# SCHOOL BILLING MACHINE

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## Abstract

The School Billing Machine (SBM) is a Hand Held Compute, in which the program is stored along with all the relevant data, for issue of bills, right at the customer premises, immediately for the given input to the SBM. The storage of the program and data is done through a personal computer (Host PC), and is called pre journey configuration user-connection record including type of connection, previous reading, past payments etc. The type of consumer profile are stored on the Host PC, and made available for uploading on to the SBM at the time of Configuration. Once the pre-configuration is over the SBM is ready for field operations. It accesses the customer`s account on SBM and record the current reading. On the basis of last reading a bill would be generated instantly. Payment in non cash mode can also be collected then and there. In such case, the receipt would also be generated. The payment could be collected though non cash modes. A collection report can be prepared at the end of the bill. After the journey is transaction

data files are transferred from SBM to the Host PC, over a Communication cable connected to serial communication port. School billing machine has be designed keeping this features in view. These school billing machines (SBM) are light in weight, allow easy programming, portable, have non volatile memory for storing data, a built in printer and serial communication link to get connect to a Host computer for data transfer. The electronic circuit is designed to allow for easy customizing of billing application. The electronics are housed in light weight rugged ABS plastic enclosures (in pleasing colors) specially designed for hand held applications. The units have rugged printers attached for the data such as bills etc, for printing on the spot.

**Keywords:**

STM32F103CBT6 UC ;
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## 1. Introduction

Generally, to satisfy the daily needs of a person, he should pay, less or more for his choice which involves flow of cash along with time management. As the population is increasing rapidly, the needs are also getting increased. However the cash flow is between the owner and the customer who can be either direct or an indirect payment linked with time. The direct flow of cash involves paying the money directly to the owner, where as the indirect way involves third person through online payment. Now a day as technology is involved everywhere, People are looking for easy transaction. To make it possible SBM'S are designed which are basically handheld structures. The payment through them saves lot of time and we pay the amount to the third party, not directly to the product manufacturer. Few products developed for this purpose includes electricity, dairy products billing, van billing, goods billing in supermarkets etc. Our sbm comes under its category which is used at school premises. Student details are stored in the sbm and can be used whenever needed to access any student details. Initially the records of all the students are stored in the host computer and parameters such as student id, parents name and phone number, fee details, his performance etc are loaded. SBM are provided with a password for the safe and reliable transaction and is encrypted. Every student will be given a unique id number. To get their details we can enter either their id number or parents phone number can also be set as a second option. Basically to login we can have one main user and two or three general users. Its structure is so reliable provided with RS232 serial communication, one microprocessor, battery, keypad, LCD display etc. The information from the host computer is given to sbm through serial communication. Hence we access the details faster once we get logged in. The only disadvantages being, if an additional student gets added, then we have to store the details again from the host Computer.

## 2. Existing System

In existing system we are using serial communication with low speed of 9600 baud rate. The LCD used here is 16*1 Alphanumeric and low speed impact printer with 512KB memory for data storage.

## 3.Proposed System

The main purpose for using this system is because of serial communication with high speed of 115200 baud rate. The LCD used here is 24*2 Backlight Alphanumeric and high speed Dot matrix impact printer with 1MB memory for data storage. By which the above features are more with High speed which intern make easy for administration and it will reduce errors. In existing system we are having some issues like baud rate is low compared to proposed system and LCD we used
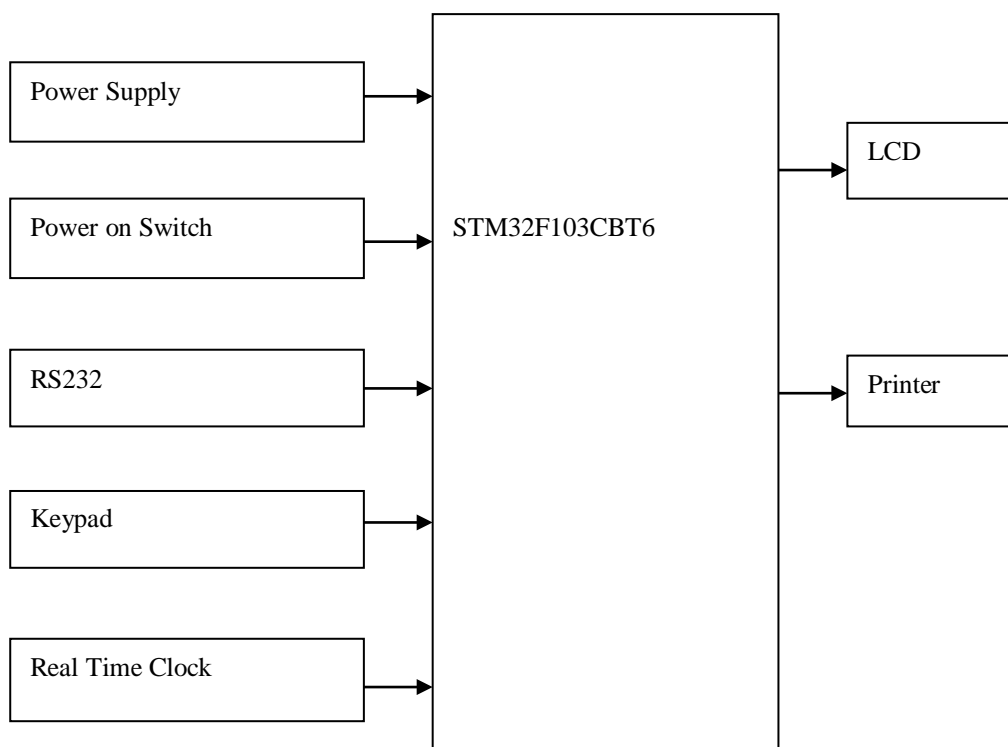
**4.Block Diagram**



Fig 1.Block diagram of the system

### 3. Block Diagram Description

The system consists of a microcontroller called STM32F103CBT6, power supply in the system can be power supplied with 12v and the system is not directly powered on and it will be having a power on/off switch by which it can be powered on and system is provided with a cable called RS232 by which communication is transferred through this cable. This system also consists of a keypad through which give input to the system to access the student details through keypad. RTC is used to display the time in minutes, seconds, month of the day, month. Liquid crystal display is used to display whatever we give input to the system. Printer action is mainly used to print the data about student.

1. **STM32F103CBT6 UC:**

    The STM32F103CBT6 medium-density performance line family incorporates the high-performance ARMCortex-M3 32-bit RISC core operating at a 72 MHz frequency, high-speed embedded memories (Flash memory up to 128 Kbytes and SRAM up to 20 Kbytes), and an extensive range of enhanced I/Os and peripherals connected to two APB buses. All devices offer two 12-bit ADCs, three general purpose 16-bit timers plus one PWM timer, as well as standard and advanced communication interfaces: up to two I$^2$Cs and SPIs, three USARTs, an USB and a CAN.

2. **Power Supply& Power on Switch** :

    The power here we used is 12v which is used to power on the system by which the power on/off switch is used to power the system in order not to direct get thepower supply and the microcontroller uses only 5v which intern all the components are driven by 3.3v .

**3. RS232:**

In telecommunications, **RS-232**, Recommended Standard **232** is a standard introduced in 1960 for serial transmission of data. It formally defines the signals connecting between a DTE (data terminal equipment) such as computer, and a DCE (data circuit-terminating equipment or data communication equipment), such as a modem. The standard defines the electrical characteristics and timing of signals, the meaning of signals, and the physical size and pinout of connectors. The RS-232 standard defines the voltage levels that correspond to logical one and logical zero levels for the data transmission and the control signal lines. Valid signals are either in the range of +3 to +15 volts or the range −3 to −15 volts with respect to the "Common Ground" (GND) pin; consequently, the range between −3 to +3 volts is not a valid RS-232 level.

**4. Keypad:**

There are 20 keys available on the billing machine, which includes ten alphanumeric keys and the others are escape key, PLU, scan, PF, get, mode, up and down arrows, ST, dot key. Their functionalities are as below:

1. Escape key: The user, use this key whenever he need to attain the previous screen.
2. PF: Paper feed, used for paper printing.
3. Get: To get the details.
4. Mode: Looking for all the options.
5. St: enter
6. Dot key: Generally used for floating point values, but here we may not involve much with it.



Fig 2. 5*4 Switch Key Pad

## 5. Real Time Clock :

RTCs often have an alternate source of power, so they can continue to keep time while the primary source of power is off or unavailable. This alternate source of power is normally a lithium battery in older systems, but some newer systems use a super capacitor, because they are rechargeable and can be soldered. Thealternator power source can also supply power to battery backed RAM. Most RTCs uses a crystal oscillator, but some use the power line frequency. In many cases, the oscillator`s frequency is 32.768KHz. This is the same frequency used in quartz clocks and watches, and that the frequency is exactly $2^{15}$ cycles per seconds, is a convenient rate to use with simple binary counter circuits.
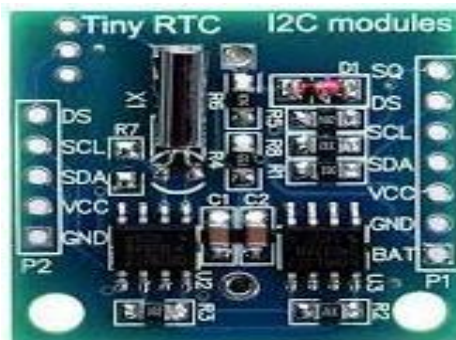


Fig 3. RTC with I2cmodule

## 6. Liquid Crustal Display:

A Liquid crystal display is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome. LCDs are available to display arbitrary images or fixed images with low information content, which can be displayed or hidden, such as preset words, digits and 7-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements. LCDs are used  in a wide range of applications including LCD televisions, computer monitors, instrument panels, cockpit displays, and indoor and outdoor signage.



Fig 4. 24*2 LCD Panel

## 7. Dot matrix Impact Printer:

Dot matrix is the process of computer printing which uses a print head that moves back-and-forth or in an up-and-down motion on the page and prints by impact, striking an ink-soaked cloth ribbon against the paper, much like the print mechanism on a typewriter. However, unlike a typewriter or daisy wheel printer, letters are drawn out of a dot matrix, and thus varied fonts and arbitrary graphics can be produced. These printers can print on multi-part forms since they print using mechanical pressure. Dot matrix printers, like any impact printer, can print on multi-part stationery or make carbon-copies. Impact printers have one of the lowest printing costs per page. As the ink is running out, the printout gradually
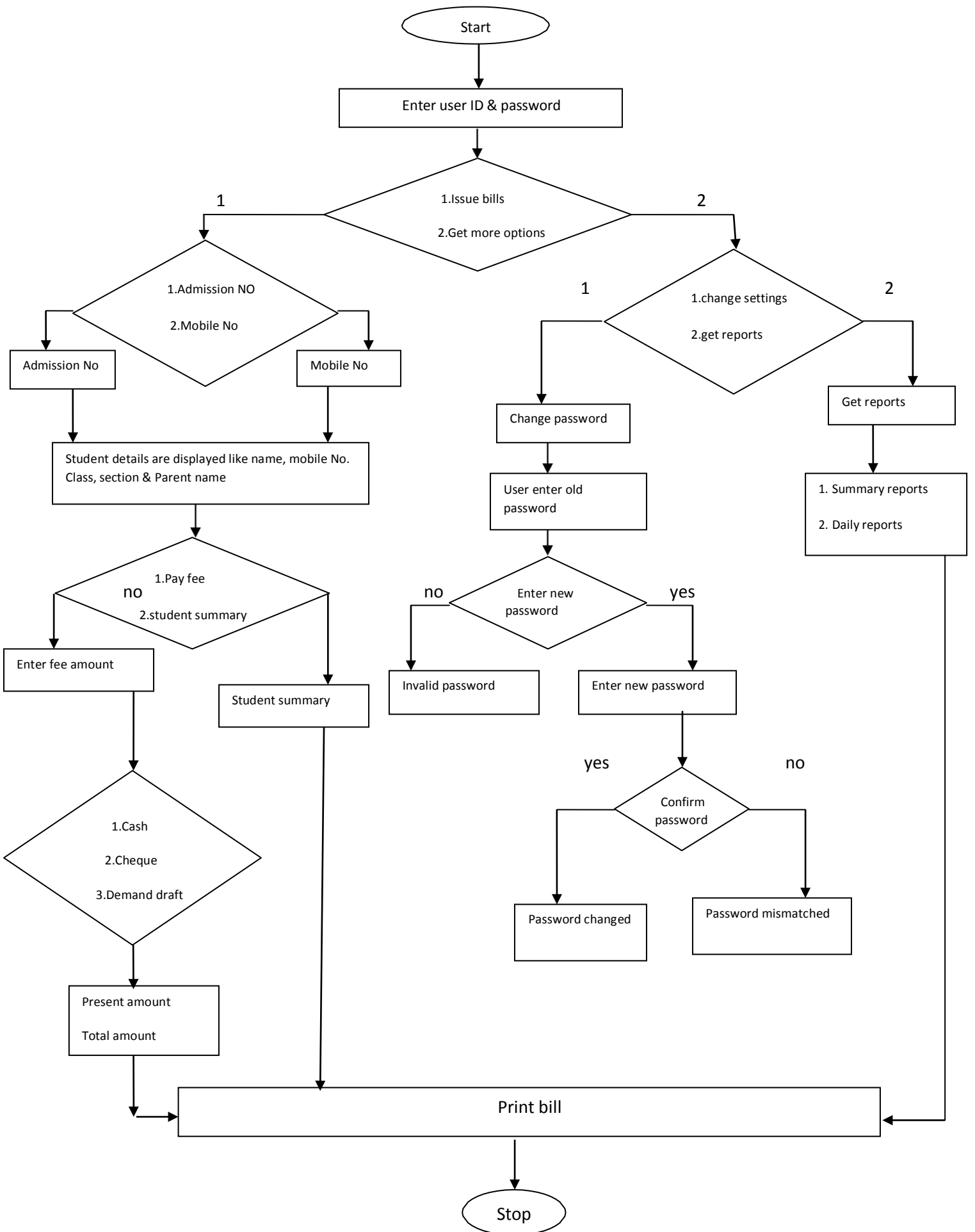
**Results:**
**Steps wise process**
**Step1:**



Fig 1: user registration

**Step2:**



Fig 2: Getting Students details

**Step 3:**



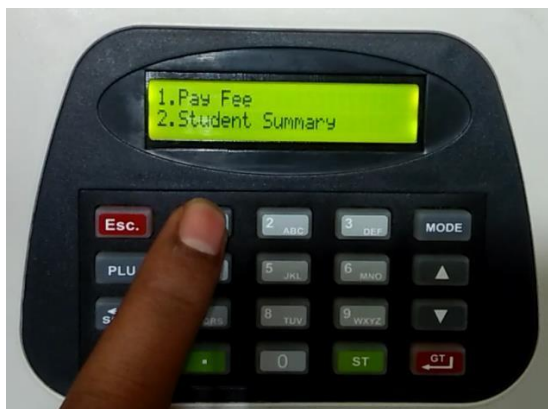Fig 3: Getting student details

**Step 4:**



Fig 4: Paying Student fee

**Step 5:**



Fig 5: Cash modes

**Step 6:**



Fig 6: Printing Bill

**Conclusion:**

In this paper we define the vital role of billing whenever needed. It is fast reliable and error free, where the data is encrypted through password. The major importance goes to its hand held structure and ease of data transferring.

**Future Scope:**

Our project is not only limited to schooling but also has a huge advantageous method of instantaneous billing. However the billing mechanisms already exist like electricity billing, daily basis products billing etc. With the rapid growth in technology we can further extend our purpose to large institutions, and at places wherever billing can be done faster provided with a paper proof.

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