

# **Express-DN7**

COM Express Basic Size Type 7 Module with Intel Atom<sup>®</sup> C3000 SoC

### Features

- Intel Atom<sup>®</sup> Processor C3000 SoC (up to 16 cores), supports full virtualization (VT-d/VT-x)
- Up to 48GB ECC DDR4 memory at max. 2400MHz (and non-ECC supported)
- Up to 2x PCIe x8 Gen3 for flexible expansion
- Up to 4x 10GBASE-KR ports
- IEEE 1588 Precision Time Protocol (PTP) support for real-time applications
- Extreme Rugged operating temperature range: -40°C to +85°C (build option for eTEMP SKUs)
- Supports Smart Embedded Management Agent (SEMA) functions

### **Specifications**

#### Core System

#### CPU

Intel Atom® Processor C3000 SoC, 14nm (formerly codename: "Denverton-NS") Atom® C3808 2.0GHz 12MB, 25W (12C/2133MHz, eTEMP) Atom® C3708 1.7GHz 16MB, 17W (8C/2133MHz, eTEMP) Atom® C3508 1.6GHz 8MB, 12W (4C/1866MHz, eTEMP) Atom® C3308 1.6/2.1GHz 4MB, 10W (2C/1866MHz, eTEMP) Atom® C3958 2.0GHz 16MB, 31W (16C/2400MHz, by request) Atom® C3858 2.0GHz 12MB, 25W (12C/2400MHz, by request) Atom® C3558 2.2GHz 16MB, 25W (8C/2400MHz, by request) Atom® C3558 2.2GHz 8MB, 16W (4C/2133MHz, by request) Atom® C3538 2.1GHz 8MB, 15W (4C/2133MHz, by request) Atom® C3338 1.5/2.2GHz 4MB, 9W (2C/1866MHz, by request)

Supports: Intel® Quick Assist Technology (Crypto and Compression accelerator), Intel® VT (including VT-x, VT-d, VT-x with Extended Page Tables), Intel® Turbo Boost Technology 2.0, Intel® SSE4.2, Intel® 64 Architecture, Intel® ISA compatibility, Intel® Execute Disable Bit, Intel® OS Guard, Intel® Secure Key, Intel® AES-NI, Intel® Security Hash Algorithm Extensions (SHA-1, SHA-256)

Note: Availability of features may vary between SoC SKUs

#### Метогу

Up to dual channel 2400/2133/1866 MHz DDR4 ECC (or non-ECC), up to 48GB in three SODIMM sockets

Notes: Memory frequency & capacity depends on SKUs; 3rd SO-DIMM supported by build option.

### Embedded BIOS

AMI EFI with CMOS backup in 16MB SPI BIOS

#### Cache

16MB for C3708/C3958/C3758, 12MB for C3808/C3858, 8MB for C3508/C3558/C3538, 4MB for C3308/C3338

#### Expansion Busses

Up to 1 PCI Express x8 Gen3; CD connector (lanes 16-23 x8, x4, x2 (or x1), four controllers)

Up to 1 PCI Express x8 Gen3; AB & CD connector, lanes 0-7 (x8, x4, x2 (or x1), four controllers, dependent on GbE support) LPC bus, SMBus (system), I<sup>2</sup>C (user) Note: PCI Express ports dependent on SoC SKU SEMA Board Controller

Supports voltage/current monitoring, power sequence debug support, AT/ATX mode control, logistics and forensic information, flat panel control, general purpose I<sup>2</sup>C, failsafe BIOS (dual BIOS), watchdog timer and fan control

#### Debug Headers

40-pin multipurpose flat cable connector for use with DB-40 debug module providing BIOS POST code LED, BMC access, SPI BIOS flashing, power testpoints, debug LEDs MIPI60 header for debug of CPU (build option)

• 10G Ethernet

#### Intel® MAC/PHY Intel® 10G Ethernet Controller integrated in SoC (two controllers)

#### 10G Interface

Up to 4x 10GBASE-KR (bandwidth dependent on SoC SKU)

#### Ethernet

Intel<sup>®</sup> MAC/PHY Intel<sup>®</sup> i210

#### Interface

10/100/1000 GbE connection

#### NC-SI

NC-SI supported on AB connector, connected to GbE controller



## Specifications

### Multi I/O and Storage

USB Up to 2x USB 3.0/2.0 (USB 0,1), 2x USB 2.0 (USB 2,3) Note: USB ports dependent on SoC SKU

#### SATA

Up to 2x SATA 6Gb/s (SATA 0,1) Note: SATA ports dependent on SoC SKU

#### Serial

2 UART ports with console redirection

**GPIO/SD** 4 GPO and 4 GPI (GPI with interrupt)

#### eMMC

eMMC 5.0 (build option) 8GB/16GB/32GB/64GB As storage device

#### • Super I/O

Supported on carrier if needed (standard support for W83627DHG-P)

#### • TPM (build option)

Chipset: Infineon Type: TPM 2.0

#### • Power

Standard Input: ATX = 12V±5% / 5Vsb ±5% or AT = 12V±5% Wide Input: ATX = 8.5-20 V / 5Vsb ±5% or AT = 8.5-20V Management: ACPI 5.0 compliant, Smart Battery support Power States: C1-C6, S0, S1, S4, S5, S5 ECO mode (Wake-on-USB S4, WOL S4/S5) ECO mode: Supports deep S5 mode for power saving

#### Mechanical and Environmental

Form Factor: PICMG COM.0, Rev 3.0 Type 7 Dimension: Basic size: 125 mm x 95 mm

#### **Operating Temperature**

Standard: 0°C to 60°C Extreme Rugged: -45°C to +85°C (optional by project basis, only for eTEMP SKUs)

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#### Humidity

5-90% RH operating, non-condensing 5-95% RH storage (and operating with conformal coating)

#### Shock and Vibration

IEC 60068-2-64 and IEC-60068-2-27 MIL-STD-202F, Method 213B, Table 213-I, Condition A and Method 214A, Table 214-I, Condition D

#### HALT

Thermal Stress, Vibration Stress, Thermal Shock and Combined Test

#### Operating Systems

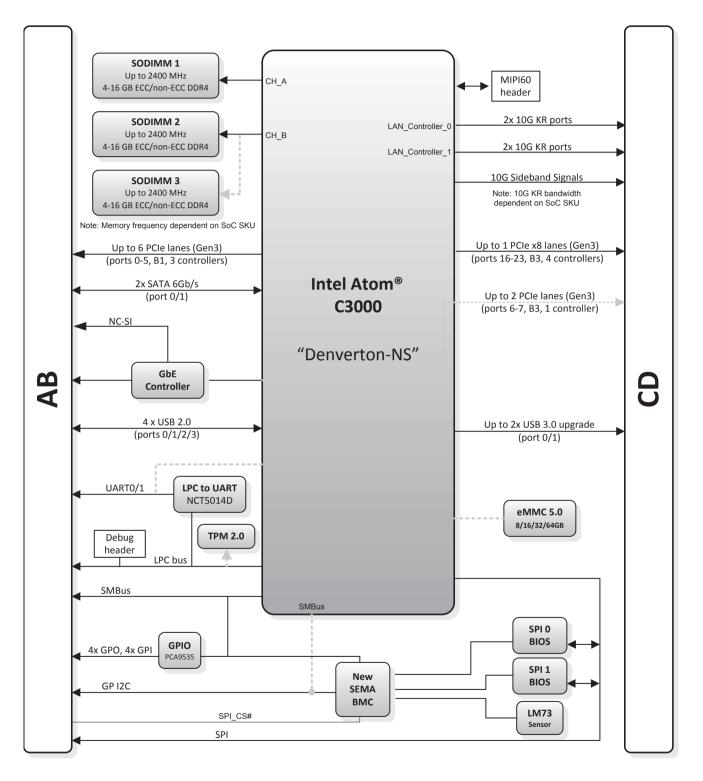
Standard Support Windows Server 2012/2016 64-bit, Yocto Linux 64-bit)

Extended Support (BSP) Yocto Linux 64-bit

Note: \* All specifications are subject to change without further notice.



### Functional Diagram





## **Ordering Information**

- Express-DN7-C3808
   Basic size COM Express Type 7 module with Intel Atom<sup>®</sup>
   C3808, 12C (eTEMP)
- Express-DN7-C3708
   Basic size COM Express Type 7 module with Intel Atom<sup>®</sup> C3708, 8C (eTEMP)
- Express-DN7-C3508
   Basic size COM Express Type 7 module with Intel Atom<sup>®</sup> C3508, 4C (eTEMP)
- Express-DN7-C3308
   Basic size COM Express Type 7 module with Intel Atom<sup>®</sup>

   C3308, 2C (eTEMP)
- Express-DN7-C3958
   Basic size COM Express Type 7 module with Intel Atom<sup>®</sup>
   C3958, 16C
- Express-DN7-C3858
   Basic size COM Express Type 7 module with Intel Atom<sup>®</sup> C3858, 12C
- Express-DN7-C3758
   Basic size COM Express Type 7 module with Intel Atom<sup>®</sup> C3758, 8C
- Express-DN7-C3558
   Basic size COM Express Type 7 module with Intel Atom<sup>®</sup> C3558, 4C
- Express-DN7-C3538
   Basic size COM Express Type 7 module with Intel Atom<sup>®</sup> C3538, 4C
- Express-DN7-C3338
   Basic size COM Express Type 7 module with Intel Atom<sup>®</sup>

   C3338, 2C

Note: C3958, C3858, C3758, C3558, C3538, C3338 support by project basis

### **10G BASE-KR Support**

	C3808	C3708	C3508	C3308	
LAN Controller 0 (Gb/s)	10		2.5		
	2.5		1		
		1			
LAN Controller 1 (Gb/s)	10		2.5		
	2	.5	· ·	1	
		1			

	C3958	C3858	C3758	C3558	C3538	C3338
LAN Controller 0 (Gb/s)			10			2.5
			2.5			1
			1			
LAN Controller 1 (Gb/s)		10			2.5	
		2.5			1	
		1				

Combined throughput on all four ports is 20Gb/s

10GBASE-KR ports 0,1 are from LAN Controller 0 10GBASE-KR ports 2,4 are from LAN Controller 1

Notes:

\* All specifications are subject to change without further notice.

\* "Build option" indicates an alternative BOM configuration to support additional or alternative functions that are not available on the standard product. Please contact our sales representatives.

\* All modules above support to connect to optical PHY as default. connect to copper PHY is by project basis

### Accessories

#### Heat Spreaders

• HTS-DN7-B

Heatspreader for Express-DN7 with threaded standoffs for bottom mounting

• HTS-DN7-BT

Heatspreader for Express-DN7 with through hole standoffs for top mounting

#### **Passive Heatsinks**

• THS-DN7-BL

Low profile heatsink for Express-DN7 with threaded standoffs for bottom mounting

• THS-DN7-BLT

Low profile heatsink for Express-DN7 with through hole standoffs for top mounting

THSH-DN7-BL

High profile heatsink for Express-DN7 with threaded standoffs for bottom mounting

#### **Active Heatsink**

#### • THSF-DN7-BL

High profile heatsink with fan for Express-DN7 with threaded standoffs for bottom mounting

### Starter Kit

#### • Starterkit

COM Express Type 7 Starter Kit Plus-Full Fiber COM Express Type 7 Starter Kit Plus-Full Copper Note: Two starter kits are available: one supporting SPF+ and one supporting 10GBASE-T

## I/O support on different SOCs

compliant with PICMG definition

"Type7 module may supports more x1 root hubs in bucket one (B1). It's expected that future generation products may limit the number of available root hubs on bucket one (B1) to 2.

30       30       30       30       30       30       30         10 <t< th=""><th>B1</th><th></th><th>B3</th><th>B4</th><th>B2</th><th>SATA</th><th>USB 3.0 upgrade</th><th>USB 2.0</th></t<>	B1		B3	B4	B2	SATA	USB 3.0 upgrade	USB 2.0	
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$\frac{1}{12} + \frac{1}{12} $						-			
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N       N			default GbE using last						
Image: Normal Sector       Image:				B4: ports 24-31					
m       m				B2: ports 8-15					
SB C 333       SB C 333       SB C 333       SB C 330 uppedie       U SS C 1 uppedie         No No       No No       No No       SB C 30 uppedie       U SS C 1 uppedie </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
B1     C3     B4     D2       x8     x8     x8     x8     x8     x8       x8     x8     x8     x8     x8     x8       x8     x8     x8     x8     x8     x8       x8     x8     x8     x8     x8     x8     x8       x8     x8     x8     x8     x8     x8     x8       x8     x8     x8     x8     x8     x8     x8     x8       x8     x8     x8     x8     x8     x8     x8     x8       x8     x8     x8     x8     x8     x8     x8     x8       x8     x8     x8     x8     x8     x8     x8     x8       x8     x8     x8     x8     x8     x8     x8     x8       x8     x8     x8     x8     x8     x8     x8     x8     x8       x8     x8     x8     x8     x8     x8     x8     x8     x8       x8     x8     x8     x8     x8     x8     x8     x8       x8     x8     x8     x8     x8     x8     x8     x8       x8     x8     x8									
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x2       x2 <th< td=""><td>x8</td><td></td><td>x8</td><td>x8</td><td>x8</td><td></td><td></td><td></td></th<>	x8		x8	x8	x8				
At       At <th< td=""><td>x4</td><td>x4</td><td>x4 x4</td><td>x4 x4</td><td>x4 x4</td><td></td><td></td><td></td></th<>	x4	x4	x4 x4	x4 x4	x4 x4				
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No     <									
1       1			default GbE using last	x1					
Add       A				ut					
an object       38       Sing CH DDR4, max. 16 GB DDR4	x2	x2 x2							
83         Store of the set o	x1 x1	x1							
ISIO, 1CH DDR4, max. 16 GB DDR4		no GbE							
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	B1 x8 x4 x1 x1 x1 x1 x1 x1 x1 x1 x1 x1	x2 x2 x x1 x1 x1 for GbE 44, max. 16 GB DE	2 x2 x2 x x1 x1 x1 x1 x1 x1 x1 x1 x1	x1         x1         x1         x1           B4         x8         x8         x4         x4	x1         x1         x1         x1           B2         x8         x8           x4         x4         x4	SATA 0 1	USB 3.0 upgrade 0 1 2 3		
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