



System-On-Modules


Our Reliable and Scalable SOMs for Your Embedded Solutions

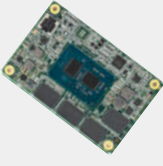



Our Reliable and Scalable SOMs for Your Embedded Solutions

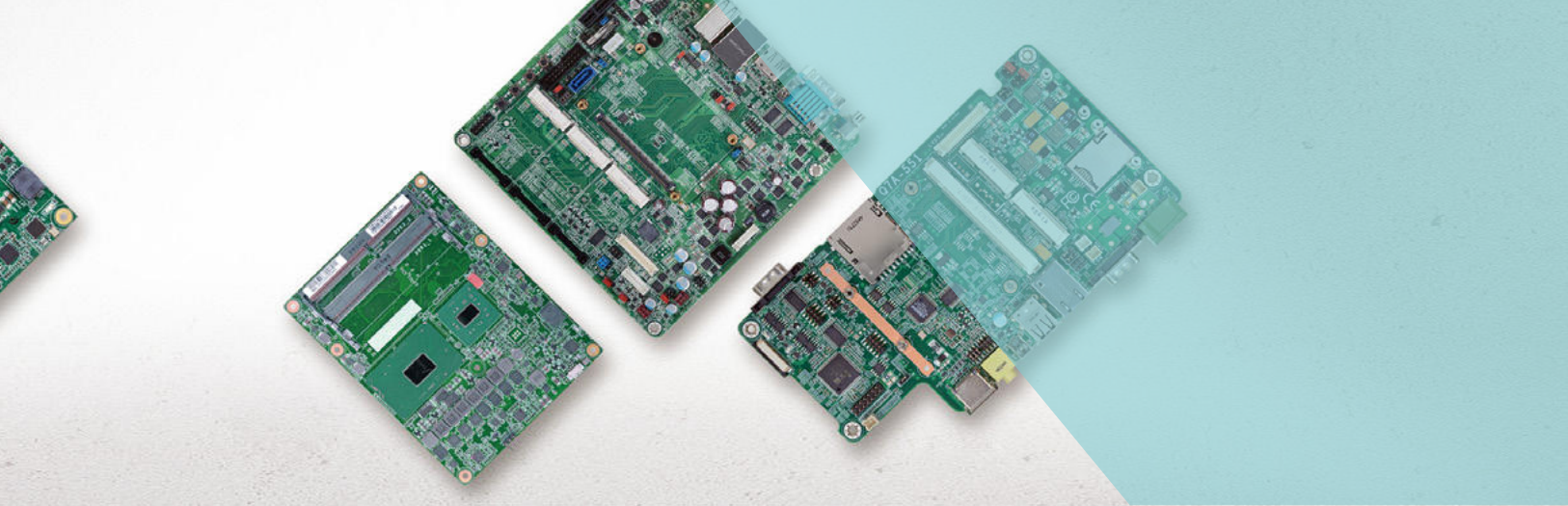
We provide off-the-shelf System-On-Modules including COM Express Mini, COM Express Compact, COM Express Basic, Qseven, SMARC and Customized Design-in Services for various embedded computing solutions

System-On-Modules Product Overview

Qseven	Processor	Platform	Chipset	Model	Index
 EHL700	Intel Atom® Processor x6000E Series	Atom	-	EHL700	P6
	Intel Atom® Processor E3900	Atom	-	AL701 AL700	P7
	Intel Atom® Processor E3800	Atom	-	BT700	
	Freescale™ i.MX6 Series	ARM	-	FS700	

COM Express Mini	Type	Processor	Platform	Chipset	Model	Index
 EHL9A2	Type 10	11th Gen Intel® Core™ Processor	ULT	-	TGU9A2	P8
		8th Gen Intel® Core™ Processor	ULT	-	WL9A3	P9
		Intel® Atom® Processor Elkhart Lake Series	Atom	-	EHL9A2	
		Intel Atom® Processor E3900/ Intel® Pentium® N4200	Atom	-	AL9A2 AL9A3 AL9A8	
		Intel Atom® Processor E3800	Atom	-	BT9A3	
		AMD® Ryzen™ R1000 Series Processor	AMD	-	GH9A3	

COM Express Compact	Type	Processor	Platform	Chipset	Model	Index
 TGU968	Type 6	11th Gen Intel® Core™ Processor	ULT	-	TGU968	P10
		8th Gen Intel® Core™ Processor	ULT	-	WL968	P11
		7th Gen Intel® Core™ Processor	ULT	-	KU968	
		6th Gen Intel® Core™ Processor	ULT	-	SU968	
		Intel Atom® Processor E3900/ Intel® Pentium® N4200	Atom	-	AL968	
		Intel Atom® Processor E3800	Atom	-	BT968	



COM Express Basic



ICD970

Type	Processor	Platform	Chipset	Model	Index
Type 7	3rd Gen Intel® Xeon® Scalable Processors D-1700 Family	Server	-	ICD970	
	Intel Atom® Processor C3000	Atom	-	DV970	
Type 6	11th Gen Intel® Core™ Processor	Mobile	RM590E/ QM580E/ HM570E	TGH960	P12
	8th/9th Gen Intel® Core™ Processor	Mobile	CM246/ QM370	CH960-CM246/QM370, CH961-CM246/QM370	
			HM370	CH960-HM370, CH961-HM370	
	7th Gen Intel® Core™ Processor	Mobile	CM238/ QM175	KH960-CM238/QM175	P13
			HM175	KH960-HM175	
	6th Gen Intel® Core™ Processor	Mobile	CM236/ QM170	SH960MD-CM236/QM170	P14
HM170			SH960-CM236/QM170		
AMD® Ryzen™ V1000/R1000 Embedded Processors	AMD	-	GH960	P15	

Carrier Board



COM333-I

Form Factor	Compliance	Model	Index
Mini-ITX	COM Express R2.1, Type 10	COM100-B	P16-P17
microATX	COM Express R3.0, Type 6, Type 10	COM335	
	COM Express R3.0, Type 7	COM333-I	
	COM Express R2.1, Type 6	COM332-B(R.A)	
	COM Express R2.1, Type 6	COM332-B(R.B1)	
Mini-ITX	Qseven (BT700)	Q7X-151(R.A)	P18
	Qseven (AL700, AL701, BT701)	Q7X-151(R.D1)	
Proprietary	Qseven (FS700)	Q7A-551	

SDM



SDML-WL

Form Factor	Compliance	Model	Index
SDM Large	Intel® Smart Display Module	SDML-WL	P19

Design Assistance

- Comprehensive evaluation of carrier board design during planning phase
Hardware/Software Recommendations, Technical Specifications, Developing Schedule, and Database Schematic Review, Placement/Layout Review, Debugging Assistance Services, and General/Special Reference Design
- Comprehensive design documentation for designing carrier board
Carrier Board Design Guide, User's Manual, Schematic & Layout Checklist, and 2D/3D Mechanical Drawing

Strict Validation

- Strict validation and testing process ensures reliable deployments
Dedicated Design Review Team, Thermal Simulation, and COMe Debug Module Card

Thermal Solution

- Customized thermal solution design & Optional heatspreader
For special requirements like high-temperature environments or ultra-slim chassis

Software Integration

- Embedded OS and BIOS customization
Windows 10, Windows 7, WES 7, Windows XP, Linux (CentOS/Debian), etc.
- Windows licensing offerings
- Application Programming Interface (API) library
Watchdog, Hardware Control/Monitor, GPIO, Backlight Control, SMBus, etc.
- Remote management utility



Planning



Design



Validation



Integration



Production



Rugged Design

- Industrial-rated components with high MTBF over 100,000 hrs
- Extended operating temperatures
- High ESD protection for I/O ports
- Signal integrity measurement
- Wide range power design
- 100% Japanese-made solid capacitor
- Power hot plug protection for DC-in type SBC and Industrial Motherboards



Software Integration

- Embedded BIOS and OS customization services
- Windows licensing offerings
- Android, Linux distribution (Yocto/Ubuntu/CentOS/Debian)
- Embedded API (Hardware Monitor, SMBus, I²C, Brightness Control, GPIO, Watchdog)
- Remote management utility



Embedded Total Solution

- Express customization service: 30 days (NRE cost: project based)
- Strict revision control
- Long product life cycle support
- High volume OEM/ODM production capabilities



Embedded Boards



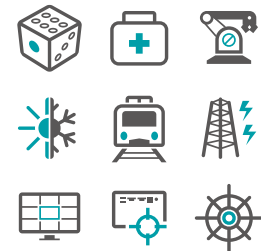
Peripherals



Systems



Embedded Software & BIOS



Vertical Solutions

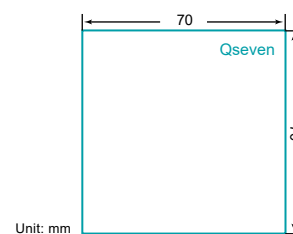
Qseven

Extremely Small & Mobile Solutions



Features

Qseven is equipped with fast serial interfaces in an ultra-small form factor with a measurement of just 70 x 70 mm. It is much smaller than other system-on-module standards such as COM Express, which makes it an ideal solution for space-limited and low power applications such as industrial automation, retail, and power & energy.



Wide Temp

Atom

Model Name	EHL700	
Compliance	Qseven R2.1	
System	Processor	Intel Atom® x6000 Series / Intel Pentium® N and J Series Processors / Intel Celeron® N and J Series Processors
	Socket	BGA 1493
	Max. Speed	1.2~3.0GHz
	TDP	6W/6.5W/9W/10W/12W
	Cache	1M~2M
	Chipset	-
BIOS	AMI SPI 256Mbit	
Memory	Technology	Dual Channel LPDDR4 3200MHz
	Max. Capacity	4GB/8GB/16GB
	Socket	Memory down
Graphics	Interface	1 LVDS/eDP, 1 DDI
Expansion	PCIe	4 PCIe x1
	PCI	-
	LPC	1
	I ² C	1
	SMBus	1
	CAN Bus	-
Audio	Interface	HD Audio
Ethernet	Controller	1 Intel® I210IT
I/O	USB	1 USB 3.2 + 8 USB 2.0 / 3 USB 3.2 + 4 USB 2.0
	SATA	2 SATA 3.0
	IDE	-
	SSD	-
	eMMC	1 eMMC 5.1 up to 128GB (Opt.)
	DIO	4-bit DIO
	SD	-
TPM	FTPM	
iAMT	-	
Power	5V, 5VSB, VCC_RTC	
Operating Temperature	-40°C~85°C, 0 to 60°C	

*Populated by default

Wide Temp



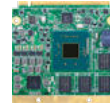
Atom

Wide Temp



Atom

Wide Temp



Atom

Model Name		AL701	AL700	BT700
Compliance		Qseven R2.1	Qseven R2.1	Qseven R2.0
System	Processor	Intel Atom® E3900	Intel Atom® E3900	Intel Atom® E3800
	Socket	BGA 1296	BGA 1296	BGA 1170
	Max. Speed	1.1~2.5GHz	1.1~2.5GHz	1.46~2.41GHz
	TDP	6W/6.5W/9.5W/12W	6W/6.5W/9.5W/12W	5W/7.5W/8W/10W
	Cache	2M	2M	0.5M/1M/2M
	BIOS	AMI SPI 128Mbit	AMI SPI 128Mbit	AMI SPI 64Mbit
Memory	Technology	Dual Channel LPDDR4 3200MHz	Dual Channel DDR3L 1600MHz	Single Channel DDR3L 1066/1333MHz
	Max. Capacity	4GB/8GB	4GB/8GB	2GB/4GB
	Socket	Memory down	Memory down	Memory down
Graphics	Interface	1 LVDS*/eDP, 1 DDI	1 LVDS*/eDP, 1 DDI	1 LVDS, 1 DDI
Expansion	PCIe	4 PCIe x1	4 PCIe x1	3 PCIe x1
	LPC	1	1	1
	I ² C	1	1	1
	SMBus	1	1	1
	CAN Bus	1 (only Linux support)	-	-
Audio	Interface	HD Audio	HD Audio	HD Audio
Ethernet	Controller	1 Intel® I211 / 1 Intel® I210	1 Intel® I211 / 1 Intel® I210	1 Intel® I211 / 1 Intel® I210
I/O	USB	1 USB 3.2, 8 USB 2.0	1 USB 3.2, 8 USB 2.0	1 USB 3.2, 6 USB 2.0
	SATA	2 SATA 3.0	2 SATA 3.0	2 SATA 2.0
	eMMC	eMMC 5.0 up to 32GB (Opt.)	eMMC 5.0 up to 32GB (Opt.)	1 x 8GB/16GB/32GB eMMC (Opt.)
	DIO	4-bit DIO	4-bit DIO	-
	SD	Optional	Optional	Optional
TPM		Optional	FTPM	Optional
Power		VCC_RTC, 5V standby, 5V	VCC_RTC, 5V standby, 5V	VCC_RTC, 5V standby, 5V
Operating Temperature		-40°C~85°C, 0°C~60°C	-40°C~85°C, 0°C~60°C	-40°C~85°C, -20°C~70°C, 0°C~60°C



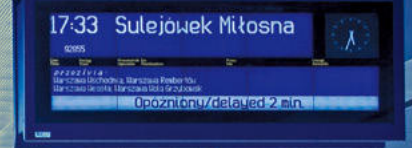
ARM

Model Name		FS700
Compliance		Qseven R1.2
System	Processor	Freyscale™ i.MX6 Series
	Socket	FCPBGA
	Max. Speed	1.0GHz
	TDP	-
	Cache	32KB
	Chipset	-
BIOS		-
Memory	Technology	Single Channel DDR3 1000/1200MHz
	Max. Capacity	1GB/2GB
	Socket	Memory down
Graphics	Interface	1 HDMI, 2 LVDS
Expansion	PCIe	1 PCIe x1
	LPC	-
	I ² C	2
	SMBus	-
	CAN Bus	1
Audio	Interface	I ² S
Ethernet	Controller	1 Atheros AR8033
I/O	USB	4 USB 2.0, 1 USB OTG
	SATA	1 SATA 2.0
	IDE	-
	SSD	-
	eMMC	1 x 4GB*/8GB/16GB eMMC
	DIO	1 SDIO
	SD	1 microSD onboard
TPM		-
iAMT		-
Power		VCC_RTC, 5V standby, 5V
Operating Temperature		-20°C~70°C

*Populated by default

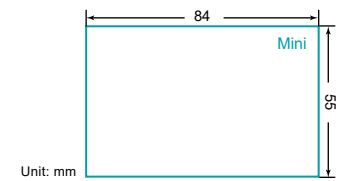
COM Express Mini

Power-Saving & Small-Size Solutions



Features

COM Express® Mini module delivers high performance on a small footprint which features 55 x 84 mm in size. It is ideal for space-limited, power-saving and mobile applications. DFI's ultra-small modules are available with COM Express® pin-out Type 10.



COMe Type 10

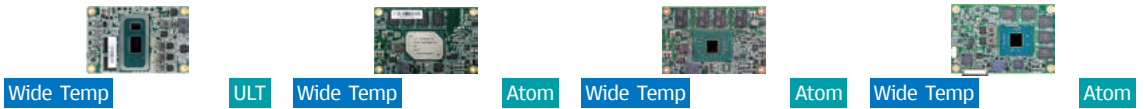
Wide Temp

ULT

Model Name		TGU9A2
Compliance		COM Express® R3.0 Mini, Type 10
System	Processor	11th Gen Intel® Core™
	Socket	BGA1526
	Max. Speed	up to 3.0GHz(Turbo)
	TDP	up to 15W
	Cache	4M/6M/8M/12M
	Chipset	-
Memory	BIOS	AMI SPI 256Mbit
	Technology	Dual Channel LPDDR4X 4266MHz
	Max. Capacity	8GB/16GB
Graphics	Socket	Memory down
	Interface	1 eDP, 1 DDI
Expansion	PCIe	1 PCIe x4
	SDIO	-
	PCI	-
	LPC	-
	I ² C	1
	SMBus	1
	CAN Bus	-
Audio	Interface	HD Audio
Ethernet	Controller	1 Intel® I225IT
	USB	2 USB 3.2, 8 USB 2.0
I/O	SATA	2 SATA 3.0
	IDE	-
	SSD	1 x 64GB/128GB/256GB/512GB/1024GB on board SSD (Opt.)
	eMMC	-
	DIO	8-bit DIO
	SD	-
	TPM	
iAMT		-
Power		4.75V~20V, 5VSB, VCC_RTC (ATX mode), 4.75V~20V, VCC_RTC (AT mode)
Operating Temperature		-40°C~85°C, 0°C~60°C

*Populated by default

COME Type 10



Model Name		WL9A3	AL9A2	AL9A3	BT9A3
Compliance		COM Express® R3.0 Mini, Type 10	COM Express® R2.1 Mini, Type 10	COM Express® R2.1 Mini, Type 10	COM Express® R2.1 Mini, Type 10
System	Processor	8th Gen Intel® Core™	Intel Atom® E3900/Intel® Pentium® N4200	Intel Atom® E3900/Intel® Pentium® N4200	Intel Atom® E3800
	Socket	FCBGA 1528	BGA 1296	BGA 1296	BGA 1170
	Max. Speed	1.7~4.4GHz	1.1~2.5GHz	1.1~2.5GHz	1.46~2.41GHz
	TDP	15W	6W/6.5W/9.5W/12W	6W/6.5W/9.5W/12W	5W/7.5W/8W/10W
	Cache	4M/6M/8M	2M	2M	0.5M/1M/2M
BIOS	AMI SPI 128Mbit	AMI SPI 128Mbit	AMI SPI 128Mbit	AMI SPI 64Mbit	
Memory	Technology	Dual Channel LPDDR3 2133MHz	Single Channel DDR3L 1866MHz	Dual Channel DDR3L 1866MHz	Single Channel DDR3L 1066/1333MHz
	Max. Capacity	8GB/16GB	4GB non-ECC/8GB ECC	4GB/8GB	2GB/4GB
	Socket	Memory down	Memory down	Memory down	ECC memory down
Graphics	Interface	1 LVDS*/eDP, 1 DDI	1 LVDS*/eDP, 1 DDI	1 LVDS*/eDP, 1 DDI	1 LVDS, 1 DDI
Expansion	PCIe	4 PCIe x1	4 PCIe x1	4 PCIe x1	3 PCIe x1
	SDIO	1	1 (Opt.)	1 (Opt.)	--
	LPC	1	1	1	1
	I ² C	2	2	1	1
	SMBus	1	1	1	1
Audio	Interface	HD Audio	HD Audio	HD Audio	HD Audio
Ethernet	Controller	1 Intel® I219	1 Intel® I210AT/IT	1 Intel® I210AT/IT	1 Intel® I210AT/IT
I/O	USB	2 USB 3.2, 8 USB 2.0	2 USB 3.2, 8 USB 2.0	2 USB 3.2, 8 USB 2.0	1 USB 3.2, 8 USB 2.0
	SATA	2 SATA 3.0	2 SATA 3.0	2 SATA 3.0	2 SATA 2.0
	SSD	-	-	1 x 4GB/8GB/16GB/32GB/64GB SSD (Opt.)	-
	eMMC	1 x 4GB/8GB/16GB/32GB/64GB eMMC (Opt.)	1 x 8GB/16GB/32GB/64GB eMMC (Opt.)	-	1 x 4GB/8GB/16GB/32GB eMMC (Opt.)
	DIO	8-bit DIO	8-bit DIO	8-bit DIO	8-bit DIO
	SD	Optional	Optional	Optional	-
TPM		FTPM	FTPM	FTPM	FTPM
iAMT		-	-	-	-
Power		12V~20V, 5VSB, VCC_RTC (ATX mode) 12V~20V, VCC_RTC (AT mode)	4.75V~20V, 5VSB, VCC_RTC (ATX mode) 4.75V~20V, VCC_RTC (AT mode)	4.75V~20V, 5VSB, VCC_RTC (ATX mode) 4.75V~20V, VCC_RTC (AT mode)	4.75V~20V, 5VSB, VCC_RTC (ATX mode) 4.75V~20V, VCC_RTC (AT mode)
Operating Temperature		-30°C~85°C, 0°C~60°C	-40°C~85°C, 0°C~60°C	-40°C~85°C, 0°C~60°C	-40°C~85°C, 0°C~60°C

COME Type 10



Model Name		EHL9A2	GH9A3	AL9A8
Compliance		COM Express® R3.0 Mini, Type 10	COM Express® R3.0 Mini, Type 10	COM Express® R3.0 Mini, Type 10
System	Processor	Intel® Atom® Processor Elkhart Lake Series	AMD® Ryzen™ Embedded R1000 Series	Intel Atom® E3900/Intel® Pentium® N4200
	Socket	FCBGA 1528	FP5	BGA 1296
	Max. Speed	1.7~4.4GHz	up to 3.5GHz(Turbo)	1.1~2.5GHz
	TDP	6W/9W/10W/12W	up to 10W	6W/6.5W/9.5W/12W
	Cache	4M/6M/8M	1M	2M
	Chipset	-	-	-
BIOS	AMI SPI 256Mbit	SPI 64Mbit	AMI SPI 128Mbit	
Memory	Technology	Dual Channel LPDDR4X 3200MHz/4267MHz	Single Channel DDR4 2400MHz	Dual Channel LPDDR4-2400MHz
	Max. Capacity	8GB/16GB	4GB/8GB	4GB/8GB
	Socket	Memory down	Memory down	Memory down
Graphics	Interface	1 LVDS*/eDP, 1 DDI	1 LVDS*/eDP, 1 DDI	1 LVDS*/eDP, 1 DDI
Expansion	PCIe	4 PCIe x1	3 PCIe x1	4 PCIe x1
	SDIO	1 (Opt.)	1	1
	LPC	1	1	1
	I ² C	1	2	1
	SMBus	1	1	1
	CAN Bus	1	-	-
Audio	Interface	HD Audio	HD Audio	HD Audio
Ethernet	Controller	1 Intel® I225IT	1 Intel® I210	1 Intel® I210AT/IT
I/O	USB	1 USB 3.2, 8 USB 2.0	2 USB 3.2, 8 USB 2.0	2 USB 3.2, 8 USB 2.0
	SATA	2 SATA 3.0	2 SATA 3.0	2 SATA 3.0
	SSD	-	-	-
	eMMC	1 eMMC 5.1 8GB/16GB/32GB/64GB/128GB (Opt.)	Optional	1 x eMMC up to 128GB
	DIO	8-bit DIO	8-bit DIO	8-bit GPIO
	SD	1	-	Optional
TPM		BIOS default support FTPM, TPM2.0 by request	BIOS default support FTPM, TPM2.0 by request	Optional
Power		4.75V~20V, 5VSB, VCC_RTC (ATX mode) 4.75V~20V, VCC_RTC (AT mode)	12V~20V, 5VSB, VCC_RTC (ATX mode) 12V~20V, VCC_RTC (AT mode)	4.75V~20V, 5VSB, VCC_RTC (ATX mode) 4.75V~20V, VCC_RTC (AT mode)
Operating Temperature		-40°C~85°C, 0°C~60°C	-40°C~85°C, 0°C~60°C	-40°C~85°C, 0°C~60°C

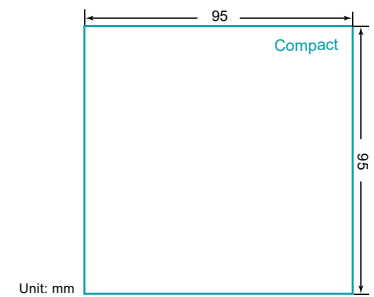
COM Express Compact

Reliable & Compact Solutions



Features

COM Express® Compact module is designed with computing capability and cost efficiency in a compact form factor with a footprint of 95 x 95 mm, making it the best Option for transportation and defense applications. DFI's Compact modules are available with COM Express® pin-out Type 2 and Type 6.



COMe Type 6

Wide Temp

ULT

Model Name		TGU968
Compliance		COM Express® R3.0 Compact, Type 6
System	Processor	11th Gen Intel® Core™
	Socket	FCBGA 1449
	Max. Speed	1.5~4.4GHz
	TDP	15W
	Cache	4M~12M
	Chipset	-
BIOS		AMI BIOS
Memory	Technology	Dual Channel DDR4 3200MHz
	Max. Capacity	64GB
	Socket	2 SODIMM
Graphics	Interface	1VGA, 1LVDS(Optional to eDP), 3DDI
Expansion	PCIe	8 PCIe x1 + 1 PCIe x4
	LPC	1
	I ² C	1
	SMBus	1
	CAN Bus	-
Audio	Interface	HD Audio
Ethernet	Controller	1 Intel® I225
I/O	USB	4 USB 3.2, 8 USB 2.0
	SATA	2 SATA 3.0
	IDE	-
	SSD	1 x 64GB/128GB/256GB/512GB/1024GB on board SSD (Opt.)
	eMMC	-
	DIO	8-bit DIO
	SD	-
TPM		Optional
iAMT		-
Power		8.5~20V, 5VSB, VCC_RTC (ATX mode) 8.5~20V, VCC_RTC (AT mode)
Operating Temperature		-40°C~85°C, 0°C~60°C

*Populated by default

COME Type 6

Wide Temp



ULT

Wide Temp



ULT

Wide Temp



ULT

Model Name	WL968	KU968	SU968
Compliance	COM Express® R3.0 Compact, Type 6		COM Express® R2.1 Compact, Type 6
System	Processor	8th Gen Intel® Core™	7th Gen Intel® Core™
	Socket	FCBGA 1528	BGA 1356
	Max. Speed	1.7~4.4GHz	2.2~3.9GHz
	TDP	15W	15W
	Cache	2M/4M/6M/8M	2M/3M/4M
	Chipset	-	-
	BIOS	AMI SPI 128Mbit	Insyde SPI 128Mbit
Memory	Technology	Dual Channel DDR4 2400MHz	Dual Channel DDR4 2133MHz
	Max. Capacity	64GB	4GB/8GB/16GB
	Socket	2 SODIMM	Memory down
Graphics	Interface	1 VGA*/DDI, 1 LVDS*/eDP, 1 DDI	1 VGA*/DDI, 1 LVDS*/eDP, 1 DDI
Expansion	PCIe	6 PCIe x1 2 PCIe x1 + 1 PCIe x4 3 PCIe x1 + 2 PCIe x2	5 PCIe x1 4 PCIe x1 + 1 PCIe x4 3 PCIe x1 + 2 PCIe x2
	PCI	-	-
	LPC	1	1
	I ² C	1	1
	SMBus	1	1
	CAN Bus	-	-
	Audio	Interface	HD Audio
Ethernet	Controller	1 Intel® I219	1 Intel® I219
I/O	USB	4 USB 3.2, 8 USB 2.0	4 USB 3.2, 8 USB 2.0
	SATA	Up to 3 SATA 3.0 (RAID) (Opt.)	3 SATA 3.0 (RAID)
	IDE	-	-
	SSD	-	-
	eMMC	eMMC 5.1 8GB/16GB/32GB/64GB/128GB (Opt.)	-
	DIO	8-bit DIO	8-bit DIO
	SD	-	-
TPM	Optional	Optional	Optional
iAMT	iAMT 12.0 (Core i7/i5)	iAMT 11.0 (Core i7/i5)	iAMT 11.0 (Core i7/i5)
Power	12V, 5VSB, VCC_RTC (ATX mode) 12V, VCC_RTC (AT mode)	12V, 5VSB, VCC_RTC (ATX mode) 12V, VCC_RTC (AT mode)	12V, 5VSB, VCC_RTC (ATX mode) 12V, VCC_RTC (AT mode)
Operating Temperature	-40°C~85°C, 0°C~60°C	-40°C~85°C, 0°C~60°C	-40°C~85°C, 0°C~60°C

COME Type 6

Wide Temp



Atom

Wide Temp



Atom

Model Name	BT968	AL968
Compliance	COM Express® R2.1 Compact, Type 6	
System	Processor	Intel Atom® E3800
	Socket	BGA 1170
	Max. Speed	1.46~2.41GHz
	TDP	5W/7.5W/8W/10W
	Cache	0.5M/1M/2M
	Chipset	-
	BIOS	AMI SPI 64Mbit
Memory	Technology	Dual/Single Channel DDR3L 1066/1333MHz
	Max. Capacity	4GB/8GB
	Socket	1 or 2 SODIMM
Graphics	Interface	1 VGA, 1 LVDS*/DDI, 1 DDI
Expansion	PCIe	3 x PCIe x1 or 1 PCIe x4
	PCI	-
	LPC	1
	I ² C	1
	SMBus	1
	CAN Bus	-
	Audio	Interface
Ethernet	Controller	1 Intel® I211 / 1 Intel® I210
I/O	USB	1 USB 3.2, 8 USB 2.0
	SATA	2 SATA 2.0
	IDE	-
	SSD	-
	eMMC	1 x 4GB/8GB/16GB/32GB eMMC (Opt.)
	DIO	8-bit DIO
	SD	-
TPM	Optional	-
iAMT	-	-
Power	12V, 5VSB, VCC_RTC (ATX mode) 12V, VCC_RTC (AT mode)	12V, 5VSB, VCC_RTC (ATX mode) 12V, VCC_RTC (AT mode)
Operating Temperature	-40°C~85°C, -20°C~70°C, 0°C~60°C	-40°C~85°C, 0°C~60°C

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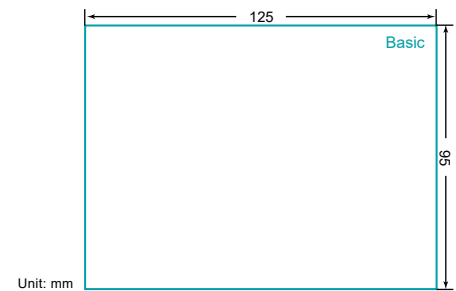
COM Express Basic

High-Performance & Cost-Effective Solutions



Features

COM Express® Basic module provides high-level processing performance and high-speed interfaces for a wide range of computing-demand applications such as medical, transportation, and industrial automation. DFI's Basic modules are compatible with COM Express® pin-out Type 2, Type 6 and Type 7.



COMe Type 6/7



Server



Atom



RM590E
QM580E
HM570E



Wide Temp
CM246
QM370



Wide Temp
CM246
QM370

Model Name		ICD970	DV970	TGH960	CH960-CM246/QM370/HM370	CH961-CM246/QM370/HM370
Compliance		COM Express® R2.1 Basic Type 7	COM Express® R3.0 Basic Type 7	COM Express® R3.0 Basic Type 6	COM Express® R2.1 Basic Type 6	COM Express® R2.1 Basic Type 6
System	Processor	Intel® Xeon® D Ice Lake-D LCC	Intel Atom® C3000	11th Gen Intel® Core™	8th/9th Gen Intel® Core™	8th/9th Gen Intel® Core™
	Socket	FCLGA4189	BGA 1310	BGA 1787	BGA 1440	BGA 1440
	Max. Speed	1.9~2.4GHz	1.7~2.0GHz	3.1~4.7GHz	2.5~4.4GHz	2.5~4.5GHz
	TDP	50W/ 52W/ 67W	17W/25W/31W	25W/35W/45W	45W	45W
	Cache	10M/ 15M	12M/16M	8M/ 12M/ 12M	8M/12M	8M/12M
	Chipset	-	-	Intel® RM590E/QM580E/HM570E Chipset	Intel® CM246/QM370/HM370	Intel® CM246/QM370/HM370
Memory	BIOS	Insyde SPI 128Mbit	Insyde SPI 128Mbit	AMI SPI 256Mbit	AMI SPI 128Mbit	AMI SPI 128Mbit
	Technology	Dual Channel DDR4 2933MHz	Dual Channel DDR4 2400MHz	Dual Channel DDR4 3200MHz	Dual Channel DDR4 2666MHz	Dual Channel DDR4 2666MHz
	Max. Capacity	32GB	32GB	128GB	64GB	128GB
	Socket	2 SODIMM	2 SODIMM	4 SODIMM	2 SODIMM	4 SODIMM
Graphics	Interface	-	-	1 x VGA 1 x LVDS/eDP (eDP available upon request) 3 x DDI (HDMI/DP++)	1 VGA*/DDI, 1 LVDS*/eDP, 2 DDI	1 VGA*/DDI, 1 LVDS*/eDP, 2 DDI
	Expansion	2 x PCIe x8 (Gen3) 1 x PCIe x16(Gen4)	2 PCIe x8	1 x PCIe x16 (Gen 4) 8 x PCIe x1 (Gen 3)	1 PCIe x16 / 2 x PCIe x8 / 1 PCIe x8 + 2 PCIe x4	1 PCIe x16 / 2 PCIe x8, 8 PCIe x1
Audio	LPC	1	1	1	1	1
	i ² C	1	1	1	1	1
	SMBus	1	1	1	1	1
	CAN Bus	-	-	-	-	-
	Interface	-	-	HD Audio	HD Audio	HD Audio
Ethernet	Controller	1 Intel® I210 or 1 Intel® I210IT	1 Intel® I210, 4 10Gbase-KR	1 Intel® I225 series (10/100/1000Mbps/2.5G)	1 Intel® I219	1 Intel® I219
	USB	4 x USB 3.2, 4 x USB 2.0	2 USB 3.2, 4 USB 2.0	4 x USB 3.2 Gen2, 8 x USB 2.0	4 USB 3.2, 8 USB 2.0	4 USB 3.2, 8 USB 2.0
I/O	SATA	2 x SATA 3.0 (up to 6Gb/s)	2 SATA 3.0 (RAID)	4 x SATA 3.0 (up to 6Gb/s) support RAID 0/1/5/10	4 SATA 3.0 (RAID in CM246&QM370)	4 SATA 3.0 (RAID in CM246&QM370)
	IDE	-	-	-	-	-
	SSD	-	-	(Opt) NVMe SSD: PCIe x4 Gen4, 64GB~1TB	-	-
	eMMC	eMMC 5.1 16Gb (Opt.)	-	-	-	-
	DIO	1 x 8-bit DIO (Default 4 inputs and 4 outputs)	8-bit DIO	1 x 8-bit DIO (Default 4 inputs and 4 outputs)	8-bit DIO	8-bit DIO
TPM	Optional	Optional	Optional	Optional	Optional	
iAMT	-	-	iAMT 12.0 (Core i7/i5 in RM590E & QM580E)	iAMT 12.0 (Core i7/i5 in CM246&QM370)	iAMT 12.0 (Core i7/i5 in CM246&QM370)	
Power		-	12V, 5VSB, VCC, RTC (ATX mode)	8.5V~20V, 5VSB, VCC, RTC (ATX mode)	12V, 5VSB, VCC, RTC (ATX mode)	8.5V~20V, 5VSB, VCC, RTC (ATX mode)
		-	12V, VCC, RTC (AT mode)	8.5V~20V, VCC, RTC (AT mode)	12V, VCC, RTC (AT mode)	8.5V~20V, VCC, RTC (AT mode)
Operating Temperature	-	-40°C~85°C, 0°C~60°C	-40°C~85°C, 0°C~60°C	-40°C~85°C, 0°C~60°C	-40°C~85°C, 0°C~60°C	-40°C~85°C, 0°C~60°C

*Populated by default



COMe Type 6

Wide Temp

QM175

CM238

Model Name		KH960-CM238/QM175
Compliance		COM Express® R2.1 Basic, Type 6
System	Processor	7th Gen Intel® Core™
	Socket	BGA 1440
	Max. Speed	2.1~4.0GHz
	TDP	25W/35W/45W
	Cache	3M/6M/8M
	Chipset	Intel® CM238/QM175
BIOS		Insyde SPI 128Mbit
Memory	Technology	Dual Channel DDR4 2400MHz
	Max. Capacity	32GB
	Socket	2 SODIMM
Graphics	Interface	1 VGA*/DDI, 1 LVDS*/eDP, 2 DDI
Expansion	PCIe	1 PCIe x16 / 2 PCIe x8, 8 PCIe x1
	LPC	1
	I ² C	1
	SMBus	1
	CAN Bus	-
Audio	Interface	HD Audio
Ethernet	Controller	1 Intel® I219
I/O	USB	4 USB 3.2, 8 USB 2.0
	SATA	4 SATA 3.0 (RAID)
	IDE	-
	SSD	-
	eMMC	-
	DIO	8-bit DIO
TPM		Optional
iAMT		iAMT 11.0 (Core i7/i5)
Power		12V, 5VSB, VCC_RTC (ATX mode) 12V, VCC_RTC (AT mode)
Operating Temperature		-40°C~85°C, 0°C~60°C



COMe Type 6

Wide Temp

HM175

Model Name		KH960-HM175
Compliance		COM Express® R2.1 Basic, Type 6
System	Processor	7th Gen Intel® Core™
	Socket	BGA 1440
	Max. Speed	2.1~3.7GHz
	TDP	25W/35W/45W
	Cache	3M/6M/8M
	Chipset	Intel® HM175
BIOS		Insyde SPI 128Mbit
Memory	Technology	Dual Channel DDR4 2400MHz
	Max. Capacity	32GB
	Socket	2 SODIMM
Graphics	Interface	1 VGA*/DDI, 1 LVDS*/eDP, 2 DDI
Expansion	PCIe	1 PCIe x16 / 2 PCIe x8, 8 PCIe x1
	LPC	1
	I ² C	1
	SMBus	1
	CAN Bus	-
Audio	Interface	HD Audio
Ethernet	Controller	1 Intel® I219
I/O	USB	4 USB 3.2, 8 USB 2.0
	SATA	4 SATA 3.0
	IDE	-
	SSD	-
	eMMC	-
	DIO	8-bit DIO
TPM		Optional
iAMT		-
Power		12V, 5VSB, VCC_RTC (ATX mode) 12V, VCC_RTC (AT mode)
Operating Temperature		-40°C~85°C, 0°C~60°C

*Populated by default



COMe Type 6

Wide Temp

QM170
CM236

Model Name		SH960-CM236/QM170
Compliance		COM Express® R2.1 Basic, Type 6
System	Processor	6th Gen Intel® Core™
	Socket	BGA 1440
	Max. Speed	1.6~3.7GHz
	TDP	25W/35W/45W
	Cache	2M/3M/6M/8M
	Chipset	Intel® CM236/QM170
BIOS		Insyde SPI 128Mbit
Memory	Technology	Dual Channel DDR4 2133MHz
	Max. Capacity	32GB
	Socket	2 SODIMM
Graphics	Interface	1 VGA*/DDI, 1 LVDS*/eDP, 2 DDI
Expansion	PCIe	1 PCIe x16 / 2 PCIe x8, 8 PCIe x1
	LPC	1
	I ² C	1
	SMBus	1
	CAN Bus	-
Audio	Interface	HD Audio
Ethernet	Controller	1 Intel® I219
I/O	USB	4 USB 3.2, 8 USB 2.0
	SATA	4 SATA 3.0 (RAID)
	IDE	-
	SSD	-
	eMMC	-
	DIO	8-bit DIO
TPM		Optional
iAMT		iAMT 11.0
Power		12V, 5VSB, VCC_RTC (ATX mode) 12V, VCC_RTC (AT mode)
Operating Temperature		-40°C~85°C, 0°C~60°C



COMe Type 6

Wide Temp

QM170
CM236

Model Name		SH960MD-CM236/QM170
Compliance		COM Express® R2.1 Basic, Type 6
System	Processor	6th Gen Intel® Core™
	Socket	BGA 1440
	Max. Speed	1.9~3.5GHz
	TDP	25W/35W/45W
	Cache	2M/3M/6M/8M
	Chipset	Intel® CM236/QM170
BIOS		Insyde SPI 128Mbit
Memory	Technology	Dual Channel DDR4 2400MHz
	Max. Capacity	8GB/16GB
	Socket	Memory down
Graphics	Interface	1 VGA*/DDI, 1 LVDS*/eDP, 2 DDI
Expansion	PCIe	1 PCIe x16 / 2 PCIe x8, 8 PCIe x1
	LPC	1
	I ² C	1
	SMBus	1
	CAN Bus	-
Audio	Interface	HD Audio
Ethernet	Controller	1 Intel® I210
I/O	USB	4 USB 3.2, 8 USB 2.0
	SATA	4 SATA 3.0 (RAID)
	IDE	-
	SSD	-
	eMMC	-
	DIO	8-bit DIO
TPM		Optional
iAMT		iAMT11.0 PCIe
Power		12V, 5VSB, VCC_RTC (ATX mode) 12V, VCC_RTC (AT mode)
Operating Temperature		-40°C~85°C

*Populated by default



COMe Type 6

Wide Temp

HM170

Model Name		SH960-HM170
Compliance		COM Express® R2.1 Basic, Type 6
System	Processor	6th Gen Intel® Core™
	Socket	BGA 1440
	Max. Speed	1.6~3.5GHz
	TDP	25W/35W/45W
	Cache	2M/3M/6M/8M
	Chipset	Intel® HM170
Memory	BIOS	Insyde SPI 128Mbit
	Technology	Dual Channel DDR4 2133MHz
	Max. Capacity	32GB
Graphics	Socket	2 SODIMM
	Interface	1 VGA*/DDI, 1 LVDS*/eDP, 2 DDI
Expansion	PCIe	1 PCIe x16 / 2 PCIe x8, 8 PCIe x1
	LPC	1
	I ² C	1
	SMBus	1
	CAN Bus	-
Audio	Interface	HD Audio
Ethernet	Controller	1 Intel® I219
	USB	4 USB 3.2, 8 USB 2.0
I/O	SATA	4 SATA 3.0
	IDE	-
	SSD	-
	eMMC	-
	DIO	8-bit DIO
	TPM	
iAMT		iAMT 11.0
Power		12V, 5VSB, VCC_RTC (ATX mode)
		12V, VCC_RTC (AT mode)
Operating Temperature		-40°C~85°C, 0°C~60°C



COMe Type 6

Wide Temp

AMD

Model Name		GH960
Compliance		COM Express® R3.0 Basic, Type 6
System	Processor	AMD® Ryzen™ V1000/R1000 Embedded Processors
	Socket	FP5 BGA
	Max. Speed	2~3.8GHz
	TDP	12/54W
	Cache	4/8M
	Chipset	-
Memory	BIOS	Insyde SPI 64Mbit
	Technology	Dual Channel DDR4 up to 2400/3200MHz
	Max. Capacity	32GB
Graphics	Socket	2 SODIMM
	Interface	1 VGA*/DDI, 1 LVDS*/eDP, 2 DDI
Expansion	PCIe	1 PCIe x8, 6 PCIe x1 / 2 PCIe x2 / 1 PCIe x4
	LPC	1
	I ² C	1
	SMBus	1
	CAN Bus	-
Audio	Interface	HD Audio
Ethernet	Controller	1 Intel® I210
	USB	4 USB 3.2, 8 USB 2.0
I/O	SATA	2 SATA 3.0 (RAID)
	IDE	-
	SSD	-
	eMMC	-
	DIO	8-bit DIO
	TPM	
iAMT		-
Power		12V, 5VSB, VCC_RTC (ATX mode),
		12V, VCC_RTC (AT mode)
Operating Temperature		-40~85°C, 0~60°C

*Populated by default

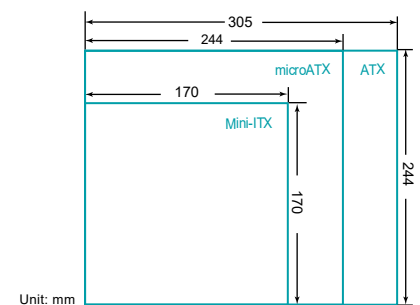
Carrier Board

Compatible with a Wide Range of Modules



Features

Our carrier board (also known as base board or evaluation board) offers a flexible engineering development environment for COM Express Type 10, Type 7, Type 6, Type 2, Qseven and SMARC to help our customers minimize installation requirements while reducing design time and cost.



Model Name		COM333-I	COM335
Compliance		COM Express® R3.0, Type 7	COM Express® R3.0, Type 6, Type 10
Form Factor		microATX (244 x 244 mm)	microATX (244 x 244 mm)
Graphics	Connector	1 VGA via BMC	1 VGA, 1 eDP, 2 LVDS, 1 DDI
	Expansion	2 x PCIe x4/ 1 x PCIe x8	1 PCIe x16, 1 PCIe x4, 3 PCIe x1
Expansion	PCIe, PCI	-	-
	Mini PCIe, M.2	-	-
	SIM	-	-
Audio	Audio Codec	-	Realtek ALC888
Rear I/O	Ethernet (GbE)	2 GbE, 4 10Gbase-KR(2 RJ45, 2 SFP+)	1
	Serial	1 RS-232	2 RS-232
	USB	4 USB 3.2/2.0	3 USB 3.2, 4 USB 2.0
	Display	-	3 DP
	Audio	-	Min-in, Line-in, Line-out
	PS/2	-	-
Internal I/O	Serial	1 (TX/RX)	2 (TX/RX)
	USB	-	-
	Display	-	-
	Audio	-	-
	SATA	2 SATA 3.0	4 SATA 3.0
	DIO	8-bit DIO	8-bit DIO
	LPC	1	1
	SMBus	1	1
i ² C	1	1	
Power	4-pin ATX 12V, 24-pin ATX	8-pin ATX	
Operating Temperature		0°C~60°C	-40°C~85°C

*Populated by default



Model Name		COM100-B
Compliance		COM Express® R2.1, Type 10
Form Factor		Mini-ITX (170 x 170 mm)
Graphics	Connector	1 LVDS, 1 DP
	PCIe, PCI	1 PCIe x1
Expansion	Mini PCIe, M.2	3 Mini PCIe
	SIM	1
Audio	Audio Codec	Realtek ALC886
Rear I/O	Ethernet (GbE)	1
	Serial	2 RS-232
	USB	2 USB 3.2, 4 USB 2.0
	Display	1 DP
	Audio	Mic-in, Line-in, Line-out
	PS/2	-
Internal I/O	Serial	1 (TX/RX)
	USB	-
	Display	1 LVDS
	Audio	Front Audio, S/PDIF
	SATA	1 SATA 3.0
	DIO	8-bit DIO
	LPC	1
	SMBus	1
i ² C	1	
Power		5~19V DC-in
Operating Temperature		0°C~60°C



Model Name		COM332-B(R.A)	COM332-B(R.B1)
Compliance		COM Express® R2.1, Type 6	COM Express® R2.1, Type 6
Form Factor		microATX (244 x 244 mm)	microATX (244 x 244 mm)
Graphics	Connector	1 VGA, 3 DP, 1 LVDS*/eDP, 1 eDP*/LVDS	1 VGA, 3 DP, 1 LVDS*/eDP, 1 eDP*/LVDS
	PCIe, PCI	1 PCIe x16, 6 PCIe x1	1 PCIe x16, 4 PCIe x1
Expansion	Mini PCIe, M.2	2 Mini PCIe	1 M.2 M Key 2280
	SIM	-	-
Audio	Audio Codec	Realtek ALC888	Realtek ALC888
Rear I/O	Ethernet (GbE)	1	1
	Serial	-	-
	USB	4 USB 3.2, 4 USB 2.0	4 USB 3.2, 4 USB 2.0
	Display	3 DP	3 DP
	Audio	Mic-in, Line-in, Line-out	Mic-in, Line-in, Line-out
	PS/2	-	-
Internal I/O	Serial	2 (TX/RX)	2 (TX/RX)
	USB	-	-
	Display	1 VGA, 1 LVDS, 1 eDP	1 VGA, 1 LVDS, 1 eDP
	Audio	Front Audio, S/PDIF	Front Audio, S/PDIF
	SATA	4 SATA 3.0	4 SATA 3.0
	DIO	8-bit DIO	8-bit DIO
	LPC	1	1
	SMBus	1	1
i ² C	-	-	
Power		4-pin ATX 12V, 24-pin ATX	4-pin ATX 12V, 24-pin ATX
Operating Temperature		0°C~60°C	0°C~60°C

*Populated by default



Model Name		Q7X-151(R.A)	Q7X-151(R.D1)
Compliance		BT700	AL700 / AL701 / BT701
Form Factor		Mini-ITX (170 x 170 mm)	Mini-ITX (170 x 170 mm)
Graphics	Connector	1 LVDS, 1 DP	1 LVDS, 2 DP, 1 eDP
	PCIe, PCI	1 PCIe x4	2 PCIe
Expansion	Mini PCIe	-	2 Mini PCIe
	SIM	-	-
Audio	Audio Codec	Realtek ALC886	Realtek ALC886
Rear I/O	Ethernet (GbE)	1	1
	Serial	2 RS-232	2 RS-232
	USB	1 USB 3.2, 2 USB 2.0	3 USB 3.2, 6 USB 2.0
	Display	1 DP	1 DP
	Audio	Mic-in, Line-in, Line-out	Mic-in, Line-in, Line-out
	PS/2	-	-
Internal I/O	Serial	1 (TX/RX)	1 (TX/RX)
	USB	4 USB 2.0 (Optional)	2 USB 2.0 (Optional)
	Display	1 LVDS	1 LVDS
	Audio	-	-
	SATA	2 SATA 3.0	2 SATA 3.0
	DIO	-	-
	LPC	1	1
	SMBus	1	1
Power	i ² C	1	1
	CAN Bus	1	1
Power		12V DC-in	12V DC-in
Operating Temperature		0°C~60°C	0°C~60°C



Model Name		Q7A-551
Compliance		FS700
Form Factor		Proprietary (190 x 102 mm)
Graphics	Connector	1 HDMI, 1 LVDS
	PCIe, PCI	-
Expansion	Mini PCIe	1 Mini PCIe
	SIM	1
Audio	Audio Codec	I ² S
Rear I/O	Ethernet (GbE)	1
	Serial	1 RS-232/422/485, 1 RS232/UART
	USB	2 USB 2.0, 1 USB Client
	Display	1 HDMI
	Audio	Line-out / Mic-in
	PS/2	-
Internal I/O	Serial	1 RS-232/422/485
	USB	-
	Display	1 LVDS
	Audio	-
	SATA	-
	DIO	12-bit DIO
	LPC	-
	SMBus	-
Power	i ² C	-
	CAN Bus	1
Power		12~36V DC-in
Operating Temperature		0°C~60°C

*Populated by default

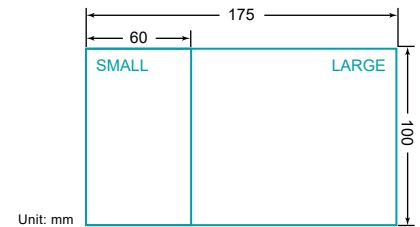
SDM

Compact & Smart Retail Signage Solutions



Features

Intel® Smart Display Module is for next generation commercial AIO displays and visual IoT devices. Intel® SDM provides the primary compute building block and requires an interface board on the displays or host system to complete platform implementation and provide standard end user physical interfaces.



Large Size: 175mm x 100mm
Small Size: 60mm x 100mm



Model Name		SDML-WL
Compliance		SDM Large
System	Processor	8th Gen Intel® Core™
	Socket	FCBGA 1528
	Max. Speed	1.7~4.4GHz
	TDP	15W
	Cache	2M/4M/6M/8M
Memory	Chipset	-
	BIOS	AMI SPI 128Mbit
	Technology	Dual Channel DDR4 2400MHz
Graphics	Max. Capacity	32GB
	Socket	2 SODIMM
Expansion	Interface	1 DP, 2 HDMI
	PCIe	1 PCIe x1 for docking, 1 PCIe x4 for M.2 M Key, 1 PCIe x1 for M.2 B Key, 1 PCIe x1 for M.2 E Key
	PCI	-
	LPC	-
	i ² C	1 i ² C master, 1 i ² C slaver (for docking)
	SMBus	-
Audio	CAN Bus	-
I/O	Interface	HD Audio
	Controller	1 Intel® I219
	USB	4 USB 3.2 (Type A), 1 USB 3.2 (Type C)
	SATA	-
	IDE	-
	SSD	-
	eMMC	-
DIO	-	
SD	-	
TPM		Option
iAMT		iAMT 12.0 (Core i7/i5)
Power		12V DC-in
Operating Temperature		0°C~60°C

*Populated by default