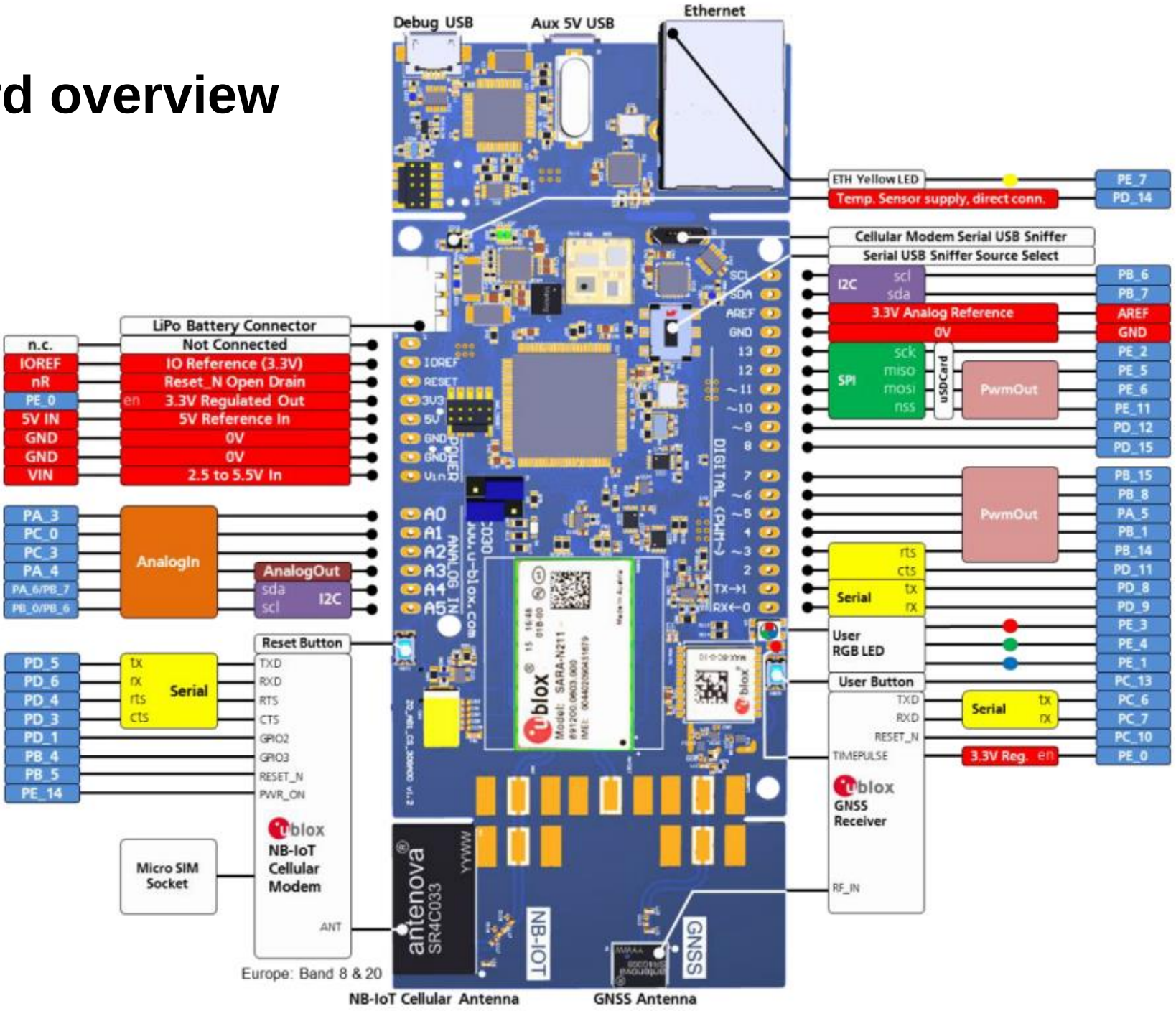
U-blox C030-N211

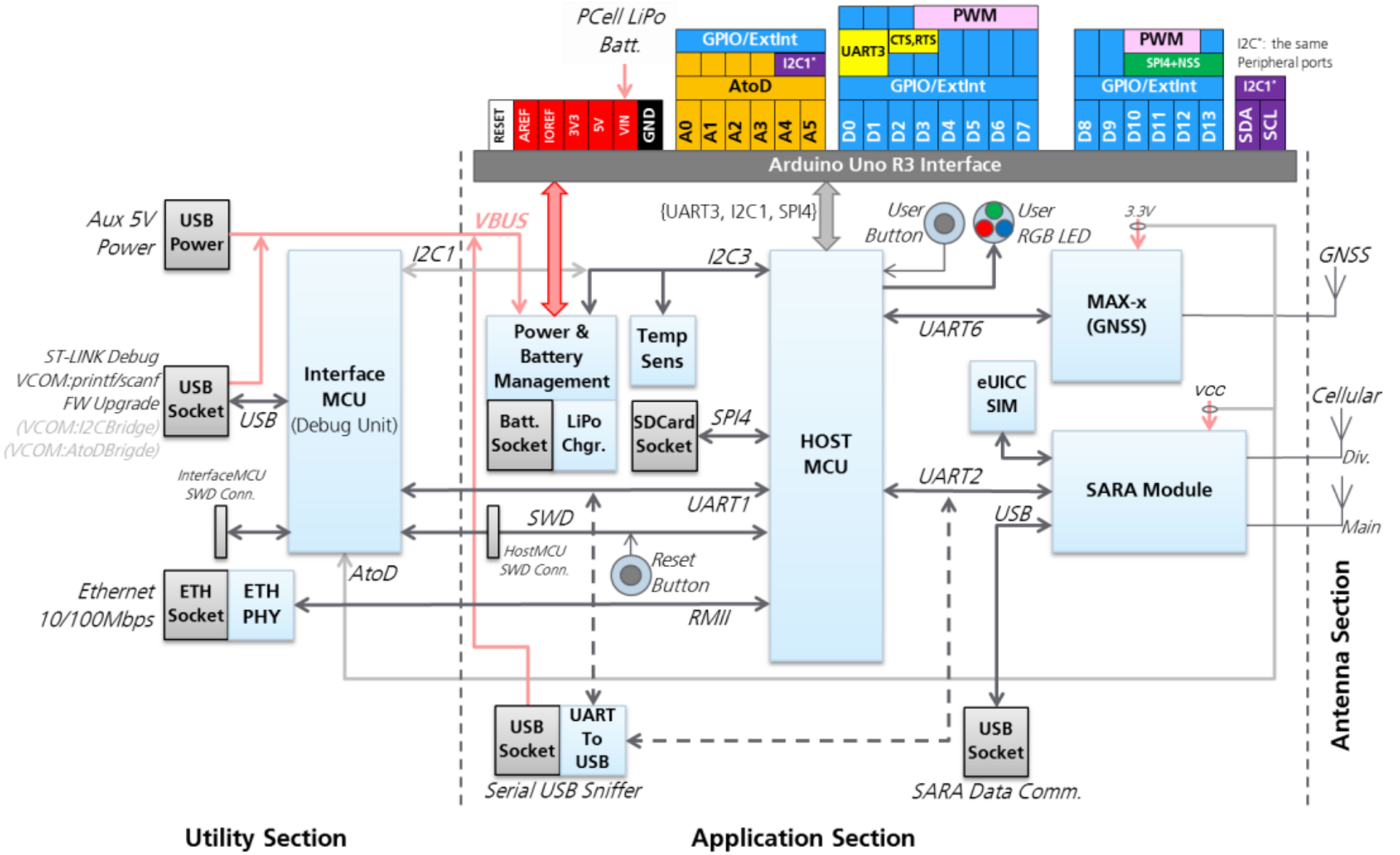
Introduction

- u-blox C030 board is a prototyping solution for IoT applications supporting
  - new LPWAN (low power wide area network) cellular technologies, such as LTE Cat 1, Cat M1, NB-IoT, and existing 2G/3G networks
  - a global navigation satellite system (GNSS) receiver
- Board is powered by an Arm® STM32F437VGT6 Cortex-M4 host MCU with 1 MB FLASH and 256 kB RAM

Board overview



Block diagram



Programming and debugging

- On-board ST-Link/V2-1 debugger/programmer with SWD connector
  - ST-Link/V2-1 standalone development and debug capability
  - USB re-enumeration, Virtual COM port, mass storage device and debug port
- 5V from ST-Link/V2-1 Debug USB VBUS, 3.3V operation

MCU main connections

- ST-Link: USART1 (pins PA9 and PA10)
- MAX-M8 GNSS chip:
  - USART6 (PC6 and PC7)
  - PA15 (sort of enable pin)
- user RGB LEDs: PE3, PE4, PE1
- SARA-N211 modem (we won’t use it for now): USART2 (PD5, PD6, PD3, PD4)

First test with STM32Cube

- In MX
  - MCU: STM32F437VGT6
  - Pinout view: set PE3, PE4 and PE1 to GPIO_Output
- In IDE
  - Run… Debug configurations… Debugger… Debug probe
    - ST-LINK (ST-LINK GDB server)
- First test (as usual): *C030_blinky.c*

GNSS

- In MX
  - MCU selector: STM32F437VGT6
  - System Core… GPIO:
    - PA15: GPIO output
  - Connectivity… USART1 (for printf):
    - Enable
    - Mode: Asynchronous
    - (PA9 and PA10: already connected)
  - Connectivity… USART6 (for GNSS):
    - Enable
    - Mode: Asynchronous
    - Parameter Settings… Baud Rate: 9600
    - (PC6 and PC7: already connected)

GNSS

- In the IDE
  - keep card close to a window
  - Run… Debug configurations… Debugger… Debug probe
    - ST-LINK (ST-LINK GDB server)
  - test *C030_forGNSS*
  - examples of NMEA messages:
    - $GPGGA: 1st param. is time, 2nd-3rd is latitude, 3th-4th is longitude, 9th is altitude (m)
    - $GPGLL: 1st-2nd param. is latitude, 3rd-4th is longitude, 5th param. is time
    - $GPVTG: 7th param. is speed (km/h)
    - $GPGSV: 4th param. is number of satellites in view

HSE (high speed external) clock source

- An external 12 MHz quartz is available
- In MX, to use it:
  - Pinout… System Core…RCC
    - HSE: Crystal/Ceramic Resonator
  - Clock configuration
    - Input frequency: 12 MHz
    - System Clock Mux: HSE