



# STM32 Reference

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IEEE Penn State – Projects Committee  
SP26

A decorative graphic in the top-left corner featuring a network of thin, intersecting lines in purple and orange. Some lines end in small circular nodes, resembling a circuit board or a data network diagram.

# Table of contents

Slides 3-4: Setting up **printf()**

Slides 5-8: Setting up **SWV Console**

Slides 9-10: Enabling **float** output (extra)

Slide 11: Enjoy print(f)!

Slides 12-14: **Debugging** tips (workshop 2)

A decorative graphic in the bottom-right corner featuring a grid of small blue dots. Overlaid on this grid are several wavy, flowing lines in orange and purple, along with some geometric shapes like triangles and squares, creating a modern, tech-inspired aesthetic.

# Getting setup with printf();

Make sure to add this code **BETWEEN THE COMMENTS!!**

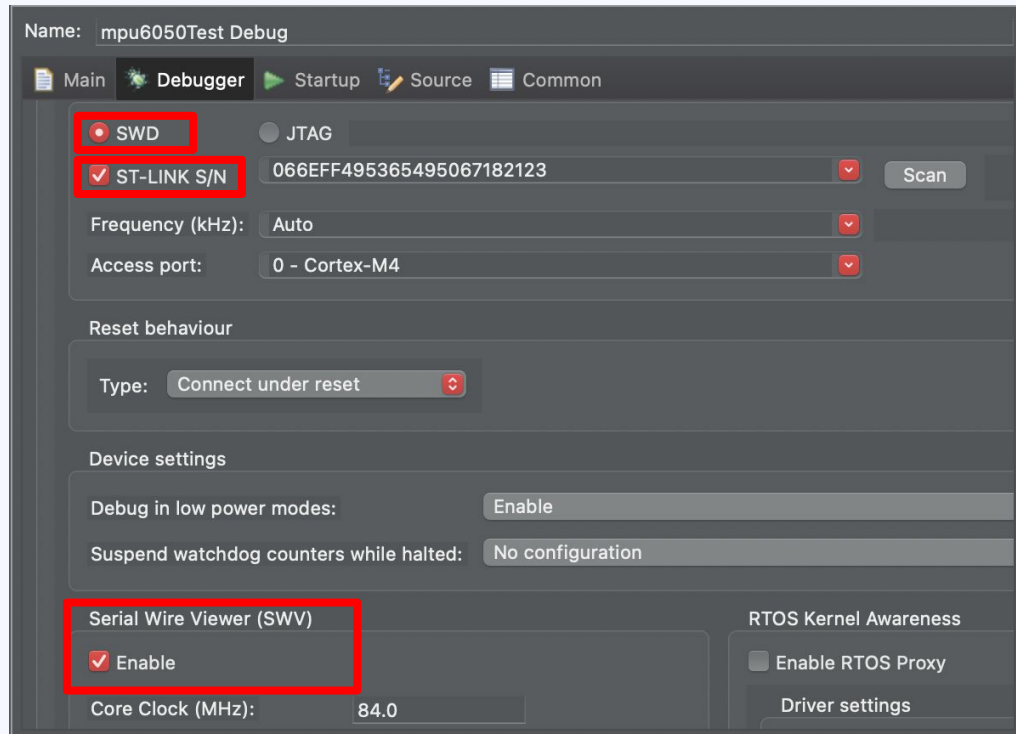
```
/* Private user code -----*/  
/* USER CODE BEGIN 0 */  
int _write(int file, char* ptr, int len) {  
    for(int i = 0; i < len; i++) {  
        ITM_SendChar((*ptr++));           // ADD THIS  
    }  
    return len;  
}  
/* USER CODE END 0 */
```

# Setting up - Continued

1. Click the

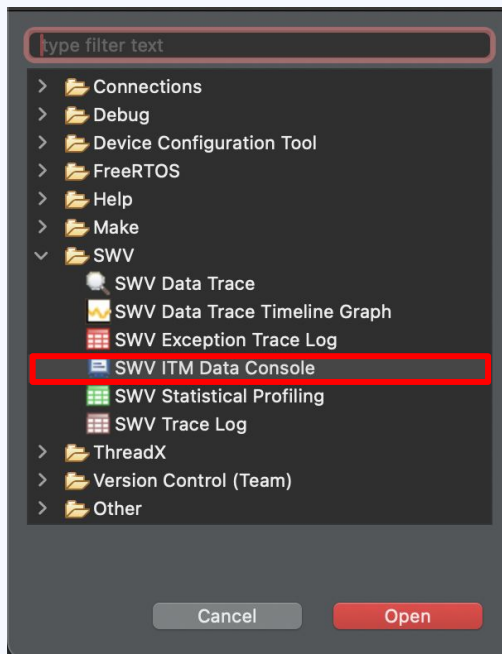


debug button, make sure settings look like this



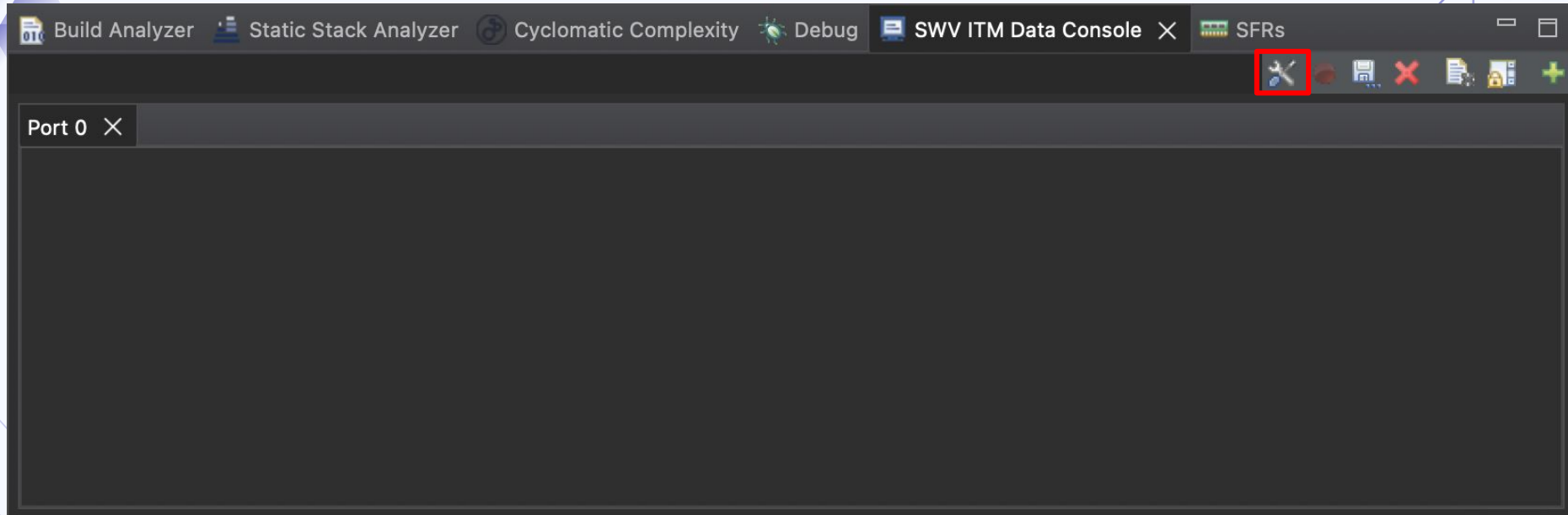
# Open SWV Console

1. Go to the toolbar, **Window** -> **Show view** -> **Other**
2. Click the highlighted option below and then click open



# SWV Configuration

Click the highlighted settings button (make sure you run the debugger)



# SWV - Continued

Make sure your port configuration looks like this (port 0 enabled)

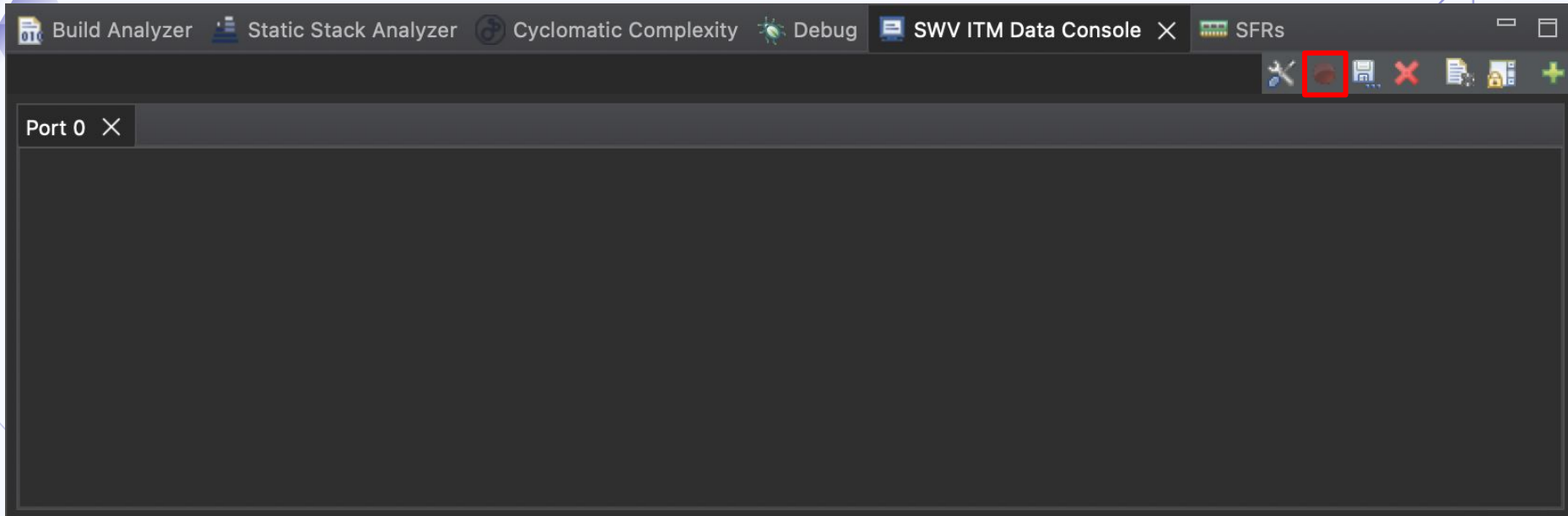
The screenshot shows the SWV configuration interface with the following sections:

- Clock Settings:** Core Clock: 84 MHz, Clock Prescaler: 42, SWO Clock: 2000.0 kHz.
- Trace Events:** CPI: Cycles per instruction, EXC: Exception overhead, SLEEP: Sleep cycles, LSU: Load store unit cycles, FOLD: Folded instructions, EXETRC: Trace Exceptions.
- PC Sampling:** Enable (unchecked), Resolution: 16384 Cycles/sample.
- Timestamps:** Enable (checked), Prescaler: 1.
- Data Trace:** Four comparators (0-3) with settings for Enable, Var/Addr, Access, Size, and Generate.
- ITM Stimulus Ports:** A row of checkboxes for ports 31 down to 0. Port 0 is checked. A red box highlights this row.
- Privileged only ports:** Port 31..24, Port 23..16, Port 15..8, Port 7..0.

Buttons: Cancel, OK.

# SWV Configuration

Click red circle to start listening!





# Extra - Enabling float output

1. In the project explorer on the left side of your screen, right click the blue icon for your project
2. Click 'properties'
3. Add '-u \_printf\_float' to the C linker settings as shown in the next slide

- type filter text
- > Resource Builders
  - ▼ C/C++ Build
    - Build Variables
    - Environment
    - JSON Compilation Database
    - Logging
    - Settings
  - > C/C++ General
  - CMSIS-SVD Settings
  - Project References
  - Refactoring History
  - Run/Debug Settings

## Settings

Configuration: Debug [ Active ]

Manage Configurations...

### Tool Settings

#### Build Steps

#### Build Artifact

#### Binary Parsers

#### Error Parsers

- MCU/MPU Toolchain
  - MCU/MPU Settings
  - MCU/MPU Post build outputs
- ▼ MCU/MPU GCC Assembler
  - General
  - Debugging
  - Preprocessor
  - Include paths
  - Miscellaneous
- ▼ MCU/MPU GCC Compiler
  - General
  - Debugging
  - Preprocessor
  - Include paths
  - Optimization
  - Warnings
  - Miscellaneous
- ▼ MCU/MPU GCC Linker
  - General
  - Libraries
  - Miscellaneous

#### Other flags

-u \_printf\_float

#### Additional object files

- ☐ (-mtune=cortex-a35)
- ☐ (-mstrict-align)
- ☐ (-fshort-enums)


Restore Defaults

Apply



**Congratulations, enjoy printf()!**

# Debugging (workshop 2)

If you click Debug  and if your code has 0 errors BUT your STM32/OLED screen doesn't output correctly, check your wiring!

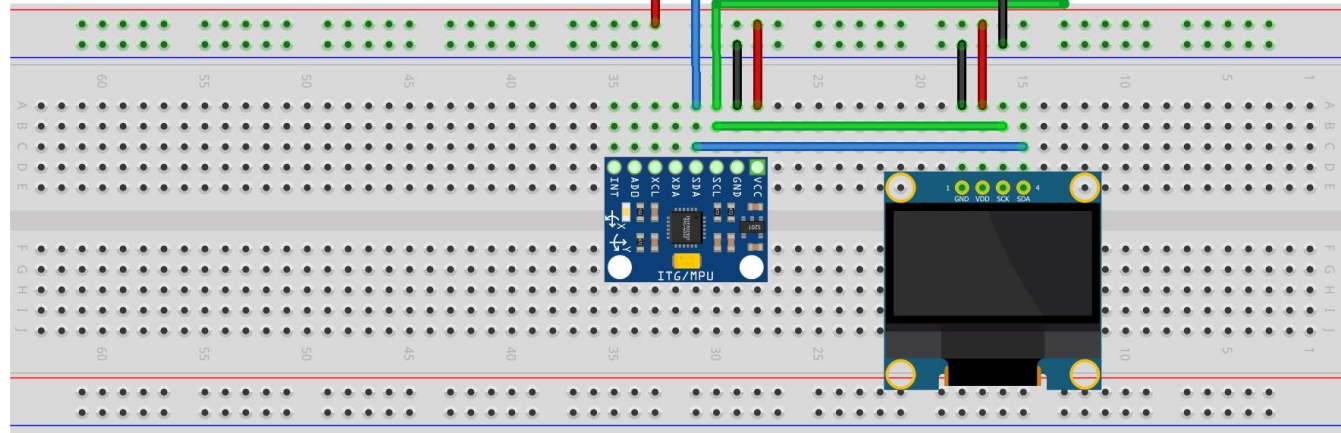
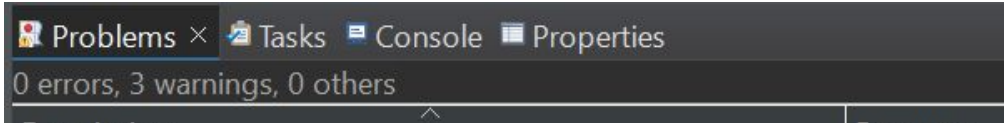
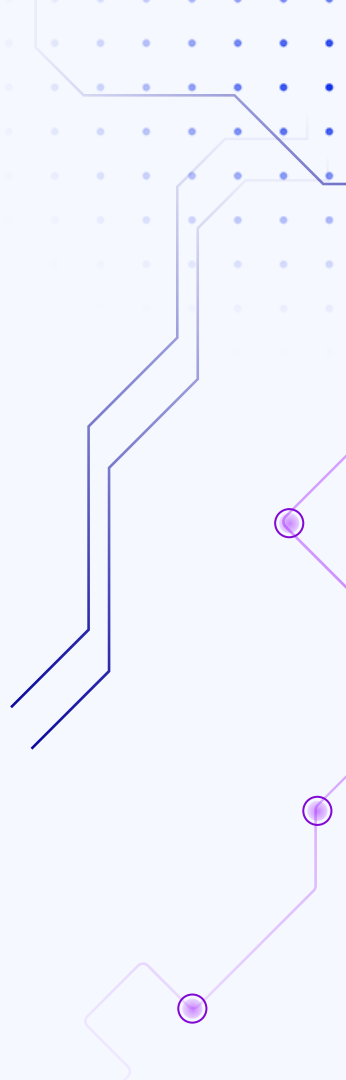



Diagram on slide 12 of "IEEE STM32 Peripherals Workshop"

# Wiring checklist

Before checking connections, **REMOVE STM32 FROM POWER** (laptop)

- ❑ SDA connected from OLED screen to MPU6050 and STM32
- ❑ SCL connected from OLED screen to MPU6050 and STM32
- ❑ VCC connected from OLED screen and MPU6050 to + vertical strip (on breadboard)
- ❑ GND connected from OLED screen and MPU6050 to - vertical strip (on breadboard)
- ❑ + vertical strip (on breadboard) connected to **3V3 pin** (not 5V) on STM32
- ❑ - vertical strip (on breadboard) connected GND pin on STM32



# **If anything isn't working, don't hesitate to ask for help!**

**Raise your hand to get the attention of someone from  
Projects Committee**