BBU and RRU Single-Core Optical Modules



Overview

The base station can be divided into two modules: the RRU for transmitting signals and the BBU for processing signals.

Key Takeaways

Single-core optical modules connect the BBU and RRU, enabling high-speed, long-distance data transmission in distributed base station architectures.

Overview of BBU and RRU

In a distributed base station, the BBU (Baseband Unit) handles baseband signal processing, main control, clock synchronization, and transmission management, typically located indoors in a climate-controlled environment.

The RR

U (Remote Radio Unit) is mounted on the tower near antennas and manages RF signal transmission and reception, including amplification and filtering.

The RR

U connects to the BBU via optical fiber, forming the fronthaul link essential for high-speed communication.

Role of Single-

Core Optical ModulesSingle-core optical modules are used to transmit data between the BBU and RRU over a single optical fiber, supporting various data rates such as 1. 25G, 2. 5G, 6G, and 10G depending on network requirements.

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These modules are critical in CPRI (Common Public Radio Interface) applications, converting electrical baseband signals into optical signals for long-distance transmission. They are particularly useful in scenarios where fiber resources are limited, and serial networking or CWDM (Coarse Wavelength Division Multiplexing) can multiplex multiple signals over a single fiber.

Environmental and Technical Considerations

Temperature Tolerance: BBU modules operate indoors under controlled temperatures, while RRU modules must withstand extreme outdoor conditions, from -40℃ to over 85℃, due to exposure to sunlight and environmental fluctuations. Reliability: RRUs are designed for passive heat dissipation without fans, so optical modules must maintain performance under high thermal stress. Fiber Requirements: Single-core modules often use OS2 single-mode fiber, and CWDM solutions allow multiple RRUs to share a single fiber, optimizing fiber usage and reducing deployment costs.

Data Integrity: Optical modules ensure minimal signal attenuation and high fidelity over distances, which is crucial for maintaining low-latency and high-throughput fronthaul connections.

Deployment Benefits

Using single-core optical modules between BBU and RRU allows operators to: Reduce the number of fibers required for multiple RRUs. Simplify network expansion and upgrades. Maintain high-speed, low-latency connections essential for 4G LTE and 5G networks.

Ensure robust operation in harsh outdoor environments without additional cooling systems. In summary, single-core optical modules are a key enabler for distributed base station architectures, providing reliable, high-speed optical links between indoor BBUs and outdoor RRUs while supporting industrial-grade environmental conditions and efficient fiber utilization.

Article Content

Which Optical Modules Are Commonly Used In 4G Base Stations?

The base station can be divided into two modules: the RRU for transmitting signals and the BBU for processing signals. The BBU is small and exquisite, with low power consumption, while the RRU is

Cellular Network Infrastructure: From Antenna to BBU

Here''s the sequence of how signals travel from an antenna to the Baseband Unit (BBU), including key information about each step and associated hardware.

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What is RRU and BBU

The BBU centralizes the “baseband,” “transmission,” “main control,” “clock,” and other functions of the base station. On the other hand, the RRU

Do you know how optical modules are used in base stations?-ETU

The base station is logically divided into two parts: BBU and RRU. RRU is responsible for signal transmission and reception, and BBU is responsible for signal processing.

Understanding AAU, RRU, and BBU in telecom networks

Enhances signal strength and coverage, reducing the need for separate RRUs. Here is a technical diagram comparing AAU, RRU, and BBU in a telecom network.

What Powers Base Station Connectivity? Are CPRI Modules the

CPRI modules are designed exclusively for the fronthaul link between a BBU and an RRU in a wireless base station. Their entire design is optimized for this point-to-point, synchronous ...

Difference Between AAU, RRU, and BBU

Integrates the RRU and antenna into a single unit. Used mainly in 5G networks to support massive MIMO (Multiple Input Multiple Output). Enhances

How Do BBU and RRU Collaborate Efficiently in Base Stations?

Discover how BBU and RRU work together via CPRI/eCPRI for efficient 5G signal transmission. Learn about functional splits, latency control, and O-RAN advantages.

Single-core optical module RRU end

The base station can be divided into two modules: the RRU for transmitting signals and the BBU for processing signals. The BBU is small and exquisite, with low power consumption, while the RRU is ...

Why Optical Modules For CPRI Applications Need To Support

In 4G wireless networks, the two core units of the CPRI architecture are the BBU (Building Baseband Unit, indoor baseband processing unit) and the RRU (Remote Radio Unit).

Huawei 5900 BBU and BTS Modules Explained

Focus on the BTS equipment: BBU Huawei 5900, UMPT and UBBP Focus on the BTS equipment: BBU Huawei 5900, UMPT and UBBP Today I''m sharing with you some elements that are often found in a

5G Applications | Baseband Unit | Remote Radio Units

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Fiber optic signals arriving from the RRU are converted to electrical signals at the BBU and after adjusting for the baseband frequencies, are further

What is RRU and BBU

RRU and BBU are crucial components in base station construction, enabling a distributed architecture that improves efficiency.

Understanding BBU, RRU, and AAU in telecom networks

Telecom Network Components: BBU, RRU, and AAU Explained Understanding the key components of a modern telecom network is essential for grasping how 4G and 5G systems function.

BBU, RRU, AAU: Telecom Network Components Explained

Understanding BBU, RRU, and AAU in a Telecom Network □□ BBU (Baseband Unit) Acts as the core processing unit of a base station. Handles tasks like modulation, encoding, decoding, and network ...

System Scheme of Base Station Passive Wavelength Division

Conclusion After the passive WDM scheme is adopted, the CPRI signal of the three sectors is converged from the BBU device side through the passive expander at point B, and then

HISILICON Optical Modules in the field of communication base stations

In 4G network, the optical modules used to connect bbu and rru are mainly Gigabit to 10 Gigabit optical modules; in 5G network, the interfaces between bbu and rru are such as cpri

Understand AAU, RRU, BBU in one article

All in all, compared with RRU, AAU has more functions of antenna and some functions of BBU. Compared with RRU, AAU is larger in size, larger in area, heavier in weight, consumes more

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