# IoT Development Kit (IDK) Quick Start Guide

# Getting Started with the IoT Development Kit from ON Semiconductor

# **Available Shields**

- IDK Baseboard
- Ambient Light Sensor (ALS) Shield
- Touch Shield, PIR Shield, Stepper Motor Shield
- LED Ballast Shield, Wi-Fi<sup>®</sup> Module
- BLDC Shield, PoE Shield, CAN Shield

# Accessories

- Mini-USB Cable
- Cable Assembly

# **Tools Needed**

- IDE Installer
- PC: Windows<sup>®</sup> PC with minimum 1 USB port, JRE/JDK version 8u101 or later installed. OS: Windows 7, 8 or 10.

## Introduction

The IDK baseboard can be connected with different shields depending on the required IoT application. The IDK baseboard allows the user to create many types of IoT nodes and/or gateways depending on which shields are used with the baseboard. The IDK baseboard is configured by connecting the baseboard with the PC and USB cable and using accompanying PC software.

## **Software Installation**

Programing/configuring the IDK requires the ON Semiconductor IDE software. The IDE should be installed on the PC before connecting the hardware to the PC. The Software Suite can be downloaded from <u>www.onsemi.com</u>.

Steps for installation of the IDE are mentioned on page 5 of this Quick Start guide.

## Hardware Setup

After the IDE software is installed, hardware can be connected as shown in Figure 1. A single 12 V, 2 A power supply adapter powers the evaluation board (e.g. CUI INC, model SMI24–12....12 V/2 A or any other supporting  $V_{OUT} = 10-35$  V). Jumper settings required for the correct operation of the baseboard and the shields are listed in subsequent sections in this document. The shield boards plug directly into the IDK baseboard. The PC connects to the IDK baseboard through a USB cable.

The shields are classified into two broad categories – PMOD & Arduino – based on the interface where the shields are connected to the baseboard. In addition, Arduino-type shields include "Powered" and "Non-Input Power" shields.



# **ON Semiconductor®**

www.onsemi.com

# EVAL BOARD USER'S MANUAL







Figure 1. Hardware Setup

# **APPLICATIONS INFORMATION**

Baseboard Rev2.0

# Powering Up the IDK

The IDK baseboard can be powered up in stand-alone USB Mode.

Powered shields require additional power supply for its operation. No-Input power shields (e.g. PMOD-type shields) draw power from the baseboard itself.

PMOD type shields: ALS, PIR & Touch (does not require additional power supply).

Arduino powered shields: Stepper Motor & LED Ballast shields are supplied from external power source.

## **IDK Powering Modes**

The IDK can be powered in 4 different ways:

- 1. USB: The IDK baseboard can be powered through USB Mode. Jumper setting: None.
  - **CAUTION:** In USB Mode, powered shields like Stepper motor, LED Ballast, etc. need to be connected to an external 12 V supply using the cable assembly provided with the IDK.
- 2. External 12 V DC power adapter supplied with the IDK: Wall power adapter can be connected to the DC jack J11. Jumper settings: J16:ON. J12: OFF & J15: OFF.
- 3. External 12 V DC through J11 Connector: 12 V can be provided from an external DC power supply through J11 Pin no.2 (+Ve) & J11 Pin No. 3 (-Ve). Jumper settings: J12: ON. J15: OFF & J16: OFF.
- 4. External 9–32 V DC through J11 Connector: 12 V can be provided from an external DC power supply through J11 Pin No.2 (+Ve) & J11 Pin No. 3 (–Ve). Jumper settings: J12: OFF, J15: ON & J16: OFF.

# Jumper Settings

The default jumper settings are highlighted below for the IDK boards.



- J32: Pins 2–3 to be shunted for Expander IO1\_6 th pin as Wi-Fi Mod Chip select
- J31: Pins 1–2 to be shunted for HR pulse from HRM shield to  $\ensuremath{\text{DIO16}}$
- J31: Pins 2–3 to be shunted for DIO16 to Arduino connector.
- J35, J36: Pins 1–2 to be shunted for expander IO pins to Arduino connectors
- J35, J36: Pins 2–3 to be shunted for expander IO Pins to LEDs

#### Figure 2. Baseboard Rev 2.0

ALS



No Jumper settings needed



PIR

J5 J6



J6: 2–3 to be shunted J5: 2–3 to be shunted



Touch





Figure 5. Touch

Stepper



No Jumper settings needed

Figure 6. Stepper

Ballast



No Jumper settings needed

Figure 7. Ballast

# BLDC Shield



No Jumper settings needed
Figure 8. BLDC Shield

PoE Shield



No Jumper settings needed

Figure 9. PoE Shield

CAN Shield



CAN H – J15, CAN L – 16, GND – J17

Jumper Configuration for DB9 Pins							
CAN OBD II							
CAN H	Pin 7	Pin 3					
CAN L	Pin 2	Pin 5					
GND	Pin 3	Pin 2					

Figure 10. CAN Shield

# SW INSTALLATION STEPS

### Java Installation

JRE/JDK version 8u101 or above needs to be installed on the PC: <u>http://www.oracle.com/technetwork/java/javase/</u> <u>downloads/jdk8-downloads-2133151.html</u>

Java SE	Overview	Downloads	Documentation	Comm	unity	Technologies	Training		
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Figure 11. Java

#### **GNUToolchain**

The GNU cross compiler needs to be installed to compile the IDK application. Double click on the GNUToolchain.exe to install the cross compiler. *Internet connection is mandatory to install the cross compiler*.

Name	Date modified	Туре	Size
💮 Gnutoolchain.exe		Application	163 KB
IDK_Installer_x86.exe		Application	145,726 KB
IDK_Installer_x86_64.exe		Application	145,854 KB

Figure 12. GNU Toolchain Installation (1/5)

Select the "GNU Toolchain" checkbox and click Next.

Choose Compone Choose which fea		olchain you want to i	nstall.
Check the compor nstall. Click Next		o install and uncheck	the components you don't want to
Select component	s to install:	GNU Toolchain	Description Position your mouse over a component to see its description.
Space required: 4	20.0MB		

Figure 13. GNU Toolchain Installation (2/5)

Select Destination folder and click Next. It is recommended to not change installation path.

		GNU 1	Toolcha	in Setu	р		-	-	
Choose Inst	all Location							-	
Choose the f	older in which	to install GNL	J Toolchair	<b>)</b> .				(	4
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#### Figure 14. GNU Toolchain Installation (3/5)

Installer automatically downloads toolchain and installs.

8	GNU Toolchain Setup	- 🗆 🗙
<b>Installing</b> Please wait while (	GNU Toolchain is being installed.	
Downloading Tool	chain.zip	
Show <u>d</u> etails		
	Connecting	
	Cancel	
	< <u>B</u> ack Next >	Cancel

## Figure 15. GNU Toolchain Installation (4/5)

GNU Tool chain installation complete.

8	GNU Toolchain Setup – 🗆 💌
	Completing GNU Toolchain Setup
	GNU Toolchain has been installed on your computer. Click Finish to close Setup.
5	
S	
	< Back Finish Cancel

Figure 16. GNU Toolchain Installation (5/5)

## **IDK Installation**

Double click on the installer downloaded from ON Semiconductor.

For 32 bit machines, install IDK Installer x86.exe. For 64 bit machines, install IDK Installer x86 64.exe



Figure 17. IDK Installation (1/5)

Read the license, check the box and click Next.



Figure 18. IDK Installation (2/5)

Choose the destination directory to install the IDK. *It is* recommended to have IDK installed under C:\OnSemiconductor or D:\OnSemiconductor.

If a previous workspace is being retained, then make sure that metadata folder inside Workspace directory is deleted.

	IDK Setup 🗕 🗖 📕
Choose Install Lo	ocation
Choose the folder	in which to install IDK.
Setup will install ID select another fold	K in the following folder. To install in a different folder, click Browse and ler. Click Next to continue.
Destination Fold	er
Destination Fold	-
	Browse 20.6MB
D:\OnSemicon Space required: 2:	Browse 20.6MB

Figure 19. IDK Installation (3/5)

	IDK Setup	- D ×
Installation Complete Setup was completed		
Completed		
Show <u>d</u> etails		
		<u>Close</u> Cancel

Figure 20. IDK Installation (4/5)

Once in is successfully installed, a shortcut will be created on the desktop.

Double click on the IDK shortcut on the desktop to launch the IDK IDE.

The ON Semiconductor splash screen will launch, followed by the Welcome Screen.

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Figure 21. IDK Installation (5/5)

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