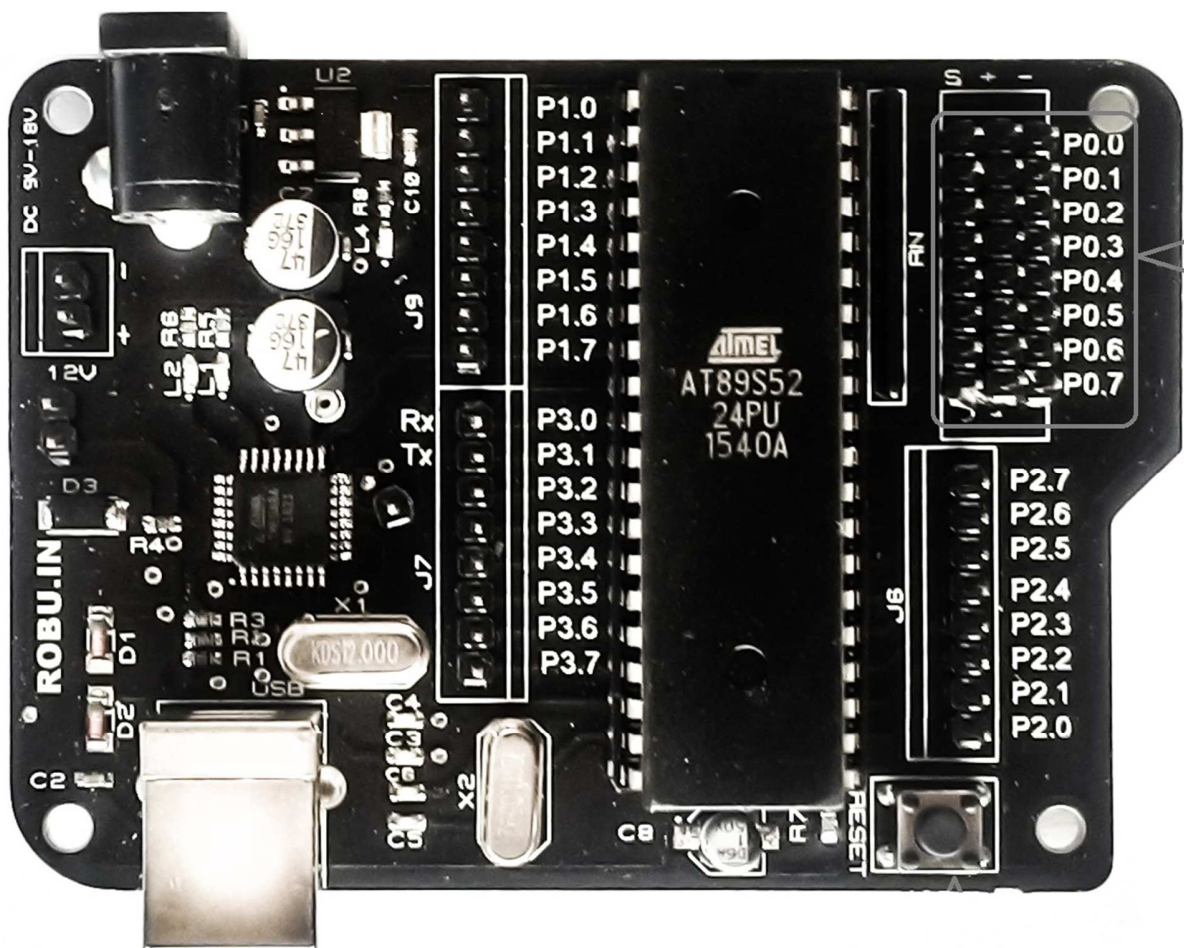


ARYABHATTA 8051 DEVELOPMENT BOARD WITH ON-BOARD USB PROGRAMMER



1. Descriptions:

With this board you can develop and prototype 40 pin 89S52 and 89s51 microcontrollers. The on board programmer allows easy connection with PC using USB type B cable for Programming. The Operating Voltage is 9V to 15V DC.

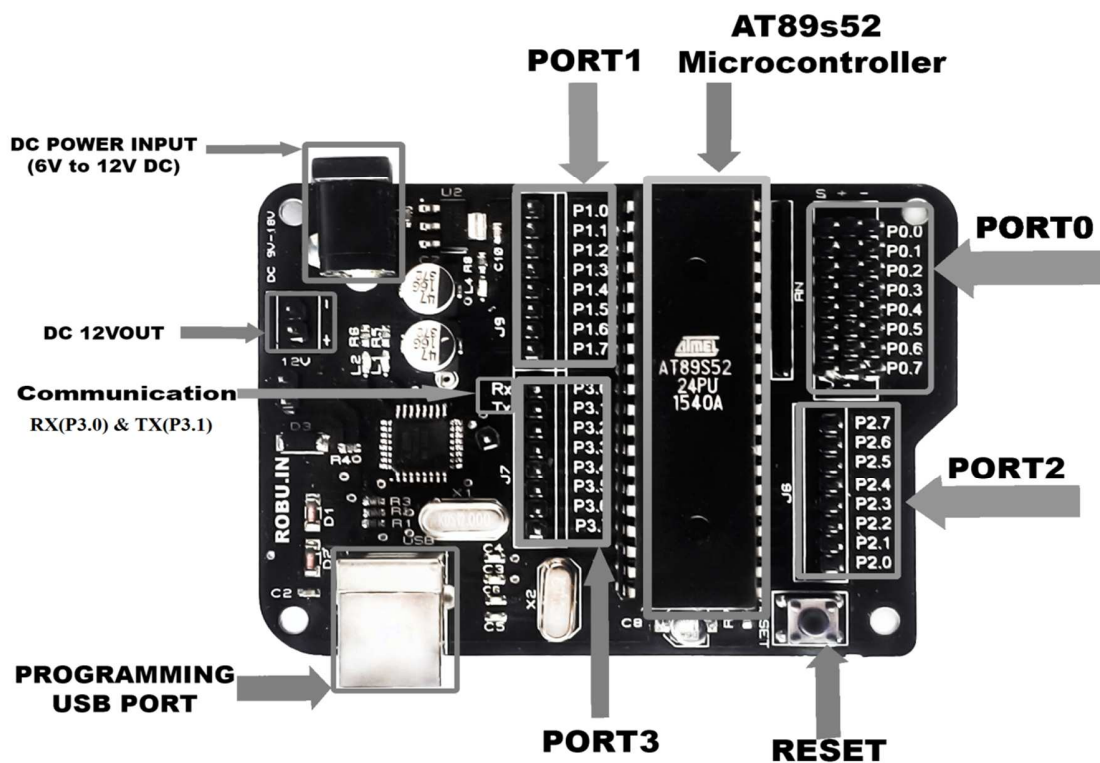
2. Features:

1. Quartz crystal 11.0592 MHz
2. On board programmer.
3. Reset button.
4. Power plug-in jack.
5. GND bus.
6. VCC bus.
7. On board 5V voltage regulator.
8. Power Indicating LED.
9. On board Regulated Power Supply 5V, 12V, GND.
- 10.High quality PCB FR4.
- 11.External pull-up resistors for Port 0.
- 12.Port extensions for all ports.

3. Specifications:

1. Size: 85 x 62 mm.
2. Supported Microcontroller: AT89SXXXX series.

4. Hardware Details:



PORT 0(P0.0-P0.7)- 8 bit Bidirectional I/O port with external pullup and having multiplexed low-order address/data bus

PORT 1(P1.0-P1.7)-8-bit bidirectional I/O port with internal pull-ups.

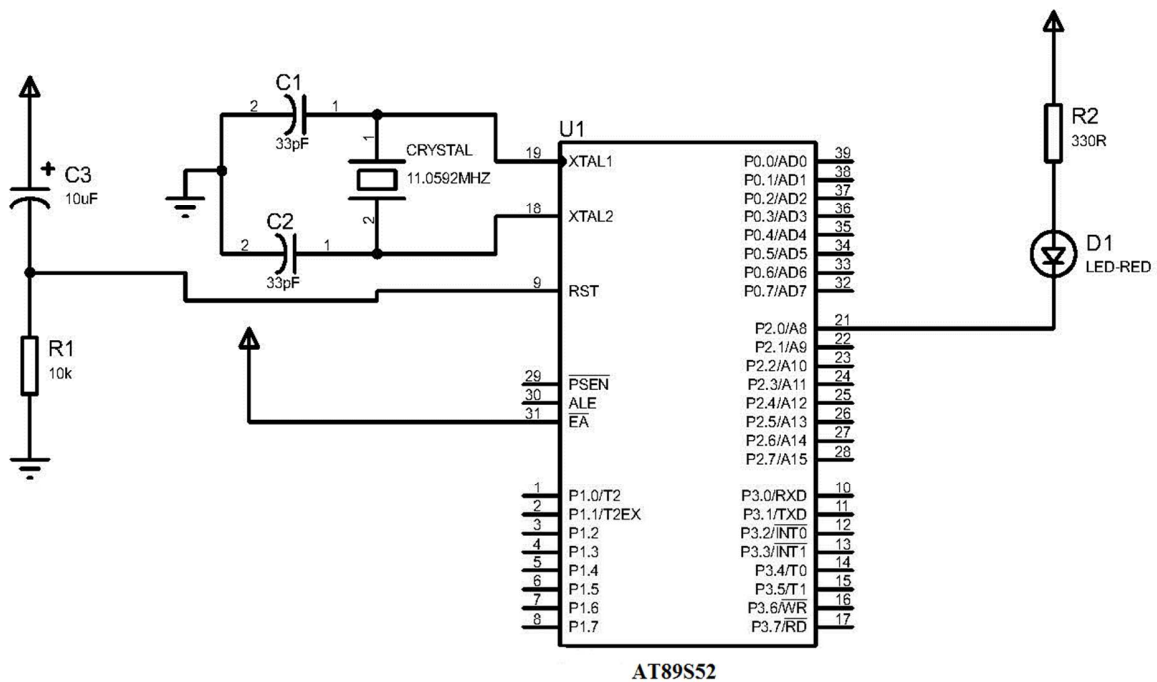
PORT 2(P2.0-P2.7)-8 bit Bidirectional I/O port with internal pull-ups and having multiplexed Higher-order address/data bus.

5. Examples:

1. LED blinking
2. Serial Communication
3. 7 Segment Display
4. LCD interfacing

1) LED blinking:

Schematic:

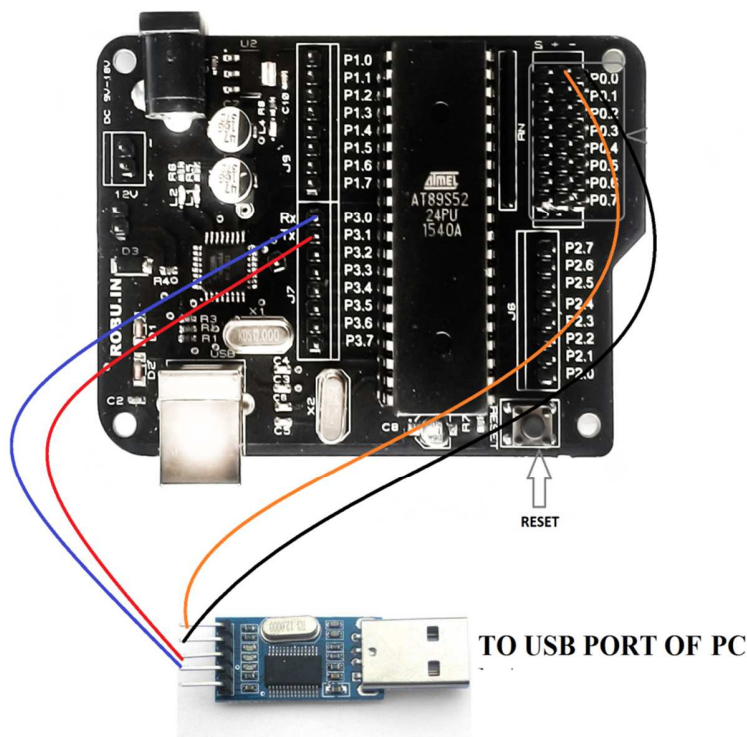


Code:

```
#include<reg52.h>      // special function register declarations
sbit LED = P2^0;      //LED pin
void Delay(void);     // Function prototype declaration
void main (void)
{
    while(1)          // infinite loop
    {
        LED = 0;      // LED ON
        Delay();
        LED = 1;      // LED OFF
        Delay();
    }
}
void Delay(void)
{
    int j;
    int i;
    for(i=0;i<10;i++)
    {
        for(j=0;j<10000;j++)
        {
        }
    }
}
```

2) Serial Communication:

Schematic:



+5V of PL2303 to +5V of 8051

GND of PL2303 to GND of 8051

TXD of PL2303 to RX of 8051

RxD of PL2303 to TX of 8051

*PL2303 is USB to TTL converter.
FTDI chip also work.*

Description:

Serial data transmitted by 8051 is printed on serial terminal of PC by using PL2303 or FTDI232 which are usb to ttl convetre.

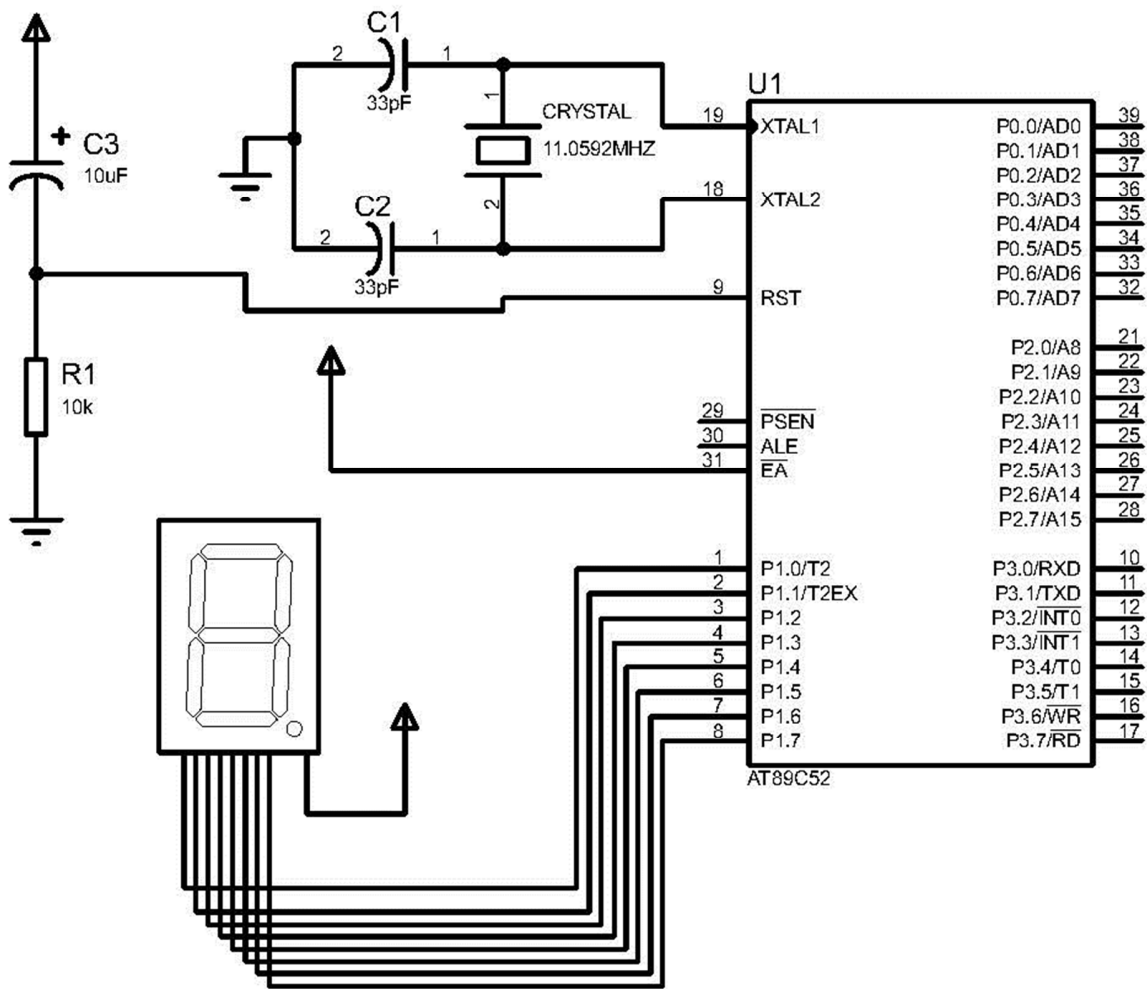
Code:

```
#include<reg51.h>
void main(void)
{
  TMOD=0x20; // Timer1 Mode2 8 bit auto reload
```

```
TH1=0xFD; // 9600 bps
SCON=0x50; // 8 Data bit, 1 start bit, 1 stop bit
TR1=1; // Timer1 ON
while(1==1)
{
SBUF='R';
while(TI==0); // Pole TI flag for complete transmission
TI=0;
SBUF='O';
while(TI==0);
TI=0;
SBUF='B';
while(TI==0);
TI=0;
SBUF='U';
while(TI==0);
TI=0;
SBUF='!';
while(TI==0);
TI=0;
SBUF='T';
while(TI==0);
TI=0;
SBUF='N';
while(TI==0);
TI=0;
}
}
```

3. 7 Segment Display:

Schematic:



Code:

```
#include<reg51.h>

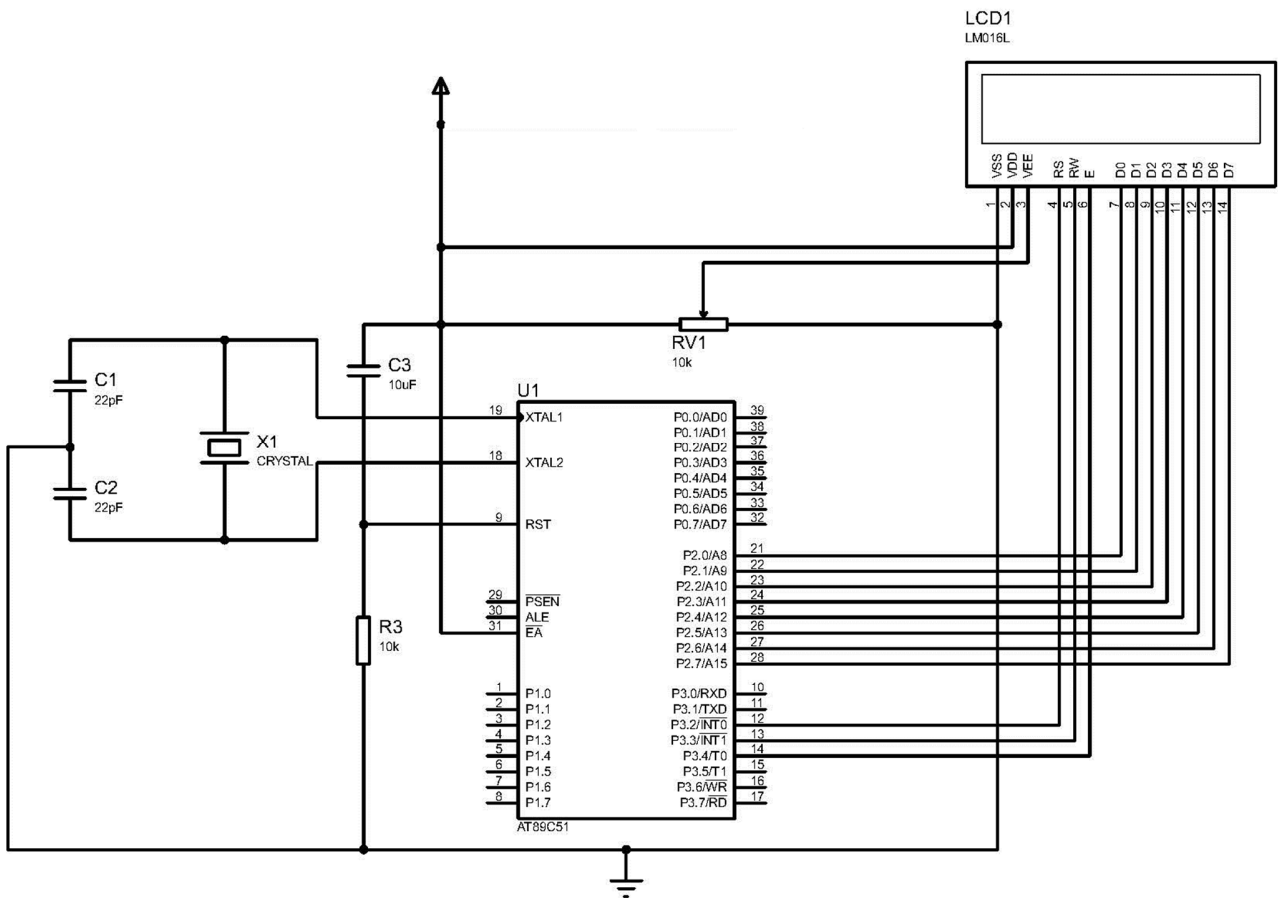
void msdelay(unsigned int time) // Function for creating delay in milliseconds.
{
    unsigned i,j ;
    for(i=0;i<time;i++)
        for(j=0;j<1275;j++);
}

void main()
{
    unsigned char
no_code[]={0xC0,0xF9,0xA4,0xB0,0x99,0x92,0x82,0xF8,0x80,0x90}; //Array
for hex values (0-9) for common anode 7 segment

    int k;
    while(1)
    {
        for(k=0;k<10;k++)
        {
            P1=no_code[k];
            msdelay(100);
        }
    }
}
```

4. LCD 16x2

SCHEMATIC:



Code:

```
// Program for LCD Interfacing with 8051 Microcontroller (AT89S52)
#include<reg51.h>
#define display_port P2 //Data pins connected to port 2 on microcontroller
sbit rs = P3^2; //RS pin connected to pin 2 of port 3
sbit rw = P3^3; // RW pin connected to pin 3 of port 3
sbit e = P3^4; //E pin connected to pin 4 of port 3
void msdelay(unsigned int time) // Function for creating delay in milliseconds.
{
    unsigned i,j ;
    for(i=0;i<time;i++)
        for(j=0;j<1275;j++);
}
void lcd_cmd(unsigned char command) //Function to send command instruction
to LCD
{
    display_port = command;
    rs= 0;
    rw=0;
    e=1;
    msdelay(1);
    e=0;
}
void lcd_data(unsigned char disp_data) //Function to send display data to LCD
```

```
{
    display_port = disp_data;
    rs= 1;
    rw=0;
    e=1;
    msdelay(1);
    e=0;
}

void lcd_init() //Function to prepare the LCD and get it ready
{
    lcd_cmd(0x38); // for using 2 lines and 5X7 matrix of LCD
    msdelay(10);
    lcd_cmd(0x0F); // turn display ON, cursor blinking
    msdelay(10);
    lcd_cmd(0x01); //clear screen
    msdelay(10);
    lcd_cmd(0x81); // bring cursor to position 1 of line 1
    msdelay(10);
}

void main()
{
    unsigned char a[15]="ROBU.IN"; //string of 14 characters with a null
terminator.
    int l=0;
    lcd_init();
```

```
while(a[l] != '\0') // searching the null terminator in the sentence
{
    lcd_data(a[l]);
    l++;
    msdelay(50);
}
}
```