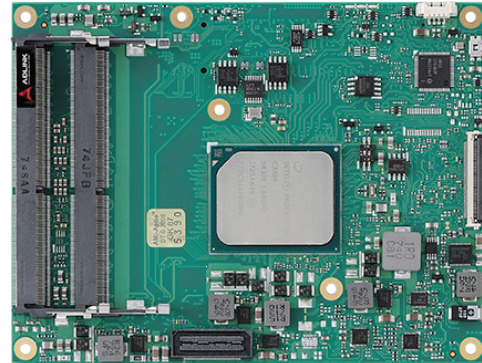


# Express-DN7

## COM Express Basic Size Type 7 Module with Intel Atom® C3000 SoC

### Features

- Intel Atom® 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® C3758 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

##### Memory

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® MAC/PHY

Intel® 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)

#### 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

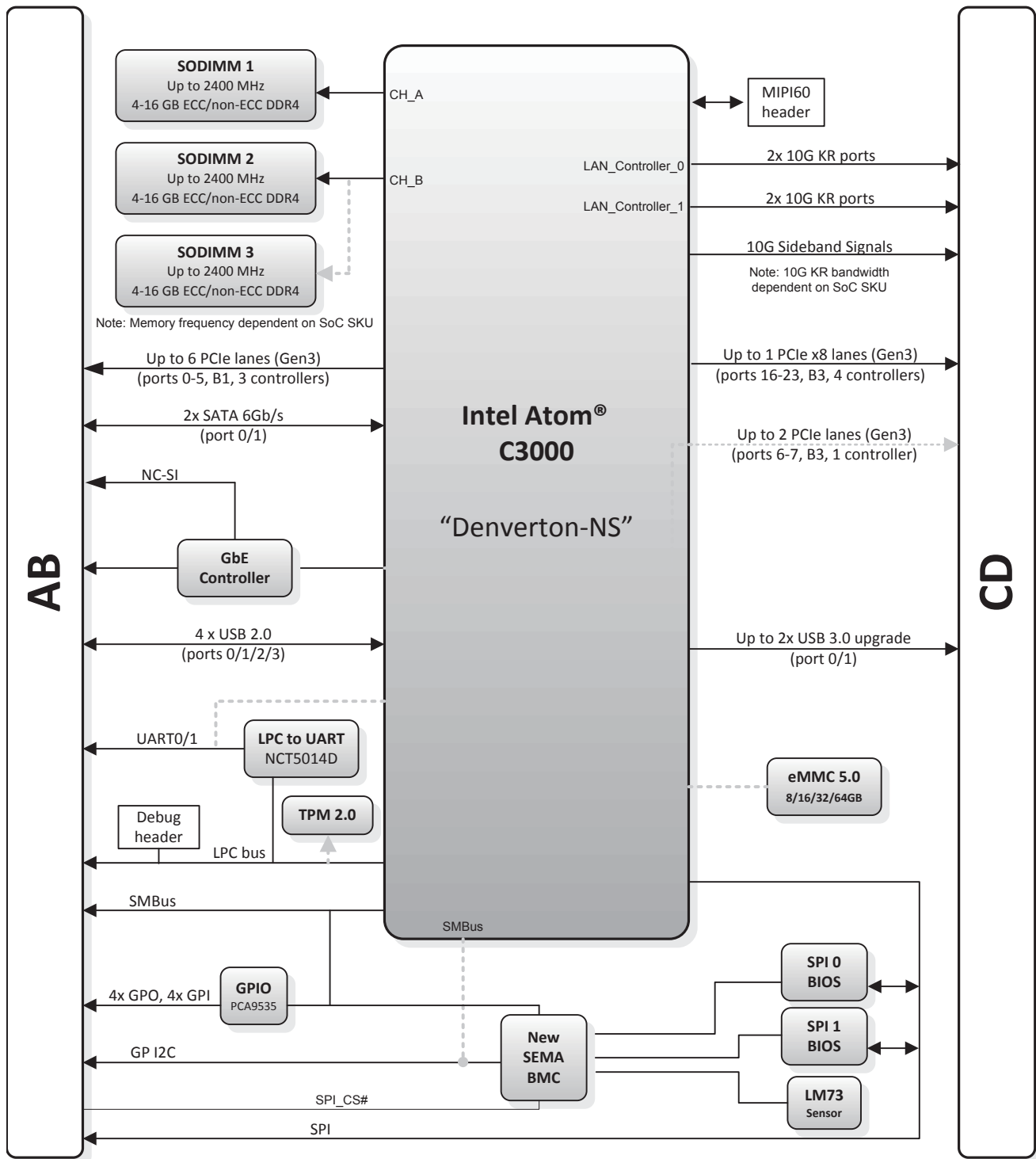
#### Standard Support

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

#### Extended Support (BSP)

Yocto Linux 64-bit

## Functional Diagram



## Ordering Information

- **Express-DN7-C3808**  
Basic size COM Express Type 7 module with Intel Atom® C3808, 12C (eTEMP)
- **Express-DN7-C3708**  
Basic size COM Express Type 7 module with Intel Atom® C3708, 8C (eTEMP)
- **Express-DN7-C3508**  
Basic size COM Express Type 7 module with Intel Atom® C3508, 4C (eTEMP)
- **Express-DN7-C3308**  
Basic size COM Express Type 7 module with Intel Atom® C3308, 2C (eTEMP)
- **Express-DN7-C3958**  
Basic size COM Express Type 7 module with Intel Atom® C3958, 16C
- **Express-DN7-C3858**  
Basic size COM Express Type 7 module with Intel Atom® C3858, 12C
- **Express-DN7-C3758**  
Basic size COM Express Type 7 module with Intel Atom® C3758, 8C
- **Express-DN7-C3558**  
Basic size COM Express Type 7 module with Intel Atom® C3558, 4C
- **Express-DN7-C3538**  
Basic size COM Express Type 7 module with Intel Atom® C3538, 4C
- **Express-DN7-C3338**  
Basic size COM Express Type 7 module with Intel Atom® 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 1		2.5 1	
LAN Controller 1 (Gb/s)	10 2.5 1		2.5 1	

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

# Express-DN7

## 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.

**C3808, C3708, C3958, C3858, C3758**  
20 HSIO, 2CH DDR4, max. 48 GB DDR4

B1				B3				B4				B2			
x8				x8				x8				x8			
x4		x4		x4		x4		x4		x4		x4		x4	
x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2
x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1

SATA
0 1

USB 3.0 upgrade
0 1 2 3

USB 2.0
0 1 2 3

for GbE

B1			
x8			
x4		x4	
x2	x2	x2	x2
x1	x1	x1	x1

no GbE

Dual layout supports default GbE using last x1 in the B1 bucket, alternative is no GbE but full PCIe x8 on B1.

B1: ports 0-7  
B3: ports 16-23  
B4: ports 24-31  
B2: ports 8-15

**C3558, C3538**  
12 HSIO, 2CH DDR4, max. 48 GB DDR4

B1				B3				B4				B2			
x8				x8				x8				x8			
x4		x4		x4		x4		x4		x4		x4		x4	
x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2
x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1

SATA
0 1

USB 3.0 upgrade
0 1 2 3

USB 2.0
0 1 2 3

for GbE

B1			
x8			
x4		x4	
x2	x2	x2	x2
x1	x1	x1	x1

no GbE

Dual layout supports default GbE using last x1 in the B1 bucket, alternative is no GbE but full PCIe x8 on B1.

**C3338**  
10 HSIO, 1CH DDR4, max. 16 GB DDR4

B1				B3				B4				B2			
x8				x8				x8				x8			
x4		x4		x4		x4		x4		x4		x4		x4	
x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2
x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1

SATA
0 1

USB 3.0 upgrade
0 1 2 3

USB 2.0
0 1 2 3

for GbE

B1			
x8			
x4		x4	
x2	x2	x2	x2
x1	x1	x1	x1

no GbE

Dual layout supports default GbE using last x1 in the B1 bucket, alternative is no GbE but full PCIe x8 on B1.

**C3508**  
8 HSIO 2CH DDR4 max. 48 GB DDR4

B1				B3				B4				B2			
x8				x8				x8				x8			
x4		x4		x4		x4		x4		x4		x4		x4	
x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2
x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1

SATA
0 1

USB 3.0 upgrade
0 1 2 3

USB 2.0
0 1 2 3

for GbE

**C3308**  
6 HSIO, 1CH DDR4, max. 16 GB DDR4

B1				B3				B4				B2			
x8				x8				x8				x8			
x4		x4		x4		x4		x4		x4		x4		x4	
x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2	x2
x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1

SATA
0 1

USB 3.0 upgrade
0 1 2 3

USB 2.0
0 1 2 3

for GbE