Chhatrapati Shivaji Institute of Technology, Durg

Computer Science & Engineering Department

Semester – 8th

Section - B

Programmer's Keyboard

Major Project Presentation

Developed by

- Annim Banerjee (101)
- 3032209112
- Rishabh Sharma (106)
- 3032209121
- Srijan Tiwari (87)
- 3032209092

Under the Supervision of

Mr. Saket Soni.

Asst. Professor

CSE Department.

Contents

Abstract

Abstract

Designing and building of a *keyboard* with those feature which helps in speeding up the programmer or say to coder to do coding on the respective IDE editor window.

Overview

Overview

- This project is partly based on embedded systems and rest of the part is software based.
- Special key sets are provided which are dedicated to do specific task.
- This project is been developed keeping the programmers as our audience.
- This project has been developed in two languages, C++ and C#.

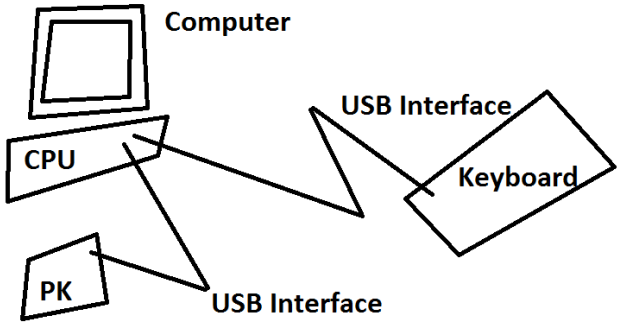
Overview

- This project is not been developed as per IEEE, FCC(Federal Communication Commission) Electronics specification.
- This keyboard having an USB interface to connect with your system.
- A software will been developed for rendering this keyboard from your system.

Challenges

Challenges

- To provide such an interface which is from current technology. One of them is USB(Universal Serial Bus).
- The key arrangement.
- The monitoring control unit.
- How we can implement the same without any kind of special control system, instead, just using simple logic gates and registers etc.
- Communication from our device to computer.



Methodology

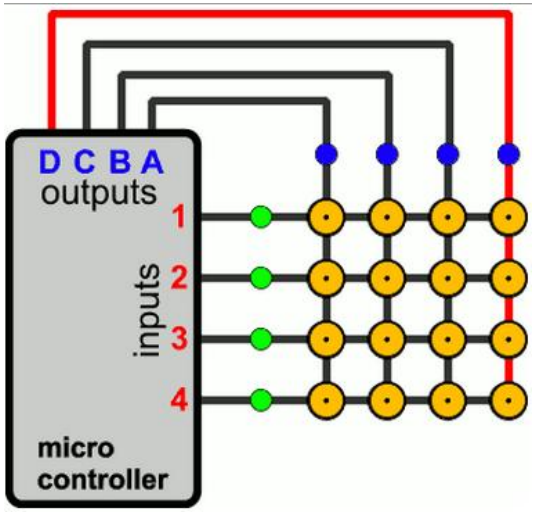
Methodology

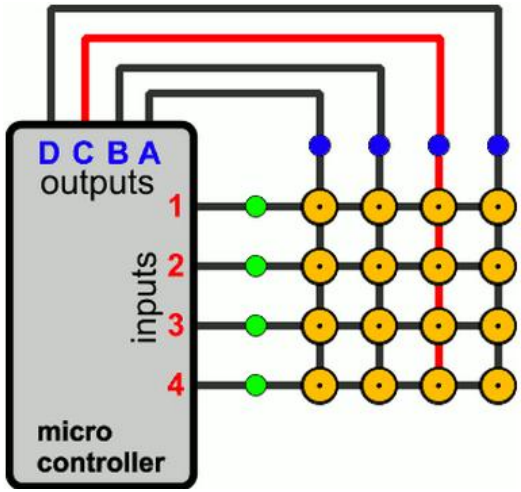
- **Hardware Modules**
  - Keyboard Module
  - Controller Module

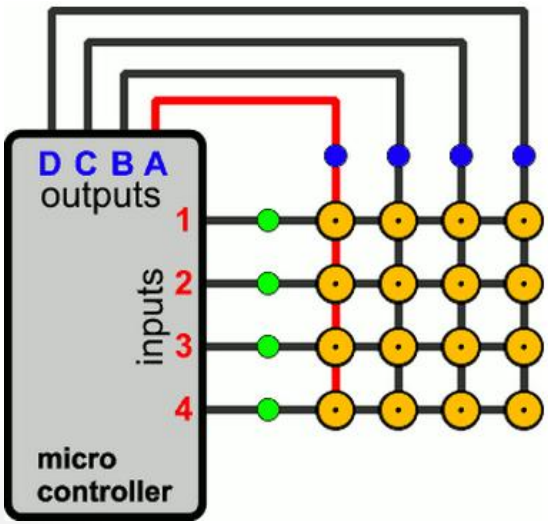
- **Software Modules**
  - Software in C++ using WinAPI.
  - Software In C# .NET.

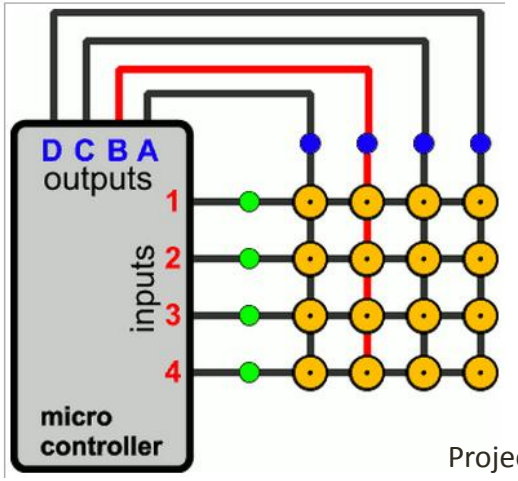
Methodology

- **Keyboard Module** along with controller connection…



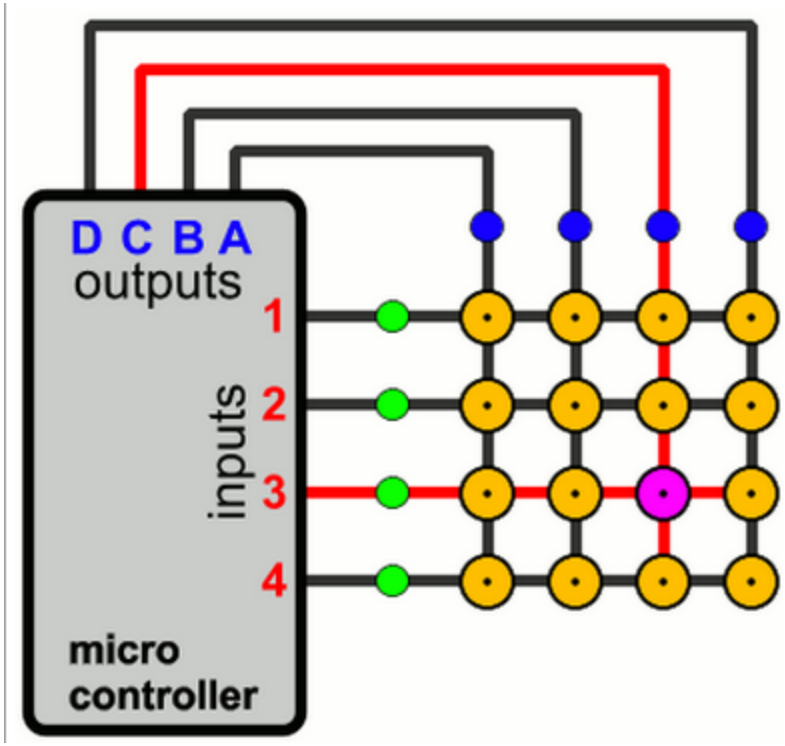






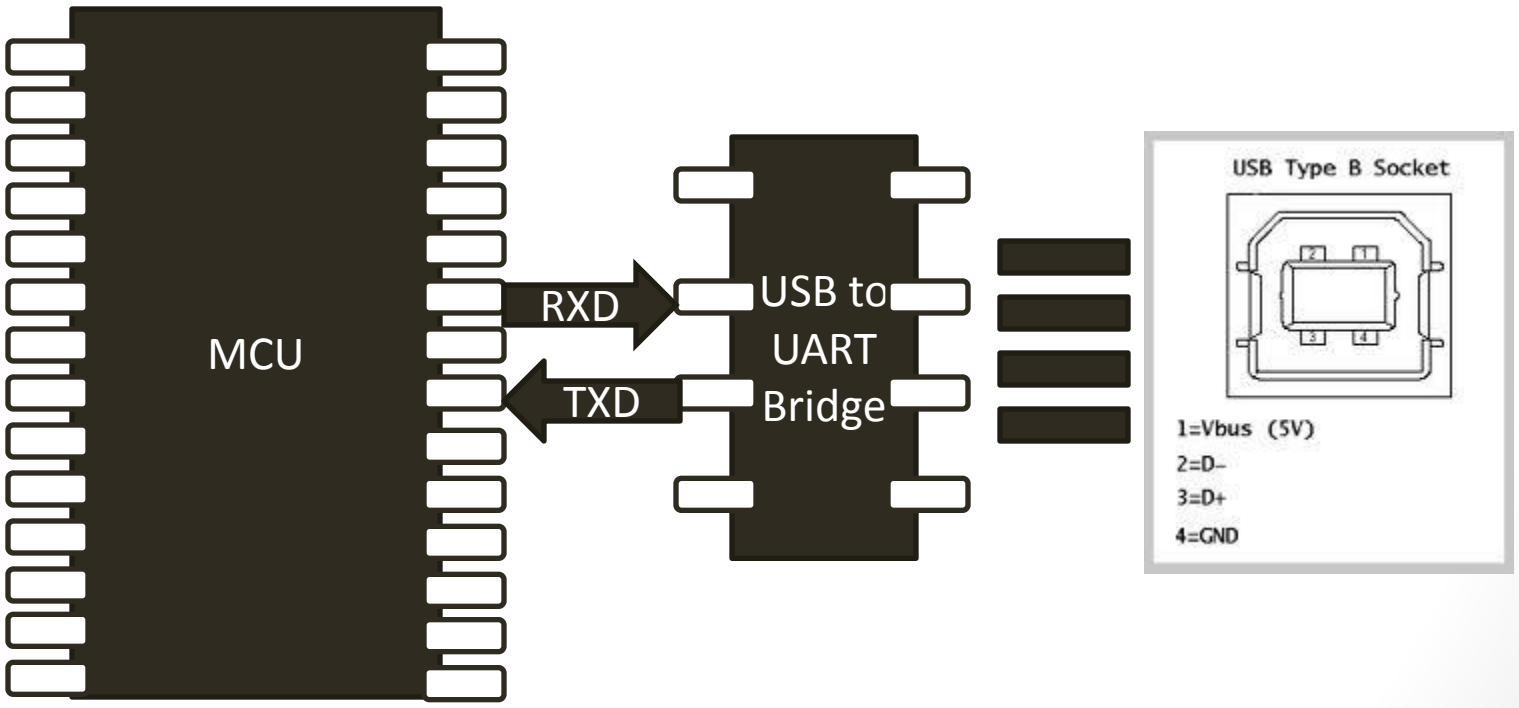
Methodology

- **Keyboard Module** along with controller connection…



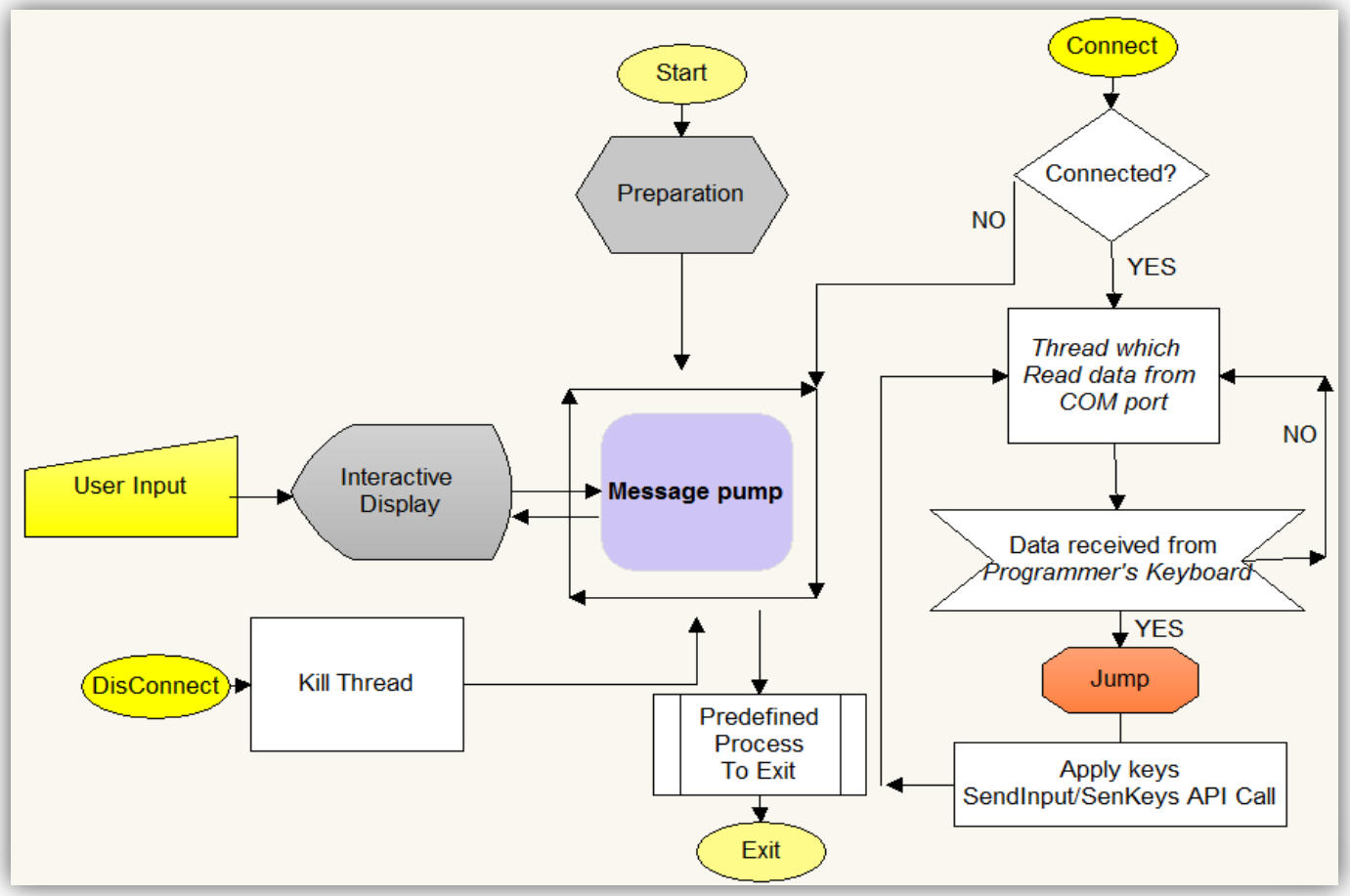
Methodology

- **Controller Module** along with serial communication connection



Methodology

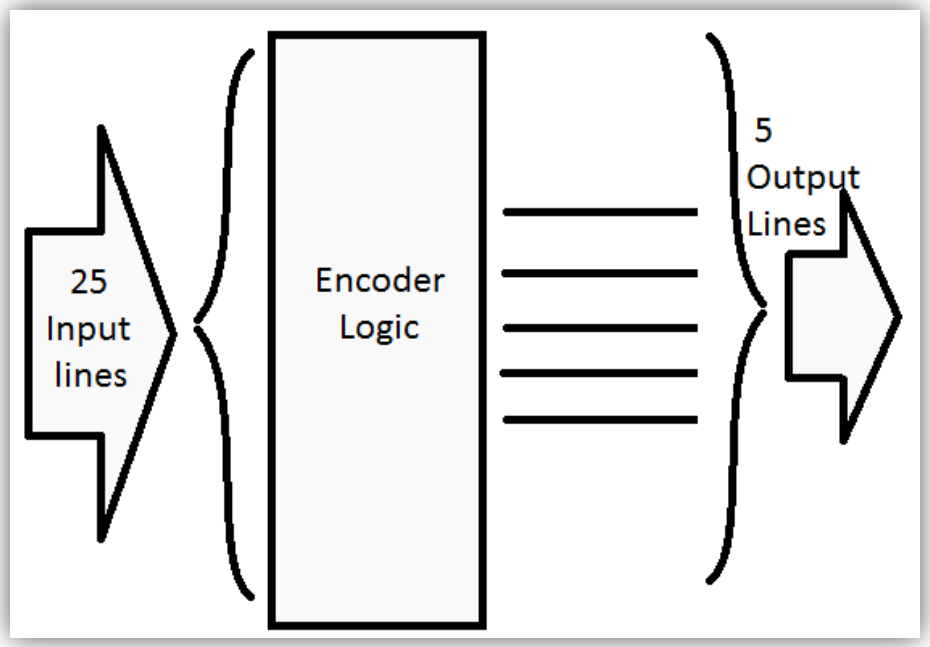
- **Software front**



Solutions

Solution

- **To make the same without MCU and USB to UART bridge…**



O1 = A+C+E+G+I+K+M+O+Q+S+U+W+Y.
O2= B+C+F+G+J+K+N+O+R+S+V+W.
O3= D+E+F+G+L+M+N+O+P+T+U+V+W.
O4= H+I+J+K+L+M+N+O+X+Y.
O5= P+Q+R+S+T+U+V+W+X+Y.

- To derive an encoder logic.

Solution

➢ To communication of MCU with computer

- Few more hardware required –
  - One 8-bit parallel in, serial out shift register chip-
    - This takes 5 input lines parallel and put the same data out in serial way.
    - Still 3 bits left, consider as *don't care*.
    - Requires a clock tick to push serially data out from chip towards computer port and get it register on computer's port buffer.
- Case-
  - Computer peeks onto port buffer for any data except 0x00f.
  - Iff any button pressed-
    - For once and for first time, a high signal shall be issued over D+ line and negative of the same too over D-.
    - The point when the software program finds a change in port buffer, it then recognised as ***START*** of the communication.
    - XOR the computer's port buffer with 0x00f data.
    - For next 8 cycles…
      - From computer, D+ carries a dummy HIGH signal to give a clock to parallel-in-serial-out sift register and over same channel D+, one by one bit will be transferred in to computers port buffer by ORing the value with previously stored data in computer's port buffer.

Solution

➢ To communication of MCU with computer

- The final value so obtained in the computer's port buffer will be in binary format indicating the n^{th} number of key is been pressed!
- Immediately XOR the computer's port buffer with 0x00f for clearing the buffer.

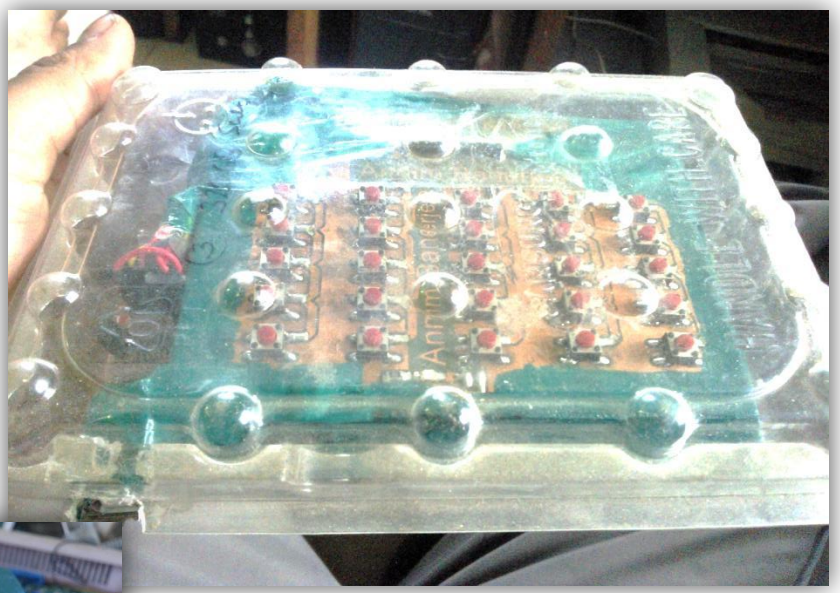
- Put a voltage inverter will put the mirror of D+ in D- BUS line for correct communication as per USB data communication protocol.
- Place a fuse on D+ and D- line for eliminating noise and have strong strength of data in BUS lines.

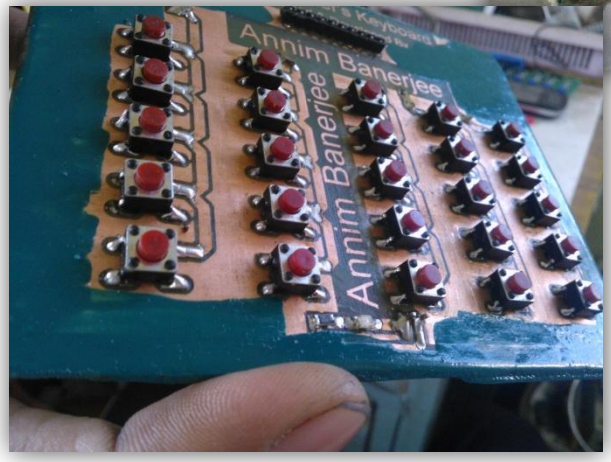
Protocol to call for communication to happen-**using Serial port DB9, RS232 technology…**

- With this port, we got one more signal BUS line and that is DTR signal which stands for ***Detect-To-Ready*** signal which acts as ***RESET*** signal for any MCU or any digital system. NOTing to this signal will be better in terms of usage.
- Case regarding this technology is quite similar to USB technology based theory-protocol. We shall send a DUMMY ***START*** signal to computer from DTR BUS line and over software end, program will constantly pulling LOW. If found HIGH, that indicates a START condition and rest goes the same. This DTR will be used to give a clock tick to parallel-in-serial-out shift register to get the data bits out from it.
- The TXD line of DB9 pin shall be used to put data from keyboard to computer's port buffer.
- A voltage doubler of +10V circuit will be required to put data which will be evaluated for validation purpose by the PC.

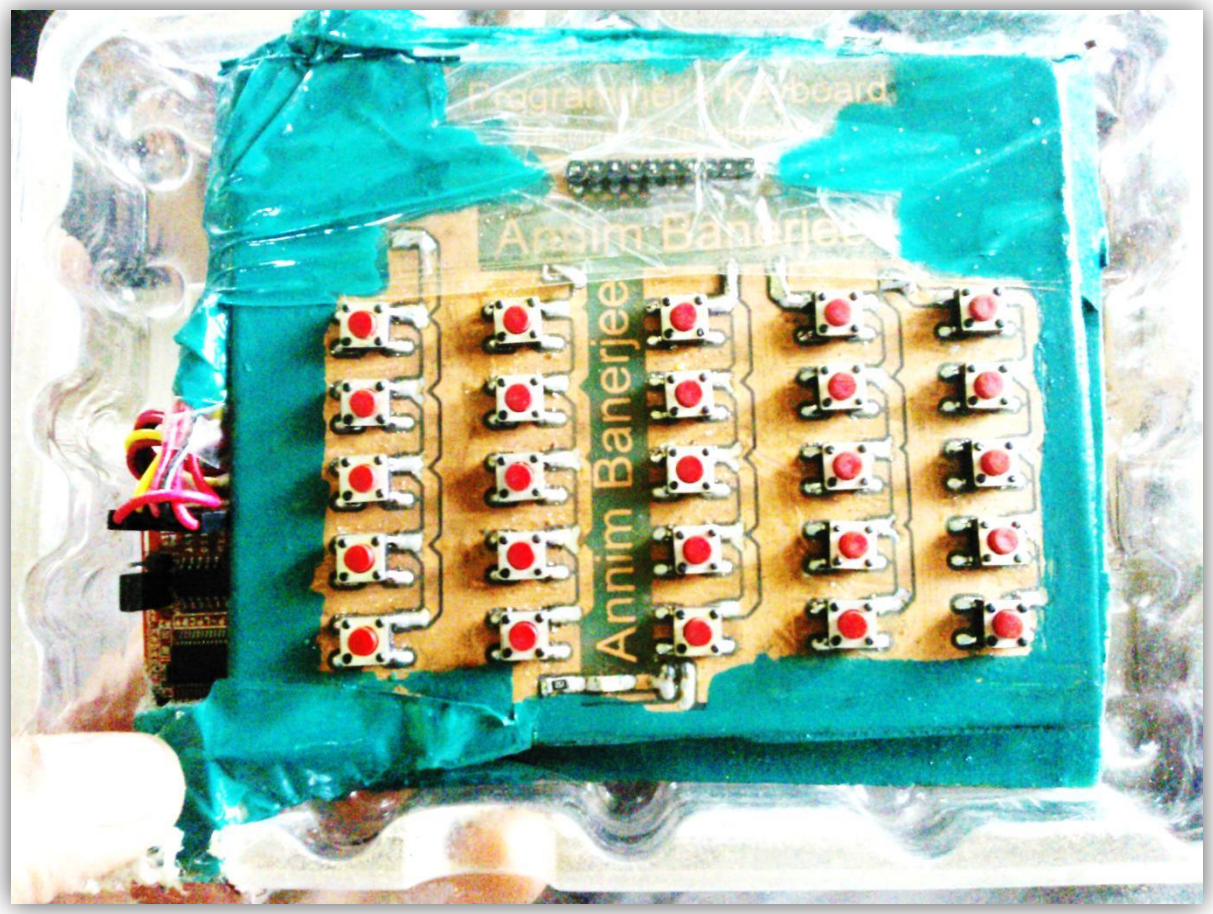
Results

Results

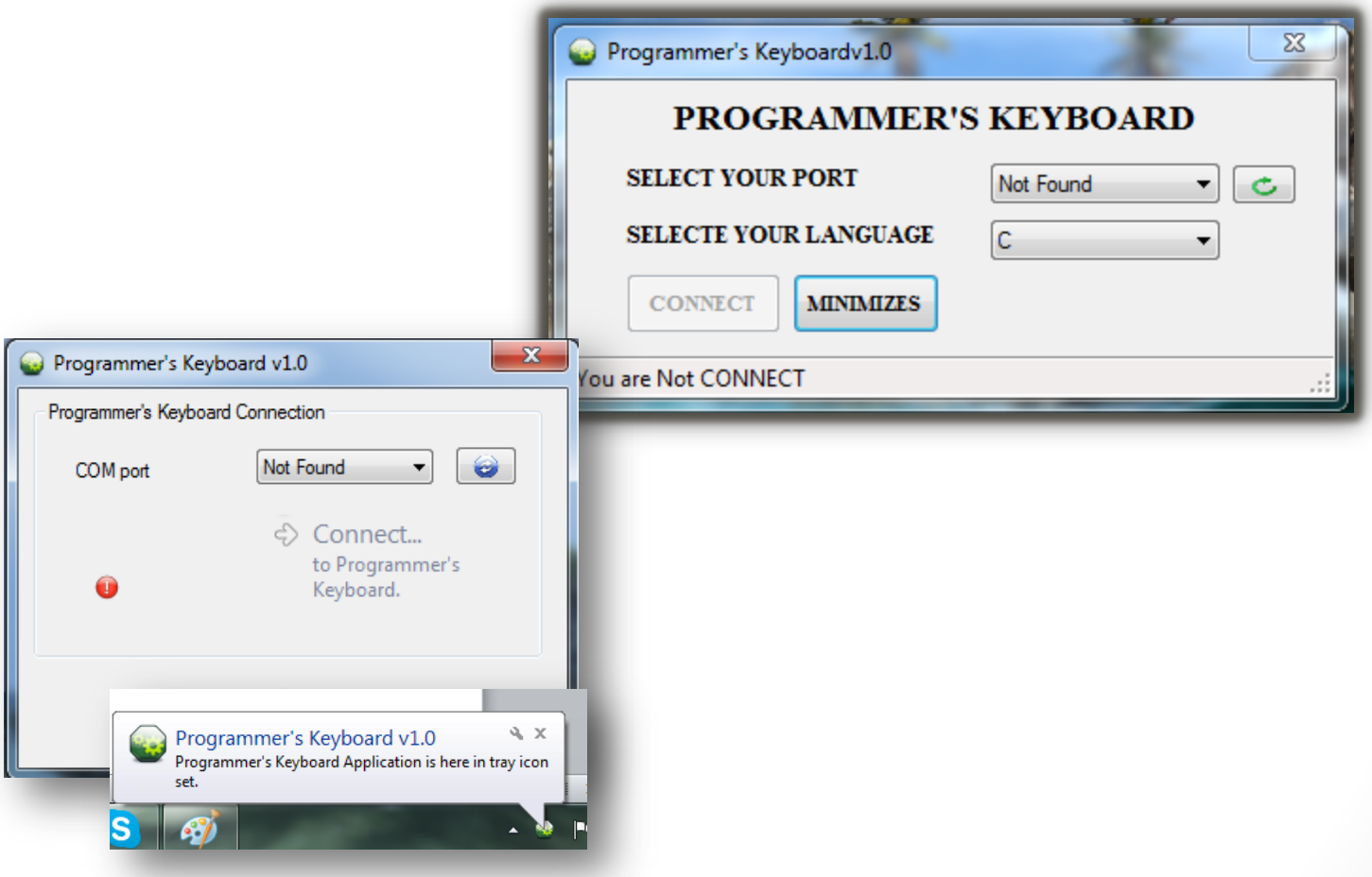




Results



Results


Programmer's Keyboardv1.0
PROGRAMMER'S KEYBOARD
SELECT YOUR PORT
Not Found
SELECTE YOUR LANGUAGE
C
CONNECT
MINIMIZES
You are Not CONNECT
Programmer's Keyboard v1.0
Programmer's Keyboard Connection
COM port
Not Found
Connect...
to Programmer's Keyboard.
Programmer's Keyboard v1.0
Programmer's Keyboard Application is here in tray icon set.

Scope

Scope

- The USB module should be included in the circuitry of controller board with best suitable USB-to-Serial converter chip.
- Can be converted into a normal workable keyboard with 102, 104 keys.
- Can be converted into a controller for specific game.
- A good logic should be developed to replace the controller, i.e. MCU from the project and also UART communication can be re-designed by using very simple TTL logics. A small mechanism is been shown which might replace the MCU and also the USB-to-Serial converter chip, but this will be an experimental.

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- http://www.google.co.in/url?sa=t&rct=j&q=ft232rl&source=web&cd=2&cad=rja&sqi=2&ved=0CDMQFjAB&url=http%3A%2F%2Fwww.ftdichip.com%2FDocuments%2FDataSheets%2FICs%2FDS_FT232R.pdf&ei=agZCUd7XC5CsrAfmj4GIDg&usg=AFQjCNGami1T1YXLF1U9kCK2hDTudVhVnQ&bvm=bv.43287494,d.bmk