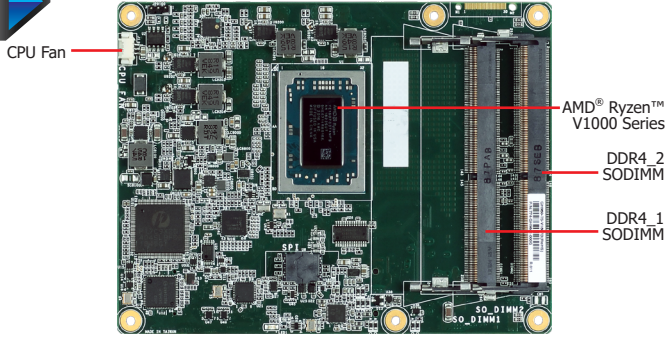


GH960

V1000/R1000



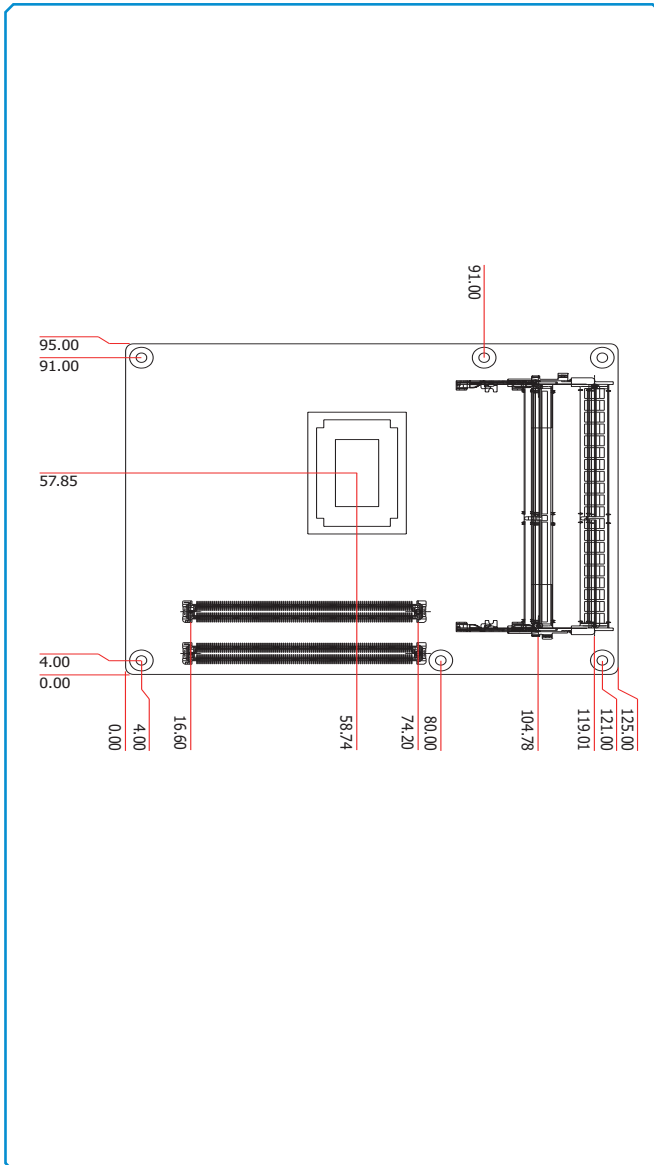
Features

- **Dual channel DDR4 2400/3200MHz SODIMM up to 32GB**
- **Four display ports: VGA*/DDI + LVDS*/eDP + 2 DDI Supports up to four independent displays**
- **DP++ resolution supports up to 4096x2304 @ 60Hz**
- **Multiple expansion: 1 PCIe x8, 6 PCIe x1**
- **Rich I/O: 1 Intel GbE, 4 USB 3.1, 8 USB 2.0**

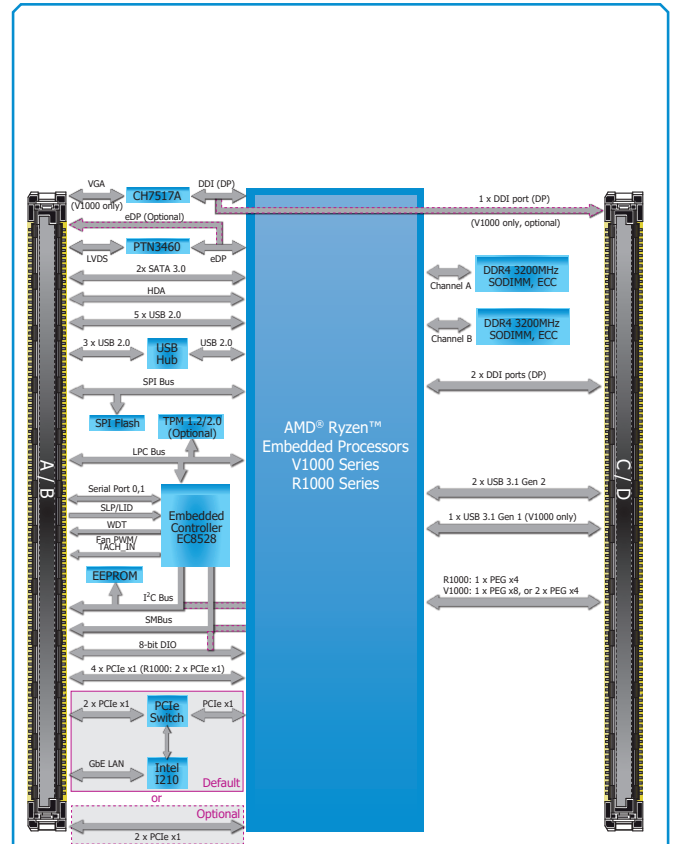
* Populated by default



Mechanical Drawing



Block Diagram



PCIe L0~3				PCIe L4	PCIe L5	PCIe L6	PCIe L7
x4							
x2		x2					
x1	x1	x1	x1	x1	x1	x1	

* 7 x PCIe x1 or 2 x PCIe x2 or 1 x PCIe x4

Specifications

SYSTEM	Processor	AMD® Ryzen™ Embedded V1807, Quad Core, 2MB Cache, 11 CU, 3.35GHz (3.8GHz), 35-54W AMD® Ryzen™ Embedded V1756, Quad Core, 2MB Cache, 8 CU, 3.25GHz (3.6GHz), 35-54W AMD® Ryzen™ Embedded V1605, Quad Core, 2MB Cache, 8 CU, 2.0GHz (3.6GHz), 12-25W AMD® Ryzen™ Embedded V1404I, Quad Core, 2MB Cache, 8 CU, 2.0GHz (3.6GHz), 12-25W AMD® Ryzen™ Embedded V1202, Dual Core, 1MB Cache, 3 CU, 2.3GHz (3.2GHz), 12-25W AMD® Ryzen™ Embedded R1606G, Dual Core, 1MB Cache, 3 CU, 2.6GHz (3.5GHz), 12-25W AMD® Ryzen™ Embedded R1505G, Dual Core, 1MB Cache, 3 CU, 2.4GHz (3.3GHz), 12-25W	
	Memory	Two 260-pin SODIMM up to 32GB	Dual Channel DDR4 up to 2400/3200MHz
	BIOS	Insyde SPI 64Mbit	
	GRAPHICS	Controller	AMD® Radeon™ Vega Graphics
	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: MPEG2, AVC/H264, JPEG, HEVC/H265, VP8, VP9	
	Display	1 x VGA/DDI (DDI available upon request) 1 x LVDS/eDP (eDP available upon request) 2 x DDI (HDMI/DVI/DP++)	VGA: resolution up to 1920x1200 @ 60Hz LVDS: dual channel 24-bit, resolution up to 1920x1200 @ 60Hz eDP: resolution up to 3840x2160 @ 60 Hz HDMI: resolution up to 2560x1600 @ 60Hz or 4096x2160 @ 24Hz DVI: resolution up to 1920x1200 @ 60Hz DP++: resolution up to 4096x2304 @ 60Hz
	Quad Displays	VGA + LVDS + 2 DDI or eDP + 3 DDI (available upon request)	
	EXPANSION	Interface	1 x PCIe x8 (Gen 3) 6 x PCIe x1 or 2 x PCIe x2 or 1 x PCIe x4 1 x LPC 1 x I ² C 1 x SPI 1 x SMBus 2 x UART (TX/RX)
AUDIO	Interface	HD Audio	
ETHERNET	Controller	1 x Intel® I210AT PCIe (10/100/1000Mbps) (normal temp.) or 1 x Intel® I210IT PCIe (10/100/1000Mbps) (wide temp.)	
I/O	USB	4 x USB 3.1 8 x USB 2.0	
	SATA	2 x SATA 3.0 (up to 6Gb/s)	RAID 0/1
	DIO	1 x 8-bit DIO (Default 4 inputs and 4 outputs)	
WATCHDOG TIMER	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds	
SECURITY	TPM	TPM1.2/2.0 (Available Upon Request)	
POWER	Type	12V, 5VSB, VCC_RTC (ATX mode)	12V, VCC_RTC (AT mode)
	Consumption	Typical: 12V @ 0.82A (9.84Watt) Max.: 12V @ 2.63A (31.56Watt)	
OS SUPPORT		Windows: Windows 10 IoT Enterprise 64-bit Linux	
ENVIRONMENT	Temperature	Operating: 0 to 60°C -40 to 85°C	Storage: -40 to 85°C
	Humidity	Operating: 5 to 90% RH	Storage: 5 to 90% RH
	MTBF	318550 hrs @ 25°C; 149853 hrs @ 45°C; 84138 hrs @ 60°C excluding accessories Calculation Model: Telcordia Issue 4 Environment: GB, GC – Ground Benign, Controlled	
MECHANICAL	Dimensions	COM Express® Basic	95mm (3.74") x 125mm (4.9")
	Compliance	PICMG COM Express® R3.0, Type 6	
CERTIFICATIONS		CE, FCC, RoHS	

Ordering Information

Model Name	P/N	Processor	Memory	VGA/DDI	LVDS/eDP	GbE	USB 3.0	USB 2.0	Power	Thermal	Temp.
GH960-TS-V1807B	770-GH9602-000G	V1807B	2 SODIMM	VGA	LVDS	1	4	8	ATX/AT	Cooler	-40 to 85°C
GH960-TS-V1756B	770-GH9602-200G	V1756B	2 SODIMM	VGA	LVDS	1	4	8	ATX/AT	Cooler	-40 to 85°C
GH960-TS-R1606G	770-GH9602-500G	R1606G	2 SODIMM	N/A	LVDS	1	4	8	ATX/AT	Cooler	-40 to 85°C
GH960-TS-V1404I	770-GH9602-800G	V1404I	2 SODIMM	N/A	LVDS	1	4	8	ATX/AT	Cooler	-40 to 85°C
GH960-BS-V1202B	770-GH9602-300G	V1202B	2 SODIMM	VGA	LVDS	1	4	8	ATX/AT	Cooler	0 to 60°C
GH960-BS-V1605B	770-GH9602-600G	V1605B	2 SODIMM	VGA	LVDS	1	4	8	ATX/AT	Cooler	0 to 60°C
GH960-BS-R1505G	770-GH9602-700G	R1505G	2 SODIMM	N/A	LVDS	1	4	8	ATX/AT	Cooler	0 to 60°C

Packing List

• 1 GH960 board	
• 1 Cooler for 0 to 60°C (Height: 36.72mm) or 1 Cooler for -40 to 85°C (Height: 64.72mm)	0 to 60°C: V Series A71-111102-000G R Series A71-111102-030G -40 to 85°C: V Series A71-111102-010G R Series A71-111102-020G

Optional Items

• Carrier board kit	770-CM3322-000G
• Heat spreader (Height: 11mm)	A71-808323-000G