



## 802.3at Power Over Ethernet Option Module for Cinnamon Bay SBC

ADI Engineering's PoE+ Option Module adds 802.3at to ADI's Intel Atom-based Cinnamon Bay SBC. The PoE+ Option Module can be used with any Cinnamon Bay SBC model, seamlessly upgrading its on-board Gb Ethernet port to 802.3at Power over Ethernet – allowing OEMs to easily create and deploy innovative “no new wires” PoE+ powered embedded systems with quick time to market and low cost.

802.3at is a next-generation standard recently ratified by the IEEE for high-power devices requiring more than 13 watts as allowed under the older 802.3af standard. After accounting for Cinnamon Bay SBC's power consumption, ADI's 802.3at PoE+ Option Module provides up to 20 watts to power your choice of peripherals – such as backlit LCD video displays, cameras, video encoders, Wi-Fi or cellular radios, mass storage devices, audio amplifiers and speakers, or any other device.

ADI's 802.3at Option Module is backwards compatible with older 802.3af 13 watt power sources, subject to the lower 802.3af power limit. The PoE+ Option Module is a turnkey 802.3at solution – all functions including the PD controller, electrically isolated high-efficiency converter, transient protection and EMI filtering are included. The only external components required are an RJ45 and PoE+ Ethernet transformer.



Cinnamon Bay SBC with PoE+ Option Module

### Cinnamon Bay SBC PoE+ Option Module Feature Set

Feature	Specification
Form Factor	43.9x72mm
Standards Compliance	<ul style="list-style-type: none"> <li>802.3at</li> <li>Backwards compatible with 802.3af PSEs, subject to 802.3af power limit</li> </ul>
Power Output	12VDC, 25W maximum
Voltage Input Range	40-58VDC, 600mA maximum
Converter Topology	Electrically isolated active clamp forward converter
Efficiency	85-90%, typical
Electrical Isolation	1500 VRMS
Input Transient Protection	60V clamp, 600W peak
Input Power Filtering	Differential and high-voltage line-to-ground capacitors, Common-mode choke
PoE Mode Support	Modes A and B
Host Board Connectors	Two 2x4 2mm center headers
Temperature Rating	<ul style="list-style-type: none"> <li>-40C to 70C ambient, convection cooled, without power de-rating</li> <li>Extended ranges possible with conductive cooling or power de-rating</li> </ul>



PoE+ Option Module



### Example PoE+ Powered Systems Using Cinnamon Bay SBC

Using the newly ratified 802.3at standard, ADI's Cinnamon Bay SBC and PoE+ Option Module enable OEMs and system integrators to quickly create complete “no new wires” PoE+ embedded systems with large backlit HD displays, up to 1080P HD video decoders, cameras, radios, disk drives, audio amplifiers and a wide variety of other peripherals needed by your application. Finally, customers can deploy complete Intel Atom embedded systems powered by PoE+ and running Linux or Windows.

Some example systems enabled by Cinnamon Bay SBC and PoE+ are shown to the right, but the possibilities are only limited by your imagination. In every case, PoE+ delivers substantial advantages in cost, reliability, manageability, and energy efficiency.

PoE+ Powered Application	Peripherals	Typical Power (Watts)
Interactive Kiosk / Digital Signage	17" HD Widescreen LCD + CCFL Backlight Touchscreen Audio Amplifier + Speakers Solid State or Rotating Drive	25W
Panel PC / Human Machine Interface	10.4" LCD + CCFL Backlight Touchscreen Solid State or Rotating Drive	15W
Wireless Video Surveillance	IR Illuminated IP Camera or Analog Camera + Video Encoder Motion Detector 802.11n Radio Solid State or Rotating Drive	15W
Headless Controller	Solid State or Rotating Drive	5W
Quad 802.11n Wireless Router / Mesh Node	Quad MiniPCI Daughtercard 4 ea. 802.11n Radios Solid State or Rotating Drive	25W

## Benefits of PoE+ in Embedded Systems

IEEE 802.3af PoE was originally developed for specialized networking applications needing 13 watts or less and where running local AC power to each device was either impossible, costly, or overly cumbersome – IP phones, enterprise-grade wireless access points, and certain classes of outdoor wireless infrastructure equipment, for example. As these systems have now been deployed in the field for years, additional benefits of PoE technology have emerged – benefits that are needed by many classes of embedded devices. But the 13 watt limit of 802.3af precluded widespread embedded systems usage.

Multiple factors are now converging to make Power Over Ethernet technology very appealing for mainstream embedded applications. First, the IEEE ratified the 802.3at PoE+ standard in September 2009, providing almost double the power of the older 13 watt 802.3af standard. The 25 watt power budget of 802.3at is required to support complex embedded systems incorporating multiple I/O devices, video displays, cameras, sensors and other peripherals. Second, low-power Intel Atom technology finally allows the creation of high-performance x86-based embedded systems – including large HD video displays and backlights - within the power limits of PoE+ technology. As a result, 802.3at PoE+ is transforming Power Over Ethernet from a limited niche technology to one squarely in the mainstream of embedded applications.

The benefits of PoE+ with Cinnamon Bay SBC include:

- “No new wires” deployment of PoE+ powered embedded devices requires only a single RJ45 network connection without running AC power or a separate power connection. The result is greatly simplified installation, at significant savings and without the need to run high-voltage AC to each device. Plus the one connection that must be made – the PoE+ enabled network cable – is a low voltage circuit, so installation does not require expensive licensed electrician labor or conduit. PoE+ cables and equipment can also be installed in plenum spaces.
- A 2003 study by Purdue University shows that when power wiring must be run, PoE saves between \$350 and \$1000 *per device* in installation costs. PoE yields a large and immediate savings by dramatically lowering hidden costs inherent with conventional powering methods.
- There are fewer external cables and connections at risk of failing, breaking, dislodging, or being cut, for improved system reliability.
- In scenarios where multiple embedded devices are being installed, elimination of individual AC power supplies from each embedded device greatly simplifies the overall system while reducing costs, eliminating multiple failure points, and improving energy efficiency.
- Since the per-unit AC power supplies are consolidated into a central PoE infrastructure, it is finally practical to add robust AC surge protection and backup power in an embedded setting, even in highly distributed systems or harsh environments. The result is a significant improvement in overall system availability, since operation of embedded devices can now be sustained even during an AC power failure. And the PoE+ power supplies and UPS's usually can be placed in protected environments even when the embedded devices are not.
- PoE+ offers smart power control and management, along with remote power diagnostics and status reporting. Now embedded systems can benefit from off-the-shelf power control, power management and remote diagnostics for improved availability and faster repair times.

## Other Daughtercards for Cinnamon Bay SBC

ADI offers three off-the-shelf daughtercards for Cinnamon Bay SBC. When needed, ADI or its customers can easily create application-specific daughtercards, transforming Cinnamon Bay SBC into a differentiated end product with low cost and quick time to market. Daughtercards can be powered by Cinnamon Bay SBC when operating from a PoE+ power source.

**IP Media Daughtercard:** Adds digital and analog HD and SD video outputs, digital and analog audio I/O, and expansion slots for Wi-Fi and cellular radios, and tuners (shown with Cinnamon Bay SBC).



**DVI or VGA Expansion Daughtercards:** Adds DVI or VGA video output, PCI Express slot, additional USB and RS-232 ports, and additional discrete I/O (shown with Cinnamon Bay SBC).



## Ordering Information

Order Part Number: 80201-0022-G00

## Contact Information

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## Available Through

