

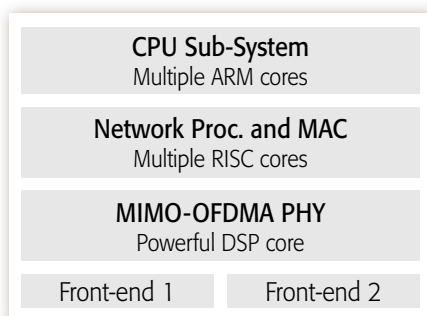
DAN2200

Integrated SoC Platform for WiMAX Femtocells

Product Overview

DesignArt's DAN2200 SoC is a silicon platform specifically targeted for WiMAX femtocell designs, optimized for low-cost, yet high performance access point applications. The DAN2200 product features the highest level of integration of modules into single-chip architecture, incorporating a complete baseband PHY and MAC, an embedded network processor and several CPU cores.

The highly integrated DAN2200 SoC architecture provides full SW flexibility, while drastically reducing the femtocell component count, making it the lowest cost femtocell design architecture on the market.



Product Highlights

Powerful SoC for WiMAX Femtocells

- Single-chip baseband architecture for lowest cost femtocell designs
- On-chip PHY, MAC and control & management processors
- Compliant with 802.16e WiMAX Wave2, and NWG R 1.0/R 1.5
- Superior throughput - 40Mbps in downlink (@10MHz, MIMO, DL:UL 3:1)
- Supports up to 2,000 CIDs in registered service flows; up to 250 active users
- Non-blocking packet processing rate (>70,000 packets per second)

Rich product Feature Set

- 2x2 MIMO: DL Matrix A/B; UL collaborative MIMO
- Adaptive modulation, coding, and MIMO switching mechanism
- Dynamic link power adaptation - open and closed loop power control
- Supports all WiMAX QoS grades; Advanced scheduling features
- Unique mechanism for over-the-air synchronization to WiMAX BTS
- Cell sniffing capability for auto configuration and interference mitigation
- Software configurable packet classification (IP-CS and ETH-CS)
- Complete WiMAX security package; IPSEC tunnels to core network
- Handover, Sleep and Idle modes

Highly integrated SoC Platform

- Complete on-chip BTS PHY & MAC baseband processing
- Embedded high-speed network processor, DSP core and control CPUs
- On-chip IEEE1588 synchronization module
- Most integrated SoC in the market - lowest-cost femtocell designs

Open SoC platform

- Multi-core DSP / CPU architecture - SW-centric PHY and MAC
- High processing power (> 500MIPS free for application SW integration)
- Unique SW architecture - flexible support of vendor differentiation
- Carrier-grade, in-field upgradeable - future proof design

DAN2200 SoC Characteristics

PHY

- SOFDMA with 512 and 1024 point FFT
- 3.5MHz, 5MHz, 7MHz, 10MHz
- QPSK, 16QAM, 64QAM (DL and UL)
- PUSC, FUSC, and AMC
- Multiple zones (incl. MIMO zones)
- DL MIMO - Matrix A (STC), Matrix B (SM)
- 40Mbps DL throughput (@10MHz, 3:1)
- UL MRC / MMSE; UL collaborative MIMO
- Power control: open and closed loop
- Over-the-air Sync to WiMAX BTS
- IEEE1588v2 Synchronization capability
- Cell sniffing capabilities

MAC and Networking

- Supports IP-CS and ETH-CS
- Software configurable packet classifier
- Concatenation, fragmentation, packing and re-assembly
- Packet processing rate > 70,000pps
- Up to 2,000 CIDs; 250 active users
- Supports all WiMAX QoS grades
- Advanced Scheduler: Proportional Fair, traffic shaping, congestion management
- Advanced rate adaptation mechanism
- ARQ and H-ARQ
- Complete security package: Data Encryption, PKMv2, EAP authentication
- IPSEC tunnels to core network
- Handover (MS and BS initiated and handover optimization)
- Sleep and Idle modes

Embedded Processors

- Powerful DSP core
- 4 x Tensilca Xtensa RISC, 200MHz
- 3 x ARM926EJ, 200MHz

Interfaces

- 2 RFIC interfaces
- Data Interface: GB Ethernet (GMII)
- Mng. interface: GB Ethernet (GMII)
- Memories: Serial-FLASH, SDRAM
- GPS interface - 1pps and 10MHz input

Physical

- 19 mm x 19 mm, PBGA 484
- Lead-free RoHS compliant
- Operating conditions -40c to +85c
- Power consumption < 1W

DAN2200 SoC Main Benefits

• Lowest cost femtocell design

Integrating a complete baseband PHY and MAC, network processing unit, DSP core, control CPUs, and sync module on a single chip, the DAN2200 SoC is by far the most integrated femtocell chip on the market. This highly integrated SoC design eliminates the need of costly adjunct components, making it the lowest BOM femtocell design architecture on the market.

• Highest performance femtocell

The DAN2200 SoC is based on DesignArt's DAN2400 SoC powerful architecture, enabling exceptional femtocell base station performance - supporting 2x2 MIMO in downlink and uplink, 40Mbps downlink throughput, a non-blocking packet processing rate enabling highest capacity even with 64 bytes packets, and support of up to 250 simultaneous active users.

• Integrated capabilities for over-the-air synchronization and cell sniffing

The DAN2200 SoC integrates CPE / MS device capabilities, allowing the femtocell to synchronize on external base stations, enabling a unique and low-cost solution for robust femtocell network synchronization. Furthermore, a femtocell based on the DAN2200 chip provides "cell sniffing" mechanisms for automated interference management, self-configuration and frequency planning.

• Cost-effective service application SW integration

With multiple embedded processor cores, the DAN2200 offers spare networking and control processing power (> 500MIPS), enabling the cost effective integration of optional home gateway applications (e.g., VoIP ATA), thus eliminating additional processor components.

• Open SW platform

Equipment vendors, as well as operators, need to differentiate themselves in the market place, based on flexible and customizable network offerings. The DAN2200 SoC integrates SW centric implementations of WiMAX PHY, MAC and control plane layers, based on a targeted multi-core architecture. Vendors can integrate their own capabilities with DesignArt's complete SW solution - on any layer - providing operators with differentiated best-of-breed capabilities.

DAN2200 SoC Reference Design

The DAN2200-RD is a complete WiMAX Femtocell reference design based on the DAN2200 SoC. It is equipped with 2 RF ports, 2 Ethernet ports, memories, synchronization devices, and power supply module. The DAN2200-RD is delivered to customers with DesignArt's comprehensive SW stack, comprising of complete PHY and MAC modules, running on the SoC's embedded processors. The package contains a well defined API, and complete documentation set.

The following figure demonstrates DAN2200-RD femtocell base station Reference Design.

DAN2200-RD board

