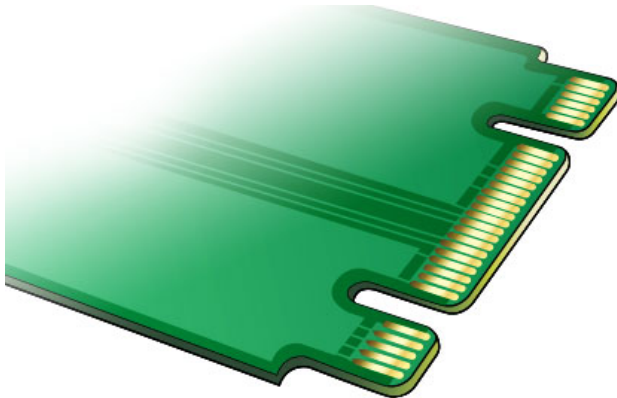


## The M.2 interface



M.2 connector with key B+M

### What is M.2?

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M.2 is a **specification for internal expansion cards** on PC mainboards and notebook computers. M.2 was conceived as an **successor of the mSATA interface** and for the first time introduced by Intel in **2012** under the label **Next Generation Form Factor (NGFF)**.

As for usage and interface variety, M.2 is **more flexible** because not only SATA signals can be transmitted via the M.2 interface but **also USB and PCIe**. Thereby extended functions are possible e.g. the application of WLAN, Bluetooth, GPS or NFC cards.

### For what M.2 is suitable?

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There is already an M.2 interface in many **PCs and notebook computers**. It is ideally applicable to connect an SSD in a compact **mobile device** such as in a notebook computer and Ultrabook™ but also in a desktop PC.

M.2 modules stand out for their **compact design and flexible measurements**. Thanks to the low power consumption M.2 SSDs can also easily be used as **bootable drives** within embedded systems.



Especially applicable for mobile devices and embedded systems

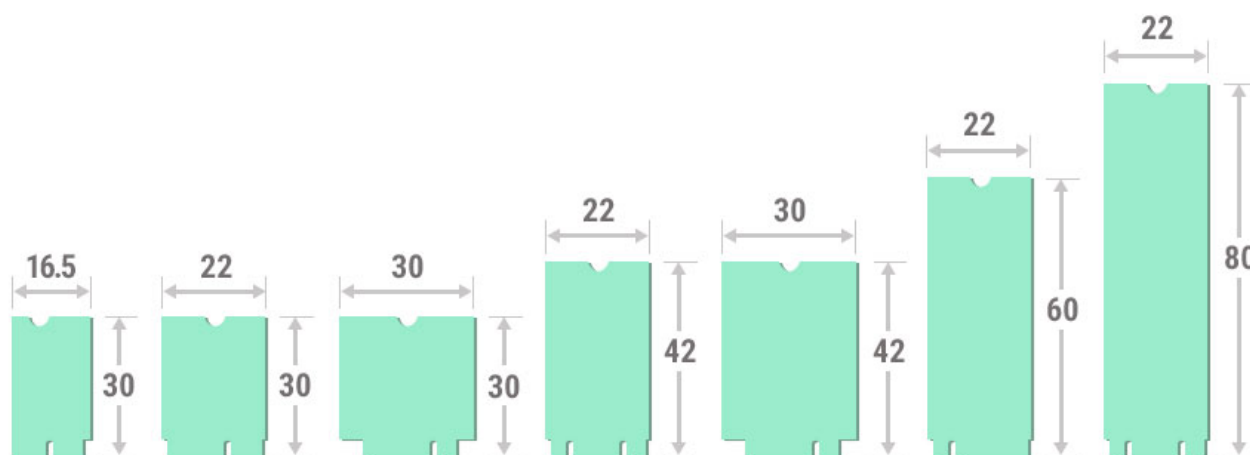
## Which variants are there?

The M.2 standard contains variants with up to four **PCIe lanes**, one **SATA 6 Gb/s** and / or one **USB 3.0** port. So it is possible to connect **PCIe as well as SATA SSDs**. Furthermore, both bus systems at every port can be used at the same time.

## How is the design and what are the form factors?

M.2 cards have a rectangular shape. At their front side they show a **plug connector strip** and at their back side a centered placed **semicircular recess**. The recess is needed to mount the card: it can be slotted into the appropriate port at the board and fixed with a screw. Components can be mounted on the card's topside as well as their bottom side.

The **size** of an M.2 module is marked by its form factor. The form factor defines the **width by length in millimeters**. For example, the form factor **2260** means the card has a **width of 22 mm and a length of 60 mm**. The longest components have a length of 110 millimeters. At present, the most common M.2 SSDs have a width of 22 mm and a length of 42, 60 or 80 mm.

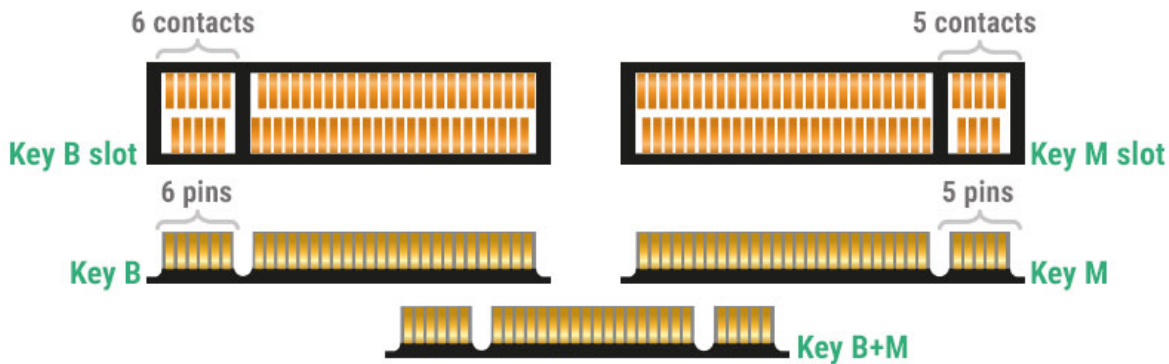


Form factors e. g. >>> 1630 Key E • 2230 Key E • 3030 Key A • 2242 Key B+M • 3042 Key A • 2260 Key M • 2280 Key B+M

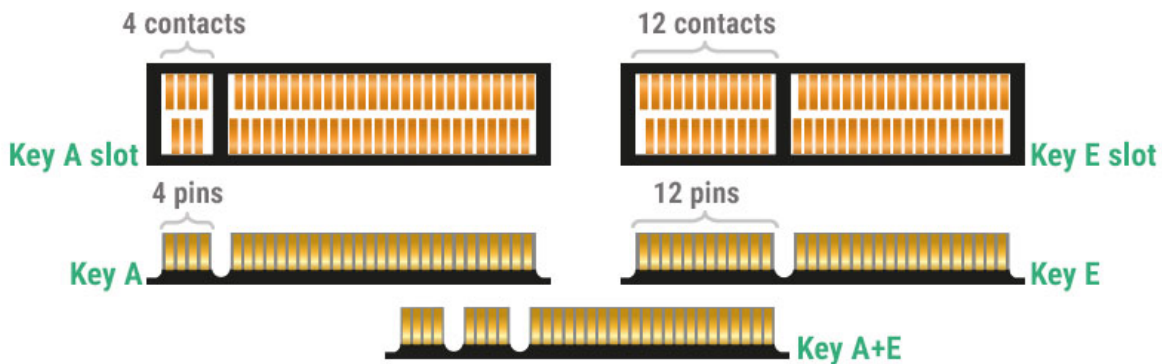
## What do the M.2 keys mean?

The shape of the M.2 connectors differs depending on the **interface** the M.2 port provides. According to the possible applications the M.2 module has **recesses at certain points of the plug connector strip**. The **key** signifies this connector form.

The different keys call for plug-in cards with recesses at these certain points. Currently the **keys B, M, A and E** together with **B+M** and **A+E** are in use. The slot and the module have to support the **same key** in order to be **compatible**.



Schematic figure of contact shapes of Key B, Key M, Key B+M



Schematic figure of contact shapes of Key A, Key E, Key A+E

### Which key supports which signal transfer?

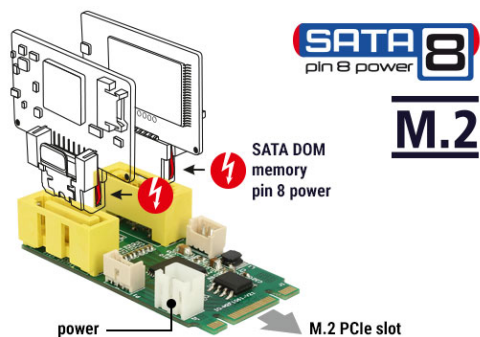
Key	supports	Key	supports
Key B	SATA	Key A	PCIe (x2) and USB
Key M	PCIe ( x2 / x4 )	Key E	PCIe (x2) and USB
Key B+M	SATA or PCIe *	Key A+E	PCIe (x2) and USB *

\* Depending each on the internal connection

**Please note:** Theoretically and / or in future, the Keys listed here are able to support also other kinds of signals. Furthermore, Keys that are not listed here are reserved for coming variants or interfaces. The table depicted above is valid for Delock products.

## Delock M.2 product examples

### Converters



→ Item 63464

**NEW**

## Converter M.2 Key B+M male > 2 x Mini SATA pin 8 power plug

### ■ Connectors:

- 1 x 59 pin M.2 Key B+M male >
- 2 x SATA 6 Gb/s plug pin 8 power with latchtype
- 1 x 2 pin power connector (power supply for SATA devices)
- 2 x 3 pin power connector (optional)

### ■ Interface: PCIe

### ■ Form factor: M.2 2242

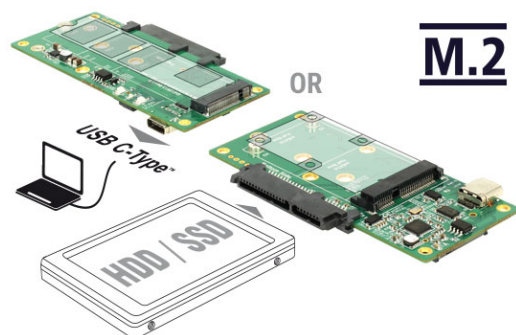
### ■ Suitable for M.2 slot with key M or B based on PCIe

### ■ Data transfer rate up to 6 Gb/s

### ■ Supports HDD and SSD

### ■ Dimensions (LxWxH): ca. 42 x 22 x 11 mm

→ [Show application info](#)



→ Item 62993

## Converter SuperSpeed USB 10 Gbps with USB Type-C™ female > 1 x SATA / 1 x M.2 Key B / 1 x mSATA

### ■ Connectors:

1 x SuperSpeed USB 10 Gbps (USB 3.1 Gen 2) USB Type-C™ female >

1 x SATA 6 Gb/s 22 pin receptacle

1 x 67 pin M.2 key B slot

1 x mSATA slot (half size / full size)

### ■ Interface: SATA

### ■ Chipset: Asmedia ASM1351

### ■ Supports M.2 modules in format 2280, 2260 and 2242 with key B or key B+M based on SATA

■ Maximum height of the components on the module: 1.35 mm,

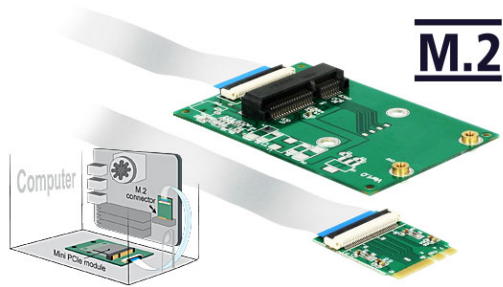
application of double-sided assembled modules supported

■ Suitable for 2.5" SATA HDD / SSD: supports 3.3 V / 5 V HDD / SSD

■ Supports SATA 1.5 Gb/s, SATA 3 Gb/s and SATA 6 Gb/s

■ Dimensions (LxWxH): ca. 90 x 40 x 8 mm

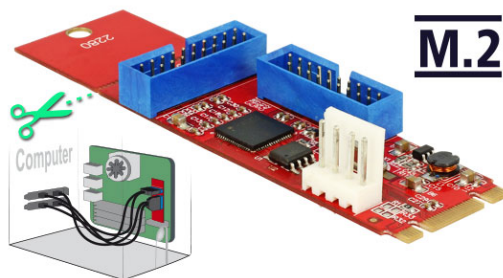
→ [Show infographic with connectors](#)



→ Item 62848

## Converter M.2 Key A+E male > 1 x Mini PCIe Slot half size / full size

- **Connectors:**
  - 1 x 59 pin M.2 key A+E male >
  - 1 x Mini PCIe slot
- Interface: PCIe + USB
- Form factor M.2: 2230
- Form factor Mini PCIe: half size and full size
- Suitable for M.2 slot with key A or key E based on PCIe and USB
- PCI Express Rev. 1.1
- Operating temperature: 0 °C ~ 80 °C
- Dimensions (LxWxH):
  - M.2 board: ca. 30 x 22 x 3 mm
  - Mini PCIe board: ca. 69 x 45 x 6 mm



→ Item 62843

## Converter M.2 Key B+M male > 2 x USB 3.0 Pin Header

- **Connectors:**
  - 1 x 59 pin M.2 Key B+M male >
  - 2 x 19 pin USB 3.0 pin header male
  - 1 x 4 pin pin header power connector (optional for power supply)
- Interface: PCIe
- Form factor: M.2 2280 (resp. 2260)
- Suitable for M.2 slot with key M or B+M based on PCIe
- Chipset: Renesas
- Data transfer rate up to 5 Gbps
- Dimensions (LxWxH): ca. 82 x 22 x 14 mm



→ Item 62704

## 3.5" Converter SATA 22 Pin / SFF-8643 > 1 x M.2 Key M + 1 x M.2 Key B

- **Connectors:**
  - 1 x SATA 6 Gb/s 22 pin female (for SATA SSDs)
  - 1 x 36 pin SFF-8643 female (for PCIe SSDs 2 or 4 lanes)
  - 1 x 67 pin M.2 key M slot (PCIe SSD)
  - 1 x 67 pin M.2 key B slot (SATA SSD)
- Interface: SATA / PCIe (2 or 4 lanes)
- Supports M.2 modules in format 2280, 2260, 2242 and 2230
  - with key M or key B+M based on PCIe or SATA
- Maximum height of the components on the module: 1.5

mm,

application of double-sided assembled modules supported

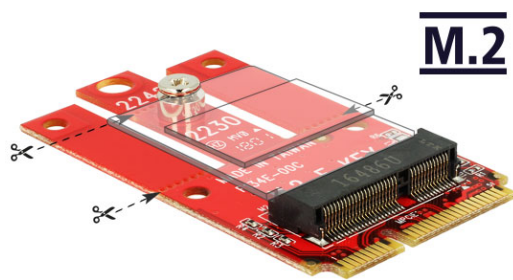
- SATA 15 pin power connector always necessary
- Supports NVMe Express (NVMe)
- Maximale Ausgangsstromstärke: 4 A (PCIe) und 3 A (SATA)
- Dimensions (LxWxH):

Board incl. installation frame: ca. 140 x 100 x 23 mm

Board without installation frame: ca. 120 x 87 x 16 mm

→ [Show application example](#)

## Adapters



→ Item 63909

**NEW**

### Adapter Mini PCIe > M.2 Key E slot

■ **Connectors:**

1 x Mini PCIe male >

1 x 67 pin M.2 Key E slot

■ Interface: USB 2.0 / PCIe

■ Form factor: Mini PCIe full size / half size

■ Supports M.2 modules in format 2242, 2230, 3042 and 3030

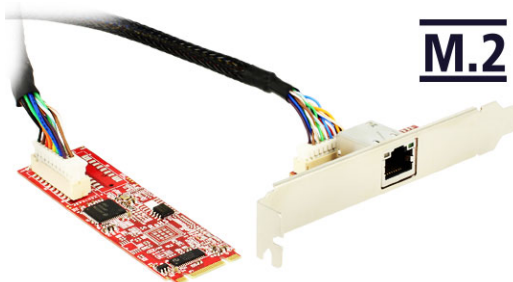
with key E or key A+E based on USB / PCIe

■ Maximum height of the components on the module: 1.5

mm,

application of double-sided assembled modules supported

■ Dimensions (LxW): ca. 54 x 30 mm



→ Item 62751

### Adapter M.2 > 1 x RJ45 Gigabit LAN Port (PCIe)

■ **Connectors:**

1 x M.2 key B+M male >

1 x Gigabit LAN RJ45 female

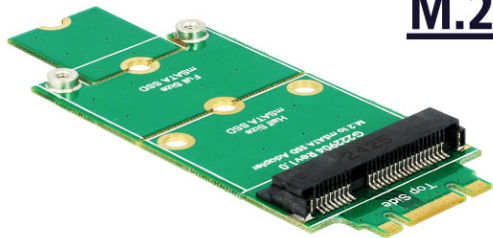
■ Interface: PCIe (2.1 x1)

■ Form factor: M.2 2280

■ Chipset: Intel® i210

■ Maximum power consumption: 0.65 W (3.3 V, 200 mA)

■ Dimensions (LxWxH): ca. 50.9 x 30 x 7.05 mm

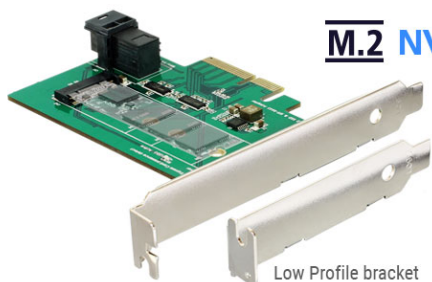
**M.2**

→ Item 62591

## Adapter M.2 > mSATA

- **Connectors:**
  - 1 x 59 pin M.2 key B+M male >
  - 1 x mSATA slot (half size / full size)
- Interface: SATA
- Suitable for full size and half size modules
- Dimensions (LxWxH): ca. 80 x 31.5 x 4.7 mm

## More products in the area of M.2

**M.2 NVMe**

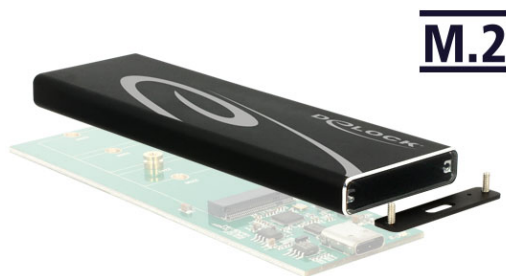
→ Item 89517

### PCI Express Card >

#### 1 x internal NVMe M.2 PCIe / 1 x internal SFF-8643 NVMe

- **Connectors:**
  - 1 x 67 pin M.2 key M slot
  - 1 x PCI Express x4, V3.0
  - 1 x 36 pin SFF-8643 female
- Interface: PCIe
- Low profile form factor
- Supports M.2 modules in format 2280, 2260, 2242 and 2230
  - with key M or key B+M based on PCIe
- Maximum height of the components on the module: 1.35 mm,
  - application of double-sided assembled modules supported
- Supports NVM Express (NVMe)
- Short circuit protection, over heating protection

→ Show application example

**M.2**

→ Item 42574

### External Enclosure M.2 SSD 80 mm > SuperSpeed USB 10 Gbps (USB 3.1 Gen 2)

- **Connectors:**
  - external: 1 x SuperSpeed USB 10 Gbps (USB 3.1 Gen 2) USB Type-C™ female
  - internal: 1 x 67 pin M.2 key B slot
- Chipset: Asmedia ASM1351
- Supports M.2 modules in format 2280, 2260, 2242 and 2230
  - with key B based on SATA

- Maximum height of the components on the module: 1.35 mm,  
application of double-sided assembled modules supported
- Data transfer rate up to 6 Gbps
- LED indicator for power and access
- Dimensions (LxWxH): ca. 126 x 40 x 10 mm

Also available as:

- [Item 42573](#) Enclosure M.2 SSD 60 mm
- [Item 42572](#) Enclosure M.2 SSD 42 mm



**M.2**

### M.2 Flash Module SATA 6 Gb/s SSD 256 GB

- **Connector:** 59 Pin M.2 Key B+M Stecker
- Interface: SATA 6 Gb/s
- Form factor: M.2 2242
- Chipset: Toshiba
- Flash Type: MLC
- Storage capacity: 256 GB
- Maximum speed: read 530 MB/s - write 210 MB/s
- Maximum write cycles: 3000
- Maximum power consumption: 1.4 W (3.3 V x 422 mA)
- With Thermal Sensor, ATA security, iSmart
- Operation temperature: Industrial grade -40 °C ~ 85 °C
- Dimensions (LxWxH): ca. 42 x 22 x 3.2 mm

→ Item 54793

→ All Delock **M.2** products at a glance



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