# 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







J7: 1–2 to be shunted for I<sup>2</sup>C Mode selection J15: 1–2 to be shunted for I<sup>2</sup>C Mode selection J13: 1–2 to be shunted

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 C	ommunity	Technologies	Training
Java EE					
Java ME	Java SE Runtime	Environment	8 Dow	ploade	
Java SE Support	Do you want to run Java™ programs, or do you want to develop Java programs? If you want to run				
Java SE Advanced & Suite	Java programs, but not develop them, download the Java Runtime Environment, or JRE™.				
Java Embaddad					
Java Embeudeu	If you want to develop applications for Java, download the Java Development Kit, or JDK 14. The JDP includes the JRE, so you do not have to download both canadately.				
Java DB	includes the JKE, so you do not have to download both separately.				
Web Tier	JRE 8u101 Checksum				
Java Card	JRE 8u102 Checksum				
Java TV	Java	a SE Runtime	Enviro	nment 8u10	)1
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	Mac OS X	64 32	MB ire-8	u101-maccsx-x64	dma
	Solaris SPARC 64 bit	52	MB ire.8	u101.solaris.soar	cv9 tar oz
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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.

Thoose Compone Choose which fea	e <b>nts</b> tures of GNU Toolchain	you want to insta	all.	(
Check the compor Install. Click Next	nents you want to install to continue.	and uncheck the	e components you do	n't want to
Select component	s to install: 🛛 🗐 GNU	Toolchain	Description Position you over a com see its desc	ir mouse conent to ription.
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.

Choose Install Locatio Choose the folder in whi	<b>n</b> ch to install GNU Toolchain.	
Choose the folder in whi	ch to install GNU Toolchain.	
Setup will install GNU Too Browse and select anoth	olchain in the following folder. To install in a er folder. Click Install to start the installatio	different folder, dick n.
Destination Folder		
C:\Users\m1008129	Documents (GNUToolchain)	Browse
Space required: 420.0ME	3	
Space available: 3.9GB		

#### Figure 14. GNU Toolchain Installation (3/5)

Installer automatically downloads toolchain and installs.

6	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	
	< <u>B</u> ack <b><u>Finish</u> Cancel</b>

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 II select another fol	DK in the following folder. To install in a different folder, click Browse and der. Click Next to continue.
Destination Fold	er
Destination Fold	ler Iductor Browse
Destination Fold	er nductor Browse
Destination Fold	er nductor Browse 20.6MB 3.3GB
Destination Fold P:\OnSemicor Space required: 2 Space available: 5	ler nductor Browse 20.6MB 5.3GB
Destination Fold	ler Iductor Browse 20.6MB 5.3GB

Figure 19. IDK Installation (3/5)

	IDK Setup	- D ×
Installation Complete Setup was completed	e successfully.	
Completed		
Show <u>d</u> etails		
	< Back	Close

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.

	C/C++ - IDK	×
Eile	it Source Refactor Mavigate Search Project Examples Bun Window Help	
8	Welcome 🛙	å ⇔ ⇔ x* x* 🗄 ⇔ ø
10		<b>Source</b> Workbench
	Welcome to the OnSemi IOT Developme	ent Environment
	welcome to the onsemi for Developing	
	First Steps         Overview           Take your first steps         Get an overview of	the features
	Tutorials Samples Solution Try out the samples Try out the samples	s

Figure 21. IDK Installation (5/5)

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