Features

Performance for Industrial IoT Applications
- Intel Apollo Lake-I x7 E3950 Quad Core Processor
- Up to 8GB Soldered LPDDR4 System Memory
- Time Coordinated Computing
- Precision Time Measurement

Rugged Design for Demanding Environments
- -40°C to +85°C Operating Temperature Range
- PC/104 Small Form Factor
- Shock and Vibration Tested
- Wide Range Power Input (+9 - 36V DC)

Fast Graphics at High Resolutions
- Intel Low Power Gen9 Graphics Engine
- Multiple Displays Supported
- Full-HD and 3D Graphics Acceleration

Secure and Trusted Data
- TPM 2.0 Hardware Security Enabled
- Intel Security Engine
- Cryptographic Acceleration

Connectivity and I/O for Embedded Systems
- Dual Ethernet
- 1x USB 3.2 Gen 1 Type C and 8x USB 2.0
- 24x GPIO with Event Sense
- 4x Serial Ports, 1x Serial Console Port
- 1x I2C Bus

Expansion Options
- PCIe/104™ OneBank™
- M.2 Expansion Socket

PX1-C441-3950 Top View

Product Description

WINSYSTEMS PX1-C441-3950 single board computer (SBC) is a PC/104 form factor SBC with PCIe/104™ OneBank™ expansion featuring the Intel Atom Apollo Lake-I E3940 x7 Quad Core Processor. Its small size, rugged design and extended operational temperature make it a great fit for industrial IoT applications and embedded systems in the industrial control, transportation, Mil/COTS, and energy markets.
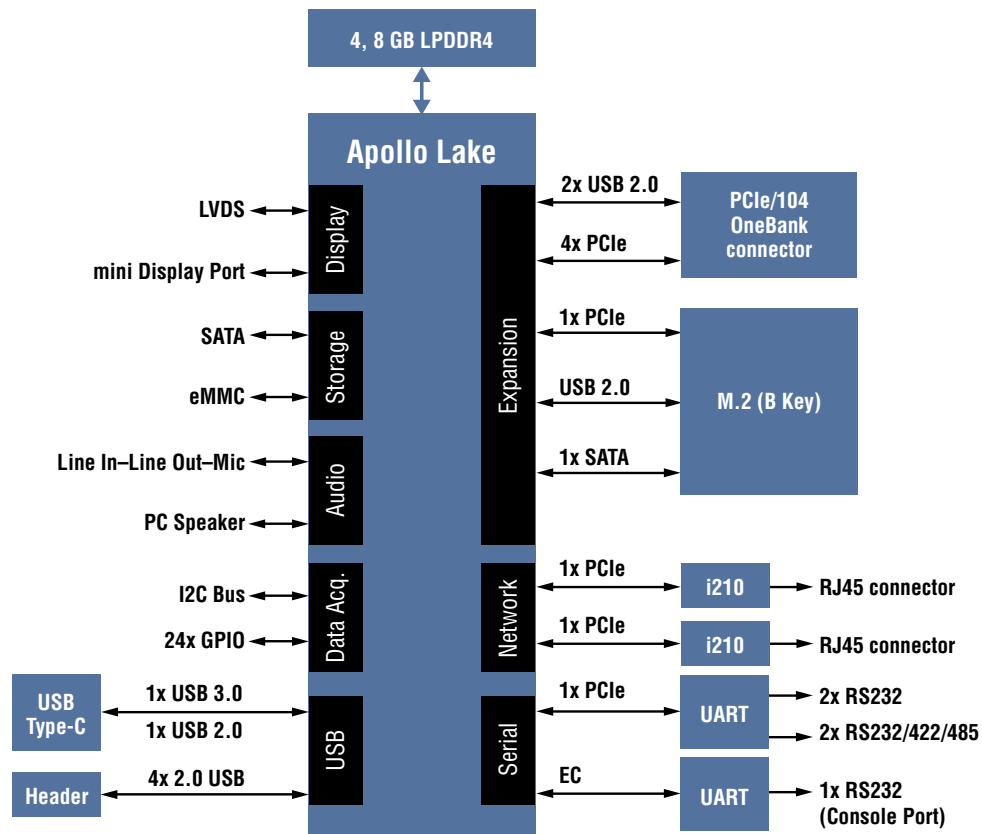
The WINSYSTEMS PX1-C441-3950 SBC features the Intel Atom Apollo Lake-I Quad core System on Chip (SoC) for processing and graphics. It includes up to 8 GB of soldered down LPDDR4 system memory and a non-removable eMMC device for solid state storage of an operating system (OS) and applications. In addition, the board supports M.2 and SATA devices.

This full-featured SBC has onboard I/O and supports simultaneous DisplayPort and LVDS video. It provides dual Gigabit Ethernet interfaces, eight USB 2.0 channels, one SuperSpeed USB 3.2 Gen 1 channel, four serial ports and one serial console port, 24 general purpose I/O (GPIO) lines, one I2C bus, stereo audio, and a watchdog timer.
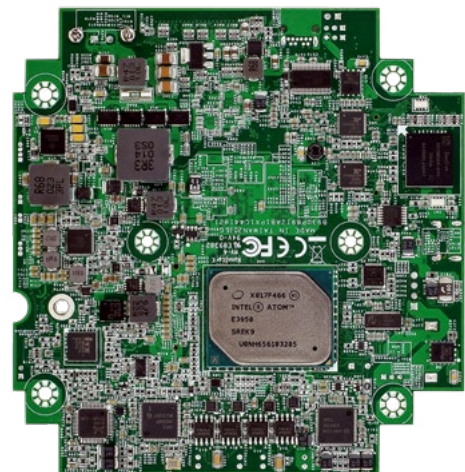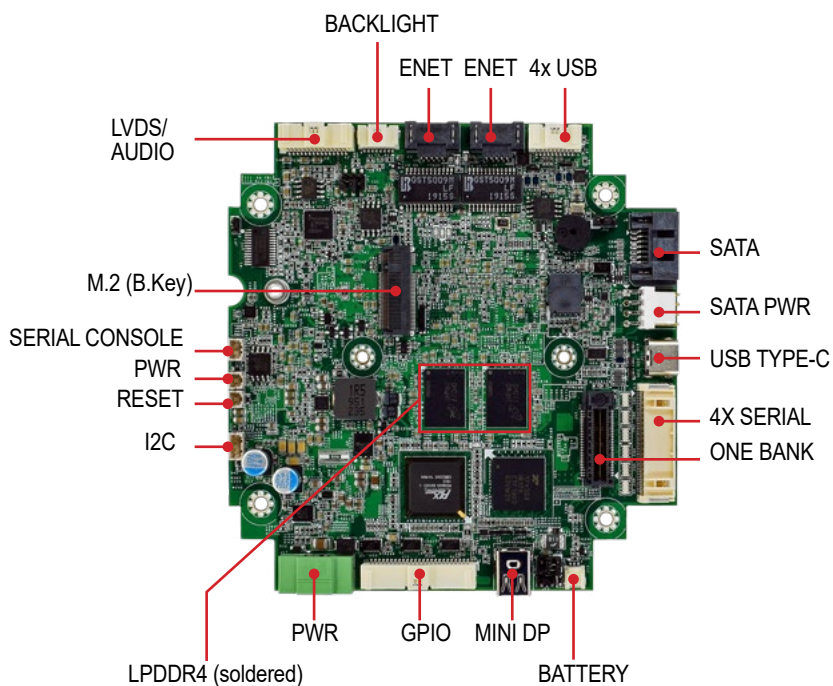
Additionally, the board has an M.2 socket and a PCIe/104 OneBank connector that provides four PCIe and two USB 2.0 I/O expansion channels.

The PX1-C441-3950 supports Linux, Windows® 10 desktop, Windows® 10 IoT, and other x86-compatible real-time operating systems. Drivers are available from the WINSYSTEMS website.

Block Diagram

Connectors

PX1-C441-3950

Technical Specifications

PART NUMBER	PX1-C441-3950
PROCESSOR	Intel Atom Apollo Lake-I x7 E3950 Quad Core, up to 2.0 GHz
MEMORY	• Up to 8GB of soldered down LPDDR4 system memory (RAM)
STORAGE	• eMMC Solid State Disk supporting up to 64 GB of Flash (Optional - MOQ required) • M.2 SSD support with 22mm x 42mm B-Key Socket • SATA Connector

DISPLAY	• Dual, simultaneous video output support
	   – DisplayPort
	   – LVDS

NETWORK INTERFACE	• Two 1000 Mbps using the Intel i210 LAN controller
	   – Supports Wake on LAN on both channels
	   – Status & Activity LEDs for both Ethernet controllers

ONBOARD I/O	• Eight USB 2.0 with overcurrent protection
	   – Four USB 2.0 available on USB header
	   – Two USB 2.0 available on PCIe/104 OneBank
	   – One USB 2.0 available on USB Type-C
	   – One USB 2.0 available on M.2
	• One USB 3.2 Gen 1 port with overcurrent protection available on the USB Type-C connector
	• Four 16C550-compatible, serial channels with speeds up to 30 Mbps in RS-422/485 modes
	   – Two capable of RS-232 operation
	   – Two capable of RS-232/422/485 operation
	• One RS232 serial console port
	• 24 lines of general purpose digital I/O (user selectable input/output supported voltages: 1.8/2.5/3.3/5V)
	• Stereo audio output
	• One I2C Bus
	• One SATA 3.0 channel
	• Speaker output for beep tones
	• Real-time Clock (RTC) with optional battery back up
	• Watchdog timer adjustable from 1 second to 255 minutes

EXPANSION BUS	• PCIe/104 OneBank connector with four PCIe channels and two USB 2.0 channels • M.2 connector with one USB 2.0 port, one SATA channel, and one PCIe channel
POWER	Input: +9 - 36V DC Typical: 9W Sleep: 3W Max: 23W
SOFTWARE	• UEFI compliant BIOS in SPI Flash Device • Compatible with Linux, Windows 10 Enterprise, Windows 10 IoT Core, and other x86 operating systems
ENVIRONMENTAL	• Operational from -40°C to +85°C (Requires airflow) • RoHS compliant
MECHANICAL	Dimensions - 4.55 x 4.39 inches (115.6 x 111.6 mm) Weight - 4.2 oz (120 gm) without heatsink PC Board thickness 0.078 inches

Order Information

SBC PART NUMBER	PX1-C441-3950-e-m-t e = 4/8/16/32/64 eMMC m = 1/2/4/8 GB system memory (RAM) t = Thermal Option: 0 = Heat spreader, 1 = Heat sink	

CABLES	• CBL-SET-441-2 cable and accessories set includes:
	   – USB Adapter ADP-IO-USB-002 (Adapter to 4x USB 2.0 Type A connectors)
	   – USB CBL-USB4-002-12 (Cable to USB Adapter, 12")
	   – Ethernet (2) CBL-ENET1-302-12 (ENET cable with two connectors, 12")
	   – Serial CBL-SER4-002-12 (Cable to four DB9 connectors, 12")
	   – Battery BAT-LTC-E-36-16-2 (External 3.6 V, 1650 mAH battery)
		• Additional Cables
		   – CBL-DIO24-002-12 | Digital I/O – 50-pin IDC Female, 12"
		   – CBL-DIO24-001-12 | Digital I/O – Molex Pico-Clasp, 12"
		   – CBL-SATA-701-20 | SATA – Data (Latching), 20"
		   – CBL-PWR-117-12 | Power cable to SATA drive
		   – CBL-LVDSAB-009-18 | LVDS/backlight with analog audio

OPTIONAL BATTERY	• BAT-LTC-E-36-16-2 (External 3.6 V, 1650 mAH) • BAT-LTC-E-36-27-2 (External 3.6 V, 2700 mAH)	

Expansion and Configuration Options

WINSYSTEMS provides additional cables, expansion cards, power supplies, and solid state drives to complete your embedded computing solution including data acquisition, communications, location, and other features via PCIe/104 and M.2 interfaces. Our engineers are available to guide you through product selection and configured options. The other product in this family is the PX1-C441-3940 embedded SBC.