WIRELESS LOW COST BILLING WITH PRINTING SYSTEM

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Abstract –In this paper, we are going to see design of a system that helps to customers for weighting and billing. We will make a system which can give weight as well as printing using controller. Now day's systems have only weighting facility and they costly and require lager human power. Our project is for weight and printing (billing). We are making this system wireless by using remote control device. By using remote we can switch system on off and convert from lt to kg and vice versa. We are designing this system in low cost. It will save the time of customers and owner by giving direct print of bill .We except our project to be able to reduce human power when weighting and billing occur. We are creating the link between input weight, rate and corresponding result in prize output.

Key Words: Weight, printing, billing

INTRODUCTION

Now a day precise measurement and storage of weight is one of the most important activities in industries. The mechanical weighing machines are now replaced by the electronics weighing machine as electronic weighing machines are smart with the advantages like accuracy, reliability, and wide range. The Electronics weighing bridges are comparatively light weight and easy to operate with direct display. Earlier electronic weighing machine were designed using DPM, Microprocessor and Personal computer. The disadvantage of DPM type weigh machine has no facility to store data internally. Microprocessor and Personal computer based system cost is very high. To remove this drawback microcontroller based weighting machine is designed. This paper presents the software and hardware design, results and conclusion.

Motivation

We have found that now days only weighting system are present and they are costly. Also require large human power. This system only working on electrical supply and it consume large time. We are designing a system wireless using remote control. Also our system gives direct print of bill. Our system converts from ltr to kg and vice versa.

PROPOSED WORK

To implement calculation link between i/p weight, rate and corresponding result in prize output Writing the Code for weight measurement and printing the given i/p data and print corresponding output.

SCOPE:

This system can update it to Real time industry use. This system has remote monitoring and control by connecting a XBee with same configuration. This system has configuration for long distance.Fig.1 indicates Wireless low cost billing with printing system

BLOCK DIAGRAM

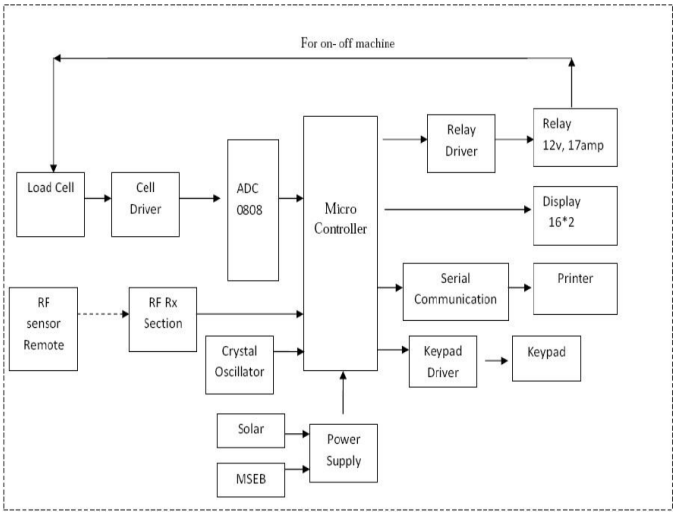

Fig.1 Wireless low cost billing with printing system

Fig.1 indicates wireless low cost billing with printing system and its component details is as follow

Microcontroller

Output of RF remote sensor and load cell is input to microcontroller. Load cell output is analog we have converted in digital with the help of ADC 0808 and fed to microcontroller. We are using 8-bit Microcontroller.

High Performance, Low Power AVR® 8-Bit Microcontroller

• Advanced RISC Architecture

– 131 Powerful Instructions – Most Single Clock Cycle Execution

– 32 x 8 General Purpose Working Registers

– Fully Static Operation

– Up to 20 MIPS Throughput at 20 MHz

– On-chip 2-cycle Multiplier

• High Endurance Non-volatile Memory Segments
• Peripheral Features
– Two 8-bit Timer/Counters with Separate Prescaler and Compare Mode
– One 16-bit Timer/Counter with Separate Prescaler, Compare Mode, and Capture
Mode
– Real Time Counter with Separate Oscillator
– Six PWM Channels
– 8-channel 10-bit ADC in TQFP and QFN/MLF package
Temperature Measurement
– 6-channel 10-bit ADC in PDIP Package
Temperature Measurement
– Programmable Serial USART
– Master/Slave SPI Serial Interface
– Byte-oriented 2-wire Serial Interface (Philips I2C compatible)
– Programmable Watchdog Timer with Separate On-chip Oscillator
– On-chip Analog Comparator
– Interrupt and Wake-up on Pin Change
• Special Microcontroller Features
– Power-on Reset and Programmable Brown-out Detection
– Internal Calibrated Oscillator
– External and Internal Interrupt Sources
– Six Sleep Modes: Idle, ADC Noise Reduction, Power-save, Power-down, Standby,
and Extended Standby
• I/O and Packages
– 23 Programmable I/O Lines
– 28-pin PDIP, 32-lead TQFP, 28-pad QFN/MLF and 32-pad QFN/MLF
• Operating Voltage:
– 1.8 - 5.5V for ATmega48PA/88PA/168PA/328P
• Temperature Range:
– -40°C to 85°C
• Speed Grade:
– 0 - 20 MHz @ 1.8 - 5.5V
• Low Power Consumption at 1 MHz, 1.8V, 25°C for ATmega48PA/88PA/168PA/328P:
– Active Mode: 0.2 mA
– Power-down Mode: 0.1 µA
– Power-save Mode: 0.75 µA (Including 32 kHz **RTC)**

Sensor

Strain Gauge Load Cells is act as a sensor, which sense physical quantity pressure and convert it into equivalent electrical anaolg signal. There is a strain gauge load cell, which is a mechanical element of which the force is being sensed by the deformation of a (or several) strain gauge(s) on the element.

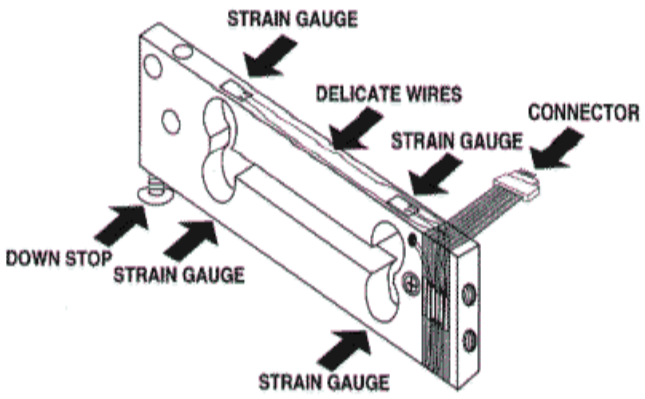

Fig.2 Strain Gauge Load Cells

Fig.2 indicates string gauge load cells. In bar strain gauge load cells, the cell is set up in a "Z" formations so that torque is applied to the bar and the four strain gauges on the cell will measure the bending distortion, two measuring compression and two tension. When these four strain gauges are set up in a wheat tone bridge formation, it is easy to accurately measure the small changes in resistance from the strain gauges.

ADC

Based on Avia Semiconductor's patented technology, HX711 is a precision 24-bit analog- to-digital converter (ADC) designed for weigh scales and industrial control applications to interface directly with a bridge sensor. The input multiplexer selects either Channel A or B differential input to the low-noise programmable gain amplifier (PGA). Channel A can be programmed with a gain of 128 or 64, corresponding to a full-scale differential input voltage of ±20mV or ±40mV respectively, when a 5V supply is connected to AVDD analog power supply pin. Channel B has a fixed gain of 32. On- chip power supply regulator eliminates the need for an external supply regulator to provide analog power for the ADC and the sensor. Clock input is flexible. It can be from an external clock source, a crystal, or the on-chip oscillator that does not require any external component. On-chip power- on-reset circuitry simplifies digital interface initialization. There is no programming needed for the internal registers. All controls to the HX711 are through the pins.
FEATURES • Two selectable differential input channels • On-chip active low noise PGA with selectable gain of 32, 64 and 128 • On-chip power supply regulator for load-cell and ADC analog power supply • On-chip oscillator requiring no external component with optional external crystal • On-chip power-on-reset • Simple digital control and serial interface: pin-driven controls, no programming needed • Selectable 10SPS or 80SPS output data rate • Simultaneous 50 and 60Hz supply rejection • Current consumption including on-chip analog power supply regulator: normal operation < 1.5mA, power down < 1uA • Operation supply voltage range: 2.6 ~ 5.5V •

Operation temperature range: -40 ~ +85 • 16 pin SOP-16 package
APPLICATIONS • Weight Scales • Industrial Process Control

Display

JHD162A LCD module 16×2.

The JHD162A has 16 pins and can be operated in 4-bit mode or 8-bit mode. Here we are using the LCD module in 4-bit mode. Before going in to the details of the project, let's have a look at the JHD162A LCD module. The schematic of a JHD162A LCD module is given below.

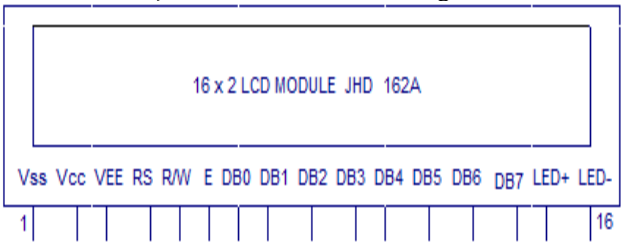

Fig.3 JHD162A LCD module 16×2

Fig.3 indicates JHD162A LCD module 16×2.The name and functions of each pin of the JHD162A LCD module is given below.

Pin1 (Vss): Ground pin of the LCD module.

Pin2 (Vcc):+5V supply is given to this pin

Pin3 (VEE): Contrast adjustment pin. This is done by connecting the ends of a 10K potentiometer to +5V and ground and then connecting the slider pin to the VEE pin. The voltage at the VEE pin defines the contrast. The normal setting is between 0.4 and 0.9V.

Pin4 (RS): Register select pin. The JHD162A has two registers namely command register and data register. Logic HIGH at RS pin selects data register and logic LOW at RS pin will select command register. If we make the RS pin HIGH and put a data on the data lines (DB0 to DB7) it will be recognized as a data. If we make the RS pin LOW and put a data on the data lines, then it will be taken as a command.

Pin5(R/W): Read/Write modes. This pin is used for selecting between read and write modes. Logic HIGH at this pin activates read mode and logic LOW at this pin activates write mode.

Pin6 (E): This pin is meant for enabling the LCD module. A HIGH to LOW signal at this pin will enable the module.

Pin7 (DB0) to Pin14 (DB7): These are data pins. The commands and data are put on these pins.

Pin15 (LED+): Anode of the back light LED. When operated on 5V, a 560 ohm resistor should be connected in series to this pin. In arduino based projects the back light LED can be powered from the 3.3V source on the arduino board.

Pin16 (LED-): Cathode of the back light LED.

For knowing more about LCD module JHD162A and it interfacing, The circuit diagram of interfacing LCD to arduino for displaying a text message is shown below

Flowchart

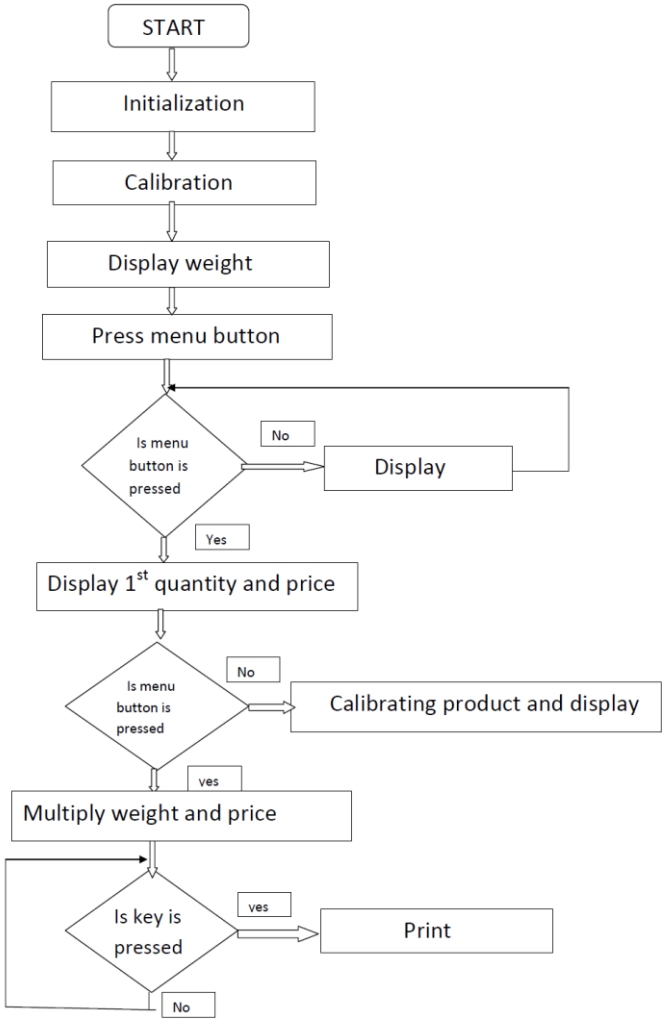

Fig.4 Flowchart wireless low cost billing with printing system

Working

In this system we are going to put weight on load cell. This weight is display on LCD.Load cell convert pressure into electrical signal. We can use strain gauge load cell. By using HX711 amplifier we convert analog to digital signal. It is used to get measurable data out from load cell .Here we are using thermal printer, which gives the print of bill.

Result-

The prime focus of this project is replace the existing home and small scale industries based weight and printing system into wireless on/off, weight and printing system, because the wireless converts kg to ltr & vice versa.

Fig.5 billing with printing system

Fig.5 indicates billing with printing system which print the bill according to type of item and its cost

Conclusion:-We have designed wireless low cost billing with printing system. This system is very comfortable to user because with the help of key pad prices of item atoms are adjustable. This system is user friendly.

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BIOGRAPHIES

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Mr.Sachin Sambhaji Patil working as an assistant professor in department of Electronics and telecommunication engineering at annasaheb dange college of Engineering and technology, ashta since 2008.He has attended 4 internationational conferences and 4 national conferences.He has published 10 papers in international journals. He awarded as Young investigator in IRNET international conference at Nagpur.