How to Build and adjust Code, using an Arduino R3 Uno , a "Max 7219, 4 in 1, 8 x 8 Dot Matrix Display".

Pat McMahon- V1- 30/12/2020

<u>Design Brief</u> – You will Build and adjust the Example Code for multiple "Max 7219, 4 in 1, 8 x8 Dot Matrix Displays", using an Arduino Uno R3 Microcontroller.

Note—You can purchase a small single 8 x 8 (64) LED Dot matrix Display or a 4 in 1 linked (32 x 8) Display. In this build, as in the photo below, we are using two MAX 7219, 4 in 1 (64 x 8) to visually Display Text . I have been able to link four, 4 in 1's together (128 x 8) to successfully scroll Text, over 70 characters long, using an Arduino Uno R3 Microcontroller.



Parts Required

- A Max 7219, 4 in 1, Dot Matrix Display or multiple 4 in 1's linked together.
- An Arduino R3 Uno Microcontroller with the Arduino IDE installed on your Computer & upload Cable.
- 5 Dupont Male connecting leads & a 5 right angle Male header Pins that come with each of the 4 in 1 Displays.

First you need to instal the MD_MAX 72XX Library to your Arduino IDE as below. Go to Sketch > Include Library > Manage Libraries > install MD_MAX 72XX by majicDesigns



Type in MD_MAX 72XX and push INSTALL button

| Library Manage | r | | × |
|--|---|---|-------------------------------|
| pe All | ✓ Topic All | ✓ MD_MAX 72XX | |
| ID_MAX72XX by mplements functi se the LED matrix | majicDesigns Versio ons that allow the M as a pixel addressab | n 3.2.5 INSTALLED IAX72xx (eg, MAX7219) to be used for LED matrices (64 individual L ble display. | EDs) Allows the programmer to |

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Once the MD_MAX72XX library is installed in your IDE, go to File > Examples > MD_MAX72XX > MD_MAX72XX_ Message_Serial to open the Sketch to display Scrolling Text.

Selecting "MD_MAX72XX_ PrintText" will display static Text, try the Pacman sketch or some of the other sketches.

| le Edit Sketch | Tools Help | | | |
|----------------|--------------|----------------------------------|----|----------------------------|
| New | Ctrl+N | | | |
| Open | Ctrl+O | | | |
| Open Recent | > | | | |
| Sketchbook | > | | | |
| Examples | > | A | | |
| Close | Ctrl+W | RETIRED | > | |
| Save | Ctrl+S | Examples for Arduino/Genuino Uno | | |
| Save As | Ctrl+Shift+S | EEPROM | > | |
| | | SoftwareSerial | > | |
| Page Setup | Ctrl+Shift+P | SPI | > | |
| Print | Ctrl+P | Wire | > | |
| Preferences | Ctrl+Comma | Examples from Custom Libraries | | |
| Quit | Ctrl+Q | Adafruit ADXI 343 | > | |
| 1 #define I | BUZZER 2 // | Adafruit Keynad | 5 | |
| 2 MFRC522 1 | nfrc522(SS | Adafruit MERC630 REID | ,R | C522 instance. |
| 3 Servo mys | Servo; //de | Adafruit Unified Sensor | 5 | MD MAX72vy DaftPunk |
| 4 | | Analog Keypad by Makuna | , | MD MAX72xx Dynamic HW |
| 5 void setu | up () | AnyRtttl | , | MD MAX72vy Eves |
| 6 { | | BitBang I2C | , | MD MAX72vy HW Mapper |
| 7 Serial. | begin (9600 | DallasTemperature | 5 | MD_MAX72XX_Message_ESP8266 |
| 8 SPI.beg | gin(); | DHT sensor library | , | MD MAX72vy Message SD |
| 9 mfrc522 | 2.PCD Init(| Dht11 | > | MD MAX72xx Message Serial |
| 0 myServo | attach(3) | DigitledDisplay | , | MD MAX72vy Pacman |
| 1 myServo | .write(0); | Drive | , | MD MAX72xx PrintText |
| 2 pinMode | (LED G, OU | ErequencyTimer2 | , | MD MAX72xx PrintText MI |
| 3 pinMode | LED_R, OU | IRremote | > | MD_MAX72xx_PushWheel |
| 4 pinMode | BUZZER, O | Keypad | > | MD MAX72xx RobotEves |
| 5 noTone | (BUZZER); | LedControl | > | MD MAX72xx ScrollChart |
| 6 Serial. | println("P | max7219 | > | MD MAX72xx Shift |
| 7 Serial. | println(); | MAX7219 Dot Matrix | > | MD MAX72xx Test |
| 8 | | MD MAX72XX | > | MD MAX72xx Zones |
| 9 } | | MD Parola | 1 | |

To display your text you need to change 6 things in the Example sketches above ie (Message_Serial)

- Note some line numbers may be different to the examples below, seek the text as described in screenshots.

1 -line 22,the #define HARDWARE_TYPE MD_MAX72XX::PAROLA_HW to ::DR1CR0RR0_HW (Note 0 are zero's)

22 #define HARDWARE TYPE MD MAX72XX:: PAROLA HW

to 22 #define HARDWARE TYPE MD MAX72XX::DR1CR0RR0 HW

2 -line 23, #define MAX_DEVICES **11** to 4, 8, 12, 16 etc. (ie the number of individual 8 x 8 displays you have)

23 #define MAX DEVICES 11 23 #define MAX DEVICES 4

3 - line 45, change the "Hello!" message to your own message ie "Hi, hope you have found this info easy to follow" then save. If you don't save this new message, your message will revert to Hello! each time you open the sketch.

45 uint8_t curMessage[BUF_SIZE] = { "Hello! " };

4 - Ensure your Uno is connected & powered up.

to

go to Tools > Serial Monitor > change the Baud rate to 57,600 & Carriage Return to Newline. This enables you to write your new message directly in the serial monitor dialogue box, then push the Send button, to display it on your 4 in 1 Display.



25 #define CLK_PIN 13 // or CLK 26 #define DATA_PIN 11 // or DIN 27 #define CS PIN 10 // or CS

6 - Add the previously installed Library to your adjusted sketch. Note the previous line numbers will increase with this addition.

Go to Sketch > include Library > MD_MAX72XX



Now that you have adjusted the software sketch Code, you need to complete the Hardware Build of the Uno & the 4 in 1 Display. Insert the right angled male header pin that comes with the 4 in 1 Display, to the right hand end (IN) of the 4 in 1, as below and solder. NOTE—Only if using multiple 4 in 1's, on the other end (OUT), once a second 5 pin angled header pin is installed & soldered, you will need to get a pair of pointy nose pliers and carefully up turn the pins vertically to attach to the next 4 in 1, and then solder.



Note - Only if using multiple 4 in 1 Displays.

A5 +5V

Insert then bend 5 pins up vertically on the other end (OUT) to insert in the next 4 in 1, if using multiple 4 in 1's, then solder.

Attach 5 Dupont male headers to VCC(+5V), GND (0V), DIN to pin D11, CS to pin D10, CLK to pin D13 from the 4 in 1 to the Arduino Uno.



Once attached to your Arduino Uno, upload your adjusted sketch and test to see if you successfully get your scrolling text.

Upload your adjusted sketch MD_MAX72xx_Message_Serial §

File Edit Sketch Tools Help

Extension Work - Using the same scrolling sketch Code and by adding a 10 K potentiometer as shown, your can fasten up or slow down the travel of your scrolling Text, by the turn of the Potentiometer Knob.



CONGRATULATIONS for Coding and Building your 4 in 1, MAX7219 Display. Go back and upload other Examples listed ie Print Text, Pacman etc.