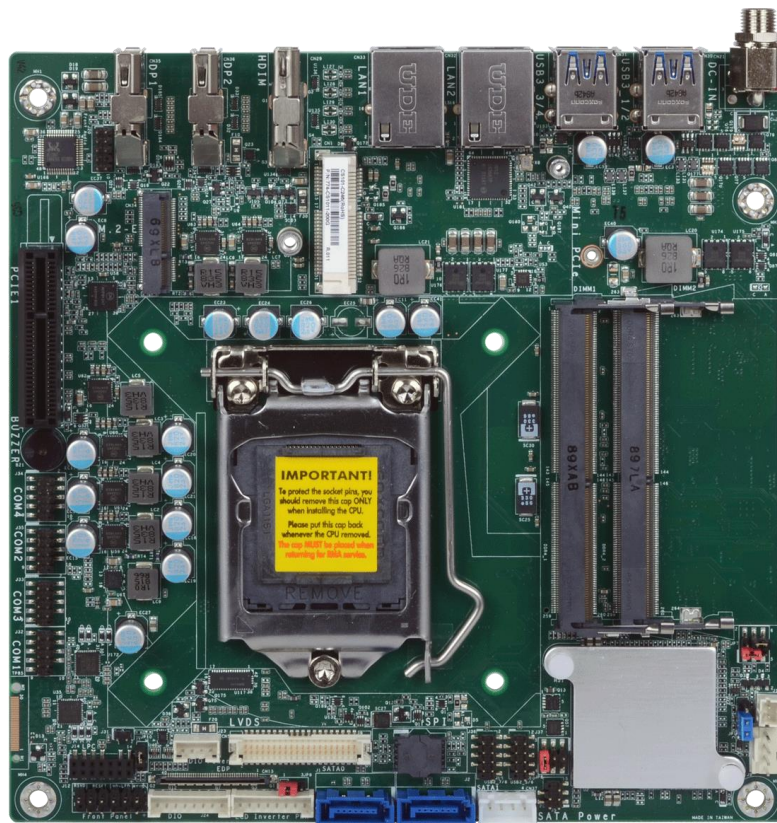


MBU4147

Industrial Motherboard Series



MBU4147

PRODUCT HIGHLIGHTS

- ▶ Intel 8th/9th Gen Intel® Core™ with Intel® C246
- ▶ 2 DDR4 SODIMM up to 32Gb
- ▶ Multiple expansion: 1 PCIe x4, 1 x Mini-PCIe, 1 x M.2 2280 M key, 1 x M.2 2230 E key
- ▶ Supports 3 independent displays
- ▶ Rich I/O: 2 Intel GbE, 4 COM, 4 USB 3.1, 4 USB 2.0
- ▶ 15-Year CPU Life Cycle Support Until Q2' 33 (Based on Intel IOTG Roadmap)



TECHNICAL INFORMATION

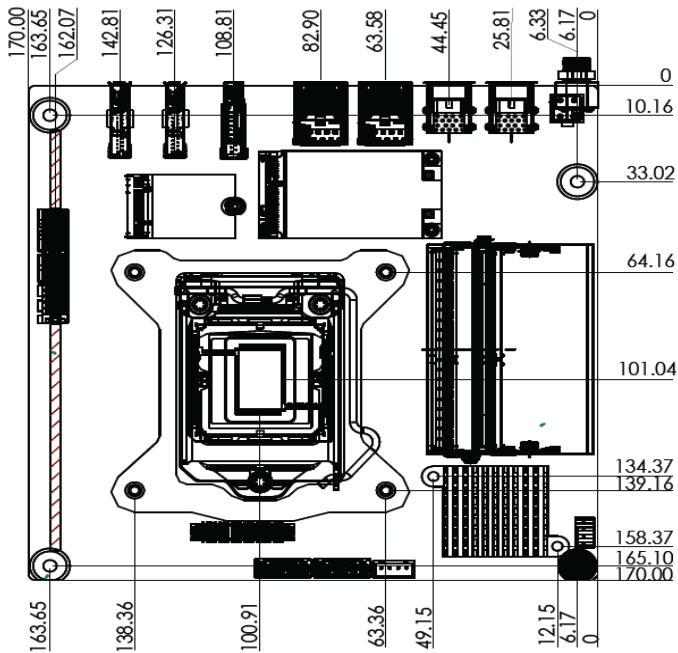
SYSTEM	PROCESSOR	9th Generation Intel® Core™ Processors, LGA 1151 Socket, TDP up to 65W Intel® Core i7-9700TE Processor (Core 8; Max speed 3.8 GHz; TDP 35W) Intel® Core i5-9500E Processor (Core 6; Max speed 4.2 GHz; TDP 65W) Intel® Core i5-9500TE Processor (Core 6; Max speed 3.6 GHz; TDP 35W) Intel® Core i3-9100E Processor (Core 4; Max speed 3.7 GHz; TDP 65W) (support ECC memory) Intel® Core i3-9100TE Processor (Core 4; Max speed 3.2 GHz; TDP 35W) (support ECC memory) 8th Generation Intel® Core™ Processors, LGA 1151 Socket, TDP up to 80W Intel® Xeon E-2176G Processor (Core 6; Max speed 4.7 GHz; TDP 80W) (support ECC memory) Intel® Core™ i7-8700 Processor (Core 6; Max speed 4.6 GHz; TDP 65W) Intel® Core™ i7-8700T Processor (Core 6; Max speed 4.0 GHz; TDP 35W) Intel® Core™ i5-8500 Processor (Core 6; Max speed 4.1 GHz; TDP 65W) Intel® Core™ i5-8500T Processor (Core 6; Max speed 3.5 GHz; TDP 35W) Intel® Core™ i3-8100 Processor (Core 4; Max speed 3.6 GHz; TDP 65W) (support ECC memory) Intel® Core™ i3-8100T Processor (Core 4; Max speed 3.1 GHz; TDP 35W) (support ECC memory) Intel® Pentium G5400 Processor (Core 2; Max speed 3.7 GHz; TDP 58W) Intel® Celeron G4900 Processor (Core 2; Max speed 3.1 GHz; TDP 54W)
	CHIPSET	Intel® C246 Chipset
	MEMORY	Two 260-pin SODIMM up to 32GB Dual Channel DDR4 2666MHz ECC/Non-ECC memory supported
	BIOS	AMI SPI 128Mbit
	GRAPHICS	Intel® UHD Graphics 630 (Pentium G5400, Celeron G4900 support Intel® UHD610)
GRAPHICS	CONTROLLER	Intel® UHD Graphics 630 (Pentium G5400, Celeron G4900 support Intel® UHD610)
	FEATURE	OpenGL 4.5, DirectX 12, OpenCL 2.1 HW Decode: AVC/H.264, MPEG2, VC1/WMV9, JPEG/MJPEG, HEVC/H265, VP8, VP9 HW Encode: AVC/H.264, MPEG2, JPEG, HEVC/H265, VP8, VP9
	DISPLAY	1 x LVDS/eDP (eDP MOQ available upon request) 1 x HDMI, 2 x DP++ LVDS: resolution up to 1920x1200 @ 60Hz eDP: resolution up to 4096x2304 @ 60Hz HDMI: resolution up to 4096x2160 @ 30Hz DP1.2: resolution up to 4096x2304 @ 60Hz
	TRIPLE DISPLAYS	DP++ +DP++ +HDMI, DP++ +DP++ +LVDS/eDP, DP++ +HDMI+LVDS/eDP
EXPANSION	INTERFACE	1 x PCIe x4 (Gen 3) 1 x Full-size Mini PCIe (co-lay with mSATA) 1 x M.2 2280 M Key (PCIex4/SATA) (PCIe x4/SATA) (Support NVMe and Intel® Optane memory) 1 x M.2 2230 E Key (USB/PCIe)
AUDIO	AUDIO CODEC	Realtek ALC888S-VD2-GR
ETHERNET	CONTROLLER	1 x Intel® I219LM PHY with iAMT12 and vPro (10/100/1000Mbps) (only Core i7/i5 supports iAMT) 1 x Intel® I210AT PCIe (10/100/1000Mbps)

TECHNICAL INFORMATION (CONTINUED)

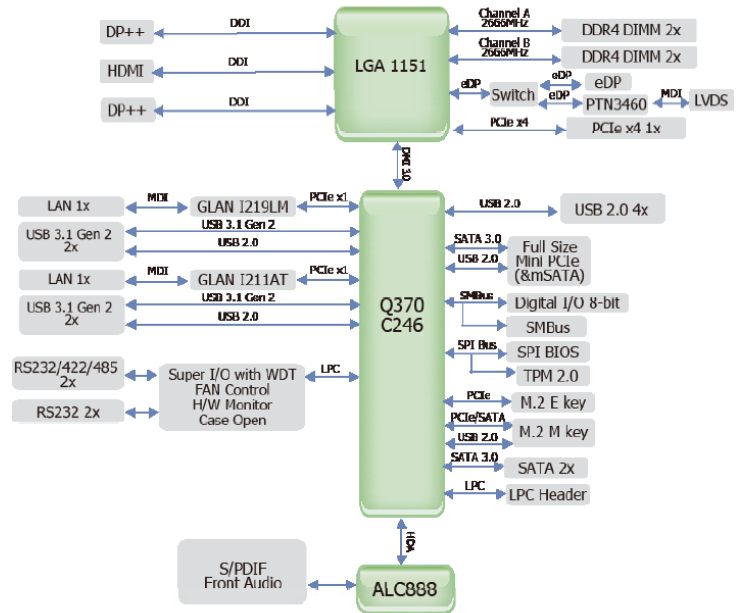
REAR I/O	ETHERNET	2 x GbE (RJ-45)
	SERIAL	N/A
	USB	4 x USB 3.1 Gen2
	PS/2	N/A
	DISPLAY	1 x HDMI 2 x DP++
	AUDIO	N/A
INTERNAL I/O	SERIAL	2 x RS-232/422/485 (2.0mm pitch) 2 x RS-232 (RS-232 w/ power)(2.0mm pitch)
	USB	4 x USB 2.0
	DISPLAY	1 x LVDS LCD Panel Connector 1 x eDP (MOQ available upon request)
	AUDIO	1 x Front Audio
	SATA	2 x SATA 3.0 (up to 6Gb/s) (RAID 0/1/5) 1 x SATA Power
	DIO	1 x 8-bit DIO
	LPC	N/A
	SMBUS	1 x SMBus
	OUTPUT & INTERVAL	System Reset, Programmable via Software from 1 to 255 Seconds
	SECURITY TPM	TPM2.0 (MOQ. available upon request)
	TYPE	Single 12V +/-5% DC
	CONNECTOR	DC-in Jack Right Angle Connector (4-pin) (MOQ available upon request) Straight Type Connector (4-pin) (MOQ available upon request)
	CONSUMPTION	Idle: i7-9700K 95W: 12V @ 0.96A (11.52W) Max: i7-9700K 95W: 12V @ 13.4A (160.8W)
	RTC BATTERY	CR2032 Coin Cell
OS SUPPORT		Windows 10 Pro 64-bit Windows 10 IoT Enterprise 64-bit Linux
ENVIRONMENT	TEMPERATURE	Operating: 0 to 60°C Storage: -40 to 85°C
	HUMIDITY	Operating: 5 to 90% RH Storage: 5 to 90% RH
	MTBF	590,510 hrs @ 25°C; 349,867 hrs @ 45°C; 225,814 hrs @ 60°C Calculation model: Telcordia Issue 4 Environment: GB, GC – Ground Benign, Controlled
MECHANICAL	DIMENSIONS	Mini-ITX Form Factor 170mm (6.7") x 170mm (6.7")
	HEIGHT	PCB: 1.6mm Top Side: 20mm Bottom Side: 3mm
CERTIFICATIONS		CE, FCC, RoHS, UL

MBU4147

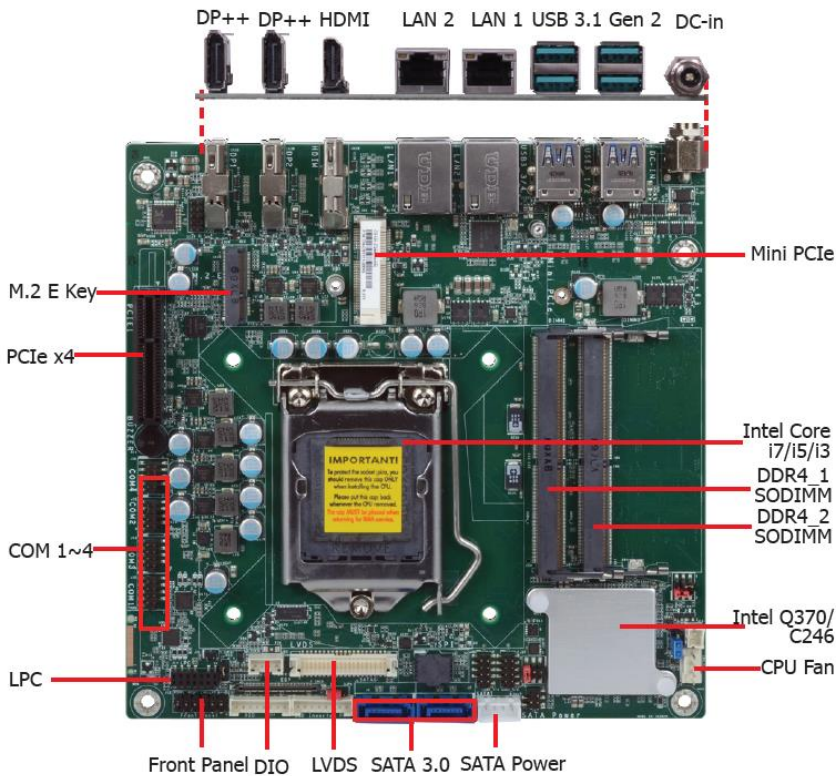
MECHANICAL DRAWING



BLOCK DIAGRAM



MOTHERBOARD LAYOUT



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