RNS805-RU-BB RU Baseband Board

Product Brief

Product Summary

The RNS805 RU Baseband Board (RNS805-RU-BB) is a flexible 5G/4G Radio Unit board which is suitable for customer's O-RU products, as well as lab evaluation and field trails.

The RNS805-RU-BB provides the customer design and architectural flexibility, offering discrete RF FEM interface connectors which can be integrated with a customer specific 4-channel RF Front End Module.

The RNS805-RU-BB provides baseband support for Cat A Split 7.2 Radio Unit (O-RU) as specified by O-RAN Alliance, in conjunction with the RANsemi O-RU and M-plane software.

The RNS805-RU-BB is designed to support both 5G NR and 4G LTE operating in either TDD or FDD modes from 600MHz to 6GHz, available in 5 different RF SKUs.

The board is also designed to be cascaded with an optional second board, to allow more complex use cases using 'simple cascade' where linked RNS805 SoCs can be evaluated.

The board is preloaded to boot with a Linux operating system. The board compatible with RANsemi O-RU software licences as detailed on page 4.

Alternatively the board is available as a RNS805 RU Baseband Platform with O-RU binary and M-plane binary pre-loaded.

Key Features

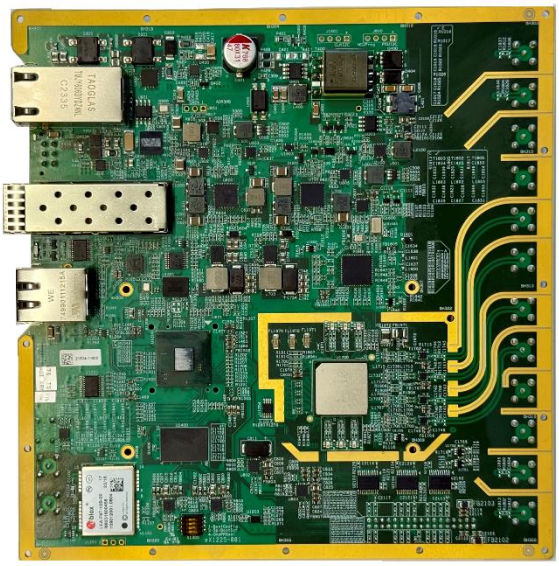
- RNS805 5G/4G O-RU SoC subsystem
- TI AFE7769D 4T4R RFIC subsystem with DPD capability
- 4Gb 16-bit interface LPDDR4 SDRAM
- 4Gb SLC NAND Flash for booting
- Chip integrated temperature sensors
- Synchronisation and clocking functions using on-board GNSS receiver or IEEE 1588
- Components are rated at -40 to +85°C
- Optional 10GE interface supporting Type 3 PoE++

Key Interfaces

- SFP28 cage for optical LC 10/25GE interface for fronthaul eCPRI
- 2x RJ45 connectors
  - 10GE copper PoE interface
  - 100base-T Ethernet debug
- MCX RFFE RF ports
  - 4 RF TX ports
  - 4 RF RX ports
  - 4 RF DPD Observation ports
- RFFE Control interface
- GNSS Antenna port
- 1PPS synchronisation input
- Auxiliary 12V power supply port

RNS805-RU-BB hardware

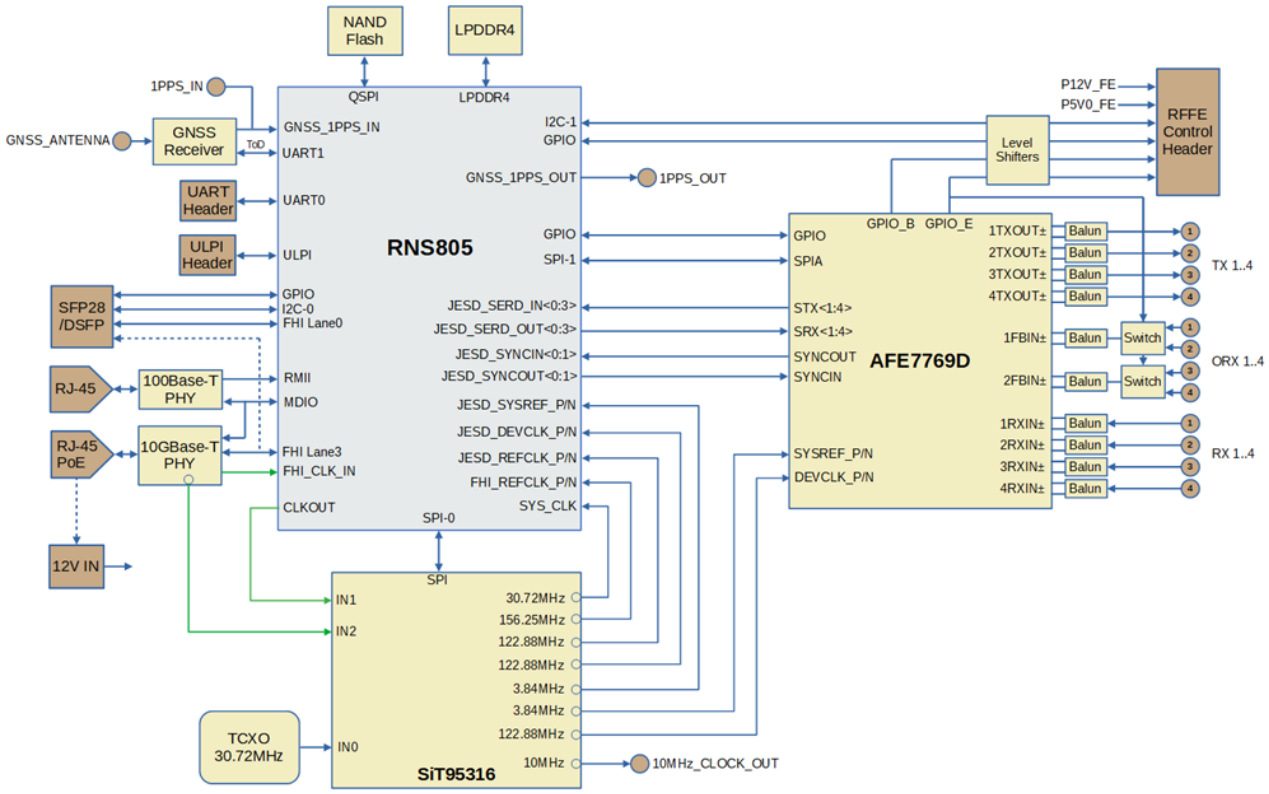
The RNS805-RU-BB is a compact double-sided design with dimensions 165 x 170mm.



The board is designed for indoor and outdoor applications when integrated into a partner enclosure. A 3D mechanical model is available on request. The board is also designed for product test and manufacturing.

Complete board documentation and design files are available to facilitate customer's board designs at RANsemi discretion.

RNS805-RU-BB Hardware Architecture



RNS805-RU-BB RF specification

Optimised RF SKUs

The RNS805-RU-BB comes in 5 different sub-6 GHz SKUs to provide RF optimisation for the different 5GNR frequency bands as detailed below:

SKU#	Frequency range	Frequency bands
1	600 – 1000 MHz	n5, n8, n12, n13, n14, n18, n20, n26, n28, n71, n85, n100
2	1000 – 2200 MHz	n1, n2, n3, n24, n25, n34, n39, n50, n51, n65, n66, n70, n74
3	2200 – 2800 MHz	n7, n30, n38, n40, n41, n53, n90
4	3000 – 4200 MHz	n48, n77, n78
5	4400 – 6000 MHz	n46, n79

RF specification

The RF specification for the RNS805-RU-BB board is shown below, with the operating frequency being the SKU table above.

The on-board AFE7769D CFR/DPD for RF power amplifier linearisation has been proven over a wide range of third-party LDMOS and GaN PAs ranging 250mW to >50W.

Parameter	Value
3GPP Standard	5G NR, 4G LTE
Duplexing mode	TDD, FDD
Operating Frequency	See SKU table on page 2
Maximum Occupied Bandwidth (OBW)	200MHz
Maximum Instantaneous Bandwidth (IBW)	300MHz
Number of Tx ports	4 x MCX
Number of Rx ports	4 x MCX
Number of DPD ORx feedback ports	2 or 4 x MCX
Tx / Rx / ORx impedance	50-ohms, single-ended
Tx peak power	0dBm
Target Peak to Average Ratio	8dB
Tx power control range	29dB
Tx power control steps	0.125dB
Tx port return loss[1]	10dB
Rx peak power	-14dBm (0dB attenuation) 14dBm (max attenuation)
Rx Attenuation Range	28dB
Rx Attenuation Step	1dB
Rx noise figure	14dB
Rx port return loss[1]	10dB
ORx peak power	-0.5dBm (0dB attenuation) / 12dBm (max attenuation)
ORx attenuation Range	16dB
ORx attenuation Step	1dB
ORx port return loss[1]	10dB
Port to port isolation[2]	≥ 40dB
Notes: 1. Return loss measured in the optimised frequency band for the different SKU. 2. Port to port isolation may need to have RF mechanical shields to realise the specification.	

RFFE control interface

The RFFE control interface includes:

- 20 timed GPIO signals for TDD and DPD/VSWR
- Feedback switching, PA and LNA control plus one I2C interface
- Interface levels can be set to 1.8V or 3.3.

Ordering Information

Order Code	Product Name	Details
RNS805-RU-BB-*SKU#*	RNS805 RU Baseband Board	Available in low volumes. See terms of sale. Suitable with existing licence holders. RF *SKU#* as summarised on page 2.
RNS805-RU-BX	RNS805 RU Baseband Platform	RNS805 RU Baseband Board with O-RU binary and M-plane binary pre-loaded. Contact RANsemi for further details.

The Export Control Classification Number (ECCN) is 5A991.b.4

Additional compatible O-RU Software

Customers can upgrade to the following full licence software products. Licensees will be able to download software releases and documentation from the RANsemi resources page.

Order Code	Product Name	Details
O-RU-bin	O-RU binary 5GNR with LTE	Including support and M-plane evaluation licence
NR-RU-bin	5GNR O-RU software, binary software,	Including support and M-plane evaluation licence
O-RU-src	O-RU source code 5GNR with LTE	Including support
NR-RU-src	NR RU source code 5GNR	Including support
RU-MP-src	O-RU M-plane source code	Including support

Further information

For further details about RNS805-RU-BB, RNS805 silicon, O-RU software and starter kits, please contact your local RANsemi representative or email us at info@ransemi.com

Note on certification

While RANsemi can't certify conformity to relevant 3GPP radio specifications and EMC directives for the finished product, we can support our customers in their product certification efforts.