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Automatic Demand Draft Withdrawal Machine Using Microcontroller

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***Abstract*— At present, intelligent automation has stepped its presence in every field all over the world. This paper is an intelligent automation for issuing the demand drafts in automated way. In present scenario, demand draft was taken manually. Without the help of human source, it is highly impossible to take DD. To take DD the customer has to go for bank and wait for an hour. Initially the customer will be provided DD form, after filling the complete details it will be forwarded to the next level, this process is followed in existing system and DD will be taken only on bank working hours. In order to overcome such kind of difficulties an idea is introduced which allows the customer to take DD automatically. To make the work easier, faster and automated a domain called embedded system is used. In this automated system, the customer has to insert their currency in the rupee slot and have to wait for few seconds to accept it. Then within next few seconds they have to feed the required details in the PC instead of writing in a form. This is then generated and the sum of amount which has been inserted will be added in the softcopy. Then they have to verify once and have to give print .Thus the Demand Draft will be generated in few seconds instead of standing for hours. Thus, this system eliminates the drawbacks of the existing set-up. It is placed in the bank branches similar to that of ATM. In proposed system, image processing is used to count the currency. With this automation, issuing of demand draft is made easier by feeding the inputs in the input module. In our project we designed the hardware for taking the currency notes from the input slot and software is designed to generate the demand draft. The objective of this project is to design a simple, easy to install, microcontroller-based circuit to control and PC or laptop interface for generating the demand draft.**

***Keywords*— Demand draft, DD, Currency, Cash counter, Laptop, Microcontroller, Matlab, Labview, Webcam, Image processing**

I. INTRODUCTION

A demand draft or "DD" is an instrument most banks in India use for effecting transfer of money. It is a Negotiable Instrument. A Demand Draft is an instrument that signifies the availability of cash till the amount specified in the DD. It is similar to a cheque in appearance and usage with the difference that a cheque may or may not get cashed but a DD is guaranteed payment. But in case of a DD you must have cash and that amount would be debited the moment you issue a DD and the payment would happen when the customer deposits the DD.

Demand drafts are frequently used to purchase items over the phone. Demand drafts are frequently used by consumers instead of credit cards, and large companies also commonly use them. Demand drafts are also a popular method for lending institutions to attempt to collect on overdue loans.

Now-a-days intelligent automation has stepped its presence in every field all over the world. Our project is an intelligent automation for issuing the demand drafts in automated way. The use of low cost technologies for highly reliable applications with the help of newly innovated algorithms makes the automation process to reach the consumers at cheaper and reliable cost. It can be placed in the bank branches similar to that of ATM.

A. Technical Background

Our project is inspired from the currently existing Demand Draft method followed in most of the banks.

1) Existing System: The application form along with the cheque on your account or cash is deposited with the counter clerk who gives you a Demand Draft (which looks like a cheque) for the amount. Customers are required to fill an application form which asks the following information:

- Name of the recipient.
- Amount to be transferred.
- Place where the transferred money is to be paid.
- Mode in which you will pay money to the Bank i.e. in cash or by debit to your account.

Some of the limitations in present system are

- It is time consuming to humans.
- Issuing of demand draft is done during a particular time intervals in some banks.

To overcome the limitations in the existing Demand Draft system, we implemented an automated Demand Draft Withdrawal machine in our project.

B. Proposed Solution

In automated system, the customer has to insert their currency in the rupee slot and have to wait for few seconds

to accept it. Then within next few seconds they have to feed the required details in the PC instead of writing in a form. This is then generated and the sum of amount which has been inserted will be added in the softcopy. Then they have to verify once and have to give print .Thus the Demand Draft will be generated in few seconds instead of standing for hours. The entire system becomes user friendly. Thus, this system eliminates the drawbacks of the existing set-up.

Advantages

- DD can be taken on Bank Holidays
- Customer need not to wait for bank formalities
- Customer need not to go to Bank to take the DD.
- Customer can take the DD from anywhere.

II. Proposed Solution

The controller used here is a low power, cost efficient chip MSP430 microcontroller which communicates with the Sensor for sensing the currency note efficiently and drivers to control the rotation of notes. MSP430 also communicates with PC/Laptop for parsing the data.

Also, the use of easily available components reduces the manufacturing and maintenance costs. The design is quite flexible as the software can be changed any time. It can thus be tailor-made to the specific requirements of the user. This makes the proposed system to be efficient and effective in time saving.

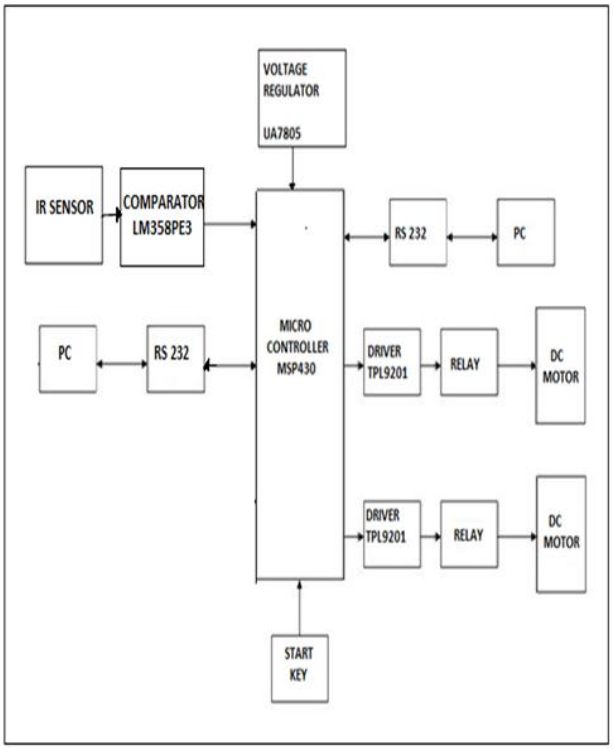


Fig. 1 Overall system block diagram

Initially the currency notes are inserted in the cash counter which has motors for rotation and sensors for sensing the currency. After sensing the number of currencies is displayed in the seven segment display of the counter. The image of note is taken using webcam and by image processing the type of currency is identified. (i.e. whether Rs.50 or Rs.100 or Rs.500 or Rs.1000)

The total amount deposited is calculated by multiplying the no. of currency and the type of currency. This is done in MSP430 and the obtained result is sent to labview and the other required details are filled there and then the final DD can be printed using printer.

III. Overview of the Project

Cash Counter

To design a cash counter with perfect rotating speed was difficult, hence we used the motors from the counting machine. Cash Counter comprises of sensors, DC motors, Seven Segment Display.

Image Processing

To identify the currency note given by the user, we generated matlab programs to turn on the webcam and to identify the type of currencies inserted. One Laptop is used for this.

DD Format

To create a DD format where the user should fill the input details like name of bank, favor of and other details, labview is used and another laptop is used for this purpose.

Communication

To establish communication between two laptops, MSP430 is used. It provides the parsing of data between laptops via RS232.

IV. Implementation

A. Hardware Implementation

The basic concept of the project is taking the demand draft automatically. The current world is running behind the time, in order to save time and reduce the manpower this idea is introduced. This project comprises microcontroller, computer, printer, camera and motor.

1) List of Components:

MSP-EXP430G2 Launchpad: The Launchpad has an integrated DIP target so)cket that supports up to 20 pins, allowing MSP430™ Value Line devices to be dropped into the Launchpad board. It also offers an on-board flash emulation tool allowing direct interface to a PC for easy programming, debugging, and evaluation. The Launchpadexperimenter board is capable of programming the eZ430-RF2500T target boards, the eZ430-Chronoswatch module or the eZ430-F2012T/F2013T target boards. The USB interface provides a 9600-BaudUART serial

connection from the MSP430G2xx device to the host PC or a connected target board.

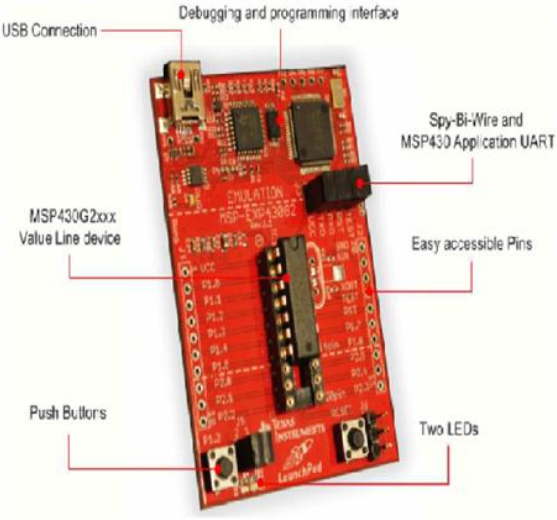


Fig. 2 MSP-EXP430G2 Launchpad overview

MSP-EXP430G2 Launchpad Features:

- USB debugging and programming interface featuring a driverless installation and application UARTserial communication with up to 9600 Baud
- Supports MSP430G2xx2, MSP430G2xx3, and MSP430F20xx devices in PDIP14 or PDIP20 packages
- Two general-purpose digital I/O pins connected to green and red LEDs for visual feedback
- Two push button for user feedback and device reset
- High-quality 20-pin DIP socket for an easy plug-in or removal of the target device.

Kit Contents: The MSP-EXP430G2 experimenter kit includes the following hardware:

- Launchpad emulator socket board (MSP-EXP430G2)
- Mini USB-B cable, 0.5 m
- Two MSP430 flash devices

MSP430G2553: Low-power 16-bit MSP430 microcontroller with an 8-channel 10-bit ADC, on-chipcomparator, touch-sense enabled I/Os, universal serial communication interface,16kB flashmemory, and 512 bytes of RAM.

MSP430G2452: Low-power 16-bit MSP430 microcontroller with an 8-channel 10-bit ADC, on-chipComparator, and touch-sense enabled I/Os, universal serial interface, 8kB flash memory, and 256 bytesof SRAM.

- Two 10-pin PCB connectors female
- 32.768-kHz clock crystal from Micro Crystal.

2) Voltage Regulator (UA7805): The application of UA7805 includes on-card regulation for elimination of noise and distribution problems associated with single-point regulation. Each of these regulators can deliver up to 1.5 A of output current.

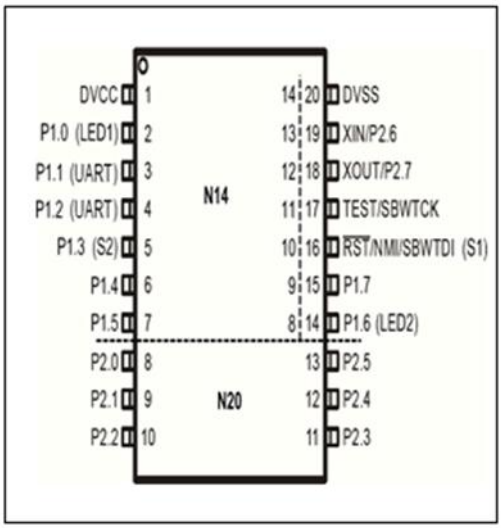


Fig. 3 Pin configuration of MSP430

The internal current-limiting and thermal-shutdown features of these regulators essentially make them immune to overload. In addition to use as fixed-voltage regulators, these devices can be used with external components to obtain adjustable output voltages and currents, and also can be used as the power-pass element in precision regulators

3) Comparator (LM 358): LM 358 consist of two independent, high-gain, frequency-compensated operational amplifiers designed to operate from a single supply over a wide range of voltages. Operation from split supplies also is possible if the difference between the to supplies is 3 V to 32 V (3 V to 26 V for the LM2904), and VCC is at least 1.5 V more positive than the input common-mode voltage. The low supply-current drain is independent of the magnitude of the supply voltage.

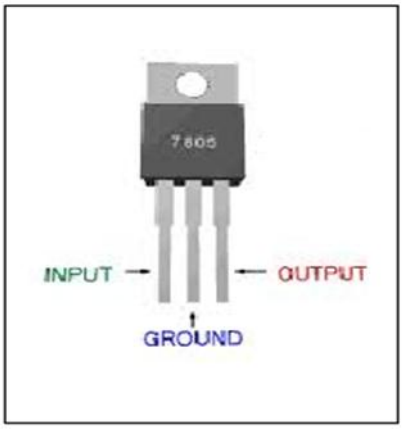


Fig. 4 Pin configuration of voltage regulator (UA7805)

The Op-amp in open loop configuration can be used as a basic comparator. When two inputs are applied to the open loop op - amp then it compares the two inputs. Depending upon the comparison, it produces output voltage which is either positive saturation voltage or negative saturation voltage. A comparator is a circuit which compares a signal voltage applied at one input of an op-amp with a known reference voltage at the other input, and produce either a high or low output voltage, depending on which input is higher.

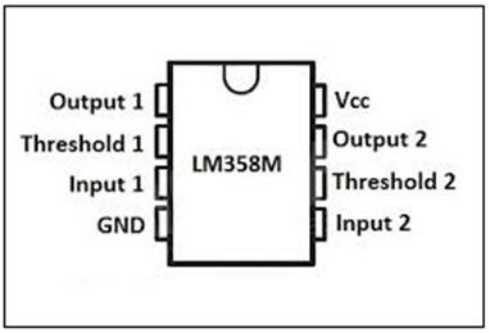


Fig. 5 Pin configuration of comparator (LM358)

4) Octal Buffer (SN74ABT240A): Octal buffers and line drivers are designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters.

It is organized as two 4-bit buffers/line drivers with separate OE\ inputs. When OE\ is low, the devices pass inverted data from the A inputs to the Y outputs. When OE\ is high, the outputs are in the high-impedance state.

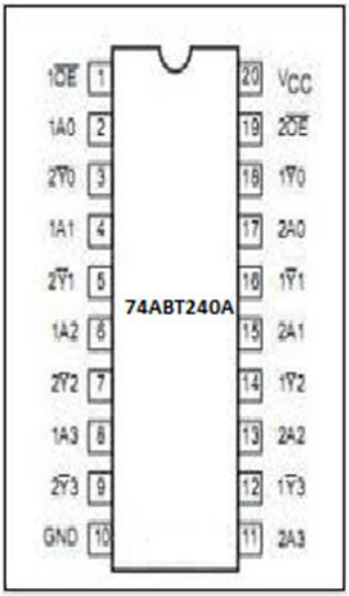


Fig. 6 Pin configuration of OCTAL BUFFER (SN74ABT240A)

This device is fully specified for partial-power-down applications using I off. The Ioffcircuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

To ensure the high-impedance state during power up or power down, OE\ should be tied to VCC through a pull-up resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

5) MAX 232: The MAX232 is an IC, first created in 1987 by Maxim Integrated Products, that converts signals from an RS-232 serial port to signals suitable for use in TTL compatible digital logic circuits. The MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals.

The drivers provide RS-232 voltage level outputs (approx. ± 7.5 V) from a single + 5 V supply via on-chip charge pumps and external capacitors. This makes it useful for implementing RS-232 in devices that otherwise do not need any voltages outside the 0 V to + 5 V range, as power supply design does not need to be made more complicated just for driving the RS-232 in this case.

The receivers reduce RS-232 inputs (which may be as high as ± 25 V), to standard 5 V TTL levels. These receivers have a typical threshold of 1.3 V, and a typical hysteresis of 0.5 V.

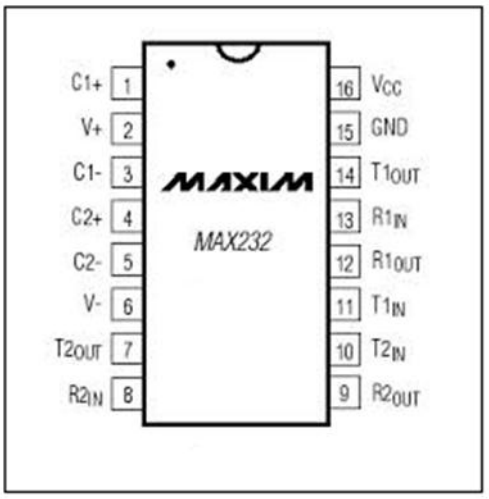


Fig. 7 Pin Configuration of MAX232

6) RS232: In telecommunications, RS-232 is a standard for serial binary data interconnection between a DTE (Data terminal equipment) and a DCE (Data Circuit-terminating Equipment). It is commonly used in computer serial ports.

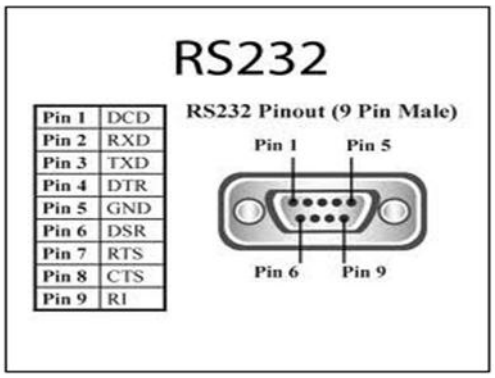


Fig. 8 Pin configuration of RS232

B. *Software Implementation*

We have used two softwares in our project.

- MATLAB
- LABVIEW

1) MATLAB: MATLAB (matrix laboratory) is a numerical computing environment and fourth-generation programming language. Developed by MathWorks, MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages, including C, C++, Java, and Fortran.

2) LABVIEW: Lab view is a highly productive development environment that engineers and scientists use for graphical programming and unprecedented hardware integration to rapidly design and deploy measurement and control systems. Within this flexible platform, engineers scale from design to test and from small to large systems while reusing IP and refining their processes to achieve maximum performance.

Front Panel

Every user created VI has a front panel that contains the graphical interface with which a user interacts. The front panel can house various graphical objects ranging from simple buttons to complex graphs. Various options are available for changing the look and feel of the objects on the front panel to match the needs of any application.

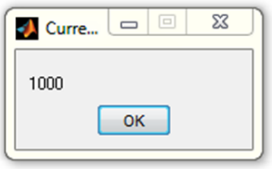
Block diagram

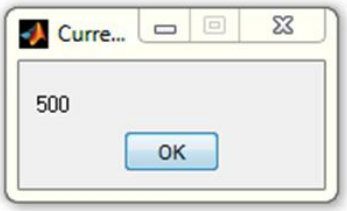
Nearly every VI has a block diagram containing some kind of program logic that serves to modify data as it flows from sources to sinks. The block diagram houses a pipeline structure of sources, sinks, VIs, and structures wired together in order to define this program logic. Most importantly, every data source and sink from the front panel has its analog source and sinks on the block diagram. This representation allows the input values from the user to be accessed from the block diagram. Likewise, new output values can be shown on the front panel by code executed in the block diagram.

V. RESULTS

The expected result is to take demand draft when the money is fed to the input system. There is no need to wait for the DD process in the Bank. The DD can also be taken during holidays. The main advantage of this system is that one can take demand draft without getting anyone's help. This system is much authenticated and reduced. The application completed to take a DD in the Bank Holidays also and no need to wait for the DD process inside the Bank. Thus the user process is simplified based on their recruitments.

A. *MATLAB Results*



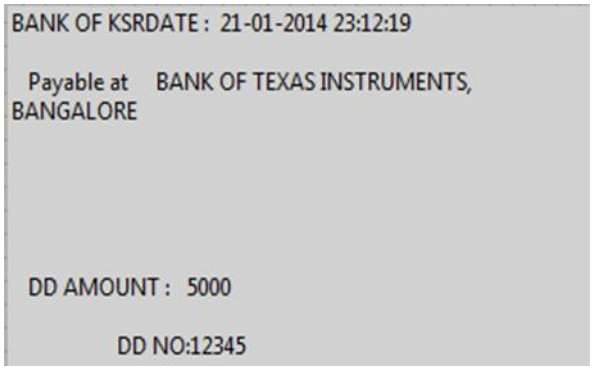


B. Labview Result 1

ENTER THE AMOUNT

PAYABLE TO

DEMAND DRAFT

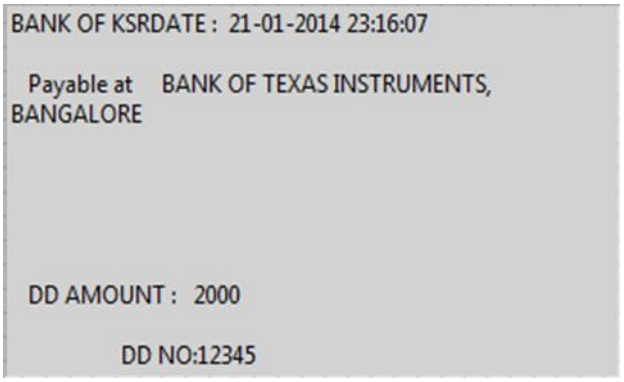


C. Labview Result 2

ENTER THE AMOUNT

PAYABLE TO

DEMAND DRAFT



VI. Conclusion

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge while doing this project work; we feel that the project work is a good solution to bridge the gates between institution and industries. By using more techniques, they can be modified and developed according to the applications. This project is economically beneficial one.

VII. Future Scope

It is possible to make the present invention better with the provision for finding fake currency.

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