OpenCellular

Open-source Access Platform

Kashif Ali /
Emily McMilin
Facebook

Why yet another BTS?

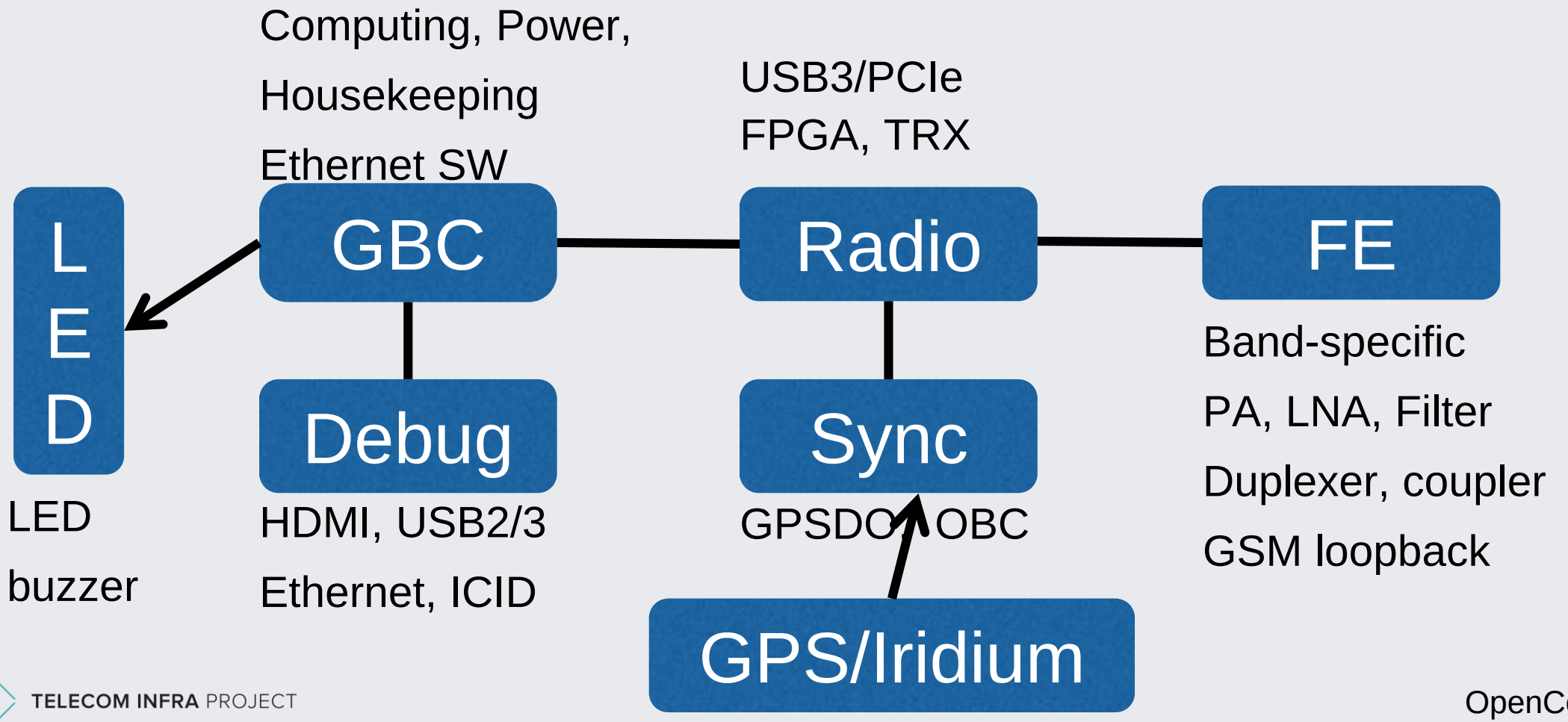
- Population density – small clusters, spread across large area
- The direct “cost” of a BTS is a manageable portion of a traditional site budget. (power, tower, land, backhaul, security, operation/management)
- Open-source hardware – enabling integrated solution and open ecosystem. (work have just started …)

Architecture

OC Gen-1: simplified block diagram

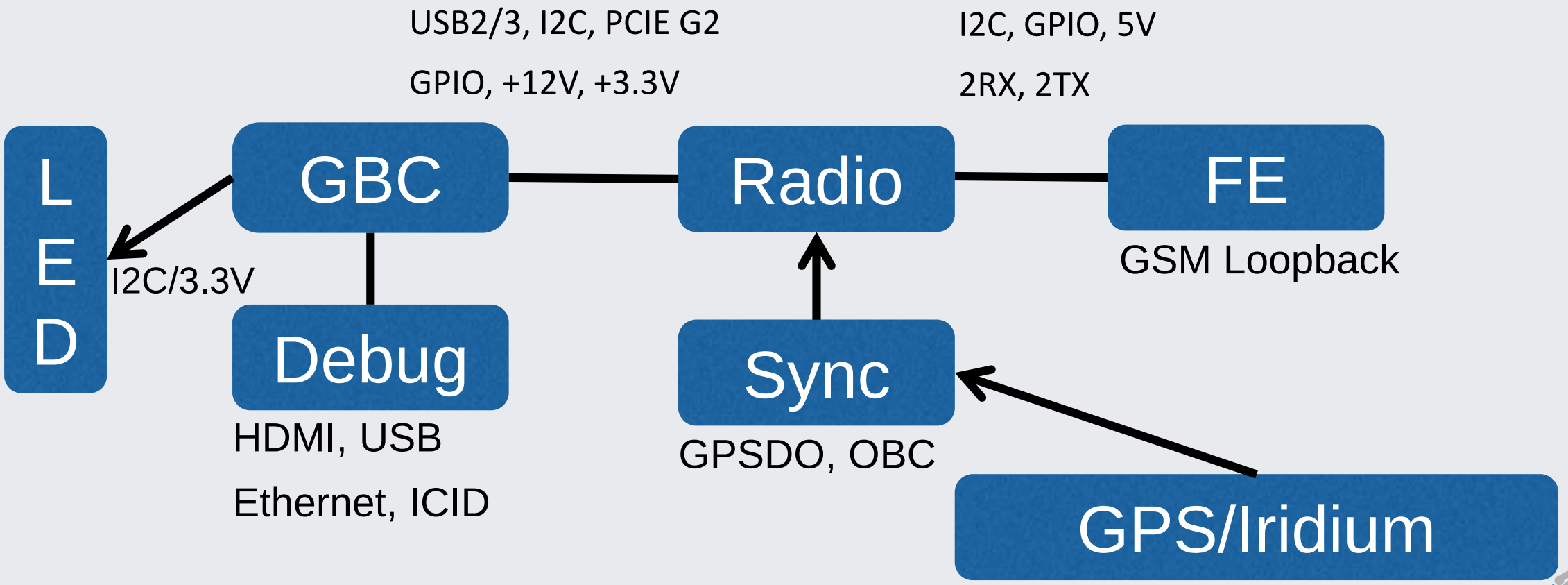
Architecture

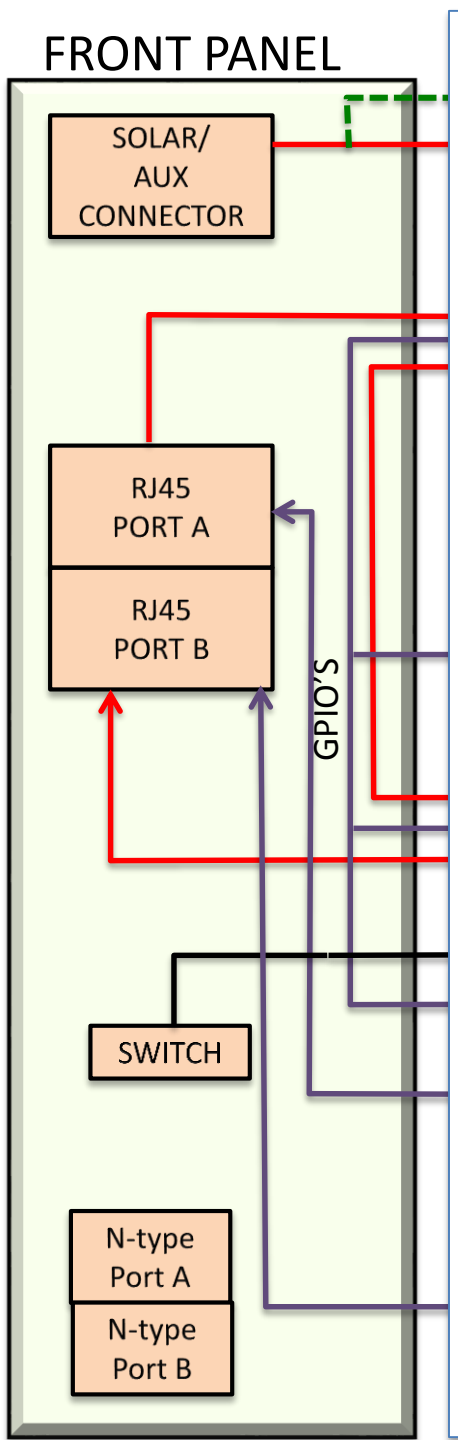
OC Gen-1:block diagram



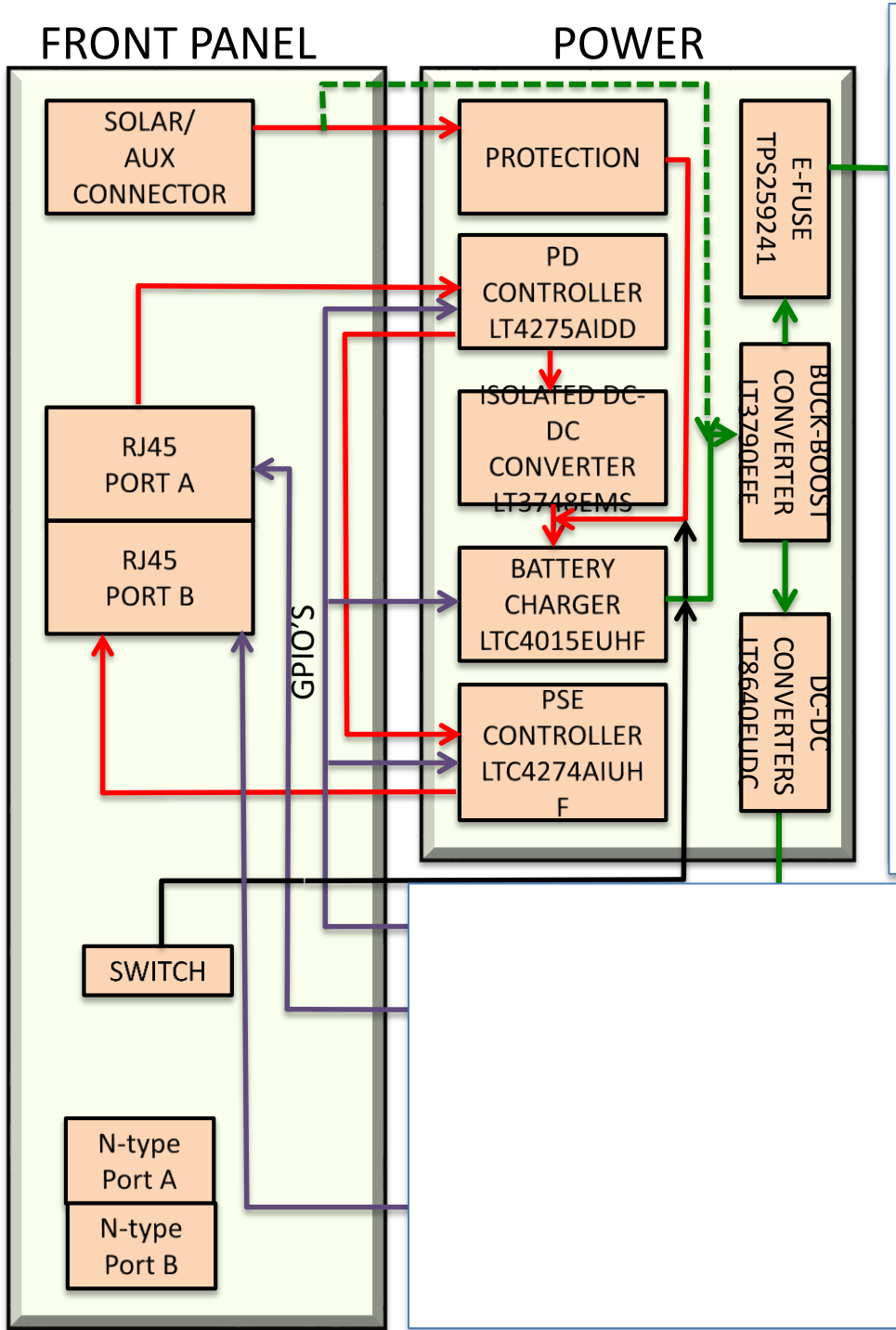
Architecture

OC Gen-1: Interfaces



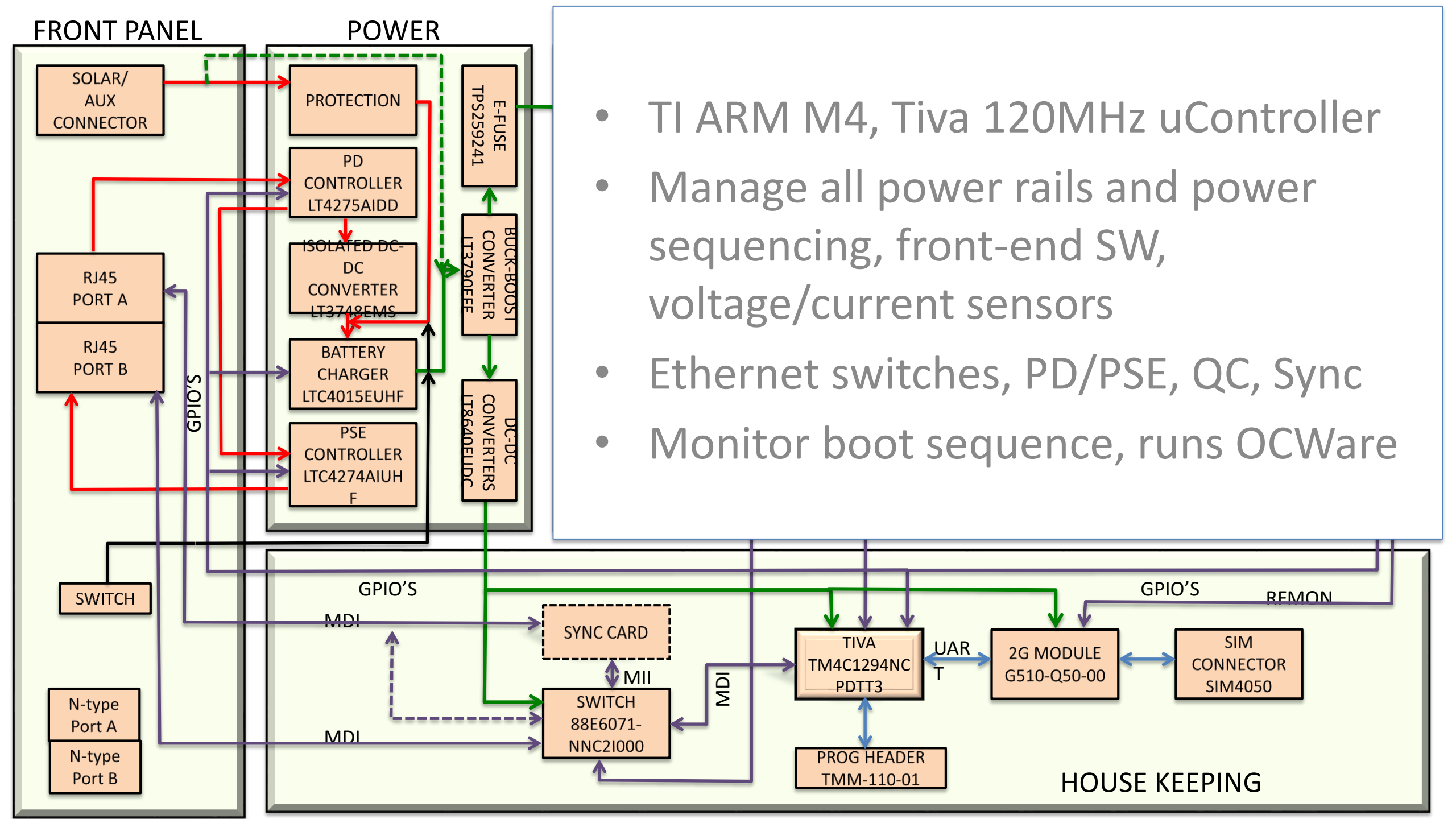


- DC input: 16-24VDC
- PoE: PD
  (IEEE 802.3at/af/PoE++/Passive PoE)
- PoE: PSE (max. 20W)
- Main power switch
- 2x N-type (two TRX)

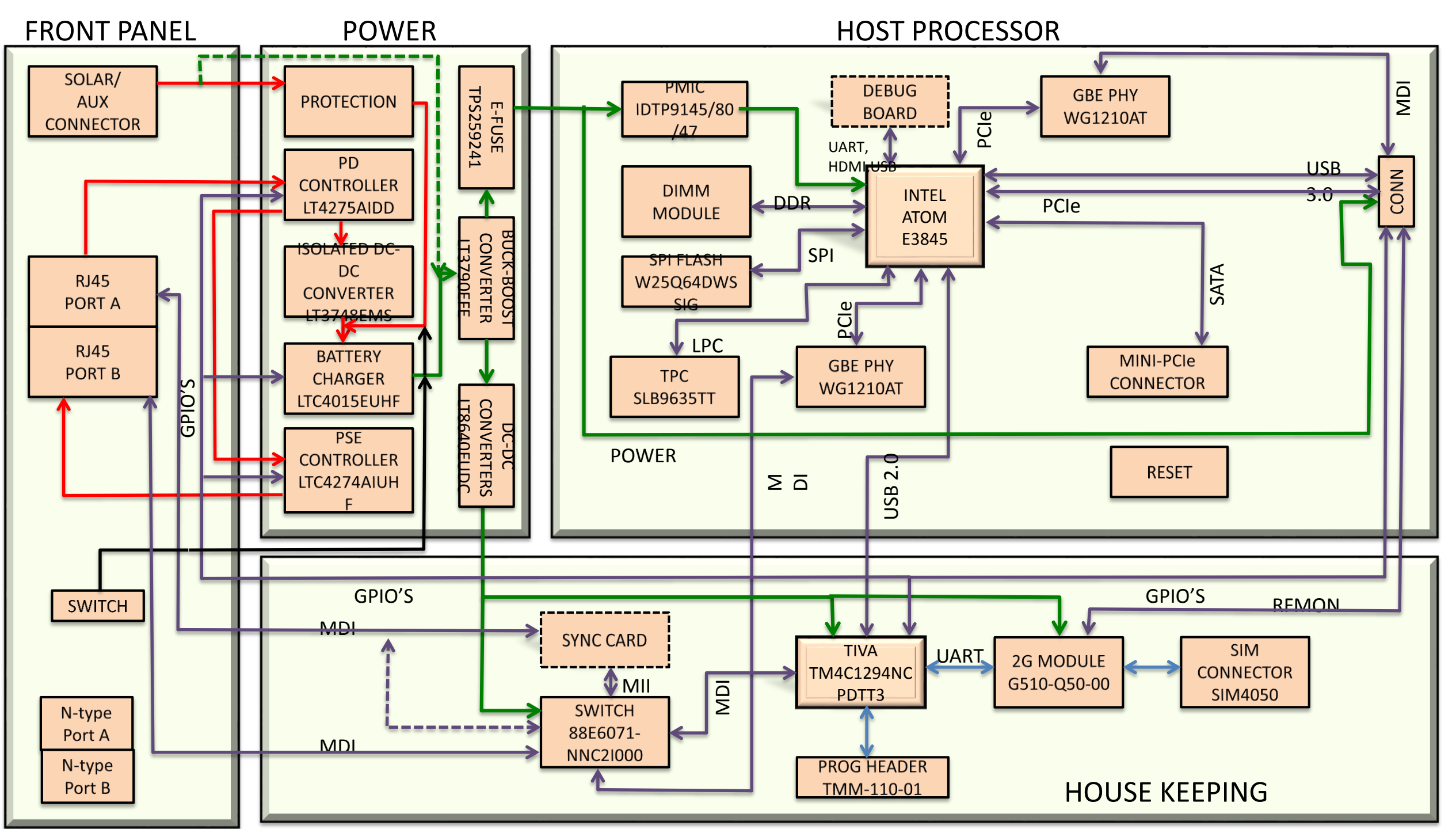


- LT4275 PD controller
- LT4274 PSE controller
- Two QC (charge controller):
  internal battery: Lithium ion (2700mAH)
  external battery: SLA (65AH)
- 12V for main rail + housekeeping (own)

- Hard-coded power sequencing

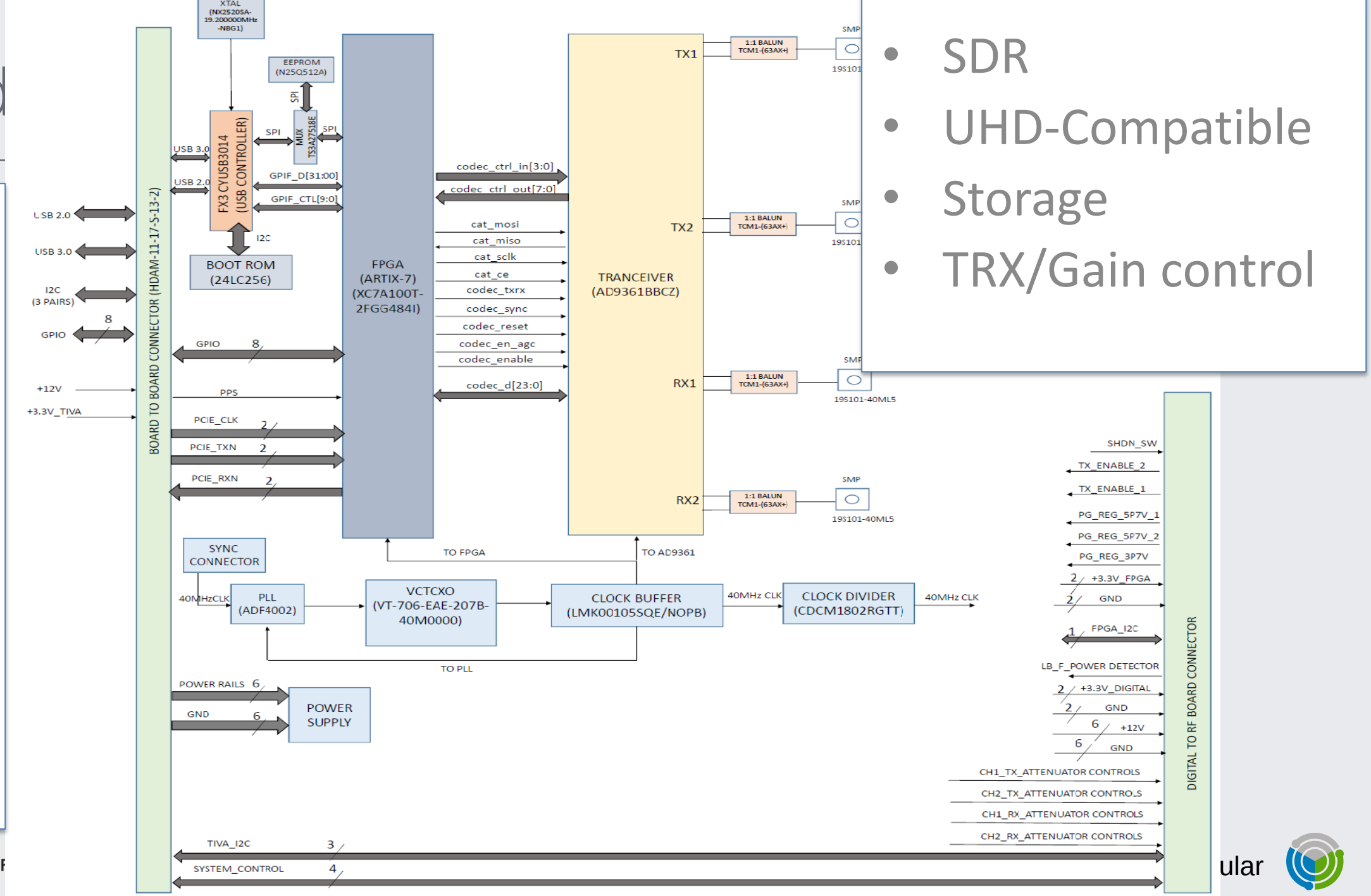


- TI ARM M4, Tiva 120MHz uController
- Manage all power rails and power sequencing, front-end SW, voltage/current sensors
- Ethernet switches, PD/PSE, QC, Sync
- Monitor boot sequence, runs OCWare


FRONT PANEL
POWER
HOST PROCESSOR
SOLAR/ AUX CONNECTOR
PROTECTION
E-FUSE TPS259241
PD CONTROLLER LT4275AIDD
ISOLATED DC-DC CONVERTER LT3748EMS
BUCK-BOOST CONVERTER LT3790EEE
RJ45 PORT A
RJ45 PORT B
BATTERY CHARGER LTC4015EUHF
PSE CONTROLLER LTC4274AIUHF
DC-DC CONVERTERS LT8640EUDC
GPIO'S
PMIC IDTP9145/80/47
DEBUG BOARD
GBE PHY WG1210AT
MDI
UART, HDMI, USB
PCIe
DIMM MODULE
DDR
INTEL ATOM E3845
USB 3.0
CONN
PCIe
SPI FLASH W25Q64DWSSIG
SPI
SATA
LPC
PCIe
TPC SLB9635TT
GBE PHY WG1210AT
MINI-PCIe CONNECTOR
POWER
MDI
USB 2.0
RESET
SWITCH
GPIO'S
GPIO'S
REMON
MDI
SYNC CARD
MII
SWITCH 88E6071-NNC2I000
MDI
TIVA TM4C1294NCPDTT3
UART
2G MODULE G510-Q50-00
SIM CONNECTOR SIM4050
N-type Port A
N-type Port B
MDI
PROG HEADER TMM-110-01
HOUSE KEEPING

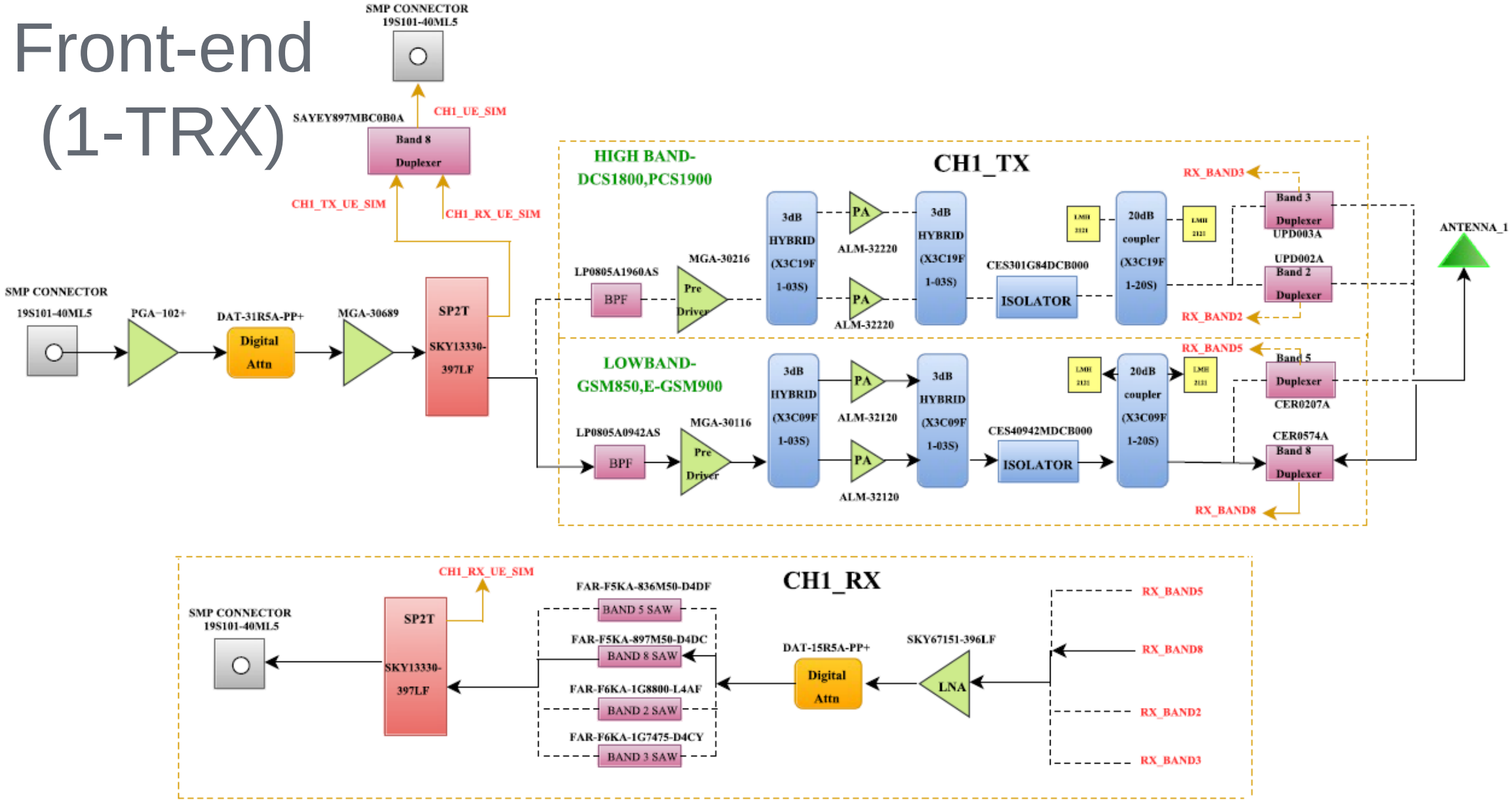
Rad

- USB2.0
- USB3.0
- I2C
- PCIE G2
- GPIO
- +12V
- +3.3V



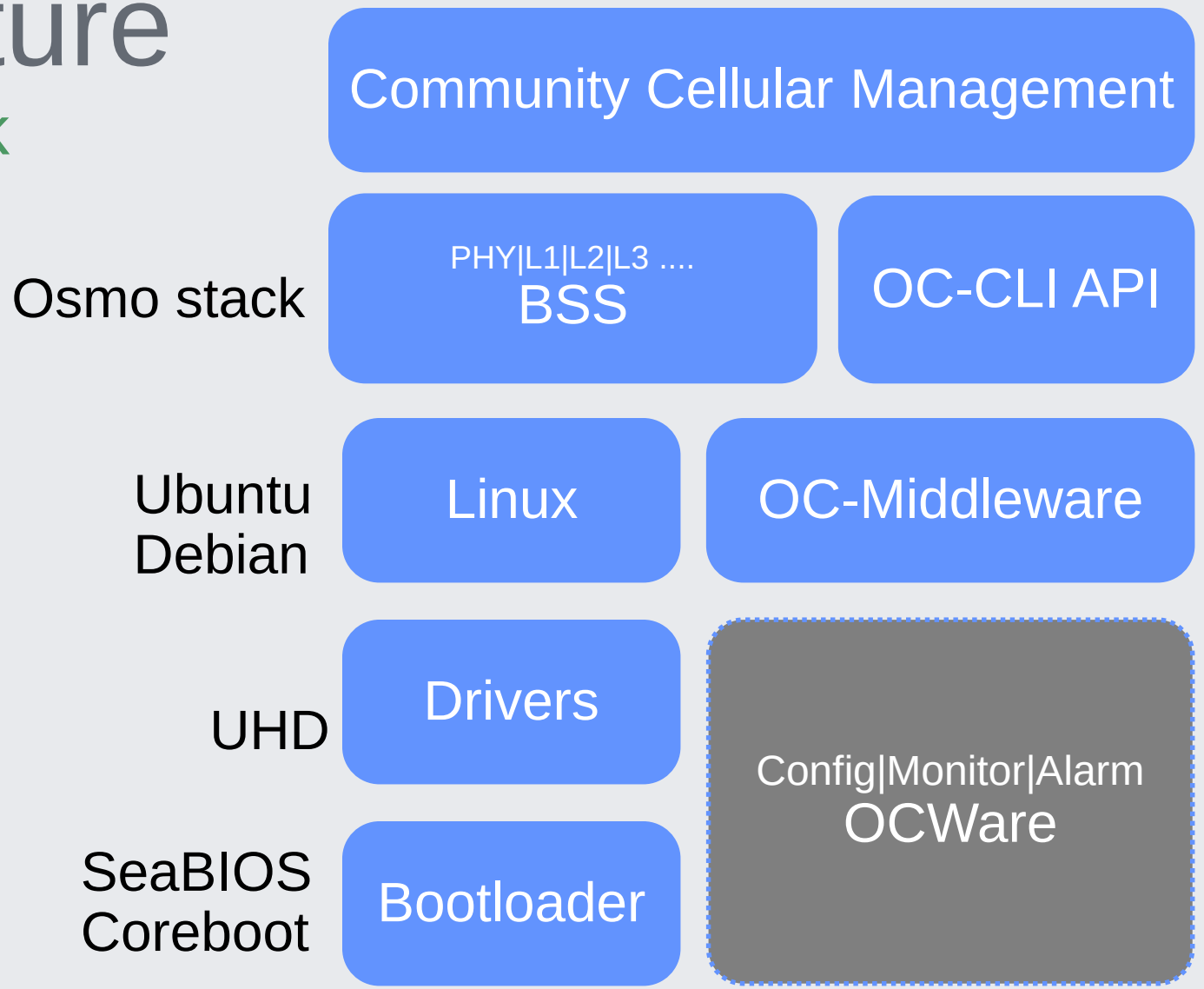
- SDR
- UHD-Compatible
- Storage
- TRX/Gain control

Front-end (1-TRX)



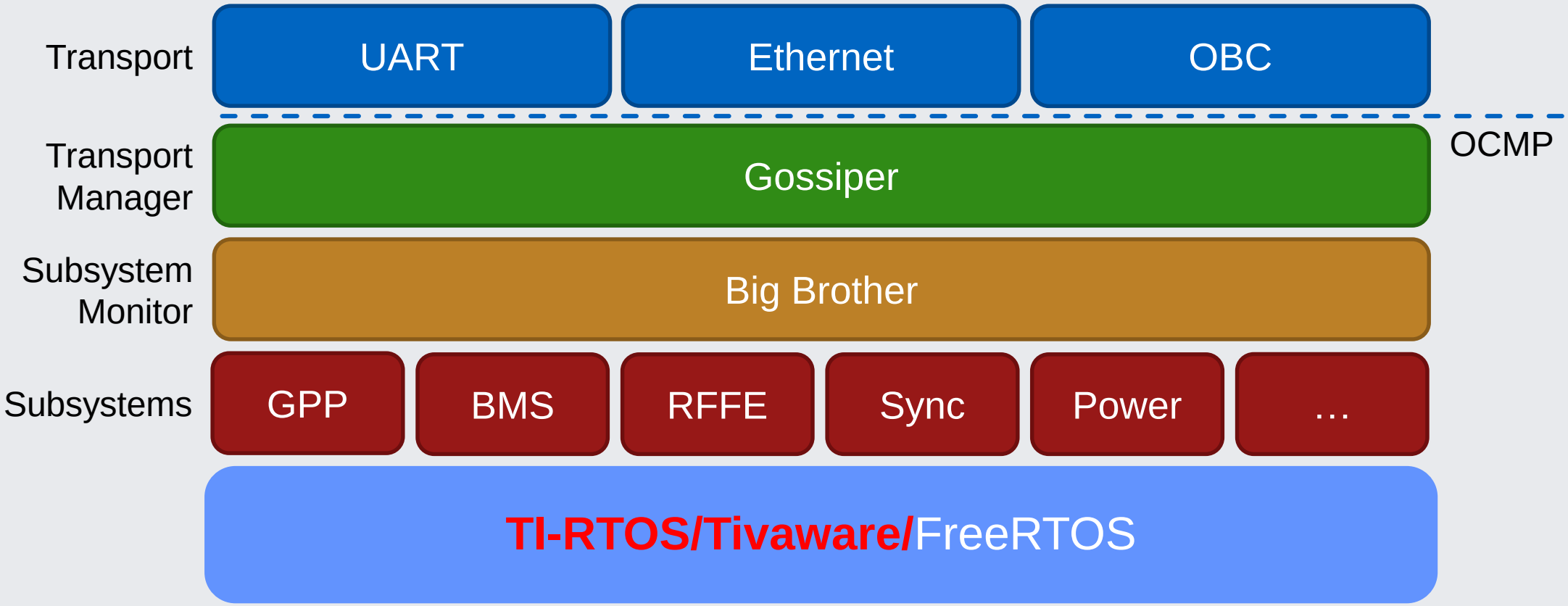
Architecture

Software block



Architecture

OCWare



Architecture

Radio