BOX-PC
Fanless, Atom E3845 1.9GHz
BX-321 Series

This product is a small, fanless PC for embedding with a palm-size body that can be mounted on a 35mm DIN rail.
This product is the successor to the previous BX-320 microcontroller products and it meets the needs of replacing the BX-321 in systems. The exterior of this product has the same dimensions. The functionality of this product can also be expanded in ways such as adding digital I/O by connecting F&eIT Series device modules.* This product achieves further decreases in power usage and increases in speed while maintaining sufficient performance by employing a low power platform featuring the Intel Atom® Processor E3845 for the CPU.
This product is equipped with an external expansion connector that can be connected by cable to an expansion chassis for PCI/PCI Express expansion boards.

* Windows Embedded Standard 7 32bit only

* The contents in this document are subject to change without notice.
* Visit the CONTEC website to check the latest details in the document.
* The information in the data sheets is as of March, 2022.

Features

- Contributes to reducing running costs and energy efficiency
While inheriting the basic functionality of the previous BX-320 Series, this product achieves further decreases in power usage and increases in speed while maintaining sufficient performance by employing a low power platform featuring the Intel Atom® Processor E3845 for the CPU.

- Contributes to equipment miniaturization. PC functionality and expandability concentrated into a small form (94.0 (W) x 120.0 (D) x 74.7 (H))
The small chassis (94.0 (W) x 120.0 (D) x 74.7 (H)) is equipped with a variety of interfaces including VGA, USB3.2 Gen1 x 1, USB 2.0 x 3, RS-232C x 2, LAN x 2 (1000BASE-T, 100BASE-TX), Audio, and the F&eIT I/F (for F&eIT Series device modules). This product is also equipped with a PCIe connector that can be connected to an external expansion chassis. This product has the same dimensions as the previous BX-320 Series products, so it can be swapped into existing systems.

- Fan-less design reduces maintenance and inspection work
This product features a completely spindle-free design that eliminates the CPU fan and uses a CFast card for storage. The use of components that deteriorate with age has been held down as much as possible, which greatly reduces the burden of maintenance and inspection work.

- Remote power management functions that save operational labor
This product supports Wake On LAN to externally start the PC via the network and Power On by Ring to start the PC by the modem receiving a call. This makes it capable of providing large operational labor savings.

- Freely expandable peripherals. Twin CFast card slots and other abundant interfaces
It is also equipped with two CFast card slots (one slot is internal). The operating system and data can be separated, and one slot can be used for system startup, while the other can be used for maintenance or to bring back system logs and collected data, which is very convenient.

- Usable as a controller for F&eIT Series measurement, control, and communication devices *1
This product can be used as a controller for F&eIT Series measurement, control, and communication devices. Device modules including digital I/O, analog I/O, and serial communication can be used as measurement, control, and communication devices. *2

- Up to eight F&eIT Series device modules can be connected to the F&eIT I/F *1
The F&eIT I/F can accommodate up to eight F&eIT Series device modules (maximum total current of each module is 3A or less).

- Expandable with PCI boards and/or PCI Express boards
With a single separately sold cable, this product can connect to a PCI Express Cable expansion chassis (DE Series) which enables expansion by PCI/PCI Express boards.

- Possibly installed in 35mmDIN rail
A detachable metal installation part for attaching the main unit to a 35mm DIN rail is bundled by default, which can be used according to the installation conditions. The system features a unique configuration for its connection to a module on the side in a stacking manner, which allows you to configure the system simply and elegantly without using backplanes and other connecting devices.

- Safety design required for embedded applications
For Windows Embedded Standard installed model or Windows 10 IoT Enterprise LTSB 2016 64bit installed model, it is possible to use the WF *3 function of OS. It is designed for safety required for embedding purpose, for example, prohibiting unwanted writing to the CFast card with EWF function will relieve the concern about the writing limits to the CFast card and prevent an unintentional system alteration.

- A wide range of power supplies (10.8 - 31.2VDC) supported
As the product supports a wide range of power (10.8 - 31.2VDC), it can be used in a variety of power environments.

- "Power failure protection system" features power-off without OS shutdown
Equipped with the "Power failure protection system" function that protects data and prohibits writing to storage in the event of power failure *3. Along with the lockdown (disk writing suppression) function of Windows IoT Enterprise, power can be safely turned off without a shutdown process. Moreover, file system damage or data damage caused by sudden power failure can be avoided.

- CONTEC-customized BIOS provides useful utility
Useful utility of BIOS *4 customized by CONTEC is provided. The "CONTEC Fast Boot" achieves Windows startup in less than half the normal time. *5
The "Disk Copy" function provides secure disk backup at the BIOS level, and also supports backup in file format or compressed file format. We also offer the CONTEC tools "BIOS update tool" for updating BIOS. *6

*1 Windows Embedded Standard 7 32bit only
*2 Adjust the total current consumption of each module so that it is less than 3A.
*3 EWF (Enhanced Write Filter) is a function of Windows Embedded Standard.
UWF(Unified Write Filter) is a function of Windows 10 IoT Enterprise LTSB 2016.
They protect the disk from being actually written by redirecting the writing to RAM.
*4 For details, see each setting in the manual [BIOS Setup] section.
*5 It is the actual measured value when Windows 10 and HORM function are enabled at the factory. Time may vary depending on configuration. Note that TXE, TPM, Network Stack, and SMART Self Test are not supported when the CONTEC Fast Boot is enabled.
*6 Contact your retailer for more information.

Specifications

Function Specifications

Item		Description
CPU		Intel Atom® Processor E3845 1.91GHz
BIOS		BIOS (mfd. by AMI)
Memory		4GB, 204pin SO-DIMM socket x 1, PC3L-10600(DDR3L 1333) ECC
Graphics Controller		Intel® HD Graphics (CPU integrated)
System Resolution	Analog RGB	800 x 600, 1,024 x 768, 1,152 x 864, 1,280 x 600, 1,280 x 720, 1,280 x 768, 1,280 x 800, 1,280 x 960, 1,280 x 1,024, 1,360 x 768, 1,366 x 768, 1,400 x 1,050, 1,440 x 900, 1,600 x 900, 1,600 x 1,200, 1,680 x 1,050, 1,920 x 1,080, 1,920 x 1,200 (1,6770,000 colors)
Audio		HD Audio compliant, LINE OUT x1, MIC IN x1
CFast Card Slot		2 slot, CFast CARD Type I x 2 bootable
		BX-321-DC73131x: Built-in CFast card slot (SLC) (16GB, 1 partition) *1 BX-321-DC781724: Built-in CFast card slot (Q-MLC) (32GB, 1 partition) *1 BX-321-DC7C1724: Built-in CFast card slot (iSLC) (40GB, 1 partition) *1 BX-321-DC7D1724: Built-in CFast card slot (TLC) (128GB, 1 partition) *1 Other models: none
LAN		Intel® I210 Controller 1000BASE-T/100BASE-TX/10BASE-T 2 port (Wake On LAN support)
USB		USB 3.2 Gen1 (USB3.0) compliant 1port USB 2.0 compliant 3ports
Serial		RS-232C (general-purpose) : 2port (SERIAL PORTA, B), 9pin D-SUB connector (male) Baud rate : 50 - 115,200bps
Security (TPM)		TCG TPM2.0
Hardware monitoring		Monitoring CPU temperature, power voltage
Watchdog timer (WDT)		Software programmable, 255 level (1sec - 255 sec) Causes a reset upon time-out.
RTC/CMOS		Lithium backup battery life: 10 years or more. The real-time clock is accurate within □3 minutes (at 25□C) per month
Power Management		Power management setup via BIOS Power On by Ring/Wake On LAN Supports ACPI Power management
F&eIT I/F *3		It can be accommodated up to 8 F&eIT series device modules.(Max.3A)
BUS EXPANDER		Expansion chassis (DE series) connection connector
Interface	Display	Analog RGB x 1 (15pin D-SUB connector)
	Audio	LINE OUT: 3.5φStereo mini jack, Full-scale output level 1.4Vrms(Typ.) MIC IN: 3.5φStereo mini jack, Full-scale input level 1.4Vrms(Typ.)
	CFast Card Slot	2 slot, CFast CARD Type I x 2, bootable BX-321-DC700000:- BX-321-DC73131x:Built-in CFast card slot contains a CFast card (SLC) . (16GB, 1 partition) *1 BX-321-DC781724:Built-in CFast card slot contains a CFast card (Q-MLC) . (32GB, 1 partition) *1
	LAN *2	2-port (RJ-45 connector)
	USB	USB3.2 Gen1 (USB3.0) compliant 1port (TYPE-A connector) USB2.0 compliant 3ports (TYPE-A connector)
	RS-232C	1 port (9pin D-SUB connector [Male])
	F&eIT *3	1 port
	BUS EXPANDER	1 port
Power supply	Rated Voltage Range	12 - 24VDC ±10% *4
	Input Voltage Range	10.8 - 31.2VDC
	Current Consumption (Max.)	12V 1.5A, 24V 0.9A (When no using USB-powered or F&eIT-powered peripherals) 12V 4.2A, 24V 2.2A (When using USB-powered or F&eIT-powered peripherals)
	External Device Power Supply Capacity	CFast card slot: +3.3V: 1A(500mAx2) USB3.2 Gen1 (USB3.0) I/F: +5V: 0.9A (900mAx1) USB2.0 I/F: +5V: 1.5A (500mAx3) F&eIT I/F: +5V: 3A
Physical dimensions (mm)		94 (W) x 120(D) x 74.7(H) (No protrusions)
Weight		About 1.0kg (Excluding attachment fittings)

*1 The capacity of disk in the OS pre-installed type is a value when 1GB is calculated by 1 billion bytes. The capacity that can be recognized from OS might be displayed fewer than an actual value.
*2 If you use the 1000BASE-T, be careful of the operating temperature. For more details on this, refer to "Installation Requirements".
*3 Windows Embedded Standard 7 32bit only.
*4 Use a power cable 3 meters or shorter.

Environment Requirements

Item		Description
Operating temperature *1		0 - 60°C (With 1000BASE-T: 0 - 55°C), airflow 0.7m/s 0 - 50°C (With 1000BASE-T: 0 - 45°C), no airflow
Storage temperature		-10 - +60°C
Humidity		10 - 90%RH (No condensation)
Floating dust particles		Not to be excessive
Corrosive gases		None
Line-noise resistance	Line noise	AC Line /±2kV *2 Signal Line/±1kV (IEC61000-4-4 Level 3, EN61000-4-4 Level 3)
	Static electricity resistance	Touch /±4kV (IEC61000-4-2 Level 2, EN61000-4-2 Level 2) Air /±8kV (IEC61000-4-2 Level 3, EN61000-4-2 Level 3)
Vibration resistance	Sweep resistance	10 - 57Hz /semi-amplitude vibration 0.15mm, 57 - 150Hz/2.0G 40minutes each in X, Y, and Z directions (JIS C60068-2-6-compliant, IEC60068-2-6-compliant)
Impact resistance		15G half-sine shock for 11ms in X, Y, and Z directions (JIS C 60068-2-6-compliant, IEC 60068-2-6-compliant)
Grounding		Class D grounding, SG-FG / continuity
Standard		VCCI Class A, FCC Class A, CE Marking (EMC Directive Class A, RoHS Directive), UKCA

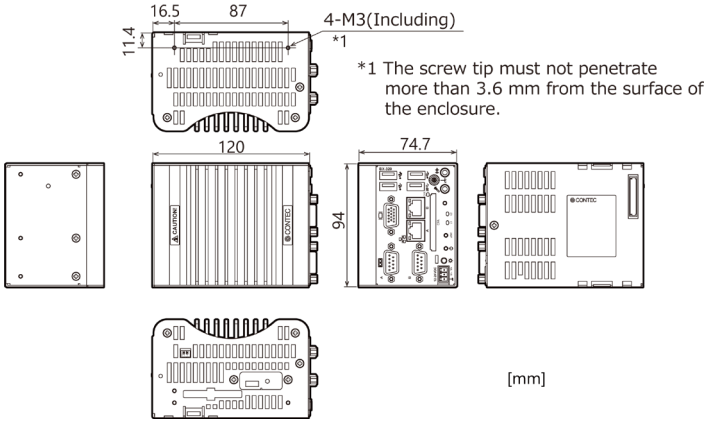
*1 Derating occurs due to the way of installation. For more details on this, refer to the reference manual.
*2 When AC-DC power supply unit "DLP75-24-1(manufactured by TDK-Lambda)" is used.

Packing List

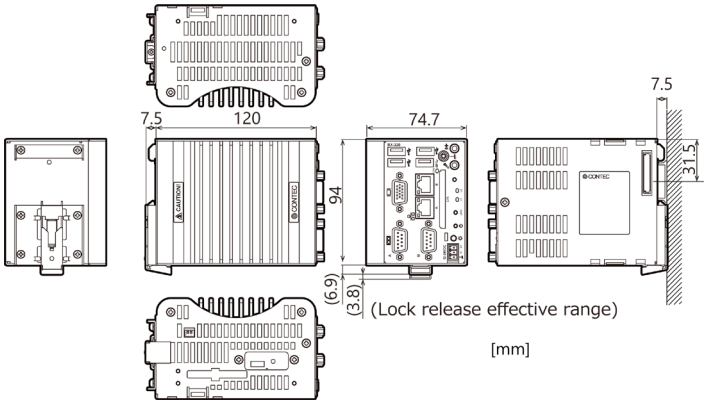
Name	BX-321-DCx00000 [Base Model] Pcs.	BX-321-DCxxxxxx*1 [OS Pre-installed Model] Pcs.
The Main Body	1	1
DIN Rail Attachment Fittings Set	1*2	1*2
F&eIT Module Metal Fittings	2	2
Rubber foot	4	4
Washer Assembled Screw (M3x7)	2	2
Countersunk screw (M3x5)	3	3
Connector cover	1*2	1*2
CFast card removal prevention fitting	1	1
CFast card removal prevention fitting (bottom face side)	1*2	1*2
Cable clamp	1	1
Power connector	1	1
Product Guide	1	1
IPC Precaution List	1	1
Warranty Certificate	1	1
Serial Number Label	1	1
MICROSOFT SOFTWARE LICENSE TERMS	-	1
Setup Procedure Document	-	1
Recovery Media	-	1

Physical Dimension

BX-321-DCxxxxxx (Including screw hole dimensions *1)



BX-321-DCxxxxxx (When mounting the DIN rail installation metal fittings *2)



*2 To secure this product with the included fittings, use the included screws (M3x7). In other situations, use screws with a penetration depth (L) from the chassis surface to the screw tip of 3 mm or lower.

Supported OS

Windows Embedded Standard 7 32bit (Japanese, English, Chinese, Korean)

Windows 10 IoT Enterprise LTSB 2016 64bit (Japanese / English / Chinese / Korean)

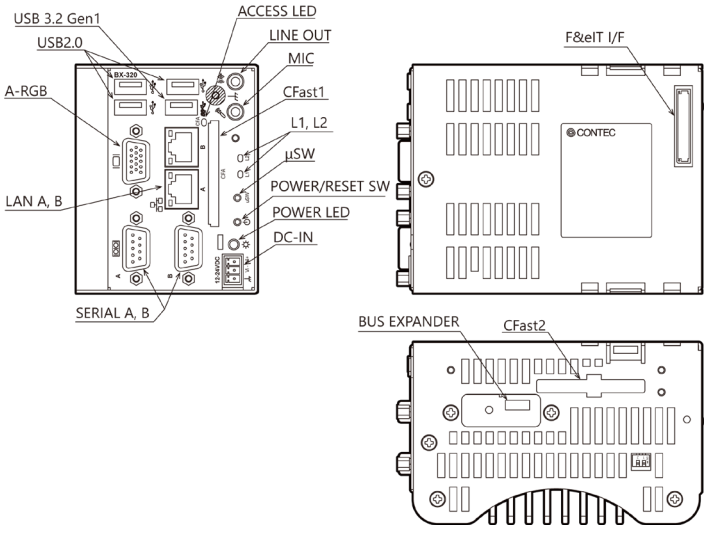
List of Options

Item	Model	Description
Storage	CFS-4GB-A	4GB SATA CFast card (SLC)
	CFS-8GB-A	8GB SATA CFast card (SLC)
	CFS-16GB-A	16GB SATA CFast card (SLC)
	CFS-32GBM-A	32GB SATA CFast card (MLC)
	CFS-16GBQ-A	16GB SATA CFast card (Q-MLC)
	CFS-32GBQ-B	32GB SATA CFast card (Q-MLC) (Wide temperature range specification)
	CFS-40GBIP-A	40GB CFast Card (Power Failure Protection Supported type)
	CFS-128GBTP-A	128GB CFast Card (Power Failure Protection Supported type)
PCI Bus Expansion Chassis	ECH-PCI-DE-H4D	Short size x 4, DIN rail attachment is possible.
Optional cable	CB-DE-1	Cable for PCI Express (1m)
	CB-DE-2	Cable for PCI Express (2m)

CAUTION

If a product other than our optional one is used, the normal operation may be impaired or the functions may be limited.

Nomenclature of Product Components



Component Function

Name	Function
Front	
POWER LED	Power ON display LED
ACCESS LED	SATA device access display LED
L1, L2	User Programmable LED x 2
DC-IN	DC power input connector
POWER SW	PC power switch
µSW	User Programmable Switch
MIC IN	Mic in (φ3.5 PHONE JACK)
LINE OUT	Line out (3.5φPHONE JACK)
A-RGB	Display (15pin D-SUB, female)
USB 3.2 Gen1	USB 3.2 Gen1 (USB3.0) port connector x1
USB 2.0	USB 2.0 port connector x3
LAN A	Ethernet 1000BASE-T/100BASE-TX/10BASE-T RJ-45 connector
LAN B	Ethernet 1000BASE-T/100BASE-TX/10BASE-T RJ-45 connector
CFast1	CFast card slot (SATA connection)
SERIAL A	Serial port 1 connector (9-pin D-SUB, male)
SERIAL B	Serial port 2 connector (9-pin D-SUB, male)
Side	
F&eIT I/F	Max. 8 units of F&eIT series device module is connectable
Bottom	
BUS EXPANDER	Expansion chassis (DE series) connection connector
CFast 2	CFast card slot (SATA connection)

Product Lineup

Model	Memory	OS	Storage device
BX-321-DC700000	4GB ECC	None	None
BX-321-DC731314		Windows Embedded Standard 7 32bit (Japanese, English, Chinese, Korean)	CFast Card (SLC) 16GB
BX-321-DC781724		Windows 10 IoT Enterprise LTSB 2016 64bit (Japanese / English / Chinese / Korean)	CFast Card (Q-MLC) 32GB
BX-321-DC7C1724			CFast Card (iSLC) 40GB
BX-321-DC7D1724			CFast Card (TLC) 128GB

Difference between the BX-320 and BX-321

	BX-320	BX-321
Connector for expansion chassis	18pin PCI Express External Cabling connector	Exclusive interface connector