# MIO-2260

## Intel® Atom™ N455 MI/O-Ultra SBC, DDR3, 18-bit LVDS, VGA ,1 GbE, Mini PCIe, 2 USB, 2 COM, MIOe


VxWorks® Windows Embedded Linux QNX

CE FCC

## Features

- Embedded Intel® Atom™ N455 Single Core + ICH8M, DDR3 memory support
- Intel Gen 3.5 DX9, MPEG2 Decode in HW, Dual Independent display: 18-bit LVDS + VGA
- Supports 12 V +/- 10% input power and DC power hot plug design
- 1 Intel GbE support, Rich I/O interface with 2 COM, 1 SATA, 2 USB 2.0, GPIO, SMBus, CF, and MIOe expansion interface
- Supports embedded software APIs and Utilities

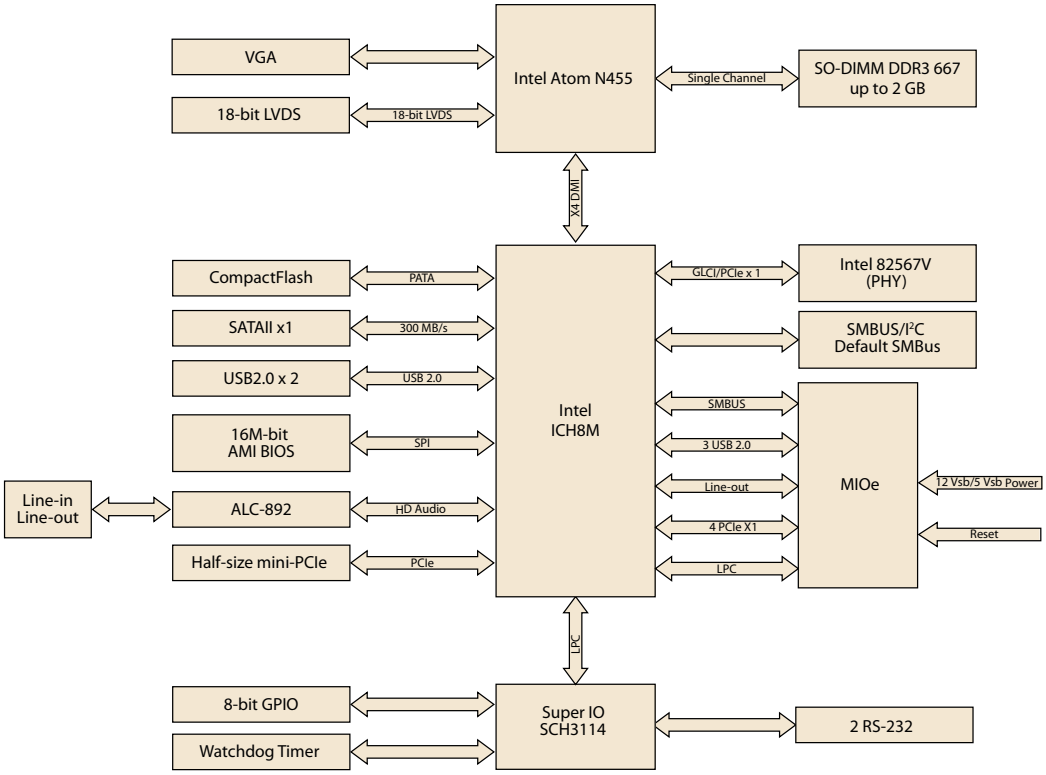
**Software APIs:** GPIO, H/W Monitor, Brightness, Watchdog, Backlight On/Off, SMBus & I²C, CPU Speed, System Throttling

**Utilities:** BIOS Flash, Monitoring, eSOS, Flash Lock, Embedded Security ID

## Specifications

| | | |
|---|---|---|
| Processor System | CPU | Intel Atom N455 Single Core 1.66 GHz Processor |
| | Frequency | 1.66 GHz |
| | L2 Cache | 512 KB |
| | System Chipset | Intel N455 + ICH8M |
| | BIOS | AMI 16 Mbit Flash BIOS |
| Memory | Technology | DDR3 667 MHz |
| | Max. Capacity | 2 GB |
| | Socket | 1 x 204-pin SODIMM |
| Display | Chipset | Intel Atom Processor N455 1.66GHz |
| | VRAM | Optimized Shared Memory Architecture up to 224 MB system memory |
| | Graphic Engine | Intel Gen 3.5 DX9, MPEG2 Decode in HW<br>Embedded Gen3.5+ GFX Core |
| | LVDS | LVDS: Single channel 18-bit LVDS up to WXGA 1366 x 768 |
| | VGA | Intel Atom N455 Single Core up to 1400 x 1050 (SXGA) |
| | Dual Display | VGA+LVDS |
| Ethernet | Speed | 10/100/1000 Mbps (Supports Wake on LAN) |
| | Controller | ICH8M + Intel 82567V |
| | Connector | RJ45 |
| Audio | Chipset | Realtek ALC892<br>High Definition Audio (HD), Line-in, Line out |
| WatchDog Timer | | Output System reset, Programmable counter from 1 ~ 255 minutes/ seconds |
| Storage | Compact Flash | Supports CompactFlach Card TYPE II (Primary Master IDE Channel) |
| | SATA | 1 SATA II (Max. Data Transfer Rate 300 MB/s) |
| Rear I/O | Serial | - |
| | Ethernet | 1 (10/100/1000Mbps) |
| | VGA | 1 |
| | USB | 2 |
| | DC Power Jack | 1 (support by request) |
| Internal I/O | Serial | 2 x RS-232 (ESD protection for RS-232: Air gap ±15 kV, Contact ±8 kV) |
| | I²C | 1 (Share SMBus pin , support by request) |
| | SMBUS | 1 |
| | GPIO | 8-bit GPIO (5 V tolerance) |
| Expansion | Mini PCI Express | 1 (half size) |
| | MIOe | 1 (SMBus, 3 x USB 2.0, 4 x PCIeX1, LPC, line out, 5 Vsb/12 Vsb power) |
| Power | Power Type | AT (Supports DC power hot plug design) |
| | Power Supply Voltage | Support single 12V input (12 V +/- 10%) |
| | Total peripheral power supply output | 5V@ 2.8A for CPU board and MI/O module totally, 12V@ 2A for MI/O module |
| | Power Consumption (Typical) | 0.64 A, 12 V |
| | Power Consumption (Max, test in HCT) | 0.86 A, 12 V |
| | Power Management | APM, ACPI |
| | Battery | Lithium 3 V/210 mAH |
| Environment | Operational | 0 ~ 60° C (32 ~ 140° F) (Operational humidity: 40° C @ 95% RH, Non-Condensing) |
| | Non-Operational | -40° C ~ 85° C and 60° C @ 95% RH, Non-Condensing |
| Physical Characteristics | Dimensions (L x W) | 100 x 72 mm (3.9" x 2.8") |
| | Total Height | 33.48 mm |
| | Weight | 0.42 kg (0.93 lb), weight of total package |

## Board Diagram




## Ordering Information

| Part No. | CPU | L2 Cache | LVDS | VGA | GbE | Audio | RS-232 | USB 2.0 | SATAII | GPIO | CF | MIOe | mini PCIe | DC power jack | Thermal Solution | Operational Temp. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MIO-2260NF-S6A1E | Intel Atom N455 1.66 GHz | 512 KB | 18-bit | Yes | 1 | Yes | 2 | 2 | 1 | 8-bit | 1 | 1 | 1 (half size) | - | Passive | 0 ~ 60° C |

## Packing List

| Part No. | Description | Quantity |
|---|---|---|
| | MIO-2260 SBC | |
| | Startup Manual | |
| | Utility CD | |
| 1700006291 | SATA Cable | 1 |
| 1701200220 | RS-232 x 2 ports 2.0 mm pitch 22 cm | 1 |
| 1700019156 | Audio cable 2.0 mm pitch 20 cm (line in & line out) | 1 |
| 1700019656 | SATA power cable 5P-1.25/5P-2.0+SATA 5P 15 cm | 1 |
| 9666226000E | Screw and stud pack (1 screw for mini-PCIe, 4 M3 studs and screws for heatsink) | 1 |
| 1960053175T001 | Passive heatsink 99.5 x 70.5 x 15.7 mm | |

## Optional Accessories

| Part No. | Description |
|---|---|
| 1960053176T001 | Heat spreader |

## Embedded OS/API

| Embedded OS/API | Part No. | Description |
|---|---|---|
| Win XPE | 2070010314 | XPE WES2009 V4.0 24MUI |
| | 2070010313 | XPE WES2009 V4.0 ENG |
| WinCE | 2070010331 | CE6.0 R3 Pro V6.0.0 ENG (3COM) |
| WES 7 | 2070009835 | Image WES7E Intel Lunar V5.0 ENG |
| QNX | | V6.5/ 6.4/ 6.3 |
| Vxwork | | V6.8 |
| Linux | | Ubuntu V10.04 |
| Software API | | SUSI V3.0 |

# Value-Added Software Services

**Software API:** An interface that defines the ways by which an application program may request services from libraries and/or operating systems. Provides not only the underlying drivers required but also a rich set of user-friendly, intelligent and integrated interfaces, which speeds development, enhances security and offers add-on value for Advantech platforms. It plays the role of catalyst between developer and solution, and makes Advantech embedded platforms easier and simpler to adopt and operate with customer applications.

## Software APIs

### Control

**GPIO**

General Purpose Input/Output is a flexible parallel interface that allows a variety of custom connections. It allows users to monitor the level of signal input or set the output status to switch on/off a device. Our API also provides Programmable GPIO, which allows developers to dynamically set the GPIO input or output status.

**SMBus**

SMBus is the System Management Bus defined by Intel® Corporation in 1995. It is used in personal computers and servers for low-speed system management communications. The SMBus API allows a developer to interface a embedded system environment and transfer serial messages using the SMBus protocols, allowing multiple simultaneous device control.

**I²C**

I²C is a bi-directional two wire bus that was developed by Philips for use in their televisions in the 1980s. The I²C API allows a developer to interface with an embedded system environment and transfer serial messages using the I²C protocols, allowing multiple simultaneous device control.

### Monitor

**Watchdog**

A watchdog timer (WDT) is a device that performs a specific operation after a certain period of time if something goes wrong and the system does not recover on its own. A watchdog timer can be programmed to perform a warm boot (restarting the system) after a certain number of seconds.

**Hardware Monitor**

The Hardware Monitor (HWM) API is a system health supervision API that inspects certain condition indexes, such as fan speed, temperature and voltage.

**Hardware Control**

The Hardware Control API allows developers to set the PWM (Pulse Width Modulation) value to adjust fan speed or other devices; it can also be used to adjust the LCD brightness.

### Display

**Brightness Control**

The Brightness Control API allows a developer to interface with an embedded device to easily control brightness.

**Backlight**

The Backlight API allows a developer to control the backlight (screen) on/off in an embedded device.

### Power Saving

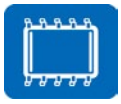
**CPU Speed**

Make use of Intel SpeedStep technology to reduce power power consumption. The system will automatically adjust the CPU Speed depending on system loading.

**System Throttling**

Refers to a series of methods for reducing power consumption in computers by lowering the clock frequency. These APIs allow the user to lower the clock from 87.5% to 12.5%.

## Software Utilities



**BIOS Flash**

The BIOS Flash utility allows customers to update the flash ROM BIOS version, or use it to back up current BIOS by copying it from the flash chip to a file on customers' disk. The BIOS Flash utility also provides a command line version and API for fast implementation into customized applications.

**Embedded Security ID**

The embedded application is the most important property of a system integrator. It contains valuable intellectual property, design knowledge and innovation, but it is easily copied! The Embedded Security ID utility provides reliable security functions for customers to secure their application data within embedded BIOS.

**Monitoring**

The Monitoring utility allows the customer to monitor system health, including voltage, CPU and system temperature and fan speed. These items are important to a device; if critical errors happen and are not solved immediately, permanent damage may be caused.

**eSOS**

The eSOS is a small OS stored in BIOS ROM. It will boot up in case of a main OS crash. It will diagnose the hardware status, and then send an e-mail to a designated administrator. The eSOS also provides remote connection: Telnet server and FTP server, allowing the administrator to rescue the system.

**Flash Lock**

Flash Lock is a mechanism that binds the board and CF card (SQFlash) together. The user can "Lock" SQFlash via the Flash Lock function and "Unlock" it via BIOS while booting. A locked SQFlash cannot be read by any card reader or boot from other platforms without a BIOS with the "Unlock" feature.





Last updated : 25-Nov-2011