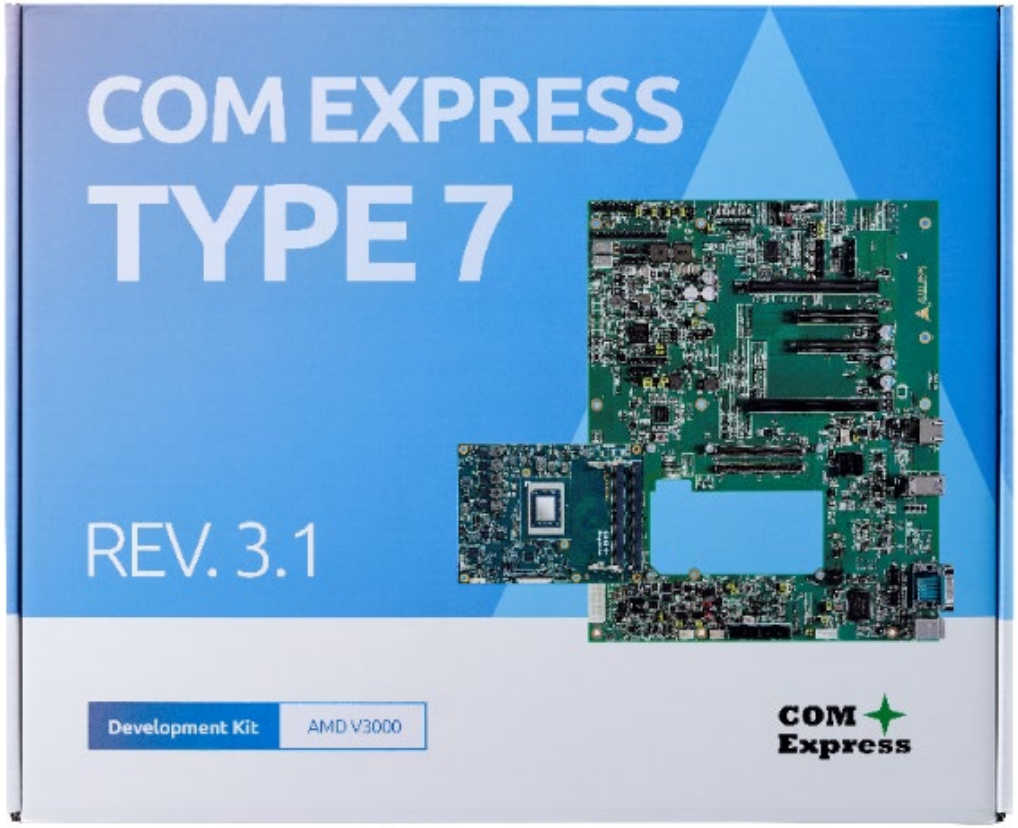
# COM Express Type 7
# Ryzen V3000 Dev Kit

User's Guide




COM Express®


Revision: Rev. 1.0
Date: 2024-05-20
Part Number: 50M-77105-1000


ADLINK
LEADING EDGE COMPUTING

# Revision History

| Revision | Description | Date | Author |
|---|---|---|---|
| 1.0 | Initial release | 2024-05-20 | AL |

# Preface

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## Safety Instructions

For user safety, please read and follow all Instructions, **WARNING**s, **CAUTION**s, and **NOTE**s marked in this manual and on the associated equipment before handling/operating the equipment.

Read these safety instructions carefully.

- Keep this manual for future reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- Turn off power and unplug any power cords/cables when installing/mounting or un-installing/removing equipment.
- To avoid electrical shock and/or damage to equipment:
- Keep equipment away from water or liquid sources;
- Keep equipment away from high heat or high humidity;
- Keep equipment properly ventilated (do not block or cover ventilation openings);
- Make sure to use recommended voltage and power source settings;
- Always install and operate equipment near an easily accessible electrical socket outlet;
- Secure the power cord (do not place any object on/over the power cord);
- Only install/attach and operate equipment on stable surfaces and/or recommended mountings;
- If the equipment will not be used for long periods of time, turn off the power source and unplug the equipment.

## Conventions

The following conventions may be used throughout this manual, denoting special levels of information

**Note**: This information adds clarity or specifics to text and illustrations.

**Caution**: This information indicates the possibility of minor physical injury, component damage, data loss, and/or program corruption.

**Warning**: This information warns of possible serious physical injury, component damage, data loss, and/or program corruption.

## Getting Service

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# Table of Contents

# 1. Introduction

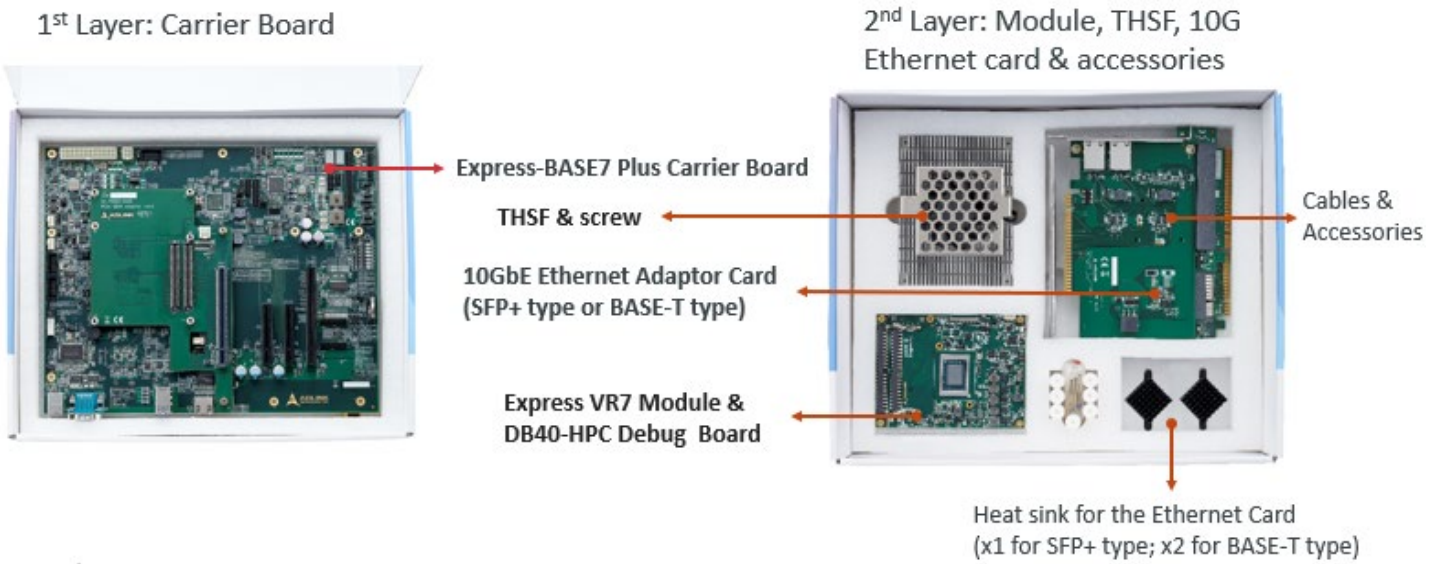
The COM Express Type 7 Dev Kit consists of a COM Express Type 7 module, memory, and thermal solution of your choice with Express-BASE7 Plus ATX size COM Express Type 7 reference carrier board for immediate testing and verification of COM Express-based customer designs and development. Along with necessary cabling, the starter kit also includes additional items such as 10GbE adapter card and n debug board.

It allows you to quickly emulate the functionality of your end product for software development and hardware verification. Drivers, BSP, carrier board design files, and COM Express module user's manual are also offered  to aid you in designing your own custom carrier board.

The COM Express Type 7 Dev Kit a dedicated 10GbE adapter card with a debug board (DB40-HPC) that converts 10G Base-KR to 10GbE SFP+ or 10GBASE-T signals.

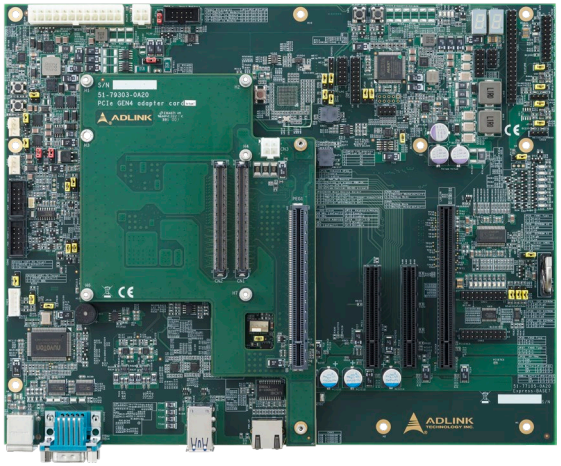
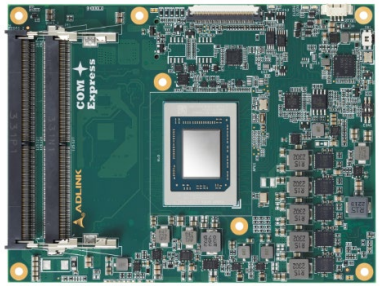
## 1.1. Unpacking

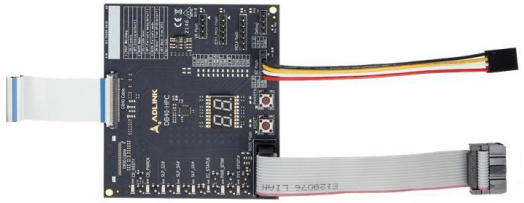
Once received, make sure the EPE foam layers contain the items shown below:



## 1.2. What's Included

### 1.2.1 Standard Items

| No. | Photo | Part Number | Description |
|---|---|---|---|
| 1. |  | **85-77105-700E** | **Express-BASE7 Plus**<br>The Type 7 reference carrier board supports PCIe Gen4 x16 and includes a 2nd PCIe clock for PCIe lane 16-31 |
| 2. |  | **91-72140-00XX** | **Express-VR7 COM Express Type 7 module (V3C18I)** |

| | | | |
|---|---|---|---|
| 3. |  | **32-21019-0010-A0** | **THSF** (Heatsink with Fan), exclusively for Express-VR7<br>**Screws (2 pcs.)**<br>For securing the module and THSF. |
| 4. |  | **95-17005-0000** | **PCIe x8 to two PCIe x4 adapter card** (P8TO24)<br><br>For function testing purposes. |
| 5. |  | **55-79026-0000**<br><br>**30-30016-0000**<br><br>**30-10192-0000**<br><br>**30-23105-0000** | **Debug board** (DB40-HPC)<br><br>40-pin flat cable (for connecting COM Express module)<br><br>External SPI cable (for BIOS update)<br><br>EC cable (for EC FW update) |
| 6. |  | **34-25332-0000-A0** | **I/O panel for Express-BASE7 Plus carrier** |

| | | | |
|---|---|---|---|
| 7. |  | 30-10057-5010 | **7-pin SATA cable**<br>180° (-) to 180° |
| 8. |  | 30-20171-1000 | **SATA power to Molex 4-pin cable** |
| 9. |  | 36-00621-0000 | **Plastic cylinder**<br><br>For lifting up the carrier board, 7 pcs |
| 10. | | 36-00622-0000 | **Plastic screws for thecylinder**<br><br>Quantity: 7 pcs. |
| 11. |  | 36-00622-0000 | **M2.5 screw with specific length**<br><br>For assembling module and carrier, 7pcs |

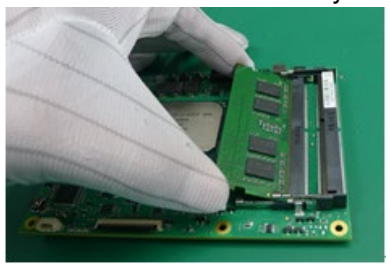
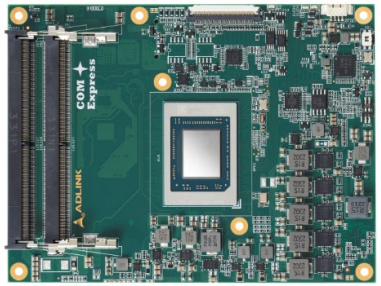
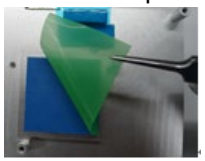
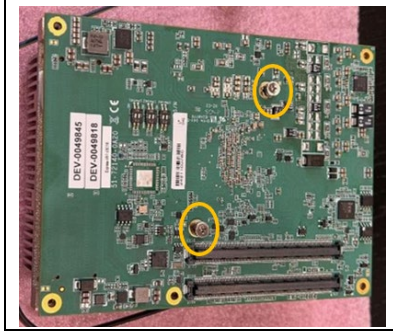
### 1.2.2 Optional Items

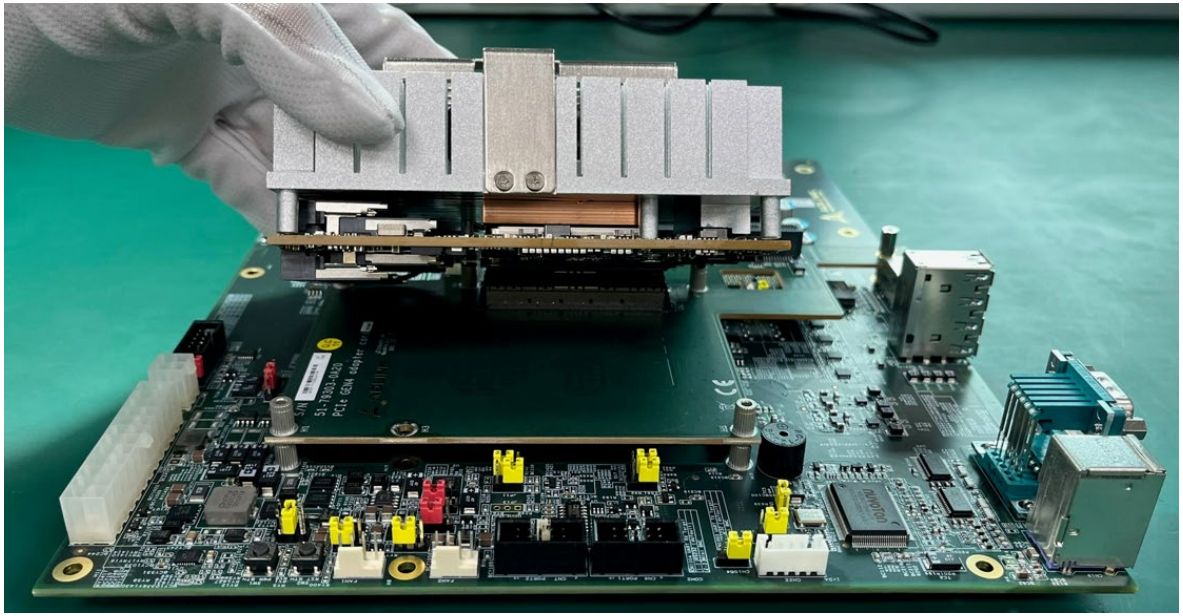
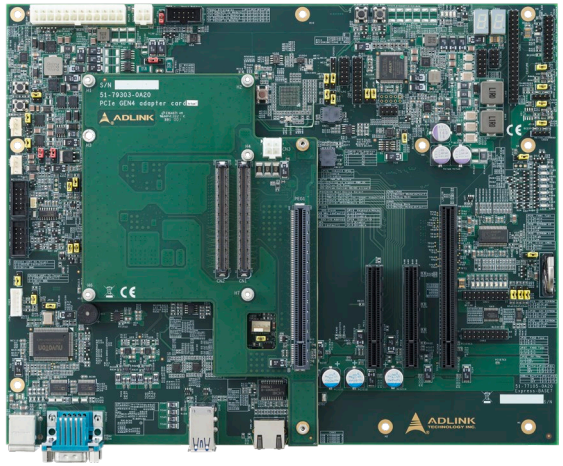
| No. | Photo | Part Number | Description |
|---|---|---|---|
| 1. |  | **85-79029-010E**<br><br>**32-40318-0000** | **10GbE SFP+ adapter card**<br>(CEI-2x10G-SFP+)<br><br>Converts 2x 10GBASE-KR to 2x 10GbE SFP+ signals via Intel CS4224 PHY<br><br>Dedicated for Express-VR7 module.<br><br>Heatsink on PHY. |
| 2. |  | **85-79031-010E**<br><br>**32-40318-0000** | **10GbE BASE-T adapter card**<br>(CEI-2x10GBASE-T)<br><br>Converts 2x 10GBASE-KR to 2x 10GBASE-T via Marvell AQR113C PHY<br><br>Dedicated for Express-VR7 module.<br><br>Heatsink on PHY<br>Quantity: 2pcs. |

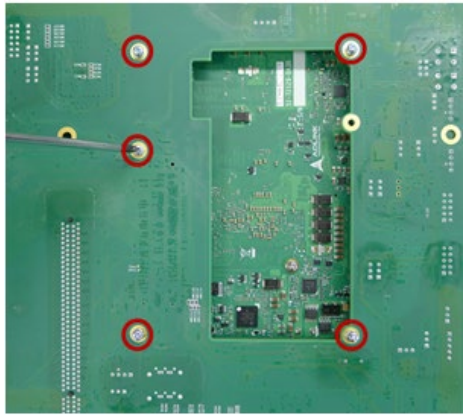
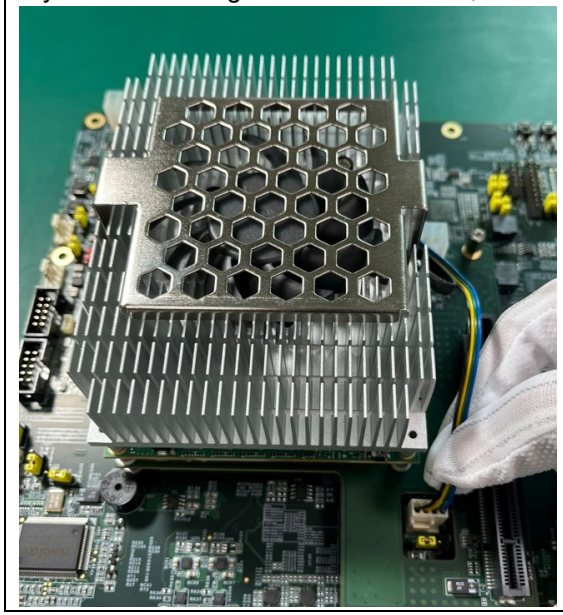
# 2. Getting Started

## 2.1. Board Installation

*Images are for reference only.

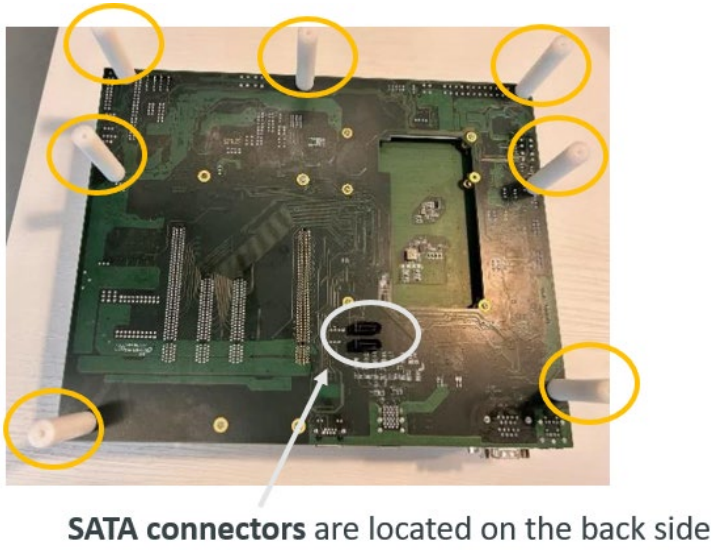
| Procedures | Required Items |
|---|---|
| **Step 1**<br>Insert the SO-DIMM memory into the COM Express-VR7 module's SO-DIMM socket.<br>  |  |
| **Step 2**<br>Remove all protective membranes from the thermal pads.<br>  |  |
| **Step 3**<br>Secure the THSF onto the COM Express Type 7 module with the provided M2.5 screws.<br>  | |

| Procedures | Required Items |
| --- | --- |
| **Step 4**<br>Place the assembled COM Express Type 7 module and THSF onto the connectors on the carrier board, as illustrated below.<br>  |  |

| Procedures | Required Items |
|---|---|
| **Step 5**<br>Secure the COM Express Type 7 module to the carrier board from the solder side using the provided M2.5, L=16mm.<br>  |  |
| **Step 6**<br>If you are installing a heatsink with fan, connect the fan's plug into the carrier board, as shown below.<br>  | None |

**Step 7**

If you need to use the SATA connectors on the back side of the carrier, install the provided cylinders to support the carrier board.



# 3. 10GbE Adapter Cards

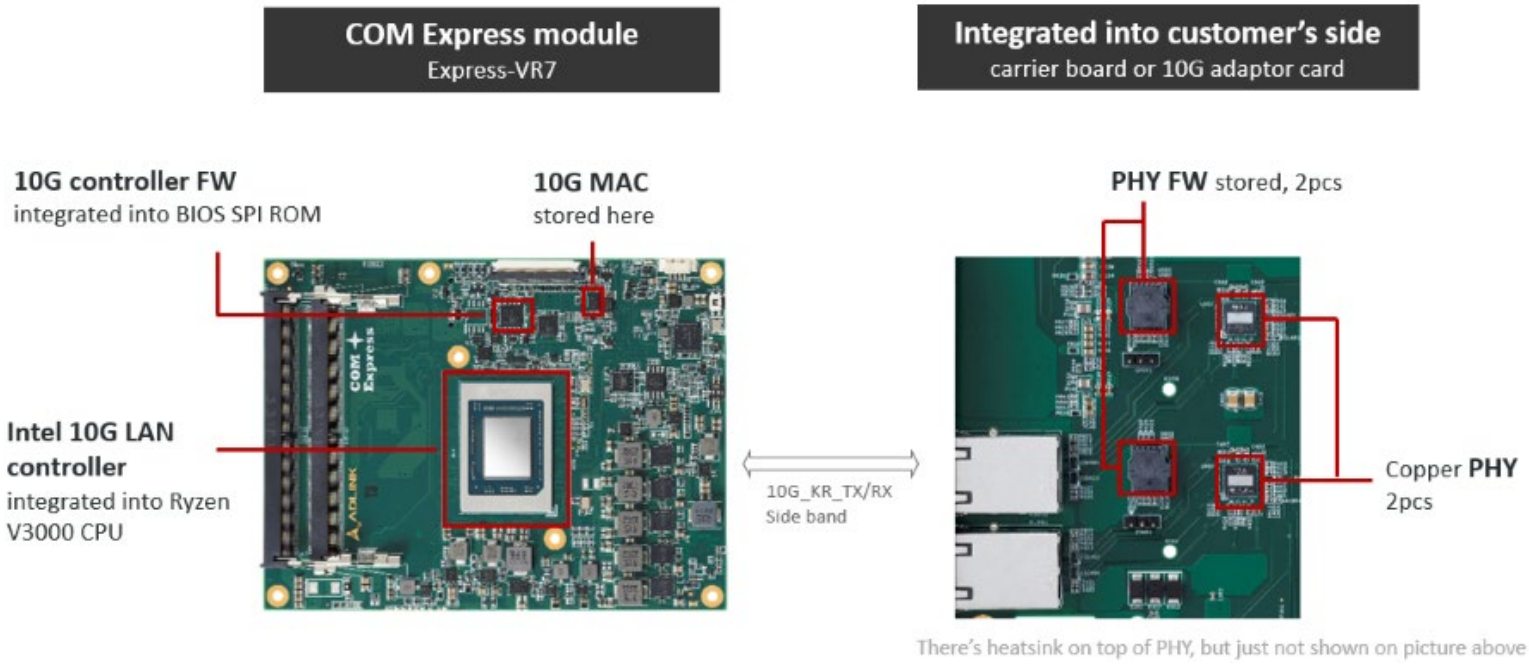
ADLINK 10GbE adapter cards provide access to the COM Express Type 7 module's 10GBASE-KR interface and converts it into 10GbE SFP+ or 10GbE copper (10GBASE-T) signals. Each COM Express Type 7 module requires dedicated 10GbE adapter card because the selected PHY on the cards may be different.

**Note:** To store the firmware for the 10GbE controller, an EEPROM dedicated is on the COM Express Type 7 module. This firmware can support selected SFP+ PHY and Copper PHY. Multiple firmware versions are stored on the 10GBE adapter card, as depicted in the structure below.

## 3.1. 10GbE BASE-T Card

**CEI-2x10GBASE-T**

Exclusively for Express-VR7 usage, it converts 10GBASE-KR and related sideband signals into 10GBASE-T signals through Marvell AQR113C PHY. For more information, please download the user's manual from ADLINK website.



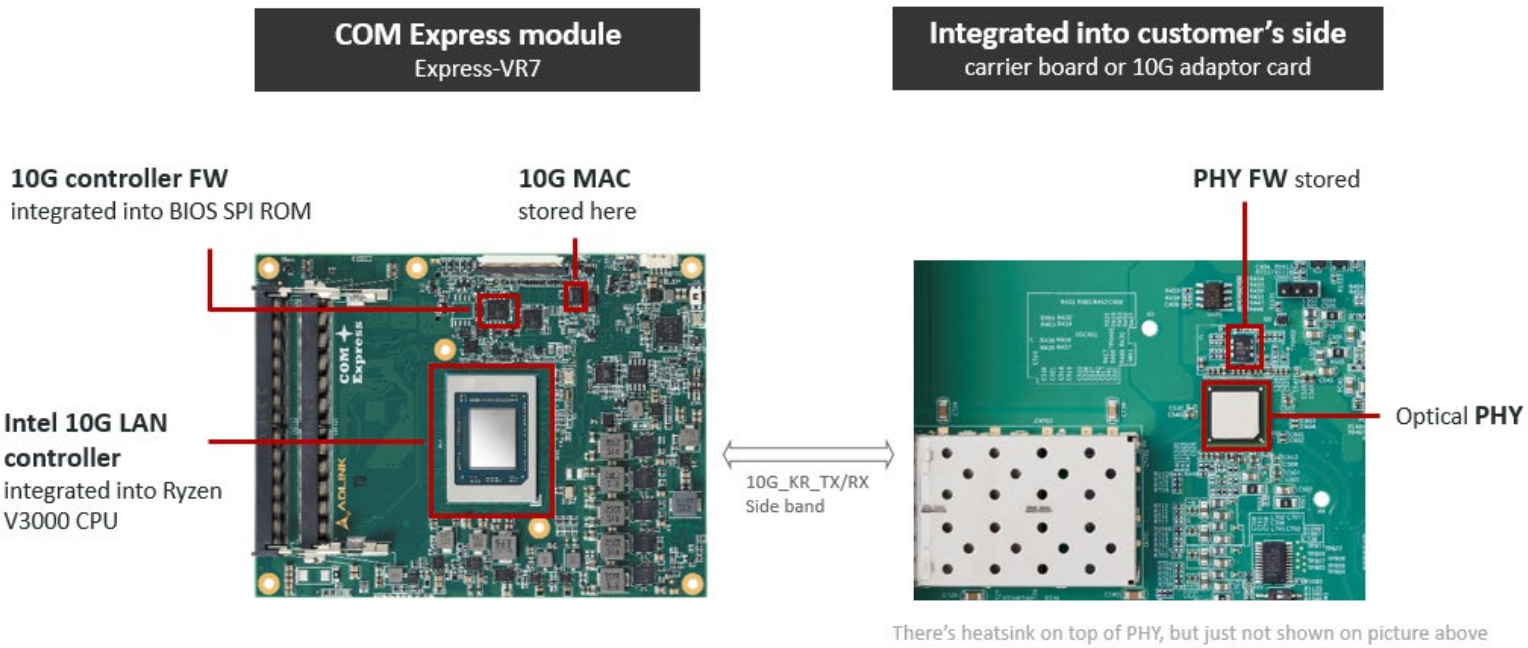
**LAN LED Behavior**

| LED Function | LED Color | LED State | Description |
|---|---|---|---|
| Speed | Green/Yellow | Off | Lower than 1G |
| | | Green | 1G |
| | | Yellow | 10G |
| Status & Activity | Yellow | Off | No link |
| | | Steady On | Link established; no activity detected |
| | | Blinking | Link established; activity detected |

## 3.2. 10GbE SFP+ Card

**CEI-2x10G-SFP+**

Exclusively for Express-VR7 usage, it converts 10GBASE-KR and related sideband signals into 10GbE SFP+ signals and can be connected to SFP+ transceivers through Intel CS4224. For detailed information, please download the user's manual from ADLINK website.

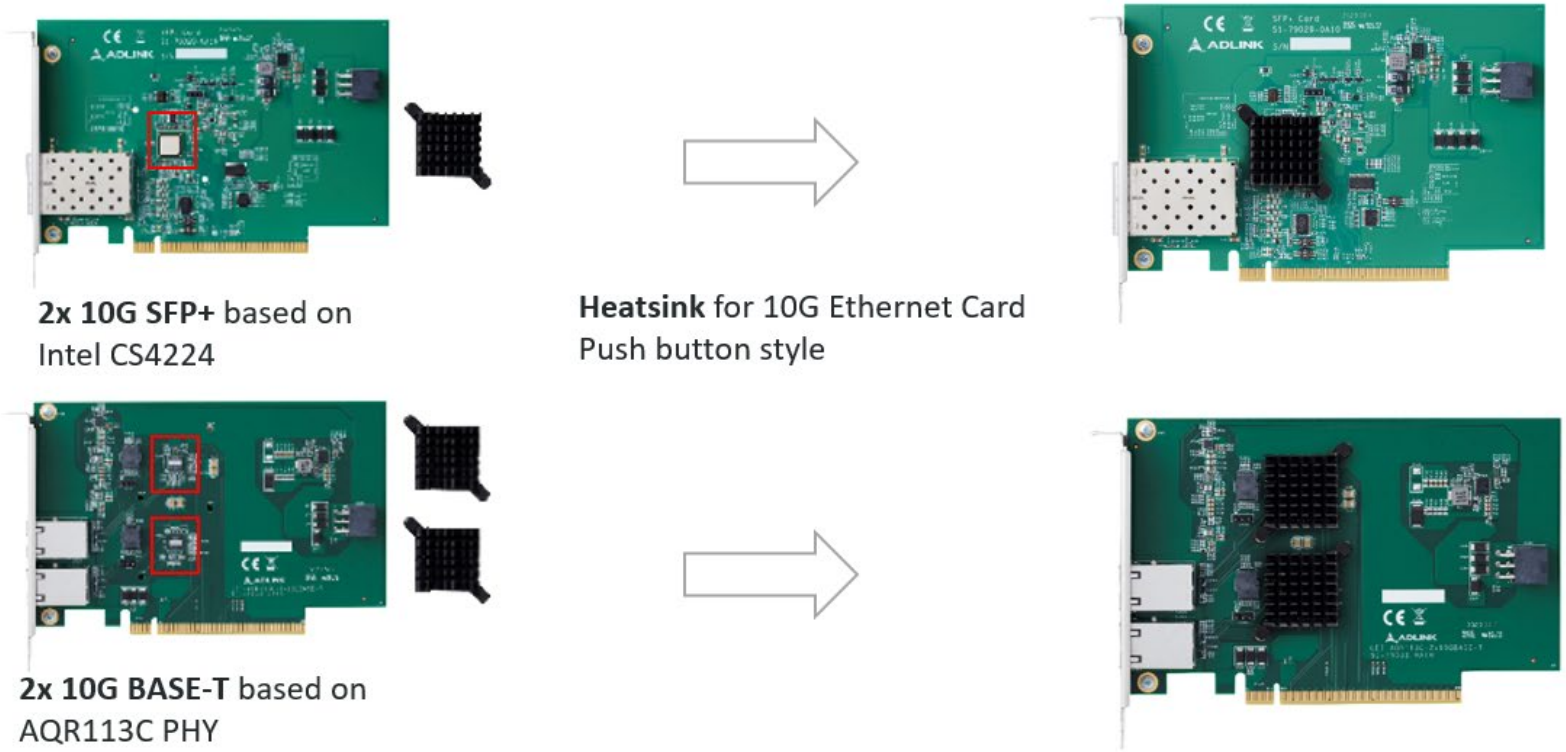


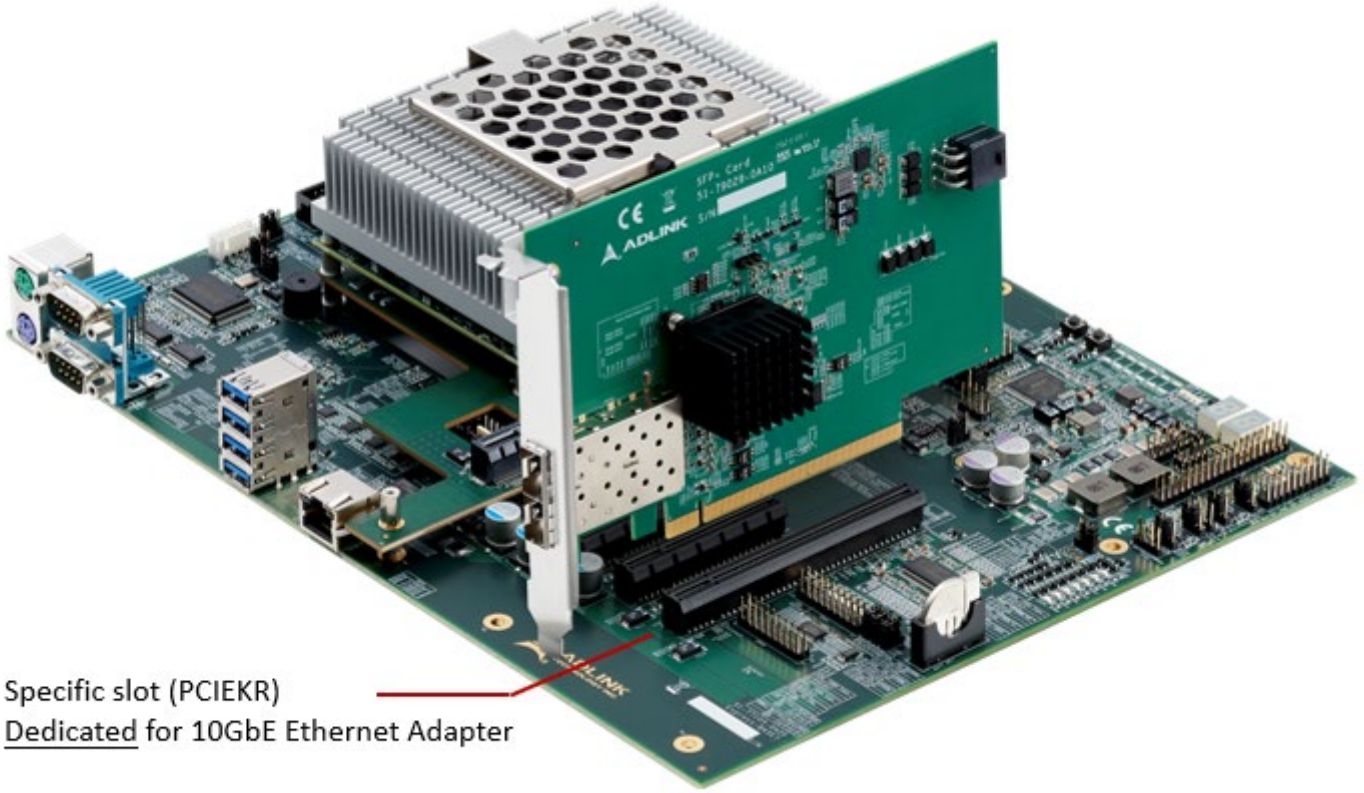

**SFP+ Transceiver Approved Vendor List (AVL):**

| Brand | LED | Function |
|---|---|---|
| Finisar | FTLX8571D3BCL | SFP+ Optical |
| Netgear | AXM761 | SFP+ Optical |
| Netgear | AXM764 | SFP+ Optical |
| Intel | FTLX1471D3BCVI31 | SFP+ Optical |
| Finisar | FTLX8571D3BCL | SFP+ Optical |

## 3.3. 10GbE Adapter Card Installation

Below is an example of a 10GbE adapter card (using a 10GbE SFP+ card) being installed on the Express-BASE7 Plus carrier board with a Type 7 COM Express module. Prior to installing the card on the carrier board, ensure to first install the push-button-style heatsink onto the 10GbE adaptor card.






**Note:** The PCIe x16 slot, labeled with PCIEKR, features a proprietary pinout exclusively for 10GbE adapter cards.

# 4. PCIe x8 to two PCIe x4 Adapter Card

A PCIe x8 or two PCIe x4 adapter cards allow you to use two PCIe x4 add-on cards in a single PCIe x8 slot, ideal for functionality testing. (For functionality test purpose.)

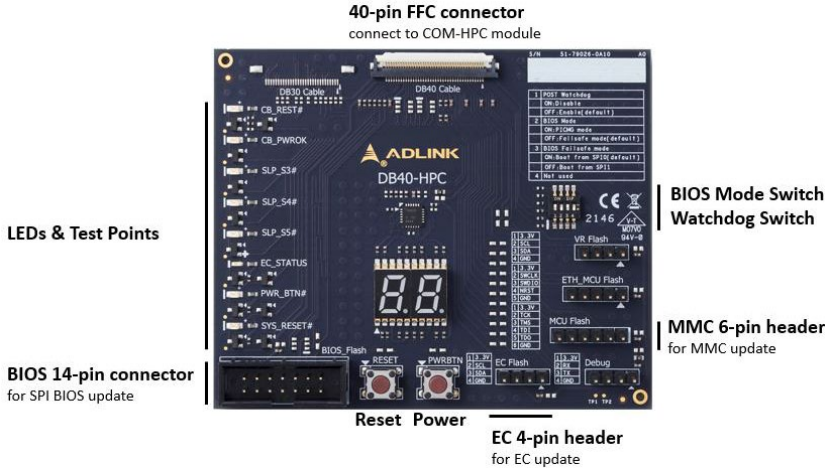
# 5. Debug Board

**DB40-HPC**

The DB40-HPC debug board provides COM Express system debugging functions with these features:

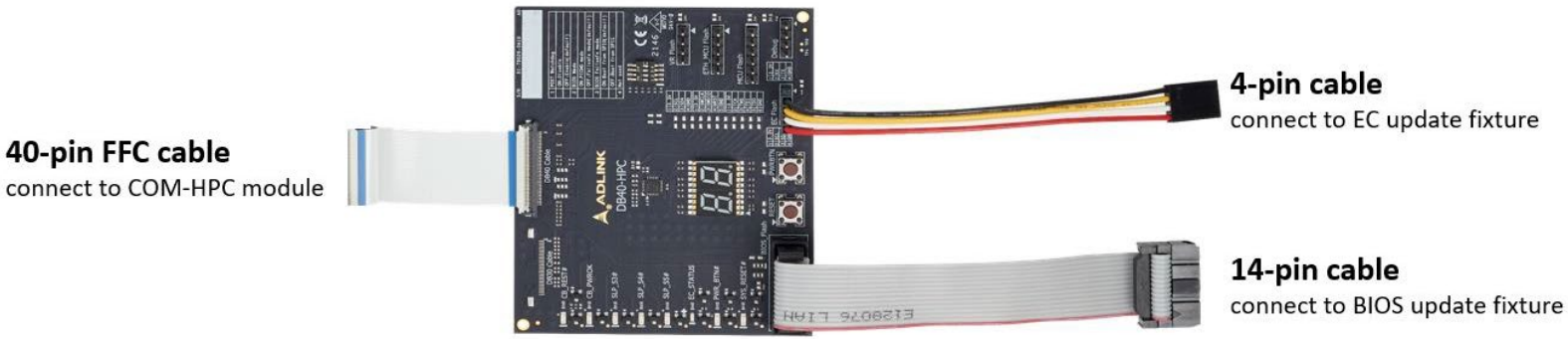
- **Interface to SPI Flash** for BIOS Update
- **Interface to EC** for EC Update
- **Interface to MMC** for MMC Update
- **Buttons** for Power and Reset
- **Status LEDs and Test Points** for CB_REST#, CB_PWROK, SLP_S3#, SLP_S4#, SLP_S5#, EC_STATUS, PWR_BTN#, SYS_RESET#

The DB40-HPC debug board can only be used on products that have the appropriate FFC debug connector.



## 5.1. Connecting the COM Express Module and Debug Card

Three cables are required for firmware updates, as illustrated below:



## 5.2. Buttons and Switches

This section describes the buttons and switches on the DB40 debug board.

**Power Button (PWRBTN)** toggles the PWRBTN# signal for the COM Express module**Reset Button (RESET)** toggles the SYS_RESET# signal for the COM Express module**Mode Switch**: This 4-pole DIP switch allows selection of various modes.

| Switch | Function |
|---|---|
| 1 | POST Watchdog<br>ON = Disable<br>OFF = Enable (default) |
| 2 | BIOS Mode<br>ON = PICMG Mode<br>OFF = Failsafe Mode (default) |
| 3 | BIOS Failsafe Mode<br>ON = Boot from SPI0 (default)<br>OFF = Boot from SPI1 |
| 4 | Not used |

## 5.3. Display and LEDs

This section describes the hexadecimal display and LED functionality.

### 5.3.1 Boot-Up Procedure – Hexadecimal Display

During power-up and BIOS execution, the CPU will first retrieve commands from POST and executes them. Each command is assigned a corresponding debug port data code or BIOS POST checkpoint code. The LED display shows the results from each checkpoint, enabling technicians or administrators to debug the system properly.

- The POST code is written on I/O port 80hex.
- The POST code is shown on the two 7-segment LED displays on the debug board.
- The Port 80 Decoding Interface depends on module design.

### 5.3.2 LED Indicator Table

The table below shows the state of system signals indicated by the LED indicator..

| LED | Function |
|---|---|
| CB_RESET# | The LED will light up on an active rest signal of the carrier board. |
| CB_PWROK | The LED will light up on an active power OK from the COM-HPC module |
| SLP_S3# | The LED will light up on a released SUS_S3# signal from the COM-HPC module |
| SLP_S4# | The LED will light up on a released SUS_S4# signal from the COM-HPC module |
| SLP_S5# | The LED will light on a released SUS_S5# signal from the COM-HPC module |

| LED | Function |
|---|---|
| EC_STATUS | The LED will show the status of the EC on the COM-HPC module |
| PWR_BTN# | The LED will light up on an active power button signal of the COM-HPC module |
| SYS_RESET# | The LED will light up on an active reset signal of the COM-HPC module |

### 5.3.3 Embedded Controller (EC) LED Status

The table below shows the EC LED status on the COM Express module.

| Behavior (blue) | Description |
|---|---|
| Blinking status LED | It indicates a failure during power-up. The number of flashes indicates an error code. This signaling code indicates issues such as a missing/wrong system voltage, being stuck on the reset line, BIOS failure, or an unexpected shutdown of an on-board power supply. The error code is board-specific. Please refer to the COM-HPC module manual for details. |
| Bright blue flash | A system state has changed due topower-button activity, reset-button activity, PCI_RST# activity, or activity on SLP_Sx signals. |
| Fast blinking status LED | If the board is running on Fail-SafeBIOS. |
| Bright blue flashes every 4s | System is in suspend-to-RAM or suspend-to-disk state. |