

# Automatic Scanning machine with Image clearance using Matlab

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**Abstract** - In the days where everything around us is digital, then why storing large amounts of data should still be manual process! Scanning papers sure does help us store them digitally and safely for a long time and on a number of devices. But scanning is a tedious job - the flipping of paper, waiting for the data to be digitally transferred to the computer is a waste of time. So we have come up with this paper scanning machine which will not only make the task of scanning easy and time saving but also cost efficient. The AUTOMATIC SCANNING MACHINE using MATLAB is a way of getting the scanning done efficiently and quickly. All we need to do is give the input i.e. number of papers to be scanned and then the machine will start doing its job with the help of the Matlab code. The pages will scanned in no time and we won't even have to keep a track of it. This project makes the task of having to store large amounts of data in the form of hardcopies a simple task. With the automatic scanning machine, we can not only scan large number of sheets within a matter of time but also make sure that they are of good quality and are stored in whatever location we want them to be in.

**KEYWORDS** - tedious job, time saving, MATLAB code, hardcopies

## I. INTRODUCTION

Scanning is a process of converting the hard copies of papers into digital format; i.e. soft copies. Into an image that can be viewed on our personal computer screens and saved in a number of such devices. Now-a-days days scanning is not just a luxury anymore, its more of a necessity. Most of our forms and applications are filled online thus requiring us to scan ample number of papers.

Getting a single page scanned is a tedious process. And if the numbers of pages are more, then the job is tougher. Propose idea will is a combination of hardware and software that shall enable us to perform scanning with ease.

The MATLAB code will carry out the scanning and clearance of papers whereas the microcontroller (AT89C51) will have the code that will carry out the communication between the two domains, give commands to the scrap printer and also work as a counter to count the number of pages being scanned and the number that is left to be scanned or so.

There will be a logic correction device and an 16\*2 Liquid Crystal Display, interfaced with the microcontroller that will give us the details of the ongoing process of scanning. Also a motor to provide necessary amplification for the scrap printer

whose basic function will be to flip the pages so as to enable quick capturing of images with the help of a web camera.

The AUTOMATIC SCANNING MACHINE using MATLAB is a way of getting the scanning done efficiently and quickly. All we need to do is give the input i.e. number of papers to be scanned and then the machine will start doing its job with the help of the MATLAB code. The pages will scanned in no time and we won't even have to keep a track of it.

## II. WORKING

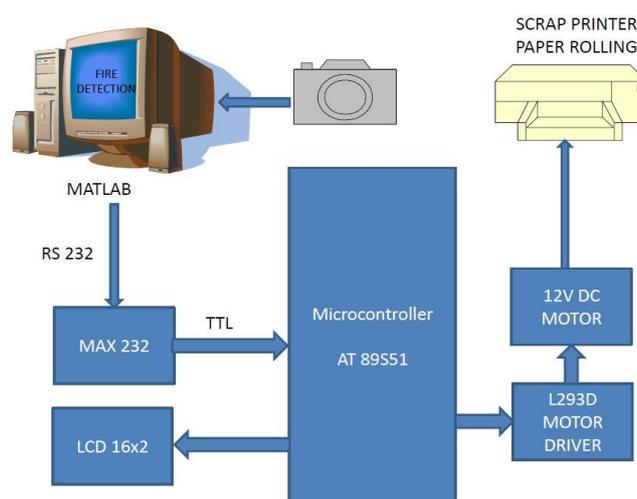


Figure 1: Basic Block Diagram

Proposed idea of AUTOMATIC SCANNING MACHINE is implemented to minimize human efforts and time for paper scanning. Scanning is the process of converting hard copy documents to soft copy. Camera acts as a medium which converts physical document into software formatted image file. Scanning defines clarity in the image which can be achieved after processing the resultant image. MATLAB based application is developed to process the image providing maximum information, averaging near by pixels to make it uniform, edge sharpening, etc. Scrap printer is used for rolling multiple documents which can be fed in the tray. Microcontroller 89S51 controls the rolling operation. PC is connected to the microcontroller using Serial communication RS 232. Max 232 acts as a logic converter which converts RS 232 logic to TTL logic which can be read by the microcontroller. Micro controller reads the data on serial RX pin P3.0 (UART). Matlab sends the command for paper rolling. Microcontroller receives and controls the DC motor for paper rolling. L293D acts as a motor driver IC which provides power

to the motor, with respect to input from the uC. LCD acts as a user interface for the hardware based system.

### A. MICROCONTROLLER AT89S52

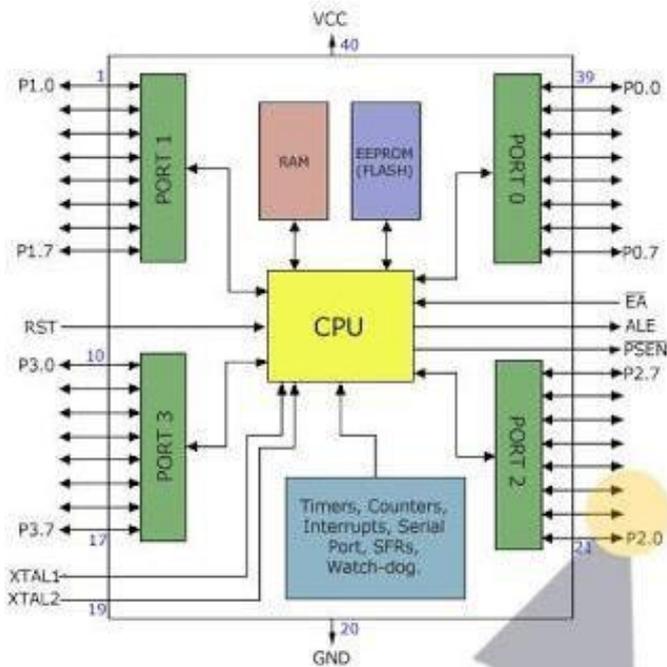


Figure 3: Architecture of Microcontroller

The device which we used in our project was the AT89S52 which is a typical 8051 microcontroller manufactured by Atmel™. The block diagram provided by Atmel™ in their datasheet that shows the architecture of 89S52 device. However an easier one is given above. The 89S52 has 4 different ports, each one having 8 Input/output lines providing a total of 32 I/O lines. Those ports can be used to output DATA and orders do other devices, or to read the state of a sensor, or a switch. Most of the ports of the 89S52 have 'dual function' meaning that they can be used for two different functions. The first one is to perform input/output operations and the second one is used to implement special features of the microcontroller like counting external pulses, interrupting the execution of the program according to external events, performing serial data transfer or connecting the chip to a computer to update the software. Each port has 8 pins, and will be treated from the software point of view as an 8-bit variable called 'register', each bit being connected to a different Input/output pin.

Diagram below shows the pin configuration of the 89S52, where the function of each pin is written next to it, and, if it exists, the dual function is written between brackets. Note that the pins that have dual functions can still be used normally as an input/output pin. Unless the program uses their dual functions, all the 32 I/O pins of the microcontroller are configured as input/output pins.[1]

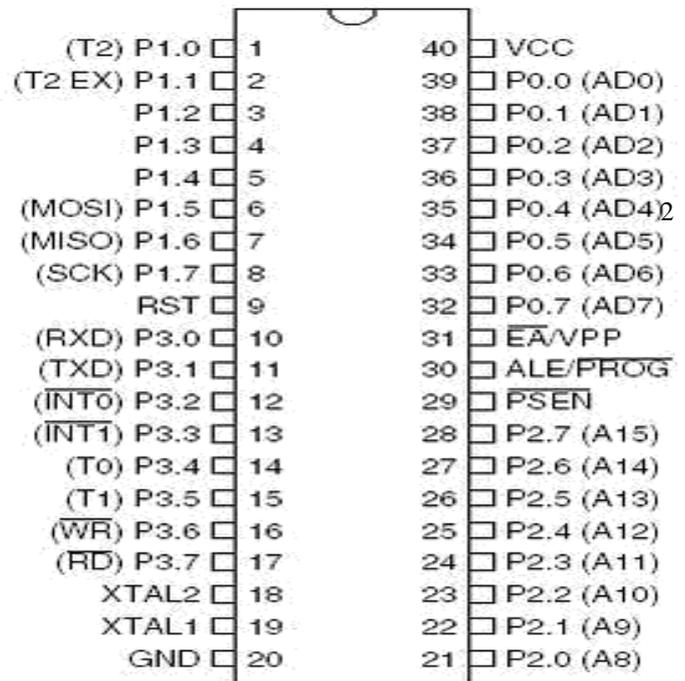


Figure 3: Pin Diagram of AT89S52

### Salient Features of AT89S52

- 8K Bytes of flash Memory
- 4.0V to 5.5V Operating Range
- 256 x 8-bit Internal RAM
- 32 Programmable I/O Lines
- 3, 16-bit Timer/Counters
- 8, Interrupt Sources
- Full Duplex UART Serial communication Channel
- Low-power Idle & Power-down Modes
- Quick Interrupt Recovery from Power-down Mode
- Dual Data Pointe
- Fast Programming Time[1]

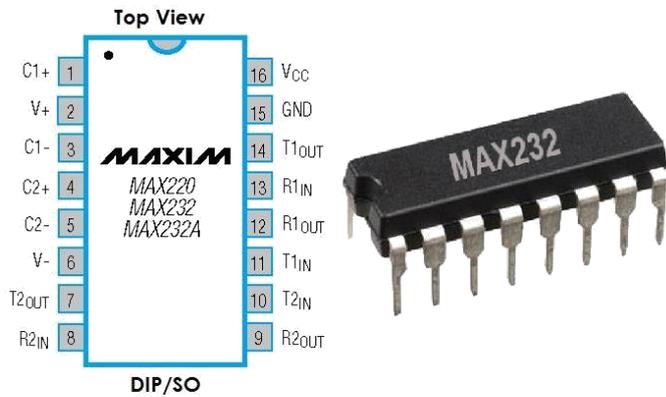
### B. MAX 232

#### Features of Max 232

- Operate from Single +5V Power Supply (+5V and +12V—MAX231/MAX239)
- Low-Power Receive Mode in Shutdown (MAX223/MAX242)
- Meet All EIA/TIA-232E and V.28 Specifications
- Multiple Drivers and Receivers
- 3-State Driver and Receiver Outputs
- Open-Line Detection (MAX243)
- Superior to Bipolar[2]

#### Applications

- Portable Computers
- Low-Power Modems
- Interface Translation
- Battery-Powered RS-232 Systems
- Multidrop RS-232 Networks[2]



MAX232: Construction, Operation, Types and Application

Figure 4: Pin Diagram of MAX232

### C. 16x2 LCD DISPLAY

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments.[3]

#### Features

- 5 x 8 dots with cursor
- Built-in controller (KS 0066 or Equivalent)
- + 5V power supply (Also available for + 3V)
- 1/16 duty cycle
- B/L to be driven by pin 1, pin 2 or pin 15, pin 16 or A.K (LED)[3]

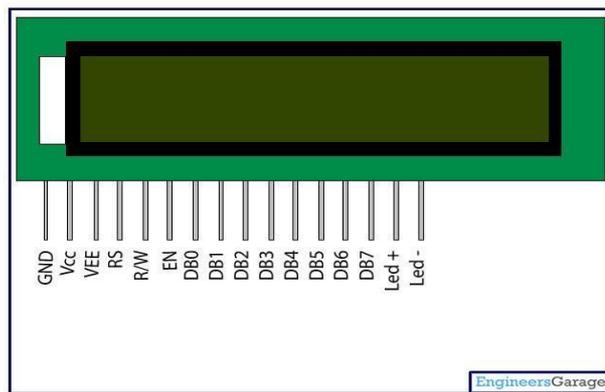


Figure 5: Pin Diagram of 16x2 LCD Display

### D. L293D

The Device is a monolithic integrated high voltage, high current four channel driver designed to accept standard DTL or TTL logic levels and drive inductive loads (such as relays solenoids, DC and stepping motors) and switching power transistors. To simplify use as two bridges each pair of channels is equipped with an enable input. A separate supply input is provided for the logic, allowing operation at a lower voltage and internal clamp diodes are included. This device is suitable for use in switching applications at frequencies up to 5 kHz. The L293D is assembled in a 16 lead plastic package

which has 4 center pins connected together and used for heatsinking The L293DD is assembled in a 20 lead surface mount which has 8 center pins connected together and used for heatsinking.[4]

### E. VARIOUS INTERFACING DIAGRAMS

#### 1. Interfacing 16x2 LCD to 8051 uC

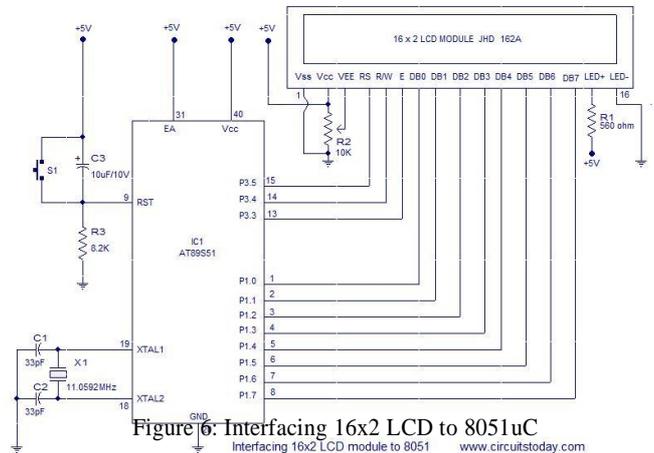


Figure 6: Interfacing 16x2 LCD to 8051 uC

#### 2. Interfacing DC Motor with 8051 using L293D

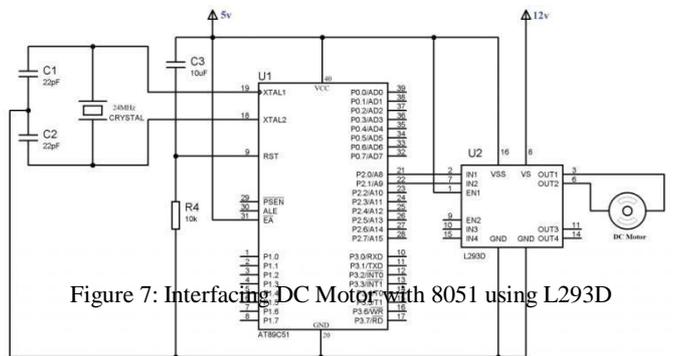


Figure 7: Interfacing DC Motor with 8051 using L293D

#### 3. Serial interface using max232

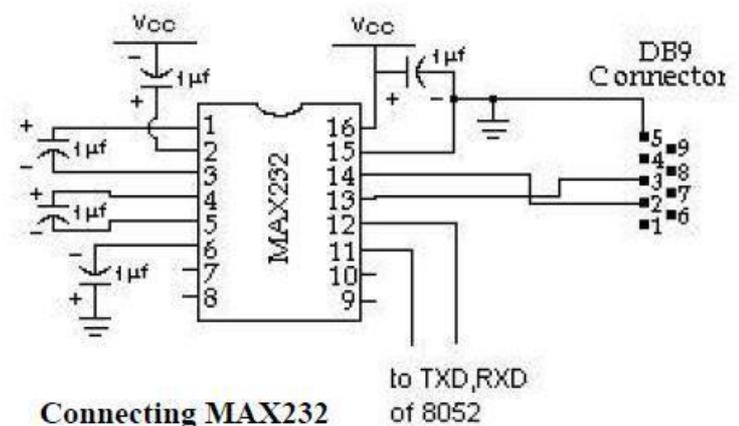


Figure 7: Serial interface using max232

### III. ADVANTAGES

- No more waiting in long lines to get a single piece of paper scanned.
- Even if the number of papers increases; the time required to scan them remains minimum.
- Cost efficient.
- Time saving.
- No maintenance required.
- Easy handling.

### IV. APPLICATIONS

We can scan a large no of papers. Thus the project will find its applications in various firms where scanning is a necessity. It could be offices in multinational companies, colleges, schools, household purposes, et. Basically the automatic scanning machine has it use in every organization which needs to preserve large amounts of data for surveillance or other purposes and having to store that many number is pages is impossible. So scanning is the best option. In fact efficient and time saving scanning is the need of the hour.

### V. CONCLUSION

Proposed project makes the task of having to store large amounts of data in the form of hardcopies a simple task. With the automatic scanning machine, we can not only scan large number of sheets within a matter of time but also make sure that they are of good quality and are stored in whatever location we want them to be in. The time saving equipment makes the every college student and office employees job a piece of cake.

With the automatic process and the easy to handle components/procedures the maintenance of the entire system is made easy. Hence we are aimed at making the job of manual scanning completely automatic and efficient.

### VI. ACKNOWLEDGMENT

We would like to express our sincere thanks to Prof. Jyoti Dange for taking time from her busy schedule to provide us with the much needed help, support and encouragement. Her views have always been equitable striking perfect balance between encouragement and constructive criticism. Her constructive tips and suggestions helped us a lot to build a project from an idea. We have been benefiting a lot from her immense knowledge and experience. We are also thankful to our Principal, HOD and all the staff members of the Electronics and Telecommunication department who have provided us various facilities and guided us to develop a very good project idea.

### VII. REFERANCES

- [1] <http://www.atmel.com/images/doc1919.pdf>
- [2] <http://www.ti.com/lit/ds/symlink/max232.pdf>
- [3] <http://www.picaxe.com/docs/led008.pdf>
- [4] <http://www.engineersgarage.com/electronic-components/l293d-motor-driver-ic>