PC802 5G Small Cell PHY SoC

Picocom
Empowering Wireless

Product Brief

Product Summary

The PC802 is a purpose-designed PHY SoC for 5GNR/LTE small cell disaggregated and integrated RAN architectures, and includes support for industry-leading Open RAN specifications. The SoC interfaces with a layer 2/3 stack via the SCF FAPI interface over PCIe. The PC802 supports seamless interfacing to Radio Units (O-RU) via the O-RAN Open Fronthaul eCPRI interface, or directly to RFICs with a standardised JESD204B high-speed serial interface.

Key Applications

The PC802 SoC is designed for 5G small cell platforms including:

- ◆ Indoor residential, enterprise and industrial networks
- ◆ Neutral host networks
- ◆ Outdoor networks

The PC802 can be used in:

- ◆ Integrated small cell
- ◆ Split 2 and 6 disaggregated small cells
- ◆ Split 7.2x O-RAN Distributed Unit (DU)
- ◆ Split 7.2x O-RAN Remote Unit (RU)
- ◆ Platforms with variable splits

Key Features

- ◆ Silicon runs Picocom's 5GNR and LTE PHY (lower and upper) software
- ◆ SCF FAPI interfaces
- ◆ Ceva XC12 5G-optimised 1280-bit vector signal processors
- ◆ RISC-V scalar processor clusters
- ◆ Codecs: LDPC, Turbo and Polar
- ◆ Fourier transforms: FFT, iFFT
- ◆ Equalisers: MMSE/MMSE-IRC/MLD
- ◆ Digital Front End (DFE)
- ◆ O-RAN eCPRI Open Fronthaul
- ◆ IQ compression/decompression
- ◆ Secure on-chip boot capability
- ◆ Debug and device monitoring

Key Interfaces

- ◆ 4-lane JESD204B radio interface supporting up to 4 RFICs
- ◆ 10/25 Gigabit Ethernet for eCPRI
- ◆ Gen 4 4-lane PCIe interface to NPU
- ◆ LPDDR4 32bit interface (2666/3200MHz)
- ◆ Synchronisation and clock interfaces: IEEE1588v2, GNSS
- ◆ SPI, I2C and GPIO control interfaces

Key Performance

The PC802 supports 3GPP 5GNR releases 15 and 16, with flexibility for future releases.

The PC802 also supports simultaneous 5GNR/LTE mode, flexible multi-RAT, multi-carrier component configurations and Dynamic Spectrum Sharing (DSS) support.

5GNR FR1 Sub-6GHz summary

- ◆ Up to 8 TX/8 RX RF baseband ports
- ◆ 2 UL/4 DL MIMO layers per cell for 2 cells
- ◆ 4 UL/8 DL MIMO layers for 1 cell
- ◆ 100MHz BW per cell
- ◆ Throughput DL: 4Gbps, UL 2Gbps

5GNR FR2 mmW summary

- ◆ 2 TX/2 RX RF ports for single cell
- ◆ 2 UL/2 DL MIMO layers
- ◆ 400MHz BW
- ◆ Throughput DL: 3Gbps, UL 3Gbps

LTE summary

- ◆ Single LTE cell: 4 TX/4 RX antenna ports, 4 UL/4 DL MIMO layers, 20MHz
- ◆ Dual or Tri LTE cells: each cell up to 4 TX/4 RX antenna ports, 2 UL/4 DL MIMO layers, 20MHz
- ◆ Dual mode 5G and 3 LTE cells

#### Package summary

- ◆ 25mm x 25mm Thermally Enhanced FCBGA

Device description

The PC802 device's function in a small cell use case is, at the highest level, seen as transforming FAPI messages from the L2/3 into IQ samples for the radio, and vice versa. This includes driving the external physical and software interfaces, PHY processing and Digital Front End (DFE) functions.

The PC802 is also optimised to provide upper PHY processing in an O-RAN Alliance O-DU, by transforming the FAPI messages from the L2/3 into frequency domain IQ samples using eCPRI and Open fronthaul messages, which can be transmitted over the Ethernet to O-RU remote radio units.

The high-level PC802 architecture and functional block diagrams for the different use cases are illustrated below.

Architecture block diagram
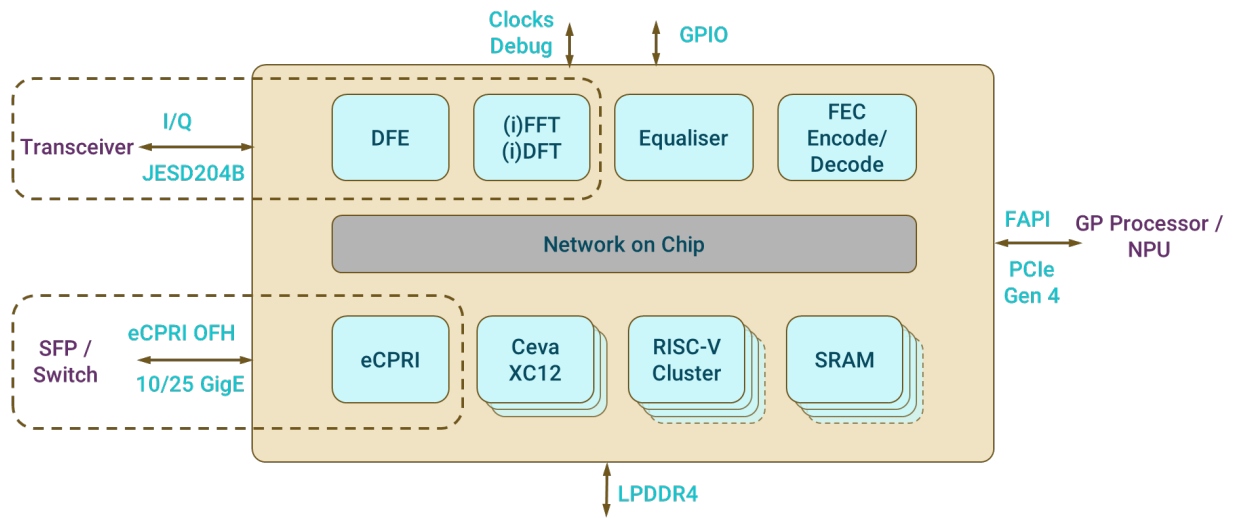
System/functional block diagram for use cases
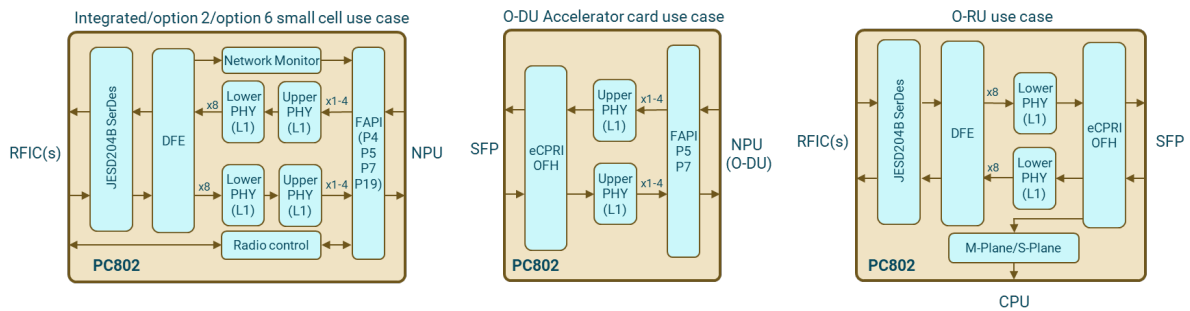
Further information

Please contact Picocom info@picocom.com for further information.