Document Title	HSI of Digital Calculator
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Document Change History				
Version	**Author**	**Date**	**Change**	**Status**
1.0	Esraa Awad	23/1/2020	Initial creation	Draft
1.1	Esraa Awad	30/1/2020	-Change in Requirement`s names. -Change in system hardware block diagram adding external switch for powering LCD on and off.	Draft
1.2	Esraa Awad	1/2/2020	Adding tactile switch in pin configurations and hardware description tables	Draft

Table of Content

Index of Figures

Hardware Description

Hardware	Description
AVR ATmega32 (MCU)	Low-power Microchip 8-bit AVR RISC-based microcontroller Program Memory Size 32 (KB) Pin Count 44
LCD (LMB161A)	LCD Mode: STN Positive Transflective Display Color: Dark Blue Background Color: Yellow-Green Driving Duty: 1/16 Duty Viewing Direction: 6:00 Backlight : LED
4*4 Keypad	Four rows of matrix and four are columns of matrix. 8 pins are driven out from 16 buttons present in the module.
Buzzer	Resonant: 2300 +/-300HZ Frequency: 2300 +/- 300 HZ Rated Voltage: 5V Voltage range: 4: 8 V Rated Current: 30 ma Min Sound output at 10 cm: 85 dB
Tactile switch	tactile switch button is released and the pressure has been took off has 2 pins one for gnd and other for volt.

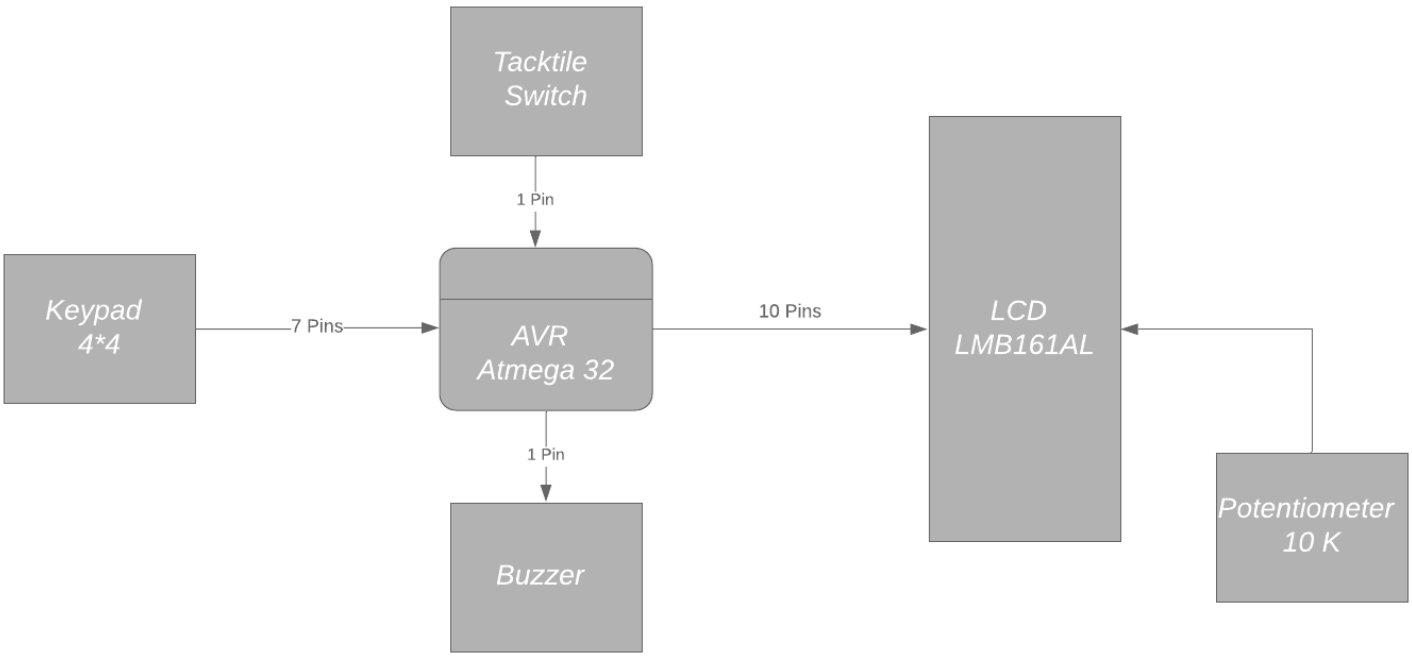

Figure 1.1 System hardware block diagram

Pins Configuration (ATmega32 AVR):

PORT	Configuration
PORTA	Pin(0:7) connected to data pins of LCD
PORTB	Pin(0:3) connected to control pins of LCD
PORTC	Pin(0:7) connected to Keypad pins rows (0:3 Output) and columns (4:7 Inputs)
PORTD	Pin 0 connected to Buzzer and pin 1 connected to tactile switch

Features description

Requirement Name	Hardware Requirement Description
Req_PO1_DGC_HSI_001_V01	Keypad consists of 10 numbers (0:9), basic operation keys (+-/*) and clear key, its eight pins are connected to MCU
Req_PO1_DGC_HSI_002_V01	Buzzer has 2 pins one GND and the other connected to MCU as output.
Req_PO1_DGC_HSI_003_V01	Micro controller 8-bit AVR ATmega32 has 32 DIO pins
Req_PO1_DGC_HSI_004_V01	LCD has 3 control pins and 8 pins for data to be displayed on its screen
Req_PO1_DGC_HSI_005_V01	A tactile switch has 2 pins one GND and the other connected to MCU as input for switching LCD on and off .