Arduino Based
PROGRAMMABLE DIGITAL DATA DISPLAY

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LCDs are widely used in applications like token-display machines in malls and supermarkets, order number displays in restaurants and café, and so on. The project presented here demonstrates the working of Arduino based message display on LCD using Bluetooth.

Circuit and working

This circuit uses Arduino board that accepts data via HC-05 Bluetooth module from various types of gadgets like Android based smartphones. Arduino is the heart of this programmable display. The circuit is shown in Fig. 1.

The power supply is applied through the power input connector (not shown here). However, the same can be provided through the USB port to drive Arduino and LCD display.

In this application, the Bluetooth module acts as both transmitter and receiver, and is compatible with most smartphones. Different port pins of Arduino are used to drive the 16 × 2 LCD as shown in the circuit.

The message typed by the user on the Android based smartphone is received by the Bluetooth module and transmitted at its Tx pin, which is connected to port pin 0 (Rx) of Arduino. Similarly, Rx pin of the Bluetooth module is connected to port pin 1 (Tx) of Arduino.

In this manner data communication takes place between the user and Arduino board.

Software program

Circuit operation is performed using the software program loaded into the internal memory of Arduino board. The program implements all the required functionalities including user inputs through the smartphones by displaying messages on the LCD.

Launch Arduino software and select the correct COM port and Arduino board, and write Arduino sketch (program). The program is given below for reference:

```
#include <LiquidCrystal.h>
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);
String inData;

void setup() {
 Serial.begin(9600);
 lcd.begin(16, 2);
 lcd.print("Welcome!");
 delay(3000);
 lcd.clear();
}
void loop() {
 int i=0;
 char commandbuffer[100];

 if(Serial.available()){
 delay(100);
 while( Serial.available() && i< 99) {
 commandbuffer[i++] = Serial.read();
```
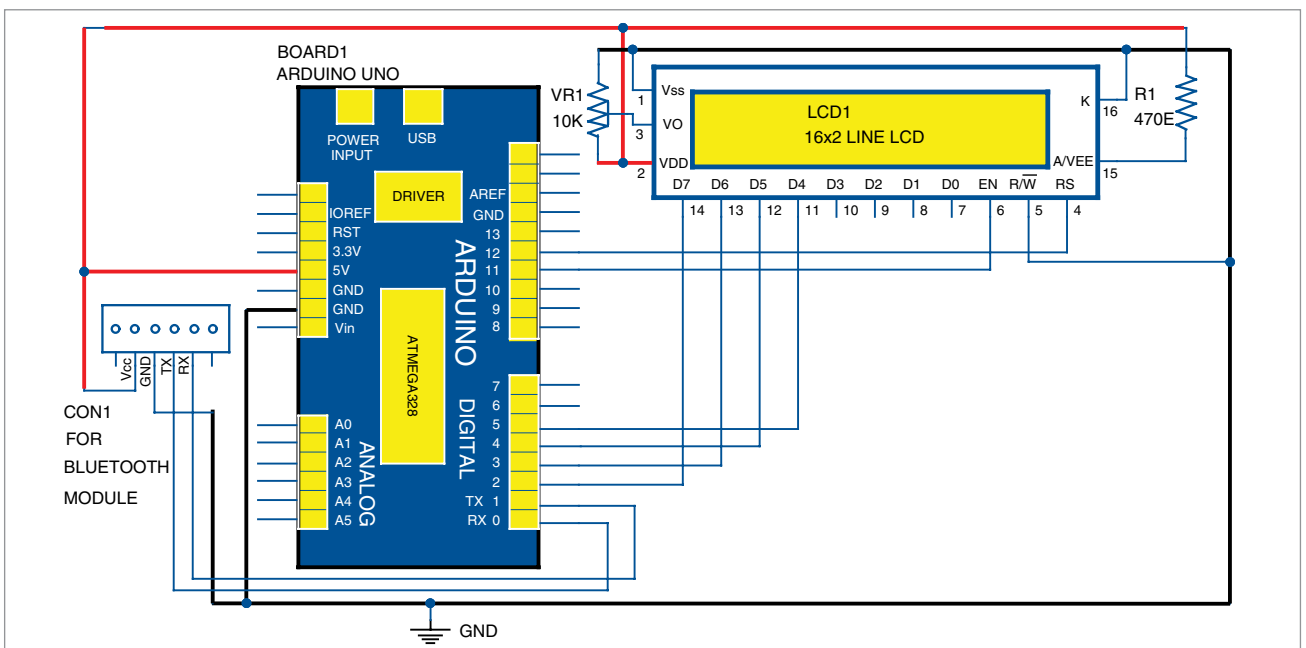

Fig. 1: Circuit diagram of Arduino based programmable digital data display

Upload the source code to Arduino board.

Hardware setup

Components required for the project are Arduino Uno, HC-05 Bluetooth module, LCD module and Android smartphone.

Connect Bluetooth module. Connect Bluetooth module to Arduino. Connections of Bluetooth module with Arduino are mentioned below:

Bluetooth module	Arduino board
TX	Pin 0 (Rx)
RX	Pin 1 (Tx)
VCC	+5V
GND	GND

Connect LCD. Connect the LCD module to Arduino. Refer circuit diagram (Fig. 1) for connections. Turn on your Arduino and check if the LCD is working properly. You will see some black pixels on the screen.

Testing

To display the message on the LCD using the Android based smartphone, download Blue Term application from Google Play Store. Run it and HC-05 Bluetooth module will be detected by your smartphone. Pair your smartphone with HC-05. You can now type the desired message on your smartphone, followed by pressing Enter for transmission to HC-05 connected to Arduino. The message will be displayed on the LCD screen.

Author's prototype is shown in Fig. 2. EFY

Fig. 2: Author's prototype of Arduino based programmable digital data display

```
}
commandbuffer[i++]='\0';
}

if(i>0)

Serial.println((char*)commandbuffer);
lcd.print((char*)commandbuffer);
delay(1000);
lcd.clear();
}
```

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