At Analog Devices, we make technologies that sense, measure, interpret, and connect—bridging the physical and digital worlds to form the foundation of the Internet of Things. Our technologies are designed to maximize system-level intelligence and reliability, enabling applications where the quality and integrity of data and insights are mission critical. The brain of the connected solution—processors—combines hardware and advanced algorithms to interpret data to deliver intelligence, functionality, and localized decision making for IoT solutions. They offer class leading, ultra low power active and hibernate modes for IoT applications where power consumption, security, and robustness are key requirements. System power can be optimized with digital sensors and ultra low power transceivers using SensorStrobe™ technology in the ADuCM4050.

Features

- Up to 52 MHz ARM® Cortex®-M4F with FPU and MPU
- Power
  - Active (full-on mode) <40 μA/MHz (typical)
  - Flexi (core in sleep, peripherals active) <100 μA (typical)
  - Hibernate (with SRAM retention) <680 nA (typical)
  - Shutdown (optional RTC active) <50 nA (typical)
  - Built-in power management with single-supply operation (VBAT): 1.74 V to 3.6 V
- ADC
  - 12-bit, 1.8 MSPS SAR ADC for housekeeping functions
  - Built-in power monitoring capability
- Memory
  - 512 kB of embedded flash memory with ECC
  - 128 kB of configurable system SRAM with parity
  - Up to 124 kB of SRAM retained in hibernate mode
  - 4 kB of cache memory to reduce active power when executing from flash
- Security
  - Hardware crypto accelerator supporting AES-128, AES-256, SHA-256, HMAC, protected key store, and key wrap/unwrap
  - Support for ECB, CBC, CTR, CBC-MAC, CCM, and CCM*
  - True random number generator (TRNG)
  - User code protection for protecting customer IP software
  - Prevents repurposing the part with secure software upgrade via UART
- Digital peripherals
  - Three SPI interfaces with hardware flow control to enable glueless interface to sensors, radios, and converters
  - PC and two UART interfaces
  - SPORT for natively interfacing with converters and radios
  - Programmable GPIOs (44 in LFCSP and 51 in WLCSP)
  - Three general-purpose timers with PWM support
  - One RGB timer
  - One RTC for keeping wall clock time
  - One FLEX_RTC with four SensorStrobe outputs for precise time-synchronized sampling of external sensors
  - Programmable beeper
  - 27-channel DMA controller—dedicated DMA channels for each peripheral
  - Flexible interrupt sources for wake-up from hibernate
  - Four external interrupts, two UARTs, and two RTCs
- Packages and operating range
  - 64-lead LFCSP and 72-ball WLCSP
  - Industrial temperature range
- Target IoT Applications Include:
  - Smart health
  - Smart city
  - Smart building
  - Smart factory
  - Smart agriculture
  - Smart energy

**Functional Block Diagram**

**Products**

<table>
<thead>
<tr>
<th>Generic Part Number</th>
<th>Engineering Sample Part Number*</th>
<th>Production Part Number**</th>
<th>Reel Info</th>
<th>Description</th>
<th>Package (Code)</th>
<th>Range2</th>
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</thead>
<tbody>
<tr>
<td>ADuC4050</td>
<td>ADuC4050BCBZ-U1</td>
<td>ADuC4050BCBZ-RL</td>
<td>13&quot;</td>
<td>ULP ARM Cortex-M4F with 512 kB embedded flash</td>
<td>72-ball WLCSP (CB-72-3)</td>
<td>−40°C to +85°C</td>
</tr>
<tr>
<td></td>
<td>ADuC4050BCBZ-R7</td>
<td>ADuC4050BCPZ</td>
<td>Individual</td>
<td>ULP ARM Cortex-M4F with 512 kB embedded flash</td>
<td>64-ball LFCSP (CP-64-17)</td>
<td>−40°C to +85°C</td>
</tr>
</tbody>
</table>

*These production parts will be orderable after official release.

**Evaluation Board**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
<th>RoHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADZS-U4050LF-EZKIT</td>
<td>Evaluation kit for ADuC4050 LF CSP package</td>
<td>$199.00</td>
<td>Yes</td>
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<tr>
<td>ADZS-U4050WL-EZKIT</td>
<td>Evaluation kit for ADuC4050 WLCSP package</td>
<td>$199.00</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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