RS485 based SCADA system for longer distance powered devices

This project aims at building an efficient and automatic power survey system, which is capable of monitoring the electrical parameters of high voltage devices, which are present in real time industrial environment. The system makes use of RS485 based communication which is suitable of transferring data over longer distances.

The RS-485 is the recommend standard by the Electronic Industries Association (EIA) that specifies the electrical characteristics of generators and receivers that may be employed for the interchange of binary signals in multipoint interconnection of digital equipments. When implemented within the guidelines, multiple generators and receivers may be attached to a common interconnecting cable. An interchange system includes one or more generators connected by a balanced interconnecting cable to one or more receivers and terminating resistors.

This project consists of two Microcontroller based motherboards one dedicated with the sensors and the other at the display end. This display unit is provided for the user interface to view the parameter levels. Both the controllers are connected using Rs-485 cables for transmitting the data from one to other. The Receiver controller receives the data from the other microcontroller and takes the responsibility to display the data into the LCD.

The motherboard at the other end is provided with few sensors such as voltage sensor, current sensor and frequency sensor. These sensors monitor the load conditions of the device to which it connected and provides the same to the controller. The sensors, which we are employing, are meant to monitor very high voltage devices that we come across in industrial environment. There is a requirement for very sensitive interfacing between the sensors, controller and the high voltage devices. These interfacings protect the controller from damage. We also make use of the ADC module which available internally in a microcontroller to read the input from these sensors.

The major features of this project are:

1. Usage of RS-485 communication.
2. Different parameter monitoring.
3. Low power consumption.

The major learning's of this project are:

1. Implementation of ADC module.
2. LCD interfacing with Microcontroller.
3. RS 485 communication protocol.
4. Embedded C programming.
5. PCB designing.

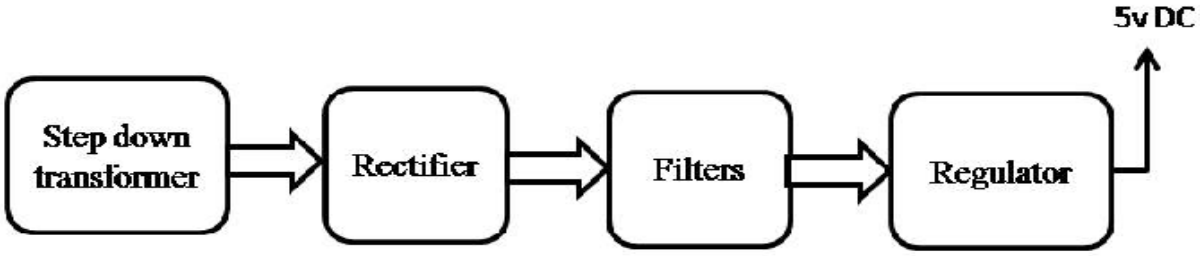
The major building blocks of this project are:

1. Regulated power supply.
2. Microcontrollers.
3. RS 485 transceivers.
4. Voltage sensor.
5. Current Sensor.
6. Frequency Sensors.
7. Temperature Sensor.
8. Reset.
9. LCD display with driver.
10. Crystal oscillators.
11. LED indicators.
12. IR sensor.

Software's used:

1. PIC-C compiler for Embedded C programming.
2. PIC kit 2 programmer for dumping code into Micro controller.
3. Express SCH for Circuit design.
4. Proteus for hardware simulation.

Regulated Power Supply:



Block Diagram:

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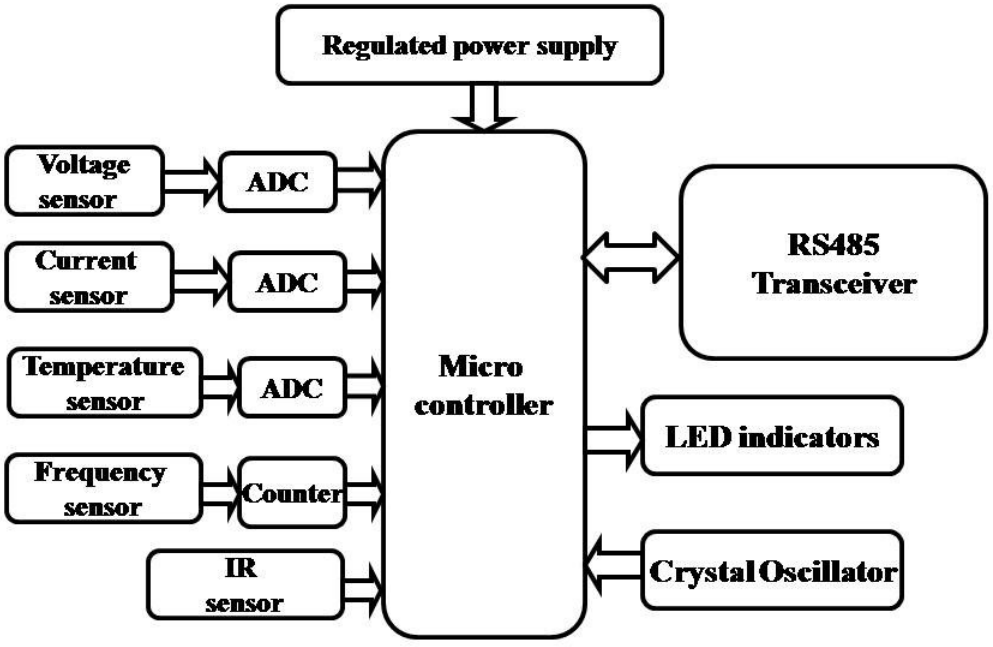
1.Transmitter Section



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2.Receiver Section