



# TDK InvenSense Smart Motion Development Kit DK-46230/DK-46234 User Guide

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# 1 OVERVIEW

The **TDK DK-46230/DK-46234 Host Board** is a comprehensive development system for TDK InvenSense Motion Sensor devices. The platform designed around the Microchip SAM V71 MCU can be used for rapid evaluation and development of InvenSense sensor-based solutions. The platform integrates an on-board Embedded Debugger so external tools are not required to program or debug with the SAM V71 MCU. Each InvenSense motion sensor has its own unique development kit (DK).

The **TDK DK-46230/DK-46234 Host Board** comes with the necessary software, including an InvenSense Motion Link, a GUI-based development tool, and embedded Motion Drivers (eMD) for InvenSense motion sensors.

Embedded Motion Drivers (eMD) consists of a set of APIs to configure various aspects of the platform including motion sensor parameters such as full-scale range (FSR), output data rate (ODR), and sensor interface to host (UART, SPI).

Motion Link is a GUI-based development tool included with the platform. It can be used to capture and visualize the sensor data from the motion sensor.

The platform supports Atmel Studio and is compatible with Microchip Xplained Pro Extension boards. The Xplained Pro extension series evaluation kits offer additional peripherals to extend the features of the board and ease the development of customer designs.





# 2 INTRODUCTION

## 2.1 FEATURES OVERVIEW

- Microchip SAM V71 microcontroller with 2 MB Embedded Flash
- On-board Embedded debugger (EDBG) for programming and debugging
- Built in FTDI USB to UART interface for fast motion sensor data transfer
- USB connectors for host interface to software debug and data logging
- Board power supply through USB

## 2.2 PLATFORM OVERVIEW

The **TDK DK-46230/DK-46234 Host Board** is a hardware unit for TDK sensor product evaluation and algorithm software development. The platform offers flexible solutions for many different application developments.

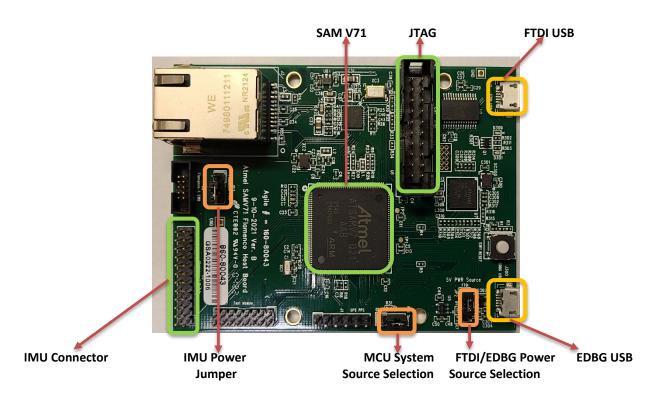


Figure 1. DK-46230/DK-46234 Host Board



## 2.2.1 Connectors

Table 1 details the connector and header reference names and descriptions.

Connector Names	Connector Ref#	Connector Function Descriptions
TDK Breakout Board Connector	J5	External Breakout Board Connector
JTAG Connector for SAM V71	CN1	JTAG Connector for SAM V71 debugging
FTDI USB	J2	USB connector for FTDI USB to serial UART interface
EDBG USB	J300	USB connector for flashing firmware
EDBG LED's	D300/D301	EDBG LEDs. D300 is green and D301 is yellow.
Power LED	D1	Red Light turns ON when supplied with power.
Reset Button	SW1	RESET Button: Hardware Reset for the Target MCU and EDBG MCU

#### Table 1. Connectors

## 2.2.2 Jumper Settings

Jumper	Description
JP1	JP1 is for system source selection. Only one jumper
	shunt is allowed.
	Jumper shunt on Pin 1/2: MCU
JP2	JP2 is for board power source selection. Only one jumper shunt is allowed.
	Jumper shunt on Pin 1/2: board power is from EDBG USB on J300
	Jumper shunt on Pin 2/3: board power is from FTDI USB on J2
JP3	JP3 is for Power

## Table 2. Jumpers

## 2.2.2.1 Configuration of Different Jumpers

To set the board to the MCU position, use jumper 1. To switch between FTDI and EDBG, use Jumper 2. Power comes from Jumper 3.





# 3 QUICK SETUP

## 3.1 USING EMD DEVELOPMENT ENVIRONMENT

This section explains how to start using the DK-46230 / DK-46234, update the firmware and install eMD drivers for the **DK-46230/DK-46234 Host Board** using Atmel Studio 7. This section also contains the simple installation instructions for Tera Term and the Industrial eMD Drivers.

For creating and debugging any AVR and SAM microcontroller applications, Atmel Studio 7 serves as the integrated development platform (IDP). To write, build, and debug your apps written in C/C++ or assembly code, you can use the Atmel Studio 7 IDP. Additionally, it effortlessly links to the development tools, programmers, and debuggers that support AVR and SAM devices. The interaction between Studio 7 and Atmel START for development has been improved. Re-configure and merge functionality in Studio 7 assist iterative development of START-based projects.

## 3.1.1 Getting Started

DK-46230 and DK-46234 come pre-programmed with eMD development environment, so the user can start discovering the features of the device immediately.

Steps to start exploring DK-46230/DK-46234:

- 1. Download FTDI driver from <u>Drivers FTDI (ftdichip.com)</u>.
- 2. Download Tera Term from <u>https://ttssh2.osdn.jp/index.html.en</u>.
- 3. Make sure that you connect the device to FTDI USB side, and your JP2 connection matches what is shown in Figure 4.
- 4. Follow the instructions on the next section to start exploring the platform.

## 3.1.2 Tera Term

- 1. Connect the Hardware module in DK-46230/DK-46234 Hardware Configuration eMD
- 2. Start Tera Term and select USB Serial Port, then click OK.

<u>vr</u>	Tera Term: New connection		×	×
File	O T CP/IP	Host: myhost.example.com	~	^
		History     Service: ○ Telnet     TCP port#: 22		Ľ
		• SSH SSH version: SSH2	$\sim$	
		O Other IP version: AUTO	$\sim$	
	Serial	Port: COM4: USB Serial Port (COM4)	$\sim$	L
	[	OK Cancel Help		v

Figure 2. New Connection Setting

3. Go to Setup -> Serial Port..., and the serial port configuration window will pop-up.





4. Select the Port that USB Serial is connected to and Type "3000000" in the "Speed" section.

ra Term: Serial port	t setup and co	nnection			>
Port:		COM4	~	New setting	
Speed:		3000000	~	3	
Data:		8 bit	$\sim$	Cancel	
Parity:		none	$\sim$		
Stop bits:		1 bit	$\sim$	Help	
Flow cont	trol:	none	$\sim$		
Transmit delay           0         msec/char         0         msec/line					
Device Friendly Name: USB Serial Port (COM4) Device Instance ID: FTDIBUS\VID_0403+PID_6001+AB0018XCA\0 Device Manufacturer: FTDI Provider Name: FTDI Driver Date: 8-16-2017 Driver Version: 2.12.28.0					

Figure 3. Serial Port Setup and connection

- 5. Then click on "New setting" to apply the configuration.
- 6. Press the software reset button on the board to see the command menu as shown in Figure 5.

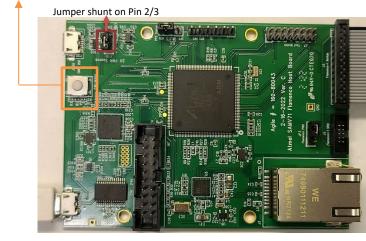


Figure 4. Software Reset Button



💆 COM12 - Tera Term VT
File Edit Setup Control Window Help
= IIM4623× Example for ATSAMU71Q21 (UART) = Compiled: Jul 7 2022 15:58:19
Resetting device IIM46234 is present
Press '' to read Whode Menu ====================================

Figure 5. Teraterm Instructions to capture Data

7. Press the "s" key to start data capturing, and press "p" to stop.

#### 3.1.3 Atmel Studio Requirements and Installation

- 1) Supported Operating Systems
  - Windows 7 Service Pack 1 or higher
  - Windows Server 2008 R2 Service Pack 1 or higher
  - Windows 8/8.1
  - Windows Server 2012 and Windows Server 2012 R2
  - Windows 10
- 2) Supported Architectures
  - 32-bit (x86)
  - 64-bit (x64)
- 3) Hardware Requirements
  - A computer that has a 1.6 GHz or faster processor
  - RAM
- o 1 GB RAM for x86
- $\circ$  2 GB RAM for x64  $\,$
- o An additional 512 MB RAM if running in a Virtual Machine
- 6 GB available hard disk space
- 4) Downloading and Installing
  - Download the latest Atmel Studio installer: <u>Atmel Studio 7</u>
    - The web installer is a small file (<10 MB) and will download specified components as needed.
  - Verify the hardware and software requirements from the "System Requirements" section
  - Make sure you have local administrator privileges





- Save all your work before starting. The installation might prompt you to restart if required.
- Disconnect all Atmel USB/Serial hardware devices
- Double-click the installer executable file and follow the installation wizard
- Once finished, the installer displays an option to **Start Atmel Studio after completion**. If you choose to open, then note that Atmel Studio will launch with administrative privileges, since the installer was either launched as administrator or with the elevated privileges.
- In Atmel Studio you may see an update notification (flag symbol) next to the Quick Launch field in the title bar. Here you may select and install updated components or device support.

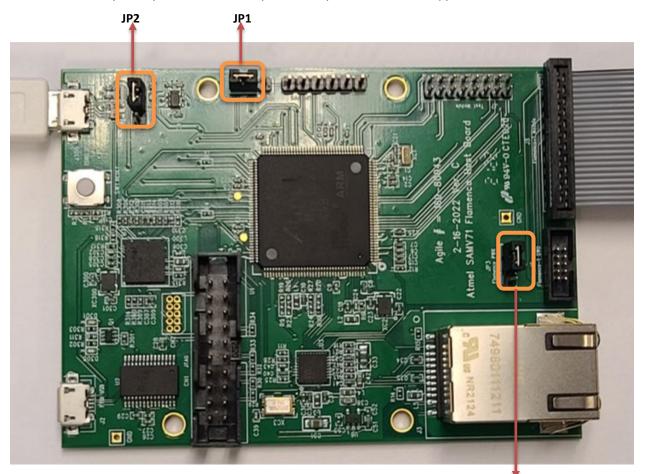


Figure 6. Hardware Configuration for eMD flashing

JP3





#### 3.1.4 Industrial eMD

The **TDK DK-46230/DK-46234** is compatible with Microchip Studio for updating and flashing the firmware. Connect the EDBG (Atmel Embedded Debugger) USB port with USB cable to PC.

- 1. Connect the host board to PC using USB micro type-B cable. Check if 'EDBG Virtual COM Port' exists at the Device Manager of PC.
- Start Atmel Studio 7.0, and select the project file IIM-4623X by File -> Open -> Project/Solution "Location of the project file"
- 3. Check if 'EDBG' is selected at the Tool section of 'Atmel Studio -> Project -> Properties' menu.
- 4. Select the menu Debug -> Start Without Debugging. Then Atmel Studio starts building and downloading. After finishes downloading, the example application starts running. After that, you can close Atmel Studio.

Build Events Toolchain Device EDBG • FFFFFFFFFFF Interface: SWD v Packs	Solution Explorer (Ctrl+ P - bution "IIM4623x" (1 project)
	-

Figure 7. Updating Firmware using Microchip Studio

5. For the serial communication between PC and the host board, a terminal program on PC (such as Tera Term) is required. Follow Tera Term installation in section 3.1.2 to see how to capture data.

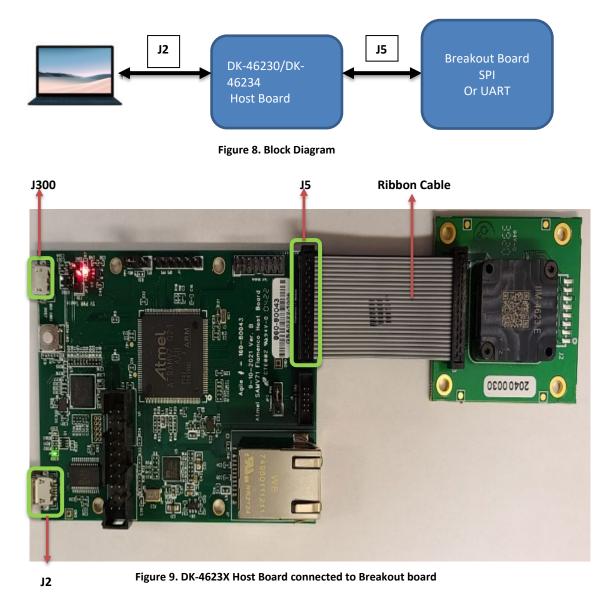


# 4 ADVANCED INFORMATION

## 4.1 USING INDUSTRIALMOTIONLINK EVALUATION SOFTWARE

This section is an installation guide for the IndustrialMotionLink Tool 1.0.0 data logger executable and shows how to use the IndustrialMotionLink tool in combination with <u>Atmel SAM V71 MCU boards</u>.

(1) Connect the FTDI USB (J2) to PC and open IndustrialMotionLink for quick testing, as shown in the block diagram in Figure 8.







## 4.1.1 Supported Devices

IndustrialMotionLink 1.0.0 supports the following InvenSense Motion devices on the Atmel MCU platform:

- <u>IIM-46230</u>
- <u>IIM-46234</u>

## 4.1.2 Installation

(1) Run the installer, IndSmartMotion\_1.0.0\_Installer.exe. Click on "More info."

Windows protected your PC	×
Microsoft Defender SmartScreen prevented an unrecognized app from starting. Running this app might put your PC at risk. More info	
Don't ru	n

Figure 10. Installation Prompt





## (2) Choose "Run anyway."



Figure 11. Installation Prompt





(3) It will prompt for the installation directory. Once the desired installation directory is selected, navigate to the next step by clicking "Next."

😽 Setup - Industrial Motionlink Platform version 1.0.0 🦳 –	_	$\times$
Select Destination Location Where should Industrial Motionlink Platform be installed?		
Setup will install Industrial Motionlink Platform into the follow	ving folder.	
To continue, click Next. If you would like to select a different folder,	click Browse.	
C:\TDK-InvenSense\Industrial Motionlink Platform 1.0.0	Browse	
At least 11.1 MB of free disk space is required.		
Next		Cancel

Figure 12. Destination Location





(4) Confirm that FTDI drivers are enabled. Click "Next."

😽 Setup - Industrial Motionlink Platform ve	rsion 1.0.0	—		$\times$
Select Additional Tasks Which additional tasks should be performed?				
Select the additional tasks you would like Set Motionlink Platform, then click Next.	tup to perform	while installing	Industri	al
External USB drivers				
Install FTDI drivers				
	Back	Next	Ca	ncel

Figure 13. Additional Drivers





(5) Verify the destination folder and start the installation by clicking "Install."

😽 Setup - Industrial Motionlink Platform version 1.0.0	—		$\times$
Ready to Install Setup is now ready to begin installing Industrial Motionlink Pla computer.	atform on y	our	
Click Install to continue with the installation, or click Back if yo change any settings.	ou want to i	review or	
Destination location: C:\TDK-InvenSense\Industrial Motionlink Platform 1.0.0			^
Additional tasks: External USB drivers Install FTDI drivers			
			~
<		>	
Back	Install	Ca	ancel

Figure 14. Verify Destination and Drivers

(6) Wait for the installation to complete and once done, click "Finish."

😽 Setup - Industrial Motionlink Platform version 1.0.0

Completing the Industrial Motionlink Platform Setup Wizard
Setup has finished installing Industrial Motionlink Platform on your computer. The application may be launched by selecting the installed shortcuts.
Click Finish to exit Setup.
Finish

—

Figure 15. Successful Completion





## 4.1.3 Starting the IndustrialMotionLink 1.0.0 Application

(1) Navigate to the IndustrialMotionLink shortcut on the desktop and run the executable, IndustrialMotionLink.exe.



Figure 16. Starting IndustrialMotionLink





## 4.1.4 Connecting Sensor Boards

(1) Start IndustrialMotionLink from the Platform.

Select SmartMotio	n Platform to use
Enable eMD Software	MotionLink Software
Select firmware: Browse Flash eMD Firmware Start eMD	Start MotionLink
Hardware	Details

Figure 17. Start Window of IndustrialMotionLink

- (2) Once IIM-46230/IIM-46234 Breakout Board is connected through J5 COM port, it shows up under "Serial port."
  - a. If the board needs to be initialized with a firmware, click "Flash MCU Firmware." Otherwise, skip this and go to the next step.

🚳 Industrial MotionLink 1.0.0 Release	-		×
Eile Help			
Flash MCU Firmware Select and Configure Sensor Board			
Firmware Boards			
Serial port COM44 · Connect	3	A      A  A     A   A   A   A   A   A   A   A   A   A   A   A   A   A   A	
Auto connect			
7			Ŧ
Console			
Industrial MotionLink 1.0.0 Release Board description found in 'data\IIM46234'			
1 board(s) found			
Using class 'InvGUI.Board_IIM46234' from C:\TDK-InvenSense\Industrial Motionlink Platform 1.0.0\data\IIM46234\Bo	ard_IIM4	16234.cs	

## Figure 18. Flashing the MCU Firmware





(3) Add the configuration to match the board that is connected by clicking, "Select and Configure Sensor Board." In this example, <u>IIM-46230/IIM-46234 Breakout Board</u> is connected to the host board, so the appropriate configuration is selected.

🚳 Industrial MotionLink 1.0.0 Release	_		×
Eile Help			^
Lue Teb			
Flash MCU Firmware Select and Configure Sensor Board			
Firmura			
Boards	_	_	
Serial port COM44 V Connect		×	
Auto connect			
			_
			=
Console			
Industrial MotionLink 1.0.0 Release			
Board description found in 'data\IIM46234' 1 board(s) found			
[] board(5) found Using class 'InvGUI.Board_IIM46234' from C:\TDK-InvenSense\Industrial Motionlink Platform 1.0.0\data\IIM46234\B	oard IIM	46234.cs	

Figure 19. Selecting and Configuring Sensor Board

(4) Select the sensor board configuration that matches the connected sensor board as shown below. Enable appropriate "Settings" and click "Ok."

		-		×
IIM46234 1				
IIM-46234				~
6-axis (Gyro + Acce	l) sensor			
Settings				
	SPI		~	
ODR (Hz):	10		~	
Accel FSR:	2		~	
Gyro FSR:	250		~	
		_		$\sim$
	Cancel		Ok	
	IIM-46234 6-axis (Gyro + Acce Settings Interface: ODR (Hz): Accel FSR:	IIM-46234 6-axis (Gyro + Accel) sensor Settings Interface: SPI ODR (Hz): 10 Accel FSR: 2 Gyro FSR: 250	IIM-46234 6-axis (Gyro + Accel) sensor Settings Interface: SPI ODR (Hz): 10 Accel FSR: 2 Gyro FSR: 250	IIM46234 1 IIM-46234 6-axis (Gyro + Accel) sensor Settings Interface: SPI v ODR (Hz): 10 v Accel FSR: 2 v Gyro FSR: 250 v

Figure 20. Configuration of Sensor Board





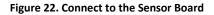
(5) To remove a sensor board configuration from the data logger, click the  $\checkmark$  button.

🚳 Industrial N	MotionLink 1.0.0 Relea	ase				- 0	$\times$
<u>F</u> ile <u>H</u> elp							
Flash MCU F	irmware		Select and Configure Sen				
Firmware			Boards			_	
Serial port	COM44 ~	Connect	IIM46234				
		Auto connect					ove Board
							=
<ul> <li>Console</li> </ul>							
Industrial /	MotionLink 1.0.0 F	Release					
	iption found in 'c	data\IIM46234'					
1 board(s)		M46234' from C:\TDK	-InvenSense\Industrial	Motionlink Platfo	rm 1.0.0\data\TTM46234	Noard TTM46234	<u></u>
			-InvenSense\Industrial				
			-InvenSense\Industrial				

Figure 21. Configuration of Sensor Board

(6) Adding the board configuration, click on "Connect" to connect to the Sensor Board after selecting the proper COM port.

S Industrial MotionLink 1.0.0 Release	-		$\times$
<u>Eile</u> <u>H</u> elp			
Flash MCU Firmware Select and Configure Sensor Board			
Firmware Serial port COM44 Connect Boards IM46234 IM46234 Image Im		* ^	
			-
⊙ Console			
Industrial MotionLink 1.0.0 Release Board description found in 'data\IIM46234'			
1 board(s) found			
Using class 'InvGUI.Board_IIM46234' from C:\TDK-InvenSense\Industrial Motionlink Platform 1.0.0\data\IIM46234\Bo Using class 'InvGUI.Board_IIM46234' from C:\TDK-InvenSense\Industrial Motionlink Platform 1.0.0\data\IIM46234\Bo	ard_IIM	146234.c	5
Using class 'InvGUI.Board_IIM46234' from C:\TDK-InvenSense\Industrial Motionlink Platform 1.0.0\data\IIM46234\Bo	ard_IIM	46234.0	5







## 4.1.5 Starting the Data Capture

(1) After adding the configuration, click on the e button to initialize the board. After initialization, a set of tabs opens in the main window as shown below.

ile <u>H</u>	elp									
Flash I	MCU Fir	mware			Sele	ct and Conf	igure Sensor Board	t l		
Firmw	vare				Boa	rde	-			
Seria	port	COM44	~	Disconnect		146234			•	~
		comm				140234				
			[	Auto conn	lect			_		
M4623	4 Table	IIM46234 G	iyroscope	IIM46234 A	ccelerometer	IIM46234	Temperature			
og file	IIM4	6234_Table_	log.csv							Enable
ndex A	ccel X (	a) Accel Y (a)	Accel Z (	a) Gyro X (dp	s) Gyro Y (dps	) Gyro Z (dp	s) Temperature			
	0.0734	0.0754	0.9902	0.0876	-0.6482	0.4913	32.0045			
1719	0.0736	0.0753	0.9904	0.0939	-0.6516	0.4829	32.0492			
172 0	0.0738	0.0753	0.9906	0.0903	-0.6458	0.5004	32.0255			
72 0	0.0739	0.075	0.9906	0.0821	-0.636	0.5125	32.0005			
172: 0	0.0741	0.0747	0.9907	0.0837	-0.6331	0.5165	32.0071			
72: 0	0.0743	0.0742	0.9906	0.0938	-0.6312	0.5152	31.9755			
172 <sup>,</sup> (	0.0746	0.0736	0.9905	0.0928	-0.6398	0.5156	31.9256			
172: 0	0.0748	0.0731	0.9904	0.0963	-0.6381	0.5213	31.9295			
	0.0747	0.0727	0.9903	0.0957	-0.64	0.5106	31.9874			
	0.0746	0.0725	0.9902	0.1008	-0.6411	0.5102	32.0242			
)70onf	ഒ∂€44	0.0725	0.9902	0.1081	-0.6538	0.5021	32.0886			
	d(s) fo									
								link Platform 1.0.0\data\II		
								link Platform 1.0.0\data\II link Platform 1.0.0\data\II		
		INK000022								
IPE '	MOTIONI	INK000022	74' wait	s for conne	ction					
ope										
					C:\TDK-Inve	nSense\Ind	dustrial Motion	link Platform 1.0.0\data\II	M46234\Board_IIM46	234.cs
	#0 11 IM46234	EM46234' (9	SP1,4,0)	opened						
sit T										

Figure 23. Capturing Data





## 4.1.6 Viewing the Data

Once the data logging has started, click on the tabs above to view the data.

(1) The "... Table" tab shows the live Gyroscope (X, Y, Z) and Accelerometer (X, Y, Z) values. You can choose to log the captured data to a text file.

Flash Me											
	CI I Eire										
Firmwa		liware			Sele	ct and Conf	igure Sensor Board				
	ire				Boa	rds					
Serial p	port	COM44	$\sim$	Disconnect	IIN	146234		😂 🕛 🔳	2	2	
			[	Auto conne	ect			Sale [			
446224	Table	110446224		UN446224 A.		1114462243	<b></b>				
	-			IIM46234 Ac	celerometer	1111/146234	Temperature			-	
g file	IIM4	6234_Table_	iog.csv							Ena	ы
dex Acc	cel X (g	g) Accel Y (g	) Accel Z (	g) Gyro X (dps	) Gyro Y (dps)	Gyro Z (dp	s) Temperature				
71: 0.0	0734	0.0754	0.9902	0.0876	-0.6482	0.4913	32.0045				
71: 0.0	0736	0.0753	0.9904	0.0939	-0.6516	0.4829	32.0492				
72 0.0	0738	0.0753	0.9906	0.0903	-0.6458	0.5004	32.0255				
72 0.0	0739	0.075	0.9906	0.0821	-0.636	0.5125	32.0005				
72: 0.0	0741	0.0747	0.9907	0.0837	-0.6331	0.5165	32.0071				
72: 0.0	0743	0.0742	0.9906	0.0938	-0.6312	0.5152	31.9755				
72, 0.0	0746	0.0736	0.9905	0.0928	-0.6398	0.5156	31.9256				
72: 0.0	0748	0.0731	0.9904	0.0963	-0.6381	0.5213	31.9295				
72 0.0		0.0727	0.9903	0.0957	-0.64	0.5106	31.9874				
72 0.0		0.0725	0.9902	0.1008	-0.6411	0.5102	32.0242				
7Con9d	໓₹44	0.0725	0.9902	0.1081	-0.6538	0.5021	32.0886				

Figure 24. Combined tabular representation of Accel, Gyro, and Temperature data





(2) The "... Gyroscope" tab shows the Gyroscope (X, Y, Z) data in graphical representation. When the "DPS" button is selected, the Y-axis units get converted from raw data (LSB) to "DPS" (Degrees Per Second).



Figure 25. Graphical representation of Gyroscope Values

(3) The "... Accelerometer" tab shows the Accelerometer (X, Y, Z) data in graphical representation. When the "g" button is selected, the Y-axis units get converted from raw data (LSB) to "g" (unit of acceleration).

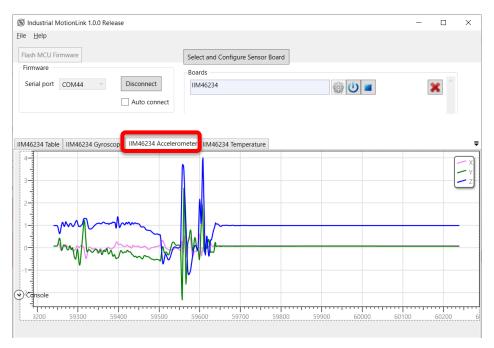


Figure 26. Graphical representation of Accelerometer Values





## 4.1.7 Storing the Data

(1) Additionally, you can choose to save the data by selecting a path/filename and clicking "Enable" to log the data to a file.

R. Inde	and all had	at and talk the	0.0 Release									_		×
-		DTIONLINK I.	0.0 Kelease									-	U	~
le H	eip													
Flash I	MCU Fin	mware			s	elect and Conf	gure Sensor Board							
Firmw	vare						5							
<i>.</i> .						Boards			_					
Seria	l port	COM4	~	Disconnect		IIM46234		ا 🕑 🎲		× ^				
				Auto conn	ect									
													_	
				IIM46234 A	celeromet	er   IIM46234 1	emperature						F	
.og file	IIM4	6234_Table	_log.csv										E	nabl
ndex A	ccel X (g	) Accel Y (g	g) Accel Z (g	g) Gyro X (dp:	s) Gyro Y (d	dps) Gyro Z (dp	s) Temperature						-	
702'	0.0005	0.0014	1.0034	-0.5153	-0.5298	0.3898	26.4327							
702' -	-0.0006	0.0014	1.0037	-0.5176	-0.5297	0.3887	26.4327							
702: -	-0.0006	0.0013	1.0039	-0.5315	-0.537	0.4011	26.4472							
	-0.0007	0.0015	1.0039	-0.5299	-0.5521	0.4002	26.4104							
	-0.0008	0.0015	1.0038	-0.5437	-0.552	0.3925	26.4353							
	-0.0009	0.0016	1.0036	-0.5277	-0.552	0.365	26.4117							
	-0.001	0.0017	1.0033	-0.519	-0.545	0.3632	26.4432							
	-0.0011	0.0016	1.0031	-0.5154	-0.5302		26.4827							
	-0.001	0.0015	1.003	-0.4898	-0.5224		26.4366							
	-0.0008	0.0015	1.0031	-0.4898	-0.5226		26.4327							
	-0.0006	0.0015	1.0032	-0.4867	-0.5299		26.4182							
	-0.0004	0.0016	1.0034	-0.5051	-0.5379		26.4695							
•) Con	-0.0004 sole	0.0016	1.0034	-0.5266	-0.5452	0.3727	26.4629							
58000	13:59:3	7.79												
	13:59:4													
50000	13:59:4	2.85												
	13:59:4													
	13:59:4 13:59:4													
	13:59:4													
	13:59:5													
	13:59:5													
	13:59:5													
	13:59:5 13:59:5													
	13:59:5													

Figure 27. Enabling Data Storage

(2) To stop saving the data to a file, press the "Disable" button.

114         -0.009         0.014         1.002         -0.5129         0.3857         26.438           114         -0.011         1.002         -0.5124         -0.5143         0.3767         26.483           114         -0.011         1.002         -0.5243         -0.5143         0.3767         25.504           114         -0.011         0.008         1.0028         -0.5342         -0.564         25.024           114         -0.011         0.008         1.0038         -0.5371         0.5248         25.014           114         -0.011         0.001         1.002         -0.547         0.3564         25.503           114         -0.011         0.011         1.002         -0.547         -0.549         0.3564         25.509           114         -0.011         0.011         1.002         -0.527         0.3549         25.509           114         -0.011         0.012         1.002         -0.549         0.3578         2.5709           114         -0.011         0.012         1.002         -0.549         0.3759         2.5403           114         -0.011         0.012         1.002         -0.449         -0.5788         0.3762         2.54									
Invate           Invate           Invate           Disconset           Disconset         Disconset           Imv46234         Imv6234         I	ł	n MCU Fin	mware			Sala	et and Configure Sent	Roard	
erial port ONM Disconnect Auto connect MM46234 Gyroscope MM46234 Accelerometer MM46234 Temperature file IM46234 Gyroscope MM46234 Accelerometer MM46234 Temperature file IM46234 Table log crv  ex Accel X (g) Accel X (g) Gyro X (dp) Gyro Y (dp) Gyro Z (dps) Temperature 4 -00008 0.0016 1.0025 -0.5022 -0.5376 0.3832 26.4104 4 -0.0001 0.0011 1.0023 -0.5234 -0.5143 0.3746 26.4853 4 -0.0011 0.0011 1.0026 -0.5182 -0.5049 0.3574 26.5041 4 -0.0011 0.0011 1.0025 -0.5242 -0.5143 0.3746 26.4853 4 -0.0011 0.0011 1.0023 -0.5247 -0.5143 0.3544 26.5091 4 -0.0011 0.0011 1.0032 -0.5247 -0.5490 0.3594 26.5091 4 -0.0011 0.0011 1.0032 -0.5247 -0.5498 0.3574 26.5491 4 -0.0011 0.0011 1.0032 -0.5247 -0.5498 0.3574 26.509 4 -0.0011 0.0011 1.0032 -0.5247 -0.5498 0.3574 26.509 4 -0.0011 0.0011 1.0032 -0.5247 -0.5498 0.3574 26.509 4 -0.0011 0.0011 1.0032 -0.5247 -0.5498 0.3574 26.509 4 -0.0011 0.0011 1.0032 -0.5247 -0.5498 0.3574 26.509 4 -0.0011 0.0011 1.0032 -0.5247 -0.5498 0.3574 26.509 4 -0.0011 0.0011 1.0032 -0.5257 -0.5158 0.3712 26.4603 4 -0.0011 0.0011 1.0032 -0.5247 -0.5498 0.3574 26.509 4 -0.0011 0.0011 1.0032 -0.5257 -0.5758 0.3729 26.4603 4 -0.0011 0.0011 1.0032 -0.5279 0.3578 0.3579 26.4603 4 -0.0011 0.0011 1.0032 -0.5299 0.3578 0.3719 26.4603 4 -0.0011 0.0011 1.0032 -0.5299 0.3578 0.3719 26.4603 4 -0.0011 0.0011 1.0032 -0.5299 0.3578 0.3719 26.4603 4 -0.0011 0.0011 1.0032 -0.5299 0.3598 0.3710 26.4603 4 -0.0011 0.0011 1.0032 -0.5299 0.3598 0.3710 26.4603 4 -0.0011 0.0011 1.0032 -0.5299 0.3548 0.3544 26.5181 4 -0.0011 0.0011 1.0032 -0.5299 0.3548 0.3710 26.4603 4 -0.0011 0.0011 1.0032 -0.5299 0.3598 0.3710 26.4603 4 -0.0011 0.0011 1.0032 -0.5299 0.3548 0.3710 26.4603 4 -0.0011 0.0011 1.0032 -0.5299 0.3548 0.3613 26.4695 -0.0012 0.0012 1.0025 -0.4826 0.5583 0.3713 26.4695 -0.0010 0.0012 1.0025 -0.4826 0.5583 0.3713 26.4695 -0.0011 0.0012 1.0025 -0.4826 0.5583 0.3713 26.4695 -0.0011 0.0012 1.0025 -0.4826 0.5583 0.3713 26.4695 -0.0011 0.0012 1.0025 -0.4825 0.5583 0.3713 26.4695 -0.0012 0.0012 1.0025 0.414 -0.0110 0.011 1.0032 0.5								Joana	
M46224 Table         MM46234 Gyroscope         MM46234 Accelerometre         MM46234 Temperature           org file         MM46234, Table_Log.cv         IM46234, Table_Log.cv         IM46234, Table_Log.cv           vdex Accel X (g) Accel Y (g) Accel Z (g) Gyro X (dpx) Gyro Y (dpx) Gyro Z (dpx) Temperature         IM46234, Table_Log.cv           vdex Accel X (g) Accel Y (g) Accel Z (g) Gyro X (dpx) Gyro Y (dpx) Gyro Z (dpx) Temperature         IM46234, Table_Log.cv           vdex Accel X (g) Accel Y (g) Accel Z (g) Gyro X (dpx) Gyro Y (dpx) Gyro Z (dpx) Temperature         IM46234, Table_Log.cv           vdex Accel X (g) Accel Y (g) Accel Z (g) Gyro X (dpx) Gyro Y (dpx) Gyro Z (dpx) Temperature         Image: Comperature           vdex Accel X (g) Accel Y (g) Accel Z (g) Gyro X (dpx) Gyro Y (dpx) Gyro Z (dpx) Temperature         Image: Comperature           vdex Accel X (g) Accel Y (g) Accel Z (g) Gyro X (dpx) Gyro Y (dpx) Gyro Z (dpx) Temperature         Image: Comperature           vdex Accel X (g) Accel Y (g) Accel Z (g) Gyro X (dpx) Gyro Y (dpx) Gyro Z (dpx) Temperature         Image: Comperature           vdex Accel X (g) Accel Y (g) Accel Z (g) Gyro X (dpx) Gyro Y (dpx) Gyro Z (dpx) Temperature         Image: Comperature           vdex Accel X (g) Acc				_					
M46234         Table         IIM46234         Gyroscepe         IIM46234         Accelerometer         IIM46234         Temperature           M46234         Table         Iog         Iom         Io	Ser	ial port	COM4	~	Disconnect	IIN	146234	🌐 🕛 🔳	× ^
Optimization         Mid40234_Table_log.cv/           Idex Accel X (g) Accel Y (g) Accel Z (g) Gyro X (dpx) Gyro Y (dpx) Gyro X (dpx) Femperature           Idex Accel X (g) Accel Y (g) Accel Z (g) Gyro X (dpx) Gyro X (dp					Auto conne	ect			
Optimization         Mid40234_Table_log.cv/           Idex Accel X (g) Accel Y (g) Accel Z (g) Gyro X (dpx) Gyro Y (dpx) Gyro X (dpx) Femperature           Idex Accel X (g) Accel Y (g) Accel Z (g) Gyro X (dpx) Gyro X (dp									
Optimization         Mid40234_Table_log.cv/           Idex Accel X (g) Accel Y (g) Accel Z (g) Gyro X (dpx) Gyro Y (dpx) Gyro X (dpx) Femperature           Idex Accel X (g) Accel Y (g) Accel Z (g) Gyro X (dpx) Gyro X (dp									
Optimization         Mid40234_Table_log.cv/           Idex Accel X (g) Accel Y (g) Accel Z (g) Gyro X (dpx) Gyro Y (dpx) Gyro X (dpx) Femperature           Idex Accel X (g) Accel Y (g) Accel Z (g) Gyro X (dpx) Gyro X (dp									
Accel X (g)         Accel Y (g)         Accel Z (g)         Gyro Y (dp)         Gyro Y (dp) <thgyro (dp)<="" th="" y=""> <thgyro (dp)<="" th="" y=""></thgyro></thgyro>					IIM46234 Ac	celerometer	IIM46234 Temperatur		
114         -0.000         0.0016         1.0025         -0.5376         0.3832         2.64.104           114         -0.0009         0.0014         1.0023         -0.5129         -0.3877         2.64.38           114         -0.001         1.0023         -0.5124         -0.5143         0.3766         2.64.83           114         -0.001         1.0026         -0.5328         -0.5143         0.3746         2.64.83           114         -0.001         0.0008         1.0026         -0.5328         -0.5676         0.3771         2.56.04           114         -0.0011         0.008         1.0038         -0.577         -0.5148         0.3684         2.65.01           114         -0.0011         0.0013         1.0537         -0.5149         0.3684         2.65.08           114         -0.0011         0.0011         1.0032         -0.5247         -0.5249         0.3594         2.65.08           114         -0.011         0.0012         1.0029         -0.4792         -0.5758         0.3772         2.54.603           114         -0.011         0.012         1.0027         -0.4422         -0.5758         0.3762         2.64.708           114         -0.0110 <td>Log fil</td> <td>le IIM4</td> <td>6234_Table</td> <td>_log.csv</td> <td></td> <td></td> <td></td> <td></td> <td></td>	Log fil	le IIM4	6234_Table	_log.csv					
114         -0.009         0.014         1.002         -0.512         -0.529         0.3857         26.438           114         -0.011         1.002         -0.5124         -0.5143         0.3764         26.4853           114         -0.011         1.0023         -0.5124         -0.5143         0.3764         26.4853           114         -0.011         1.0028         -0.5324         -0.5640         0.3771         26.5024           114         -0.0011         0.008         1.0031         -0.5434         0.3564         26.501           114         -0.0011         0.0011         1.0052         -0.5247         -0.5448         0.3554         25.604           114         -0.0011         0.0012         1.0052         -0.5247         -0.5448         0.3554         25.608           114         -0.0011         0.0012         1.0052         -0.5276         0.3711         26.4003           114         -0.0011         0.0012         1.0029         -0.4942         -0.5758         0.3729         26.4003           114         -0.0010         0.0013         1.0027         -0.4424         -0.5758         0.3762         26.4708           114         -0.0101	Index	Accel X (	a) Accel Y (g	) Accel Z (	(g) Gyro X (dps	) Gyro Y (dps	) Gyro Z (dps) Tempera	e	
114         -0.001         0.0011         1.002         -0.524         -0.5143         0.3746         26.4853           114         -0.0011         0.001         1.002         -0.5282         -0.567         0.3711         25.024           114         -0.0011         0.008         1.0026         -0.5382         -0.567         0.3711         25.024           114         -0.0011         0.008         1.0028         -0.577         -0.5148         0.3684         25.011           114         -0.0011         0.0011         1.0022         -0.5274         -0.5480         0.3594         25.698           114         -0.0011         0.0012         -0.527         -0.5158         0.3711         25.4603           114         -0.0011         0.012         1.0029         -0.499         -0.5758         0.3702         26.4603           114         -0.0011         0.012         1.0029         -0.4942         -0.5758         0.3762         26.4708           114         -0.011         0.013         1.0027         -0.4442         -0.5688         0.3762         26.4708           114         -0.0112         1.0027         -0.4426         -0.5768         0.3813         26.4695	114-	-0.0008	0.0016	1.0025	-0.5022	-0.5376	0.3832 26.410		
114 $0.0011$ 1.002 $0.5382$ $0.5067$ $0.3771$ $265024$ 114 $0.0011$ 1.0028 $0.5372$ $0.5143$ $0.3684$ $25501$ 114 $0.0011$ 1.0028 $0.5377$ $0.5264$ $25501$ 114 $0.0011$ 1.0032 $0.5377$ $0.5268$ $25503$ 114 $0.0011$ 1.0032 $0.5247$ $0.5449$ $0.3594$ $25509$ 114 $0.0011$ 1.0032 $0.5578$ $0.3702$ $254603$ 114 $0.0011$ 1.0029 $0.4994$ $0.5758$ $0.3702$ $264603$ 114 $0.0011$ 1.0027 $0.4942$ $-0.5758$ $0.3762$ $264708$ 114 $0.0012$ 1.0027 $0.4942$ $-0.5683$ $0.3762$ $264708$ 114 $0.0012$ 1.0027 $0.4942$ $-0.5683$ $0.3782$ $264708$ 114 $0.0012$ 1.0027 $0.4942$ $0.5758$ $0.3761$ $264708$	114-	-0.0009	0.0014	1.0023	-0.5192	-0.5299	0.3857 26.438		
114         -0.0011         0.0008         1.0028         -0.5377         -0.5143         0.3664         26.5011           114         -0.0011         0.0018         1.0511         -0.5436         0.3664         26.5011           114         -0.0011         0.0011         1.0021         -0.5437         -0.5448         0.3584         26.5081           114         -0.0011         0.0011         1.0022         -0.5247         -0.5448         0.3594         26.5089           114         -0.0011         0.0011         1.0029         -0.494         -0.5758         0.3729         26.4603           114         -0.0011         0.012         1.0029         -0.4942         -0.5758         0.3762         26.518           114         -0.0011         0.013         1.0027         -0.4942         -0.5758         0.3762         26.4708           114         -0.0112         0.0027         -0.4942         -0.5683         0.3782         26.4708           114         -0.012         1.0027         -0.4942         -0.5589         0.3813         26.4695           114         -0.012         1.0027         -0.4942         -0.5599         0.3648         26.4143	114-	-0.001	0.0011	1.0023	-0.5234	-0.5143	0.3746 26.485		
114         -0.0011         0.0008         1.0031         -0.5437         -0.5296         0.3628         26.5431           114         -0.0011         0.0022         -0.5247         -0.5440         0.3544         25.089           114         -0.0011         1.0022         -0.574         -0.5749         0.3741         26.4603           114         -0.0011         0.0012         1.0029         -0.499         -0.5759         0.3729         26.4603           114         -0.0011         0.0012         1.0029         -0.4942         -0.5759         0.3729         26.4603           114         -0.0011         0.0012         1.0029         -0.4942         -0.5759         0.3762         26.5181           114         -0.0011         0.0013         1.0027         -0.4942         -0.5583         0.3762         26.4708           114         -0.0011         0.0012         1.0025         -0.4842         -0.5683         0.3762         26.4708           114         -0.0012         1.0025         -0.4826         -0.5683         0.3761         26.4695           /yc	114-	-0.0011	0.001	1.0026	-0.5382	-0.5067	0.3771 26.5024		
114         -0.001         1.0032         -0.5247         -0.5449         0.3594         26.5089           114         -0.0011         1.0032         -0.5278         0.3711         26.4603           114         -0.0011         0.0012         1.0032         -0.5528         0.3711         26.4603           114         -0.0011         0.0012         1.0029         -0.494         -0.5788         0.3706         26.5181           114         -0.0011         0.0012         1.0027         -0.4942         -0.5683         0.3762         26.4708           114         -0.0012         0.0027         1.0027         -0.4942         -0.5683         0.3762         26.4708           114         -0.011         0.0121         1.0027         -0.4942         -0.5683         0.3762         26.4708           114         -0.012         1.0027         -0.4942         -0.5683         0.3761         26.4708           114         -0.012         1.0027         -0.4942         -0.5683         0.3781         26.4695           114         -0.012         1.0025         -0.4926         -0.5683         0.3813         26.4695           114         -0.011         1.0026         -0.512 <td>114-</td> <td>-0.0011</td> <td>0.0008</td> <td>1.0028</td> <td></td> <td></td> <td></td> <td></td> <td></td>	114-	-0.0011	0.0008	1.0028					
114:         -0.0011         1.0032         -0.5078         -0.5528         0.3711         26.4603           114:         -0.0011         0.0012         1.0029         -0.499         -0.5758         0.3729         26.4603           114:         -0.0011         0.0012         1.0029         -0.4942         -0.5758         0.3701         26.2518           114:         -0.0011         0.0013         1.0027         -0.4942         -0.5788         0.3762         26.4708           114:         -0.0012         0.0027         -0.4942         -0.5588         0.3762         26.4708           114:         -0.0012         0.0027         -0.4942         -0.5589         0.3813         26.4695           -0.942         0.012         1.0027         -0.4942         -0.5599         0.3648         26.4143	114-	-0.0011	0.0008	1.0031	-0.5437				
114 -0.0011 0.0012 1.0029 -0.499 -0.5758 0.3729 26.4603 114 -0.0013 0.0012 1.0029 -0.4942 -0.5758 0.3706 26.5181 114 -0.0011 0.0013 1.0027 -0.4942 -0.5683 0.3762 26.4708 114 -0.0012 0.0012 1.0025 -0.4826 -0.5683 0.3813 26.4695 1.46_0.0010011 0.0012 1.0026 -0.512 -0.5599 0.3648 26.4143	114-								
114 -0.0013 0.0012 1.0029 -0.4942 -0.5758 0.3706 26.5181 114 -0.0011 0.0013 1.0027 -0.4942 -0.5683 0.3762 26.4708 114 -0.0012 0.0012 1.0025 -0.4826 -0.5683 0.3813 26.4695 51400011 0.0012 1.0026 -0.512 -0.5599 0.3648 26.4143	114								
114 - 0.0011 0.0013 1.0027 - 0.4942 - 0.5683 0.3762 26.4708 114 - 0.0012 0.0012 1.0025 - 0.4826 - 0.5483 0.3313 264695 1.44	114								
114 -0.0012 0.0012 1.0025 -0.4826 -0.5683 0.3813 26.4695 114 -0.0011 0.0012 1.0026 -0.512 -0.5599 0.3648 26.4143	114								
140.0011 0.0012 1.0026 -0.512 -0.5599 0.3648 26.4143	114								
•) Console	114								
(+ 0.00+ 0.00+ +0.007 0.555 0.557 0.557 0.5570	A14	-0.0011 nsole							
	1	0.001	0.0011	4 0007	0.5460	0.550	0.0000 00.000		
03000 14:01:03.26 04000 14:01:05.29									
	10600	0 14:01	08.77						
04000 14:01:05.29									
04000 14:01:05.29 Ø5000 14:01:07.07 06000 14:01:08.77 07000 14:01:10.56									
04000 14:01:05.20 0500 14:01:07.07 05000 14:01:08.77 07000 14:01:10.56 08000 14:01:12.41									
44400 14:81:95.39 95000 14:01:87.07 97800 14:01:10.56 08000 14:01:12.41									
A4000 14:01:05.29 64000 14:01:07.07 64000 14:01:08.77 67000 14:01:08.56 68000 14:01:18.74 68000 14:01:18.74 68000 14:01:18.74									
44400 14:81:95.39 95000 14:01:87.07 97800 14:01:10.56 08000 14:01:12.41				le_log.c	sv' opened.				
44000 14:81:95.79 95000 14:81:95.70 97000 14:01:10.56 98000 14:81:14.71 90000 14:81:14.71 10000 14:01:16.61									
A4600 14:01:05.29 64600 14:01:05.70 64600 14:01:05.77 87600 14:01:10.56 64600 14:01:11.2.41 69600 14:01:11.2.41 10600 14:01:11.6.1 11600 14:01:11.6.3									







#### 4.1.8 Notes / Known issues / Future updates

- For the "Flash Atmel" option, you must select the correct firmware version, and as of 1.0.0, IndustrialMotionLink does not issue a warning if the incorrect firmware version is used.
- Future releases will provide further device support.
- IndustrialMotionLink Software does not identify devices with COM port numbers of less than 10. To manually change the COM port number, follow these steps:
  - 1) Search for Device Manager in Taskbar at the bottom of the Windows Screen.

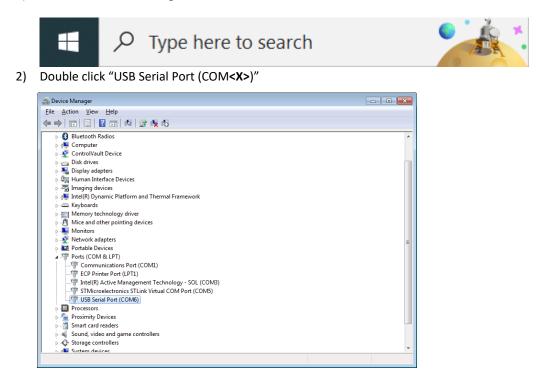


Figure 29. Device Manager

3) Go to "Port Settings" tab, and click "Advanced."

USB Serial Port (COM6) Properties
General Port Settings Driver Details
Bts per second: 9600 ▼ Data bits: 8 ▼ Parity: None ▼ Stop bits: 1 ▼
Fow control: None
Advanced Bestore Defaults
OK Cancel

Figure 30. USB Port Settings





4) In the "Advanced Settings for COM<**X**>" window, select "COM Port Number" drop-down options and pick an available COM port number that is greater than 10.

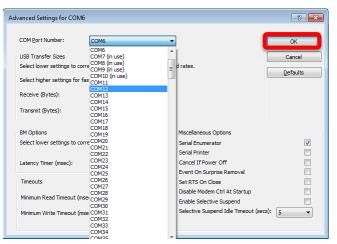


Figure 31. Advanced Settings

5) Click "OK" on all the screens after selection.

Advanced Settings for COM6		? 💌
	_	
COM Port Number: COM12	- [	ОК
USB Transfer Sizes		Cancel
Select lower settings to correct performance problems at low b	aud rates.	Defaults
Select higher settings for faster performance.		
Receive (Bytes): 4096 🔻		
Transmit (Bytes):		
BM Options	Miscellaneous Options	
Select lower settings to correct response problems.	Serial Enumerator	
	Serial Printer	
Latency Timer (msec):	Cancel If Power Off Event On Surprise Removal	
Timeouts	Set RTS On Close	
	Disable Modem Ctrl At Startup	
Minimum Read Timeout (msec):	Enable Selective Suspend	
Minimum Write Timeout (msec):	Selective Suspend Idle Timeout (secs):	5 🔹

Figure 32. COM Port Number





USB Serial Port (COM12) Properties
General Port Settings Driver Details
<u>B</u> its per second:
Data bits: 8 🔹
Parity: None
Stop bits: 1
How control: None
Advanced Restore Defaults
OK Cancel

Figure 33. USB Serial Port Properties

🚔 Device Manager	- • ×
<u>File Action View H</u> elp	
- 👰 ControlVault Device	*
🔉 🥁 Disk drives	
🖕 📲 Display adapters	
🖟 🥼 Human Interface Devices	
> Z Imaging devices	
Intel(R) Dynamic Platform and Thermal Framework	
Keyboards	
Memory technology driver	
Mice and other pointing devices	
p 🖳 Monitors	
🔈 🔮 Network adapters	
Portable Devices	
Ports (COM & LPT)	
Communications Port (COM1)	
ECP Printer Port (LPT1)	=
Tintel(R) Active Management Technology - SOL (COM3)	
STMicroelectronics STLink Virtual COM Port (COM5)	
VISB Serial Port (COM12)     Processors	
Processors           Processors           Proximity Devices	
Smart card readers	
Sound, video and game controllers	
Sound, video and game controllers	
System devices	
July System devices	
	<b>.</b>

Figure 34. USB Serial Port Properties

- 6) Repeat the above steps to change the "EDBG Virtual COM Port" number to a value greater than 10.
- 7) Now, restart the "IndustrialMotionLink" software and the COM ports should be visible in the "Serial port" drop-down list.



# 5 SYSTEM ARCHITECTURE

## 5.1 HARDWARE BLOCK DIAGRAM

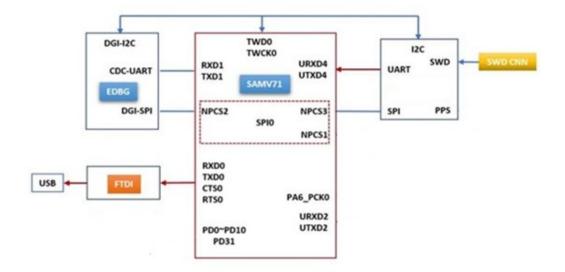


Figure 35. System Block Diagram





# 6 DECLARATION DISCLAIMER

InvenSense believes the environmental and other compliance information given in this document to be correct but cannot guarantee accuracy or completeness. Conformity documents substantiating the specifications and component characteristics are on file. InvenSense subcontracts manufacturing, and the information contained herein is based on data received from vendors and suppliers, which has not been validated by InvenSense.





# 7 REVISION HISTORY

DATE	REVISION	DESCRIPTION
11/01/2022	1.0	Initial Release

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