

Distribution Training

# Platypus

## the nPLC gateway to IoT

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Foundation Software



# Company



## Core business activities

- engineering and consulting services for embedded: compilers, operating systems, and performance optimisations
- contract development of embedded system solutions
- development and licensing of runtime solutions, management platforms and board-level products for connected devices in identification, telemetry and telematics applications

# Platypus interfaces



## Flexible IO interfaces

- USB2.0 RNDIS Ethernet adapter
  - connecting nPLC to the Internet
  - can be used to power the device
- 0 - 10V DC
  - light dimming
  - ...
- RS 458
  - bridging and endpoint
  - DMX lighting control
  - up-to 1M BAUD
- 2 GPIO PINS (adc, in, out)

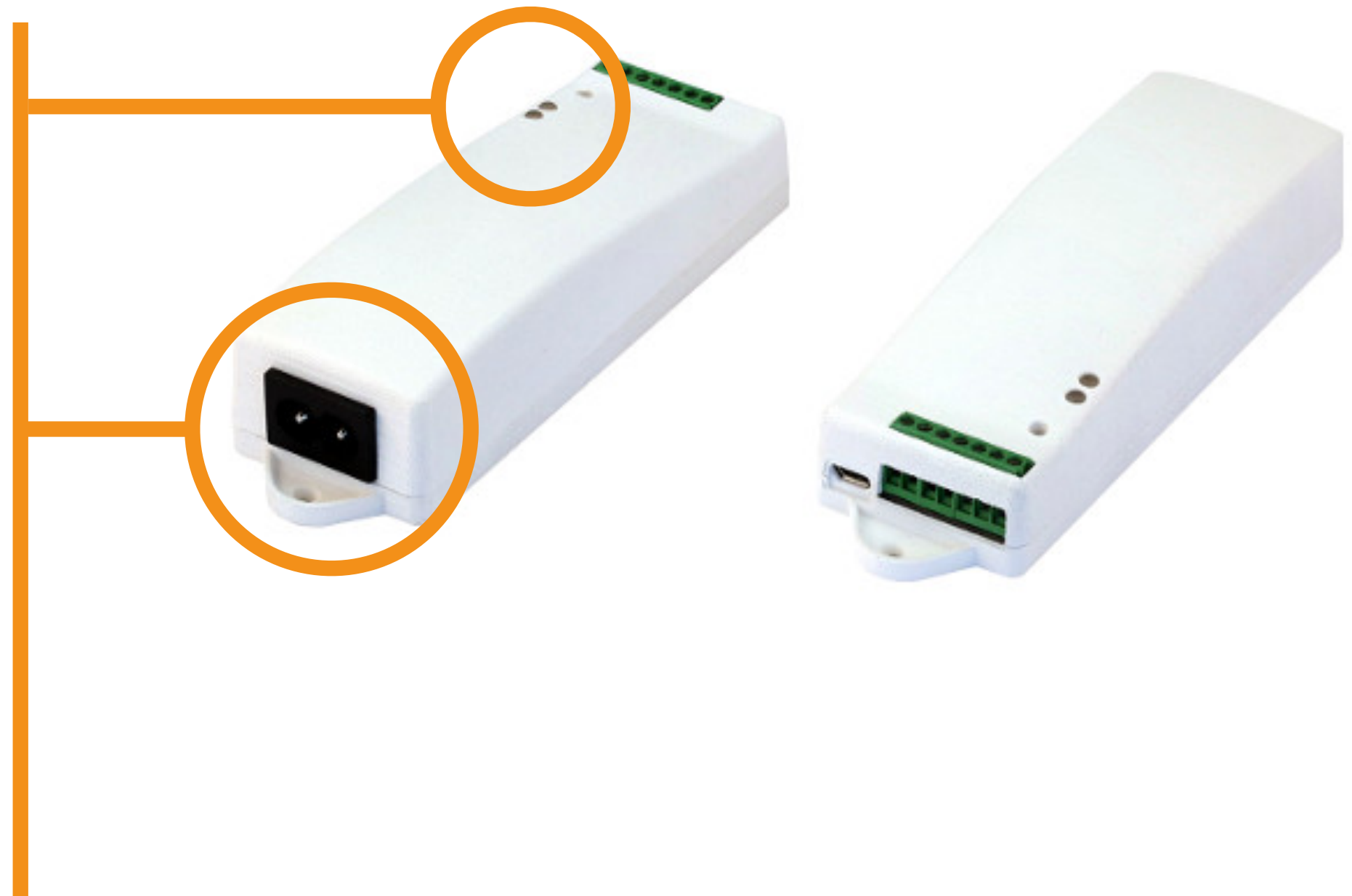
# Platypus interfaces

## Two 3-Color LED displaying

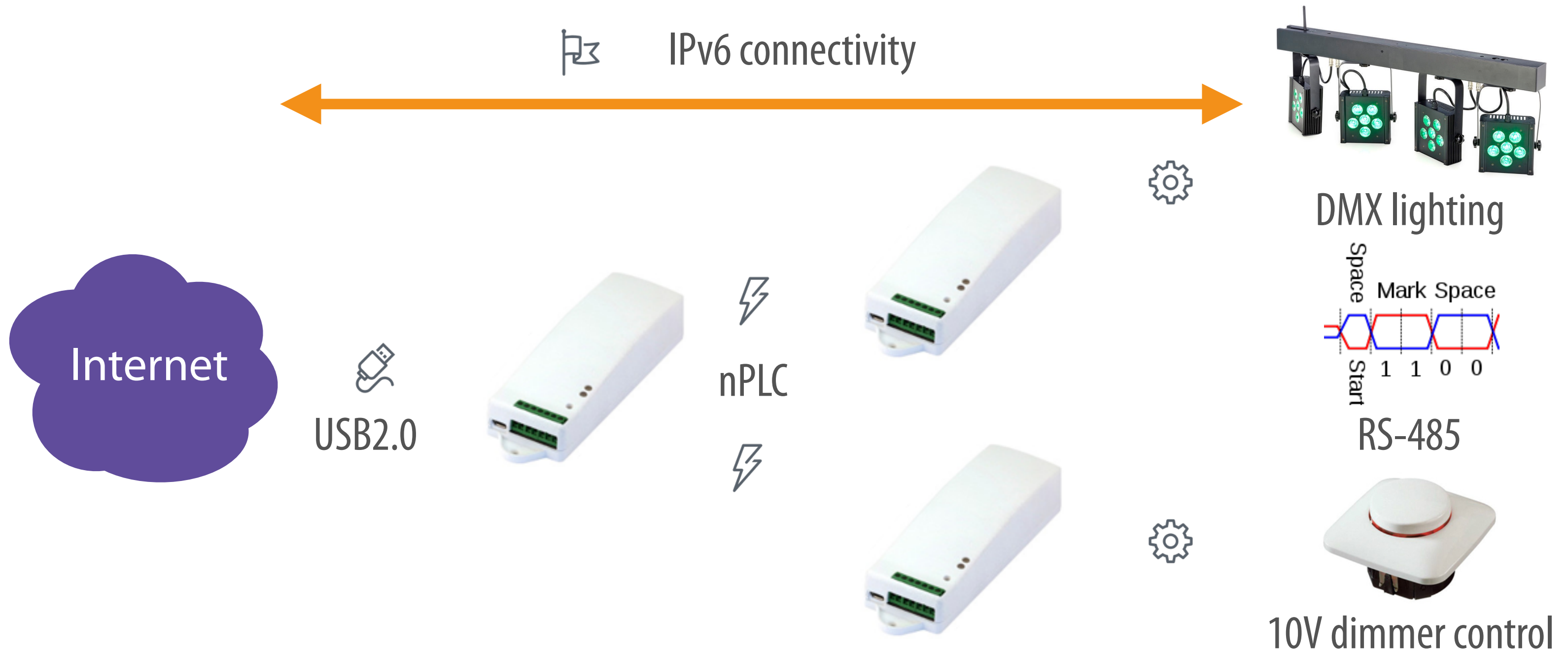
- nPLC connection status
- Platypus device status
- nPLC activity

## 100 - 240V AC

- powers the device
- analog power amp for nPLC transceiver
- analog output filter stages to ensure CELENEC B,C compliance
- analog input filter stages for noise reduction



# Platypus connects the things



# Platypus bridges the gaps

IPv6 connectivity



USB2.0



nPLC

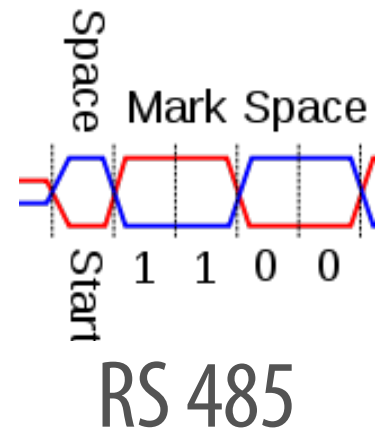


USB2.0

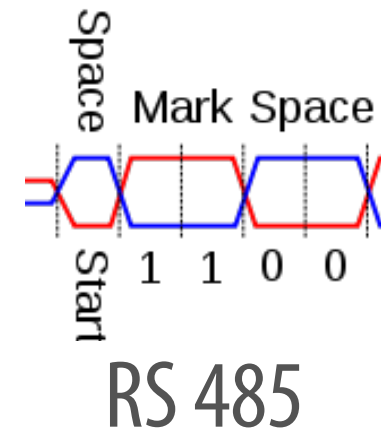


# Platypus stands alone

RS485 bridge



nPLC



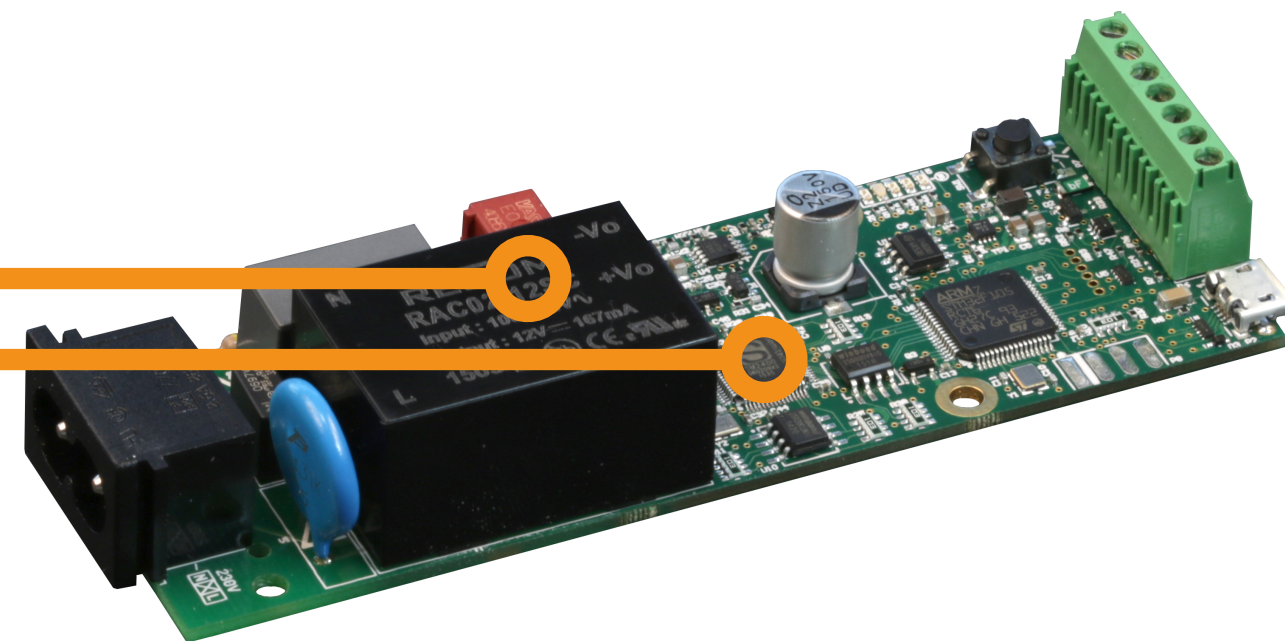
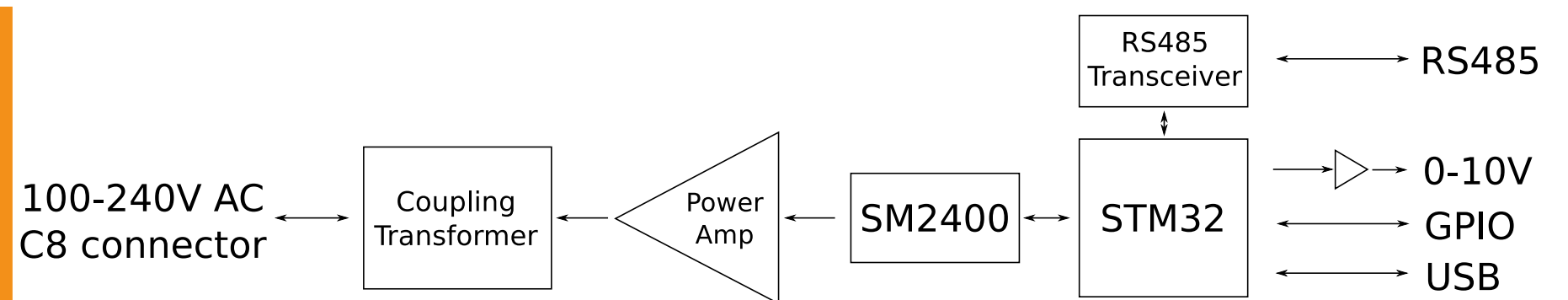
# Platypus hardware

## High Voltage Area

- power supply
- power amplifier
- coupling transformer

## Semitech SM2400 nPLC MAC

- OFDM modulation
- CSMA/CA
- encryption
- 6LoWPAN
- mesh routing
- fragmentation





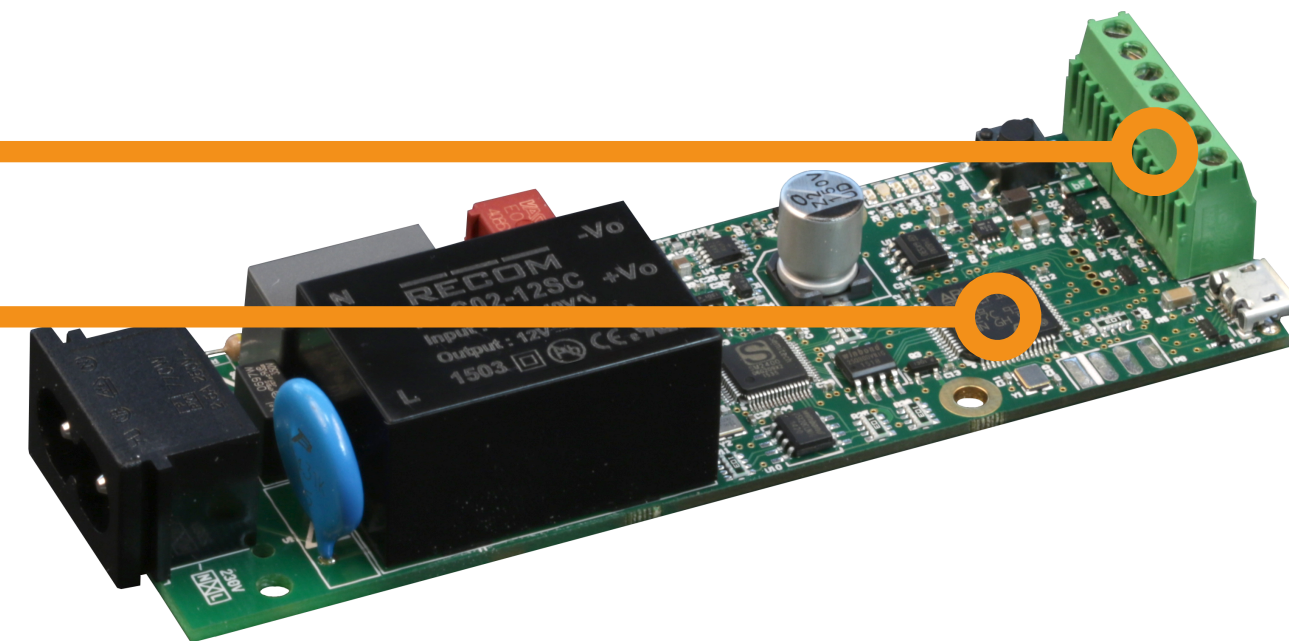
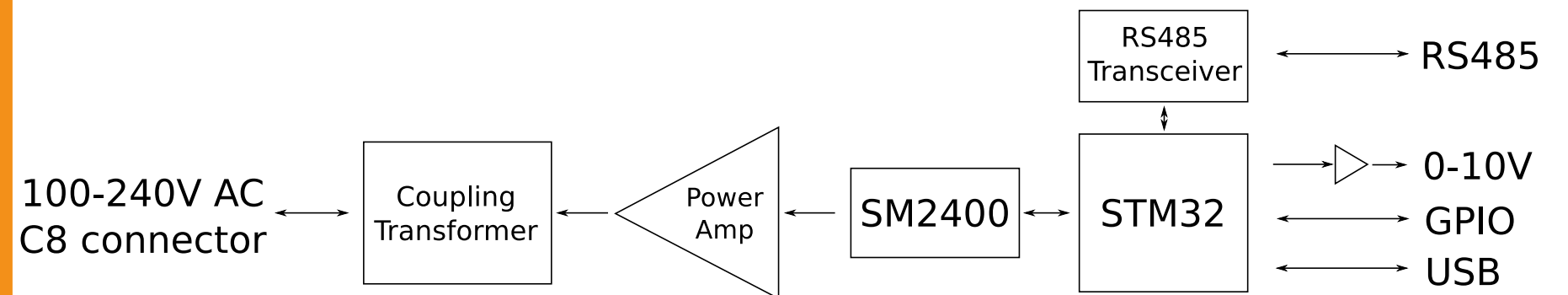
# Platypus hardware

## Flexible Management on STM32

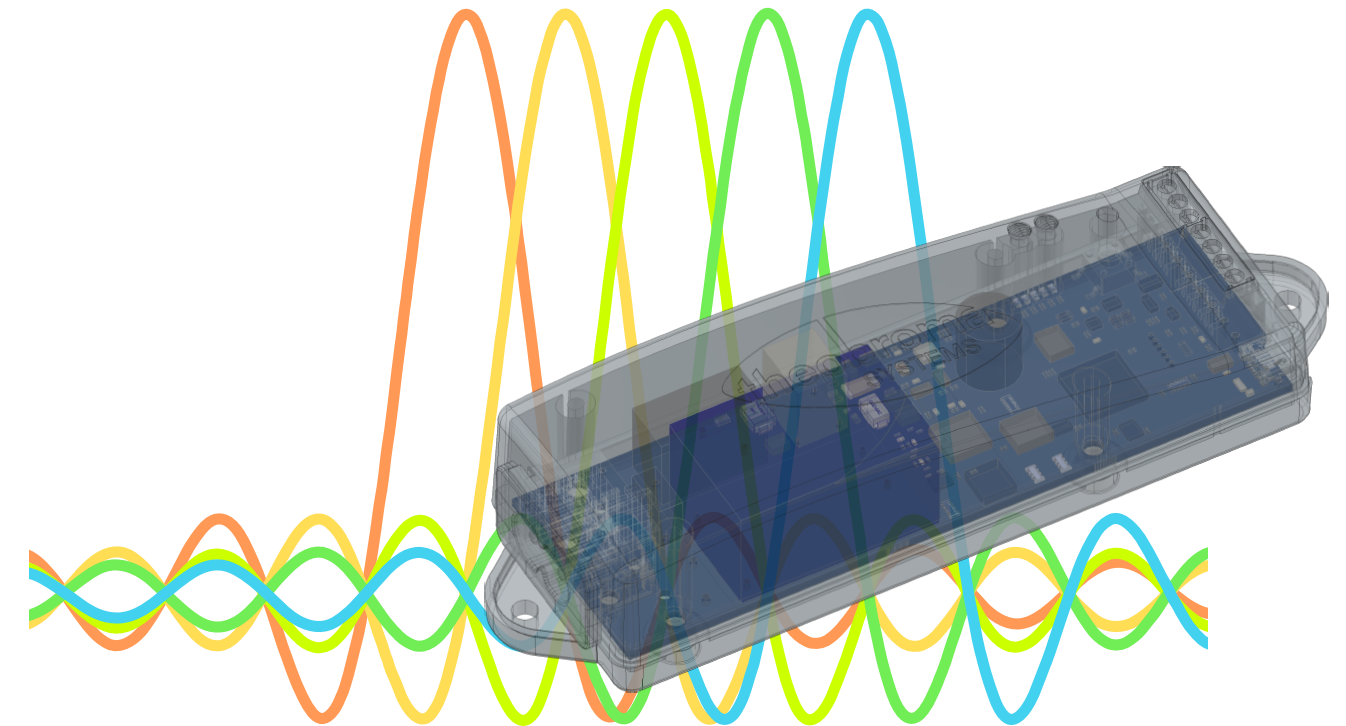
- ARM Cortex M3
- 64 kB embedded SRAM
- 128 kB embedded Flash
- integrated USB 2.0 PHY
- 8 MBit external NAND Flash
- external RS-485 driver
- flexible RIOT OS Based firmware

## IO Connector

- USB Jack
- 0-10V DAC
- RS-485
- GPIO



# Platypus compliancies

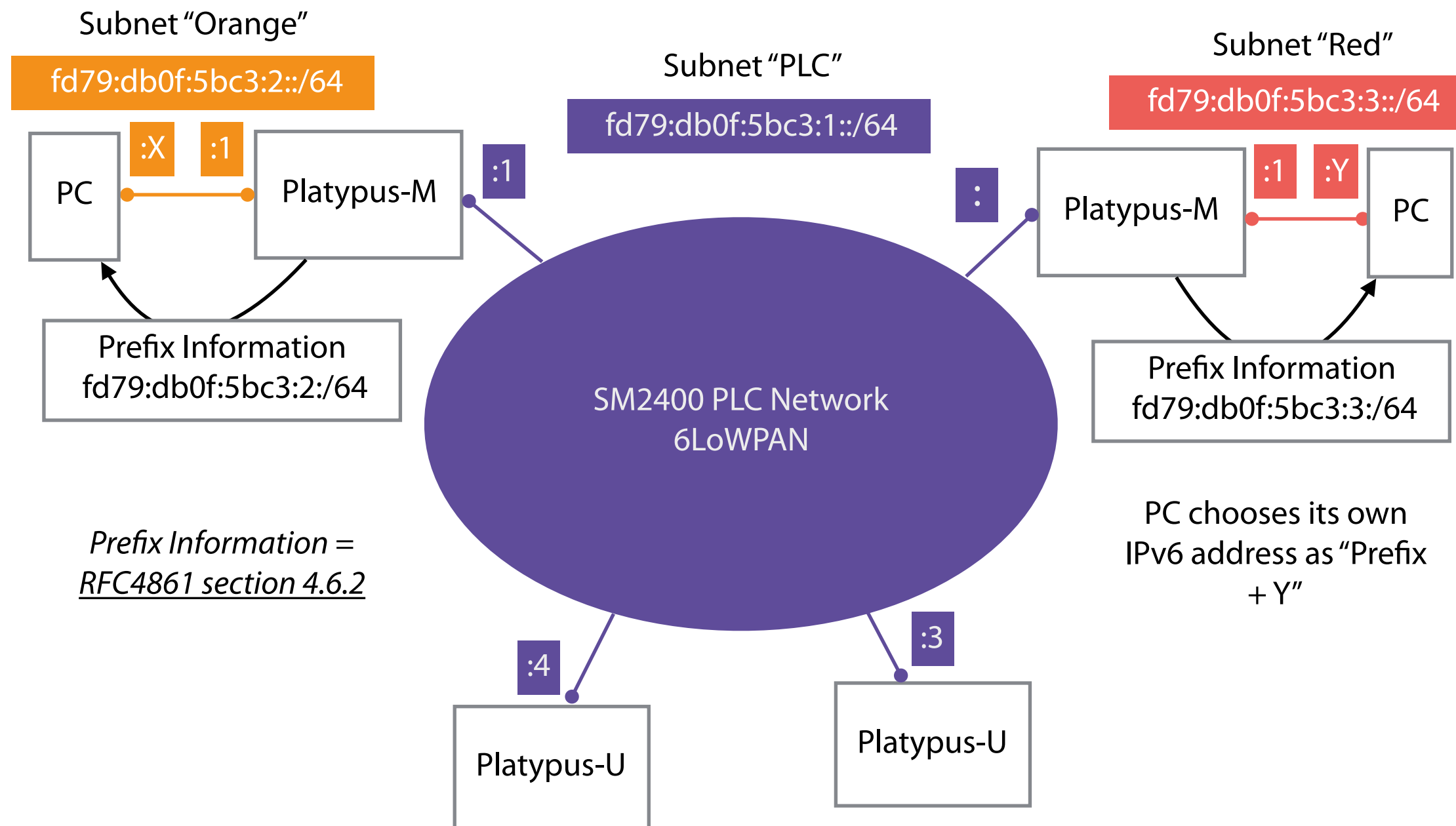


- CENELEC compliant
  - B, C
- OFDM modulation compliant with G3-PLC
- adaptive differential and coherent modulations:
  - BPSK
  - QPSK
  - 8PSK
  - 16QAM

- USB 2.0
  - RNDIS USB class
  - Windows, MAC, Linux, ...
- Plug & Play - IPv6 compliant router
- router advertisements, ICMPv6, ...

# Platypus network topology

## Platypus IPv6 Router

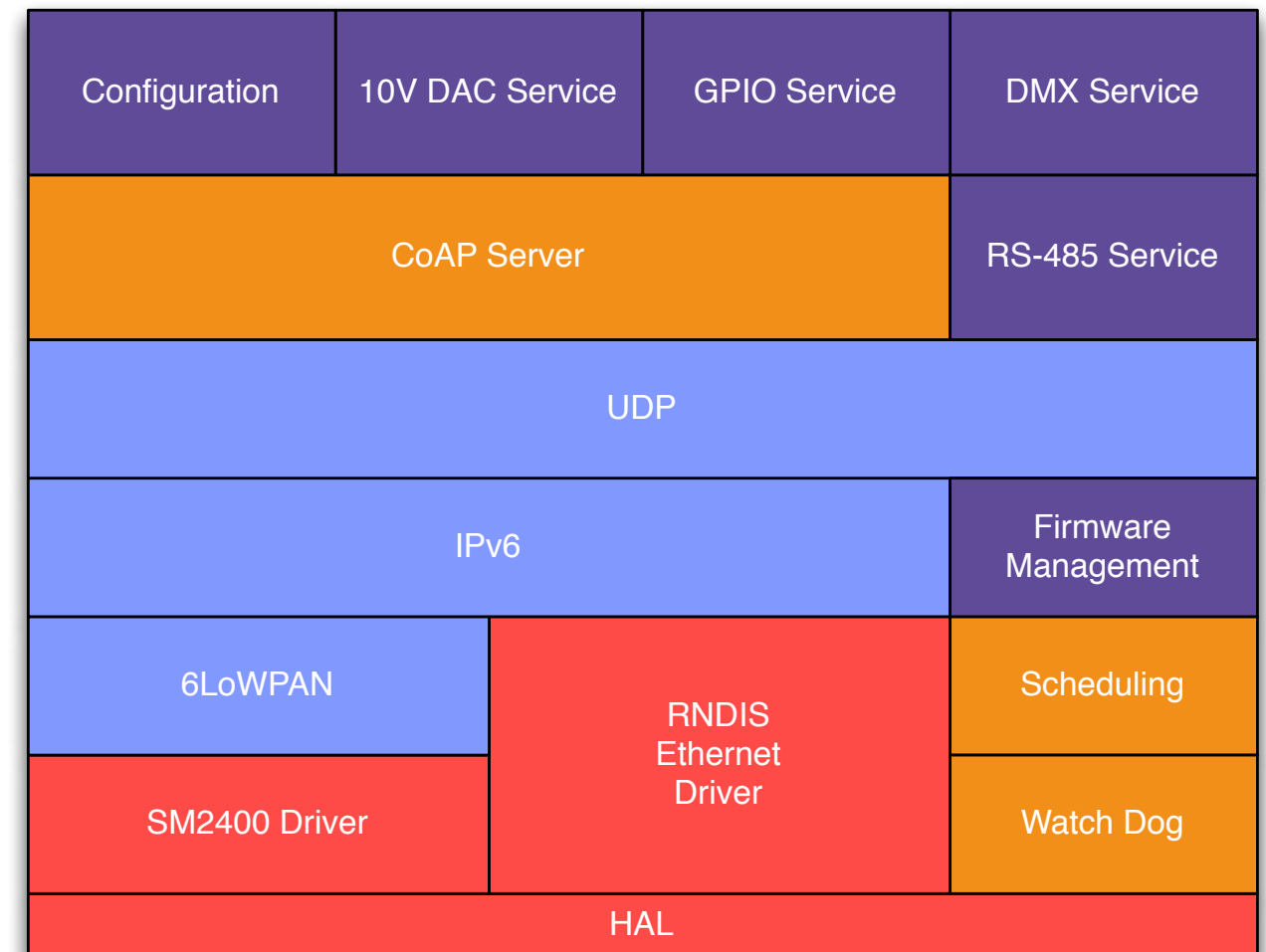


# Platypus firmware



## Flexible RIOT OS based firmware

- RIOT OS HAL
- peripheral drivers
- network driver
  - Semitech SM2400 driver
  - RNDIS Ethernet driver
- IPv6 stack including
  - ICMPv6, UDP/IPv6, 6LoWPAN
- management thread
- CoAP server



# Platypus firmware



## RIOT OS addons

- STM32F105 Connectivity Line CPU support
- Platypus BSP
- USB Device Driver
- SM2400 Driver
- RFC 4191 Route Information support
- Driver improvements (eg. DMA for UART)

