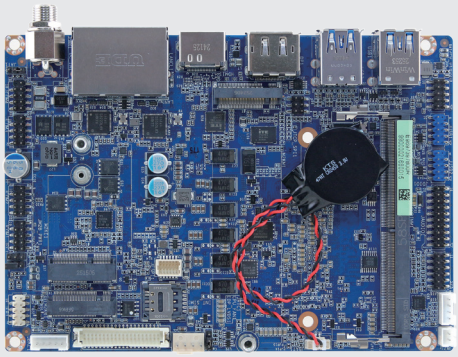
ECM-PTL

Intel® Core™ Ultra BGA processor (Series 3)
3.5" Micro Module



Features

- Bottom Layer Soldered Processor
- One 262-pin DDR5 6400MHz (H404), 7200MHz (H484) SO-DIMM socket, supports up to 48GB Max.
- Four Display, 1 x DP, 1 x HDMI, 1 x 2CH LVDS or eDP, 1 x USB Type C support DP
- Expansion Slot, M.2 Key-B, M.2 Key-E, M.2 Key-M
- Two Gigabit Ethernet, 2 x 2.5GbE
- DC in +12V ~ +24V

HDMI | DP++ | DDR5 SO-DIMM | USB 3.2 | RS232/422/485

Specifications

System Information	
Processor	Intel® Core™ Ultra Series 3 processors, BGA 2540 Intel® Core™ Ultra 5 325, 8C8T, 12MB, 2.1GHz (4.5GHz), TDP up to 25W Intel® Core™ Ultra 7 356H, 16C16T, 18MB, 1.9GHz (4.7GHz), TDP up to 25W
System Memory	1 x 262-pin DDR5 6400MHz (H404) SO-DIMM socket, 7200MHz (H484) SO-DIMM socket supports up to 32GB Max.
I/O Chipset	EC iTE IT5782VG
Watchdog Timer	H/W Reset, 1sec. ~ 65535sec and 1sec. or 1min./step
BIOS	AMI BIOS, 256Mbit SPI Flash ROM
H/W Status Monitor	CPU & system temperature monitoring Voltages monitoring
TPM	Onboard NuvoTon NPCT760AABYX supports TPM 2.0
Board	3.5"
Expansion	
Expansion	1 x M.2 Key M 2280 PCIE x4 Gen5 for storage NVMe SSD 1 x M.2 Key B 3042/3052/2242 (with 1 x PCIe x1, USB 3.2 Gen2, USB 2.0 with 1 x SIM card slot support WWAN+GNSS) support 5G (3.3V & 3.8V) * Only supports one SIM card (co-lay 1 x 10pin FPC connector for uSIM card adapter) 1 x M.2 Key E 2230 support WiFi module and CNVi (1 x PCIe x1 & USB 2.0 Signal)
Storage	
Storage	1 x M.2 (Key M, 2280) 1 x M.2 (Key B, 3042/3052/2242)
Display	
Graphic Chipset	Intel® Graphics
Spec. & Resolution	1 x HDMI 2.1b: 7680 x 4320@60Hz 1 x DP 2.1 UHBR10: Max: 7680 x 4320@30 Hz 1 x USB Type C support DP: 4096 x 2160@60Hz 1 x LVDS: 1920 x 1080 Dual channel 18/24-bits LVDS (Chrontel CH7513A-BF eDP to LVDS) or 1 x eDP: 1920 x 1080@60Hz (2 Lanes), default LVDS Note: EDP_LVDS1 Support 1 x LVDS or 1 x eDP
Multiple Display	Four Display
LVDS	1 x LVDS: 1920 x 1080 Dual channel 18/24-bits LVDS (Chrontel CH7513A-BF eDP to LVDS) or 1 x eDP: 1920 x 1080@60Hz (2 Lanes) Default LVDS. Note: EDP_LVDS1 Support 1 x LVDS or 1 x eDP

Audio	
Audio Codec	Realtek ALC888S HD Audio Decoding Controller
Audio Interface	Line-in, Mic-in, Line-out
Audio Amplifier	2 x 3W 4Ω Amplifier
Ethernet	
LAN Chipset	1 x Intel® I226LM 2.5 Gigabit Ethernet Controller 1 x Intel® I226V 2.5 Gigabit Ethernet Controller
Ethernet Interface	10/100/1000/2.5G Base-Tx GbE compatible
LAN Port	2 x RJ-45
Power Requirement	
Power Mode	AT/ATX (Default Setting: AT)
Software Support	
OS	Windows 11, Linux
Certification	
Certification Information	CE, FCC, RoHS Compliant
I/O	
USB	4 x USB 2.0 by pin header 2 x USB 3.2 Gen 2 x1 at rear I/O 1 x USB 3.2 Gen 2 x1 at rear I/O + 1 x USB Type-C 5V 3A at I/O (with USB 3.2 Gen 2x2 & DP 2.1 signal display output)
COM Port	2 x RS-232, 2 x RS-232/422/485
DIO	1 x 16-bit GPIO
MIO	1 x eSPI 1 x BIOS SPI 1 x SIM Card Slot
Mechanical & Environmental	
Operating Temp.	Standard Temperature CPU SKU: 0°C ~ 60°C (32~140°F) with 0.5m/s Air Flow Extend Temperature CPU SKU: TBC for extend Temp CPU SKU
Storage Temp.	-40°C ~ 75°C (-40°F ~ 167°F)
Operating Humidity	40°C @ 95% Relative Humidity, Non-condensing
Weight	0.44lbs (0.2kg)
Power Requirement	DC in +12V ~ +24V
Dimension (L x W)	5.7" x 4" (146mm x 101mm)

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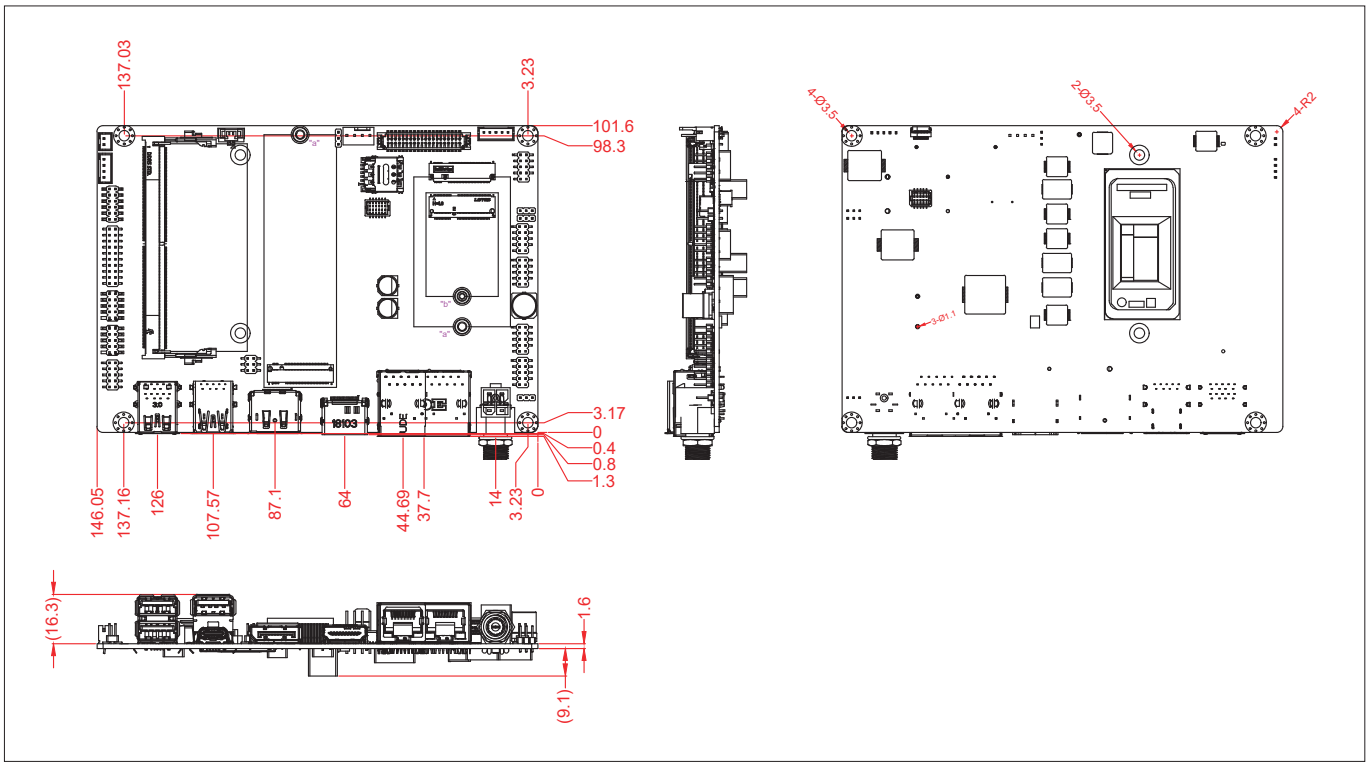
Mechanical Drawing



Ordering Information

P/N	Processor	Chipset	LAN	USB	COM	PCIe Slot	Power Input	Temp.	Note
ECM-PTL-325-A1R	Intel® Core™ Ultra 5 325, 8C8T, 12MB, 2.1GHz(4.5GHz), TDP up to 25W	NA	2	8	4	0	+12~24V DC	0°C ~ 60°C (32°F ~ 140°F)	NA
ECM-PTL-356H-A1R	Intel® Core™ Ultra 7 356H, 16C16T, 18MB, 1.9GHz(4.7GHz), TDP up to 25W	NA	2	8	4	0	+12~24V DC	0°C ~ 60°C (32°F ~ 140°F)	NA

Packing List

Item	Quantity
Flat cable 9P (M)-PHD 10P/2.0mm)	1
CPU Cooler	1
M.2 Screws	3
Graphene sheet	1

Optional Items

P/N	Optional Items
ECM-PTL-325-A1R	NA
ECM-PTL-356H-A1R	NA

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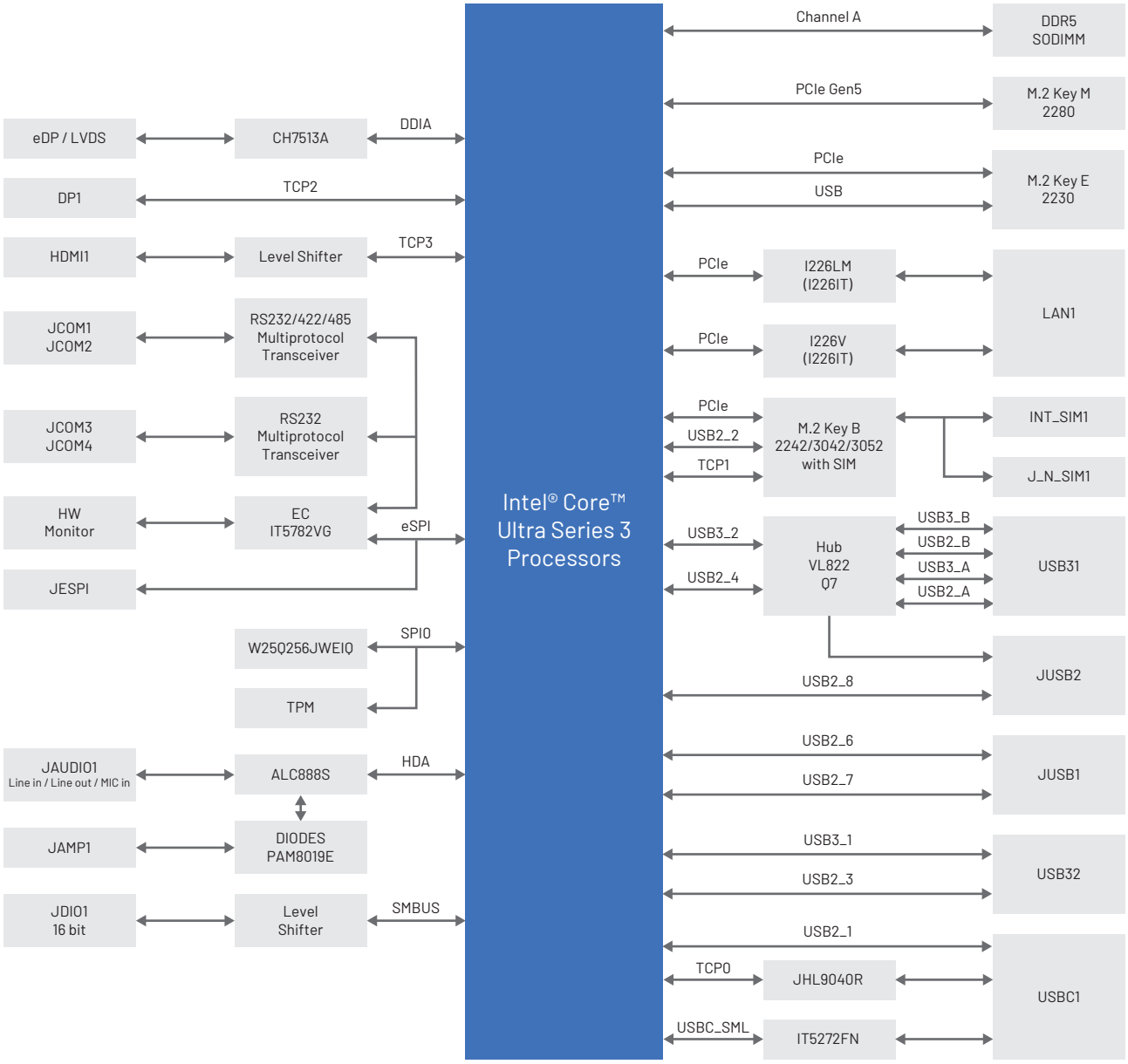
Block Diagram



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I/O Overview

