

Derivative SoC Design

For SoC products to be competitive, the designs must be as efficient as humanly possible. When it comes to System-on-Chip (SoC), 75%-80% of designs are redesigns. Rather than scrapping their existing design investments and starting over, many companies have opted for containing SoC development costs by adopting and modifying the “Platform Chip” strategy and chip architecture to suit the specific market needs.

ACL Digital Value Offerings

ACL Digital's Derivative SoC Design/Implementation expertise establishes it as a reliable partner to enable first-time right design of low power SoC designs.

Architecture definition based on system level requirements

- SoC Design to meet Software/Application Requirements
- SoC architecture definition
- Low power consumption, area optimization, integration of analog / mixed signal, RF on the same die

Verification to ensure 100% functional and code coverage

- Multi-Level Functional Verification(IP, Sub System and SoC level)
- SoC testbench development for Mixed Signal Simulations to address power, timing
- Analog block model development for verification environment (WReal, VerilogA)
- Power aware RTL simulations and GLS
- FPGA prototyping to augment verification and facilitate early software maturity

Test and silicon validation of the device

- Software development for test
- Firmware development and BSP
- Firmware testing for system performance

Integration of Sense, Compute, communication circuits on a single die

- ARM Cortex M series expertise for such devices
- **Analog Mixed Signal:** Data Convertors, Power Management, PVT Sensors
- **Sensor interfaces:** I3C
- **Wireless radio:** BTLE, Zigbee

Power aware DFT

Physical Design for SoCs

- Process selection for optimized die size, analog mixed signal/RF integration
- **Power Optimization:** Cell selection for power optimization, clock tree, etc.
- Isolation of analog/RF from Digital partitions
- Reliability/Packaging performance requirements

Turnkey design service

Market segments we cater to

Consumer Devices

Battery or non-battery operated

- Home Automation: Alarms, Cameras, Switches
- Wellness, Health Monitoring
- Personal Entertainment: Portable Audio, Headphones, etc.
- Toys: Wireless enabled, Sensors integrated

Industrial IOT

- Smart City
- Factory Sensor /Automation

Semiconductor

- Derivative Designs for Automotive, Networking, IOT, Industrial SoCs

OEMs



Success Story

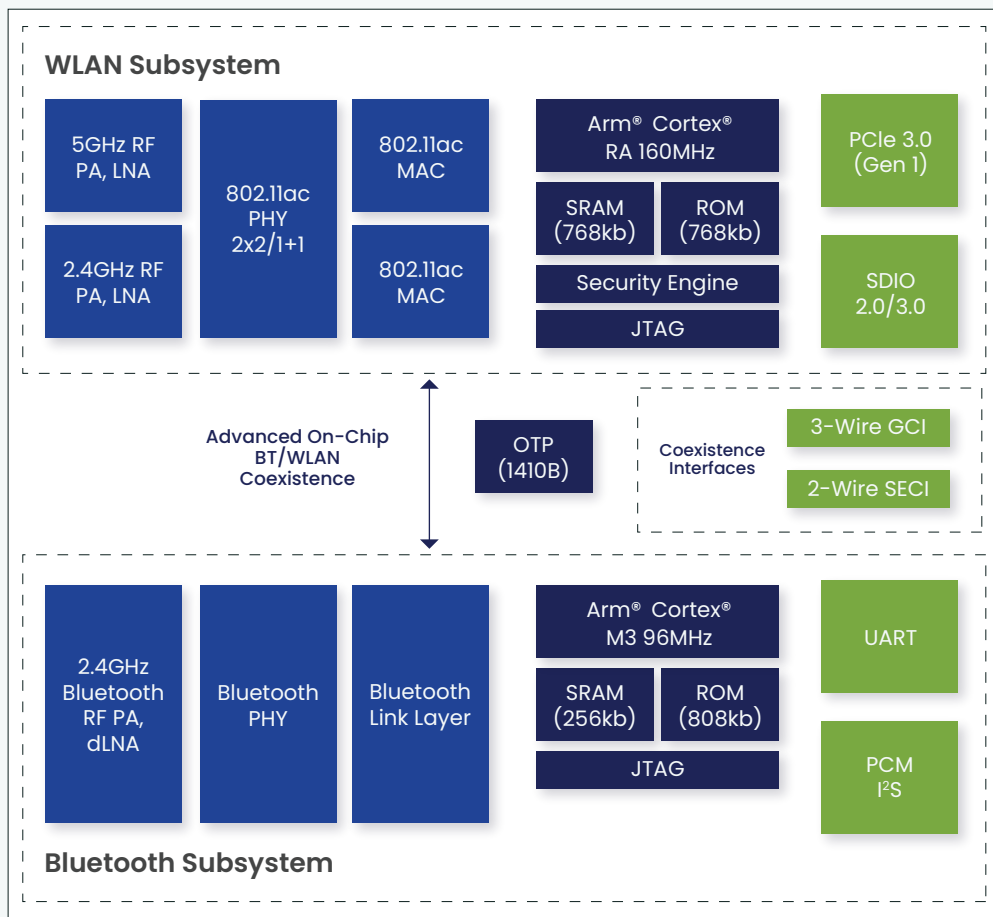
ACL Digital helped a Fabless Semiconductor Company with implementation of a low power IoT derivative chip.

Design Feature & challenges

- Combo connectivity solution with 802.12ax Wi-Fi and 5.2 BT
- Mainstream High Performance process node, FPBGA
- WLAN -960MHz max, ARM CR4 - 360MHz, BT - 96 MHz. DSP - 96MHz
- Peripherals: PCIE, SMIF, SDIO, UART, I2C, SPI, PCM, I2S, JTAG, SWD and CoEx
- PPA Optimization
- RF Co-existence with High Speed Digital
- Complex Low Power State Machine Verification
- IP selection according to power targets
- Power Optimization: Supported DVFS, Retention (scan-chain based), Sleep-Wakeup mechanisms

Contributions & Outcome

- Implementation of (RTL2GDSII)
- Analyzed the Channel Length, VT analysis and its usage based on PPA targets
- Worked with RTL and DFT teams to define modes and corners
- Keep switchable devices away from sensitive RF, Interference aware clocking scheme
- DVFS aware STA corner definitions and analysis
- Switchable domain, UPF development from scratch
- Custom Placement strategy
- Full chip and sub chip verification sign off
- First pass success






Business Benefits

- Cost Savings
- Form Factor reduction
- Lower Power consumption
- Improve reliability
- Reduced time to market by
 - Working with client on architecture to ensure right design choices
 - Working with TSMC to make appropriate technology selections
 - Leveraging turnkey design expertise to enable first time right design of low power SoC designs

ACL Digital is a design-led Digital Experience, Product Innovation, Engineering and Enterprise IT offerings leader. From strategy, to design, implementation and management we help accelerate innovation and transform businesses. ACL Digital is a part of ALTEN group, a leader in technology consulting and engineering services.

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