Activity Data Logger

Group Members

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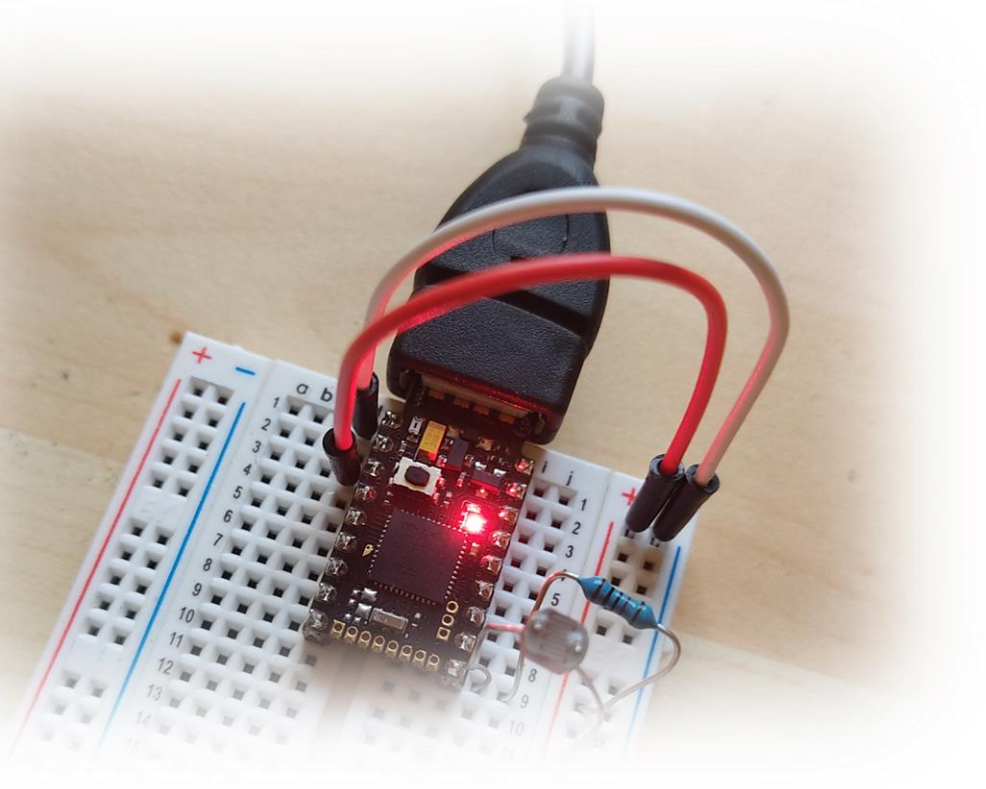


Components Used

1. Bread Board with Auxiliary Connectors
2. Pico Controller
3. ADXL345(Accelerometer Sensor) and TSL250(Ambient Light Sensor) module with SD Card → HedgeHog Module
4. SD Card Module
5. OLED → SSD1306

PICO Specification

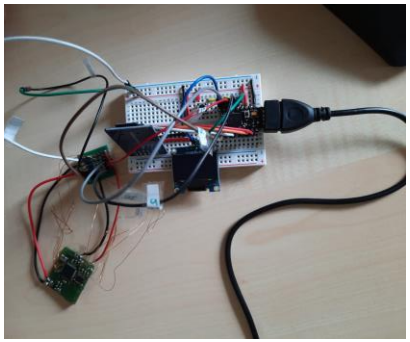
Size: 33mm x 15mm (1.3 x 0.6 inch)

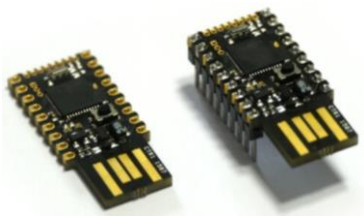
Pins: 22 GPIO pins : 9 Analog inputs, 21 PWM, 2 Serial, 3 SPI, 3 I2C

USB Type: A type connector

Buttons and LED: Two on-board LEDs and one button.

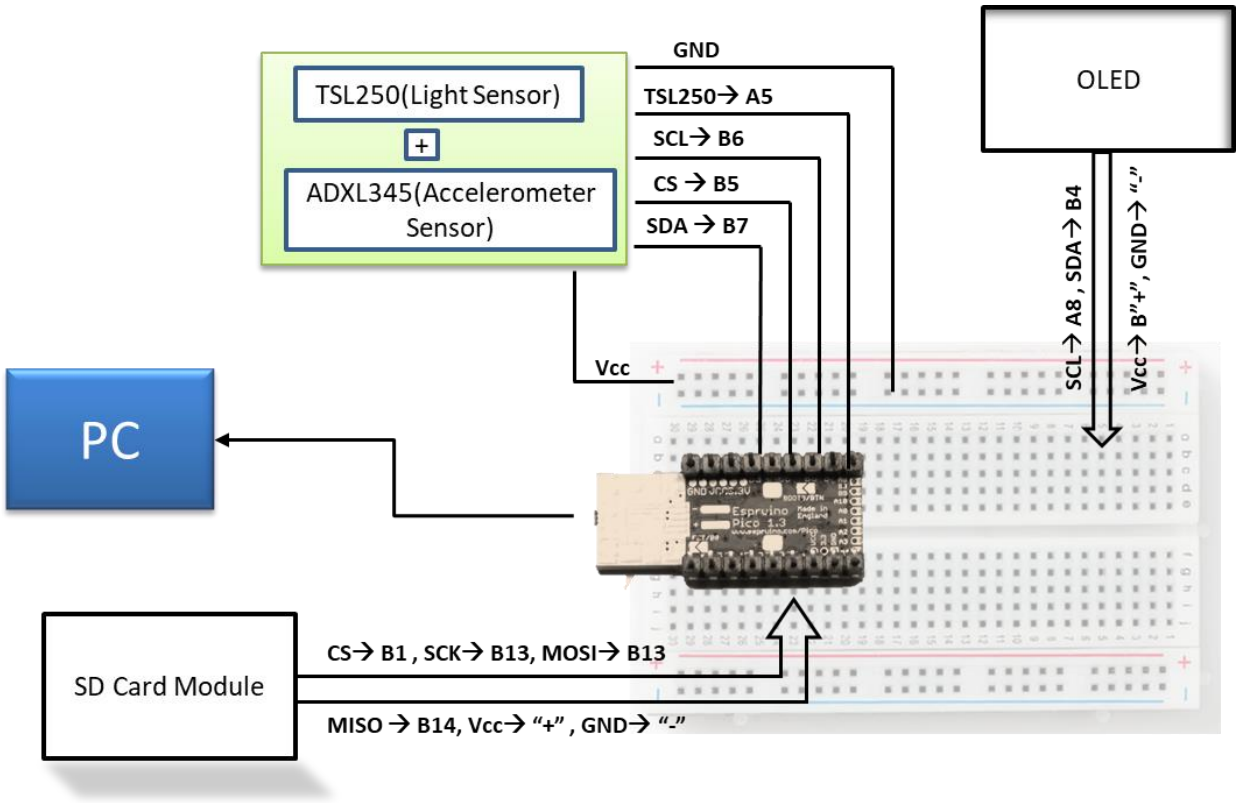
Memory: 384kb flash, 96kb RAM On-board





https://www.espruino.com/Pico

Block Diagram of Espruino with Peripheral Devices



Task 1: Getting Data from HedgeHog

- **ADXL345 (Accelerometer Sensor)**

→ Referring the datasheet of Hedge-Hog to identify the ports and pins for TSL250 sensor.

→ Use of I2C protocol to communicate ADXL345 Sensor and Pico

→ Power supplied to Hedge-Hog from PC via USB Type B.

→ Output from the Sensor are acceleration value in 3 directions as a_x, a_y, a_z .

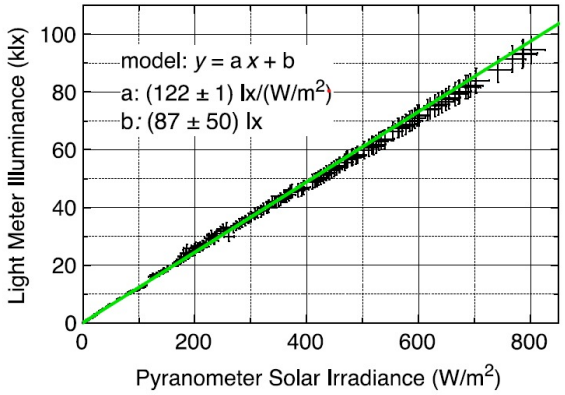
→ The value of acceleration displayed is the multiple of “g”.

- **TSL250 (Ambient Light Sensor).**

→ Voltage values are obtained from the sensor, which are converted into illuminance (lux).

→ Use of ADC for Analog data from TSL250 Sensor to Pico.

→ Conversion is done using the chart obtain from conversion guide *Michael, Johnston and Moreno (2020)*



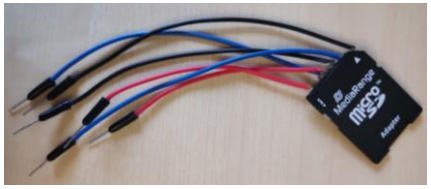
Task 2 Storing the Data in SD Card Module

→ Unable to R/W data to SD card module of Hedge-Hog.

"Error: Unable to Mount SD Card"

Trail 1: Update Espruino Firmware and use of new Memory Card in Hedge-Hog → Same Error

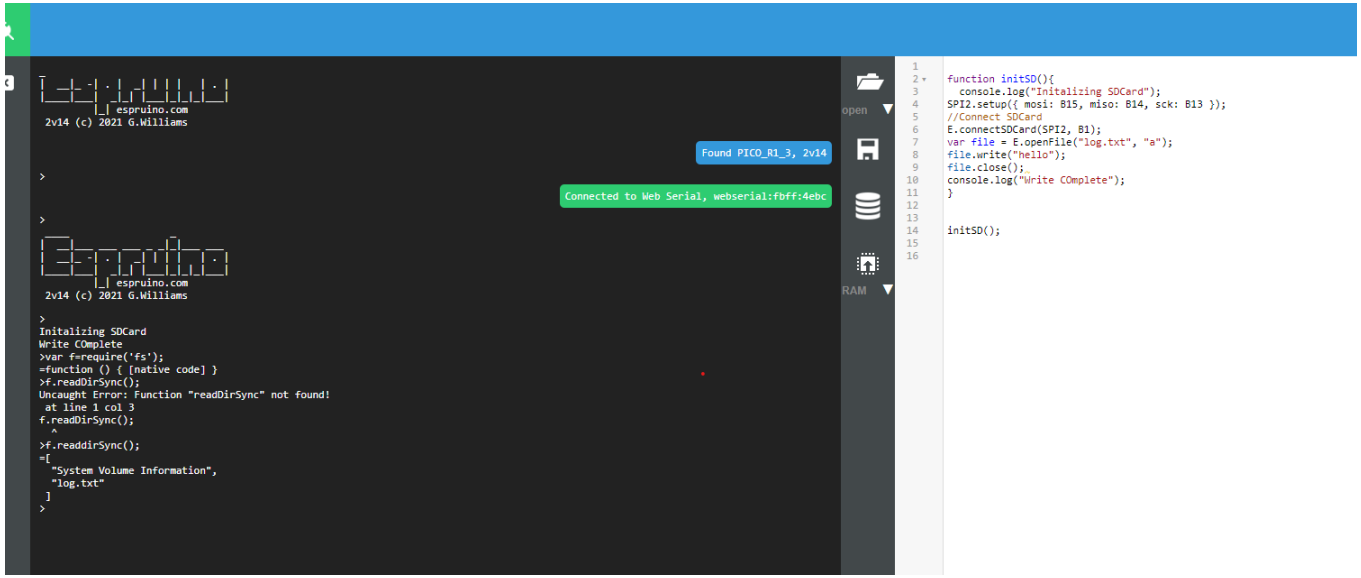
Trail 2: Connecting a SD card adaptor to Espruino Pico → Same Error



Trail 3: Using Separate SD Card Module with new SD card → Successfully wore file into SD Card without sensor data.

Task 2 Storing the Data in SD Card Module

→ Data was stored by connecting just SD Card and PICO as in the picture



→ Data from Light and Accelerometer sensor done on Console that is saved in PICO flash.

→ When using the SD card Module is connected to all the sensors and Pico, the data was not successfully logged into SD card directly.

Task 3 Display Data on OLED

- **Specification of OLED**

  Espruino Module : SSD1306.js

  Display Type: Monochrome

  Size: 128 × 64

  Library Used: Graphics Library

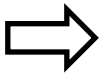
  Font Used: Vector
- Use of I2C Protocol to connect OLED and Pico.
- Change of contrast using function `g.setcontrast(value)`.
- Starting Address of OLED was 0x3D, which is the address of OLED buffer.

Time and Date on OLED

Task 4 Auxilary Functions

A. Display of Accelerometer and Light Sensor Data on OLED

B. Toggel between the Time & Data screen to Accelerometer and Light Sensor Data using Button.



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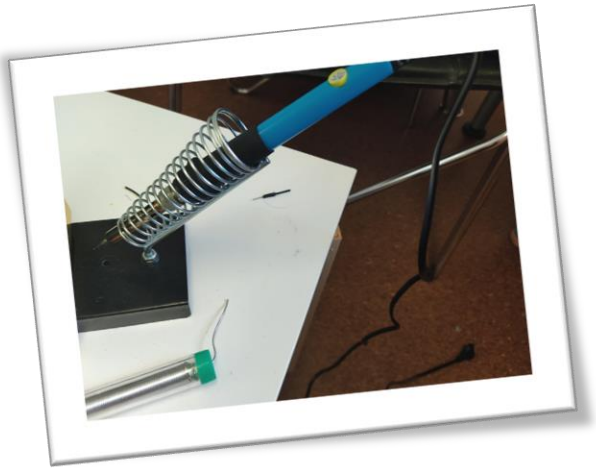
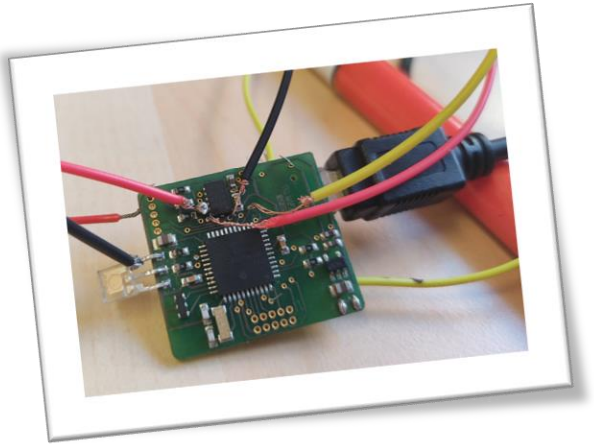
Project At Glance






THANK
YOU !

Task 4 Auxilary Functions