

PROJECT

Update Dot Matrix Using Arduino Serial Monitor



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Introduction

Arduino's are very common microcontroller boards used to study and design programmable electronics. It is often used with multiple peripherals such as buttons, sliders, sensors and motors.

Together with a TIMI acting as a small fancy display, Arduino boards become a lot more powerful and interesting to use in prototyping.

This project showcases a TIMI-96 module controlled by an Arduino Uno to display user inputted strings to a DotMatrix widget.

Requirement

To proceed with the project, the following are required.

Hardware

- [TIMI-96](#)
- [Mates Programmer](#)
- USB Type A to microUSB cable (for the Mates Programmer)
- USB Type A to Type B cable (for the Arduino, replace as necessary)
- Connecting Wires
- Arduino Uno
- Breadboard

Software

- [Mates Studio](#)
- [Arduino IDE](#)

Graphic Design

Step 1: Open *Mates Studio* and create a *Commander* project for *TIMI-96* with *Reversed Landscape* orientation

SELECT PRODUCT
CLOSE

ALL

TIMI

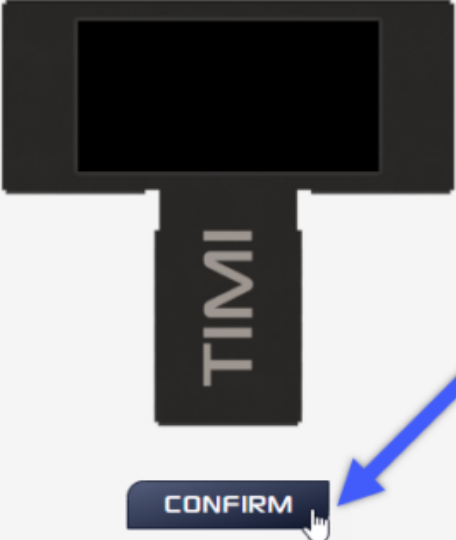
TED

MIHA

REPTOR

TIMI-96	160x80
<i>A 0.96-inch TIMI powered by 4D Labs' Pixxi28 graphics proce...</i>	
TIMI-Click	80x160
<i>A 0.96-inch TIMI for Click interface powered by 4D Labs' Pixxi...</i>	
TIMI-130	240x240
<i>A 1.30-inch TIMI powered by 4D Labs' Pixxi28 graphics proce...</i>	
TED-96	160x80
<i>A 0.96-inch TED powered by 4D Labs' Pixxi28 graphics proces...</i>	


Click Image to Rotate




Browse Recent Projects
Browse Computer

SELECT ENVIRONMENT
BACK


Commander




The Commander environment enables the user to create projects by selecting page layouts from a selection of predesigned user interfaces from Breadboard Mates team and community.



The Architect environment enables the user to design projects with custom pages and widgets. This gives more designing capabilities than the Commander environment.



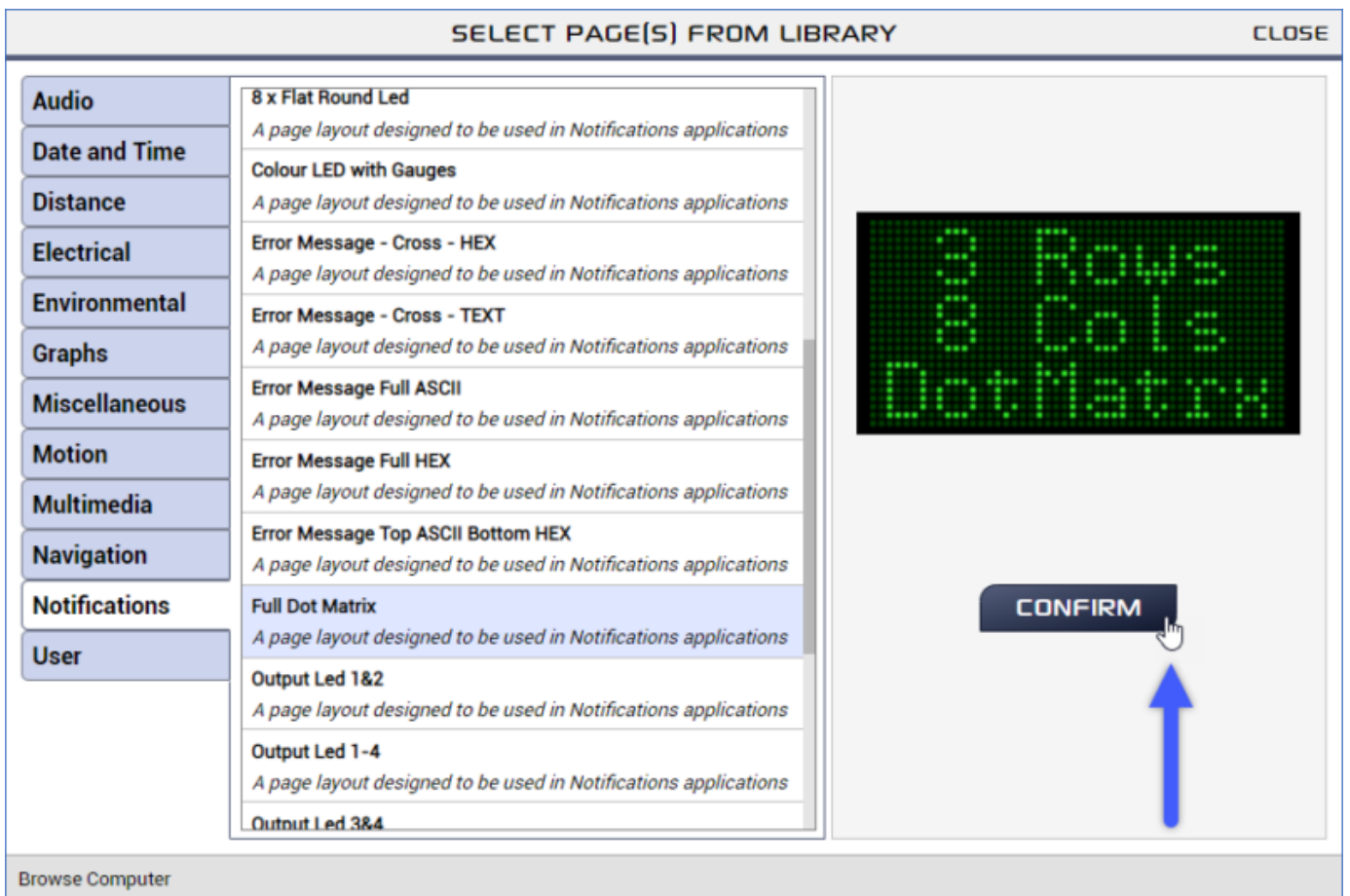
The Genius environment enables the user to design projects with custom pages and widgets and write code. This removes the need for an external host to control with the display.



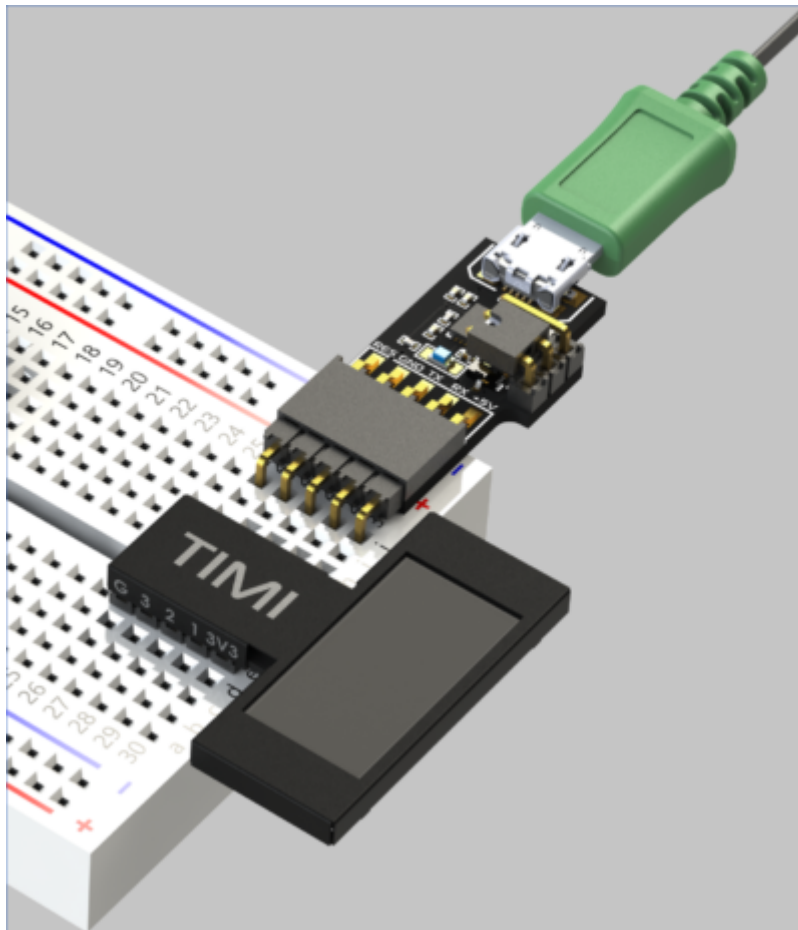
The Builder environment enables the user to design projects with custom pages and widgets and build the process flow using graphical/block programming. This removes the need for an external host to control with the display.

Browse Recent Projects
Browse Computer

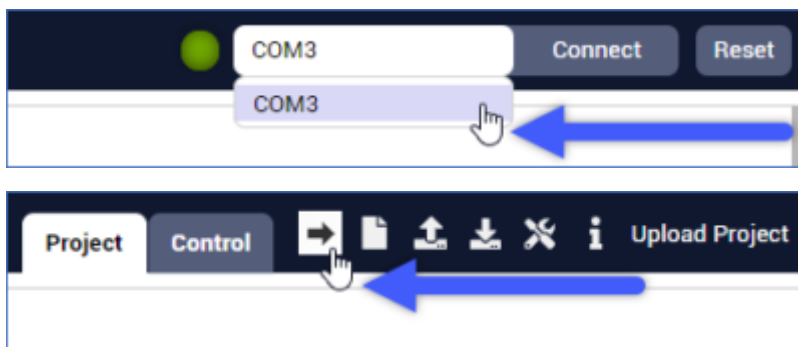
Step 2: Browse the library for appropriate page designs. For this project, *Full Dot Matrix* page under *Notifications* category was used.



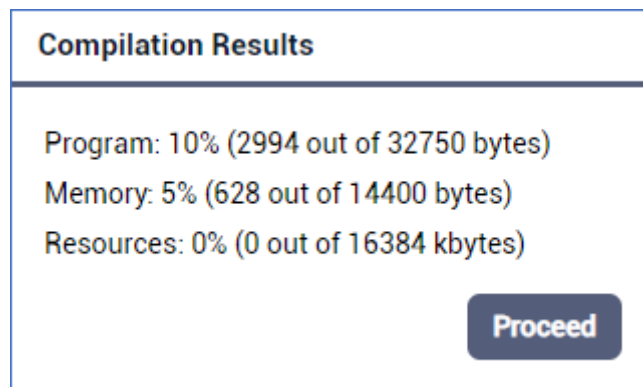
Step 3: After finalizing the design, connect TIMI-96 to your computer



Step 4: Upload the project to the appropriate COM port



Step 5: When prompted, click *Proceed* to continue with upload.

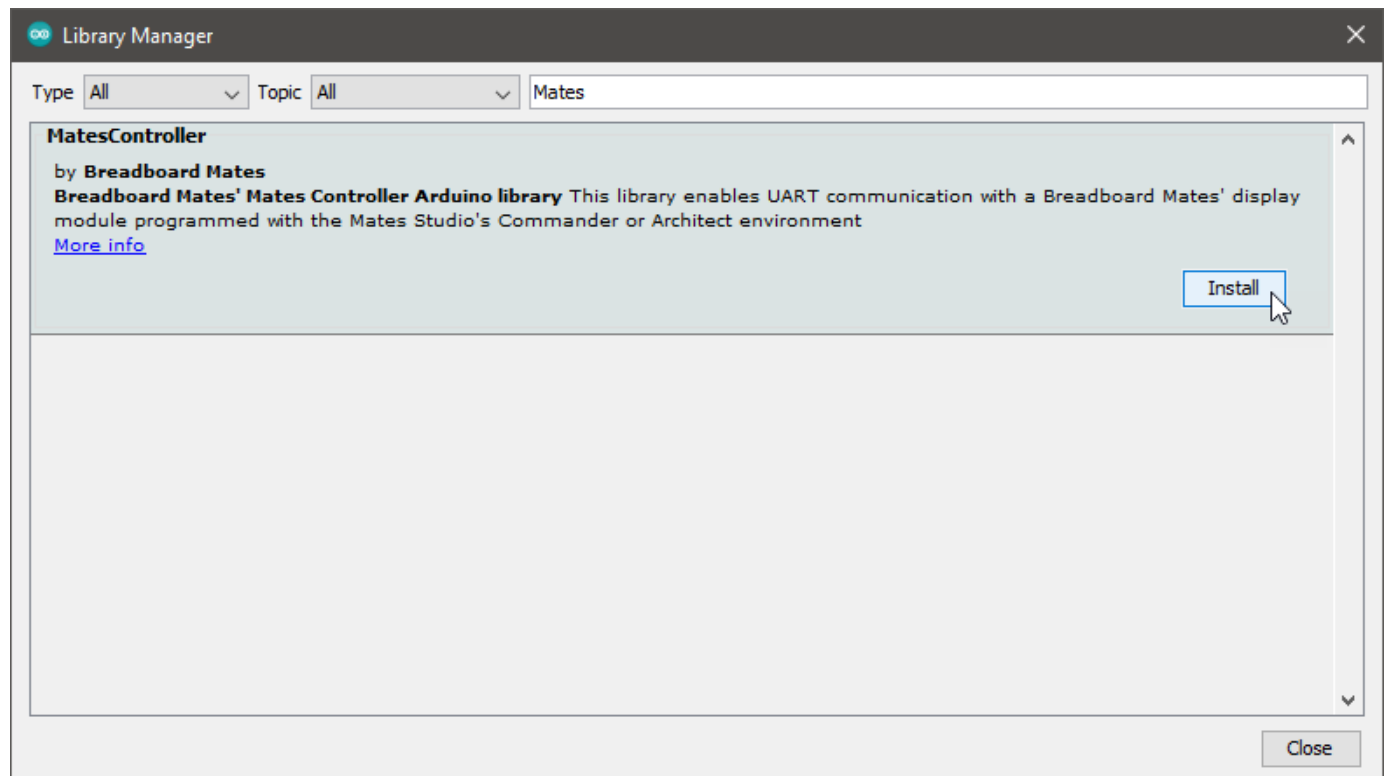


Note

It is recommended that the graphics design is finalized before moving to the next steps when working on a project.

Programming the Arduino

Step 1: Install the *MatesController* library using Arduino's *Library Manager*.



Step 2: Include *MatesController.h* and *SoftwareSerial.h* to your project.

```
#include "MatesController.h"
#include <SoftwareSerial.h>
```

Step 3: Create a *Software Serial* instance named *matesSerial* and declare *Serial* as *debugSerial*.

```
#define debugSerial Serial
SoftwareSerial matesSerial(2, 3);
```

Step 4: Create a *MatesController* instance named *mates* setting *matesSerial* for *TIMI* and *debugSerial* for Arduino's Serial Monitor.

```
MatesController mates = MatesController(matesSerial, debugSerial);
```

This will initialize the *MatesController* instance to the default reset pin 4 using a LOW pulse.

Step 5: (Optional) Create a function for toggling the built-in LED of the Arduino board. This can be used for debugging or showing errors if the Serial monitor can't be used.

```
int errLedStatus = LOW;
void ErrorLed_Toggle() {
  errLedStatus = ~errLedStatus;
```

```
digitalWrite(LED_BUILTIN, errLedStatus);  
}
```


Step 6: (Optional) At the beginning of the setup function, set the built-in LED pin to OUTPUT and set it to LOW.

```
pinMode(LED_BUILTIN, OUTPUT);
digitalWrite(LED_BUILTIN, errLedStatus);
```

Step 7: To start using the MatesController instance, use the `begin` function

```
matesSerial.begin(9600); // this should match Mates Studio project baudrate
debugSerial.begin(115200); // Serial Monitor needs to be opened in this baudrate
mates.begin();
```

As shown, the Serial objects for both TIMI and Serial Monitor needs to be initialized before the mates instance.

Note

Debug streams needs to be setup beforehand. Serial for the BBM module also needs to be setup initially if it is not a HardwareSerial (ex. Software Serial, Alt Soft Serial)

Step 8: (Optional) The `begin` function can be enclosed in an if condition to handle initialization errors.

```
matesSerial.begin(9600); // this should match Mates Studio project baudrate
debugSerial.begin(115200); // Serial Monitor needs to be opened in this baudrate
if (!mates.begin()) {
  // Display didn't send ready signal in time
  while (1) {
    ErrorLed_Toggle();
    delay(100);
  }
}
```

Step 9: In the loop function, the user input is read from Serial monitor and sent to TIMI as necessary.

```
void loop() {
  String msg = debugSerial.readString();
  int len = msg.length();

  if (len > 0) {
    debugSerial.println(msg);

    mates.updateDotMatrix(0, msg);

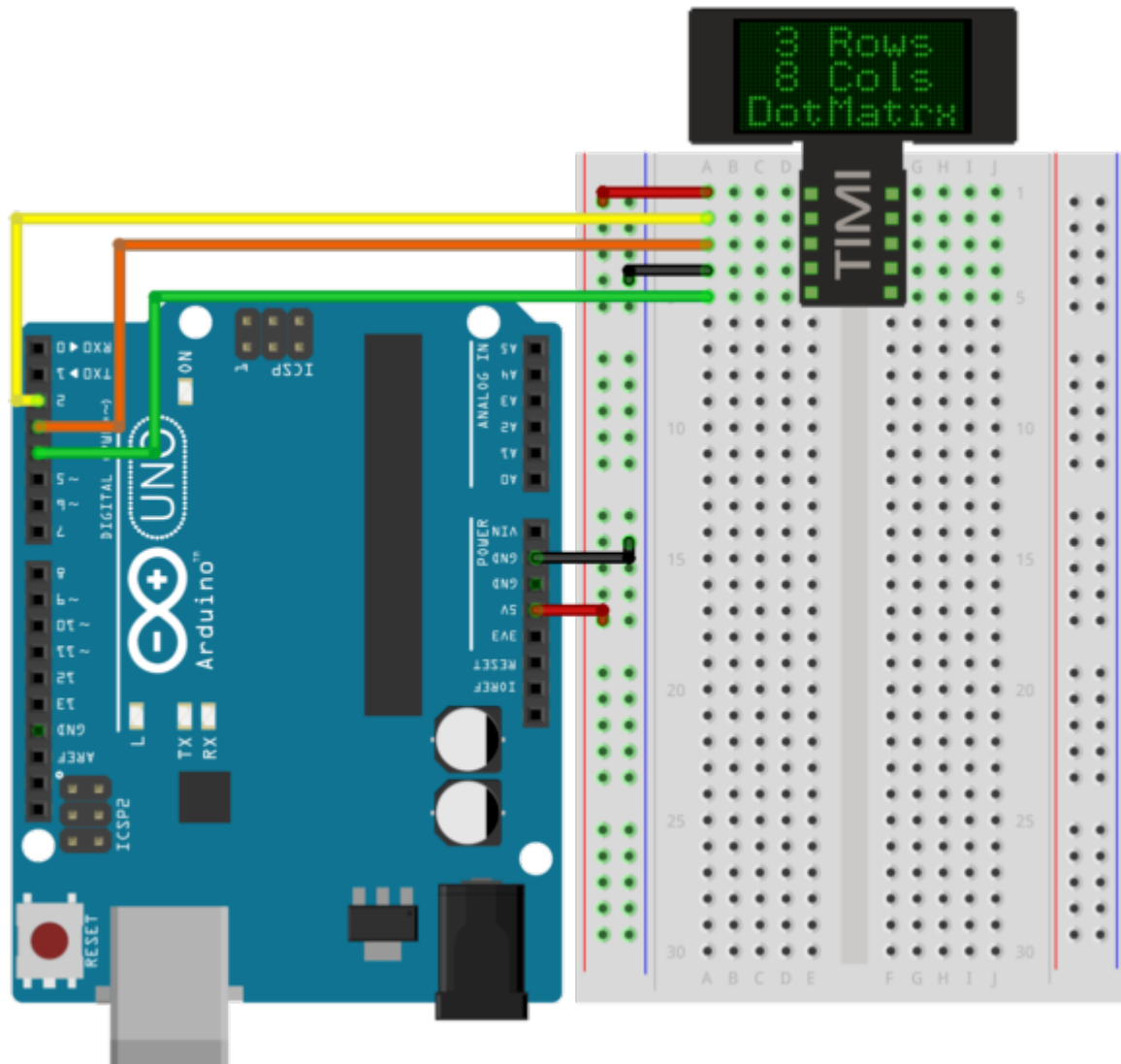
    debugSerial.println("Done!");
    debugSerial.println();

    debugSerial.print("Enter text: ");
  }
}
```

As shown, the code starts by reading the Serial monitor for user input. If there is any, the DotMatrix widget is updated with the string.

Running the Project

After designing the user interface for TIMI and writing code for the Arduino and programming them, it is time to connect the devices together. Follow the diagram below for the connection between TIMI and Arduino.



Finally, supply power to the Arduino and observe the behavior of the project.

Downloadable Resources

Here are the links to the software applications, libraries and completed project files.

- [Mates Studio](#)
- [Arduino IDE](#)
- [Arduino Mates Controller Library](#)
- [Project Files](#)