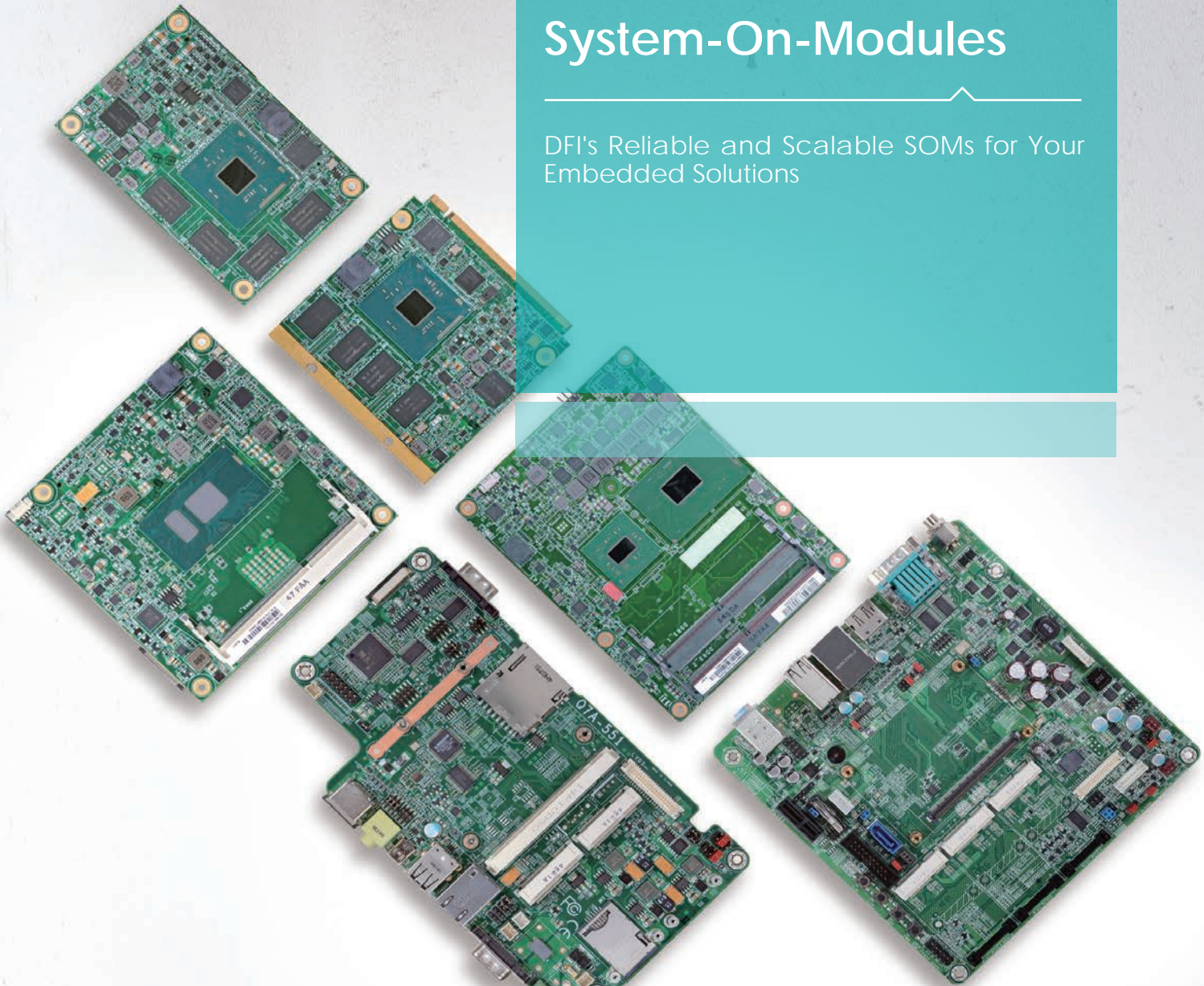


## System-On-Modules

DFI's Reliable and Scalable SOMs for Your Embedded Solutions



# DFI's Reliable and Scalable SOMs for Your Embedded Solutions

DFI provides 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

### SMARC



ALS00

Processor	Platform	Chipset	Model	Index
Intel Atom® Processor E3900	Atom	-	ALS00	P6

### Qseven



AL700

Processor	Platform	Chipset	Model	Index
Intel Atom® Processor E3900	Atom	-	AL700	P7
Intel Atom® Processor E3800	Atom	-	BT700	
Freescale™ i.MX6	ARM	-	FS700	

### COM Express Mini



AL9A3

Type	Processor	Platform	Chipset	Model	Index
Type 10	Intel Atom® Processor E3900	Atom	-	AL9A2	P8
				AL9A3	
	Intel Atom® Processor E3800	Atom	-	BT9A3	

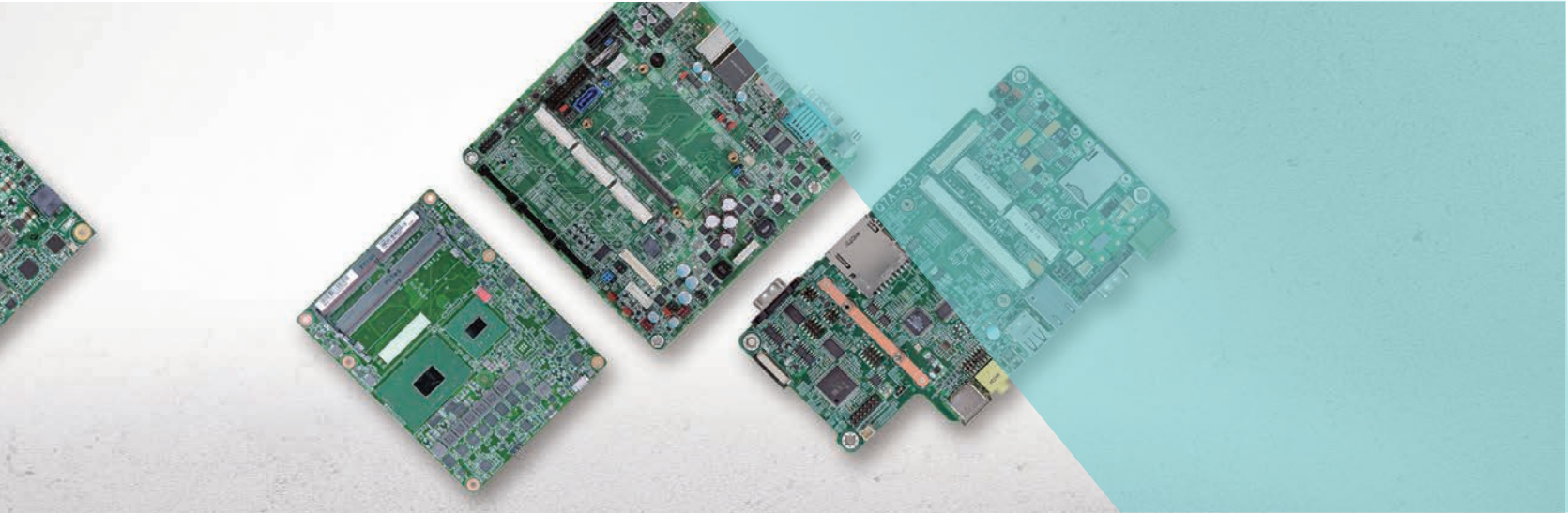
### COM Express Compact



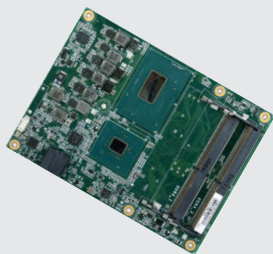
AL968

Type	Processor	Platform	Chipset	Model	Index
Type 6	7th Gen Intel® Core™ Processor	ULT	-	KU968	P9
	6th Gen Intel® Core™ Processor	ULT	-	SU968	
	4th Gen Intel® Core™ Processor	ULT	-	HU968	
Type 6	3rd Gen Intel® Core™ Processor	Mobile	QM77	CR908-B	P10
			QM67	HR908-B	
	Intel Atom® Processor E3900	Atom	-	AL968	
	Intel® Pentium®/Celeron® Processor N3000	Atom	-	BW968	
	Intel Atom® Processor E3800	Atom	-	BT968	
	AMD® Embedded G-Series SoC	AMD	-	KB968	
Type 2	AMD® Embedded G-Series	AMD	A55E	OT905	





### COM Express Basic



CH960

Type	Processor	Platform	Chipset	Model	Index
Type 7	Intel Atom® Processor C3000	Atom	-	DV970	P11
Type 6	8th Gen Intel® Core™ Processor	Mobile	CM246/ QM370	CH960-CM246/QM370	
			HM370	CH960-HM370	
	7th Gen Intel® Core™ Processor	Mobile	CM238/ QM175	KH960-CM238/QM175	
			HM175	KH960-HM175	
	6th Gen Intel® Core™ Processor	Mobile	QM170	SH960-QM170	
			HM170	SH960-HM170	
	4th Gen Intel® Core™ Processor	Mobile	QM87	HM960-QM87, HM961-QM87	
			HM86	HM960-HM86, HM961-HM86	
3rd Gen Intel® Core™ Processor	Mobile	QM77	CR901-B, CR960-QM77		
		HM76	CR960-HM76		
2nd Gen AMD® Embedded R-Series	AMD	A77E	BE960		
		A70M	CM901-B		
Type 2	4th Gen Intel® Core™ Processor	Mobile	QM87/HM86	HM920-QM87, HM920-HM86	P13
			QM77	CR900-B, CR902-B	
	3rd Gen Intel® Core™ Processor	Mobile	HM76	CR902-BL	
			QM67	HR900-B	

### Carrier Board



COM333-I

Form Factor	Compliance	Model	Index
microATX	COM Express R3.0, Type 7	COM333-I	P14
Mini-ITX	COM Express R2.1, Type 10	COM100-B	
microATX	COM Express R2.1, Type 6	COM332-B	
microATX	COM Express R2.0, Type 2	COM330-B	P15
ATX	COM Express R1.0, Type 2	COM630-B	
Mini-ITX	Qseven (AL700, BT700)	Q7X-151-RC	
Proprietary	Qseven (FS700)	Q7A-551	
microATX	SMARC (ALS00)	QSX-151	

### 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
- DFI 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, I<sup>2</sup>C, 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

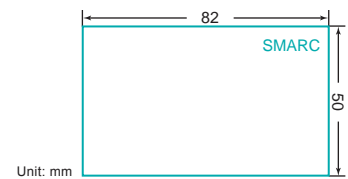
# SMARC

Extremely Energy-Saving & Small Solutions

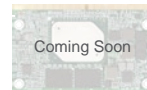


## Features

SMARC ("Smart Mobility ARChitecture") is mainly designed for the applications that require extremely energy saving, constrained space, and high performance with a full size module measuring 82mm x 80mm and short size measuring 82mm x 50mm. It's the ideal solution for digital signage, human machine interface, automation and portable devices.



Full Size: 82mm x 80mm  
Short Size: 82mm x 50mm



Wide Temp  
Atom

Model Name		ALS00 (Preliminary)
Compliance		SMARC™ Rev 2.0 Short Size
System	Processor	Intel Atom® E3900
	Socket	BGA 1296
	Max. Speed	2.5GHz
	TDP	12W
	Cache	2MB
	Chipset	-
	BIOS	AMI SPI 16Mbit
Memory	Technology	Dual Channel LPDDR4 2400MHz
	Max. Capacity	8GB
	Socket	Memory down
Graphics	Interface	1 LVDS, 1 HDMI, 1 DDI, 2 CSI2
Expansion	PCIe	1 PCIe x4
	PCI	-
	LPC	-
	I <sup>2</sup> C	1
	SMBus	1
	CAN Bus	-
Audio	Interface	HPA + I2S
Ethernet	Controller	2 Intel® I211 / 2 Intel® I210
I/O	USB	2 USB 3.0, 6 USB 2.0
	SATA	1 SATA 3.0
	IDE	-
	SSD	-
	eMMC	16GB
	DIO	4-bit DIO
	SD	SDIO
TPM		-
iAMT		-
Power		TBD
Operating Temperature		-40°C~85°C, 0°C~60°C

\*Populated by default



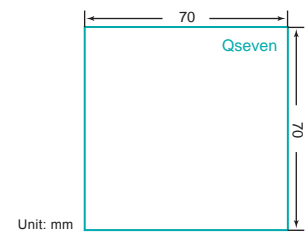
# Qseven

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



Wide Temp  
Atom



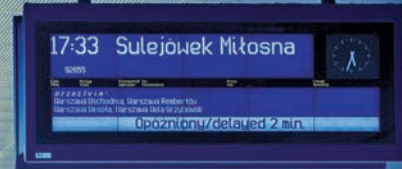
ARM

Model Name	AL700	BT700	FS700	
Compliance	Qseven R2.1	Qseven R2.0	Qseven R1.2	
System	Processor	Intel Atom® E3900	Intel Atom® E3800	Freescale™ i.MX6 Series
	Socket	BGA 1296	BGA 1170	FCPBGA
	Max. Speed	1.1~2.5GHz	1.46~1.91GHz	1.0GHz
	TDP	6W/6.5W/9.5W/12W	5W/7W/10W	-
	Cache	2M	0.5M/1M/2M	32KB
	Chipset	-	-	-
	BIOS	AMI SPI 128Mbit	AMI SPI 64Mbit	-
Memory	Technology	Dual Channel DDR3L 1600MHz	Single Channel DDR3L 1066/1333MHz	Single Channel DDR3 1000/1200MHz
	Max. Capacity	4GB/8GB	2GB/4GB	1GB/2GB
	Socket	Memory down	Memory down	Memory down
Graphics	Interface	1 LVDS, 1 DDI	1 LVDS, 1 DDI	1 HDMI, 2 LVDS
	PCIe	4 PCIe x1	3 PCIe x1	1 PCIe x1
	PCI	-	-	-
	LPC	1	1	-
	I <sup>2</sup> C	1	1	2
	SMBus	1	1	-
Audio	Interface	HD Audio	HD Audio	I <sup>2</sup> S
	Ethernet	Controller	1 Intel® I211 / 1 Intel® I210	1 Intel® I210
I/O	USB	1 USB 3.0, 8 USB 2.0	1 USB 3.0, 6 USB 2.0	4 USB 2.0, 1 USB OTG
	SATA	2 SATA 3.0	2 SATA 2.0	1 SATA 2.0
	IDE	-	-	-
	SSD	-	-	-
	eMMC	optional	optional	onboard
	DIO	4-bit DIO	-	-
	SD	1	1	1 SDIO, 1 microSD onboard
	TPM	optional	optional	-
iAMT	-	-	-	
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, -20°C~70°C, 0°C~60°C	-20°C~70°C, 0°C~60°C	

\*Populated by default

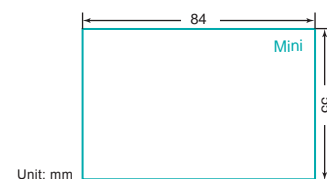
# COM Express Mini

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.



Wide Temp  
Atom



Wide Temp  
Atom



Wide Temp  
Atom

## COMe Type 10

Model Name	AL9A2	AL9A3	BT9A3	
Compliance	COM Express® R2.1 Mini, Type 10	COM Express® R2.1 Mini, Type 10	COM Express® R2.1 Mini, Type 10	
System	Processor	Intel Atom® E3900	Intel Atom® E3800	
	Socket	BGA 1296	BGA 1170	
	Max. Speed	1.1~2.5GHz	1.1~2.5GHz	1.46~2.42GHz
	TDP	6W/9W/12W	6W/9W/12W	5W/7.5W/8W/10W
	Cache	2MB	2MB	0.5M/1M/2M
	Chipset	-	-	-
BIOS	AMI SPI 128Mbit	AMI SPI 128Mbit	AMI SPI 16Mbit	
Memory	Technology	Single Channel DDR3L 1600MHz	Dual Channel DDR3L 1600MHz	Single Channel DDR3L 1066/1333MHz
	Max. Capacity	2GB/4GB/8GB	4GB/8GB	4GB/2GB
	Socket	Memory down	Memory down	ECC 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
	PCI	-	-	-
	LPC	1	1	1
	I <sup>2</sup> C	1	1	1
	SMBus	1	1	1
	CAN Bus	-	-	-
Audio	Interface	HD Audio	HD Audio	HD Audio
Ethernet	Controller	1 Intel® I211 / 1 Intel® I210	1 Intel® I211 / 1 Intel® I210	1 Intel® I210
I/O	USB	2 USB 3.0, 8 USB 2.0	2 USB 3.0, 8 USB 2.0	1 USB 3.0, 8 USB 2.0
	SATA	2 SATA 3.0	2 SATA 3.0	2 SATA 2.0
	IDE	-	-	-
	SSD	-	optional	-
	eMMC	optional	-	optional
	DIO	8-bit DIO	8-bit DIO	8-bit DIO
	SD	optional	optional	-
TPM	-	-	-	
iAMT	-	-	-	
Power	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)	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	

\*Populated by default



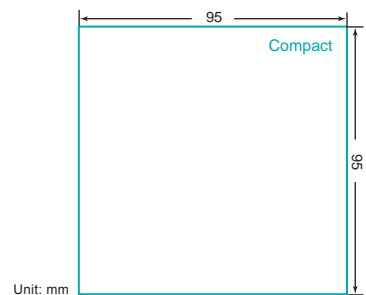
# COM Express Compact

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



Wide Temp  
ULT



ULT



QM77

Model Name		KU968	SU968	HU968	CR908-B
Compliance		COM Express® R2.1 Compact, Type 6	COM Express® R2.1 Compact, Type 6	COM Express® R2.1 Compact, Type 6	COM Express® R2.1 Compact, Type 6
System	Processor	7th Gen Intel® Core™	6th Gen Intel® Core™	4th Gen Intel® Core™	3rd/2nd Gen Intel® Core™
	Socket	BGA 1356	BGA 1356	BGA 1168	BGA 1023
	Max. Speed	2.2~3.9GHz	2.3~3.4GHz	1.6~3.3GHz	1.0~3.3GHz
	TDP	15W	15W	15W	10W/17W/25W/35W/45W
	Cache	2M/3M/4M	3M/4M	2M/3M/4M	1M/2M/3M/4M/6M
	Chipset	-	-	-	Intel® QM77
Memory	BIOS	Insyde SPI 128Mbit	Insyde SPI 128Mbit	AMI SPI 64Mbit	AMI SPI 64Mbit
	Technology	Dual Channel DDR4 2133MHz	Dual Channel DDR3L 1600MHz	Dual Channel DDR3L 1600MHz	Single Channel DDR3/DDR3L 1600MHz
	Max. Capacity	4GB/8GB	16GB	2GB/4GB/8GB	8GB
Graphics	Socket	Memory down	2 SODIMM	Memory down	1 SODIMM
	Interface	1 VGA*/DDI, 1 LVDS*/eDP, 1 DDI	1 VGA*/DDI, 1 LVDS*/eDP, 1 DDI	1 VGA, 1 LVDS, 1 DDI	1 VGA, 1 LVDS, 3 DDI
Expansion	PCIe	4 PCIe x1 + 1 PCIe x4	8 PCIe x1	1 PCIe x4, 1 PCIe x2, 1 PCIe x1	1 PCIe x16, 1 PCIe x4, 3 PCIe x1
	PCI	-	-	-	-
	LPC	1	1	1	1
	I <sup>2</sup> C	1	1	1	1
	SMBus	1	1	1	1
	CAN Bus	-	-	-	-
Audio	Interface	HD Audio	HD Audio	HD Audio	HD Audio
Ethernet	Controller	1 Intel® I219	1 Intel® I219	1 Intel® I218	1 Intel® 82579
I/O	USB	4 USB 3.0, 8 USB 2.0	4 USB 3.0, 8 USB 2.0	2 USB 3.0, 8 USB 2.0	4 USB 3.0/2.0, 4 USB 2.0
	SATA	3 SATA3.0 (RAID)	3 SATA3.0 (RAID)	3 SATA 3.0 (RAID)	2 SATA 3.0, 2 SATA 2.0 (RAID)
	IDE	-	-	-	-
	SSD	-	-	optional	-
	eMMC	-	-	-	-
	DIO	8-bit DIO	8-bit DIO	8-bit DIO	8-bit DIO
	SD	-	-	-	-
TPM		optional	optional	optional	-
iAMT		iAMT 11.6 (Core i7/i5)	iAMT 11.0 (Core i7/i5)	iAMT 9.5	-
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)	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	0°C~60°C	0°C~60°C

\*Populated by default

## COMe Type 6



QM67



Wide Temp  
Atom



Atom

Model Name		HR908-B	AL968	BW968
Compliance		COM Express® R2.1 Compact, Type 6	COM Express® R2.1 Compact, Type 6	COM Express® R2.1 Compact, Type 6
System	Processor	3rd/2nd Gen Intel® Core™	Intel Atom® E3900	Intel® Pentium®/Celeron® N3000
	Socket	BGA 1023	BGA 1296	BGA 1170
	Max. Speed	1.0~3.3GHz	1.1~2.5GHz	2.24~2.56GHz
	TDP	10W/17W/25W/35W/45W	6W/9W/12W	4W/6W
	Cache	1M/2M/3M/4M/6M	2MB	2M
	Chipset	Intel® QM67	-	-
	BIOS	AMI SPI 64Mbit	Insyde SPI 128Mbit	Insyde SPI 64Mbit
Memory	Technology	Single Channel DDR3/DDR3L 1066/1333/1600MHz	Dual Channel DDR3L 1600MHz	Dual Channel DDR3L 1600MHz
	Max. Capacity	8GB	16GB	8GB
	Socket	SODIMM	2 SODIMM	2 SODIMM
Graphics	Interface	1 VGA, 1 LVDS, 3 DDI	1 VGA*/DDI, 1 LVDS*/eDP, 1 DDI	1 VGA*/DDI, 1 LVDS*/eDP, 1 DDI
Expansion	PCIe	1 PCIe x16, 1 PCIe x4, 3 PCIe x1	4 PCIe x1	3 PCIe x1
	PCI	-	-	-
	LPC	1	1	1
	I <sup>2</sup> C	1	1	1
	SMBus	1	1	1
	CAN Bus	-	-	-
	Audio	Interface	HD Audio	HD Audio
Ethernet	Controller	1 Intel® 82579	1 Intel® I211 / 1 Intel® I210	1 Intel® I211
I/O	USB	8 USB 2.0	4 USB 3.0, 8 USB 2.0	4 USB 3.0, 8 USB 2.0
	SATA	2 SATA 3.0, 2 SATA 2.0 (RAID)	2 SATA 2.0	2 SATA 3.0
	IDE	-	-	-
	SSD	-	-	-
	eMMC	-	optional	-
	DIO	8-bit DIO	8-bit DIO	8-bit DIO
	SD	-	optional	optional
TPM	-	-	-	
iAMT	-	-	-	
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		0°C~60°C	-40°C~85°C, 0°C~60°C	0°C~60°C



Wide Temp  
Atom



AMD



AMD

## COMe Type 6 & 2

Model Name		BT968	KB968	OT905
Compliance		COM Express® R2.1 Compact, Type 6	COM Express® R2.1 Compact, Type 6	COM Express® R2.0 Compact, Type 2
System	Processor	Intel Atom® E3800	AMD® Embedded G-Series SoC	AMD® Embedded G-Series
	Socket	BGA 1170	FT3 BGA	FT1 413
	Max. Speed	1.46~2.41GHz	1.0~2.0GHz	1.0~1.65GHz
	TDP	5W/7.5W/8W/10W	6W/9W/15W/25W	9W/18W
	Cache	0.5M/1M/2M	1M/2M	2x 512KB
	Chipset	-	-	AMD® A55E
	BIOS	AMI SPI 64Mbit	AMI SPI 32Mbit	AMI SPI 32Mbit
Memory	Technology	Dual/Single Channel DDR3L 1066/1333MHz	Single Channel DDR3 1066/1333/1600MHz	Single Channel DDR3 1066/1333MHz
	Max. Capacity	4GB/8GB	8GB	8GB
	Socket	1 or 2 SODIMM	1 SODIMM	1 SODIMM
Graphics	Interface	1 VGA, 1 LVDS*/DDI, 1 DDI	1 VGA, 1 DP/LVDS, 1 DP	1 VGA, 1 LVDS
Expansion	PCIe	3 PCIe x1	1 PCIe x4, 4 PCIe x1	6 PCIe x1
	PCI	-	-	4
	LPC	1	1	1
	I <sup>2</sup> C	1	1	-
	SMBus	1	1	1
	CAN Bus	-	-	-
	Audio	Interface	HD Audio	HD Audio
Ethernet	Controller	1 Intel® I210	1 Intel® I210	1 Intel® 82574
I/O	USB	1 USB 3.0, 8 USB 2.0	2 USB 3.0/2.0, 6 USB 2.0	8 USB 2.0
	SATA	2 SATA 2.0	2 SATA 3.0	4 SATA 3.0 (RAID)
	IDE	-	-	1
	SSD	-	optional	-
	eMMC	optional	-	-
	DIO	8-bit DIO	8-bit DIO	8-bit DIO
	SD	-	-	-
TPM	optional	optional	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)	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	0°C~60°C	0°C~60°C

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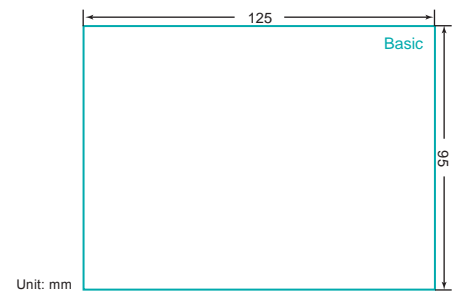
# COM Express Basic

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 7 & 6



Wide Temp  
Atom



Wide Temp  
CM246



Wide Temp  
HM370



Wide Temp  
CM238

Model Name	DV970	CH960-CM246/QM370	CH960-HM370	KH960-CM238/QM175
Compliance	COM Express® R3.0 Basic, Type 7	COM Express® R2.1 Basic, Type 6	COM Express® R2.1 Basic, Type 6	COM Express® R2.1 Basic, Type 6
System	Processor	Intel Atom® C3000	8th Gen Intel® Core™	8th Gen Intel® Core™
	Socket	BGA 1440	BGA 1440	BGA 1440
	Max. Speed	1.7~2.0GHz	3.0GHz	3.0GHz
	TDP	17/31W	45W	45W
	Cache	2M		
	Chipset	-	Intel® CM246/QM370	Intel® HM370
BIOS	Insyde SPI 128Mbit	AMI SPI 256Mbit	AMI SPI 256Mbit	Insyde SPI 128Mbit
Memory	Technology	Dual Channel DDR4 2400MHz	Dual Channel DDR4 2400MHz	Dual Channel DDR4 2400MHz
	Max. Capacity	32GB	32GB	32GB
	Socket	2 SODIMM	2 SODIMM	2 SODIMM
Graphics	Interface	-	1 VGA*/DDI, 1 LVDS*/eDP, 2 DDI	1 VGA*/DDI, 1 LVDS*/eDP, 2 DDI
	PCIe	2 PCIe x8	1 PCIe x16 / 2 PCIe x8, 8 PCIe x1	1 PCIe x16 / 2 PCIe x8, 8 PCIe x1
Expansion	PCI	-	-	-
	LPC	1	1	1
	I <sup>2</sup> C	1	1	1
	SMBus	1	1	1
	CAN Bus	-	-	-
	Audio	Interface	HD Audio	HD Audio
Ethernet	Controller	1 Intel® I210, 4 10Gbase-KR	1 Intel® I219	1 Intel® I219
I/O	USB	2 USB 3.0, 4 USB 2.0	4 USB 3.1, 8 USB 2.0	4 USB 3.0, 8 USB 2.0
	SATA	2 SATA 3.0 (RAID)	4 SATA 3.0 (RAID)	4 SATA 3.0 (RAID)
	IDE	-	-	-
	SSD	-	-	-
	eMMC	-	-	-
	DIO	8-bit DIO	8-bit DIO	8-bit DIO
	SD	-	-	-
	TPM	optional	optional	optional
iAMT	-	iAMT 11.6 (Core i7/i5)	-	iAMT 11.6 (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)	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	-40°C~85°C, 0°C~60°C

\*Populated by default



## COMe Type 6



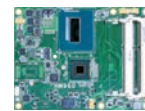
Wide Temp  
HM175



Wide Temp  
QM170



Wide Temp  
HM170



QM87

Model Name		KH960-HM175	SH960-QM170	SH960-HM170	HM960-QM87
Compliance		COM Express® R2.1 Basic, Type 6	COM Express® R2.1 Basic, Type 6	COM Express® R2.1 Basic, Type 6	COM Express® R2.1 Basic, Type 6
System	Processor	7th Gen Intel® Core™	6th Gen Intel® Core™	6th Gen Intel® Core™	4th Gen Intel® Core™
	Socket	BGA 1440	BGA 1440	BGA 1440	BGA 1364
	Max. Speed	1.9~3.7GHz	1.9~3.5GHz	1.9~3.5GHz	2.4~3.4GHz
	TDP	25W/35W/45W	25W/35W/45W	25W/35W/45W	37W/47W
	Cache	3M/6M/8M	2M/3M/6M/8M	2M/3M/6M/8M	3M/6M
	Chipset	Intel® HM170	Intel® QM170	Intel® HM170	Intel® QM87
BIOS	Insyde SPI 128Mbit	Insyde SPI 128Mbit	Insyde SPI 128Mbit	AMI SPI 64Mbit	
Memory	Technology	Dual Channel DDR4 2400MHz	Dual Channel DDR4 2133MHz	Dual Channel DDR4 2133MHz	Dual Channel DDR3L 1333/1600MHz
	Max. Capacity	32GB	32GB	32GB	16GB
	Socket	2 SODIMM	2 SODIMM	2 SODIMM	2 SODIMM
Graphics	Interface	1 VGA*/DDI, 1 LVDS*/eDP, 2 DDI	1 VGA*/DDI, 1 LVDS*/eDP, 2 DDI	1 VGA*/DDI, 1 LVDS*/eDP, 2 DDI	1 VGA, 1 LVDS, 3 DDI
Expansion	PCIe	1 PCIe x16 / 2 PCIe x8, 8 PCIe x1	1 PCIe x16 / 2 PCIe x8, 8 PCIe x1	1 PCIe x16 / 2 PCIe x8, 8 PCIe x1	1 PCIe x16, 7 PCIe x1
	PCI	-	-	-	-
	LPC	1	1	1	1
	I <sup>2</sup> C	1	1	1	1
	SMBus	1	1	1	1
	CAN Bus	-	-	-	-
Audio	Interface	HD Audio	HD Audio	HD Audio	HD Audio
Ethernet	Controller	1 Intel® I219	1 Intel® I219	1 Intel® I219	1 Intel® I217
I/O	USB	4 USB 3.0, 8 USB 2.0	4 USB 3.0, 8 USB 2.0	4 USB 3.0, 8 USB 2.0	4 USB 3.0, 8 USB 2.0
	SATA	4 SATA 3.0	4 SATA 3.0 (RAID)	4 SATA 3.0	4 SATA 3.0 (RAID)
	IDE	-	-	-	-
	SSD	-	-	-	optional
	eMMC	-	-	-	-
	DIO	8-bit DIO	8-bit DIO	8-bit DIO	8-bit DIO
	SD	-	-	-	-
TPM		optional	optional	optional	optional
iAMT		-	iAMT 11.0	-	iAMT 9.0
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)	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	0°C~60°C



QM87



HM86



HM86



QM77

## COMe Type 6

Model Name		HM961-QM87	HM960-HM86	HM961-HM86	CR901-B
Compliance		COM Express® R2.1 Basic, Type 6	COM Express® R2.1 Basic, Type 6	COM Express® R2.1 Basic, Type 6	COM Express® R2.1 Basic, Type 6
System	Processor	4th Gen Intel® Core™	4th Gen Intel® Core™	4th Gen Intel® Core™	3rd/2nd Gen Intel® Core™
	Socket	BGA 1364	BGA 1364	BGA 1364	G2 988B
	Max. Speed	1.6~3.4GHz	1.6~3.3GHz	1.6~3.4GHz	1.6~3.3GHz
	TDP	25W/37W/47W	25W/37W	25W/37W/47W	35W/45W
	Cache	3M/6M	3M	3M/6M	2M/3M/6M
	Chipset	Intel® QM87	Intel® HM86	Intel® HM86	Intel® QM77
BIOS	AMI SPI 64Mbit	AMI SPI 64Mbit	AMI SPI 64Mbit	AMI SPI 64Mbit	
Memory	Technology	Dual Channel DDR3L 1333/1600MHz	Dual Channel DDR3L 1333/1600MHz	Dual Channel DDR3L 1333/1600MHz	Dual Channel DDR3/DDR3L 1066/1333/1600MHz
	Max. Capacity	16GB	16GB	16GB	16GB
	Socket	2 ECC SODIMM	2 SODIMM	2 ECC SODIMM	2 SODIMM
Graphics	Interface	1 VGA, 1 LVDS, 3 DDI	1 VGA, 1 LVDS, 3 DDI	1 VGA, 1 LVDS, 3 DDI	1 VGA, 1 LVDS, 3 DDI
Expansion	PCIe	1 PCIe x16, 7 PCIe x1	1 PCIe x16, 7 PCIe x1	1 PCIe x16, 7 PCIe x1	1 PCIe x16, 1 PCIe x4, 3 PCIe x1
	PCI	-	-	-	-
	LPC	1	1	1	1
	I <sup>2</sup> C	1	1	1	1
	SMBus	1	1	1	1
	CAN Bus	-	-	-	-
Audio	Interface	HD Audio	HD Audio	HD Audio	HD Audio
Ethernet	Controller	1 Intel® I217	1 Intel® I217	1 Intel® I217	1 Intel® B2579
I/O	USB	4 USB 3.0, 8 USB 2.0	2 USB 3.0, 8 USB 2.0	2 USB 3.0, 8 USB 2.0	4 USB 3.0, 8 USB 2.0
	SATA	4 SATA 3.0 (RAID)	2 SATA 3.0, 2 SATA 2.0	2 SATA 3.0, 2 SATA 2.0	2 SATA 3.0, 2 SATA 2.0 (RAID)
	IDE	-	-	-	-
	SSD	optional	optional	optional	optional
	eMMC	-	-	-	-
	DIO	8-bit DIO	8-bit DIO	8-bit DIO	8-bit DIO
	SD	-	-	-	-
TPM		optional	optional	optional	optional
iAMT		iAMT 9.0	-	-	-
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)	12V, 5VSB, VCC_RTC (ATX mode) 12V, VCC_RTC (AT mode)
Operating Temperature		0°C~60°C	0°C~60°C	0°C~60°C	0°C~60°C

\*Populated by default

## COMe Type 6 & 2



QM77



AMD



AMD



QM87

Model Name	CR960-QM77/HM76	BE960	CM901-B	HM920-QM87/HM86	
Compliance	COM Express® R2.1 Basic, Type 6	COM Express® R2.1 Basic, Type 6	COM Express® R2.1 Basic, Type 6	COM Express® R2.1 Basic, Type 2	
System	Processor	3rd/2nd Gen Intel® Core™	2nd Gen AMD® Embedded R-Series	4th Gen Intel® Core™	
	Socket	BGA 1023	FP3 BGA	FS1r2 PGA	BGA 1364
	Max. Speed	1.1~3.3GHz	2.5~3.6GHz	1.9~2.7GHz	1.5~3.4GHz
	TDP	17W/25W/35W/45W	35W	35W	25W/37W/47W
	Cache	1.5M/2M/3M/4M/6M	4M	1M/4M	2M/3M/6M
	Chipset	Intel® QM77/Intel® HM76	AMD® A77E	AMD® A70M	Intel® QM87/Intel® HM86
BIOS	AMI SPI 64Mbit	AMI SPI 64Mbit	AMI SPI 32Mbit	AMI SPI 64Mbit	
Memory	Technology	Dual Channel DDR3L 1600MHz	Dual Channel DDR3L 1866MHz	Dual Channel DDR3 1600MHz	Dual Channel DDR3L 1333/1600MHz
	Max. Capacity	16GB	16GB	16GB	16GB
	Socket	2 SODIMM	2 SODIMM	2 SODIMM	2 SODIMM
Graphics	Interface	1 VGA, 1 LVDS, 3 DDI	1 VGA*/DDI, 1 LVDS*/eDP, 2 DDI	1 DP, 1 DP/LVDS, 1 DP/VGA	1 VGA, 1 LVDS
Expansion	PCIe	1 PCIe x16, 7 PCIe x1	1 PCIe x16, 7 PCIe x1	1 PCIe x16, 7 PCIe x1	1 PCIe x16, 5 PCIe x1
	PCI	-	-	-	4
	LPC	1	1	1	1
	I <sup>2</sup> C	1	1	1	1
	SMBus	1	1	1	1
	CAN Bus	-	-	-	-
Audio	Interface	HD Audio	HD Audio	HD Audio	HD Audio
Ethernet	Controller	1 Intel® 82579	1 Intel® I210	1 Intel® 82574	1 Intel® I217
I/O	USB	4 USB 3.0, 8 USB 2.0	4 USB 3.0, 8 USB 2.0	4 USB 3.0/2.0, 4 USB 2.0	8 USB 2.0
	SATA	2 SATA 3.0, 2 SATA 2.0 (RAID)	4 SATA 3.0	4 SATA 3.0 (RAID)	4 SATA 3.0 (RAID)
	IDE	-	-	-	1
	SSD	optional	-	optional	optional
	eMMC	-	-	-	-
	DIO	8-bit DIO	8-bit DIO	8-bit DIO	8-bit DIO
	SD	-	-	-	-
TPM	optional	optional	optional	optional	
iAMT	-	-	-	iAMT 9.0 (QM87)	
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)	12V, 5VSB, VCC_RTC (ATX mode) 12V, VCC_RTC (AT mode)	
Operating Temperature	0°C~60°C	0°C~60°C	0°C~60°C	0°C~60°C	



QM77



QM77



HM76



QM67

## COMe Type 2

Model Name	CR900-B	CR902-B	CR902-BL	HR900-B	
Compliance	COM Express® R2.1 Basic, Type 2	COM Express® R2.1 Basic, Type 2	COM Express® R2.1 Basic, Type 2	COM Express® R1.0 Basic, Type 2	
System	Processor	3rd/2nd Gen Intel® Core™	3rd/2nd Gen Intel® Core™	3rd/2nd Gen Intel® Core™	
	Socket	G2 988B	BGA 1023	BGA 1023	G2 988B
	Max. Speed	1.6~3.3GHz	1.1~2.8GHz	1.0~3.3GHz	1.6~3.3GHz
	TDP	35W/45W	17W/35W	10W/17W/25W/35W/45W	35W/45W
	Cache	2M/3M/6M	1.5M/2M/3M/4M	1M/1.5M/2M/3M/4M/6M	2M/3M/6M
	Chipset	Intel® QM77	Intel® QM77	Intel® HM76	Intel® QM67
BIOS	AMI SPI 64Mbit	AMI SPI 64Mbit	AMI SPI 64Mbit	AMI SPI 64Mbit	
Memory	Technology	Dual Channel DDR3/DDR3L 1066/1333/1600MHz	Dual Channel DDR3/DDR3L 1066/1333/1600MHz	Dual Channel DDR3/DDR3L 1066/1333/1600MHz	Dual Channel DDR3/DDR3L 1066/1333/1600MHz
	Max. Capacity	16GB	16GB	16GB	16GB
	Socket	2 SODIMM	2 SODIMM	2 SODIMM	2 SODIMM
Graphics	Interface	1 VGA, 1 LVDS	1 VGA, 1 LVDS, 2 DDI	1 VGA, 1 LVDS, 2 DDI	1 VGA, 1 LVDS, 2 DDI
Expansion	PCIe	1 PCIe x16, 1 PCIe x1, 1 PCIe x4	1 PCIe x16, 1 PCIe x4, 1 PCIe x1	1 PCIe x16, 1 PCIe x4, 1 PCIe x1	1 PCIe x16, 5 PCIe x1
	PCI	4	4	4	4
	LPC	1	1	1	1
	I <sup>2</sup> C	1	-	-	-
	SMBus	1	1	1	1
	CAN Bus	-	-	-	-
Audio	Interface	HD Audio	HD Audio	HD Audio	HD Audio
Ethernet	Controller	1 Intel® 82579	1 Intel® 82579	1 Intel® 82579	1 Intel® 82579
I/O	USB	8 USB 2.0	8 USB 2.0	8 USB 2.0	8 USB 2.0
	SATA	2 SATA 3.0, 2 SATA 2.0 (RAID)	2 SATA 3.0, 2 SATA 2.0 (RAID)	2 SATA 3.0, 2 SATA 2.0	2 SATA 3.0, 2 SATA 2.0
	IDE	1	1	1	1
	SSD	optional	-	-	-
	eMMC	-	-	-	-
	DIO	8-bit DIO	8-bit DIO	8-bit 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)	12V, 5VSB, VCC_RTC (ATX mode) 12V, VCC_RTC (AT mode)	12V, 5VSB, VCC_RTC (ATX mode) 12V, VCC_RTC (AT mode)	
Operating Temperature	0°C~60°C	0°C~60°C	0°C~60°C	0°C~60°C	

\*Populated by default

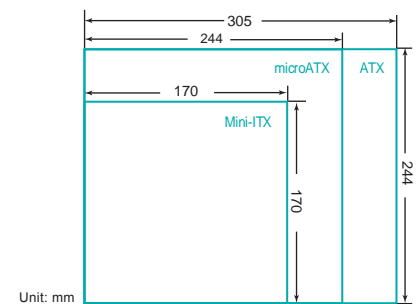
# Carrier Board

Compatible with a Wide Range of Modules



## Features

The DFI 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	COM100-B	COM332-B	
Compliance	COM Express® R3.0, Type 7	COM Express® R2.1, Type 10	COM Express® R2.1, Type 6	
Form Factor	microATX (244 x 244 mm)	Mini-ITX (170 x 170 mm)	microATX (244 x 244 mm)	
Graphics	Connector	1 LVDS, 1 DP	1 VGA*/eDP, 1 LVDS, 3 DP, 1 eDP*/LVDS	
Expansion	PCIe, PCI	1 PCIe x1	1 PCIe x16, 6 PCIe x1	
	Mini PCIe	3 Mini PCIe	2 Mini PCIe	
	SIM	1	-	
Audio	Audio Codec	Realtek ALC886	Realtek ALC888	
	Rear I/O	Ethernet (GbE)	2 GbE, 4 10Gbase-KR(2 RJ45, 2 SFP+)	1
Rear I/O	Serial	-	2 RS-232	
	USB	4 USB 3.0/2.0	2 USB 3.0, 4 USB 2.0	4 USB 3.0, 4 USB 2.0
	Display	-	1 DP	3 DP
	Audio	-	Mic-in, Line-in, Line-out	Mic-in, Line-in, Line-out
	PS/2	-	-	-
	Internal I/O	Serial	1 (TX/RX)	2 (TX/RX)
USB		-	-	-
Display		-	1 LVDS	1 VGA, 1 LVDS, 1 eDP
Audio		-	Front Audio, S/PDIF	Front Audio, S/PDIF
SATA		2 SATA 3.0	1 SATA 3.0	4 SATA 3.0
DIO		8-bit DIO	8-bit DIO	8-bit DIO
LPC		1	1	1
SMBus		1	1	1
I <sup>2</sup> C	1	1	-	
Power	4-pin ATX 12V, 24-pin ATX	5-19V DC-in	4-pin ATX 12V, 24-pin ATX	
Operating Temperature	0°C-60°C	0°C-60°C	0°C-60°C	

\*Populated by default





Type 2



Type 2

Model Name	COM330-B	COM630-B
Compliance	COM Express® R2.0, Type 2	COM Express® R1.0, Type 2
Form Factor	microATX (244 x 244 mm)	ATX (305 x 244 mm)
Graphics	Connector 1 VGA, 1 LVDS	1 VGA, 1 LVDS
Expansion	PCIe, PCI 1 PCIe x16, 1 PCIe x4, 2 PCI	1 PCIe x16, 2 PCIe x1, 4 PCI
	Mini PCIe 1 Mini PCIe	-
	SIM -	-
Audio	Audio Codec Realtek ALC886	Realtek ALC262
Rear I/O	Ethernet (GbE) 1	1
	Serial 3 R-S232	3
	USB 2 USB 2.0	4 USB 2.0
	Display 1 VGA	1 VGA
	Audio Mic-in, Line-in, Line-out	Mic-in, Line-in, Line-out
	PS/2 2 (opt.)	2
Internal I/O	Serial 1 RS-232	1
	USB 4 USB 2.0	4 USB 2.0
	Display 1 LVDS	1 LVDS
	Audio Front Audio, S/PDIF	Front Audio, S/PDIF
	SATA 2 SATA 3.0, 2 SATA 2.0	4 SATA 2.0
	DIO 8-bit DIO	8-bit DIO
	LPC 1	-
	SMBus 1	-
	I <sup>2</sup> C 1	-
	CAN Bus -	-
Power	24-pin ATX	24-pin ATX
Operating Temperature	0°C~60°C	0°C~60°C



Q7



Q7



SMARC

Model Name	Q7X-151-RC	Q7A-551	QSX-151 (Preliminary)
Compliance	AL700 (Q7X-151-RC)/BT700 (Q7X-151)	FS700	ALS00
Form Factor	Mini-ITX (170 x 170 mm)	Proprietary (190 x 102 mm)	microATX (244 x 244 mm)
Graphics	Connector 1 LVDS, 1 DP	1 HDMI, 1 LVDS	1 HDMI, 1 DP, 1 LVDS
Expansion	PCIe, PCI 2 PCIe x2	-	2 PCIe x1
	Mini PCIe 2 mSATA	1 Mini PCIe	1 mSATA, 1 EKey M.2
	SIM -	1	1
Audio	Audio Codec Realtek ALC888	I <sup>2</sup> S	HDA + I2S
Rear I/O	Ethernet (GbE) 1	1	2
	Serial 1 RS-232	1 RS-232/422/485, 1 RS232/UART	2
	USB 3 USB 3.0, 1 USB 2.0	2 USB 2.0, 1 USB Client	1 USB2.0, 1 USB3.0, 1 USB Type C
	Display 1 DP	1 HDMI	1 HDMI, 1 Type C (support PD)
	Audio Mic-in, Line-in, Line-out	Line-out / Mic-in	2
	PS/2 -	-	-
Internal I/O	Serial 2 (TX/RX)	1 RS-232/422/485	2 (TX/RX)
	USB 2 USB 2.0 (optional)	-	-
	Display 1 LVDS	1 LVDS	1 LVDS
	Audio -	-	-
	SATA 2 SATA 3.0	-	1 SATA 3.0
	DIO -	12-bit DIO	-
	LPC 1	-	-
	SMBus 1	-	1
I <sup>2</sup> C 1	-	1	
CAN Bus 1	1	2	
Power	12V DC-in	12~36V DC-in	12~24V DC-in, Battery in
Operating Temperature	0°C~60°C	0°C~60°C	0°C~60°C

\*Populated by default



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