Digiteq Automotive

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Levelshifter4X

Accessories for test benches and standalone setups

User Manual, Version 1.3

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Author: Michal Havelka
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HEAD OFFICE
Digiteq Automotive s.r.o.
Novodvorská 994/138
142 21, Prague 4
Czech Republic

CONTACTS
+420 239 046 750
info@digiteqautomotive.com
www.digiteqautomotive.com

BILLING INFORMATION
Company ID. No. 26 46 60 23
VAT ID No.: CZ 26 46 60 23
registered by the Municipal Court in Prague, Section C, Insert 84128

MANAGEMENT BOARD
Marco Jähnisch
Pavel Štěpánek

BANK ACCOUNT
Commerzbank Aktiengesellschaft
Jugoslávská 1, 120 21 Prague 2
Account No.: 10634787/6200 (EUR)
IBAN: CZ4262000000000010634787
SWIFT: COBACZPXXXX

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Changes

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1.1	14.10.2024	Proofreading	Michal Havelka	Michal Havelka
1.2	10.12.2024	New chapter – accessories	Michal Havelka	Michal Havelka
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1 About this User Manual

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We are grateful for references to mistakes or for suggestions for improvement to be able to offer you even more efficient products in the future.

2 Safety Instruction

Dear Customer, the following safety instructions are intended not only for the protection of your health but also for the protection of the product.

This section gives an overview of all important aspects of safety for the protection of individuals and to ensure safe and trouble-free operation.

The warranty/guarantee will become void if damage is incurred resulting from non-compliance with these operating instructions. We do not assume any liability for consequential damage!

We also do not assume any liability for damage to other property or personal injury caused by improper use or failure to observe the safety instructions. In such cases the guarantee/warranty will become void!

Therefore, read the following items very carefully before connecting the product and taking it into operation.

2.1 General Safety Instructions

- The product may only be set up, started or serviced after gaining familiarity with the appropriate Operating Instruction.
- The products, equipment and device must only be used indoors.
- Do not use this product near water or in wet areas to avoid fire or injury of electric current.
- Use the product, equipment and device only for its intended purpose as described in Product Specification.
- The product, equipment and devices should not be operated in potentially explosive atmospheres.
- During operation of the product, equipment and device, do not permit any work method that hinders the safety of the product, equipment and device.
- Always keep the working area of the unit clean and orderly, in order to avoid danger from dirt or scattered parts.
- Do not exceed the technical performance data specified for each product, equipment and device.
- Keep all safety precautions and hazard descriptions with the product, equipment and device in legible condition and replace the descriptions as needed.
- Operation as well as work on the products, equipment and devices must only be carried out by trained personnel.
- In case of malfunction, immediately stop the unit.
- Have any fault corrected by appropriately trained personnel.
- The device has to be placed in an open space to ensure sufficient cooling of its parts.
- Always turn off the product when you do not use it or before a revision.
- The colors of wires and connectors may not comply with VW standards.

3 Product Specification

3.1 General Description

The Levelshifter4X is a USB to UART device. It converts a USB signal to four 3.3V CMOS level UART serial interfaces and vice versa. Incorporating FT4232HL USB IC which handles all the USB protocols, the device provides a fast, simple way to connect up to 4 trace signals to one USB. It contains a small internal electronic circuit board, utilizing the FT4232HL, which is placed into a small plastic case. This device requires USB drivers, which are used to make the FT4232HL chip appear as four virtual COM ports.

Key features:

- **USB to 4× UART**
  Converts one USB 2.0 connection to four independent UART channels (3.3 V CMOS level).
- **Up to 8 trace signals**
  Each D SUB9 connector carries up to four UART signals – ideal for multi-channel ECU tracing.
- **Automotive test bench ready**
  Versions for fixed installation in test benches as well as portable standalone use.
- **Compact and lightweight**
  Small PETG plastic enclosure with low weight for easy handling and portability.
- **Integrated mounting**
  Enclosure with mounting hole suitable, for example, for 20×20 aluminum profile frames (groove 5 mm).
- **Powered via USB Type – C**
  No external power supply needed; powered directly from the host PC.
- **LED power indication**
  Clear visual indication of device power status.
- **Supports typical use cases**
  ICC/HCP3 debug, connection via CONMOD and standalone lab setups

3.2 Mechanical and Electrical Properties

Table 1: Mechanical and electrical properties

USB interface	USB 2.0 Type-C
UART interfaces	2× D-SUB9 female (up to 4 signals per connector)
UART signal levels	3.3 V CMOS
Number of UART signals	Up to 8 (4 per D-SUB9 connector)
Power supply	From USB port
Power indication	LED
Enclosure material	PETG (3D-printed plastic)
Dimensions (W × D × H, incl. conn.)	Up to 88 × 46 × 39 mm
Weight	Up to 70 g
Ingress protection	IP20
Operating temperature	0 °C to 50 °C (no condensation)
Storage temperature	−10 °C to 40 °C (no condensation)
Intended use	Indoor use only

3.3 Device description

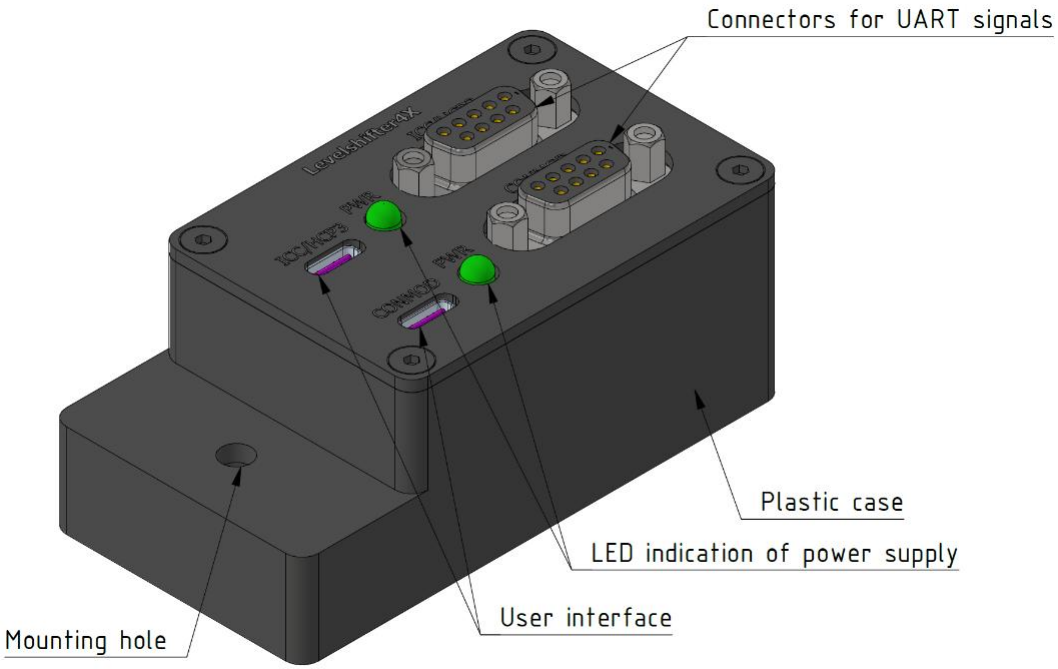


Figure 1: Device description

4 Mechanical part

4.1 Plastic case

The device is installed in a plastic box made by the 3D printing method. PETG material used.

Two basic designs, defined by the number of channels. Both designs feature an integrated mounting hole that enables secure and convenient installation, for example on a test bench or development fixture.

Figure 2: Plastic case

4.1.1 High variability and mounting possibilities

The design described in the previous paragraph enables mounting the device directly to the test bench which consists of 20x20 aluminum profiles with a groove 5 mm in the center. The mounting hole diameter is 5 mm. Alternatively, it may also be mounted in a different manner or placed freely. The device can be easily and quickly taken and may be used somewhere else.

4.1.2 Low weight and portability

The light plastic case makes the whole device light and together with the small dimensions makes it a portable solution.

5 Electrical part

5.1 Device connectors

In the most common configuration (8-channel version), the device includes the following connectors:

- J1 connector D-SUB 9 type for connection to infotainment (ICC/HCP3) debug channels
- J3 connector D-Sub 9 type for connection to CONMOD debug channels
- J2, J4 connectors USB Type-C for connection to computer

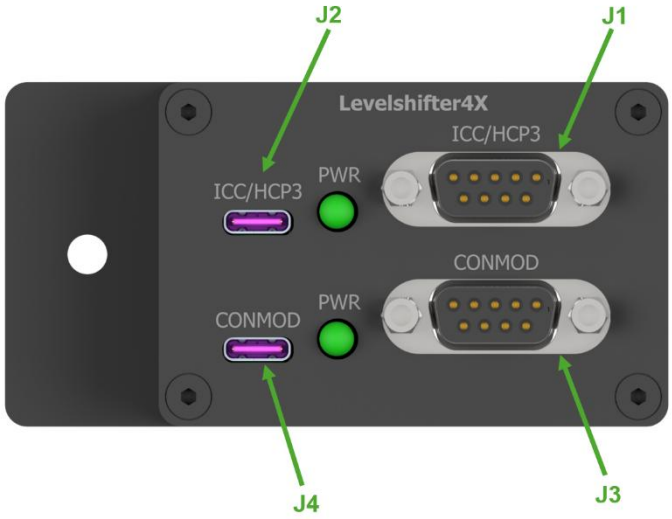


Figure 3: Device connectors

Note: Although the enclosure label describes the typical use (connection to ICC/HCP3 and CONMOD), the Levelshifter4X can also be connected elsewhere. If the device is not used for ICC and CONMOD or HCP3 and CONMOD, the J1 and J3 (D-SUB9) connectors may be used to connect to another unit or device as required by the user.

5.2 Pin assignment

Both D-SUB 9 connectors have the same pin assignment. The pinout is shown in Table 2.

Table 2: Pin assignment

D-SUB9	
Pin	**Assignment**
1	UART_TXD1
2	UART_TXD2
3	GND (KL.31)
4	UART_TXD3
5	UART_TXD4
6	UART_RXD1
7	UART_RXD2
8	UART_RXD3
9	UART_RXD4

For connection to your computer, use the supplied USB 2.0 cable (USB Type-C to the device and USB Type-A to the PC). Alternatively, any standard USB cable with a USB Type-C plug on the device side may be used, depending on the available USB ports on the host computer. The device-side USB port is USB Type-C.

6 Operating part

The Levelshifter4X uses the FT4232HL chip, which requires USB drivers available free of charge at https://ftdichip.com/products/ft4232hl/. After installing the VCP drivers, the device appears as four virtual COM ports, allowing communication through a standard terminal application such as PuTTY or Terminal. To install and use the device, connect the Levelshifter4X to your computer using a USB cable with a USB Type-C connector on the device side. See Figure 4 for the typical connection.

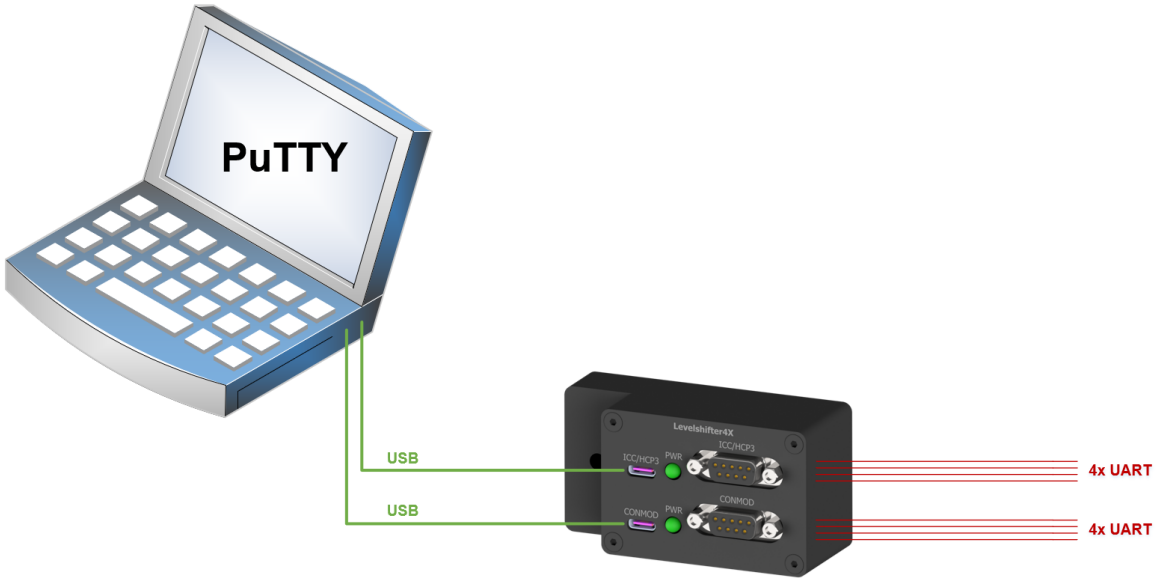


Figure 4: Typical wiring

6.1 Usage examples

6.1.1 Built-in device in the test bench

From the user's perspective, it's the most convenient solution. The connection of the Levelshifter4X to the ECUs is part of the built-in wiring harness of the test bench. Only a USB cable is needed for use.

6.1.2 CONMOD version via I/O panel

A cable harness is required to connect to the test bench I/O panel. It assumes that the test bench is equipped with the necessary UART signals.

6.1.3 ICC/HCP3 direct connection

A cable harness is required to connect to the ICC/HCP3. No preparation on the test bench is required.

6.1.4 Standalone solution (as a part of an independent solution)

The device can be used independently outside of the test bench. The converter provides a simple way to establish serial communication between a PC and UART-based devices. This makes it suitable for diverse applications across different domains and hardware platforms, with testers or engineers working with the Infotainment unit itself being only one possible example of its users.

7 List of connectors

The table below lists the connectors used in the device.

Table 3: List of connectors

Connector	Manufacturer	Part number(s)
D-SUB9 female	CONNFLY ELECTRONIC	DS1037-09FNAKT74
USB 2.0 TYPE C	MOLEX	213716-0001

8 List of connectors Abbreviations

Table 4: List of abbreviations

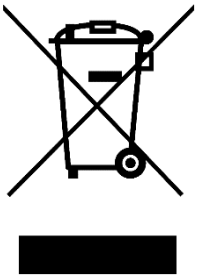
PETG	Polyethylene terephthalate glycol
CMOS	Complementary Metal-Oxide-Semiconductor
CONMOD	Connectivity Module
ECU	Electronic Control Unit
HCP	High Performance Computing Platform
I/O panel	Input/Output panel, Front panel, Side panel
ICAS	In Car Application Server
ICC	OI@Android (One Infotainment)
IP	Ingress Protection
LED	Light Emitting Diode
MIB	Modularer Infotainment Baukasten
PC	Personal Computer
TB	Test Bench
UART	Universal Synchronous / Asynchronous Receiver and Transmitter
USB	Universal Serial Bus
VCP	Virtual COM port
ZR	Zentralrechner (MIB, Main Unit, Head Unit, ICAS3, HCP3, ICC)

9 Service and Maintenance

Maintenance, adjustments, and repair work may only be carried out by the manufacturer or an authorized person with the manufacturer's agreement.

10 Legislative and ecology

Disposal of old electrical and electronic equipment (applicable in the European Union and other European countries with separate collection systems).



This symbol on the product or on its packaging indicates that this product shall not be treated as household waste. Instead it shall be handed over to the applicable collection point for recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. The recycling of materials will help to conserve natural resources.

Digiteq Product Web

https://www.digiteqautomotive.com/en/products/test-benches/levelshifter4x

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Looking for a solution?

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