OVERVIEW

The Saleng Tiny13 is an 8-bit, Arduino compatible microcontroller board complete with on board regulator, user friendly 2.54mm headers and built-in LED. It is probably the simplest Arduino compatible board with only 1Kb of flash, 64 bytes RAM, 64 bytes EEPROM, and 5 useable GPIO's. Of the 5 I/O pins available, 3 can be used as analog input pins (ADC), 2 are PWM capable and one pin is an external interrupt pin. The microcontroller has an SPI peripheral accessible from the same GPIO pins. The clock source is selected from any of the internal clock sources: 1.2MHz, 4.8MHz, and 9.6MHz. There are more than one Arduino-core board files that can be used with this board to be able to use it with the Arduino IDE if desired.

Figure 1: Saleng Tiny13

These specifications are more than enough to implement projects that are otherwise overkill/expensive for a standard Arduino board. This board has the same ATtiny processor as its larger variants such as the Attiny85. The processor has throughputs approaching 1 MIPS per MHz.

The simplicity of this board pushes its price down to probably the lowest level yet. With this simpler specifications however, the board requires an ISP programmer , such as the **Kimat Arduino ISP Shield**, Atmel ICE, USPASP, AVRISP, STK500 or the DIY programmer ArduinoISP, tobe able to upload code and set its fuses for clock and other optional settings. The board does not have a hardware UART ("Serial") but some Arduino cores may support simplified softwareSerial – styled software UART. While a bootloader may be used, it may be impractical as the code size alone has a significant footprint. Hence, we recommend to use this board without bootloader and upload code via ISP port.

FEATURES

- High performance AVR® 8-Bit Microcontroller
- Operating Voltage: 5V
- Low Power Consumption
- Internal 5V, 1A regulator
- Wide Vin - 6-12Vdc
- Builtin LED
- Small Compact Size
- Inexpensive
- Arduino Compatible

PIN FUNCTIONS

Saleng Tiny13 Pins	Function
VIN	Input Power Pin, 6-12V
VCC	5V output
GND	Ground
RST	Reset pin.
D0 / MOSI	Digital pin 0 / MOSI, connected internally to builtin LED "L"
D1 / MISO	Digital pin 1 / MOSI
A1 / D2/ SCK /	Analog pin 1 or Digital pin 2/SCK
A2 / D3	Analog pin 2 or Digital pin 3
A3 / D4	Digital & Analog input / output

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PINOUT DIAGRAM

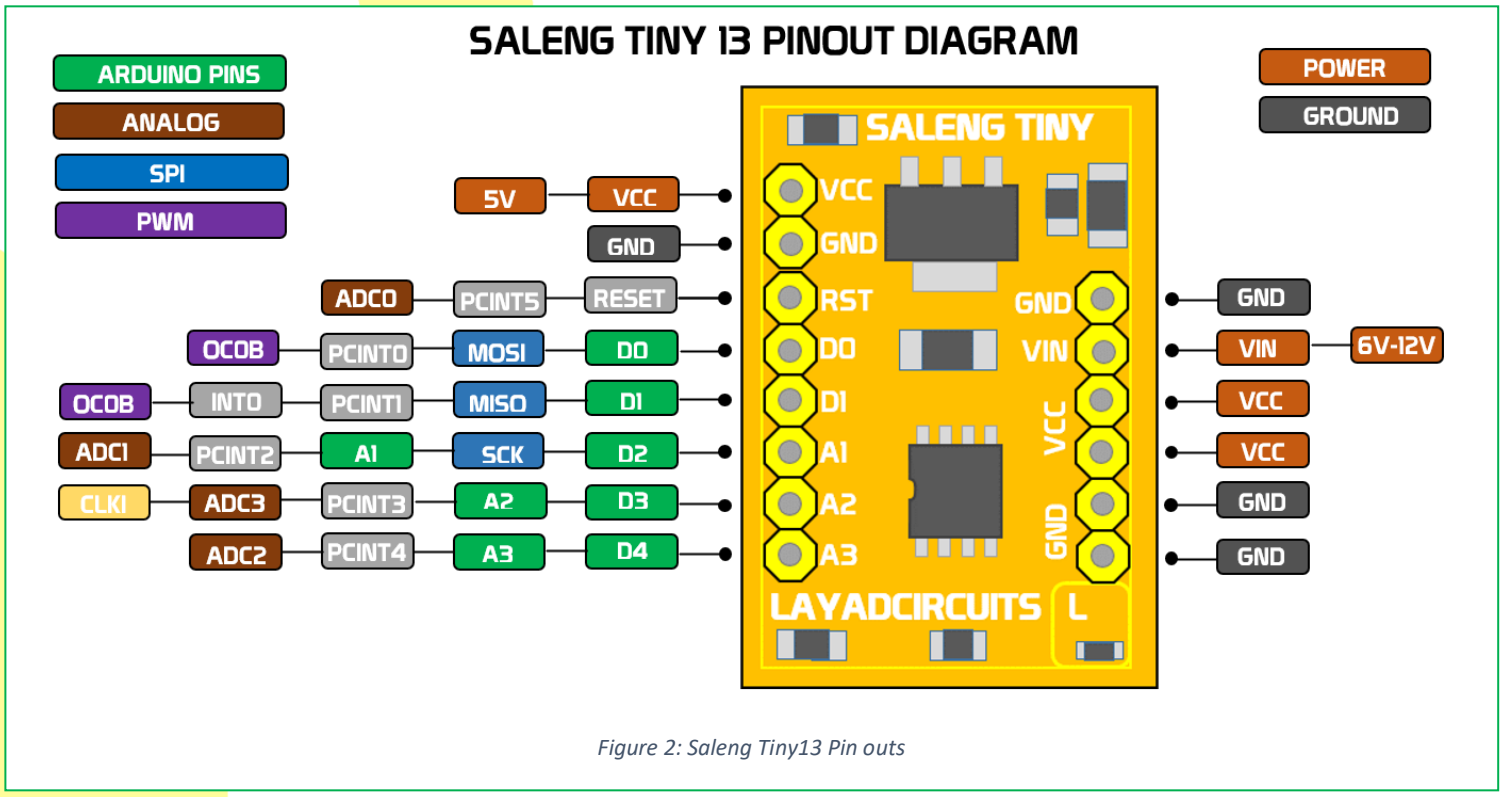

Figure 2: Saleng Tiny13 Pin outs

INSTALLING THE BOARD ON THE ARDUINO IDE

As there are more than one compatible Arduino-core , this document will focus on the the MicroCore. When the core is installed in the Arduino IDE, a new board under the Tools>Board menu shall appear and may be used with the Saleng Tiny13. MicroCore requires Arduino IDE version 1.6.13 or greater. To install via Board Manager, follow these steps. Other installation methods are discussed on the MicroCore repository. This installation is required before the Saleng Tiny13 can be used with the Arduino IDE.

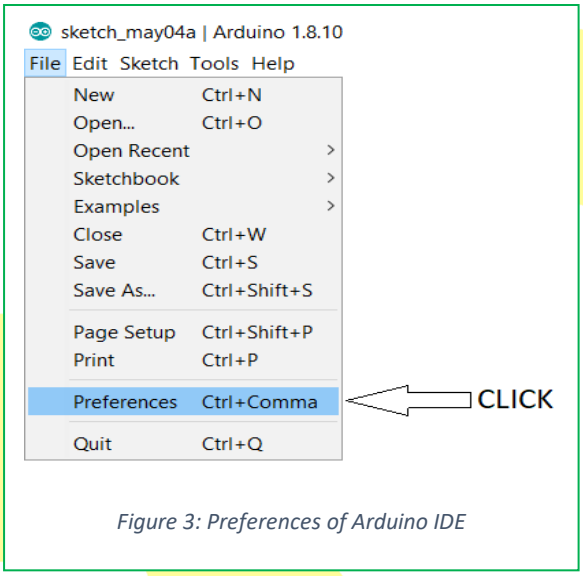

Figure 3: Preferences of Arduino IDE

Follow these steps:

- Open the Arduino IDE.
- Open the File > Preferences menu item.

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- Enter the following URL in Additional Boards Manager URLs: https://mcudude.github.io/MicroCore/package_MCUdude_MicroCore_index.json

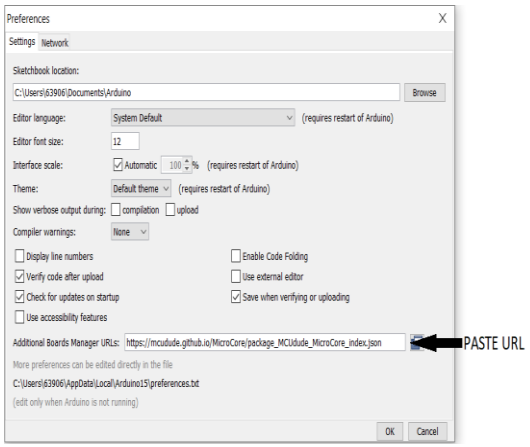

Figure 4: Paste Board Manager URL

- Open the Tools > Board > Boards Manager... menu item.

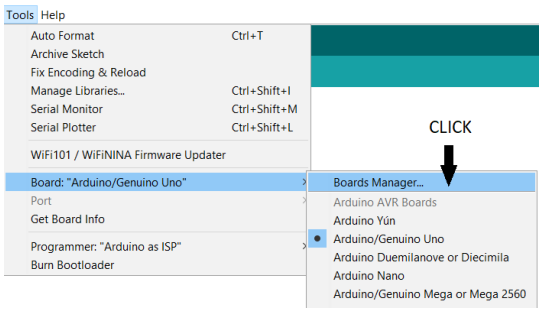

Figure 5: Board Manager

- Wait for the platform indexes to finish downloading.
- Scroll down until you see the MicroCore entry and click on it.
- Click Install.

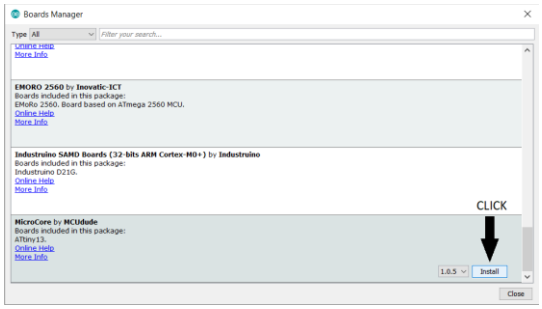

Figure 6: Click install

- After installation is complete close the Boards Manager window.

UPLOADING SKETCHES

Unlike a regular Arduino board such as an Uno that is programmed with a bootloader and has a dedicated USB port, the Saleng Tiny13 is programmed via the ISP port. The procedure for ISP writing the program is the same for all boards with classic AVRs, including Arduino Uno/Nano/Mega.

An ISP programmer is required for uploads. While this document will focus on the **Kimat Arduino ISP Shield** as an ISP programmer, others may be use such as the USBASP, Atmel ICE, AVRISP or STK500.

After successful installation of MicroCore , connect the Kimat Arduino ISP shield (and host Uno board) to Saleng Tiny13.

Kimat Arduino ISP shield	Saleng Tiny13
SCK	A1 / SCK / D2
MISO	D1 / MISO
MOSI	D0 / MOSI
RST	RST / A0
GND	GND
VCC	VCC

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- Select the ATtiny13 MicroCore board and set the settings as:

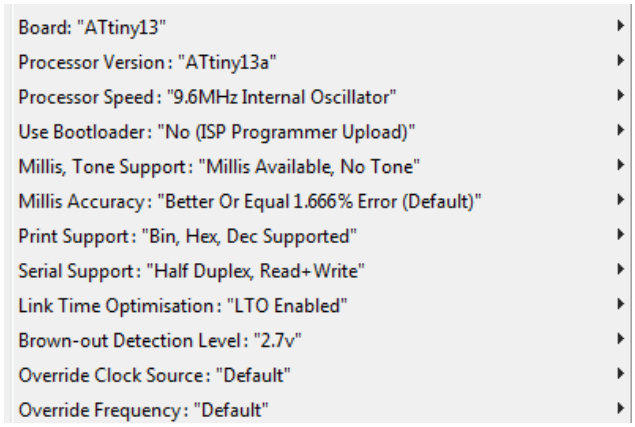

Figure 8: Board Setting of Saleng Tiny13

- After setting up the board, upload a sketch by using Upload using programmer feature and done.

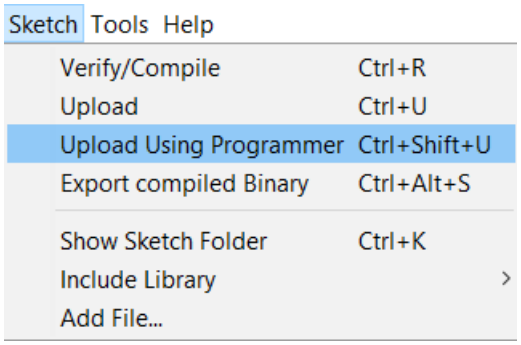

Figure 9: Upload sketch on Saleng Tiny13

APPLICATION NOTES

First Test

Before proceeding make sure that all of the steps above were successfully done. Always check your power supply connection a double 5v power supply connected to the VCC can damage the circuit. The Two Vcc and ground are intended for the components not to Saleng Tiny13.

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Upload a blinking LED sketch to determine if the Arduino Uno is able to upload code on Saleng Tiny13.

CODE:

```
 This example code is in the public domain.

  http://www.arduino.cc/en/Tutorial/Blink
*/

// the setup function runs once when you press reset or power the board
void setup() {
  // initialize digital pin LED_BUILTIN as an output.
  pinMode(LED_BUILTIN, OUTPUT);
}

// the loop function runs over and over again forever
void loop() {
  digitalWrite(LED_BUILTIN, HIGH);   // turn the LED on (HIGH is the voltage level)
  delay(1000);                       // wait for a second
  digitalWrite(LED_BUILTIN, LOW);    // turn the LED off by making the voltage LOW
  delay(1000);                       // wait for a second
}
```

The L LED should blink if the sketch was successfully uploaded.

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WIRING DIAGRAM:

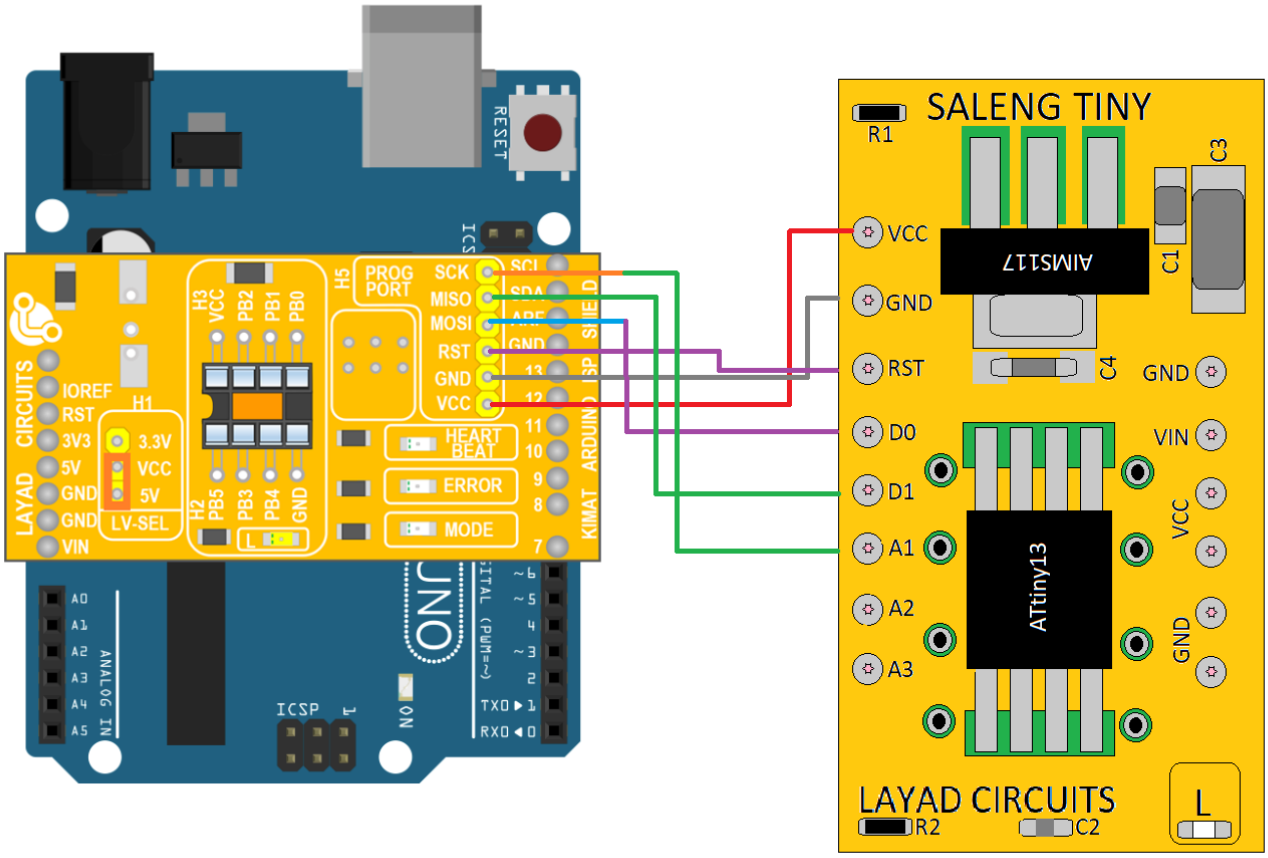

Figure 10: Wiring example for an Arduino Uno and Saleng Tiny13 connection.

DOCUMENT REVISION HISTORY

Revision:

v1.0.0/04 May 2020 R.J.Quirante/ C.D.Malecdan

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