

A CENTER FOR INTER-DISCIPLINARY  
RESEARCH 2019-20

TITLE

**“INTIMATING JACKET”**

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AUTONOMOUS

# **Advanced Academic Center**

**( A Center For Inter-Disciplinary  
Research)**

This is to certify that the project titled

**“INTIMATING JACKET”**

is a bonafide work carried out by the following students in partial fulfilment of the requirements for Advanced Academic Center intern, submitted to the chair, AAC during the academic year 2019-20

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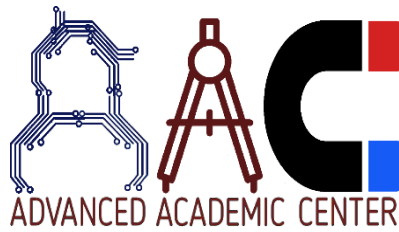
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## **ABSTRACT :**

To improve the safety cycling here we comes with the project “INTIMATING JACKET”. An Intimating jacket prototype has been developed that light up with different symbols on the back intended to help cyclists share their mood with others.

Biking in cities can be exhilarating, but it can also be harrowing and dangerous. Cyclists try to make themselves more visible to drivers by wearing reflective clothing and bling lights, but it never seems to be enough.

This is the solution to improve cycling safety, it is a cycling jacket with a led display on the back that lights up with various directional symbols and emojis to convey the cyclist’s mood. A smiley face indicates a happy cyclist, a frowny face a less happy one and so on. There are also directional symbols for when a cyclist intends to make a turn and a hazard symbol when they may be experiencing a flat tire.

In this project to convey the cyclist’s mood in the form of symbols we have fixed led-matrix on back of jacket. Here the led matrix is connected to arduino board for which rf receiver is connected. To control the led-matrix we used rf 4 channel remote. Rf remote is fixed to the bicycle handle so that cyclist can convey his mood by that.

In our project we done it for four symbols (right, left, u-turn, warning), we can develop the prototype in future for more of it.

## **INTRODUCTION :**

Biking in cities can be exhilarating, but it can also be harrowing and dangerous. Cyclists try to make themselves more visible to drivers by wearing reflective clothing and blinking lights, but it never seems to be enough. So here comes our team with a novel solution: an INTIMATING JACKET. A jacket with an LED display on the back that lights up with various emoji to convey the cyclist’s mood. A smiley face indicates a happy cyclist, a frowny face a less happy one, and so on. There are also directional symbols for when a cyclist intends to make a turn and a hazard symbol when they may be experiencing a flat tire.

## PROJECT WORKFLOW :

### HARDWARE USED:

#### ARDUINO UNO

Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. "Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.



Fig: Arudino Uno

#### P10 32x16 LED :

P10 32x16 (Total 512 LEDs) LED Display module is the easiest way to put together any size of Outdoor or Indoor LED display sign board. This panel is having total 512 high brightness red led's mounted on a high quality plastic housing designed for best display results. Any number of such panels can be combined in different fashions in order to realize LED sign board/ Graphics Board of any size.

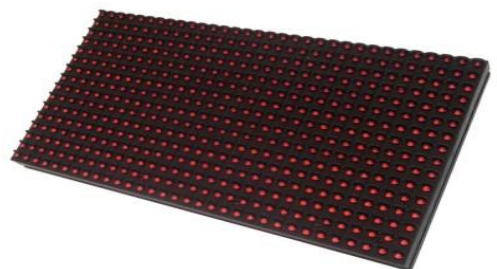


Fig: P10 32x16 LED

## 4 CHANNEL RF REMOTE AND RECIEVER MODULE :

### **Specifications:**

#### Remote control:

- Operating voltage: DC 12V (27A / 12V battery x 1)
- Operating current: 10mA at 12V
- Radiated power: 10mW at 12V
- Transmission distance: 50m - 100m (open field, the receiver sensitivity of -100dbm)
- Transmitting frequency: 315MHZ
- Modulation mode: ASK (Amplitude Modulation)
- Encoder types: fixed code

#### Decoding receiver board:

- Operating voltage: DC 5V
- Receiver sensitivity is -98dB
- Leg 7 bits: VT, D3, D2, D1, D0, +5V and GND
- VT is a valid signal high output pin upon receiving a valid signal, the pin output high, may also drive the relay
- Size: 6.6 x 22 x 41mm

### **Notes:**

There are four buttons on the remote control, and respectively correspond to the four data bits to the receiving board output pin D0, D1, D2, and D3.

Press the buttons transmit signals, the corresponding data bit is output high.

### **Package includes:**

- 1 x Remote control
- 1 x Decoding receiver board



**Fig:** 4 Channel Wireless RF Remote Control Receiver



## SOFTWARE USED :

### ARDUINO IDE

The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards. The Arduino board is connected to a computer via USB, where it connects with the Arduino development environment (IDE). The user writes the Arduino code in the IDE, then uploads it to the microcontroller which executes the code, interacting with inputs and outputs such as sensors, motors, and lights. Arduino serial monitor can be opened by clicking on the magnifying glass icon on the upper right side of the IDE or under tools. The serial monitor is used mainly for interacting with the Arduino board using the computer and is a great tool for real-time monitoring and debugging.

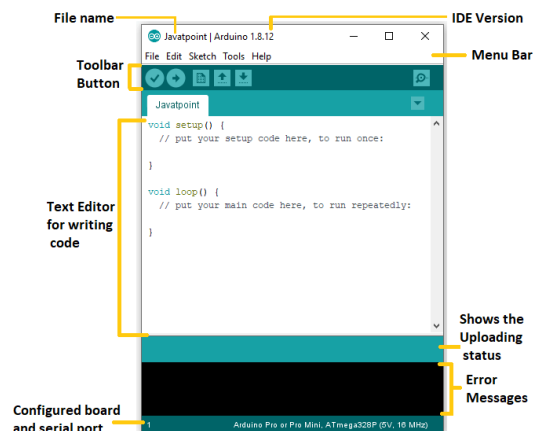
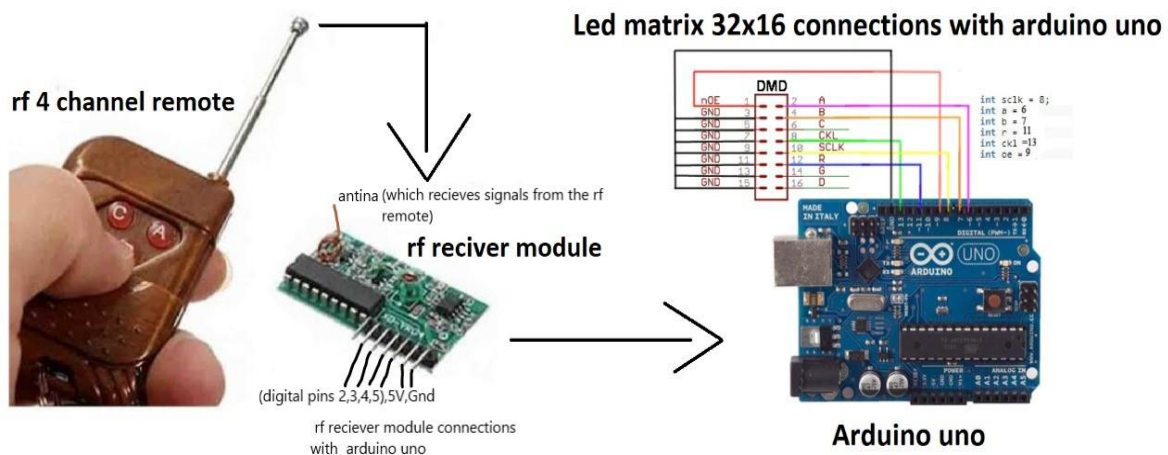


Fig: Arudino IDE

## CONNECTIONS :



**Fig:** connection of rf receiver module and p10 led matrix to the Arduino uno

## CODE :

```
#include<inttypes.h>

#include <avr/pgmspace.h>

#ifndef SYSTEM1x1_H

#define SYSTEM1x1_H

#define SystemFont1x1 System1x1

const static uint8_t System1x1[] PROGMEM = {

0x0, 0x0, // size of zero indicates fixed width font, actual length is width * height

0x05, // width

0x07, // height

0x20, // first char

0x60, // char count

// Fixed width; char width table not used !!!!

// font data

0x00, 0x00, 0x00, 0x00, 0x00, // (space)

0x7F, 0x7F, 0x00, 0x00, 0x00, // !

0x00, 0x07, 0x00, 0x07, 0x00, // "

0x14, 0x7F, 0x14, 0x7F, 0x14, // #

0x24, 0x2A, 0x7F, 0x2A, 0x12, // $

0x23, 0x13, 0x08, 0x64, 0x62, // %
```

0x36, 0x49, 0x55, 0x22, 0x50, // &  
0x00, 0x05, 0x03, 0x00, 0x00, // '  
0x00, 0x1C, 0x22, 0x41, 0x00, // (  
0x00, 0x41, 0x22, 0x1C, 0x00, // )  
0x08, 0x2A, 0x1C, 0x2A, 0x08, // \*  
0x08, 0x08, 0x3E, 0x08, 0x08, // +  
0x00, 0x50, 0x30, 0x00, 0x00, // ,  
0x08, 0x08, 0x08, 0x08, 0x08, // -  
0x01, 0x0, 0x00, 0x00, 0x00, // .  
0x20, 0x10, 0x08, 0x04, 0x02, // /  
0x3E, 0x51, 0x49, 0x45, 0x3E, // 0  
0x00, 0x42, 0x7F, 0x40, 0x00, // 1  
0x42, 0x61, 0x51, 0x49, 0x46, // 2  
0x21, 0x41, 0x45, 0x4B, 0x31, // 3  
0x18, 0x14, 0x12, 0x7F, 0x10, // 4  
0x27, 0x45, 0x45, 0x45, 0x39, // 5  
0x3C, 0x4A, 0x49, 0x49, 0x30, // 6  
0x01, 0x71, 0x09, 0x05, 0x03, // 7  
0x36, 0x49, 0x49, 0x49, 0x36, // 8  
0x06, 0x49, 0x49, 0x29, 0x1E, // 9  
0x00, 0x36, 0x36, 0x00, 0x00, // :  
0x00, 0x56, 0x36, 0x00, 0x00, // ;  
0x00, 0x08, 0x1C, 0x3E, 0x7F, // <  
0x1C, 0x1C, 0x1C, 0x1C, 0x1c, // =  
0x7F, 0x3E, 0x1C, 0x08, 0x00, // >  
0x32, 0x49, 0x79, 0x41, 0x3E, // @  
0x02, 0x7D, 0x7D, 0x02, 0x04, // A  
0x7F, 0x49, 0x49, 0x49, 0x36, // B  
0x3E, 0x41, 0x41, 0x41, 0x22, // C  
0x30, 0x28, 0x24, 0x22, 0x21, // D  
0x22, 0x24, 0x28, 0x30, 0x00, // E  
0x7F, 0x09, 0x09, 0x01, 0x01, // F  
0x20, 0x20, 0x20, 0x20, 0x21, // G  
0x7F, 0x08, 0x08, 0x08, 0x7F, // H  
0x20, 0x20, 0x20, 0x20, 0x20, // I  
0x20, 0x40, 0x41, 0x3F, 0x01, // J  
0x7F, 0x08, 0x14, 0x22, 0x41, // K  
0x7F, 0x40, 0x40, 0x40, 0x40, // L  
0x7F, 0x02, 0x04, 0x02, 0x7F, // M  
0x20, 0x2D, 0x2D, 0x20, 0x20, // N  
0x3E, 0x41, 0x41, 0x41, 0x3E, // O  
0x7F, 0x09, 0x09, 0x09, 0x06, // P  
0x3E, 0x41, 0x51, 0x21, 0x5E, // Q  
0x08, 0x10, 0x20, 0x40, 0x00, // R  
0x46, 0x49, 0x49, 0x49, 0x31, // S  
0x01, 0x01, 0x7F, 0x01, 0x01, // T  
0x3F, 0x40, 0x40, 0x40, 0x3F, // U

```

0x1F, 0x20, 0x40, 0x20, 0x1F, // V
0x40, 0x20, 0x10, 0x08, 0x04, // W
0x63, 0x14, 0x08, 0x14, 0x63, // X
0x03, 0x04, 0x78, 0x04, 0x03, // Y
0x61, 0x51, 0x49, 0x45, 0x43, // Z
0x00, 0x00, 0x7F, 0x41, 0x41, // [
0x02, 0x04, 0x08, 0x10, 0x20, // "\"
0x41, 0x41, 0x7F, 0x00, 0x00, // ]
0x04, 0x02, 0x01, 0x02, 0x04, // ^
0x1C, 0x1C, 0x1C, 0x1C, 0x1C, // _
0x00, 0x01, 0x02, 0x04, 0x00, // `
0x00, 0x70, 0x7C, 0x1C, 0x1C, // a
0x70, 0x78, 0x7C, 0x1C, 0x1C, // b
0x1C, 0x7C, 0x78, 0x70, 0x00, // c
0x3F, 0x3F, 0x3F, 0x00, 0x04, // d
0x0C, 0x1F, 0x3F, 0x1F, 0x0C, // e
0x04, 0x00, 0x00, 0x00, 0x00, // f
0x08, 0x14, 0x54, 0x54, 0x3C, // g
0x7F, 0x08, 0x04, 0x04, 0x78, // h
0x00, 0x44, 0x7D, 0x40, 0x00, // i
0x20, 0x40, 0x44, 0x3D, 0x00, // j
0x00, 0x7F, 0x10, 0x28, 0x44, // k
0x00, 0x41, 0x7F, 0x40, 0x00, // l
0x7C, 0x04, 0x18, 0x04, 0x78, // m
0x7C, 0x08, 0x04, 0x04, 0x78, // n
0x38, 0x44, 0x44, 0x44, 0x38, // o
0x7C, 0x14, 0x14, 0x14, 0x08, // p
0x08, 0x14, 0x14, 0x18, 0x7C, // q
0x7C, 0x08, 0x04, 0x04, 0x08, // r
0x48, 0x54, 0x54, 0x54, 0x20, // s
0x04, 0x3F, 0x44, 0x40, 0x20, // t
0x3C, 0x40, 0x40, 0x20, 0x7C, // u
0x1C, 0x20, 0x40, 0x20, 0x1C, // v
0x3C, 0x40, 0x30, 0x40, 0x3C, // w
0x44, 0x28, 0x10, 0x28, 0x44, // x
0x0C, 0x50, 0x50, 0x50, 0x3C, // y
0x44, 0x64, 0x54, 0x4C, 0x44, // z
0x00, 0x08, 0x36, 0x41, 0x00, // {
0x00, 0x00, 0x7F, 0x00, 0x00, // |
0x00, 0x41, 0x36, 0x08, 0x00, // }
0x08, 0x08, 0x2A, 0x1C, 0x08, // ->
0x08, 0x1C, 0x2A, 0x08, 0x08 // <-
};

```

```

/* above library is for displaying characters ... I made changes in few of them for
displaying "right left warning uthurn" symbols...*/
#endif

```

```

#include <SPI.h>
#include <DMD.h>
#include <TimerOne.h>
#define DISPLAYS_ACROSS 1
#define DISPLAYS_DOWN 1
DMD dmd( DISPLAYS_ACROSS , DISPLAYS_DOWN );
#define right 3 /*A on the rf vremote*/
#define left 5 /* B on the rf remote*/
#define warning 4 /* C on the rf remote*/
#define uturn 2 /* D on the rf remote*/
void ScanDMD() {
dmd.scanDisplayBySPI();
}
void setup() {
pinMode(right,INPUT);
pinMode(left,INPUT);
pinMode(warning,INPUT);
pinMode(uturn,INPUT);
digitalWrite(right,LOW);
digitalWrite(left,LOW);
digitalWrite(warning,LOW);
digitalWrite(uturn,LOW);
Serial.begin(9600);
Timer1.initialize( 2000 );
Timer1.attachInterrupt( ScanDMD );
dmd.clearScreen( true );
}
void loop() {
if(digitalRead(warning)==HIGH)
{
digitalWrite(right,LOW);
digitalWrite(left,LOW);
digitalWrite(uturn,LOW);
dmd.selectFont( SystemFont1x1);
dmd.drawChar(8,2,'V', GRAPHICS_NORMAL );
dmd.drawChar(13,2,'@', GRAPHICS_NORMAL );
dmd.drawChar(18,2,'Q', GRAPHICS_NORMAL );
dmd.drawChar(8,9,'H', GRAPHICS_NORMAL ); /*symbol
for
warning*/
dmd.drawChar(13,9,'M', GRAPHICS_NORMAL );
dmd.drawChar(18,9,'F', GRAPHICS_NORMAL );
dmd.drawChar(3,9,'C', GRAPHICS_NORMAL );
dmd.drawChar(23,9,'D', GRAPHICS_NORMAL );
delay(5000);
}
}

```

```

else if(digitalRead(right)==HIGH)

{

digitalWrite(left,LOW);

digitalWrite(warning,LOW);

digitalWrite(uturn,LOW);

dmd.selectFont( SystemFont1x1);

dmd.drawChar(8,4,'=',GRAPHICS_NORMAL );

/*symbol for right*/

dmd.drawChar(13,4,'=',GRAPHICS_NORMAL);

dmd.drawChar(18,4,'>', GRAPHICS_NORMAL );

delay(5000);

}

else if(digitalRead(left)==HIGH) {

digitalWrite(right,LOW);

digitalWrite(warning,LOW);

digitalWrite(uturn,LOW);

dmd.selectFont( SystemFont1x1);

dmd.drawChar(8,4,'<', GRAPHICS_NORMAL );

/*symbol for left*/

dmd.drawChar(13,4,'=',GRAPHICS_NORMAL );

dmd.drawChar(18,4,'=',GRAPHICS_NORMAL);

delay(5000); }

```

```
else if(digitalRead(uturn)==HIGH)

{

    digitalWrite(right,LOW);

    digitalWrite(left,LOW);

    digitalWrite(warning,LOW);

    dmd.selectFont( SystemFont1x1);

    dmd.drawChar(10,2,'a', GRAPHICS_NORMAL );

    dmd.drawChar(15,2,'b', GRAPHICS_NORMAL ); /*symbol for u-turn*/

    dmd.drawChar(10,9,'c', GRAPHICS_NORMAL );

    dmd.drawChar(15,9,'d', GRAPHICS_NORMAL );

    dmd.drawChar(20,9,'e', GRAPHICS_NORMAL );

    delay(5000);}

else dmd.clearScreen( true );

}
```

## WORKING VIDEO LINK:

<https://drive.google.com/file/d/1G90dBtgobupFHIIiUYdVMJoRZjTsLKcJ/view?usp=sharing>

## CONCLUSION :

Through this project, we have proposed a cost-effective jacket for cyclists by which they can convey their message. Even they can control the display with RF remote. By this cyclists can drive safely on the road and usage of cycles will also increase.

## FUTURE DEVELOPMENTS :

In this prototype we did it for only four symbols, In future we can develop this prototype for displaying many symbols and we can try to display safety quotes too

## REFERENCES :

1. [Arduino – ArduinoBoardUno](#)
2. [LED Display Board using P10 LED Matrix Display and Arduino \(circuitdigest.com\)](#)
3. [4 Channel Wireless Four button RF remote control Transmitter Receiver \(robu.in\)](#)
4. [Arduino p10 led display code - Present Build](#)