XDK110 Cross Domain Development Kit

Quick Start Documentation

Document revision:	0.9
Date:	05.07.2022
Notice:	This document will be modified without any notification. Pictures and portrayals serve as illustration and can differ from reality.

First:
The LEGIC Cross Domain Development Kit is a universal programmable multiple sensor device for prototypical applications and long term use for low volume productions.

Contents

1 Overview

1.1 Intended Use of XDK 110

The XDK 110 Cross-Domain Development Kit is a universal programmable multiple sensor device for prototypical applications and long term use for low volume productions for Internet of Things (IoT) use cases. It works with Windows 7 or higher.

1.2 Included in Delivery

- XDK 110 Development Kit with Lithium Ion Battery
- Extension board with cable; 10 cm, 26 pin
- Micro USB 2.0 connector cable
- Mounting plate and screws

1.3 Sensors

BMA280	Accelerometer
BMG160	Gyroscope
BMM150	Magnetometer
BMI160	Accelerometer/Gyroscope
BME280	Humidity/Pressure/Temperature
AKU340	Ambient Noise
MAX44009	Ambient Light

1.4 Data Storage

- Micro-SD card slot

1.5 Communication

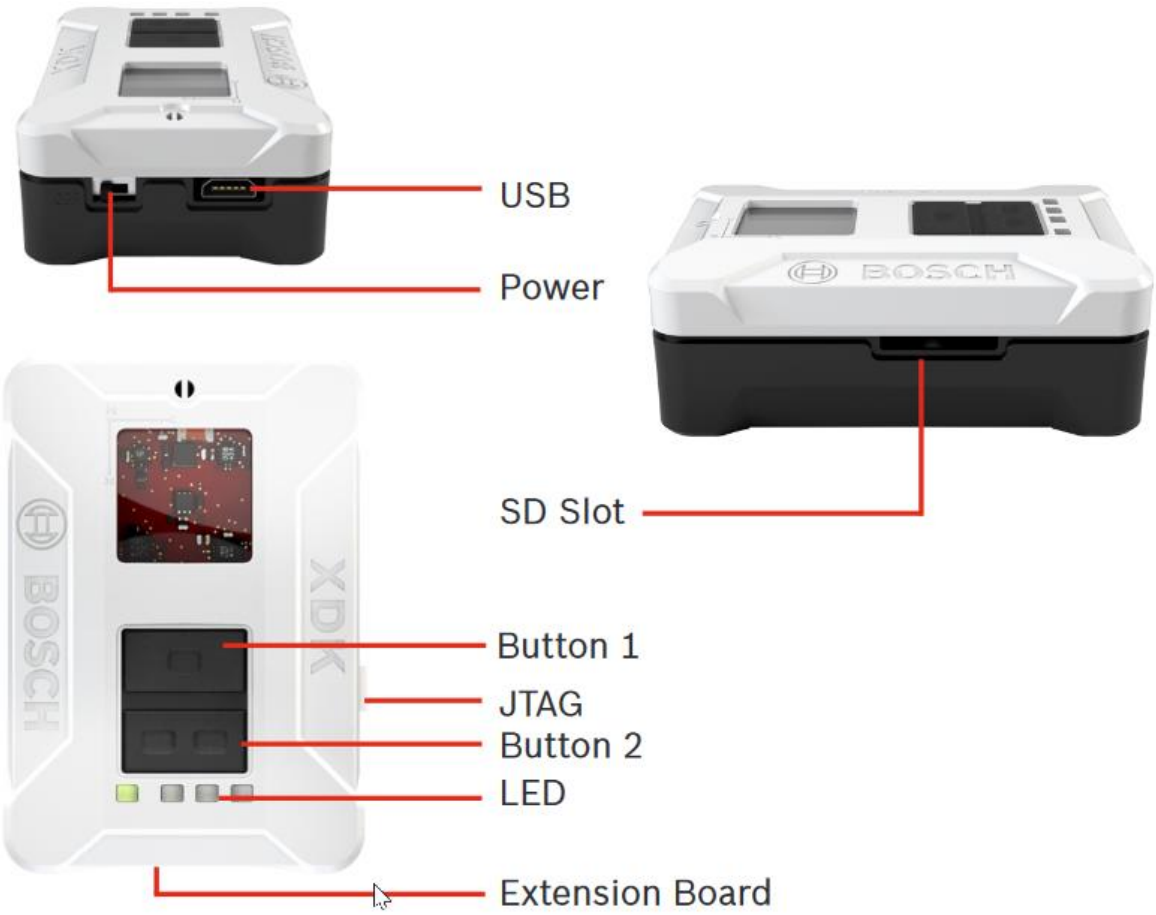
Cable:	USB 2.0
Wireless:	Bluetooth; Wireless LAN, 2,4 GHz
LED:	1x green, 1x yellow, 1x orange, 1x red

The red, orange and yellow LED can be controlled in application mode.

1.6 Technical Specifications

NAME	VALUE
Temperature Range	-20 – 60 °C operating 0 – 45 °C charging
Humidity	10 – 90 %, non-condensing
IP Rating	IP 30 (IEC 60529)
Flammability Classification	HB (IEC 60695-11-10/-20; CSA C 22.2)
Voltage	5 V DC
Charging Current	100mA/500mA; 150mA usually
Communication (Cable)	USB
Wireless LAN	IEEE 802.11 b/g/n
Bluetooth 4.0	IEEE 802.15.1
Working Height	Max. 8000m above mean sea level
Surrounding	Interior

1.7 Connectors, Buttons and LED



2 Start-up and Software

The software for the XDK is available online. You can download the software at www.xdk.io. Go to the download section to get the latest software package and demos.

2.1 Download and Installation

Download the software package “XDK Workbench” from the website www.xdk.io and start the installer. The software package contains all necessary components. Program examples, demos and a Toolbox are included (please refer 2.3. Getting started).

2.2 Connecting XDK 110

Connect the USB cable, which is included in delivery to the USB Connector of your PC and the Micro-USB Connector of the XDK.

> **Notice** Functional Limitations
>
> The device can be impaired or damaged if the power source is inadequate.
> ▶ Do not use cables > 3 m.
> ▶ Use only certified USB power adapters.

The XDK 110 uses the LED to show the following states:

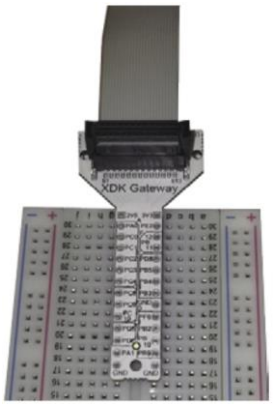
LED Green:	The green LED shows the charging status and cannot be controlled by software.	
	Continuous:	Charging/Charging suspended by thermal loop
	Flashing:	Safety timers expired
	Off:	Charging done/Recharging after termination/IC disabled or no valid input power/Battery absent

In Bootloader Mode the following LEDs are active:

LED Yellow:	Continuous:	Bootloader mode active and USB connected; Driver loaded
LED Red:	Continuous:	Bootloader Mode active
	Flashing 5x:	No valid application detected; XDK remains in Bootloader Mode

2.3 Connecting the Extension-Board “XDK Gateway”

Connect the 26-pin cable which is included in delivery with the extension board to the 26-pin connector of the XDK 110. The extension board offers a simple way to implement additional functions. It is optimized for the use of breadboards.

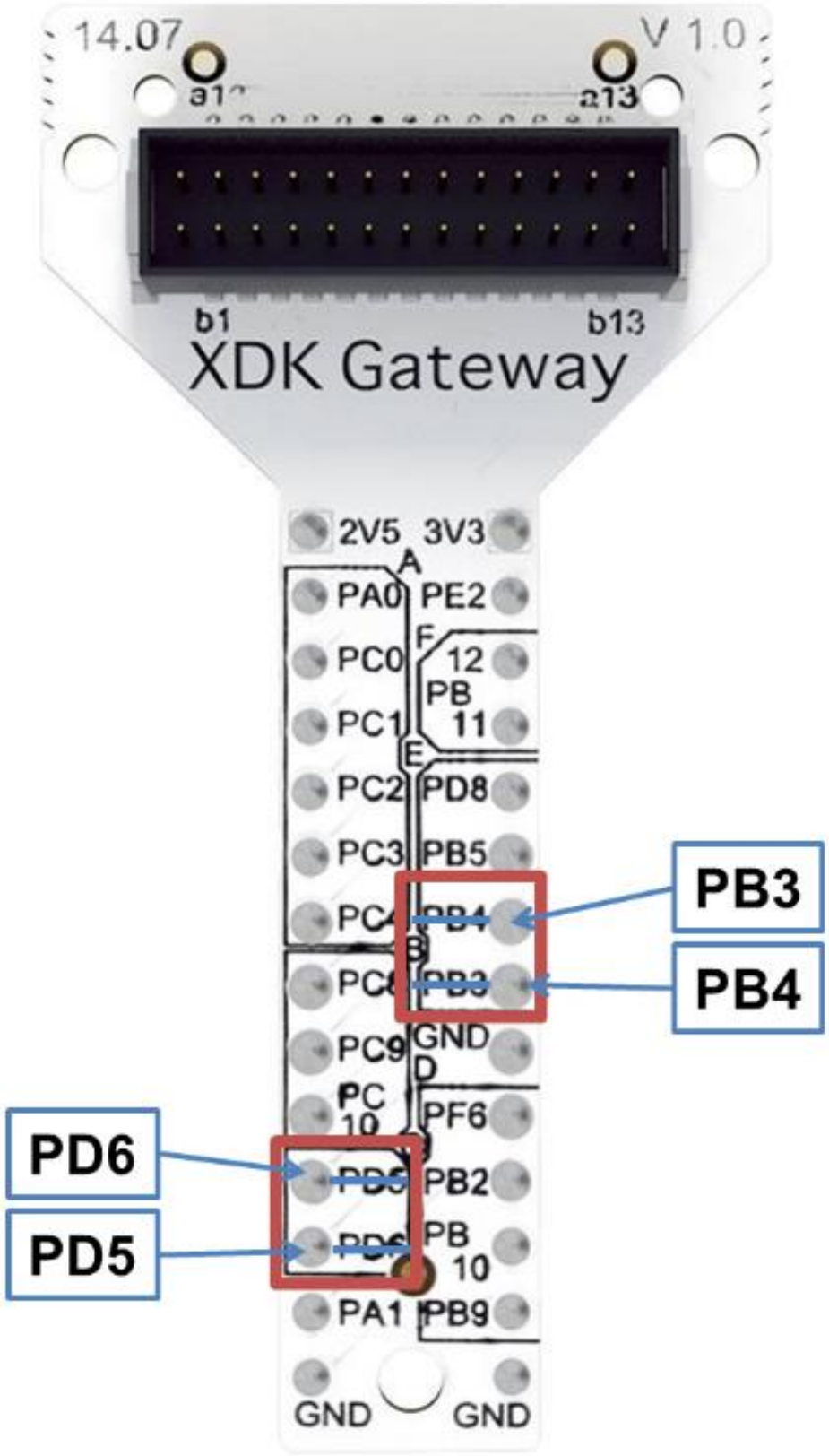


2.4 Connector Pin Assignment on the Extension Board

Connector Pin	MCU Pin	Suggested Use	Connector Pin	MCU Pin	Suggested Use
A1	PA0	TIM0_CC0	B1	PB9	UART1_TX (U1_TX)
A2	PC0	TIM0_CC1	B2	PB10	UART1_RX (U1_RX)
A3	PC1	TIM0_CC2	B3	PB2	UART1_RTS
A4	PC2	TIM0_CDTI0	B4	PF6	UART1_CTS
A5	PC3	TIM0_CDTI1	B5	PB4	US2_MISO (U2_RX)
A6	PC4	TIM0_CDTI2	B6	PB3	US2_MOSI (U2_TX)
A7	PC8	TIM2_CC0	B7	PB5	US2_SCK (US2_CLK)
A8	PC9	TIM2_CC1	B8	PD8	US2_CS (EXT_CS)
A9	PC10	TIM2_CC2	B9	PB11	2C1_SDA
A10	PD6	ADC0_CH6	B10	PB12	I2C1_SDL
A11	PD5	ADC0_CH5	B11	2V5	Power Limit 100 mA continuous/peak
A12	PA1	GPIO	B12	3V3	Power Limit 100 mA continuous/peak
A13	PE2	GPIO	B13	GND	Power

2.5 Errata

Unfortunately, there is an error in the labelling of the “XDK Gateway” (Version V1.0) extension board delivered with XDK. Some of the pins names were swapped. The correct pin assignment is shown in the picture below. We apologize for any inconvenience caused by this. The error is corrected for the successive versions.



2.6 Getting Started

- ▶ Start the software “XDK Workbench”.
- ▶ The “Welcome”-screen will appear.
- ▶ If an XDK is connected, the XDK symbol will appear.
- ▶ Create your application.
- ▶ Click on the “Flash”-Button. Your application will be transferred to the XDK.
- ▶ Check the output of the XDK by using the console of the “XDK-Workbench”.

2.7 Flashing the XDK 110

The XDK 110 can only be programmed while in bootloader mode. To enter bootloader mode, press the “Flash” button. The software puts the XDK 110 in bootloader mode, flashes the program and reboots.

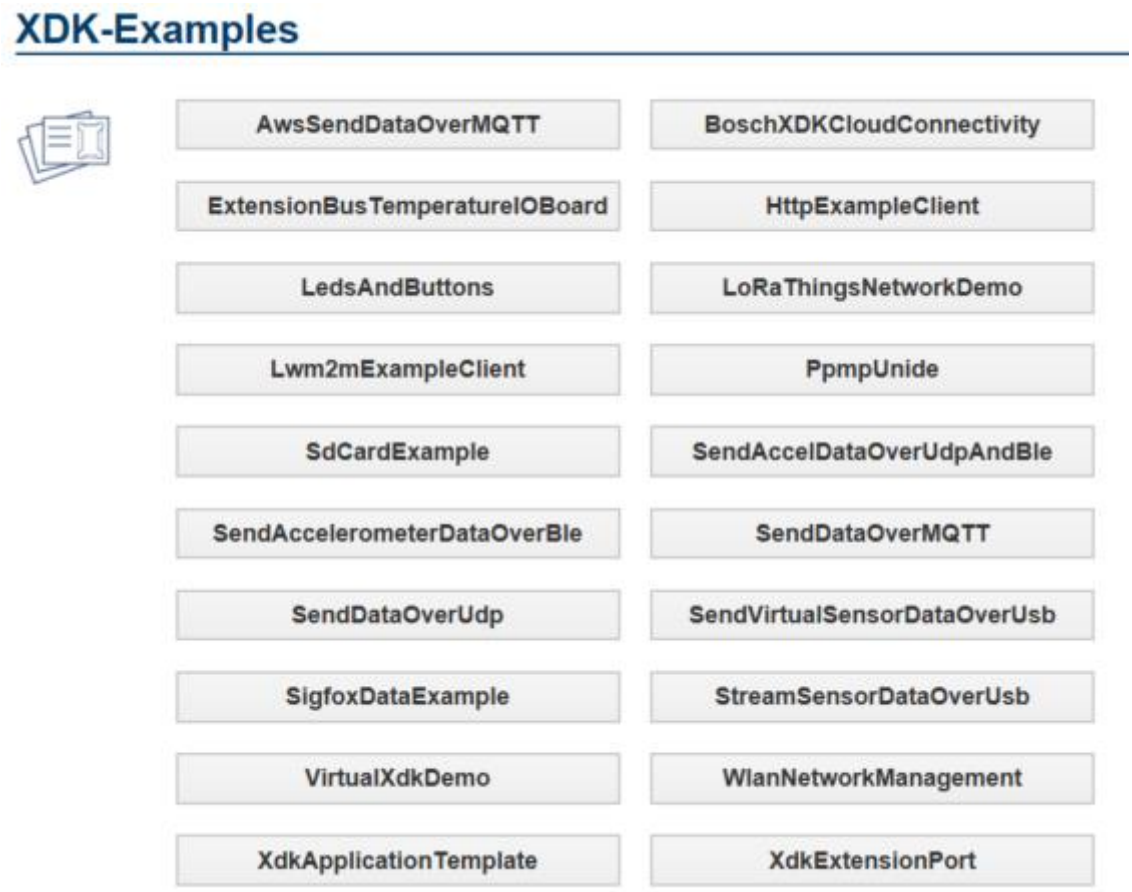
If the software does not put the XDK 110 in bootloader mode, this can be done manually:

- ▶ Switch off the XDK 110.
- ▶ Press Button 1.
- ▶ Hold down Button 1 and switch the XDK 110 back on.

The red LED will light up. If a USB connection is already established, the yellow LED will also light up. Press the “Flash” button.

2.8 Demos

The software package contains example demos, see chart below (Workbench Release 3.6.0):



2.9 Toolbox

The Toolbox contains various function blocks and algorithms, like filters, FFT (Fast Fourier Transform) and more. For example, the toolbox can help determine the spatial position of the XDK 110 by using the raw data from the gyroscope and the accelerometer.

2.10 API Documentation

The API documentation can be opened using the “Help”- function of the “XDK-Workbench“.

2.11 Community

Visit www.xdk.io. Find updates and further program examples in the forum. There you can also communicate with other XDK users and get technical support.

2.12 Accessories

Additionally, the J-link adapter “J-Link 9-Pin Cortex-M Adapter” can be purchased from Segger (http://www.segger.com). The adapter facilitates using JTAG to debug the program on the XDK 110. When ordering, refer to XDK 110 to get the right adapter.

2.13 Further Information

The device should not be carried on the body permanently.