

RTX 2016 with Update 3 Merge Modules

INSTALL GUIDE

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Installation Guide for RTX 2016 with Update 3 Merge Modules

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Introduction

IntervalZero provides merge modules that contain components of the RTX 2016 with Update 3 Runtime. This allows developers to include selected components of the RTX 2016 with Update 3 Runtime into their product installation package. RTX 2016 with Update 3 contains all features and bug fixes found in previous updates.

The RTX Runtime is broken down into the following merge module components.

- `haspds.msm` – Dongle drivers or Sentinel Runtime Environment
- `RtxSubsystem.msm` – RTX subsystem that provides real-time support for Windows
- `RtxManaged.msm` – RTX managed code support
- `RtxTcpiip.msm` – RT TCP/IP stack and NIC driver support
- `RtxTools.msm` – RTX Tools that include RTSS Object Viewer, RTX Time View, RTSS Performance View, and RTX Platform Evaluator
- `RtxPrereq.msm` – Includes content required by most RTX components
- `VirtualNic.msm` – Includes the Virtual Network driver

Editions

IntervalZero provides six different Runtime editions of the RTX product, listed in the table below.

The edition...	Includes support for real-time operations on...
Solo	One shared or dedicated RTSS processor in a uniprocessor or multicore/multiprocessor environment.
Entry	One shared or up to two dedicated RTSS processors in a multicore/multiprocessor environment.
Basic	One shared or up to three dedicated RTSS processors in a multicore/multiprocessor environment.
Professional	One shared or up to seven dedicated RTSS processors in a multicore/multiprocessor environment.
Premium	One shared or up to 15 dedicated RTSS processors in a multicore/multiprocessor environment.
Ultimate	One shared or up to 31 dedicated RTSS processors in a multicore/multiprocessor environment.

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Requirements

This chapter lists the hardware and software requirements for using the RTX Merge Modules.

Hardware Requirements

Development and Target Systems

Using the Merge Modules software involves multiple machines:

- A development machine on which you install the merge modules and then use an MSI deployment tool to create a setup installation kit, and
- The target machines where the RTX Runtime will be installed.

Development Machine

The development machine on which you install Merge Modules should have an MSI deployment tool that supports merge modules and can be used to create an installation kit.

Target Machines

The system requirements for the target machines on which the RTX Runtime will ultimately be installed must meet the following requirements.

HAL Types

When the RTX Subsystem merge module is installed, it will confirm that the target machine supports one of the following HAL types:

As displayed in Windows Device Manager

As displayed in registry resource map

ACPI x86-based PC

ACPI x86 platform

Supported Network Adapters

The RTX TCP/IP merge module provides support for a number of network adapters. For the most up-to-date list, click the link titled **RTX Network Driver Support** PDF file on this web site:

<http://www.intervalzero.com/technical-support/guides-and-minitutorials/>

Target Machine Hardware Considerations

Some hardware configurations are not supported by RTX installations. When RTX can detect these unsupported configurations, the default behavior is to display a popup error message. This behavior can be changed if the [RTX_ERROR_DISPLAY] property is set to StringRegVal or NumRegVal (see the [Merge Module Properties](#) section for more information).

Although RTX runs on most x86 platforms, unique attributes of some processors require special consideration before selecting them as a target system.

- For a comprehensive list of approved and supported hardware, see the Microsoft Windows Logo Program web page:

<http://www.microsoft.com/whdc/whql/default.msp>

Software Requirements

Development Machine Software Requirements

The RTX Merge Modules require the Windows Installer MSI Version 2.0.

Target Machine Software Requirements

Target Machine Operating System

The RTX Runtime is supported on the 32-bit configurations listed in the table below.

	Uniprocessor PIC	Uniprocessor APIC	Multi-processor
Windows 7 with SP1	No	Yes	Yes
Windows 7 (no SP)	No	Yes	Yes
Windows Embedded Standard 7 with SP1	No	Yes ¹	Yes ¹
Windows Embedded Standard 7 (no SP)	No	Yes ¹	Yes ¹

¹Windows Embedded Standard 7 system must support MSI installation to allow RTX to be installed.

For the most up-to-date list, click the link titled *Download the RTX Operating System Compatibility Matrix PDF* file on the web site <http://www.intervalzero.com/technical-support/guides-and-minitutorials/>.

NOTE: Windows Home editions are not supported.

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Installing

This section describes the installation of RTX Merge Modules.

Additional Installation Options

In addition to using the merge modules described in this document, the RTX Runtime is also available in the following installation types:

- **RTX Runtime** – RTX is available as a Runtime and SDK installation. This support provided in a separate installer and is also available as an evaluation version. The RTX Runtime can also be installed silently. For more information, see the *RTX 2016 with Update 3 Silent Installation Guide*.

Performing the Install

NOTE: RTX requires Microsoft .NET 4.5.1 to be installed on the system. You must install .NET 4.5.1 before you install RTX.

TO INSTALL RTX MERGE MODULES:

1. Download the self-extracting executable, `RTX_2016_with_Update_3_MM.exe`, from the IntervalZero web site:

<http://www.intervalzero.com/rtx-2016-downloads/#tab-1>

NOTE: For access to evaluation kits, visit the Evaluation page at <http://www.intervalzero.com/>.

In the form that appears, select RTX 2016 with Update 3 from the drop-down list, fill out the contact information, and click **Submit**.

2. Double-click the `RTX_2016_with_Update_3_MM.exe`.
3. Click **Next** in the IntervalZero RTX Merge Modules installation Welcome window.
4. Read the End User License Agreement, select **I accept the terms in the license agreement** and then click **Next**.
5. In the Custom Setup screen, view the default features that will be installed, make any changes if desired and then click **Next**.
6. In the Ready to Install the Program screen click **Install**.
7. View the status bar as the installation proceeds.
8. Click **Finish** in the installation Completed screen.

Files Added During Installation

The RTX Merge Modules installation adds files to the following directory:

```
c:\Program Files\IntervalZero\RTX Merge Modules
```

Merge Modules can be found in the subdirectory

```
\Repository\MergeModules
```

The merge modules that are installed include:

- `haspds.msm`
- `RtxManaged.msm`
- `RtxSubsystem.msm`
- `RtxTcpip.msm`
- `RtxTools.msm`
- `RtxPrereq.msm`
- `VirtualNic.msm`

Samples can be found in:

```
\Samples\InstallShield2014\SampleInstall.ism
```

- Sample InstallShield Setup Project file

\Samples\VisualStudio2013Setup\VSISample.vdproj

- Sample Visual Studio Installer Merge Module Project

Merge Module Deployment

Once the merge modules have been installed onto the development system, they can be included in a setup file that will be installed on a target system.

Runtime Installation Requirements

In addition to the target machine operating system requirements listed at the start of this document, take note of the following information when RTX merge modules are added to an installation.

- **Administrator privileges are required** — Installations using RTX merge modules must be done from an account that has administrator privileges.
- You must reboot after RTX has been installed.

Merge Module Dependencies

If any of the RTX merge modules are added to an installation, they must include the RTX Subsystem, which is contained in the merge module file `RtxSubsystem.msm`.

Merge Module Properties

Before adding the RTX Runtime merge modules to an installation kit, note the mandatory and optional properties listed in this section.

Error messages are listed at the end of this document.

Property	Description	Set to...
EMAILADDRESS	Optional. User email address.	Valid email address

Property	Description	Set to...
RTX_ERROR_DISPLAY	<p>Optional. Used to determine how error messages will be displayed.</p> <p>If this property is not added, the default behavior is Message box error display.</p>	<p>One of the following:</p> <p>MessageBox – Custom action error messages will be displayed in a message box as they do during a normal RTX installation.</p> <p>StringRegVal – The full text of an error message will be written into the registry location "InstallError" under the key SOFTWARE \Microsoft\Windows \CurrentVersion \Uninstall \{D1B94D8A-0B3A-4DE6-AE22-DE16CC74E5B1}</p> <p>NumRegVal – The error number of an error will be written into the registry location "InstallError" under the key SOFTWARE \Microsoft\Windows \CurrentVersion \Uninstall \{D1B94D8A-0B3A-4DE6-AE22-DE16CC74E5B1}</p>
RTX_WARNING_DISPLAY	<p>Optional. Used to determine how warning messages will be displayed.</p> <p>If this property is not added, the default behavior is MessageBox error display.</p>	<p>One of the following:</p> <p>MessageBox – Custom action warning messages will be displayed in a message box as they do during a normal RTX installation.</p> <p>StringRegVal – The full text of a warning message will be written into the registry location "InstallWarning" under the key SOFTWARE \Microsoft\Windows \CurrentVersion \Uninstall \{D1B94D8A-0B3A-4DE6-AE22-DE16CC74E5B1}</p> <p>NumRegVal – The error number of a warning will be written into the registry location "InstallWarning" under the key SOFTWARE \Microsoft\Windows \CurrentVersion \Uninstall \{D1B94D8A-0B3A-4DE6-AE22-DE16CC74E5B1}</p>

Property	Description	Set to...
RTXDIR	Required. Used to determine where the RTX subsystem files will be installed. Default is "%ProgramFiles%\IntervalZero\RTX" or C:\Program Files\IntervalZero\RTX	Directory location (will be created if it does not exist).
DT_ICONS	Optional. Used to instruct the installer to add RTX icons to the desktop.	1 to enable. Otherwise, the default is for icon addition to be disabled.
SM_ICONS	Optional. Used to instruct the installer to add RTX to the Start menu.	1 to enable. Otherwise, the default is for Start menu addition to be disabled.

Target Activation and Configuration

Once RTX is installed on your target system, you must activate the RTX product and configure system processors using a Command Line utility. For more activation options, see the *RTX Deployment Guide*.

Activating your Product

TO ACTIVATE YOUR PRODUCT (INTERNET CONNECTION REQUIRED):

1. Navigate to the `RTX\bin` directory and run `RtxActivationUtil.exe` as Administrator.
2. Type the `-a` flag, and then provide your activation key. For example:

```
RtxActivationUtil.exe -a IZRTX-111-2222-3333-4444-5555-IZTCP-111-2222-3333-4444-5555-IZSDK-111-2222-3333-4444-5555
```

NOTE: You can find your activation key in the email you received from IntervalZero Sales.

3. If running from a command prompt, the activated components are displayed:

Configuring your System

SETTING THE BOOT CONFIGURATION (.NET 4.5.1 REQUIRED):

1. Navigate to the `RTX\bin` directory.
2. Run `RtxActivationGUI.exe` as Administrator.
3. Provide the number of Windows `-w` and RTSS `-r` processors. For example, to assign 3 processors to Windows and 5 processors to RTX, you would type:

```
RtxActivationGUI.exe -w 3 -r 5
```

4. Restart the system.

Uninstalling

TO UNINSTALL THE RTX MERGE MODULES:

1. From the *Start* menu, choose **Control Panel**.
2. Under *Programs*, click **Uninstall a Program**.
3. Select RTX 2016 with Update 3 Merge Modules and then click **Uninstall**.
4. Click **Yes** to confirm.

NOTE:

The RTX boot line is not removed following uninstall of the Subsystem merge module. To remove the RTX boot line manually, use the following command before uninstalling the MSISample product:

```
\bin\RTXActivationUtil.exe -rbcd
```

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Using the Samples

Sample project files are provided to help in creating installation kits that include the RTX merge modules.

Visual Studio Sample Project

The RTX Merge Modules installation includes a sample Visual Studio merge module project. This simple project contains all of the RTX merge modules to build a setup.exe installation kit. It does not include any custom actions to set properties. Therefore, to run the completed installation, these properties would need to be set on the command line. To do this, follow the steps below.

INSTALL THE VISUAL STUDIO EXTENSION:

Before you can run this sample project in Visual Studio 2013, you must first install the Visual Studio 2013 Installer Projects extension, available at <https://visualstudiogallery.msdn.microsoft.com/9abe329c-9bba-44a1-be59-0fbf6151054d>.

TO EXECUTE THE SAMPLE MSI WITH MSIEXEC VIA COMMAND PROMPT:

- Launch a Command Prompt as Administrator.
- Replace `C:\Program Files\Microsoft\MSISample` with your install destination folder, using `msiexec /i MSISample.msi RTXDIR=C:\Program Files\Microsoft\MSISample`.

InstallShield Sample Project

The RTX Merge Modules installation includes a sample InstallShield project. This project contains all of the RTX merge modules, which can be seen in **Organization > Setup Design**.

NOTE: The InstallShield sample assumes that the merge modules will be located in the RTX merge modules repository. You can add this location to the repository directory by using the MergeModules tab of the InstallShield options dialog. Or, if you have another repository directory, you can move the merge modules to that location.

Appendix A:

Installation Errors and Warnings

Possible registry key values in case of an error or warning during the product install are shown in the following table.

Nbr	Description of the error or warning
1	Silent install; the CheckUninst function found a previous (pre-MSI) version of RTX.
2	Silent install; the CheckUninst function found a previous (pre-MSI) version of RT-TCP/IP installed.
3	The CheckUninst function found a previous (pre-MSI) version of RTX installed; user clicked "No" when asked to uninstall it.
4	The CheckUninst function found a previous (pre-MSI) version of RTX SDK installed; user clicked "No" when asked to uninstall it.
5	The CheckUninst function found a previous (pre-MSI) version of RTX installed; user clicked "No" when asked to uninstall it.
6	The GetOSCurrentVersion function called MsiGetProperty(VersionNT) and failed.
7	The GetOSCurrentVersion function called MsiGetProperty(VersionNT) and got NullString.
8	The GetOSCurrentVersion function called MsiGetProperty(VersionNT) and len(value) != 3.
9	The detected operating system version is not supported.
14	Calling RtxCapabilities failed.
21	Unused / saved for a "default" case.
22	Unable to load SUPPORTDIR from MSI table.
23	Either no email address, or an invalid email address was supplied.
24	No value found in HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion:ProductId.

Nbr Description of the error or warning

25	No value found in HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion:InstallDate.
32	An exception occurred while calling VciValidate.
34	Unable to load VersionNT from msi table during Reg_SetProps.
35	RtxCapabilities failed during Reg_SetProps.
38	The user's operating system is not supported without extended OS support.
41	An exception occurred while validating installation.
42	Unable to load SUPPORTDIR from MSI table during RtxCapabilities.
43	Windows installation of the subsystem on a Svr'03' SP2 on a Uniprocessor platform is not supported.
44	Unable to load SUPPORTDIR from MSI table in DoInstallSubsystemActions.
45	Unable to load AppDataFolder from MSI table in DoInstallSubsystemActions.
46	SetSecInfo failed (this is the routine which patches the subsystem files).
47	Call to VciGetHalType failed.
48	The script variable sOSVersion is not initialized during GetHalType.
50	Detected HAL: "MPS 1.4 - APIC platform", only 1 processor.
51	Detected HAL: "ACPI 1.0 - APIC platform MP", only 1 processor.
52	Detected HAL doesn't match any known HALs.
53	Detected HAL name doesn't contain "x86" or "ACPI" on windows Vista or higher.
55	A call to ListCreateFailed.
56	RegDBQueryKey("HARDWARE\\RESOURCEMAP\\Hardware Abstraction Layer") Failed.
57	First call to ListCreate failed.
58	Second call to ListCreate failed.
59	Third call to ListCreate failed.
60	In ListGetValue. The list passed in is not valid.

Nbr Description of the error or warning

61	In ListSetValue. The list passed in is not valid.
62	MsiGetProperty("ProductCode") returned "".
63	MsiGetProperty("VersionNT") returned "".
64	Calling RTXCapabilities with the current ProductID resulted in an error.
65	The OS Support field of the product code contains an invalid value.
66	The VS Support field of the product code contains an invalid value.
67	The Edition field of the product code contains an invalid value.
68	The Edition field of the product code contains an invalid value.
69	The Edition field of the product code contains an invalid value.
70	Upgrading from an evaluation package is not allowed.
71	CustomActionData was truncated.
72	Calling SetSecInfo failed.
73	MsiGetProperty("SUPPORTDIR") failed.
74	Error occured while calling ShellExecute(): File not found.
75	Error occured while calling ShellExecute(): Path not found.
76	Error occured while calling ShellExecute(): Access denied.
77	Error occured while calling ShellExecute(): Out of memory.
78	Error occured while calling ShellExecute(): Invalid EXE file or error in EXE image.
79	Error occured while calling ShellExecute(): A sharing violation occurred.
80	Error occured while calling ShellExecute(): Incomplete or invalid file association.
81	Error occured while calling ShellExecute(): DDE Time out.
82	Error occured while calling ShellExecute(): DDE transaction failed.
83	Error occured while calling ShellExecute(): DDE busy.
84	Error occured while calling ShellExecute(): No association for file extension.

Nbr Description of the error or warning

85	Error occurred while calling ShellExecute(): DLL not found.
86	MsiGetProperty("SUPPORTDIR") failed.
87	A call to RtcplStopSubsystemComponent() failed.
88	CustomActionData was truncated – possible long paths pushed the value past its limit.
89	Prop "SYSTEMP" not found.
90	Loading VciFindArc or one of its dependencies failed.
91	An exception occurred while trying to set security info.
92	An error occurred while trying to activate RTX.
93	Failed to copy Rtx_Rtss.sys file to drivers directory.
94	Failed to copy Rtx_HalExt.sys file to drivers directory.
96	An exception was thrown while calling RttlsSetNumberOfProcessSlots().
97	RttlsSetNumberOfProcessSlots() returned FALSE.
98	Failed to load positive numeric value from [RTX_CTRL_PROCESSSLOTS].
100	The LaunchConditions action detected that the current operating system is not supported.
101	An earlier version of RTX was detected, and should be uninstalled before installing this version.
102	64 bit versions of Windows are not supported.
507	RttlsEnableComponent(COMPONENT_TCPIP) failed.
508	RtcplSetTCPIPUSBDependency() failed.
521	An Exception occurred while calling Stop_Rtss.

Getting Support

IntervalZero offers a number of support options for RTX users, including technical support and the IntervalZero Website.

Third-Party Support

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

Contacting Technical Support by Phone

For technical support related to installing and using RTX, you can call 1-781-996-4481. At the prompt, press 3 for Support.

Hours are Monday - Friday, 8:30 a.m. – 5:30 p.m. US Eastern time (GMT-500), excluding holidays.

Before Calling Technical Support

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

Your Support ID

Customers who purchase direct support receive an e-mail address and password for use when accessing the IntervalZero support Website.

The Version Number of Your RTX Software

Before calling technical support, determine the version of RTX installed on your system by looking in the add/remove program list, available from the Control Panel. Also, check to make sure you have a valid maintenance contract.

IntervalZero Website

The IntervalZero Customer Support Web page is located at:

<http://www.intervalzero.com/technical-support/>

The IntervalZero support web pages provide electronic access to the latest product releases, documentation, and release notes. With a valid e-mail address and password, you can access the online problem report database to submit new issues or to obtain the status of previously reported issues.

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