KINGSTAR 3.8

MOTION RUNTIME

KS-DOC-x64-0002-R23

IntervalZero



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KINGSTAR Motion

KINGSTAR Motion provides two installations: a Runtime and a Software Development Kit (SDK). The Runtime supplies the KINGSTAR Motion Subsystem that will be deployed as part of your application, while the SDK supplies headers and libraries for you to develop your own KINGSTAR applications.

KINGSTAR also provides Runtime Merge Modules components for you to incorporate Runtime into your installer.

KINGSTAR Motion Runtime contains:

- The KINGSTAR Motion Subsystem.
- An Analysis Console to debug the system.
- An ESI Import Tool to add custom hardware profiles into the KINGSTAR Subsystem.
- A Tuning Console to easily tune motors.
- Sample applications that show the capabilities of KINGSTAR Motion.

Merge Modules contains:

• Merge Modules that allows for inclusion of the KINGSTAR Motion Runtime into your product installation.

Product editions and requirements

The difference between product editions and the hardware, software requirements for KINGSTAR are listed below.

Product editions

KINGSTAR Motion provides the following Runtime editions.

Edition	Supports
ENTRY	 1-millisecond timer, and 1 core dedicated to real-time I/O and motion control.
	 Motion capabilities, including T-Curve, S-Curve, aliasing, basic ladder logic and PLCopen.
	• EtherCAT capabilities with simulated drives and I/Os support.
PRO	 100-microsecond timer, and up to 3 cores dedicated to real-time I/O and motion control.
	 Motion capabilities, including T-Curve, S-Curve, aliasing, basic ladder logic, PLCopen, torque and Tuning Console.
	 EtherCAT capabilities with simulated drives and I/Os, and 3rd party EtherCAT master support.
	PLC and EtherCAT safety add-on.

Hardware requirements

This section lists hardware requirements for KINGSTAR and the considerations about processors.

Drives and I/O

KINGSTAR supports many servo drives, stepper drives, EtherCAT I/O modules and EtherCAT couplers. For the up-to date list, see the KINGSTAR Supported Hardware PDF file at kingstar.com.

Network interface card (NIC)

KINGSTAR requires a dedicated NIC. The NIC is configured when the Install Wizard is run. For the up-to-date list, see the KINGSTAR Supported NIC PDF file at kingstar.com.

EtherCAT

KINGSTAR uses EtherCAT technology for communication. Do the following to set up the EtherCAT network:

- 1. Make sure your computer and devices have the network interface cards (NICs) or chips that support the EtherCAT protocol. The EtherCAT protocol allows up to 65,535 devices to be connected. To know whether the hardware supports EtherCAT:
 - Computers: In Windows, go to Device Manager and find the NIC under Network adapters. Make a note of the model number of the NIC. Check the KINGSTAR online help from kingstar.com > Support > Soft Motion Help > Network interface cards, or check the offline help by clicking Start > KINGSTAR Runtime > Help System > Network interface cards. If your NIC is listed in the document, it supports EtherCAT.
 - Devices: See the manual of your device, or contact the device manufacturer.
- 2. Prepare the Ethernet cables that are CAT-5 (Category 5) or higher. The transmission rate needs to be at least 100 Mbps.
- 3. Connect your computer and devices using the Ethernet cables.

Hardware considerations

KINGSTAR requires a multiprocessor platform that supports 64-bit Windows 10 with Update, Windows 10 IoT Enterprise, Windows 8.1 with Update or Microsoft Windows 7 with Service Pack 1. Uniprocessor systems are not supported. At minimum, two cores are required; one core must be dedicated to Windows and another core must be dedicated to the KINGSTAR Subsystem. Systems with up to 64 cores are supported.

NOTE: If your system is hyper-threaded, you should assign an even number of processors between Windows and KINGSTAR real-time components. The Windows logical processor and real-time logical processor must not share the same physical processor.

Some hardware configurations are not supported by the KINGSTAR Runtime installations. Although KINGSTAR runs on most x64 platforms, unique attributes of some processors require special consideration before using them in your system.

- For a comprehensive list of approved and supported hardware, see the Windows hardware certification web page:
- https://docs.microsoft.com/en-us/windows-hardware/drivers/dashboard/windowscertified-products-list
- For a comprehensive list of system requirements for Windows 10, see the Windows 10 System Requirements web page:
- https://www.microsoft.com/en-us/windows/windows-10-specifications
- For a comprehensive list of system requirements for Windows 8.1, see the Windows 8.1 System Requirements web page:

https://support.microsoft.com/en-us/help/12660/windows-8-system-requirements

Software requirements

This section lists software requirements for KINGSTAR and things to know before you install the software.

Operating system requirements

KINGSTAR are supported on 64-bit multiprocessor configurations for the following operating systems:

- Windows 10 November 2019 Update Version 1909
- Windows 10 May 2019 Update Version 1903
- Windows 10 Spring Creators Update Version 1803
- Windows 10 Fall Creators Update Version 1709
- Windows 10 IoT Enterprise Long Term Servicing Channel (LTSC) Version 1607
- Microsoft Windows 8.1 with Update
- Windows Embedded 8.1 (must support MSI installation to allow RTX64 to be installed)
- Microsoft Windows 7 with SP1
- Windows Embedded Standard 7 with SP1 (must support MSI installation to allow RTX64 to be installed)

Microsoft Visual Studio

Microsoft Visual Studio 2019, 2017, and 2015 with at least Update 3, must be installed in your system if you want to develop KINGSTAR applications.

Microsoft .NET Framework

Microsoft .NET Framework 4.5.1 is required. It the client is not detected, the Install Wizard installs the client for you.

Real-Time Subsystem

KINGSTAR requires, at minimum, RTX64 3.7.1 Runtime. If it is not already installed in your system, the product installer installs and configures the RTX64 real-time Subsystem for you.

Real-Time Software Development Kit

KINGSTAR SDK is required for KINGSTAR application development. If it is not already installed in your system, the Install Wizard will install and configure the SDK for you.

Administrator privileges

Administrator privileges are required for installing and uninstalling the KINGSTAR, which provides local Windows Groups to control user access to KINGSTAR features. By default, all users can access the KINGSTAR features. You should modify groups to limit the access to specific users.

Request a free trial

For access to evaluation kits, go to http://kingstar.com/download-trial/. In the form that appears, select KINGSTAR from the product choices, fill out the contact information, and then click **Start Trial**.

Install KINGSTAR Motion Runtime

After purchasing KINGSTAR Motion Runtime, you will receive an email confirmation that includes the activation key and a link to the KINGSTAR Motion download page. After downloading the file, complete the steps that follow to install KINGSTAR Motion Runtime.

In this guide, our operating system is Windows 10.

1. Go to **Control Panel** > **Uninstall a program**. Select the previous version of KINGSTAR Motion Runtime from the list and uninstall it. The RTX64 Runtime should be uninstalled together with KINGSTAR Motion Runtime. If not, uninstall it manually.

IMPORTANT: Because KINGSTAR Motion Runtime 3.8 and the included RTX64 Runtime are incompatible with their previous versions, you need to uninstall the previous KINGSTAR Motion and RTX64 Runtime version before installing v3.8.

IMPORTANT: KINGSTAR Motion Runtime and KINGSTAR Fieldbus Runtime can't exist on the same computer. Uninstall either of them if you want to install the other.

2. Double-click KINGSTARMotionRuntimeInstaller.exe.

NOTE: You must have the administrator permission to install KINGSTAR Motion Runtime. Before the installation begins, the **User Account Control** dialog box may ask if you want the installer to make changes to your computer. Click **Yes** to continue the installation.

User Account Control	×	
Do you want to allow this app to make changes to your device?		
KINGSTAR Motion	Runtime Installer	
Verified publisher: IntervalZero, Inc File origin: Hard drive on this computer		
Show more details		
Yes	No	

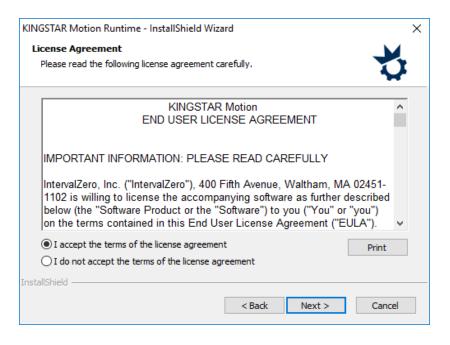
3. The prerequisite for KINGSTAR Motion Runtime is Microsoft Visual C++ 2012 Redistributable Package (x86). If you don't have the prerequisite installed on your computer, click **Install** and KINGSTAR will install it for you.

KINGSTA	R Motion Runtime - InstallShield Wizard
	KINGSTAR Motion Runtime requires the following items to be installed on your computer. Click Install to begin installing these requirements.
Status	Requirement
Pending	Microsoft Visual C++ 2012 Redistributable Package (x86)
	Install Cancel

4. In the **KINGSTAR Motion Runtime - InstallShield Wizard** dialog box, click **Next** to begin the installation.

KINGSTAR Motion Runtime - InstallShield Wizard		Х
*	Welcome to the InstallShield Wizard for KINGSTAR Motion Runtime	
KINGSTAR Motion	The InstallShield Wizard will install KINGSTAR Motion Runtime on your computer. To continue, click Next.	
	< Back Next > Cancel	

5. Read the End User License Agreement, select I accept the terms of the license agreement and click Next.



6. Choose the location you want to install KINGSTAR Motion Runtime. You can accept the default installation path, or click **Browse** to choose a different location. When you are done, click **Next**.

KINGSTAR Motion Runtime - InstallShield Wiza	ard X
Choose Destination Location Select folder where setup will install files.	₩
Setup will install KINGSTAR Motion Runtime in	the following folder.
To install to this folder, dick Next. To install to another folder.	a different folder, click Browse and select
Destination Folder C:\Program Files\IntervalZero\	Browse
InstallShield	< Back Next > Cancel

- 7. In the **KINGSTAR Motion Runtime Network Interface Setup** dialog box, select a network interface card (NIC) for KINGSTAR to use, and then click **Next**.
 - None Do not associate an NIC with KINGSTAR Motion Runtime now. You need to manually associate an NIC and configure it before you can use KINGSTAR Motion Runtime.
 - **<NIC>** Select an NIC to associate with KINGSTAR Motion Runtime, and configure its interface to use this NIC for KINGSTAR Motion network communication.

We suggest you select an NIC. KINGSTAR Motion will automatically associate and configure the card so you don't need to manually configure it later.

KINGSTAR Motion Runtime Network Interface Setup	×
Interface Setup	
Select a network interface card to use with KINGSTAR Motion Rumtime.	4
Select a controller	
0: None	
1: Intel I210 Copper-only Ethernet Controller: 2;0;0 2: Intel I217LM PHY 1000BASE with C220 Ethernet Controller: 0;25;0	
InstallShield	
< Back Next >	Cancel

8. In the **KINGSTAR Motion Runtime - InstallShield Wizard** dialog box, click **Install**.

KINGSTAR Motion Runtime - InstallShield Wiza	ırd X
Ready to Install KINGSTAR Motion Rumtin The wizard is ready to begin installation.	ne 🔂
Click Install to begin the installation.	
If you want to review or change any of your ir exit the wizard.	nstallation settings, dick Back. Click Cancel to
InstallShield	
ידו וצרמווצו ווכות	< Back Install Cancel

9. In the **Installing KINGSTAR Motion** dialog box, click **OK** to start installation. RTX64 will be installed first, and then KINGSTAR Motion.

Installing KINGSTAR Motion	×
KINGSTAR Motion Rumtime Installation Installing the IntervalZero RTX64 Subsystem and RT-TCP/IP Stack	4
Click OK to start	
This may take a while	
T	
InstallShield	ОК

10. After the installation is complete, click **Finish** to close the wizard. For more information about activating your KINGSTAR Motion components, see **Activate and configure KINGSTAR**.

KINGSTAR Motion Runtime - InstallShield Wizard			
KINGSTAR Motion	InstallShield Wizard has successfully installed KINGSTAR Motion Runtime. Click Finish to exit the wizard.		
	< Back Finish Cancel		

Activate and configure KINGSTAR

The following steps to activate and configure KINGSTAR is applicable to KINGSTAR 3.5 and later version.

Activate over the internet

Follow the steps below if you can access the IntervalZero license server. If you do not have the internet access, see the section Activate by the file.

1. On the taskbar, click **Start** > **RTX64 3.7.1 Runtime** > **Activation and Configuration**. The **RTX64 Activation and Configuration** dialog box appears.

NOTE: You must have administrative permissions to launch this utility. Before the utility starts, the **User Account Control** dialog box may ask if you want to allow this app to make changes to your device. Click **Yes** to continue.

RTX64 Activation and Configuration		_		×
Choose an activation option:	Dongle not connected			
🕑 📓 Activate over the network	COMPONENT	LICENSED RTSS CORES	LOCK	
Activate with a fingerprint file				
○ → Activate with a license file				
•				

 Click Activate over the network. Make sure your machine is connected to the internet with access to the IntervalZero license server. If a connection is available, you will see Connection established. If the connection is not available, make sure all network

cables are plugged in and click ^Q Unable to establish a connection</sup> to refresh. If the connection is still not available, you may need to configure a proxy server.

RTX64 Activation and Configuration		_		\times
Choose an activation option:	Dongle not connected			
	COMPONENT	LICENSED RTSS CORES	LOCK	
Connection established				
 Configure proxy server (optional) 				
Enter your activation key:				
Activate				
⊘ Activate with a license file				
💿 🛟 Set the RTSS boot configuration 🔺				
•				

- 3. To configure a proxy server:
 - a. Click Configure proxy server.
 - b. In the **Configure Proxy Server** dialog box, enter the information in the empty boxes and click **OK**. The information should be available from your IT department.

NOTE: The proxy server must be able to process HTTP connections. SOCKS proxies are not supported.

NOTE: If no network connection can be established, see the section Activate by the file.

🔓 Configure	Proxy Server		×	(
Server:				
Port:				
User Name:				
Password:				
?		OK	Cancel	

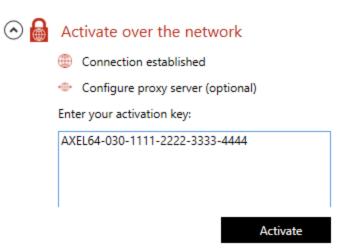
4. Back to the **RTX64 Activation and Configuration** dialog box, in the **Enter your activation key** box, enter your activation key and click **Activate**.

The product components activated by your key are listed on the right. You should see the following components:

- RTX64 SDK (this component is dimmed if you didn't purchase the license)
- RTX64 KingStar PLC (this component won't be displayed if you didn't purchase the license)
- RTX64 KingStar Motion (KINGSTAR Motion)
- RTX64 KingStar IO (KINGSTAR Fieldbus)
- RTX64 Runtime
- RTX64 RT-TCP/IP Stack

NOTE: The order of component varies between keys.

NOTE: If you want to activate part of the product, copy part of the activation key and paste it to the **Enter your activation key** box and click **Activate**. For example, if you want to activate axel64 (KINGSTAR PLC Runtime), paste the axel64 key to the activation box and activate it:



- 5. Click **Set the RTSS boot configuration**. Assign processors between Windows and RTX64 (RTSS). There must be at least one processor for Windows. You must configure this setting before you use KINGSTAR. Click **Apply** after you complete the configuration.
 - If you have purchased the KINGSTAR ENTRY edition, you can assign one processor to RTX64.
 - If you have purchased the KINGSTAR PRO edition, you can assign up to three processors to RTX64.

RTX64 Activation and Configuration		_		×
Choose an activation option:	Dongle not connected			
○ Activate over the network	COMPONENT	LICENSED RTSS CORES	LOCK	
	RTX64 3.x SDK (Eval) •			
Activate with a license file	👽 RTX64 3.x KingStar PLC (Eval) •			
📀 🛟 Set the RTSS boot configuration 🔺				
Cores not configured				
Windows: 1 Y RTSS: 1 Y		3		
Apply	♥ RTX64 3.x RT-TCP/IP Stack (Eval) ●			
•				

6. When you are prompted to restart your computer, click **Yes**.

RTX64 A	ctivation and Configuration	×
?	You must restart your system for your configuration changes to take effect. If you have never configured your system for RTX64, you must restart your system before you can use RTX64. Note that your configuration changes will not take effect following a shutdown; only after a restart. Would you like to restart now?	
	Yes No	

- 7. Choose the RTX64 boot configuration at system startup:
 - Windows 10: Windows 10 RTX64
 - Windows 8: Windows 8 RTX64
 - Windows 7: Windows 7 RTX64

NOTE: If you start your system with a configuration other than RTX64, KINGSTAR won't work properly.

Activate by the file

Follow the steps below if you can't access the IntervalZero license server.

Step I. Create a fingerprint file

 On the taskbar, click Start > RTX64 3.7.1 Runtime > Activation and Configuration. The RTX64 Activation and Configuration dialog box appears.

RTX64 Activation and Configuration		_		×
Choose an activation option:	Dongle not connected			
📀 🔒 Activate over the network	COMPONENT	LICENSED RTSS CORES	LOCK	
\odot Activate with a fingerprint file				-
O 🕒 Activate with a license file				
○ ♦ Set the RTSS boot configuration ▲				
0				

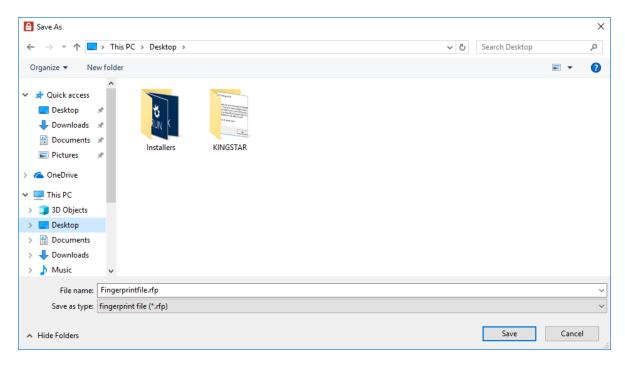
 Click Activate over the network. If it doesn't connect to the IntervalZero license server, you'll see Unable to establish a connection. If the connection is available, you will see Connection established. For further details, see the section Activate over the internet.

RTX64 Activation and Configuration		_		×
Choose an activation option:	Dongle not connected			
📀 🙆 Activate over the network	COMPONENT	LICENSED RTSS CORES	LOCK	
Unable to establish a connection				
🗢 Configure proxy server (optional)				
Enter your activation key:				
Activate				
○ Activate with a license file				
😔 🛟 Set the RTSS boot configuration 🔺				
•				

3. Click Activate with a fingerprint file.

RTX64 Activation and Configuration		_		×
Choose an activation option:	Dongle not connected			
🕑 🔒 Activate over the network	COMPONENT	LICENSED RTSS CORES	LOCK	
O 🚺 Activate with a fingerprint file				-
Enter your activation key:				
Save As				
○ → Activate with a license file				
📀 🛟 Set the RTSS boot configuration 🛦				
•				

- 4. In the Enter your activation key box, enter your activation key and click Save As.
- In the Save As dialog box, the file is automatically named Fingerprintfile.rfp. Click Save. By default, the file is saved to the desktop.



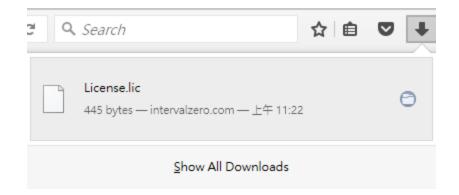
- 6. Navigate to the desktop, and copy the Fingerprintfile.rfp file to your USB flash drive.
- 7. Plug the flash drive into a machine with internet connectivity.

Step II. Create the license file and activate the product

1. Launch a web browser, and go to http://activation.intervalzero.com.

Interval	Zero	
Produ	ict Activation	
	choosing IntervalZero! product, browse for your fingerprint file	and then click
Choose a fin	gerprint file:	
Browse	No file selected.	
		Activate

- 2. Click **Browse**, browse to and open the file Fingerprintfile.rfp.
- 3. Click **Activate** to generate a license (.lic) file.
- 4. Download the License.lic. Depending on your browser, you may be prompted to save the file.



- 5. Copy the file License.lic to your USB flash drive, and use it to transfer the license file to the machine on which KINGSTAR is installed.
- 6. In the **RTX64 Activation and Configuration** dialog box, click **Activate with a license file** and click **Import**.

RTX64 Activation and Configuration		_		×
Choose an activation option:	Dongle not connected			
○ Activate over the network	COMPONENT	LICENSED RTSS CORES	LOCK	
Activate with a fingerprint file				-
○ Activate with a license file				
Import				
🕑 🛟 Set the RTSS boot configuration 🛦				
•				

7. In the **Open** dialog box, browse to License.lic and click **Open**. The product components activated by your key are listed on the right. You should see the following components:

- RTX64 SDK (this component is dimmed if you didn't purchase the license)
- RTX64 KingStar PLC (this component won't be displayed if you didn't purchase the license)
- RTX64 KingStar Motion (KINGSTAR Motion)
- RTX64 KingStar IO (KINGSTAR Fieldbus)
- RTX64 Runtime
- RTX64 RT-TCP/IP Stack

🔓 Open \times $\leftarrow \rightarrow \checkmark \uparrow \downarrow \rightarrow \text{test} \rightarrow \text{Downloads}$ V ひ Search Downloads p Organize 🔻 New folder == -2 Name Date modified Type Size 📌 Quick access License.lic 6/10/2019 16:59 LIC File 2 KB Desktop 1 🖶 Downloads Documents Pictures 💪 OneDrive 💻 This PC 🗊 3D Objects 🔲 Desktop Documents 🕹 Downloads Music Pictures Videos File name: License.lic license file (*.lic) \sim \sim Open Cancel

NOTE: The order of component varies between keys.

- 8. Click **Set the RTSS boot configuration**. Assign processors between Windows and RTX64 (RTSS). There must be at least one processor for Windows. You must configure this setting before you use KINGSTAR. Click **Apply** after you complete the configuration.
 - If you have purchased the KINGSTAR ENTRY edition, you can assign one processor to RTX64.

• If you have purchased the KINGSTAR PRO edition, you can assign up to three processors to RTX64.

B RTX64 Activation and Configuration		_		Х
Choose an activation option:	Dongle not connected			
📀 Activate over the network	COMPONENT	LICENSED RTSS CORES	LOCK	
	RTX64 3.x SDK (Eval) •			
Activate with a license file	• RTX64 3.x KingStar PLC (Eval) •			
📀 🛟 Set the RTSS boot configuration 🔺				
Cores not configured				
Windows: 1 ~ RTSS: 1 ~	♥ RTX64 3.x Runtime (Eval) ●	3		
Apply				
•				

9. When you are prompted to restart your computer, click **Yes**.

RTX64 Ac	tivation and Configuration	\times
?	You must restart your system for your configuration changes to take effect. If you have never configured your system for RTX64, you must restart your system before you can use RTX64. Note that your configuration changes will not take effect following a shutdown; only after a restart. Would you like to restart now?	
	Yes No	

10. Choose the RTX64 boot configuration at system startup:

- Windows 10: Windows 10 RTX64
- Windows 8: Windows 8 RTX64
- Windows 7: Windows 7 RTX64

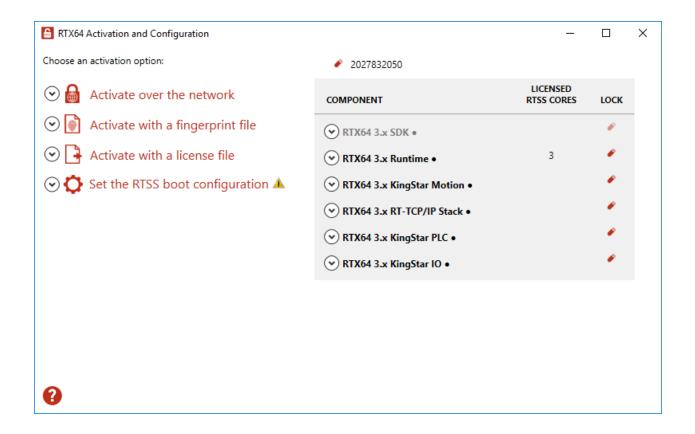
NOTE: If you start your system with a configuration other than RTX64, KINGSTAR won't work properly.

Activate using the dongle

A dongle is a USB flash drive specifically designed for containing KINGSTAR license. It is convenient for people who need to take the license with them. When you purchase the KINGSTAR license, it's optional to purchase a dongle.

- If you purchase the KINGSTAR licenses with the same number of dongles, we'll put the license files in the dongles and activate them in advance. When you get the dongles, just plug them into the computers that have the corresponding KINGSTAR products and the activation is done. After assigning the processors to Windows and RTX64, and restart your computer, you can start to use KINGSTAR.
- If you purchase the KINGSTAR licenses with the different number of dongles, we'll give you empty dongles so you can decide which dongle you want to put the license in and activate it. Once you activate a dongle, just plug it into a computer that has the corresponding KINGSTAR product and the activation is done. After assigning the processors to Windows and RTX64, and restart your computer, you can start to use KINGSTAR. For more information about activating a dongle, visit the IntervalZero website (www.intervalzero.com), go to Downloads > Add-Ons, Tools & Utilities and download Dongle Activation Utility. It includes the file and manual.

After the dongle is plugged in, a dongle icon is displayed above the component list.



Manually configure system settings

The KINGSTAR installer installs and configures the RTX64 and RTX64 Virtual NIC for you. If you didn't select a network interface card (NIC) when you install KINGSTAR Runtime, or the IP address of the Windows Virtual NIC is not set correctly, you must configure RTX64 manually.

NOTE: The following procedures are only necessary if your NIC is not associated with KINGSTAR and the IP address of the Windows Virtual NIC is not set automatically.

Configure Virtual NIC

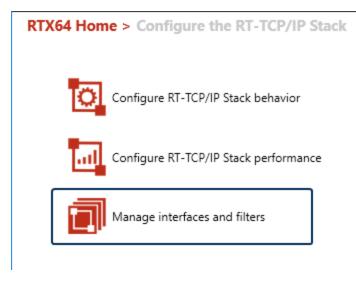
Virtual NIC for both RTX64 and Windows are automatically configured when you install KINGSTAR. You don't need to configure them, but if you want to change their IP addresses, or you need to manually configure Virtual NIC, take the following steps.

Configure Virtual NIC for RTX64:

- 1. On the taskbar, click **Start** > **RTX64 3.7.1 Runtime** > **Control Panel**.
- 2. Click **Configure the RT-TCP/IP Stack**.



3. Click Manage interfaces and filters.



4. On the left pane, click 📌 to add a new interface.

Interface	Status	_
RtVirtualNic	Enabled	~
RtIGB	Enabled	~
	>	ł
+ X	Convert Devices	

5. In the Add Interface dialog box, in the Device Name list, select RTX64 Virtual Network Interface. Other fields are automatically populated after you made the selection. The first three octets of the Virtual NIC IP address of Windows and RTX64 must be the same. By default, the Ipv4 address is 192.168.100.50.

IMPORTANT: The IP address of Virtual NIC, EtherCAT, internet must be in three different networks, or they conflict.

NOTE: If you want to use EoE, you may want to set the IP address to 192.168.100.253. For more information, see Concepts > Ethernet over EtherCAT.

🔤 Add Interface		_		×
Add Interface				
Device Name:	RTX64 Virtual Network Interface		~	
Driver Name:	RtVirtualNic.Rtdll			
Friendly Name:	RtVirtualNic			
lpv4 address:	192.168.100.50			
Netmask:	255.255.255.0			
Location:	0;0;0			
	Ok		Canc	el

6. In the **Properties for RtVirtualNic** list, in the **Device** list, the **RTX64 Virtual Network Interface** added on the left pane should be displayed. If it isn't, select the Virtual NIC you added on the left pane.

NOTE: When you use RTX64 Virtual NIC, you can use the EoE filter kse64eoe.rtdll (see Ethernet over EtherCAT) if you need EoE, but you can't use ksi064filter.rtdll, which can be used only with a real network card.

Properties for RtVirtualNic

Property	Value			
Device	RTX64 Virtual Net	RTX64 Virtual Network Interface		
Driver name	RtVirtualNic.Rtdll	RtVirtualNic.Rtdll		
IPv4 configuration	Address	Netmask	+	
	192.168.100.50	255.255.255.0	X	
Gateway	0.0.0.0			

Configure Virtual NIC for Windows:

- 1. Open the Internet Protocol Version 4 (TCP/IPv4) Properties:
 - Windows 10 and Windows 8.1: Control Panel > Network and Internet > View Network Status and Tasks > Change adapter settings > Ethernet: Windows Virtual RTX64 Ethernet > Properties (right-click) > Internet Protocol Version 4 (TCP/IPv4) > Properties > Use the following IP address
 - Windows 7: Start > Control Panel > Network and Internet > View Network Status and Tasks > Local Area Connection N (Windows Virtual RTX64 Ethernet) > Properties (right-click) > Internet Protocol Version 4 (TCP/IPv4)
 > Properties > Use the following IP address
- 2. Set the IP Address you wish to use. The last octet of the IP address of Windows and RTX64 must be different, or the IP address conflict occurs.

Windows: 192.168.100.60

Subnet mask: 255.255.255.0

IMPORTANT: The **Subnet mask** you specify in Windows must match the **Subnet mask** specified in the RTX64 Control Panel. By default, the RtVirtualNic interface sets the **Subnet mask** to 255.255.255.0.

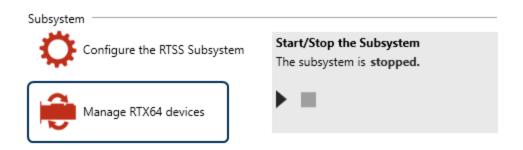
Internet Protocol Version 4 (TCP/IPv4) Properties				
General				
You can get IP settings assigned auton this capability. Otherwise, you need to for the appropriate IP settings.				
Obtain an IP address automatical	у			
• Use the following IP address:				
IP address:	192 . 168 . 100 . 60			
Subnet mask:	255 . 255 . 255 . 0			
Default gateway:				
Obtain DNS server address autom	natically			
• Use the following DNS server add	resses:			
Preferred DNS server:				
Alternate DNS server:				
Validate settings upon exit	Advanced			
	OK Cancel			

3. Click **OK**.

Manually associate a NIC

To manually associate a network interface card (NIC) with KINGSTAR, complete the steps that follow:

- 1. On the taskbar, click **Start** > **RTX64 3.7.1 Runtime** > **Control Panel**.
- 2. In **RTX64 Control Panel**, click **Manage RTX64 devices** to launch Windows **Device Manager**.



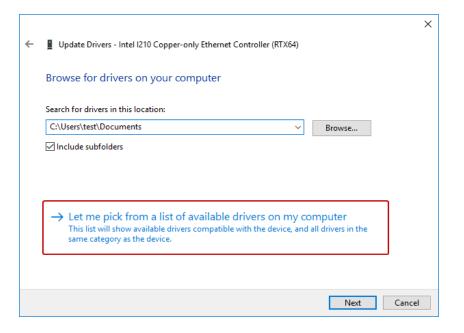
3. In the **Device Manager** dialog box, expand **Network adapters**, right-click on the network adapter you want to associate with KINGSTAR, and then click **Update driver**. The adapter must be supported by both RTX64 and KINGSTAR.

🚦 Device Manager		_	×
File Action View Help			
 DESKTOP-NQJTTDR Addio inputs and outputs Computer Disk drives Display adapters Diplay adapters Human Interface Devices Monitors Keyboards Monitors Network adapters Intel(R) Ethernet Connection I217-LM Intel(R) I210 Gigabit Network Connection WAN Miniport (IKEv2) WAN Miniport (IPV6) WAN Miniport (IPV6) WAN Miniport (PPOE) WAN Miniport (PPOE) WAN Miniport (SSTP) Windows Virtual RTX64 Ethernet Adapter Ports (COM & LPT) Print queues 	Update driver Disable device Uninstall device Scan for hardware changes Properties		
Processors BTX64 Drivers			~
Launches the Update Driver Wizard for the selected device.			

4. In the **Update Drivers** dialog box, click **Browse my computer for driver software**.

How	v do you want to search for drivers?	
→	Search automatically for updated driver software Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.	
\rightarrow	Browse my computer for driver software Locate and install driver software manually.	

5. Click Let me pick from a list of available drivers on my computer.



- 6. In the list of adapters, do one of the following:
 - If your network adapter shows in the list, select the adapter that includes RTX64 in the name, and then click **Next**.

		Х
←	Update Drivers - Intel(R) I210 Gigabit Network Connection	
	Select the device driver you want to install for this hardware.	
	Select the manufacturer and model of your hardware device and then click Next. If you have a disk that contains the driver you want to install, click Have Disk.	
	Show compatible hardware	
	Model]
	E Intel I210 Copper-only Ethernet Controller (RTX64)	
	🖾 Intel(R) I210 Gigabit Network Connection	
	This driver is digitally signed. Have Disk	
	Tell me why driver signing is important	
	Next Cancel	

• If your network adapter does not show up in the list, click **Have Disk**.

		Х
←	Update Drivers - Mediatek MT7630E 802.11bgn Wi-Fi Adapter	
	Select the device driver you want to install for this hardware.	
	Select the manufacturer and model of your hardware device and then click Next. If you have a disk that contains the driver you want to install, click Have Disk.	
	Show compatible hardware	
	Model	
	🔄 802.11n Wireless LAN Card (MediaTek, Inc.)	
	🕞 802.11n Wireless LAN Card (Microsoft)	
	🔄 Mediatek MT7630E 802.11bgn Wi-Fi Adapter (MediaTek, Inc.)	
	Rediatek MT7630E 802.11bgn Wi-Fi Adapter (Microsoft)	
	This driver is digitally signed.]
	Tell me why driver signing is important	_
	Next Cancel	

a. In the **Install From Disk** dialog box, click **Browse** and navigate to the RTX64 inf location C:\Program Files\IntervalZero\RTX64\inf if you installed RTX64 in the default location.

Install Fro	om Disk	×
••	Insert the manufacturer's installation disk, and then make sure that the correct drive is selected below.	OK Cancel
	Copy manufacturer's files from:	Browse

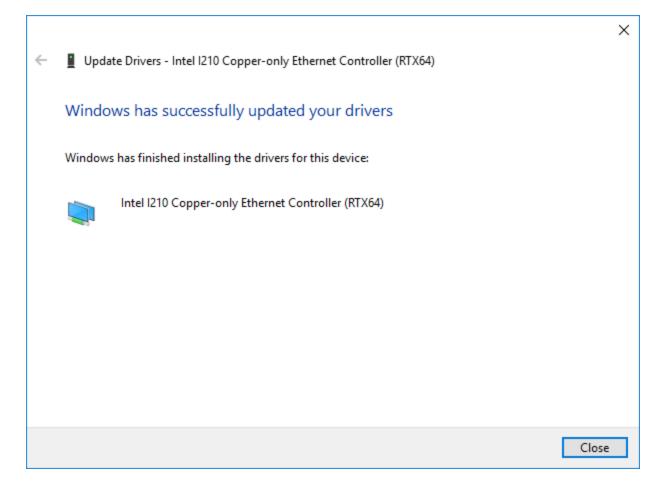
b. In the Locate File dialog box, select RTX64PnpNet.inf and click Open.

ᡖ Locate File				×
Look in:	inf	~	G 🤌 📂 🛄 🗸	
Quick access Desktop Libraries This PC	Name RTX64pnp.ii RTX64PnpN Rtx64VMini	let.inf	Date modified 10/8/2018 12:42 10/8/2018 12:42 10/8/2018 12:42	Type Setup Infc Setup Infc
Network	<			>
	File name: Files of type:	RTX64PnpNet.inf Setup Information (*.inf)	✓	Open Cancel

c. In the **Install From Disk** dialog box, click **OK**.

Install Fr	om Disk	×
<pre> • • • • • • • • • • • • • • • • • • •</pre>	Insert the manufacturer's installation disk, and then make sure that the correct drive is selected below.	OK Cancel
	Copy manufacturer's files from: C:\Program Files\IntervalZero\RTX64\inf ~	Browse

7. The RTX64 driver installs for the network adapter. Click **Close** after the installation is completed. The network adapter is now available for use with KINGSTAR.



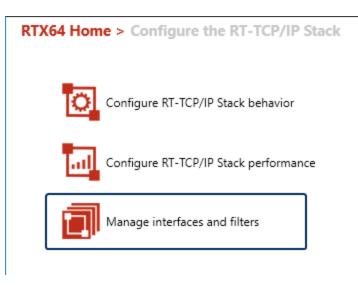
Manually configure the RT-TCP/IP stack

To manually set up the RTX64 RT-TCP/IP stack to use the dedicated NIC for KINGSTAR, complete the following steps.

- 1. On the taskbar, click **Start** > **RTX64 3.7.1 Runtime** > **Control Panel**.
- 2. Click Configure the RT-TCP/IP Stack.



3. Click Manage interfaces and filters.



4. On the left pane, click 🕂 to add a new interface.

Interface	Status	
1		
+ X	Convert Devices	

5. In the **Add Interface** dialog box, in the **Device Name** list, select a NIC that has RTX64 in its name. If the name of the NIC doesn't have RTX64, it means your NIC is not associated with KINGSTAR. See **Manually associate a NIC** to configure your NIC.

🔤 Add Interface	_	٢	x c	
Add Interface				
Device Name:		~		
Driver Name:	Intel I210 Copper-only Ethernet Controller (RTX64) RTX64 Virtual Network Interface			
Friendly Name:			el I210 Cop	
lpv4 address:				
Netmask:				
Location:				
	Ok	C	ancel	

 In the IPv4 address and Netmask box, enter the information to use with the selected NIC, and then click Ok. For example, you can enter 192.168.1.6 for IPv4 address and 255.255.255.0 for Netmask. If you have more than two NICs installed on the same computer, make sure the IPv4 address of the selected NIC doesn't conflict with that of other NICs.

NOTE: To ensure the IPv4 address doesn't conflict with your NIC, go to **Start Menu** > **Accessories** > **Command Prompt** (Windows 7), or **Start** > **Windows System** > **Command Prompt** (Windows 10). Enter ipconfig and you'll see the IPv4 address your NIC is using.

🔤 Add Interface		-		×
Add Interface				
Device Name:	Intel I210 Copper-only Ethernet Controller (RT	X64)	~	
Driver Name:	RtIGB.Rtdll			
Friendly Name:	RtIGB			
lpv4 address:	192.168.1.6			
Netmask:	255.255.255.0			
Location:	2;0;0			
	Ok		Cane	cel

7. In the **Properties for RtIGB** list, in the **Device** list, the NIC added to the left pane should be displayed. If it doesn't, select the NIC you've added on the left pane.

Properties for RtIGB

Property	Value		
Device	Intel I210 Copp	ntel I210 Copper-only Ethernet Controller (RTX64)	
Driver name	RtIGB.Rtdll		
IPv4 configuration	Address	Netmask	+
	192.168.1.6	255.255.255.0	X
Gateway	0.0.00		

8. In the Filter status list, choose Enabled.

Number of receive buffers	256	
Number of transmit buffers	256	
Interrupt type	MSI-X	
Filter status	Disabled	Ý
Filter name	Enabled	
Link status	Disabled	4
Link status thread priority	0	

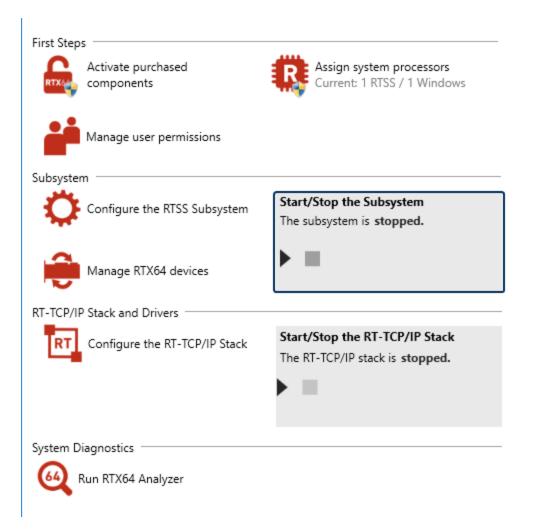
9. In the **Filter name** box, browse to the file ksio64filter.rtdll, which is in the <KSMDir>\bin (<KSMDir> is the location where KINGSTAR was installed). This will associate the KINGSTAR filter with the interface.

Number of transmit buffers	256	
Interrupt type	MSI-X	
Filter status	Enabled	
Filter name	C:\Program Files\IntervalZero\KINGSTAR\bin\ksio64filter.rtdll	
Link status	Enabled	
Link status thread priority	0	
Link status thread priority Link status thread ideal processor	0 Default	

Start RTX64 Subsystem

After the RTX64 Subsystem is configured, you can start the Subsystem so it is available for use by KINGSTAR.

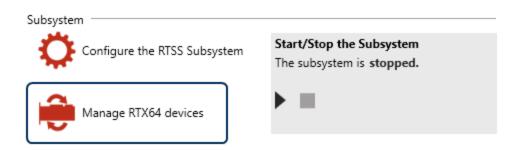
- 1. On the taskbar, click **Start** > **RTX64 3.7.1 Runtime** > **Control Panel**.
- 2. In the **Subsystem** area, in the **Start/Stop the Subsystem** group, click **b** to start the RTX64. It will also start the **RT-TCP/IP Stack**.



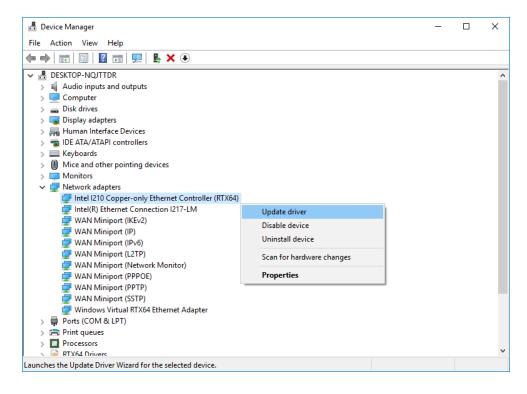
Give the NIC back to Windows

You need to give the network interface card (NIC) back to Windows if you no longer need to use it with KINGSTAR. To give the NIC back, complete the steps that follow:

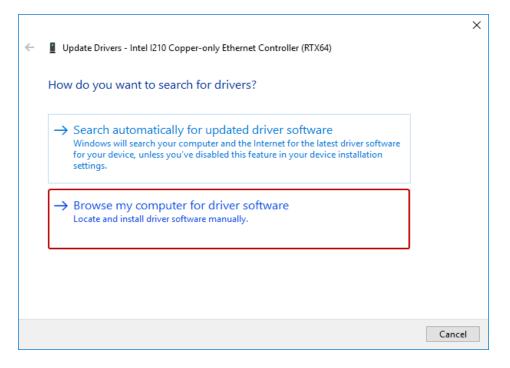
- 1. On the taskbar, click **Start** > **RTX64 3.7.1 Runtime** > **Control Panel**.
- 2. In **RTX64 Control Panel**, click **Manage RTX64 devices** to launch Windows **Device Manager**.



3. In the **Device Manager** dialog box, expand **Network adapters**, right-click on the network adapter that includes RTX64 in its name, and then click **Update driver**.



4. In the **Update Drivers** dialog box, click **Browse my computer for driver software**.



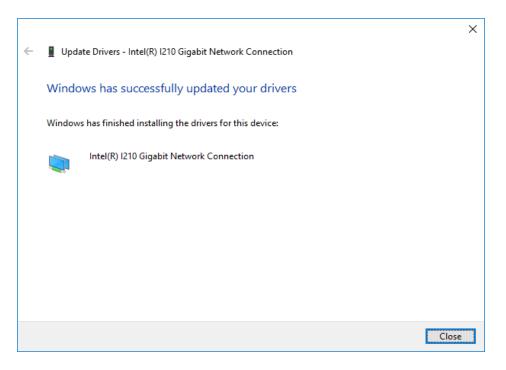
5. Click Let me pick from a list of available drivers on my computer.

		×
←	Update Drivers - Intel I210 Copper-only Ethernet Controller (RTX64)	
	Browse for drivers on your computer	
	Search for drivers in this location:	
	C:\Users\test\Documents V Browse	
	✓ Include subfolders → Let me pick from a list of available drivers on my computer	
	This list will show available drivers compatible with the device, and all drivers in the same category as the device.	
	Next Canc	el

6. In the list of adapters, choose the adapter that doesn't include RTX64 in its name, and click **Next**.

4	Up	date Drivers - Intel I210 Copper-only Ethernet Controller (RTX64)	×	
	Select the device driver you want to install for this hardware.			
	Select the manufacturer and model of your hardware device and then click Next. If you hav disk that contains the driver you want to install, click Have Disk.			
	Show compatible hardware			
	Mode	el		
		tel I210 Copper-only Ethernet Controller (RTX64)		
		tel(R) I210 Gigabit Network Connection		
	с Т	his driver is digitally signed. Have Disk		
	Ī	ell me why driver signing is important		
		Next Cancel		

7. The Windows driver installs for the network adapter. Click **Close** after the installation is completed. The network adapter is now given back to Windows.



Uninstall KINGSTAR

Before uninstalling consider the following:

- When RTX64 Runtime is uninstalled from a system, any device given to RTX64 will no longer have an associated driver and should be returned to Windows using the Windows **Device Manager**. For more information about how to return the NIC, see Give the NIC back to Windows.
- RTX64 **Control Panel** must be closed.
- KINGSTAR applications must not be running.
- If the RTX64 boot configuration is the only boot configuration present on uninstall, it will be retained so that you can start your system.

To uninstall KINGSTAR, take the following steps:

- Double-click the KINGSTAR installer to uninstall, or go to Control Panel > Programs and Features. Select the KINGSTAR software from the list and uninstall it.
- 2. After uninstalling KINGSTAR, restart your computer.

Get support

KINGSTAR offers a number of support options for KINGSTAR users, including third-party, online and phone support.

Third-party support

If you are a customer who purchased a KINGSTAR product through a third-party reseller, contact the reseller for support.

Online support

The KINGSTAR Customer Support web page is located at:

http://kingstar.com/support/

The KINGSTAR support web pages provide electronic access to the latest product releases, documentation, and release notes. You can access the online support ticketing system to submit issues or questions.

Before calling technical support

Please have the following information ready before calling KINGSTAR Technical Support:

The version number of your RTX64 and KINGSTAR software

To obtain the RTX64 version number:

- 1. Click Start > RTX64 3.7.1 Runtime > Control Panel.
- 2. In the **RTX64 3.7.1 Control Panel**, record **Version** shown in the **Runtime Information** area.

To obtain the KINGSTAR version number:

- In Windows Explorer, browse to C:\Program Files\IntervalZero\KINGSTAR\bin.
- 2. click the ksm64.rtdll file, and right-click the same file again.

- 3. On the shortcut menu, click **Properties**.
- 4. In the **ksm64.rtdll Properties** dialog box, click the **Details** tab, and record **Product version**.

Phone support

For technical support related to installing and using KINGSTAR, please call technical support at this number:

+886-2-2556-8117

Hours are Monday – Friday from 9:30 to 17:30, UTC+08:00, excluding holidays.