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BEYOND BA22-AP BASIC APPLICATION

Basic 32-bit Application Processor

OVERVIEW

Highly configurable Beyond BA22-AP Basic Application Processor, engineered for running embedded system applications, is extremely lucrative alternative to existing solutions in terms of high performance and low power consumption. Using off-chip instructions and data memories, it runs real-time operating system or even general-purpose OS, such as Linux or Android.

Designed for easy reuse and integration the BA22-AP has been rigorously verified, is silicon proven and could be employed for applications ranging from home entertainment consumer electronics to automotive.
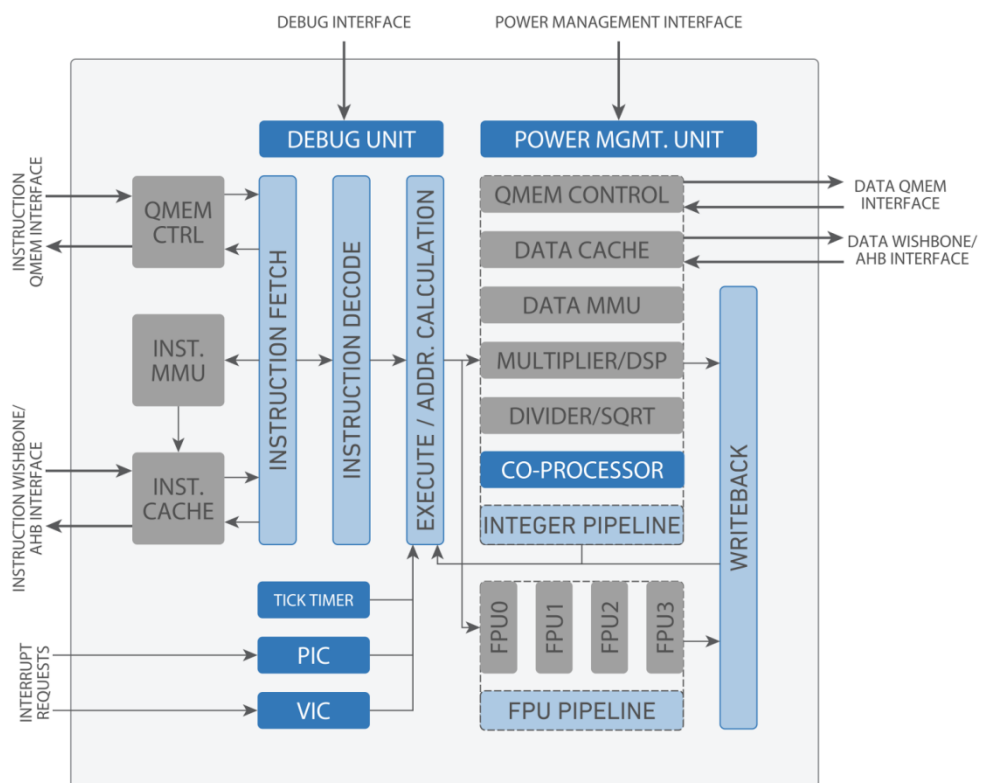
KEY BENEFITS

- 1.79 DMIPS/MHz, +450 MHz in a 65 nm
- 35k gates and low as 0.05mW/MHz on 90nm
- Complete software development environment
- Affordable silicon and license costs

APPLICATIONS

- Set top boxes and music players
- Image and video processing
- Industrial test and measurements
- Automotive
- Home entertainment consumer electronics

BLOCK DIAGRAM

FEATURES

High Performance 32-bit CPU

- 1.66 DMIPS/MHz
- Variable length (16/24/32/48 bits) instruction encoding
- Single-cycle execution on most instructions
- Fast and precise internal interrupt response
- Custom user instructions

Small Silicon Footprint & Low Power Consumption

- Industry-leading code density
  - Compact code minimizes instruction memory area & power
  - 32-bit architecture reduces power-draining memory accesses
- 35k gates and low as 0.05mW/MHz on 90nm

Fast & Flexible Memory Access

- Harvard-style, separate Instructions and Data caches
- Tightly coupled Quick Memory for fast and deterministic access to code and/or data
- Memory Management Unit for virtual memory support

Efficient Power Management

- Further reduces power consumption by 2x to 100x using dynamic clock gating for individual units
- Software controlled clock frequency in slow and idle modes
- Interrupt wake-up in doze and sleep modes

Advanced Debug Capability

- Conventional target-debug agent with a debug exception handler
- Non-intrusive debug/trace for both CPU and system
- Complex chained watchpoint and breakpoint conditions

Optional Processor Units

- Programmable Vectored Interrupt Controller
- Timer Unit
- Debug Unit
  - MDB support
  - Trace port support
- ROM patching Unit
- Floating Point Unit
- Hardware Multiplier/Divider

Integrated Peripherals

- Standard:32 bit tick timer, programmable interrupt controller with 32 maskable interrupt sources

Optional Peripherals

- AMBA bus infrastructure
- Microcontroller peripherals such as GPIO, UART, Real-Time Clock, and Timers
- Serial communication cores such as I2C and SPI
- Memory controllers, interconnect IP and more

THE BA2 INSTRUCTION SET

The BA2 instruction set provides extreme code density without compromises on performance, ease of use, or scalability. It features:

- A linear, 32-bit address space
- Variable length instructions: 16, 24, 32, or 48 bits
- Simple memory addressing modes
- A configurable number of 12 to 32 general purpose registers
- Efficient flow-control, arithmetic, and load/store instructions
- Floating point and DSP extensions

RELATED PRODUCTS

The BA2™ Processor Family includes a set of royalty-free, pre-configured products intended for different applications:

- BA22-DE Deeply Embedded Processor, for deeply embedded applications that use on-chip instruction and data memories.
- BA22-EM Embedded Processor, for deeply embedded applications that use off-chip instruction and data memories and that may need to run a real-time operating system.
- BA25 Advanced Application Processor, for demanding systems running applications on general purpose operating systems such as Linux and Android.

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Beyond Semiconductor is addressing challenges of systemic complexity in today's electronic devices, empowering its customers to create new experiences for end users. Initially known for its processor expertise, Beyond quickly gained acceptance among top semiconductor companies and evolved into global company leveraging processing, software and system-wide view competence to provide its customers with effectively designed IP and ASICs.

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