

Microcomputer Engineering

TMIK13

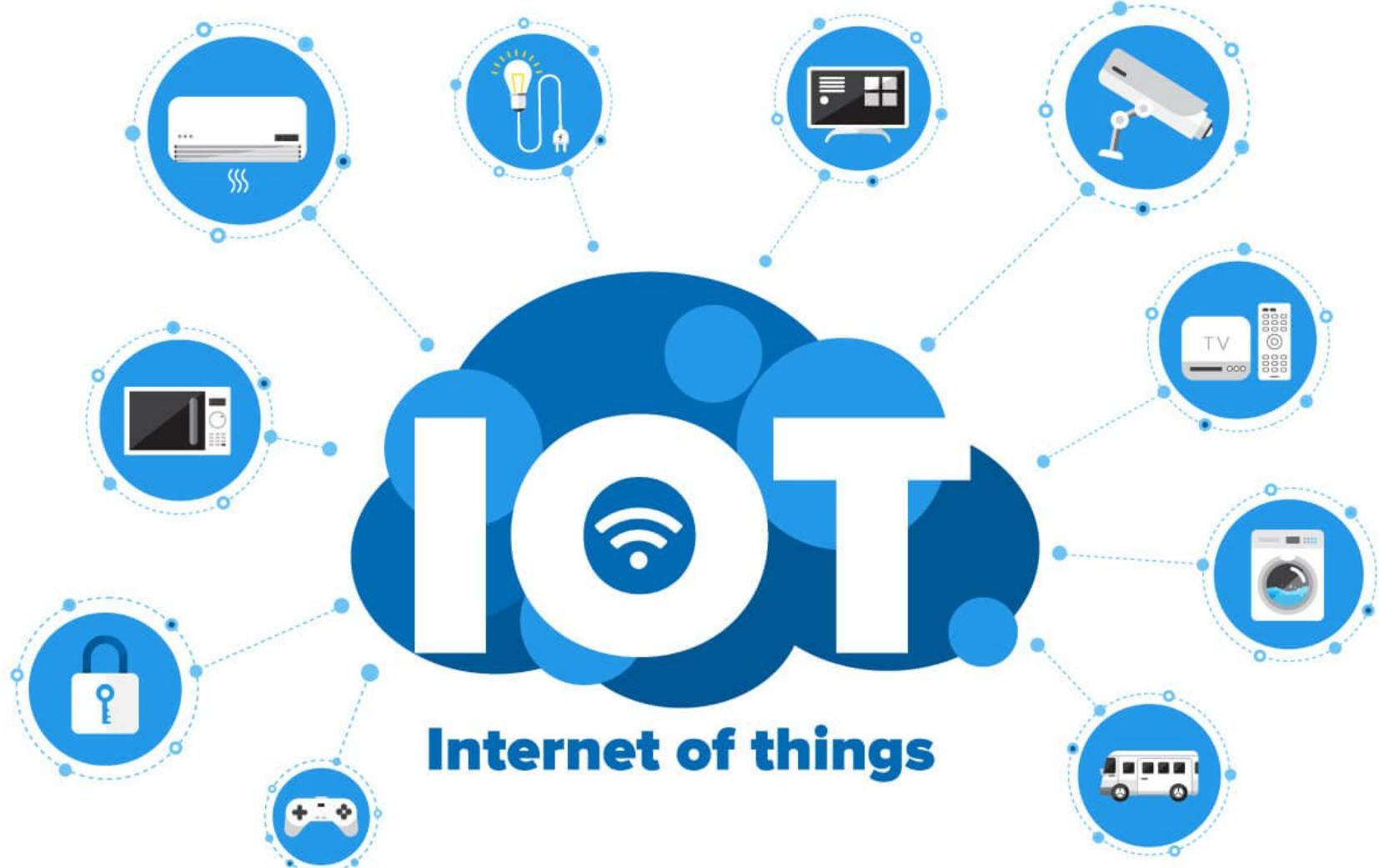
Lecture 1

INTRODUCTION TO ARM-ARCHITECTURE AND GPIO
ANDREAS AXELSSON (ANDREAS.AXELSSON@JU.SE)

Introduction – Embedded Systems



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Introduction – Embedded Systems

Embedded Systems

- Computer system with a dedicated function within a larger mechanical or electrical system [Wikipedia]
- Often with real-time computing constraints
- By far the most common form of computer system (98%)

Introduction – Microcontrollers

8-bit Microcontrollers

- Fairly low performance
- Very cheap
- Very common

16-bit Microcontrollers

- Mid-performance
- Fairly cheap
- Loosing ground to 32-bit

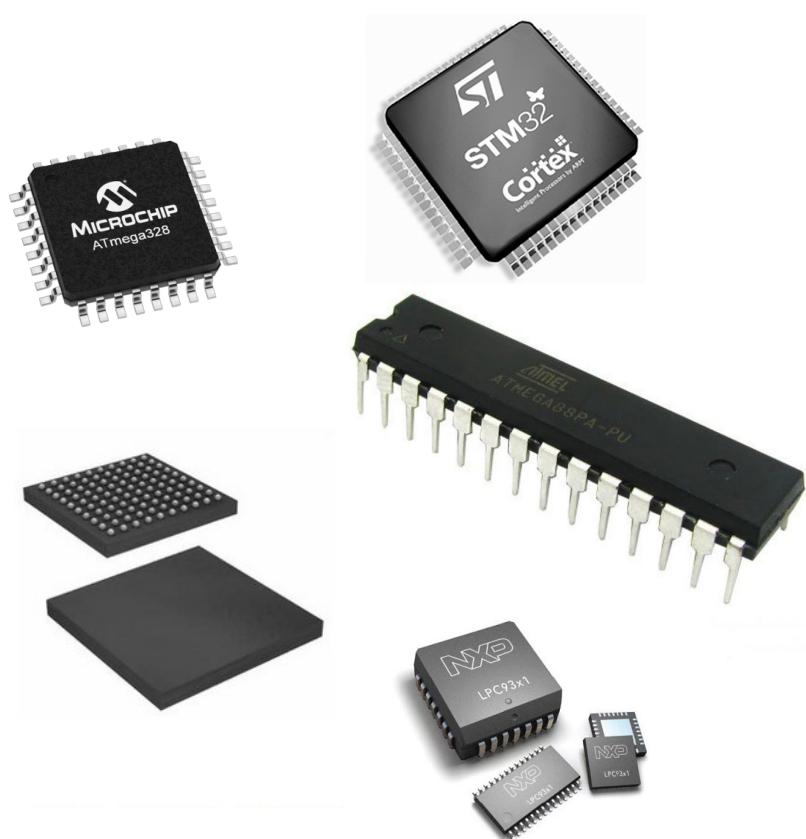
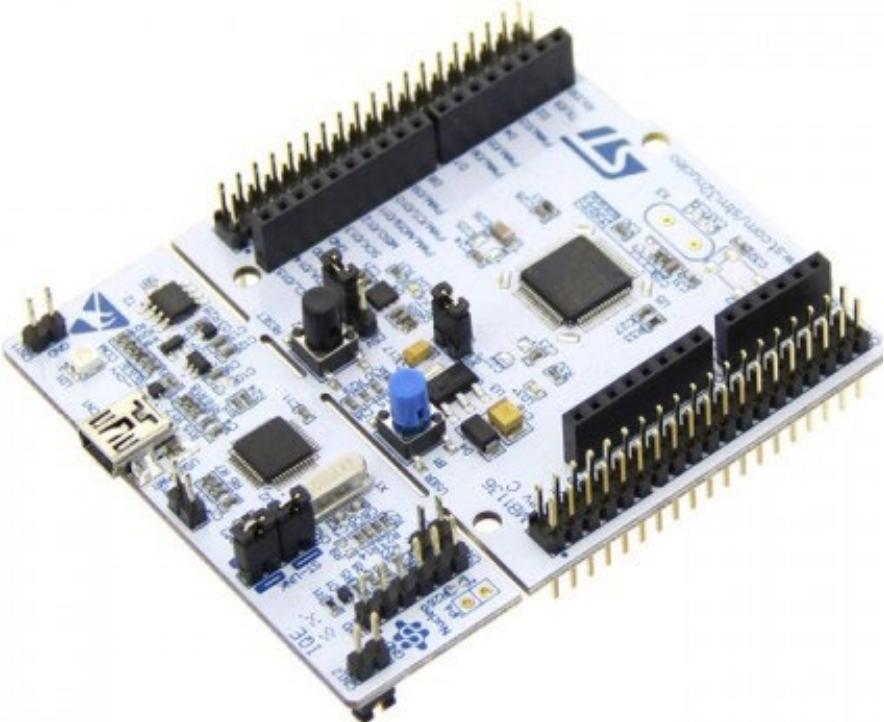
64-bit Microcontrollers on the way!

32-bit Microcontroller

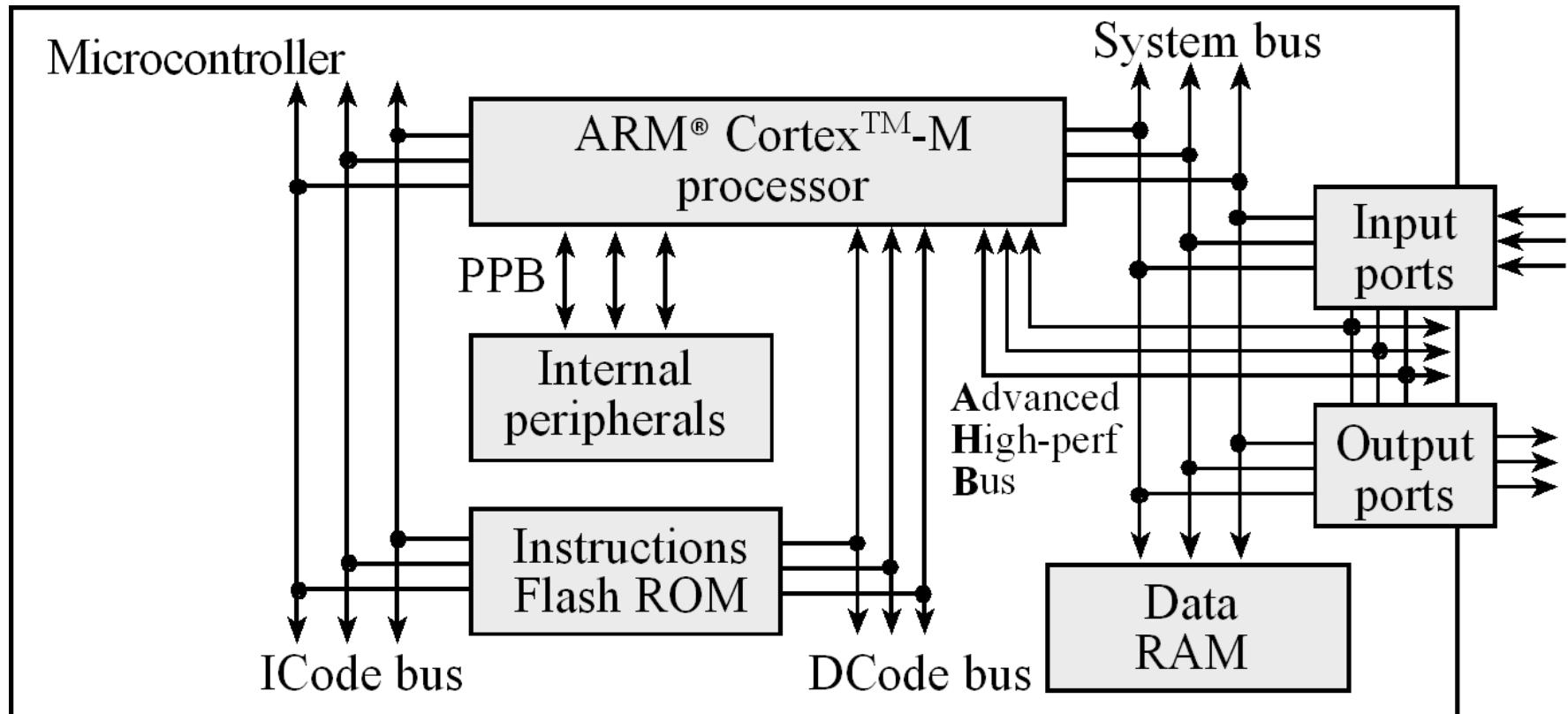
- Fairly high performance
- Fairly cheap
- Fairly Common, quickly rising in popularity



Introduction – Microcontrollers



ARM Cortex-M

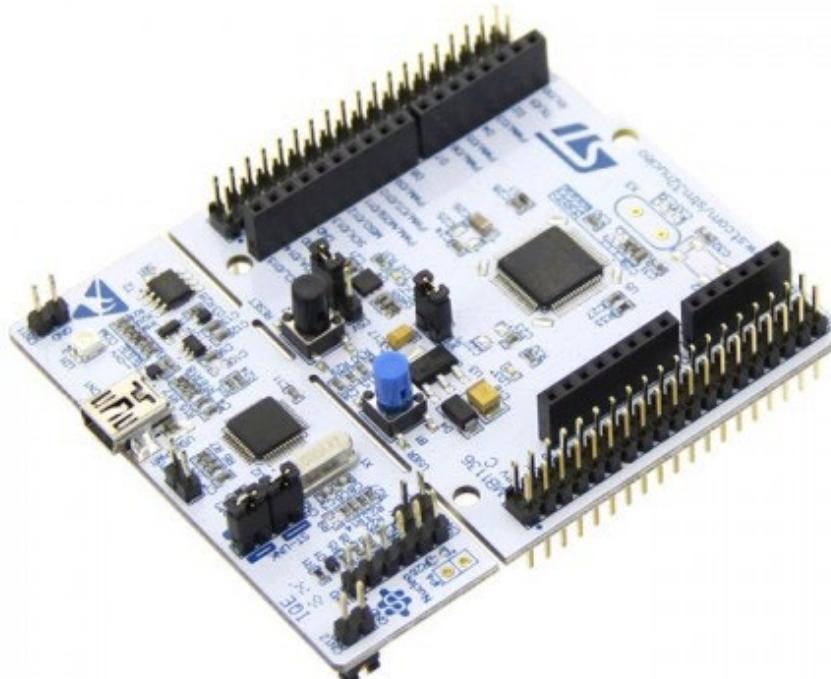


Harvard Architecture (separate instruction and data busses)

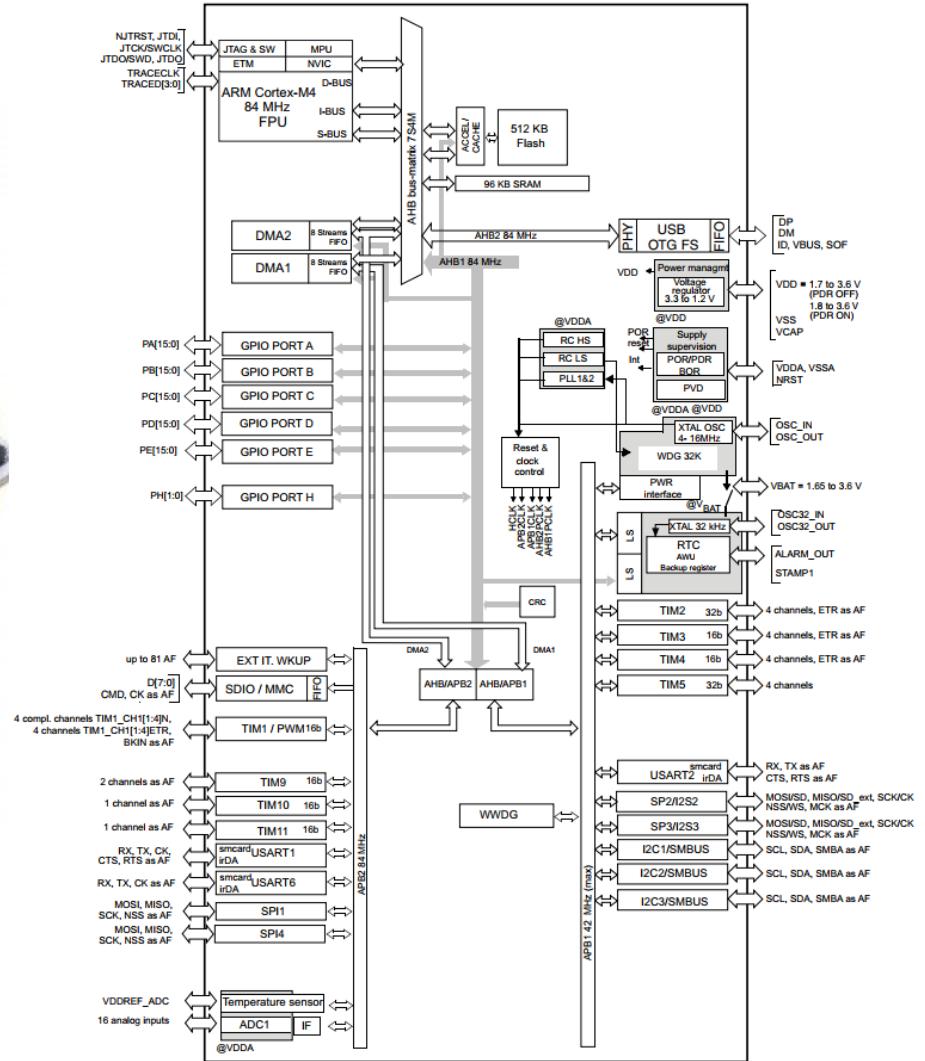
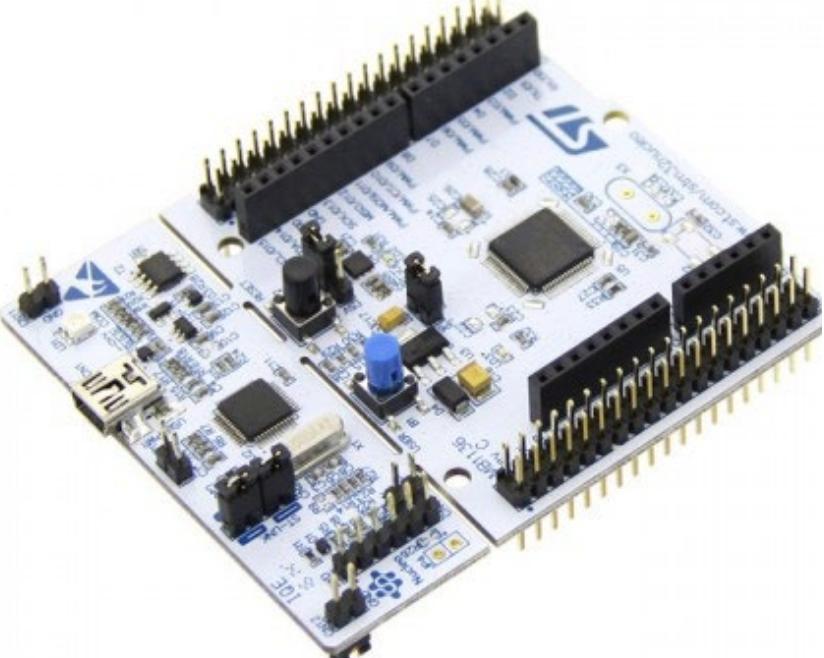
Nucleo-64 STM32F411RE

Your own kit is handed out before the first laboration

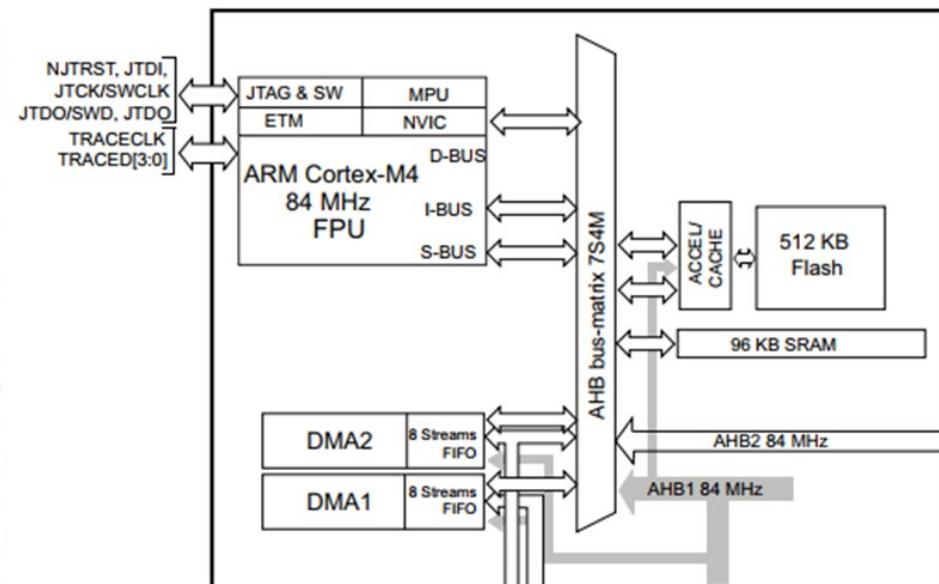
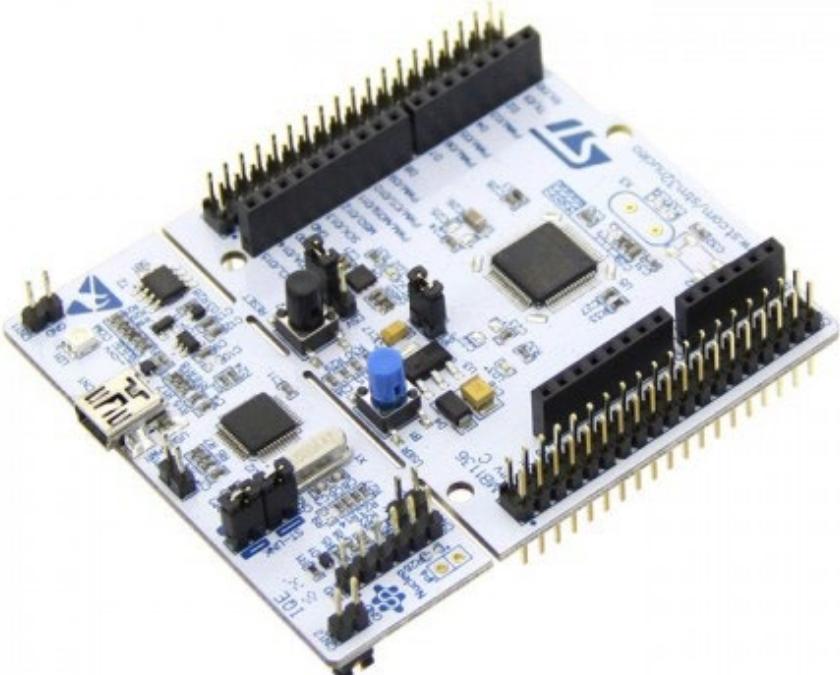
Ensure to bring it since it will be used in all laborations



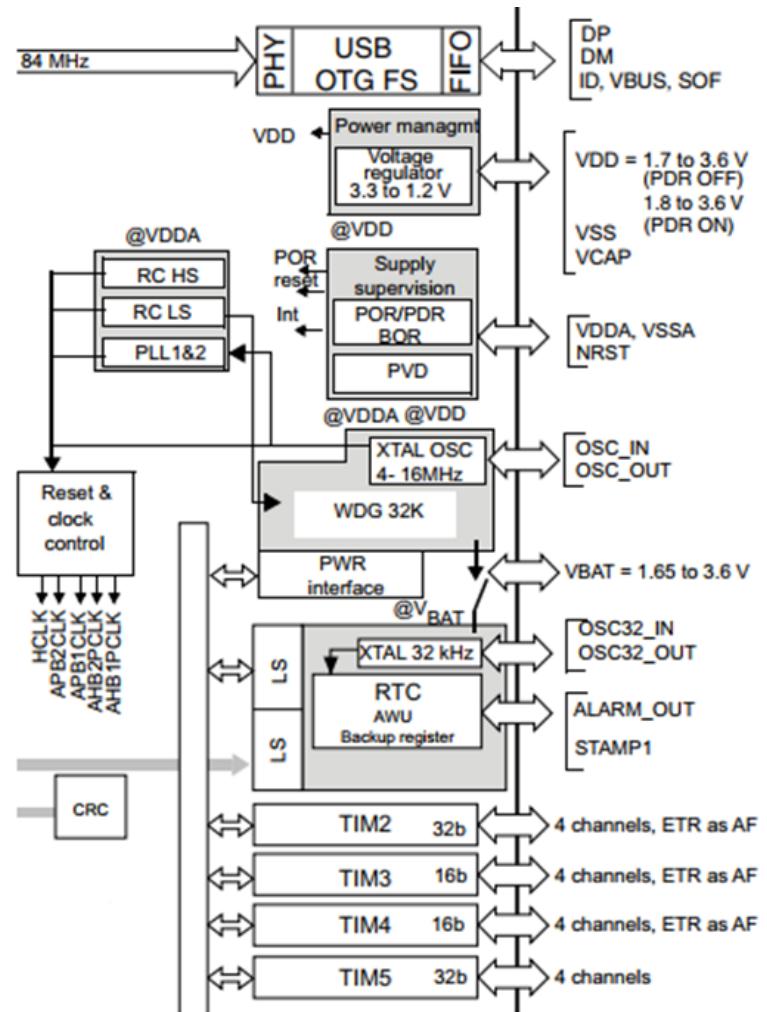
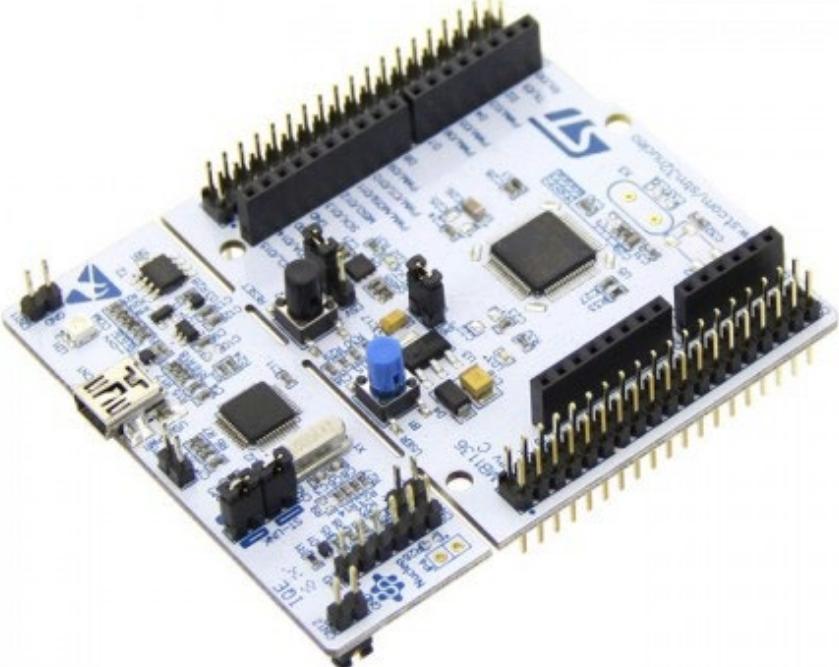
Nucleo-64 STM32F411RE



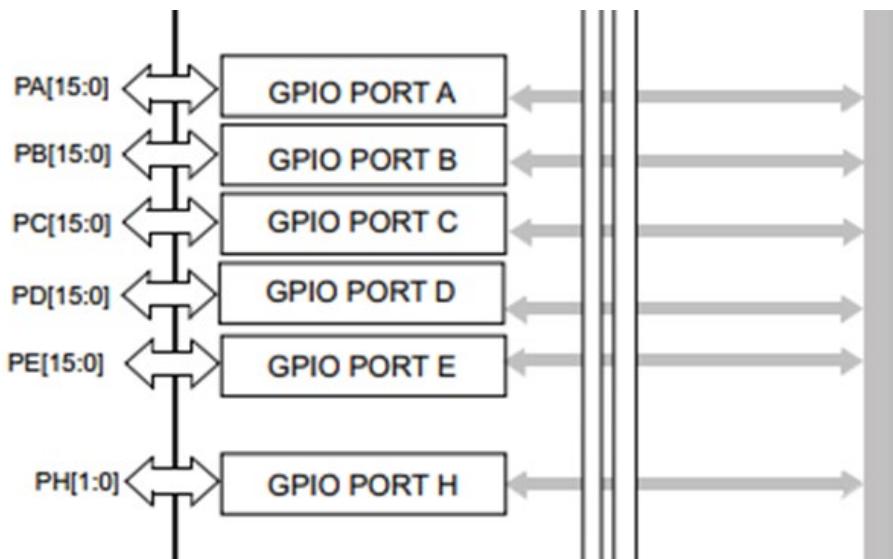
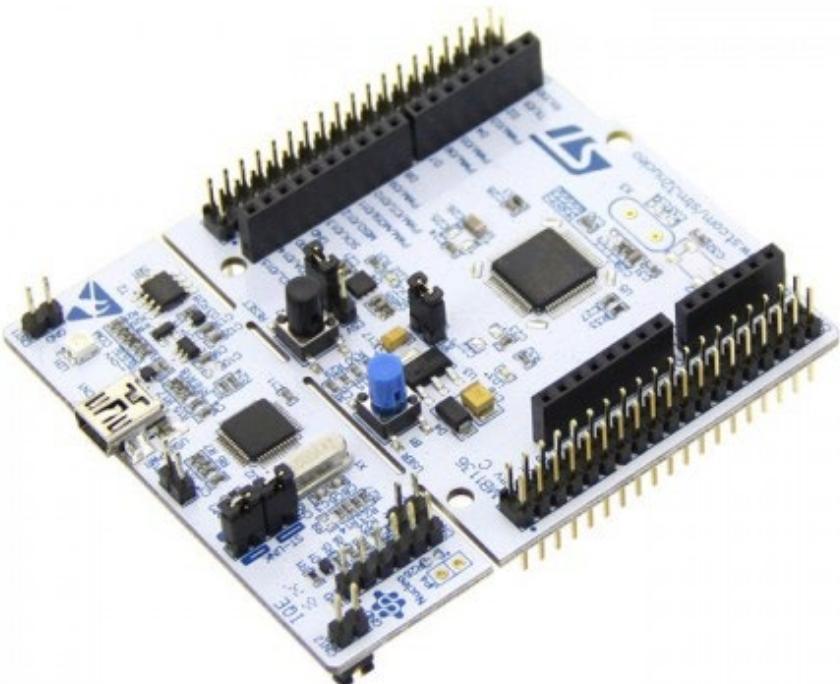
Nucleo-64 STM32F411RE



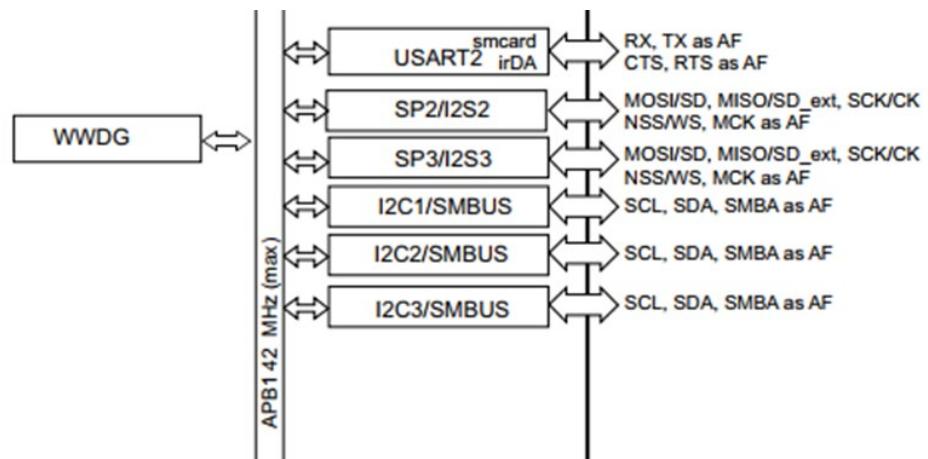
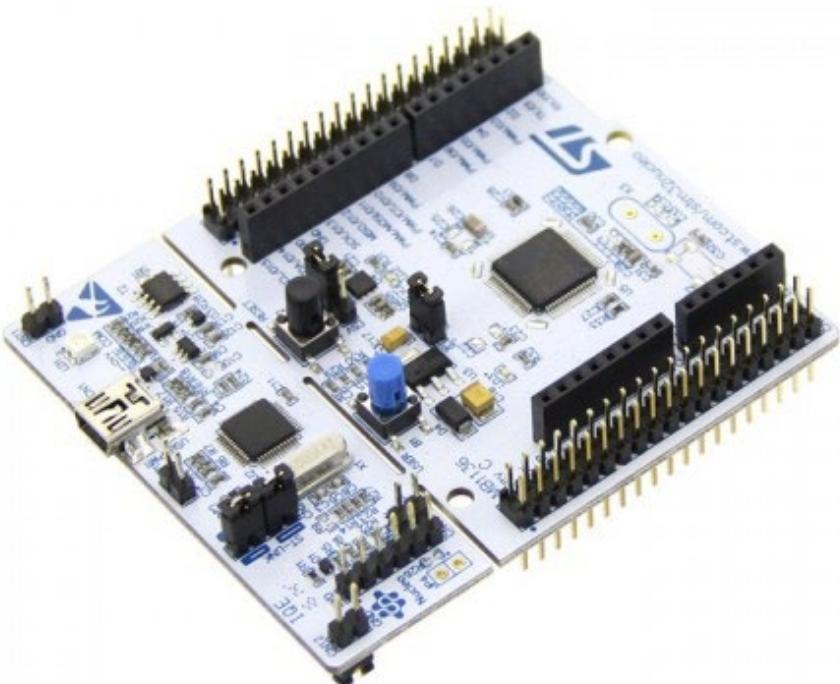
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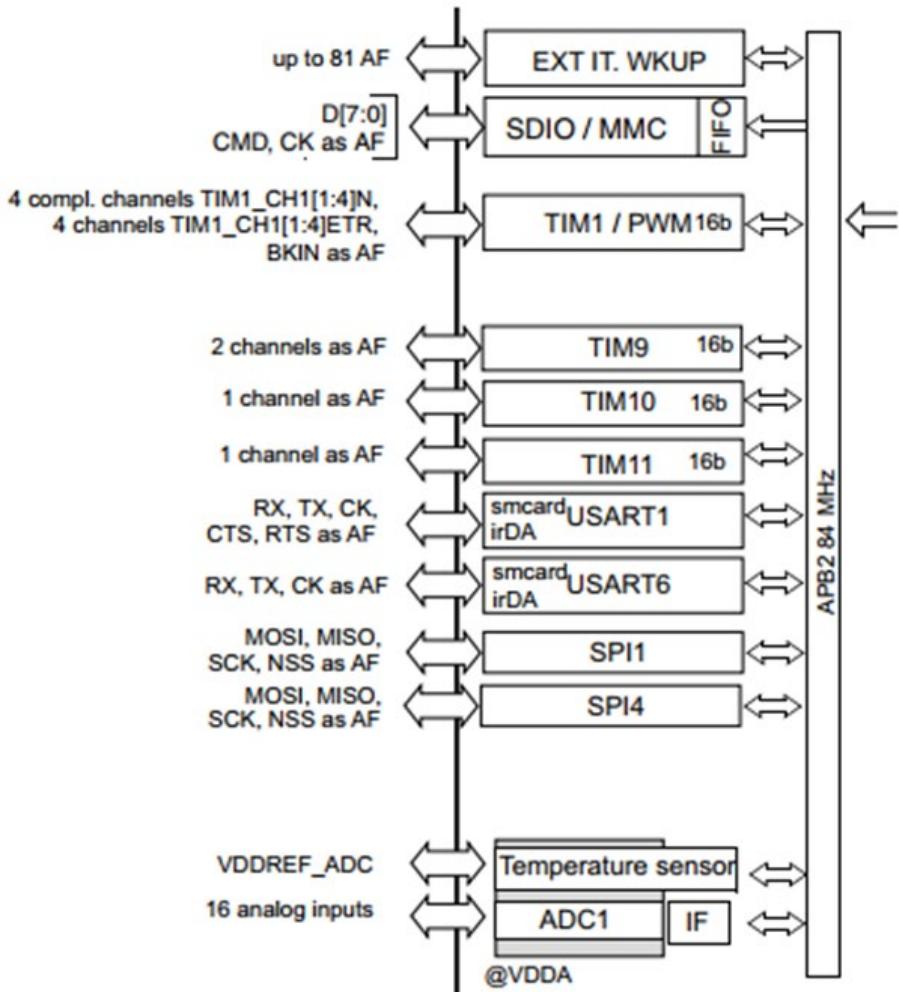
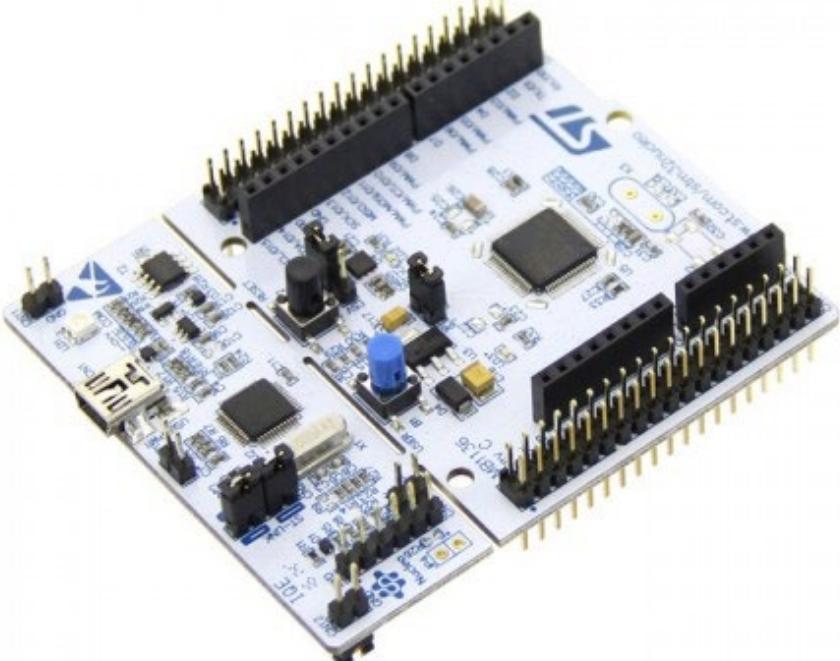
Nucleo-64 STM32F411RE



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Nucleo-64 STM32F411RE

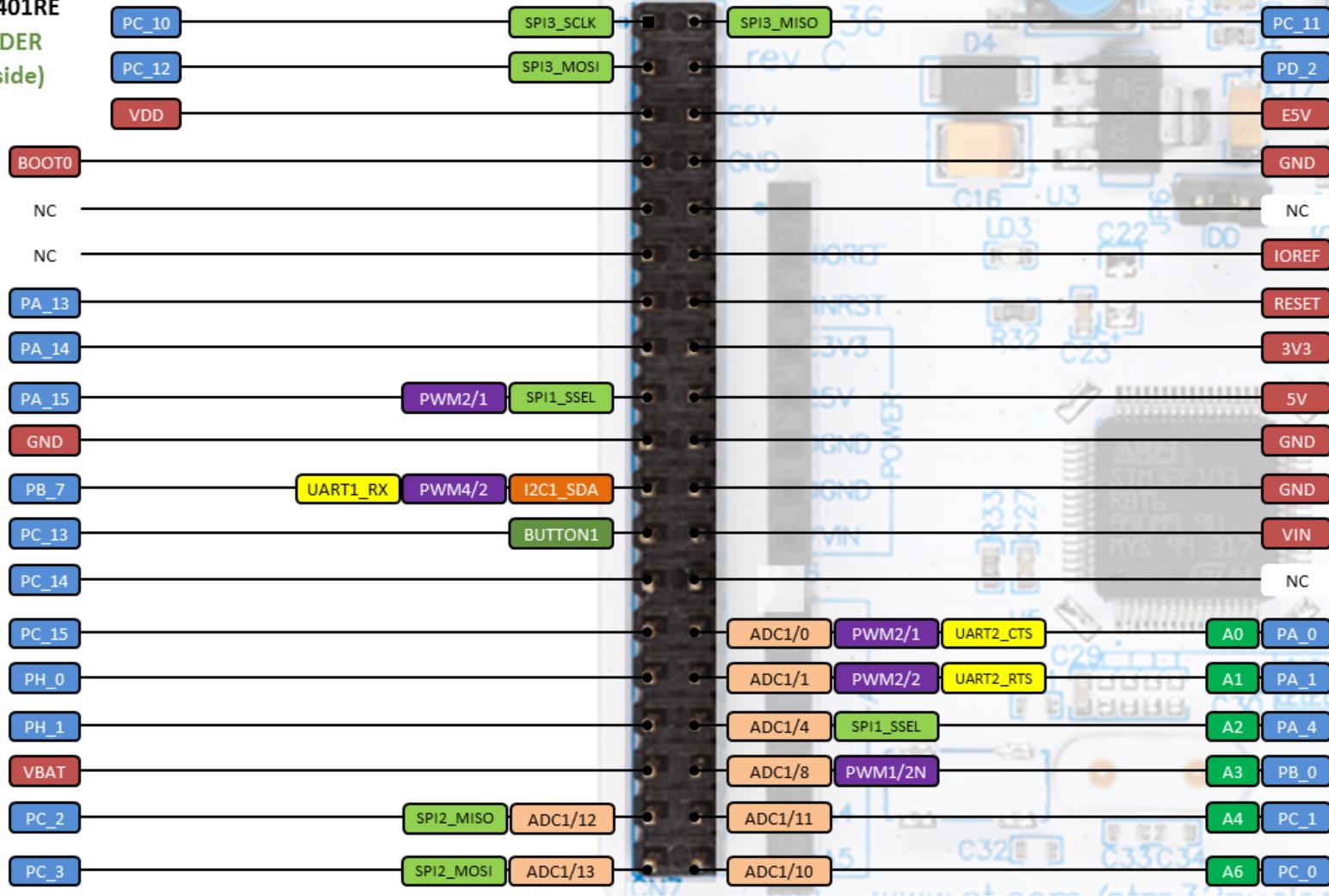




life.augmented

NUCLEO-F401RE

CN7 HEADER
(top left side)



CN7

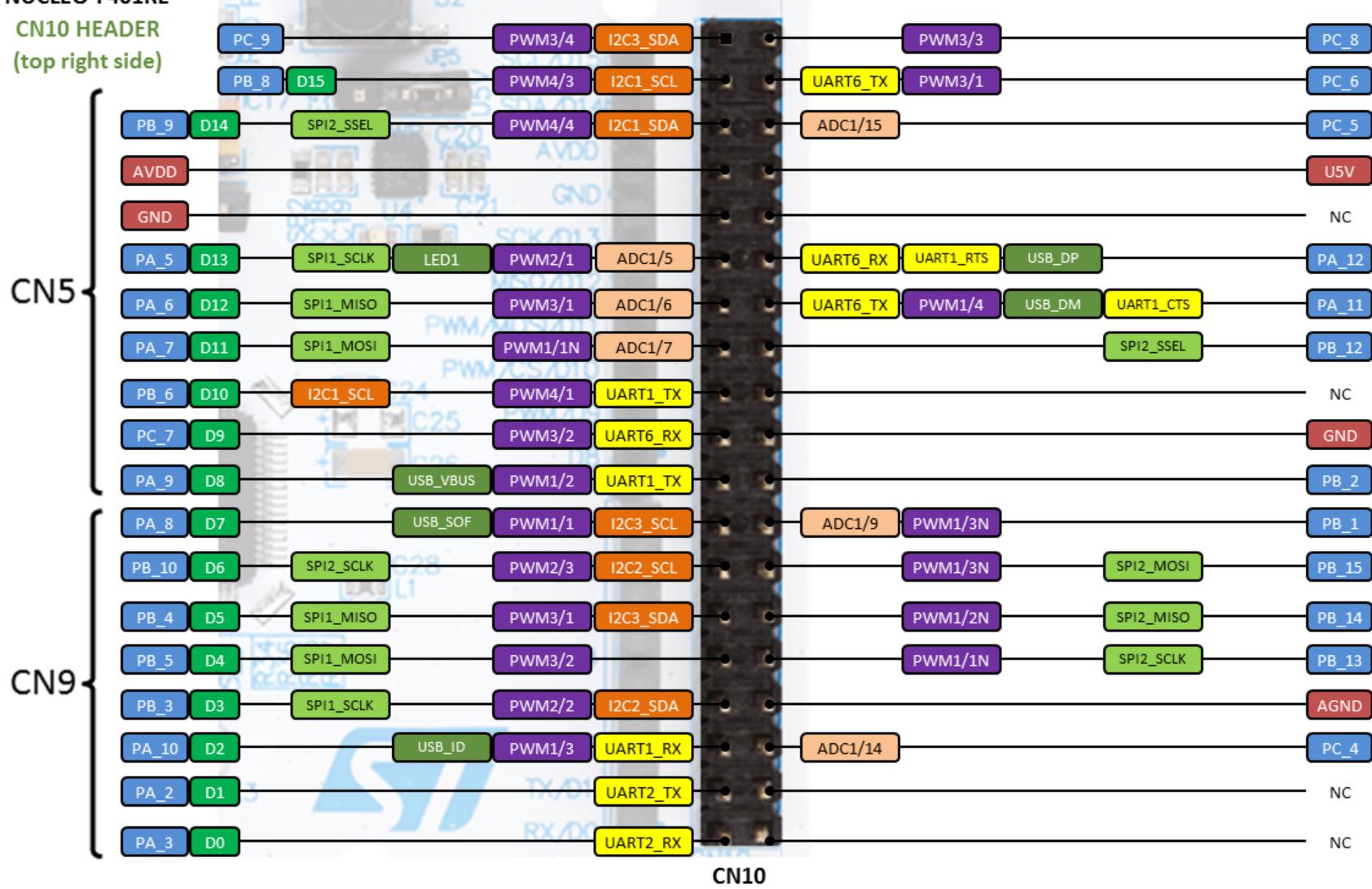


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NUCLEO-F401RE

Morpho Headers

CN10 HEADER
(top right side)



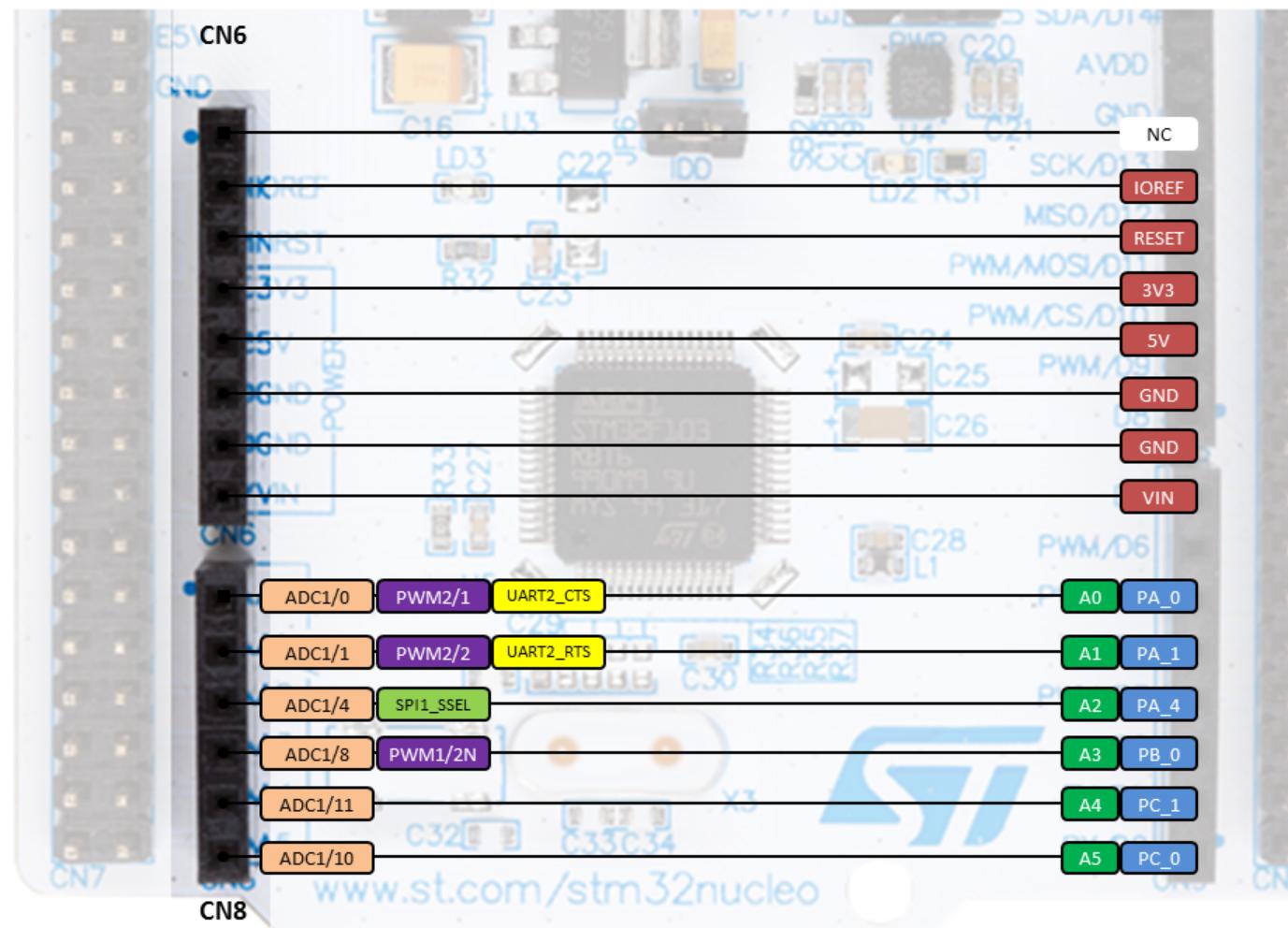


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NUCLEO-F401RE

ARDUINO HEADER
(top left side)

Arduin-compatible headers



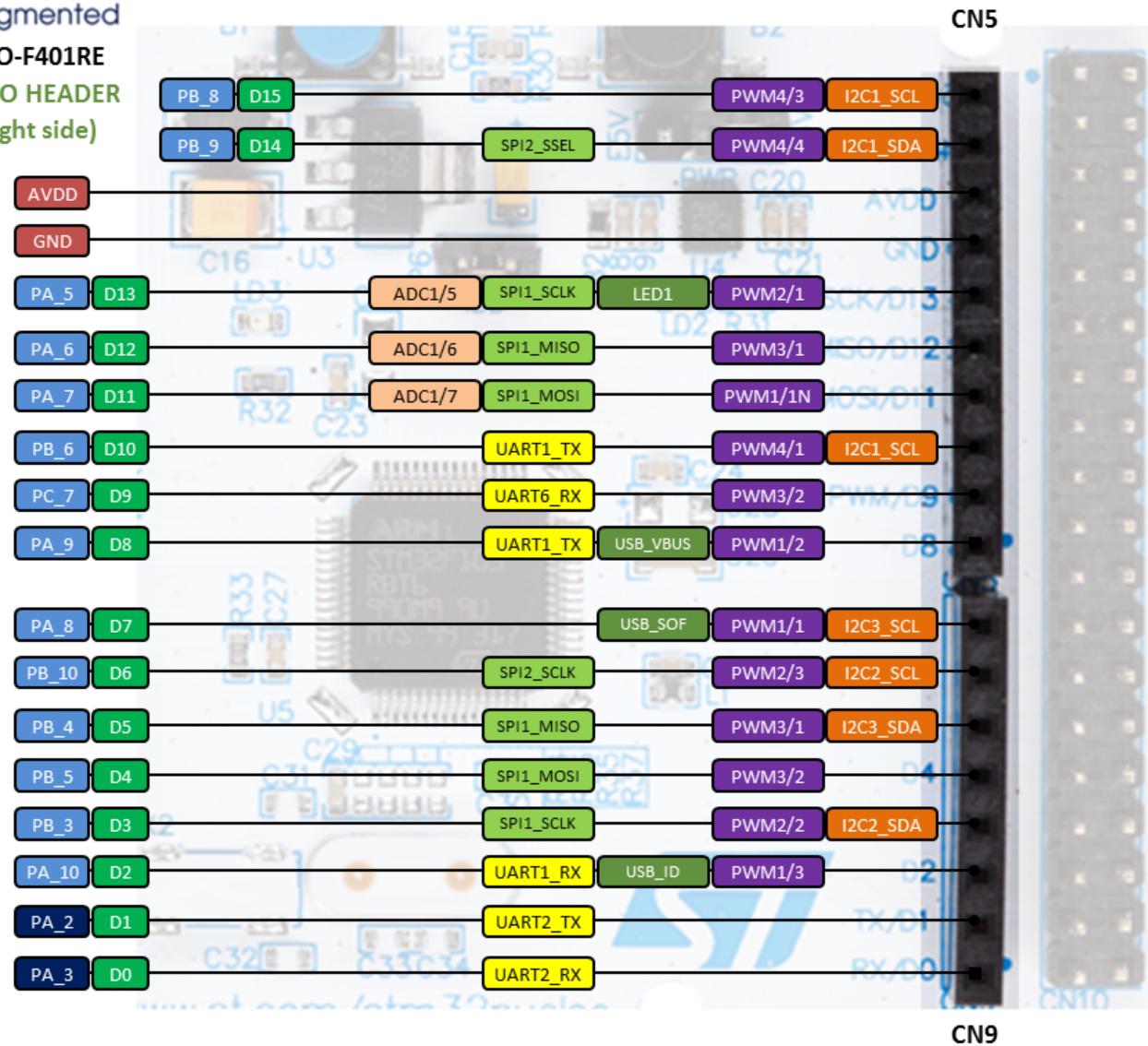


Arduinon-compatible headers

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NUCLEO-F401RE

ARDUINO HEADER
(top right side)



Development Environments



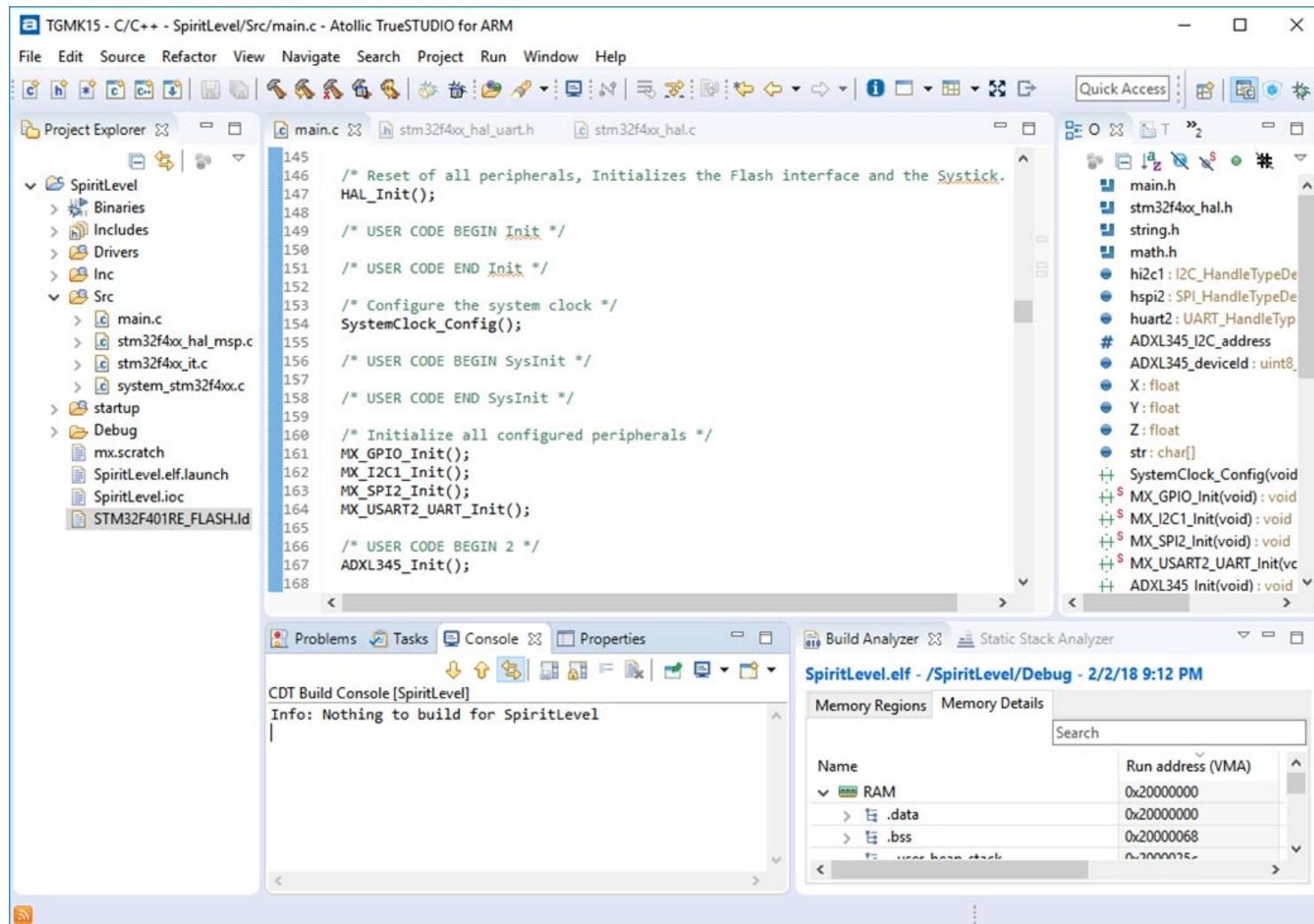
STM32CubeIDE

Speed up the development
and debug of your application

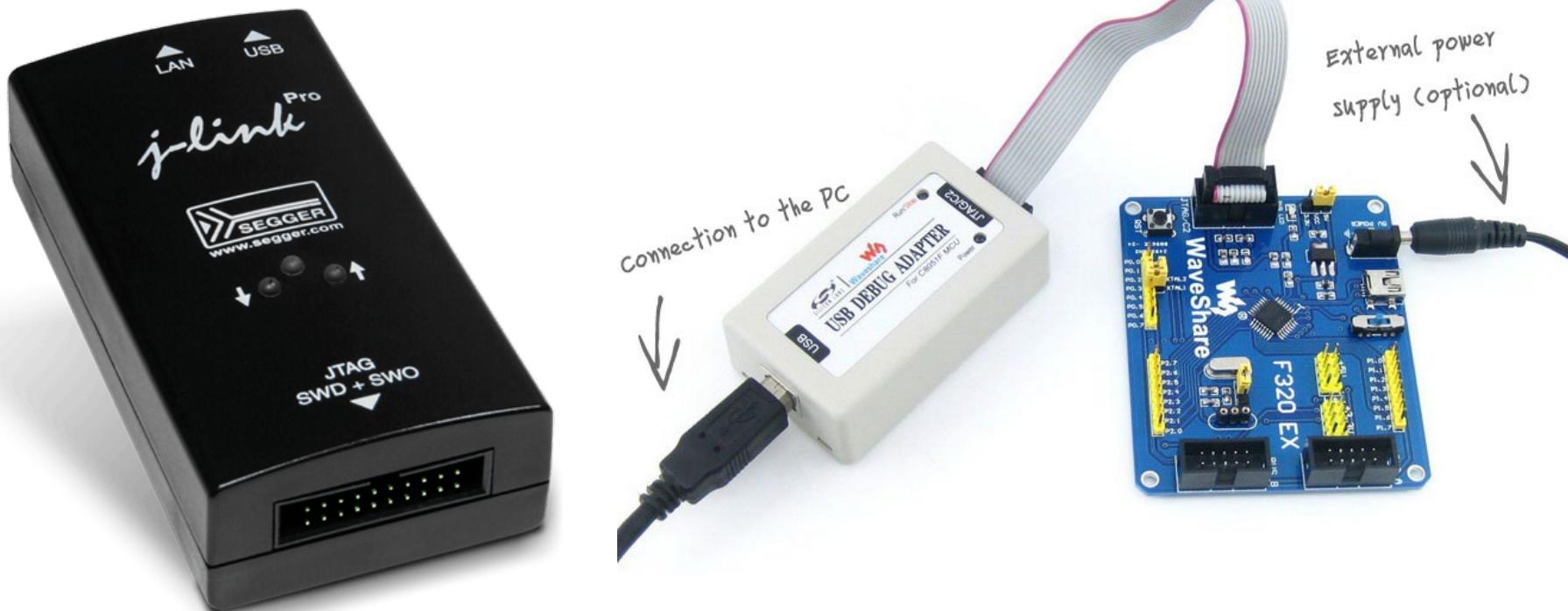


<https://www.st.com/en/development-tools/stm32cubeide.html>

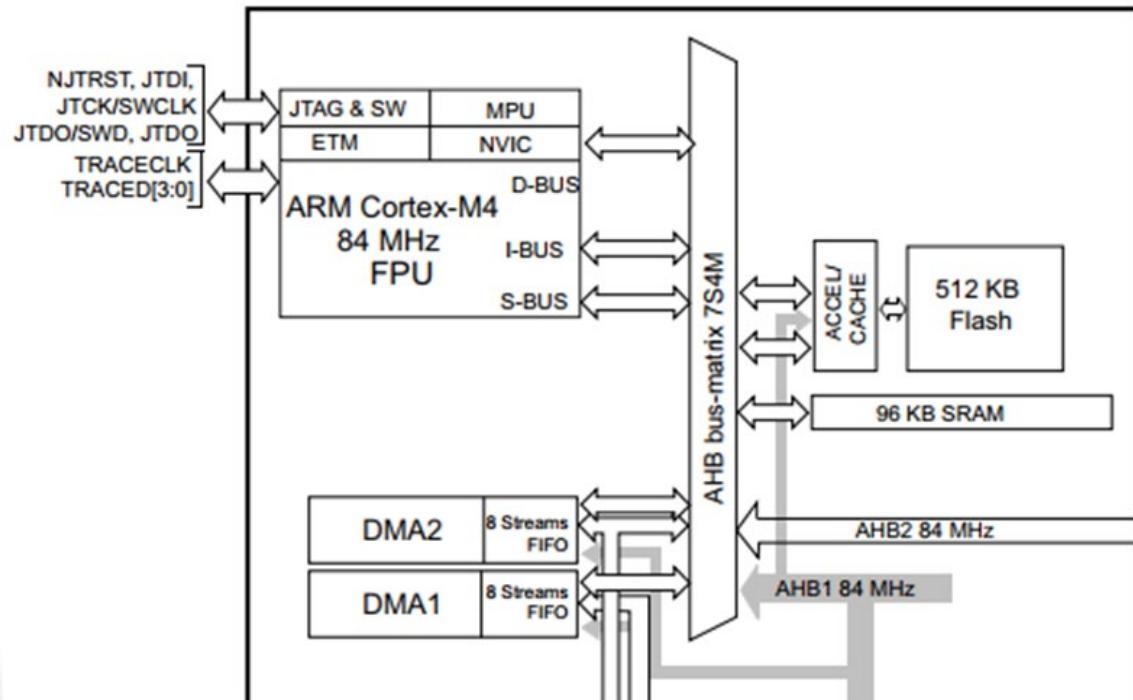
STM32CubeIDE



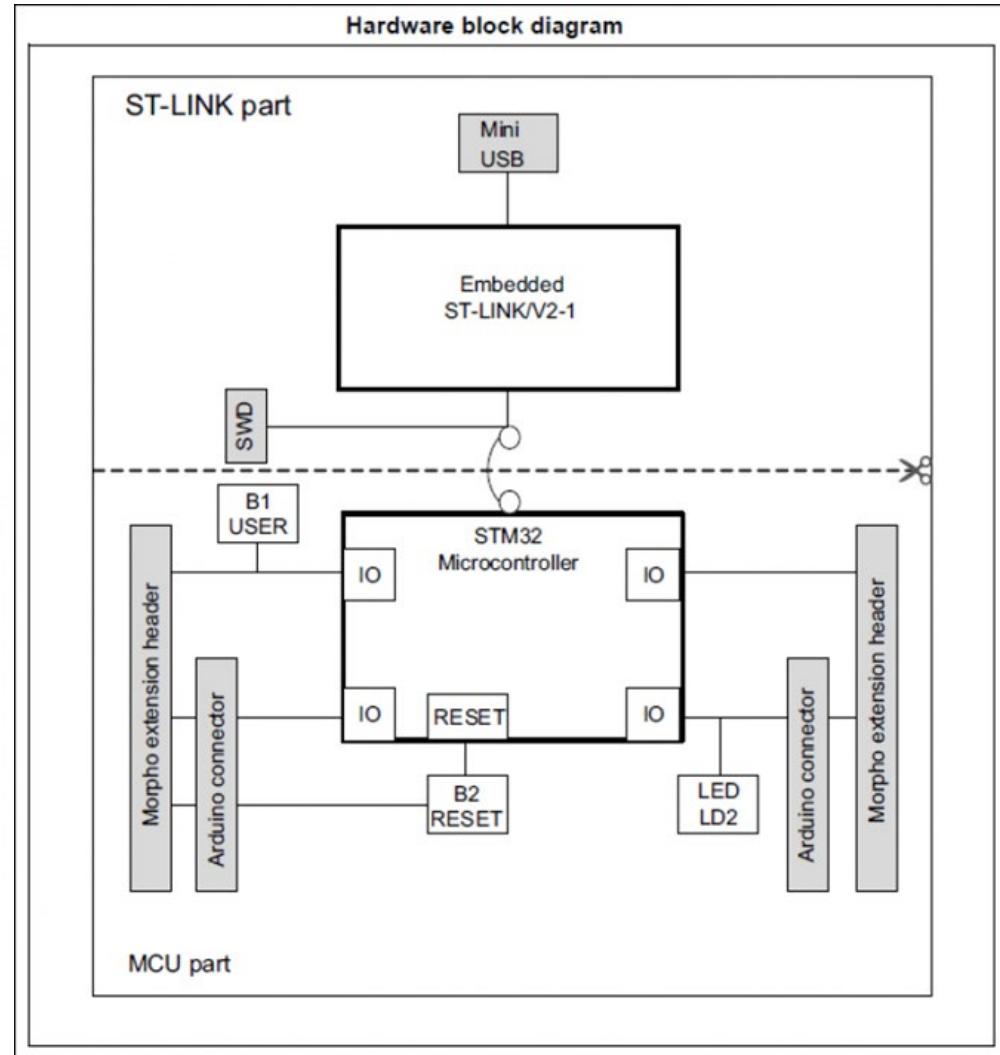
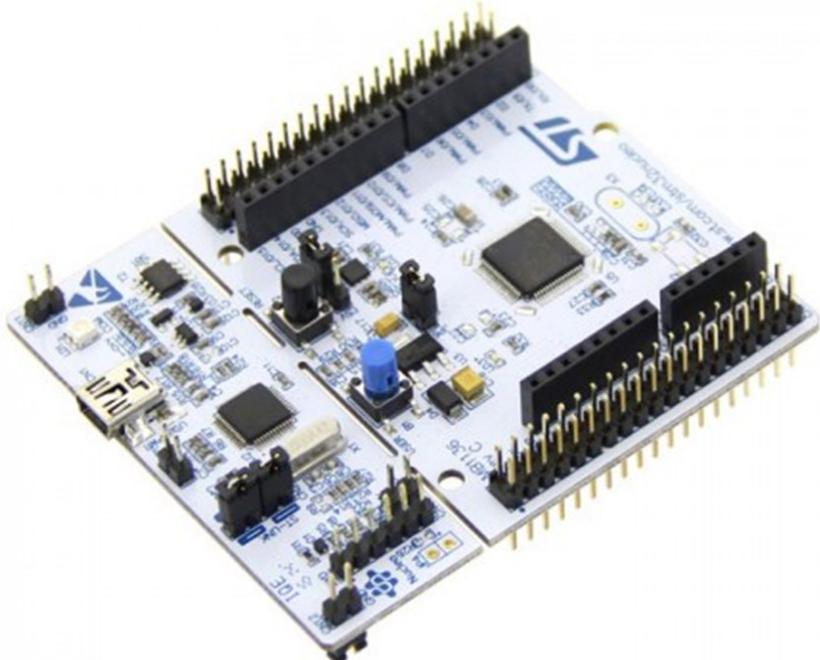
Hardware Debugger



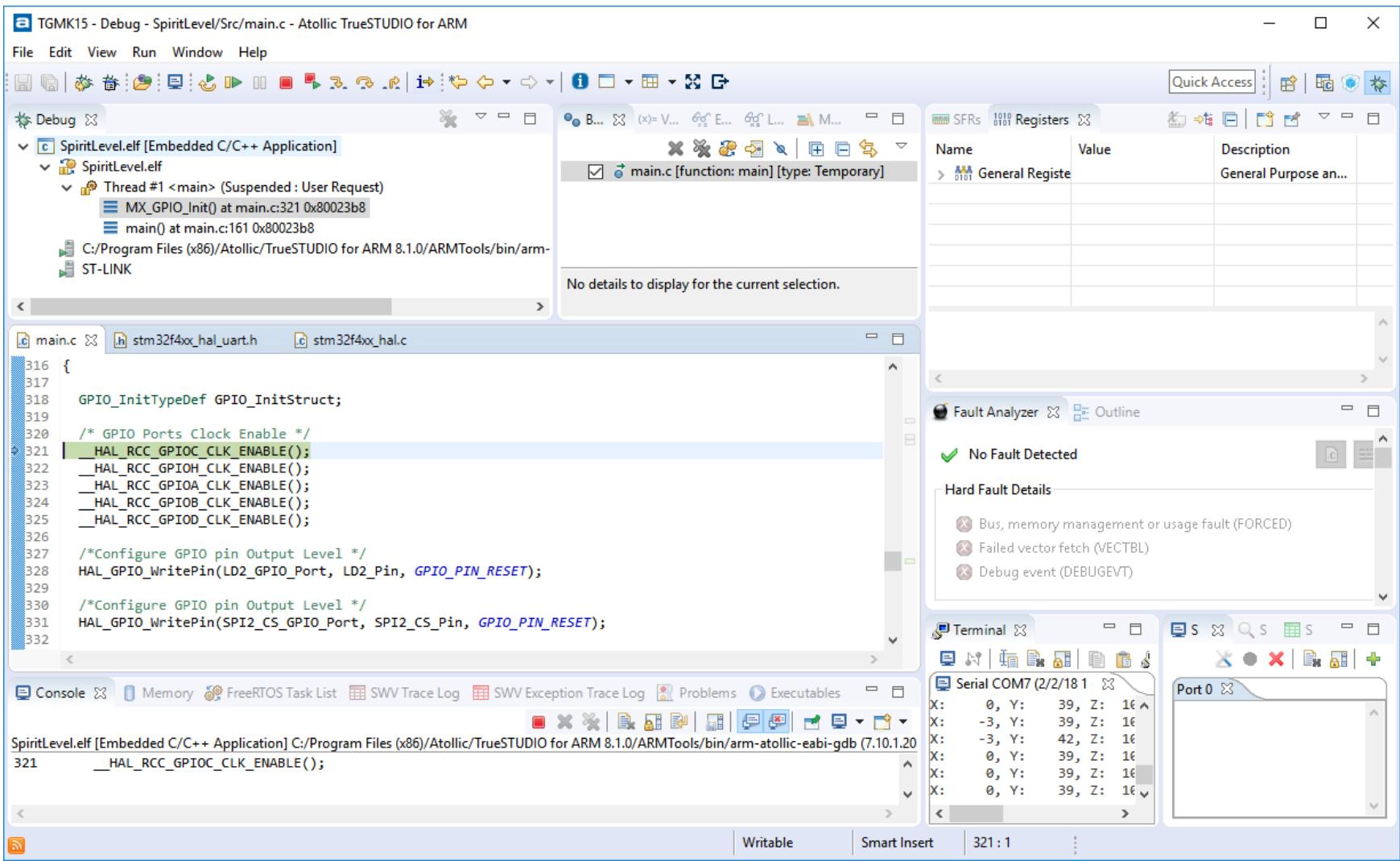
Hardware Debugger



Hardware Debugger – ST-LINK/V2



Software Debugger



Microcomputer Engineering

Questions?

Contact information

Andreas Axelsson

Email: andreas.axelsson@ju.se

Mobile: 0709-467760