Title: Measure 0 to 100Vdc using micro controller

Select a Microcontroller:

Microcontroller: PIC18F4580

Features: 10-bit ADC, multiple I/O ports, sufficient processing power for ADC operations.

Select Suitable Compiler:

Compiler: MPLAB XC8 Compiler

IDE: MPLAB X IDE

Write Algorithm for Measurement:

Algorithm:

1. Initialize the microcontroller and ADC module.
2. Continuously read the analog input voltage.
3. Convert the ADC value to a corresponding voltage.
4. Scale the voltage to the original input range (0-100V).
5. Display or transmit the measured voltage.

Calculate Achievable Theoretical Accuracy:

ADC Resolution Calculation:

-ADC Resolution: 10-bit (1024 levels)

-Reference Voltage (V_ref): 5V

-Voltage per ADC Step:

5V/1023 ≈ 4.88mV

Input Voltage Range:

-Voltage Divider Ratio: 20:1 (100V to 5V)

-Voltage per ADC Step in Input Range:

4.88mV×20

=97.6mV

4.88mV×20=97.6mV

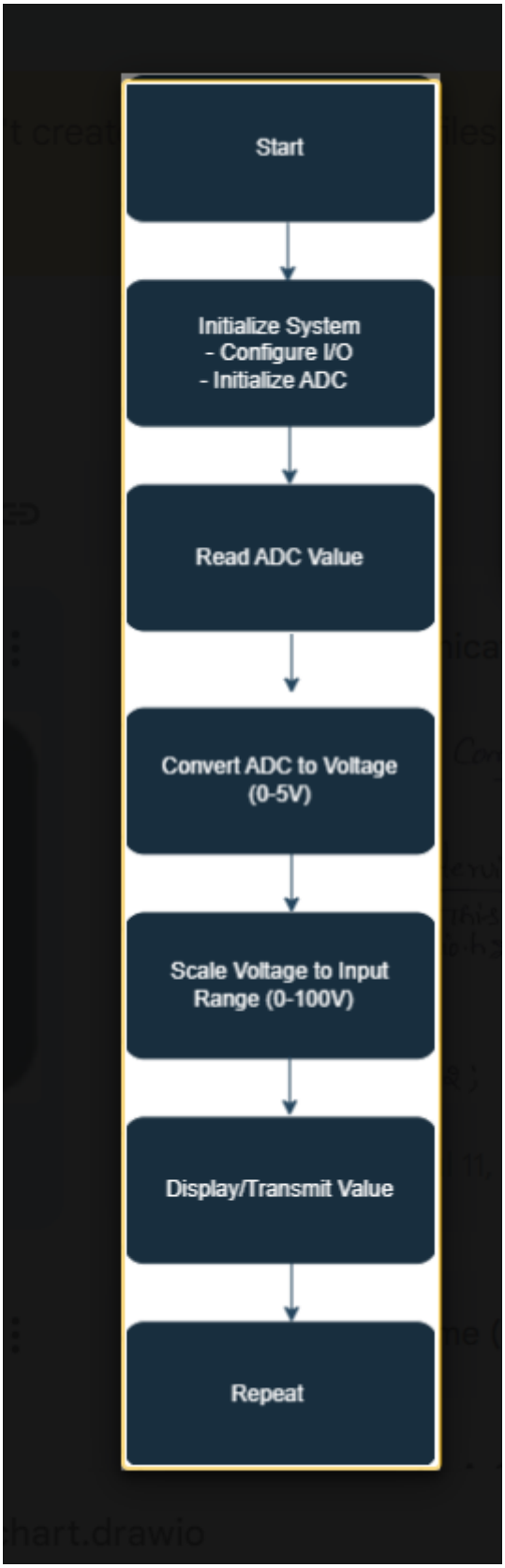
Theoretical Accuracy:

Theoretical Accuracy: ± 1 step in ADC

Accuracy in Input Range: ± 97.6mV

Therefore, the theoretical accuracy of the system for a 0-100V input range is approximately ± 97.6mV.

FLOWCHART


Start
Initialize System
- Configure I/O
- Initialize ADC
Read ADC Value
Convert ADC to Voltage
(0-5V)
Scale Voltage to Input
Range (0-100V)
Display/Transmit Value
Repeat