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# Black Polling Avoidance by Person Identification Using Biometrics

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**ABSTRACT**
*The objective of voting is to allow voters to exercise their right to express their choices regarding specific issues, pieces of legislation, citizen initiatives, constitutional amendments, recalls and/or to choose their government and political representatives. It has always been an onerous task for the election commission to conduct free and fair polls in our country, the largest democracy in the world. A lot of money have been spent on this to make sure that the election is rampage free. In order to provide in expensive solutions to the above, this project will be implemented with biometric system i.e. finger print scanning.*
**Keywords:** *onerous, biometric system, rampage.*

## 1. INTRODUCTION

Biometrics is the science and technology of measuring and analysing biological data. In information technology, biometrics refers to technologies that measure and analyse human body characteristics, such as DNA, fingerprints, eye retinas and iris, voice patterns and hand measurements for authentication purposes. In this project, we have used thumb impression for the purpose of voter identification or authentication. As the thumb impression of every individual is unique, it helps in maximizing the accuracy. A database is created containing the thumb impressions of all the voters in the constituency. Illegal votes and repetition of votes is checked in this system. Hence if this system is employed the elections would be conducted in a fair manner free from rigging. During elections, the thumb impression of a voter is entered as input to the system. This is then compared with the available records in the database. If the particular pattern matches with anyone in the available record, access to cast a vote is granted. But in case the pattern doesn't match with the records of the database or in case of repetition, access to cast a vote is denied or the vote gets rejected. The result is instantaneous and counting is done. The overall cost for conducting elections gets reduced and so does the maintenance cost of the systems.

## BLOCK DIAGRAM

A new voting system can be implemented, using login which requires a fingerprint scan and the name of the candidate. It is a web application, which supports all browsers. Valid voters will have their name, fingerprint and other details in the government database in state or district as seen fit. Therefore, that only legitimate voters can cast their vote.

### *A. Peripheral interface controller*

A Peripheral Interface Controller (PIC) is a type of microcontroller component that is used in the development of electronics, computers, robotics and similar devices. The PIC was produced by Microchip Technology and is based on

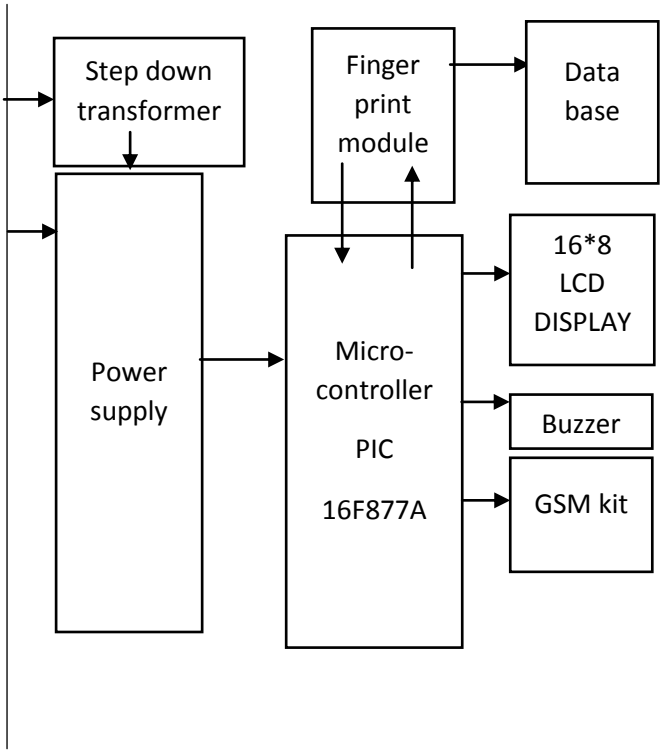


**Fig.1** Block Diagram

Harvard Computing architecture, where code and data are placed in separate registers to increase input/output (I/O) through put. A PIC is also known as Peripheral Intelligent computer. The PIC was designed to improve the performance of I/O operations from a computer's peripheral devices. It works as a standard microcontroller that has small processors, memory, registers and storage. Typically, a PIC enhances I/O operations from peripheral devices by separating I/O- based programs and data from the core Central Processing Unit (CPU). A PIC has a built-in data memory, data bus and dedicated microprocessor for processing all I/O functions and processes. It consists of temporary and permanent storage mechanisms, in the form of Random Access Memory (RAM) and Erasable Programmable Read only memory (EPROM), where RAM stores data/processes that are used and EPROM stores created values.

### *B. Buzzer*

This novel buzzer circuit uses a relay in series with a small audio transformer and speaker. When the switch is pressed, the relay will operate via the transformer primary and closed relay contact. As soon as the relay operates the normally closed contact will open, removing power from the relay, the contacts close and the sequence repeats, all very quickly… so fast that the pulse of current causes fluctuations in the transformer primary and hence secondary. The speakers tone is thus proportional to relay operating frequency. The capacitor C can be used to "tune" the note. The nominal value is 0.001µF, increasing capacitance lowers the buzzers tone.

### *C. LCD*

A Liquid Crystal Display (LCD) is a thin, flat display device made up of any number of colour or monochrome pixels arrayed infront of a light source or reflector. It is often utilized in battery-powered electronic devices because it uses very small amounts of electic power.

### *D. Fingerprint Module*

To use, simply place a finger on the reader window and the reader quickly and automatically captures and encrypts the fingerprints image before sending it to the Digital Persona Identity Engine for verification. Digital Persona products utilize optical fingerprint scanning technology for superior image quality and product reliability. The combination of a U. are.U 4500 Fingerprint Reader with the Digital Persona Identity Engine produces an unmatched ability to recognize even the most difficult fingerprints.

### *E. Database*

Here, the PC is upgraded with database management tools containing the adhaar card details of all the citizens. The fingerprint details entered in the government database for adhaar ID

authentication has been taken as a reference and is compared with the fingerprint of an individual at the polling station, once it matches he/she can proceed to vote, else the buzzer will be turned On indicating the malpractice of an individual.

## 2. WORKING

When an AC supply of 230v is given to the step down transformer, it steps down the initial supply to 12v. Then it is given to the power supply unit from there supply is taken to the different modules (PIC, finger print reader, GSM, LCD, Buzzer). PIC is coded by an embedded coding using the software 'keil Proteus'. The person is identified using the fingerprint sensor. Sensor senses the impression of the thumb. The impression is verified in database of the people. If the identified person is same as in the data base the next step is polling. When the polling is done, the person is given an acknowledgment that the particular person has done the polling. If the same person tries to do the polling a buzzer alarms and signal is sent to the authorities.

## 3. MICROCONTROLLER PIC16F877A DESCRIPTION

A Peripheral Interface Controller (PIC) is a type of microcontroller component that is used in the development of electronics, computers, robotics and similar devices. The PIC was produced by Microchip Technology and is based on Harvard Computing architecture, where code and data are placed in separate registers to increase input/output (I/O) thtoughput.

### *A. High- performance RISC CPU*

It as only 35 single word instructions to learn and single-cycle instructions except for program branches, which are two-cycle. Its operating speed is 20 MHz clock input and 200ns instruction cycle. In addition it had 8K x 14 words of flash program memory, Upto 368x8 bytes of Data Memory(RAM) and 256x8 bytes of EEPROM Data Memory, Pin out compatible to other 28-pin or 40/44-pin PIC16CXXX and PIC16FXXX microcontrollers.

### *B. Peripheral features*

a) Timer 0: 8-bit timer/counter with 8-bit pre-scalar.
b) Timer 1: 16-bit timer/counter with pre-scalar, can be incremented during sleep via external crystal/clock.
c) Timer2: 8-bit timer/counter with 8-bit period register, pre-scalar and post scalar.
d) Two Capture, Compare, PWM modules.
e) Capture is 16-bit, maximum resolution is 12.5ns.
f) Compare is 16-bit, maximum resolution is 200 ns.
g) PWM Maximum resolution is 10-bit.
h) Synchronous Serial Port(SSP) with SPI™ (Master mode) and $I^2C$™ (Master/Slave).
i) Universal Synchronous Asynchronous Receiver Transmitter (USART/SCI) with 9-bit address detection.
j) Parallel Slave Port (PSP) – 8bits wide with external RD, WR and CS controls (40/44-pin only).
k) Brown-out detection circuitry for Brown-Out Reset (BOR).

### *C. Analog Features*

a) Two analog comparators.
b) Programmable on-chip voltage reference(Vref) module.
c) Programmable input multiplexing from device inputs and internal voltage reference.
d) Comparator outputs are externally accessible.

### *D. Special features*

a) 1,00,000 erase/write cycle Enhanced Flash program memory typical.
b) 1,000,000 erase/write cycle data EEPROM memory typical.
c) Data EEPROM Retention> 40 years.

d) Self-reprogrammable under software control.
e) In-circuit Serial Programming$^{TM}$(ICSP$^{TM}$) via two pins.
f) Single-supply 5v In-Circuit Serial Programming.
g) Watchdog Timer (WDT) with ots own on-chip RC.
h) Oscillator for reliable operation
i) Programmable code protection.
j) Power saving sleep mode.
k) Selectable oscillator options.
l) In-CIRCUIT Debug(ICD) via two pins.

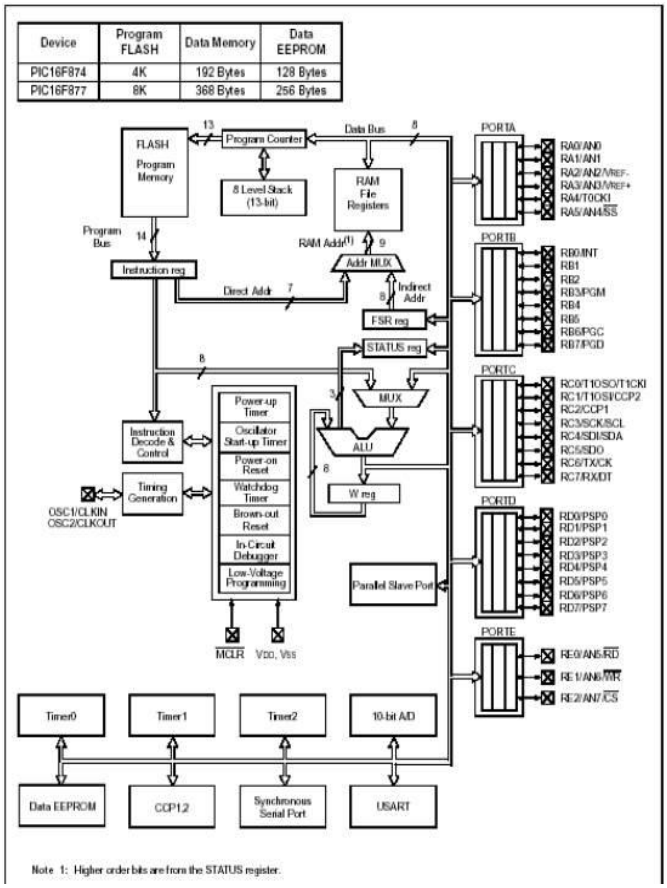


**Fig.2** Pin Diagram

### *E. Pin diagram*

Reduced Instruction Set Computer (RISC) gives the PIC16F887 two great advantages

- The CPU can recognizes only 35 simple instructions (In order to program some other microcontrollers it is necessary to know more than 200 instructions).

The execution time is the same for all instructions except two and lasts 4 clock cycles(oscillator frequency is stabilized by a quartz crystal). The Jump and Branch instructions execution time is 2 clock cycles. It means that if the microcontroller's operating speed is 20MHz, execution time of each instruction will be 200ns, i.e the program will be executed at the speed of 5 million instructions per second.

## 4. CURRENT TRANSFORMER

CT's are instrument transformers that are used to supply a reduced value of current to meters, protective relays and other instruments. CT's provide isolation from the high voltage primary, permit grounding of the secondary for safety and step-down the magnitude of the measured current to a value that can be safely handled by the instruments.

CT ratios are expressed as a ratio of the rated primary current to the rated secondary current. For example, a 300:5 CT will produce 5A of secondary current when 300 A flows through the primary. As the primary current changes the secondary current will vary accordingly. With 150A through the 300 A rated primary, the secondary current will be 2.5A(150:300=2.5:5). When the rated primary ampheres is exceeded, which is usually the case when fault occurs on the system, the amount of secondary current will increase but depending on the magnetic saturation in the CT the output may not be exactly proportional.

### *A. Polarity*

All current transformers are subtractive polarity. Polarity refers to the instantaneous direction of the primary current with respect to the secondary current and is determined by the way the transformer leads are brought out of the case. On subtractive polarity transformers the H1 primary lead and X1 secondary lead will be on the same side of the transformer(the left side when facing the low-side bushings). Bar type CT's have primary connections that bolt-up directly to the substation bus bars. Outdoor-rated versions of this equipment are used in pole-mounted primary

metering installations. This type of CT often has compensating windings which improve the accuracy across the full load range of the transformer.

### *B. Installation considerations*

This bushing CT is designed for use on existing circuit breakers and power transformers and is installed externally. It is housed in an aluminium case which provides electrostatic shielding. Care must be taken with the installation to ensure that the mounting clamp bolts do not contact the case resulting in a one-turn primary short circuit. The case is metal and it is installed externally to decrease the bushing strike distance. The circuit breaker or transformer manufacturer should be consulted to verify acceptability of the installation.

### *C. Hall effect CT's*

Hall- Effect CT's are not current transformers in the conventional sense, rather they are electronic circuit transducers which can be applied in the measurement of either AC or DC circuit currents. These devices have many applications; they are commonly used in Variable Frequency Drives (VFD's) to measure the DC link current and are also employed in AC/DC instrument probes such as the TPI-A254 Current Adapter. Hall effect devices contain null balance type amplifier circuit. The magnetic flux produced by the current flow through the primary results in an output voltage which is balanced by an equal and opposite output from the control or measuring circuit. Because the circuit is an amplifier, it requires external operating power which is supplied by the control circuit power supply, or in the case of a portable instrument probe, batteries are used.

As with conventional current transformers, Hall-Effect devices provide isolation from the high voltage circuit and reduce the measured current to a proportional value which can be safely measured by the control or instrument circuit. Hall effect devices do not pose the same danger as conventional bus-bar or donut type CT's with regard to an open circuited secondary. However, good practice dictates that instrument current probes should not be disconnected from the meter while current is passing through the device primary.

## 5. BUZZER, GSM, LCD

### *A. Buzzer*

This novel buzzer circuit uses a relay on series with a small audio transformer and speaker. When the switch is pressed, the relay will operator via the transformer primary and closed relay contact. As soon as the relay operates the normally closed contact will open, removing power from the relay, the contacts close and the sequence repeats, all very quickly.. so fast that the pulse of current causes fluctuations in the transformer primary. The speakers tone is thus proportional to relay operating frequency. The capacitor C can be used to "tune" the note. The nominal value is 0.001µF, increasing capacitance lowers the buzzers tone.

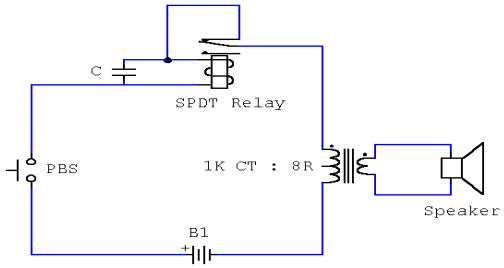


**Fig.3** buzzer

### *B. GSM*

A GSM modem is connected to each Telecontrol unit. The central server calls up each of the Telecontrol units in sample homes to pick up the

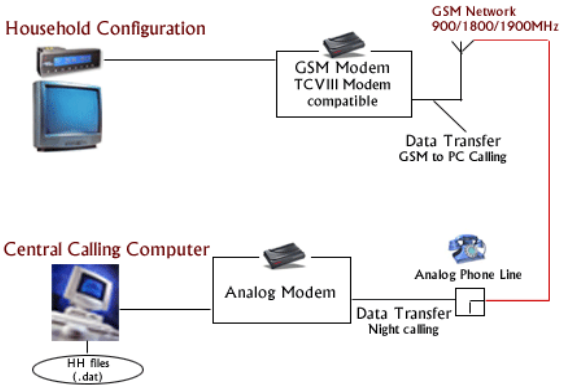


**Fig.4** GSM NETWORK

data stored therein. A Map's technology architecture enables instant data collection from the sample homes as often as desired. It also enables conducting pf instant opinion polls about the programs being telecast. The collected data is instantaneously incorporated into the aMap reports.

1. *Features of SIm300 Module- DOWNLOAD SIM 300 DATASHEET- AT COMMANDS*

a) Designed for global market, SIM300 is a Tri-band GSM/GPRS engine.
b) Works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz.
c) SIM300 features GPRS multi-slot class 10/ class 8 (optional) and supports the GPRS coding schemes.
d) CS-1, CS-2, CS-3 and CS-4 with a tiny con Figuration of 40mmx33mmx 2.85mmSIM300 can fit almost all the space requirements in your applications, such as smart phone, PDA phone and other mobile devices.


**Fig.5** GSM KIT

2. *Features of GSM Kit*

a) This GSM modem is a highly flexible plug and play quad band GSM modem for direct and integration to RS232.
b) Supports features like Voice, Data/ Fax, SMS, GPRS and integrated TCP/IP stack.
c) Control VIA at commands(GSM 07.07,07.05 and enhanced AT commands)
d) Use AC-DC Power Adaptor with following ratings; DC voltage: 12v/1A
e) Current consumption in normal operation 250 mA can rise upto 1A while transmission.
f) INTERFACES
g) RS-232 through D-Type 9 pin connector.
h) Serial port baud rate adjustable 1200 to 115200bps(9600 default).
i) BRK connector for MIC & SPK, SIM card holder.
j) Power supply through DC socket.
k) SMA antenna connector and Murata Antenna(optional).
l) LED status of GSM/GPRS module.

### C. *LCD display*

*1. LCD*

A Liquid Crystal Display is a thin, flat display device made up of any number of colour or monochrome pixels arrayed infront of a light source or reflector. It is often utilized in battery-powered electronic devices because it uses very small amounts of electric power.

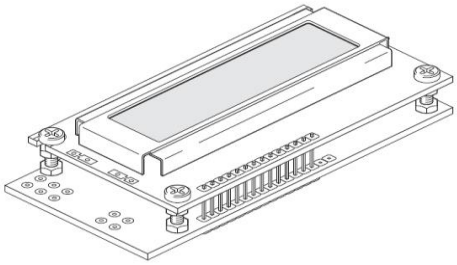

**Fig.6** LCD Display

*2. Important factors to be considered when evaluating an LCD monitor*

a) Resolution: The horizontal and vertical size expressed in pixels (eg., 1024x768). Unlike CRT monitors, LCD monitors have a native-supported resolution for best display effect.
b) Viewable size: The size of an LCD panel measured on the diagonal(more specifically known as active display area).
c) Dot pitch: The distance between the centres of two adjacent pixels. The smaller the dot pitch size, the less granularity is present, resulting in a sharper image. Dot

pitch may be the same both vertically and horizontally, or different (less common).

d) Reponse time: The minimum time necessary to change a pixel's colour or brightness.

e) Matrix type: Active or Passive.

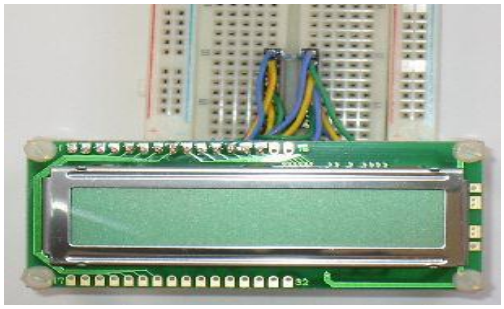

**Fig.7** LCD Module Connected To Breadboard

f) Viewing angle (coll., more specifically known as viewing direction).

g) Colour support: How many types of colours are supported (coll., more specifically known as colour gamnut).

h) Brightness: The amount of light emitted from the display (coll., more specifically known as luminance).

i) Contrast ratio: The ratio of the intensity of the brightest bright to the darkest dark.

j) Aspect ratio: The ratio of the width to the height (for example, 4:3, 16:9 or 16:10).

k) Input port (eg., DVI, VGA, LVDS or even S-Video and HDMI).

l) The LCD module can easily be used with an 8051 microcontroller such as the AT89C2051 included with the microcontroller beginner kit.

**Table.1** Pins on the 16 pin connector of the LCD Module

| LCD Connector | Function | 2051 Pin Number & Name | | | LCD Connector | Function | 2051 Pin Number & Name |
|---|---|---|---|---|---|---|---|
| 1 | Data Line 6 | 18, P1.6 | | | 16 | LCD RS | 7, P3.3 |
| 2 | Data Line 1 | 13, P1.1 | | | 15 | Data Line 5 | 17, P1.5 |
| 3 | Power - 5VDC | | | | 14 | LCD Read/Write | 6, P3.2 |
| 4 | Not Connected | | | | 13 | Data Line 0 | 12, P1.0 |
| 5 | Display Adjust | | | | 12 | Data Line 4 | 16, P1.4 |
| 6 | Data Line 7 | 19, P1.7 | | | 11 | LCD Enable | 8, P3.4 |
| 7 | Data Line 2 | 14, P1.2 | | | 10 | Data Line 3 | 15, P1.3 |
| 8 | Ground | | | | 9 | Not Connected | |

m) The LCD module comes with a 16 pin connector. This can be plugged into the breadboard as shown below.

The pins on the 16 pin connector of the LCD Module are defined below. The table also shows how to connect each pin to the 2051 microcontroller. To connect the LCD Module to a standard 40 pin 8051, use the pin names listed below to find the correct pin number on the 8051 microcontroller.

## 6. FINGER PRINT MODULE

### *1. Finger Print Sensor*

The Ultimate Fingerprint Identity Machine:

The U.are.U 4500 Reader is a USB fingerprint reader featuring an elegant, sleek design with a soft, cool blue glow and the surpassed performance Digital Persona is known for power-users and shared environments, the 4500 is the natural choice for those that want and need the very best. Here's a look at just some of its features and benefits:

a) Blue LED: Soft, cool blue glow fits into any environment. Provides a pleasing presence; doesn't compete in low light environments, such as restaurants, or conflict with alarm condition colors, such as in health care.

b) Small form factor: Conserves valuable desk space.

c) Rugged construction: High-quality metal casing weighted to resist unintentional movement.

d) Special undercoating: Stays where you put it because of a special undercoating.
e) Rotation invariant: Touch it from any direction, it still provides a high quality image and matching performance, perfect for shared environments.
f) Excellent image quality: High quality optics ensure best image every time.
g) Works well with dry, moist or rough fingerprints: Reliable performance over the widest population of users. Reads even the most difficult fingerprints.

### *2. 4500HD High Durability Model*

The 4500 HD was specifically designed for business-critical applications that require a high - level of durability from fingerprint readers but still need a high degree of accuracy. When deployed in a shared environment, fingerprint readers are commonly subjected to harsh use and outright vandalism that can significantly reduce their performance or break the device. To counter this, the 4500HD Reader has a super tough coating that stands up to physical and chemical abuse while delivering unequal accuracy and performance for hard-to read fingerprints.

**Fig.8** Fingerprint reader

The U.are.U 4500 and 4500HD fingerprint readers are designed for use with DigitalPersona's full range of software: DigitalPersona Pro for Active Directory and Digital Personal for your own applications.

### *3. Easy To Use*

To use, simply place a finger on the reader window and the reader quickly and automatically captures and encrypts the fingerprint image before sending it to the DigitalPersonal Identity Engine for verification. DigitalPersonal products utilize optical fingerprint technology for superior image quality and product reliability. The combination of a U.are.U 4500 Fingerprint Reader with Digital Personal Identity Engine produces an unmatched ability to recognize even the most difficult fingerprints.

## 7. RESULT


**Fig.9** Step 1


**Fig.10** Step 2

**Fig.11** Step 3

## 8. CONCLUSION

For over a century, fingerprints have been one of the most highly used methods for human recognition; automated biometric systems have

only been available in recent years. This work is successfully implemented and evaluated. The arrived results were significant and more comparable. It proves the fact that the fingerprint image enhancement step will certainly improve the verification performance of the fingerprint based recognition system. Because fingerprints have a generally broad acceptance with the general public, law enforcement and the forensic science community, they will continue to be used with many government's legacy systems and will be utilized in new systems for evolving applications that require a reliable biometric. Thus, the advent of this biometric voting system would enable hosting of fair elections in India. This will preclude the illegal practices like rigging. The citizens can be sure that they alone can choose their leaders, thus exercising their right in the democracy.

Accessing data from various polling station at the same time may lead to network traffic reducing the system speed. As a future work, we can focus in this area which makes the system to contact the server effectively with any traffic and the system response is provided at a faster rate increasing the processing speed of the sytem.

## 9. APPENDIX

*1 Programming View*

Programming a Predefined Message into the Module. The module can contain 7 user predefined messages, each message 16 characters long. These messages are stored on the LCD module and can be used to greatly reduce the 'display text' that must be stored within the PICAXE or Stamp (hence reducing the length of the program).Messages 1,3,5,7 automatically appear on the top line of the display. Messages 2,4,6 automatically appear on the second line of the display. The messages must be programmed into the module using a small program running in a microcontroller such as the PICAXE.

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