UltiChip Blade20 PicoRU

Specification

Version 1.0

Ultichip Comm. Tech Co. Ltd. Proprietary

Doc. Number:		**Author:**	Xinxing.Liu
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Table 1- 1 Document Revision History

Rev.	Date	Author	Comments
1.0	2022-08-08	Xinxing.Liu	Initial Version

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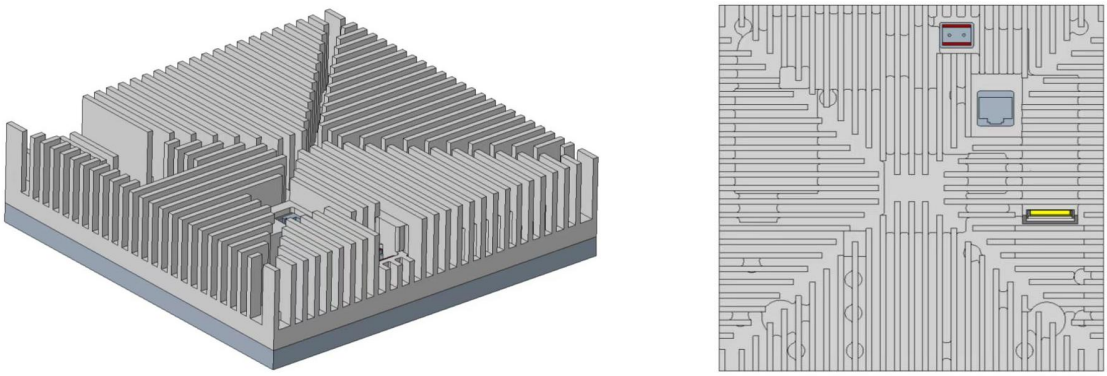
1 General Description

Blade20 is a high-performance 2T2R PicoRU independently developed by UltiChip, which, together with BBU and Switch, forms a distributed PicoRU system and is a mainstream solution for 5G indoor coverage.It has the advantages of low transmission power, easy installation, suitable for co-design with macro station system, and also has the advantages of low cost, large coverage, convenient upgrade and expansion.It is suitable for indoor coverage scenarios with high demand for data services and high service quality in dense urban areas and hot spots, such as office buildings, subways, train stations, shopping malls, stadiums, and airports.It supports POE, special RJ45 DC ports, independent DC port, switches without POE , and photoelectric composite cable.



(a) (b)

Figure 1- 1 Render diagram of Blade20 PicoRU

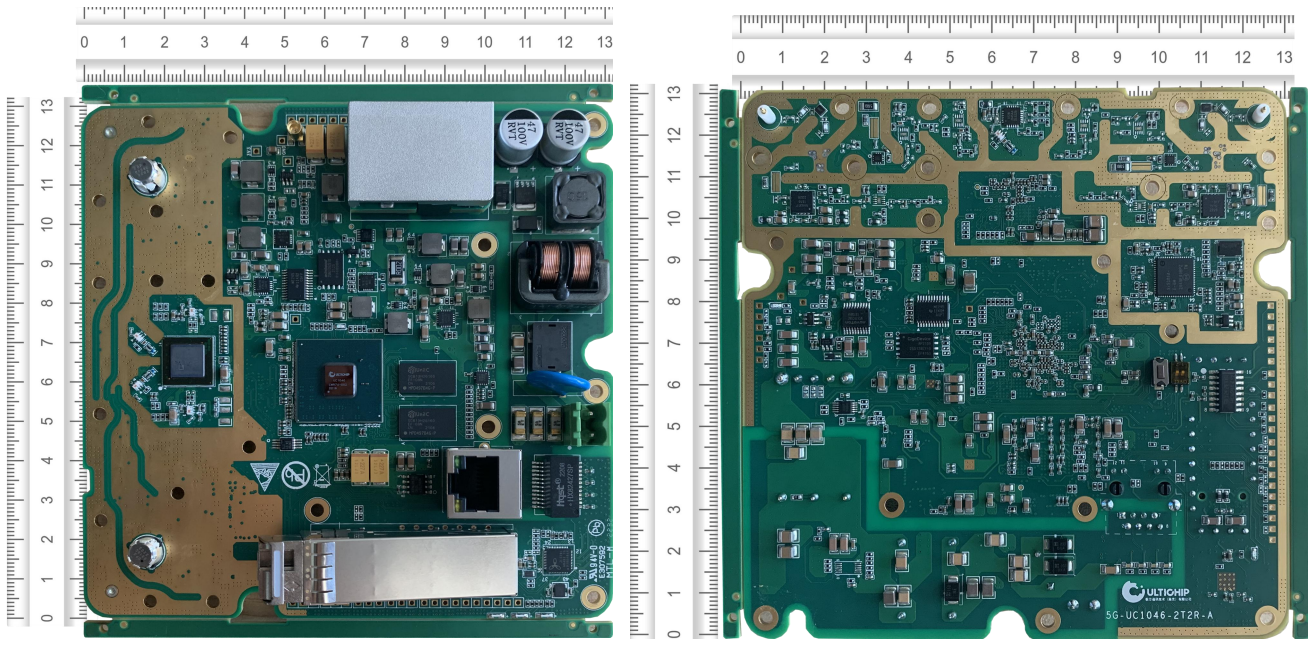


Figure 1- 2 PCB diagram of Blade20 PicoRU

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2 Features

- Independence&Safty： The key components are all made in our country. The self-developed ASIC UC1040 realizes DDC/DUC/CFR/DPD and IF processing, network processing and so on. The other devices include Zealync B20 or ADRV9009 as Transceiver, Aura PLL, Unigroup DDR, GigaDevive Flash, Novaco RF front-end, etc.
- Low power consumption: The 4W power consumption of the UC1040 DFE core chip has a huge advantage over other solutions. The optimization design of power supply also makes the power consumption significantly reduced.
- Tight structure: the low power consumption design reduce the height of the heat dissipation structure. The high dielectric constant ceramic substrate reduces the antenna size.
- Low cost: The main chip UC1040 has a price advantage over FPGA and minimal design.

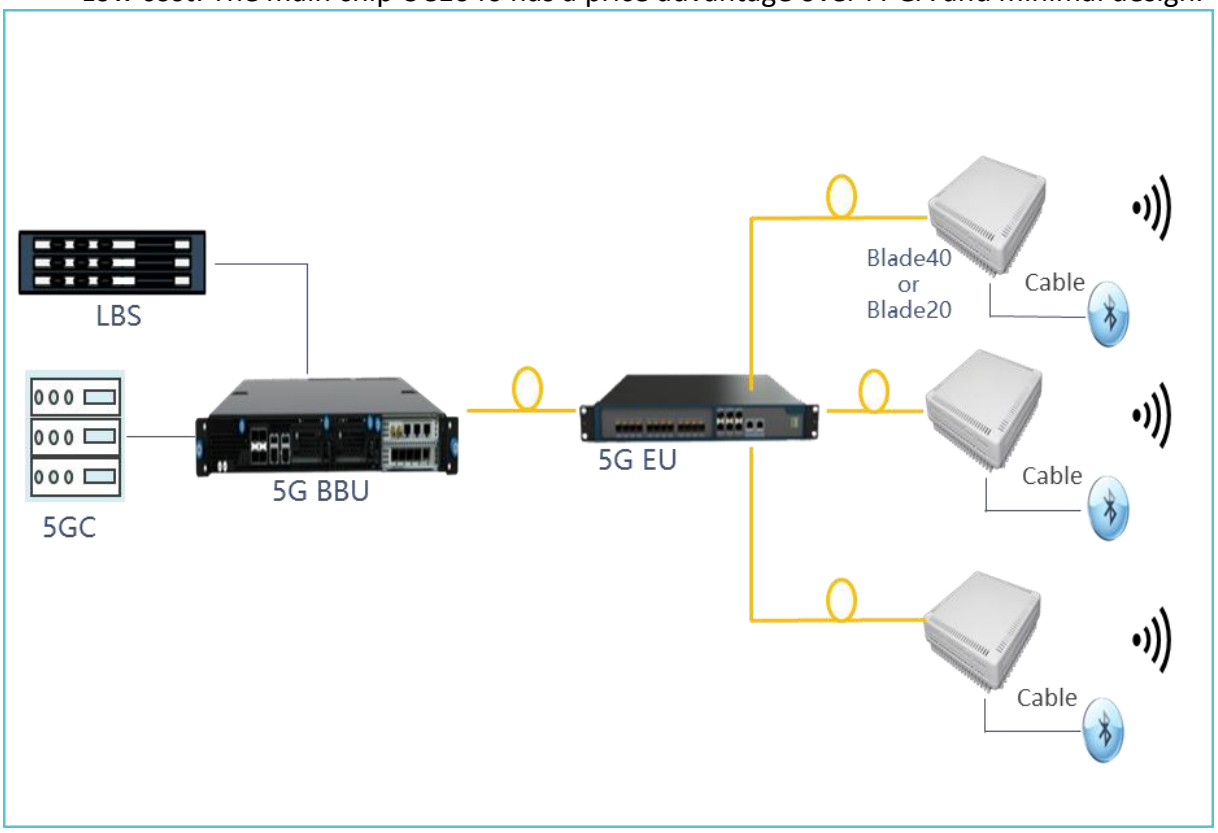

Figure 2- 1 Extended small base station solution of Blade20 PicoRU

- Product form: Blade20 PicoRU+EU (IQ hub) +BBU
- Applicable scenario: It is suitable for uniform coverage of indoor wireless signals and coverage of open indoor scenes with flexible configuration requirements for capacity, such as airports, conference centers, shopping malls, news centers, etc. The main advantage is flexible cell splitting.
- Coverage and capacity characteristics: Due to the small output power of PicoRU, more numbers need to be deployed to achieve better coverage. Each PicoRU is a source, so the relationship between coverage and capacity can be flexibly configured by cell splitting or merging techniques.

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- Construction workload: The network cable/fiber is thinner and softer than the RF cable, which is more convenient to construct and requires less wiring work than DAS.

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3 Product specifications

3.1 Wireless performance

Table 3- 1 Wireless performance

Item	Parameter
Operating band	Sub6G
IBW	100MHz
Channels	2T2R
Transmitted power	≥2*250mW（2*100MHz NR,256QAM,ACLR≤ -48dBc,EVM≤2.3%）
Carrier configuration	NR 2*100MHz(Support carrier bandwidths below 100M)
	LTE 2*20MHz(Support carrier bandwidths below 20M)
	NR 1*100MHz+LTE 1*20MHz(NR and LTE support bandwidth below 100M and 20M, respectively)
ACLR	≤-50dBc(24dBm,100 MHz NR, 8.5 dB PAR signal)
Reference sensibility	-97dBm(eCPRI,QPSK)
EVM	<2.0%(24dBm,eCPRI,100 MHz NR,256QAM,8.5 dB PAR signal)
Sensitivity with block	-6dBm CW@2400MHz-2483.5MHz,the sensitivity is not higher than -90dBm
	-14dBm CW@5150MHz-5350MHz、5725MHz-5850MHz,the sensitivity is not higher than -90dBm
Power consumption	The power consumption of the whole machine is not higher than 27W(NR 2*100MHz,2*250mW,256QAM,ACLR ≤ -48dBc)
Cell merging	Any two remote cells connected by the same EU can be configured for cell merging
Antenna	built-in omnidirectional antenna ,also supports external connection
Radio characteristic	Meet 3GPP 38.104/38.141

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3.2 Hardware

Table 3- 2 Hardware

Item	Parameter
Model	Blade20
Size	130*130*50mm(1L)
Weight	1.9kg
Interface	10G SFP*1/RJ45*10/DC
Protection Degree	IP31
LED	ALM/ACT/RUN
Power supply	Input Voltage Range:-40VDC~-57VDC，the distance of PoE is not less than 100m，the distance of the photoelectric composite cable shall not be less than 200m.
Installation	wall, ceiling, pole
power protection 1	Power supply anti-reverse connection, over-current protection
power protection 2	Meet YD/T 1082-2000
anti-thunder	Meet YD/T 2324-2011
EMC	Meet YD/T 2583.17-2019
Reliability	The annual failure rate is less than 2%, and the outage time should be less than 3 minutes/year (MTTR assumes 1 hour)
Work environment	Temperature:-5℃~55℃ Humidity:15%~85% Noise:≤55dB(A)
Ground connection	When the integrated or combined grounding resistance is less than 10 Ω, the remote unit should work normally
Maintenance	RJ45 and LED

3.3 Software

Table 3- 3 Software

Item	Parameter
Sync	1588V2 PTP
Reset	watchdog
IF process	DDC/DUC/CFR/DPD
Tx power control	resolution 0.5dB
Rx gain control	AGC/MGC
Energy efficiency	Deep Sleep

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Remote Upgrade	Support
PA Protection	Support
Alarm/diagnose message report	Support
Antenna detect	VSWR
TDD	Flexible configuration

3.4 Fronthaul

Blade20 PicoRU can support Split option7.x and Split Option8 by supporting the eCPRI/CPRI interface. Different fronthaul protocol processing can be satisfied on a unified hardware platform only by upgrading the software configuration and firmware.

Table 3- 4 eCPRI Option-7.x

item	parameter
Interface Protocol	10Gbe
	eCPRI Specification v2.0
	ORAN v6.0
Transport Header	Native Ethernet frame with VLAN/Native IPv4 packet with VLAN
eCPRI U-plane	Support eCPRI concatenation
	Support Jumbo frame
	Support application fragmentation & radio fragmentation
	Support eCPRIPCid configuration
	Support Compress Method：BFP，u-law，a-law
	Support IQ Bit width: 8,9,10,11,12,16
	Support multi-sections
eCPRI C-plane	Support section type 0/1/3
	Support extension type 0/3
eCPRI S-plane	Support PTP Full Timing Support (G.8275.1)
	Support 1588v2 + SyncE
	Support GPS/GNSS/BeiDou
Low phy	FFT/iFFT:12<= 2^m*3^n*5^k <= 4096
	Precoding
Prach	NR: format0/1/2/3/A1/A2/A3/B1/B2/B3/B4/C0/C2
	LTE: format0/1/2/3/4

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Table 3- 5 CPRI Option8

Item	Parameter
Interface Rate	12.16512Gbps,10.1376Gbps
	9.8304Gbps,6.144Gbps,4.9152Gbps, 3.072Gbps,2.4576Gbps,1.2288Gbps
	Supports rate self-negotiation
IQ compression	compress mode:BFP,u-law,a-law
	Bit width:8/9/10/11/12/16
IQ Mapping	Support OTIC
	Support Half_axc
	The IQ Mapping configuration is programmatically supported
	Interleaved/nor-Interleaved
Signaling communication	Slow C&W
	Fast C&W
Control word	Support all vendors control words to be configurable and readable
	Supports RRU power failure alarm reporting
	Supports remote BBU reset

3.5 Antenna

Built-in antenna parameters：

Table 3- 6 Electrical performance of built-in antenna

	Parameter(unit)	Value
General parameter	OBW(MHz)	for instance 3300-3600MHz
Circuit parameter	maximum input average power(W)	≥1
	VSWR of each radiation port voltage	≤1.8
	isolation(dB)	≥20
Radiation parameter	horizontal Plane Pattern roundness(dB)	±3
	vertical plane half power beamwidth(°)	≥35
	gain(dBi)	≥2.5

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