NXP® 88MW32X 802.11N WI-FI® MICROCONTROLLER SOC

High integration and low-power operation in the 88MW320/322 WLAN microcontroller system-on-chip (SoC), making it an ideal solution for low-cost, high efficiency smart device, appliance, and energy applications.

PRODUCT OVERVIEW

Several features of the NXP 88MW320/322 SoC enable low system costs and high WLAN protocol processing. For example, the high degree of integration in the SoC requires only one 3.3 V power input, a 38.4 MHz crystal and SPI flash, while the RF path needs only a low-pass filter for antenna connection.

Proven and mature IEEE 802.11n/g/b NXP technology powers a full-featured WLAN subsystem in the SoC. This WLAN subsystem integrates a WLAN MAC, baseband, and direct-conversion RF radio with integrated PA, LINA and transmit/receive switch. It also integrates a CPU subsystem with integrated memory to run NXP WLAN firmware to handle real-time WLAN protocol processing to offload many WLAN functions from the main application CPU.

An Arm® Cortex®-M4F CPU that operates up to 200 MHz powers the 88MW320/322 application subsystem. The device supports an integrated 512 KB SRAM, 128 KB mask ROM and a QSPI interface to external flash. An integrated flash controller with a 32 KB SRAM cache enables execute in place (XIP) support for firmware from flash.

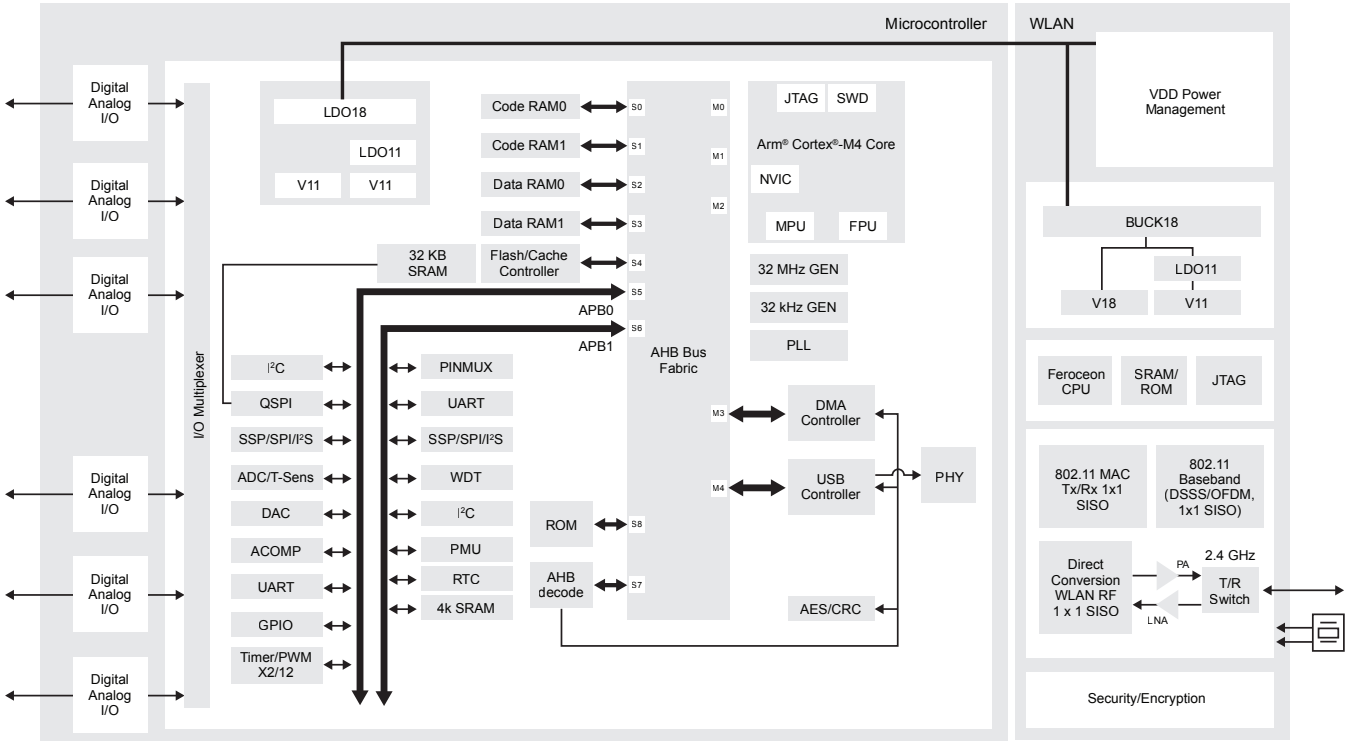
The SoC is designed for low-power operation and includes several low-power states and fast wake-up times. Multiple power domains and clocks can be individually shut down to save power. The SoC also has a high-efficiency internal PA that can be operated in low-power mode to save power. The microcontroller and WLAN subsystems can be placed into low-power states, independently, supporting a variety of application use cases. An internal DC-DC regulator provides the 1.8 V rail for the WLAN subsystem.

The SoC provides a full array of peripheral interfaces including SSP/SPI/I²S (3x), UART (3x), I²C (2x), general-purpose timers and PWM, ADC, DAC, analog comparator, and GPIOs. It also includes a hardware cryptographic engine, RTC, and watchdog timer.

The 88MW322 SoC includes a high-speed USB On-The-Go (OTG) interface to enable USB audio, video and other applications.

A complete set of digital and analog interfaces enables direct interfacing for I/O and avoids the need for external chips. The application CPU can be used to support custom application development and avoids the need for another microcontroller or processor.

88MW32X BLOCK DIAGRAM



APPLICATIONS

- Smart Home—smart outlet, light switch, security camera, thermostat, sprinkler controller, sensor, door lock, door bell, garage door, security system
- Industrial—building automation, smart lighting, Wi-Fi to other radio bridge, point of sale (POS) terminals
- Smart Devices—coffee pot, rice cooker, vacuum cleaner, air purifier, pet monitor, weighing scale, glucometer, blood pressure monitor, fitness equipment
- Smart Appliances—refrigerator, washer, dryer, oven range, microwave, dishwasher, water heater, air conditioner
- Smart Accessories—smart speakers, headset, alarm clock, gaming accessory, remote control
- Gateways—Bluetooth Smart Mesh and other radios to Wi-Fi/IP network

KEY FEATURES

- Highly integrated SoC requiring very few external components for a full system operation
- Multiple low-power modes and fast wake-up times
- Full-featured, single stream 802.11n/g/b WLAN
- High-efficiency PA with a low-power (10 dB) mode
- Cortex-M4F application CPU for applications with integrated 512 KB SRAM and 128 KB mask ROM
- Flash controller with embedded 32 KB SRAM cache to support XIP from external SPI flash
- Secure boot
- Full set of digital and analog I/O interfaces

POWER MANAGEMENT

- Power modes—active, idle, standby, sleep, shutoff, power-down
- Integrated high-efficiency buck DC-DC converter
- Independent power domains
- Brown-out detection
- Integrated POR
- Wake-up through dedicated GPIO, IRQ, and RTC

CHIP PACKAGE

- 88MW320—68-pin QFN, 8 x 8 mm
  - USB OTG not supported
  - 35 GPIOs
  - 2 GPTs
- 88MW322—88-pin QFN, 10 x 10 mm
- – USB OTG supported
- – 50 GPIOs
- – 4 GPTs

TEMPERATURE

- Commercial: 0° to 70° C
- Extended: -30° to 85° C
- Industrial: -40° to 105° C
- Storage: -55° to 125° C

PACKAGE FEATURE DIFFERENCES[1]

Features	68-Pin	88-Pin
GPIO	35 total GPIO_0 to GPIO_10 GPIO_16 GPIO_22 to GPIO_33 GPIO_39 to GPIO_49	50 total GPIO_0 to GPIO_49
USB 2.0 OTG	—	1
GPT	2	4

[1] All I/O features are muxed on GPIOs, except WLAN RF TX/RX, USB, reference clock, and reset functionality.