Advances Hardware Engineering Project Specification

Smart Weather Monitoring System

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Project Description: -

- **Hardware Specifications**: The project would be designed to realize Internet of things (IOT) application on FPGA. The IOT project would use NEXYS A7 FPGA package for its hardware processing requirements. The IOT project would measure room temperture using PMOD TC1 K type themocouple module temperture sensor.

The project would use PMOD HYGYRO Digital humidity sensor to measure humidity. The measured data will be displayed on a PMOD LCD display. PMOD Esp32 wifi module will be used as a communication protocol to transmit data. A suitable device will be used as an IOT node for the LCD display.

- **Software specifications**: Vivado IDE will be used to realize Microblaze processor core IP for the data processing requirements. Suitable external peripheral IPs will be added such as an IP for the Wi-Fi module. The project will then be proceeded for realization using C programming language in VITIS IDE. Xparameters.h and other necessary libraries will be used in the programming process.
- **Block Diagram of the IOT project:**

```
Character
LCD
Display
(Node)                                      TC1
                                         Thermocouple
              PMOD SPI Interface          module

WIFI communication

ESP32 wifi          NEXYS A7
module              FPGA
         SPI INTERFACE

                              PMOD I2C interface

                                          HYGYRO
                                          Digital
                                          humidity
                                          sensor
```