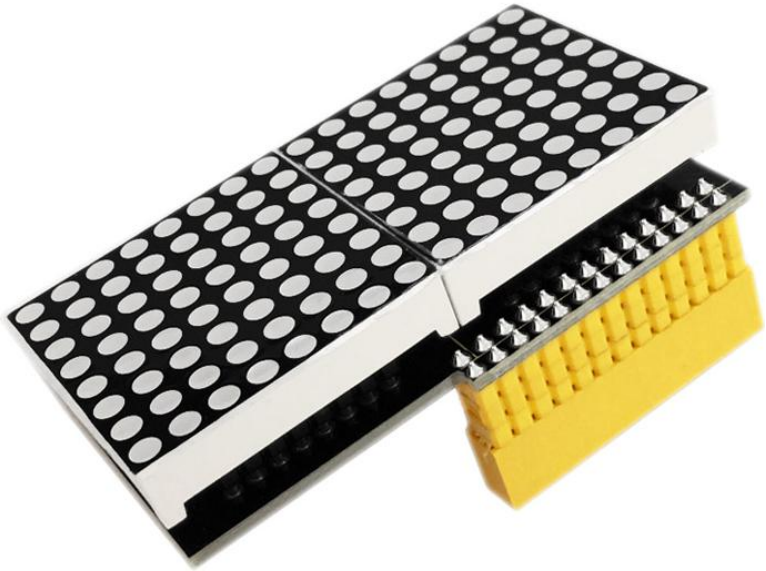
keyestudio RPI Dot Matrix



Introduction

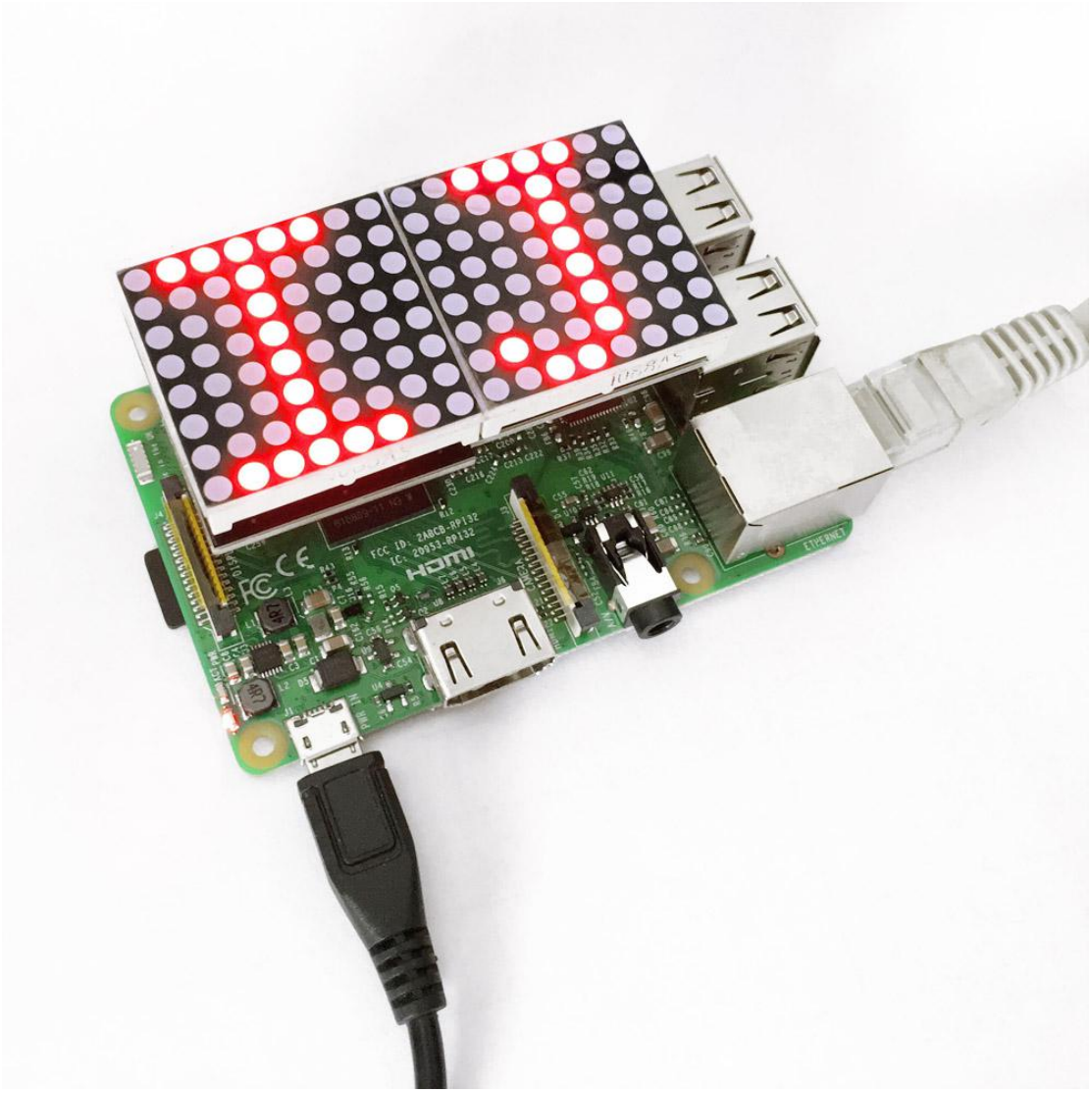
We know that the I/O Pin of Raspberry Pi is limited. So Raspberry comes with LED dot matrix screen, it would be more trouble. But use special LED constant current control chip, basically only takes Raspberry Pi SPI interface (3 IO + 2 enabled) you can control 64 LED lights. LED dot matrix drivers became possible! This dot-matrix-led-display module is compatible with any version of Raspberry Pi. We will provide installation package, source code and quickstart guide PDF to teach you step by step, so don't worry!

Specification

1. Support all versions of Raspberry Pi
2. Driver Chip : MAX7219
3. Dot Matrix Type: 8x8 common cathode red dot matrix
4. Matrix Size：64.3*35.0*26.5mm

Connection Diagram

Plug it directly into Raspberry Pi to start your works as shown in below figure.



Sample Code

```
// blink.c
//
// Example program for bcm2835 library
// Blinks a pin on an off every 0.5 secs
//
// After installing bcm2835, you can build this
// with something like:
// make or gcc -o led led.c -lbcm2835
// sudo ./led
/*
```

define from bcm2835.h			define from Board DVK511
3.3V		5V	->	3.3V		5V
RPI_V2_GPIO_P1_03		5V	->	SDA		5V
RPI_V2_GPIO_P1_05		GND	->	SCL		GND
RPI_GPIO_P1_07		RPI_GPIO_P1_08	->	IO7		TX
GND		RPI_GPIO_P1_10	->	GND		RX
RPI_GPIO_P1_11		RPI_GPIO_P1_12	->	IO0		IO1
RPI_V2_GPIO_P1_13		GND	->	IO2		GND
RPI_GPIO_P1_15		RPI_GPIO_P1_16	->	IO3		IO4
VCC		RPI_GPIO_P1_18	->	VCC		IO5
RPI_GPIO_P1_19		GND	->	MOSI		GND
RPI_GPIO_P1_21		RPI_GPIO_P1_22	->	MISO		IO6
RPI_GPIO_P1_23		RPI_GPIO_P1_24	->	SCK		CE0
GND		RPI_GPIO_P1_26	->	GND		CE1

```
::if your raspberry Pi is version 1 or rev 1 or rev A
RPI_V2_GPIO_P1_03->RPI_GPIO_P1_03
RPI_V2_GPIO_P1_05->RPI_GPIO_P1_05
RPI_V2_GPIO_P1_13->RPI_GPIO_P1_13:

*/
#include <bcm2835.h>
#include <stdio.h>
#define uchar unsigned char
#define uint unsigned int


//#define Max7219_pinCLK    RPI_GPIO_P1_11
#define Max7219_pinCS    RPI_GPIO_P1_24
//#define Max7219_pinDIN    RPI_V2_GPIO_P1_13

uchar disp1[38][8] = {
{0x3C,0x42,0x42,0x42,0x42,0x42,0x42,0x3C},//0
{0x10,0x30,0x50,0x10,0x10,0x10,0x10,0x7C},//1
{0x3E,0x02,0x02,0x3E,0x20,0x20,0x3E,0x00},//2
{0x00,0x7C,0x04,0x04,0x7C,0x04,0x04,0x7C},//3
{0x08,0x18,0x28,0x48,0xFE,0x08,0x08,0x08},//4
{0x3C,0x20,0x20,0x3C,0x04,0x04,0x3C,0x00},//5
{0x3C,0x20,0x20,0x3C,0x24,0x24,0x3C,0x00},//6
{0x3E,0x22,0x04,0x08,0x08,0x08,0x08,0x08},//7
{0x00,0x3E,0x22,0x22,0x3E,0x22,0x22,0x3E},//8
{0x3E,0x22,0x22,0x3E,0x02,0x02,0x02,0x3E},//9
{0x08,0x14,0x22,0x3E,0x22,0x22,0x22,0x22},//A
{0x3C,0x22,0x22,0x3E,0x22,0x22,0x3C,0x00},//B
```

```
{0x3C,0x40,0x40,0x40,0x40,0x40,0x3C,0x00},//C
{0x7C,0x42,0x42,0x42,0x42,0x42,0x7C,0x00},//D
{0x7C,0x40,0x40,0x7C,0x40,0x40,0x40,0x7C},//E
{0x7C,0x40,0x40,0x7C,0x40,0x40,0x40,0x40},//F
{0x3C,0x40,0x40,0x40,0x40,0x44,0x44,0x3C},//G
{0x44,0x44,0x44,0x7C,0x44,0x44,0x44,0x44},//H
{0x7C,0x10,0x10,0x10,0x10,0x10,0x10,0x7C},//I
{0x3C,0x08,0x08,0x08,0x08,0x08,0x48,0x30},//J
{0x00,0x24,0x28,0x30,0x20,0x30,0x28,0x24},//K
{0x40,0x40,0x40,0x40,0x40,0x40,0x40,0x7C},//L
{0x81,0xC3,0xA5,0x99,0x81,0x81,0x81,0x81},//M
{0x00,0x42,0x62,0x52,0x4A,0x46,0x42,0x00},//N
{0x3C,0x42,0x42,0x42,0x42,0x42,0x42,0x3C},//O
{0x3C,0x22,0x22,0x22,0x3C,0x20,0x20,0x20},//P
{0x1C,0x22,0x22,0x22,0x22,0x26,0x22,0x1D},//Q
{0x3C,0x22,0x22,0x22,0x3C,0x24,0x22,0x21},//R
{0x00,0x1E,0x20,0x20,0x3E,0x02,0x02,0x3C},//S
{0x00,0x3E,0x08,0x08,0x08,0x08,0x08,0x08},//T
{0x42,0x42,0x42,0x42,0x42,0x42,0x22,0x1C},//U
{0x42,0x42,0x42,0x42,0x42,0x42,0x24,0x18},//V
{0x00,0x49,0x49,0x49,0x49,0x2A,0x1C,0x00},//W
{0x00,0x41,0x22,0x14,0x08,0x14,0x22,0x41},//X
{0x41,0x22,0x14,0x08,0x08,0x08,0x08,0x08},//Y
{0x00,0x7F,0x02,0x04,0x08,0x10,0x20,0x7F},//Z
{0x08,0x7F,0x49,0x49,0x7F,0x08,0x08,0x08},//中
{0xFE,0xBA,0x92,0xBA,0x92,0x9A,0xBA,0xFE},//国
};
void Delay_xms(uint x)
{

  bcm2835_delay(x);

}
//------------------------
void Write_Max7219_byte(uchar DATA)
{
            uchar i ;
            bcm2835_gpio_write(Max7219_pinCS,LOW);
          /* for(i = 8; i >= 1; i--)
                {
                 bcm2835_gpio_write(Max7219_pinCLK,LOW);
                 bcm2835_gpio_write( Max7219_pinDIN, (DATA & 0x80));
                 DATA = DATA << 1;
                 bcm2835_gpio_write(Max7219_pinCLK,HIGH);
```

```
                }
            */
          bcm2835_spi_transfer(DATA);

}
void Write_Max7219(uchar address1,uchar dat1,uchar address2,uchar dat2)
//void Write_Max7219(uchar address,uchar dat)
{
   bcm2835_gpio_write(Max7219_pinCS,LOW);

   Write_Max7219_byte(address1);
   Write_Max7219_byte(dat1);
   Write_Max7219_byte(address2);
   Write_Max7219_byte(dat2);
     //_nop_();
   //Write_Max7219_byte(address);
   //Write_Max7219_byte(dat);
   bcm2835_gpio_write(Max7219_pinCS,HIGH);
}

void Init_MAX7219(void)
{
 Write_Max7219(0x09,0x00,0x09,0x00);
 Write_Max7219(0x0a,0x03,0x0a,0x03);
 Write_Max7219(0x0b,0x07,0x0b,0x07);
 Write_Max7219(0x0c,0x01,0x0c,0x01);
 Write_Max7219(0x0f,0x00,0x0f,0x00);
}

/*void Init_MAX7219(void)
{
 Write_Max7219(0x09,0x00);
 Write_Max7219(0x0a,0x03);
 Write_Max7219(0x0b,0x07);
 Write_Max7219(0x0c,0x01);
 Write_Max7219(0x0f,0x00);
}
*/

int main(void)
{
 uchar i , j;
 if (!bcm2835_init())
            return 1;
```

```
  bcm2835_spi_begin();
  bcm2835_spi_setBitOrder(BCM2835_SPI_BIT_ORDER_MSBFIRST);          // The default
  bcm2835_spi_setDataMode(BCM2835_SPI_MODE0);                       // The default
  bcm2835_spi_setClockDivider(BCM2835_SPI_CLOCK_DIVIDER_256); // The default


   bcm2835_gpio_fsel(Max7219_pinCS, BCM2835_GPIO_FSEL_OUTP);

   bcm2835_gpio_write(disp1[j][i],HIGH);

  Delay_xms(50);
  Init_MAX7219();
  while(1)
  {
   for(j = 0;j <37; j++)
   {
    for(i = 1;i < 9;i++)
       Write_Max7219(i , disp1[j+1][i-1],i,disp1[j][i-1]);
       Delay_xms(1000);
   }
  }
   bcm2835_spi_end();
   bcm2835_close();
   return 0;
}
```

Program Writing

1. Installing bcm-2835 Library

Here is the tutorial for installing bcm-2835 library in Raspberry Pi. To install bcm-2835, first we need to download bcm2835 library. So we will provide an installation package or click its office web http://www.airspayce.com/mikem/bcm2835/ to download it.

Step1:- Now after downloading library, copy it in any folder of your raspberry pi by winSCP(we provide its installation package, but please refer to usage by yourselves).

Step2:- Now it's time to extract the library, so open terminal of raspberry pi and go to the folder where you have copied your library and type this command: tar zxvf bcm2835-1.26.tar.gz

Step3:- Now to into library folder, type this command: cd bcm2835-1.26

Step4:- Now, we are ready to install bcm2835 library, so to start installation type this command: ./configure

Step5:- then type this command: make

Step6:- then this: sudo make check

Step7:- and finally this: sudo make install

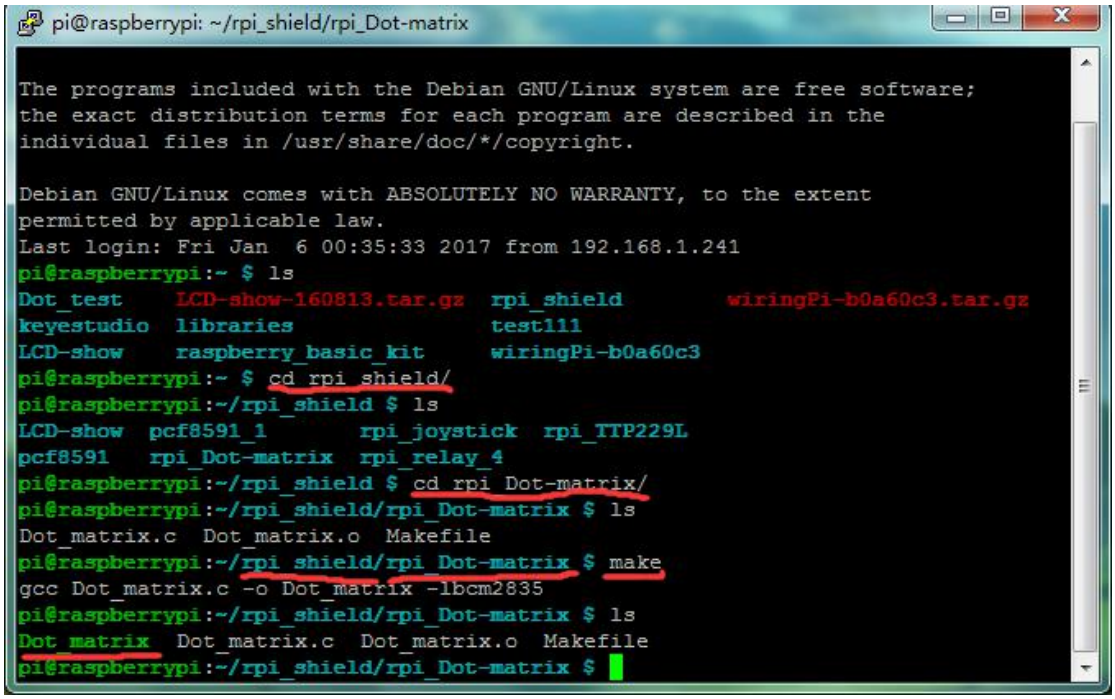
Congrats your library is installed. Now use "#include <bcm2835.h>" in your program to use

bcm2835 library.

2. Programming

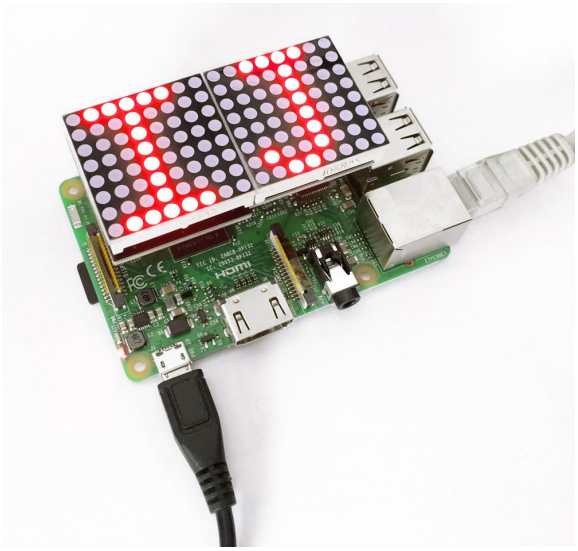
Now its time to write a program. Copy the file rpi_Dot-matrix provided by us and put it into the directory rpi_shield through winSCP. Next , type this command: cd rpi_Dot-matrix to go inside the rpi_Dot-matrix folder. Then type this command: make to make an executable file. This means this is the file we run to launch the program as shown in below figure.

Finally type this: sudo ./Dot_matrix to launch the program.



Test Result

The dot matrix will display letters “IJ” as shown in below figure. Use Ctrl+C to exit the processing program.



Sudo ./Dot_matrix

Links

Installation Package:

http://www.keyestudio.com/files/index/download/id/1484287068/

Source Code:

http://www.keyestudio.com/files/index/download/id/1484287069/

PDF:

http://www.keyestudio.com/files/index/download/id/1484287201/