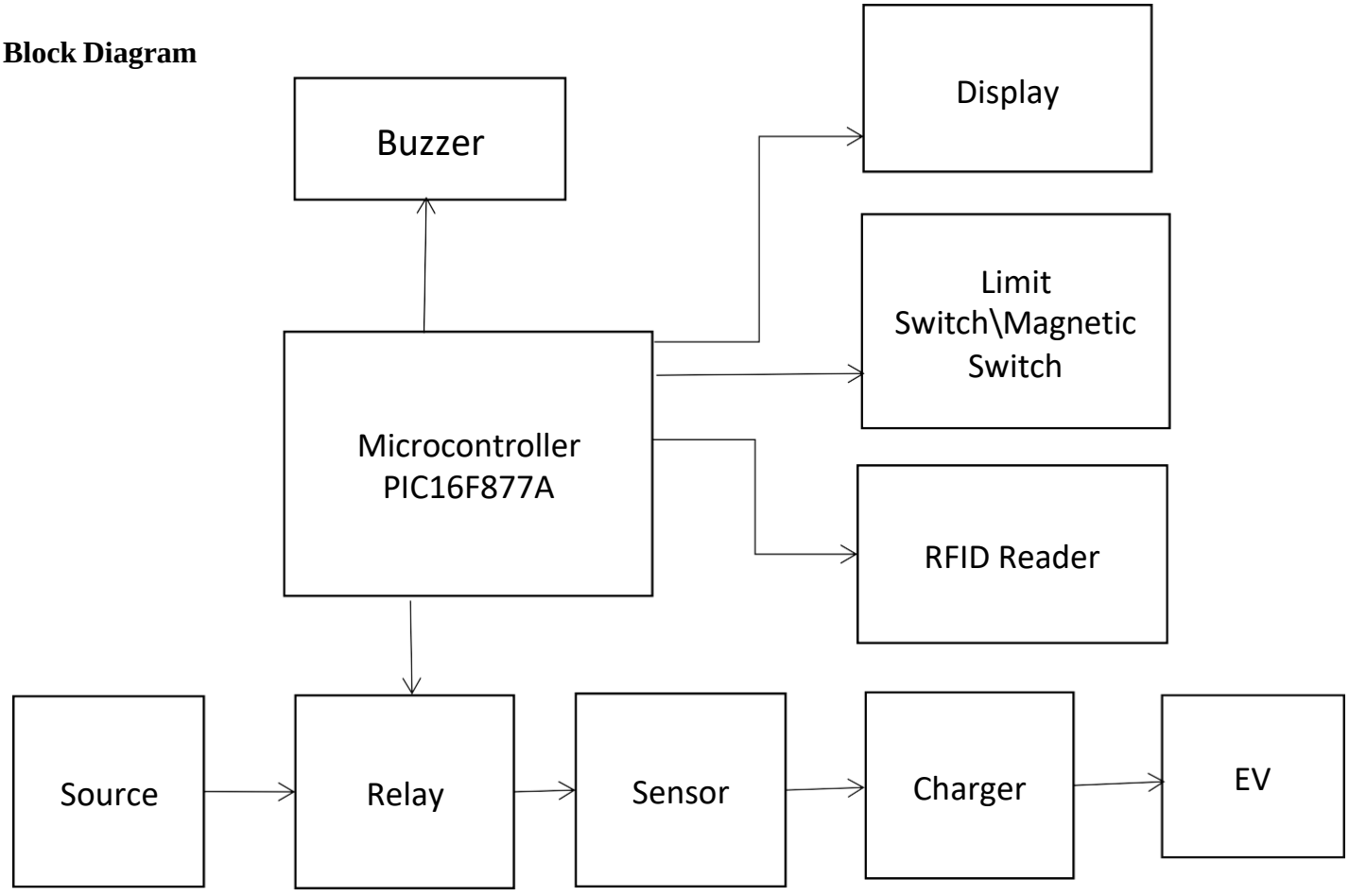
There are two main types: AC charging stations and DC charging stations. Batteries can only be charged with direct current (DC) electric power, while most electricity is delivered from the power grid as alternating current (AC). For this reason, most electric vehicles have a built-in AC-to-DC converter, commonly known as the "onboard charger". At an AC charging station, AC power from the grid is supplied to this onboard charger, which produces DC power to charge the battery. DC chargers facilitate higher power charging (which requires much larger AC-to-DC converters) by building the converter into the charging station instead of the vehicle to avoid size and weight restrictions. The station then supplies DC power to the vehicle directly, bypassing the onboard converter. Most fully electric car models can accept both AC and DC power.

Charging stations provide connectors that conform to a variety of international standards. DC charging stations are commonly equipped with multiple connectors to be able to charge a wide variety of vehicles that utilize competing standards.Public charging stations are typically found street-side or at retail shopping centers, government facilities, and other parking areas. Private charging stations are typically found atresidences, workplaces, and hotels.-Electric vehicle charging infrastructure is moving towards utilizing renewable sources of energy like solar and wind, and vehicle to grid (V2G) or Bidirectional chargers are stepsin this direction. On the other hand, to reduce range anxiety among EV owners and to make using EVchargers easier, wireless charging of electric vehicles is also creating a buzz in the automotive market space.

To get steady and constant direct current voltage at the output side. There is no combine charger or charging station available in market to charge the two-wheeler and four-wheeler at a time. Cause to charge any vehicle we have to charge it through separate charging station. For charging two-wheeler go for another charging station and to charge four-wheeler go for another charging station. To provide charging station on the city side there is less chances to get 3 phase supply to charge vehicle ghastly.

2. MATERIALS AND METHODS

Block Diagram



Description Of Block Diagram

Distributed charging stations was connected in inverter refer to IEC 61851 part 22 standard of AC electric vehicle charging station, IEC 62196 for the plugs, socket-outlets, vehicle couplers and
vehicle inlets, and ISO 15118 for road vehicles in communication protocol between electric vehicles and grid. Figure 2 described the design of the electric charging vehicle consist of the display and indicator to inform the state of charging, and the control unit based on Microcontroller. Microcontroller provided current and voltage measurement to obtain the consumed power of EV which was stored in memory both in microcontroller temporally and transmitted into PC for permanent story of power consumption records. In this development, the control unit employed a microcontroller pic16F877. The MC also interface to the central control system (personal computer) using RS485 communication method to send the information of time and power consume. While, the panel display include the indicator of standby, under preparation, under running condition, and also display the power consume by user. In addition, the system provide the self-identification of state to prevent the malfunction. The system also provide the safety circuit by limit switch to guarantee the AC plug returned back to the panel system after charging of the EV

Components :

- Temperature Sensor - Temperature monitoring and control is important in industry environments. Sensors are widely used for measurement of temperature. Usually, a temperature sensor converts the temperature into an equivalent voltage output. IC LM35 is such a sensor. Here we describe a simple temperature measurement and display system based on LM35 sensor and PIC16F877A microcontroller. The temperature in degrees Celsius is displayed on a 16×2 LCD.

- Relay - A relay is an electrical device that is operated as a switch. It consists of sets of input terminals and output terminals for single control signals or multiple control signals and sets of an operating contact terminal. The relay switch can have any number of contacts in many contact forms, such as the normally open circuits and the normally closed circuits or combinations of both the circuits. It can easily beturned ON or OFF and let the current go through or not, and the relay can also control it with very low voltages of 5V connected to a battery provided by the Arduino pins.

- Fire Ditector Sensor - Fire Ditector Sensor-Flame senor IR receiver collects these IR ways waves emits due to fire burning. This IR receiver is connected with operation amplifier which provides the output in the form of voltage at the output of this sensor.We will simply connect this output with pic16f877a microcontroller and process this information to turn on alarm or buzzer which we will connect with pic

- microcontroller as a output. So whenever fire or flame is detected around flame sensor. Output pins goes high and you will notice 5 volt at the output pin D0 of sensor and when no fire is detected output pin D0 will give logic low or zero volt.

- Digital Energy Meter-The electricity meters operate by continuously measuring the amount of instantaneous voltage and the amount of current and finding the product of these to give the immediate electrical power, which is then integrated against the time to provide the energy used for charging.

PIC16f877A Microcontroller Schematic Diagram

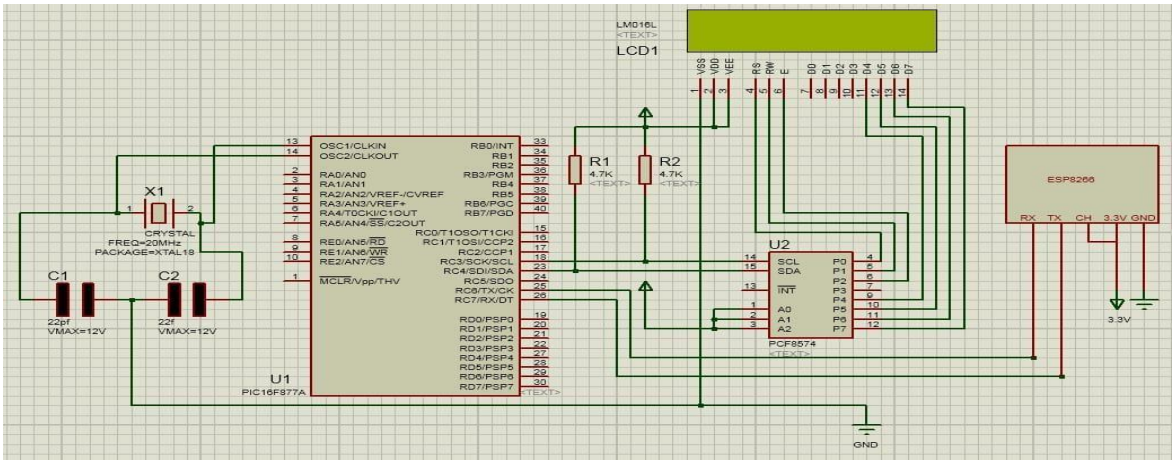


Figure 2.1: PIC16f877A Microcontroller Schematic Diagram

3. METHODOLOGY

This methodology applies to the charging of electric vehicles (EVs) through EV charging systems, including their associated infrastructure, whose GHG emission reductions are achieved through the displacement of emissions from conventional fossil fuel vehicles used for passenger and freight transportation as a result of the electricity delivered by the project chargers.This methodology provides easy-to-use monitoring parameters to quantify emission reductions, and also establishes default factors for the estimation of certain parameters for projects located in the United States and Canada as an alternative to project-specific calculations.

Finally, this methodology is applicable globally and provides a positive list for determining additionality for regions with less than five percent market penetration of electric vehicles. The positive list is found in VCS methodology module VMD0049 Activity Method for Determining Additionality of Electric Vehicle Charging Systems.

4.RESULT AND SIMULATION

Simulation And Result

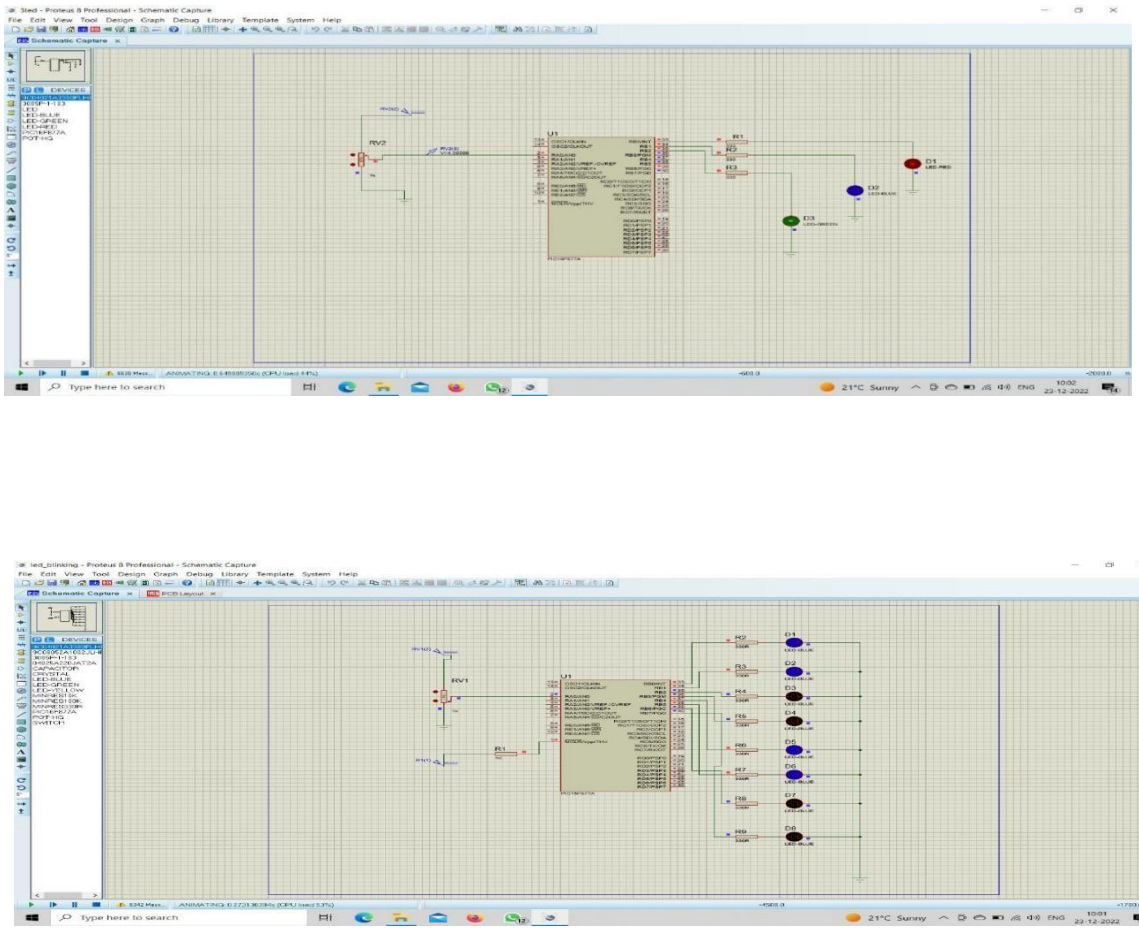


Figure 4.1:Simulation And Result

Calculation

P= Power, V= Voltage, I= CurrentP = V*I

P = 12*10

P = 120 Watts

Therefore, the time required to charge from 0 to 80% is 1 hour. (When 10A is supplied)

Note: Input = 220V AC, the charge adapters have a nominal output of 12V and 5A.

P = V*I P = 12*5

P = 60 Watts

Therefore, the time required to charge from 0 to 80% is 2 hours. (5A is supplied)

The total Theoretical time calculated to charge from 0to 100% is approximately 1 hour and 15 mins for solar charging and 2 hours 30 mines for standard charging.

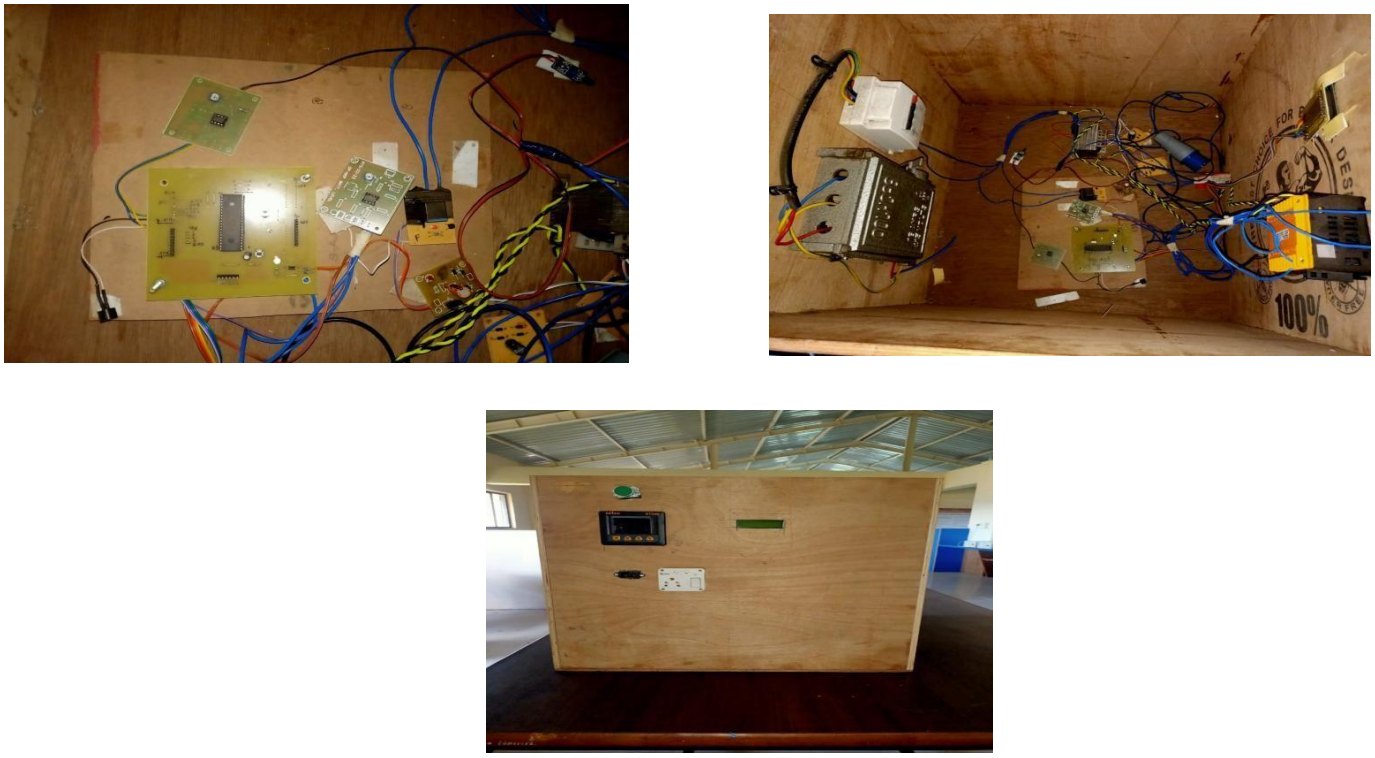


Figure4.2:Hardware

At its most basic, an EV charger pulls an electrical current from either a 230v outlet or the grid it's hardwired to and delivers that electricity to the vehicle, just like any other appliance or device you charge by plugging into the wall

5. Conclusion

Both developed and developing countries have become more active in EV introduction and diffusion. In developed countries, the government has led the promotion of next-generation environment-friendly vehicles. In the industrial world, not only conventional auto manufacturers but also large and small enterprises have joined the EV business as new business opportunities. In accordance with the implementation of many pilot projects and EV related events, public expectation on EVs is high. However, there is no clear indication for full-fledged diffusion. This is because of high prices of EVs, limited models, lack of charging infrastructure, and lack of trust in the market in terms of life span of EVs and safety. On the other hand, big auto manufacturers have become bolder in EV development, which is seen to address the above-mentioned problems and accelerate EV diffusion. This EV charging system aims to subsidize and nullify the effect of these factors and provide a user-friendly design for charging. requirements. A fast-

charging module is connected to the system, which boosts the power level and enhances the speed of charging.

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