cronologic

User Guide Appendix – Desktop Solutions

Desktop Solutions

Contents

Introduction

The TimeTagger4, xTDC4, and xHPTDC8 time-to-digital (TDC) converters by cronologic GmbH & Co. KG are available as external desktop versions, referred to as the TBT variant. Conventional Thunderbolt cables can be used to connect the TBT variants of our products to any Thunderbolt port and to any USB4 port that support PCIe.

This User Guide provides an overview of the device's operation. It should be understood as an appendix to the main User Guide of your device, where the functionality, hardware and application programming interfaces are explained. See:

TimeTagger4:

- https://docs.cronologic.de/downloads/timetagger4/TimeTagger4_User_Guide.pdf

xTDC4:

- https://docs.cronologic.de/downloads/xtdc4/xTDC4_User_Guide.pdf

xHPTDC8:

- https://docs.cronologic.de/downloads/xhptdc8/xHPTDC8_User_Guide.pdf

This user guide is also available online at docs.cronologic.de/projects/tbt2pcie.

1 Hardware

Front panel of xTDC4-TBT / TimeTagger4-xxxG-TBT

Front panel of xHPTDC8-TBT

Rear panel of TBT-units

Figure 1.1: Front and back panel of the TBT variant of our TDC cards.

1.1 Power requirements

The power requirements and the need for an external power supply depend on the particular card.

TimeTagger4 (all variants)
No external power supply is necessary. Power is supplied by the USB4 port.

xTDC4
An external power supply providing **14–15 V DC @ 45 W** is necessary.

xHPTDC8
An external power supply providing **14–15 V DC @ 60 W** is necessary.

If a power supply is necessary, we recommend the MeanWell GST60A15-P1J (15 V DC, 60 W, 4 A) power supply. However, any power supply providing sufficient power at 14–15 V DC with a plug as depicted in Fig. 1.2 is sufficient.
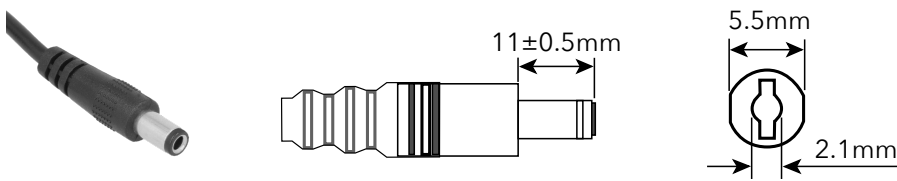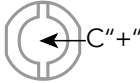
IEC 60130-10 Type A with 2.1mm inner diameter and no center pin	
DC Output Plug	**Pin Assignment**
11±0.5mm 5.5mm 2.1mm	C"+" Outside ⊖—●—⊕ Inside −V not connected to AC FG

Figure 1.2: Requirements for plugs fitting the EXT PWR socket of the device.

Note: No external power supply is provided with the TBT variants of our TDC cards.

1.1.1 Power-up sequence

The below only applies to the xTDC4-TBT and xHPTDC8-TBT card.

For a proper boot sequence, it is important to:

- **First** connect the power supply.
- Then, the **EXT PWR LED** will light up **green** (unless the supplied power is not sufficient).
- **Only now** establish the the USB4 connection.

> **Attention:** The xTDC4-TBT and xHPTDC8-TBT cards will only work with the correct power-up sequence.

In case you did not follow the above procedure and the TBT card is not recognized by your device, remove the USB4 and power supply connections, then follow the correct procedure. If afterwards the TBT card is still not recognized, a reboot of your system is necessary.

1.2 LEDs

The back panel features two LEDs:

USB-C
This LED indicates a sufficient power supply by the USB-C port if green. It is only relevant for the TimeTagger4.

EXT PWR
This LED indicates sufficient (green) or insufficient (red) power supply. If it is red, the connected power supply does not provide enough power. It is only relevant for the xTDC4 and xHPTDC8.

1.3   Inputs and connectors

For the front-panel connectors, refer to the main User Guide of the particular TDC card in your device.

TimeTagger4:

- https://docs.cronologic.de/downloads/timetagger4/TimeTagger4_User_Guide.pdf

xTDC4:

- https://docs.cronologic.de/downloads/xtdc4/xTDC4_User_Guide.pdf

xHPTDC8:

- https://docs.cronologic.de/downloads/xhptdc8/xHPTDC8_User_Guide.pdf

1.4   Optional Addons

It is possible to buy **wall brackets** and **tower feet** for the crate (see Fig. 1.3). These are not sold by cronologic, but you can purchase them from BOPLA enclosures.

Wall brackets

AS 0030-0200 WL-7024
Order no.: 94722200
Profile length 200 mm

Tower feet

AS 0030-0200 T-7024
Order no.: 94762200
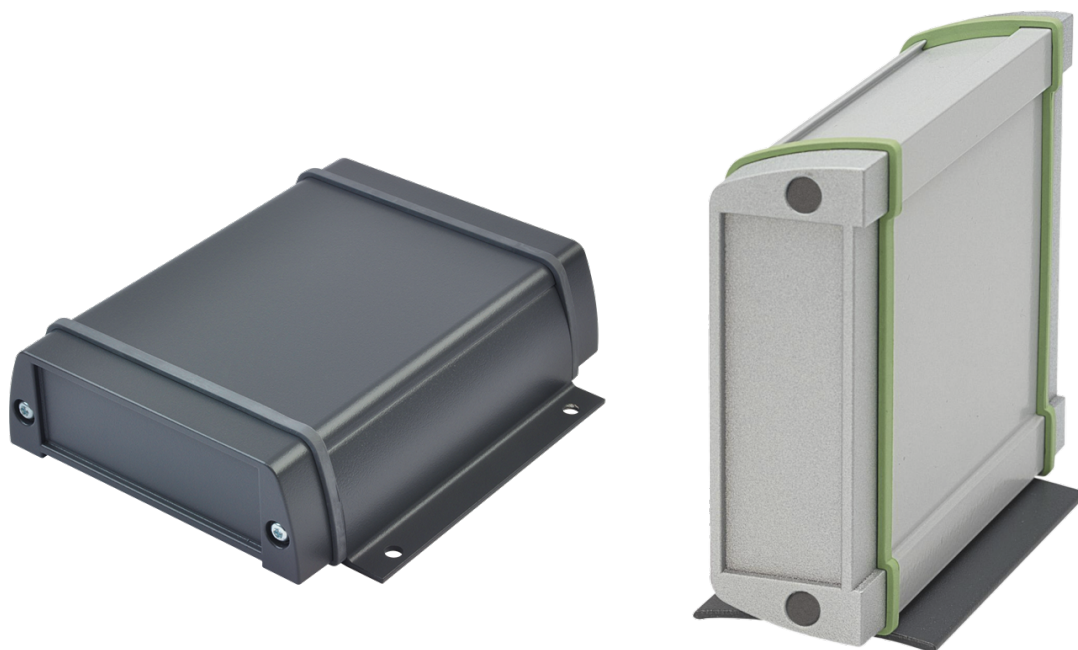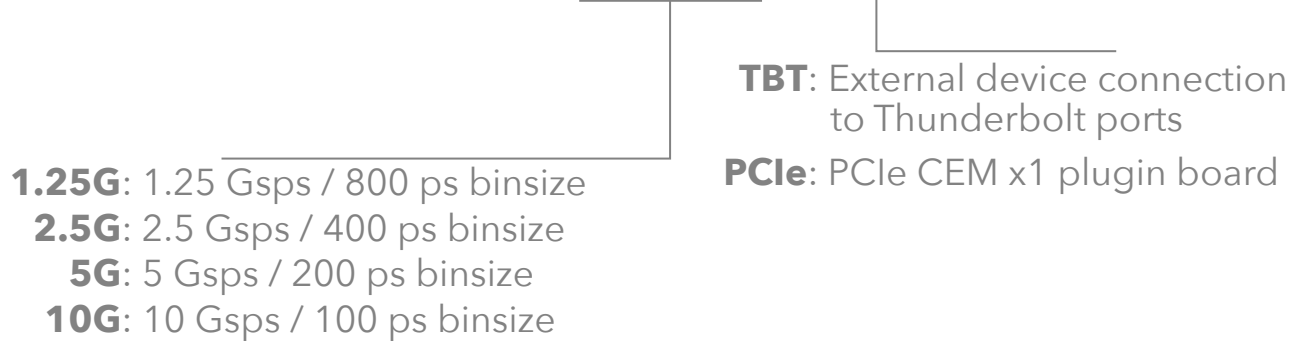Profile length 200 mm

Figure 1.3: Optional addons for the TBT variant of our TDC cards. Left: universal wall brackets; right: tower feet (sold seperately by BOPLA enclosures).

2   Ordering Information

2.1   TimeTagger4

Multiple variants of the TimeTagger4 TDC card are available. The cards adhere to the following naming scheme:

$$\text{TimeTagger4} - 1.25\text{G} - \text{TBT}$$

TBT: External device connection to Thunderbolt ports

PCIe: PCIe CEM x1 plugin board

1.25G: 1.25 Gsps / 800 ps binsize
2.5G: 2.5 Gsps / 400 ps binsize
5G: 5 Gsps / 200 ps binsize
10G: 10 Gsps / 100 ps binsize

2.2   xTDC4

xTDC4-TBT
> External device connection to Thunderbolt ports.

xTDC4-PCIe
> PCIe CEM x1 plugin board.

2.3   xHPTDC8

xHPTDC8-TBT
> External device connection to Thunderbolt ports.

xHPTDC8-PCIe
> PCIe CEM x1 plugin board.

3   Technical Data

3.1   Size and Weight

Dimensions:
>   240 × 155 × 50 mm

Weight:
>   1200 g

3.2   TDC characteristics

Refer to the main User Guide of the particular TDC card in your device.

TimeTagger4:

- https://docs.cronologic.de/downloads/timetagger4/TimeTagger4_User_Guide.pdf

xTDC4:

- https://docs.cronologic.de/downloads/xtdc4/xTDC4_User_Guide.pdf

xHPTDC8:

- https://docs.cronologic.de/downloads/xhptdc8/xHPTDC8_User_Guide.pdf

3.3   Information required by DIN EN 61010-1

3.3.1   Manufacturer

The device is a product of:

>   **cronologic** GmbH & Co. KG
>   Jahnstraße 49
>   D-60318 Frankfurt

>   HRA 42869 beim Amtsgericht Frankfurt/M
>   VAT-ID: DE235184378

3.3.2 Intended Use and System Integration

The device enclosure is designed to comply with **DIN EN 61326-1** when operated as outlined in this manual. The enclosure does not pose any hazards as defined by **EN 61010-1.**

When handling the enclosure, adequate measures have to be taken to protect the circuits against electrostatic discharge (ESD).

3.3.3 Recycling

cronologic is registered with the "Stiftung Elektro-Altgeräte Register" as a manufacturer of electronic systems with **Registration ID DE 77895909**.

The device belongs to **Category 9**, **"Überwachungs und Kontrollinstrumente für ausschließlich gewerbliche Nutzung."** The last owner of the device must recycle it in compliance with **§11** and **§12** of the German ElektroG, or return it to the manufacturer's address listed in Section 3.3.1.

4 Revision History

4.1 Firmware, Driver, and Applications

Refer to the main User Guide of the particular TDC card in your device.

TimeTagger4:

- https://docs.cronologic.de/downloads/timetagger4/TimeTagger4_User_Guide.pdf

xTDC4:

- https://docs.cronologic.de/downloads/xtdc4/xTDC4_User_Guide.pdf

xHPTDC8:

- https://docs.cronologic.de/downloads/xhptdc8/xHPTDC8_User_Guide.pdf

4.2 User Guide

1.2.1 - 2025-05-07

Updated main user guide hyperlinks

1.2.0 - 2024-10-17

Included xHPTDC8 Front Panel in Fig. 1.1
Added *Optional Addons*

1.1.0 — 2024-09-26

Added xHPTDC8
Expanded documentation on power requirements
Add documentation for power-up sequence.
Fixed LED documentation

1.0.2 — 2024-08-21

Fixed power requirements in User Guide

1.0.1 — 2024-07-09

Updated images; now including ventilation slits
Fixed typos

1.0.0 — 2024-06-26

Initial release