

# Sentinel RMS Envelope v1.0

ReadMe for Windows (32-bit and 64-bit)

## Document Revision History

Revision	Action/Change	Date
A	Sentinel RMS Envelope v1.0	December 2017

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# About Sentinel RMS Envelope

Sentinel® RMS Envelope (also referred to as "RMS Envelope") is a wrapping application that protects your native C language applications<sup>1</sup> with a secure shield. This application offers advanced protection features to enhance the overall level of security of your software.

RMS Envelope protects Win32 and Windows x64 executables and DLLs—providing a means to counteract reverse engineering and other anti-debugging measures.

By using RMS Envelope, you establish a link between the protected application and a Sentinel RMS license. This link is broken whenever the protected application cannot access the RMS license. While protecting an application, you can apply protection options that are controlled by the engines running RMS Envelope.

Currently, RMS Envelope is available as a command-line application only. RMS Envelope protection process is described in the following diagram:



You can also use the evaluation version of RMS Envelope for protecting your applications. For more information about evaluation, see [Using RMS Envelope in Evaluation mode](#).

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<sup>1</sup>The terms "program" and "application" are used throughout this document as a generic reference to the various types of programming code that can be protected using RMS Envelope, regardless of whether they are executables, binaries, assemblies or libraries.

## What's Included in the Package

The table below lists the files included in the Sentinel RMS Envelope Windows package:



**Note:** For information regarding the complete package, refer to the [ReadMeFirst.pdf](#) document included with the order e-mail. This document is also available [here](#).

File/Folder Name	Description
RuntimeEnvironment	<p>The Sentinel LDK Run-time Environment. This is required for communication with the Sentinel LDK Developer key.</p> <p>You can find the Sentinel LDK Run-time installer under the following sub-directories:</p> <ul style="list-style-type: none"> <li>• <b>Installer</b> - A command-line-based installer (<i>haspdinst.exe</i>) for Windows 32/64-bit platforms. For more information, see the installation Readme included in this sub-directory.</li> <li>• <b>Setup</b> - A GUI-based installer (<i>HASPUserSetup.exe</i>) for Windows 32/64-bit platforms. For more information, see the installation ReadMe included in this sub-directory.</li> </ul>
VendorTools	<p>Contains the following files:</p> <ul style="list-style-type: none"> <li>• SentinelRMSEnvelope.exe - RMS Envelope executable.</li> <li>• sntlhelper.dll - RMS Envelope requires this DLL while protecting a 32-bit application/DLL. RMS Envelope also places this DLL together with the protected application/DLL.</li> <li>• sntlhelper_x64.dll - RMS Envelope requires this DLL while protecting a 64-bit application/DLL. RMS Envelope also places this DLL together with the protected application/DLL.</li> </ul>
Sentinel RMS Envelope ReadMe.pdf	This file.

## Prerequisites

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This section describes RMS Envelope prerequisites:

- [For Protecting Applications](#)
- [For Using RMS Envelope Protected Applications \(Redistributables\)](#)
- [For Generating Licenses](#)

## For Protecting Applications

The following requirements must be met on the system where you want to protect applications using RMS Envelope:

### Supported Platforms

RMS Envelope supports the following Windows (32-bit and 64-bit) operating systems for both running RMS Envelope and using the protected applications:


- Windows 7
- Windows 8.0
- Windows 8.1
- Windows 10
- Windows Server 2012
- Windows Server 2012 R2
- Windows Server 2016


### Sentinel RMS Licensing Libraries

The following Sentinel RMS licensing libraries (v9.2.1 or later) are available. You can choose from these depending upon your requirements. You must place the chosen library in the RMS Envelope directory before protecting an application.



**Note:** Both the Sentinel RMS SDK and RMS Envelope should have the same serial number.

Architecture	Type	Library	Availability
32-bit	Standalone	Isnnet32.dll	The standalone licensing library. This library is available under the Sentinel RMS (v9.2.1 or later) installation directory.
	Network	Isclws32.dll	The network licensing library. This library is available under the Sentinel RMS (v9.2.1 or later) installation directory.
	Integrated	Isapiw32.dll	The integrated licensing library that allows an application to switch between standalone and network licensing. This library is available under the Sentinel RMS (v9.2.1 or later) installation directory.
	SCP Integrated	Issrvscp32.dll	The library for deploying applications in the <b>Cloud Served - Lease Standalone mode</b> . This library is <b>included with the SCL Add-on for RMS</b> (not available under the Sentinel RMS installation directory).   <b>CAUTION:</b> DLL protection is not supported in this deployment mode.
64-bit	Standalone	Isnnet64.dll	The standalone licensing library. This library is available under the Sentinel RMS (v9.2.1 or later) installation directory.
	Network	Isclws64.dll	The network licensing library. This library is available under the

Architecture	Type	Library	Availability
			Sentinel RMS (v9.2.1 or later) installation directory.
	Integrated	Isapiw64.dll	The integrated licensing library that allows an application to switch between standalone and network licensing. This library is available under the Sentinel RMS (v9.2.1 or later) installation directory.
	SCP Integrated	lssrvscp64.dll	The library for deploying applications in the <b>Cloud Served - Lease Standalone mode</b> . This library is <b>included with the SCL Add-on for RMS</b> (not available under the Sentinel RMS installation directory).  <div style="border: 1px solid black; padding: 5px; display: inline-block;">  <b>CAUTION:</b> DLL protection is not supported in this deployment mode, </div>



**Note:** Sentinel RMS provides licensing libraries for various Microsoft Visual Studio (MSVS) versions. For protecting your application using RMS Envelope, you must use the same version of the MSVS library that was used for compiling your application.

## Sentinel LDK Developer Key

The Sentinel LDK Developer key is a hardware key required for protecting applications/DLLs. This key is shipped separately to you. For more information, refer to the [ReadMeFirst.pdf](#) available with the order email.

However, the Sentinel LDK Developer key is not required for:

- Protecting applications in **evaluation mode**.
- Running protected applications

## Sentinel LDK Runtime

**Sentinel LDK Runtime** v7.6.0 (or later) is required for communication with the Sentinel LDK Developer key.

## Other Required Files

- sntlhelper.dll - Required for 32-bit application/DLL.
- sntlhelper\_x64.dll - Required for 64-bit application/DLL.

## General Recommendations for Protecting Applications

The following recommendations should be followed while protecting applications using RMS Envelope:

- Compile your applications with the /MT flag.
- Use the LoadLibrary/FreeLibrary function to load or unload protected DLLs dynamically. Do not use implicit linking for accessing the protected DLL.
- Do not protect a custom locked DLL with a custom locked license.



## For Using the Protected Applications (Redistributables)

RMS Envelope automatically copies the resources required by the protected application in its directory. You need to redistribute them along with the protected application. This directory typically consists of:

- **Your protected application**  
RMS Envelope protected application/DLL.
- **Sentinel RMS libraries**  
The [Sentinel RMS licensing library](#) used by RMS Envelope.
- **Customized library**  
If the `customLib` option is used while protecting the application, the customized library must be shipped with the protected application.
- **Other required files**
  - `sntlhelper.dll` - Ship this library with the protected application on Windows 32-bit platforms.
  - `sntlhelper_x64.dll` - Ship this library with the protected application on Windows 64-bit platforms.



**Note:** In addition, you may need to explicitly include the SCP configuration file to use the protected application in the Cloud Served - Lease Standalone mode. This is NOT copied automatically by RMS Envelope. Place it in the same directory as the protected application. For more information, see the Standalone Mode section of the SCP Installation and Configuration Guide.

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**See Also:** [Supported Platforms](#)

## For Generating RMS Licenses

You can generate RMS licenses using the following options. Contact Gemalto Sales Representative or Technical Support on how to obtain these:

- **WlscGen** - A Windows GUI-based utility that generates a license code.
- **lscgen** - A command-line based utility, available on Windows and Linux, that generates a license code.
- RMS License Code Generation Library API - The license code generation API functions help you to create your own custom license generator. For more information, refer to the [Sentinel RMS SDK License Generation API Reference Guide](#).
- **Sentinel EMS** - The Sentinel license and Entitlement management solution.



**Note:** RMS Envelope supports RMS license version 18 (or later).

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## Using RMS Envelope in Evaluation Mode

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The command-line RMS Envelope provides the `--eval` option for protecting applications in evaluation mode. To use RMS Envelope command-line application:

1. Open the command prompt.
2. Go to the directory that contains RMS Envelope command-line application.
3. Use the following command to start RMS Envelope command-line application:

```
SentinelRMSEnvelope.exe --eval [options] <infile> <outfile>
```

For example:

```
SentinelRMSEnvelope.exe --eval -f:DOTS -v:1.0 -lib:<absolute path to the licensing library>  
toprotect.exe protected.exe
```

### Notes

- The Sentinel LDK Developer Key and Sentinel LDK Runtime are not required for protecting applications in evaluation mode.
- Applications protected using evaluation mode of RMS Envelope display the following message at startup:
  - *This application is protected using demo version of Sentinel RMS Envelope.*
- In evaluation mode, applications protection period is restricted to the maximum of 90 days.
- The evaluation period starts from the date of application protection.
- To run the applications protected using evaluation mode, the vendor also requires the RMS license for a feature name and feature version combination specified at the time the application is protected.

## Running RMS Envelope

RMS Envelope can be initiated using a command-line prompt. To use RMS Envelope command-line application:

1. Open the command prompt.
2. Go to the directory that contains RMS Envelope command-line application.
3. Use the following command to start RMS Envelope command-line application:

```
SentinelRMSEnvelope.exe [options] <infile> <outfile>
```

For example:

```
SentinelRMSEnvelope.exe -f:DOTS -v:1.0 -lib:<Absolute path to licensing library> toprotect.exe  
protected.exe
```

Where,

Item	Description
options	Protection options for additional security. The list of protection options is defined in the <a href="#">Mandatory Protection Options</a> and <a href="#">Optional Protection Options</a> sections.
infile	The application/DLL that needs to be protected. If the application/DLL is not available in the RMS Envelope directory, provide the absolute path of the application/DLL.
outfile	The resulting protected file. If an absolute path is not specified for storing the protected application/DLL, the file will be stored in the RMS Envelope directory.

## Mandatory and Optional Protection Options

This section outlines the mandatory and customizable options that can be specified for protecting software with RMS Envelope:

### Mandatory Protection Options

The following information must be provided in order to protect an application/DLL using RMS Envelope:

- `-lib` - Absolute path of the licensing library.
- `-f: --fname` - Feature name
- `-v: --ver` - Feature version (required if a version is specified in the license)
- Input file location
- Output file location

### Optional Protection Options

The list of protection options is defined in the [Basic Protection Options](#) and [Advanced Protection Options](#) sections. Except for the options included in the Mandatory Protection Options section, all other protection options are not compulsory.

## Basic Protection Options

The table below describes the basic protection options that you can set while protecting your application using RMS Envelope:

Option	Description	Default Setting
<b>-b: --bgchk:&lt;time&gt;</b>	<p>Enables you to specify the time interval for performing background checks. The protected application checks for the presence of a valid license after the specified time interval.</p> <p>Use of this option is recommended to periodically check that the licensing session is alive and is not bypassed at any point during the protected application execution.</p> <p>If the background check value is higher than <b>key lifetime</b> value of the license, the license check will be done as per the key lifetime value.</p>	Enabled. 300 seconds.
<b>-cs: --csrv:&lt;contact server&gt;</b>	<p>This option is used for specifying the License Manager.</p> <p><b>Notes</b></p> <ul style="list-style-type: none"> <li>For network licensing, specify the hostname or IP address of the machine where the Sentinel RMS License Manager is installed.</li> <li>For standalone licensing, specify NO-NET as the value of this option.</li> <li>Alternatively, the License Manager name can be set using the LSHOST or the LSFORCEHOST environment variables.</li> </ul>	If no License Manager name is set, the application looks for the license first on the local computer, and then it will make a broadcast in order to locate a license looking for License Managers in the subnet, in order to locate a license.
<b>--eval</b>	<p>Protects the application in evaluation mode. The Sentinel LDK Developer key is not required for protecting applications in evaluation mode.</p> <ul style="list-style-type: none"> <li>If this option is used, the application will be protected in evaluation mode only, even if the Sentinel LDK Developer key is available.</li> <li>In this mode, the protected application can be used for a period of up to 90 days, starting from the day it is protected.</li> <li>For more information, refer to the <b>Using RMS Envelope in Evaluation Mode</b> section.</li> </ul>	-
<b>-f: --fname: &lt;feature name&gt;</b>	<p>Mandatory option. A feature identifies a suite of application, an application, a file, or a functionality of the software that needs to be licensed. The feature name can consist of alphanumeric characters, without spaces (in the ASCII range of 32-127).</p> <ul style="list-style-type: none"> <li>The maximum length of the feature name is 24 characters.</li> </ul>	-

Option	Description	Default Setting
	<ul style="list-style-type: none"> <li>The specified feature name should match the feature name that was specified in the license at the time of license generation.</li> </ul>	
<b>-h --help</b>	Displays user help.	-
<b>-lib:&lt;absolute path&gt;</b>	<p>Mandatory option. The absolute path pointing to the <a href="#">Sentinel RMS licensing library</a>.</p> <ul style="list-style-type: none"> <li>For protecting a 32-bit application/DLL, provide the path of the 32-bit library</li> <li>For protecting a 64-bit application/DLL, provide the path of the 64-bit library.</li> </ul>	-
<b>--msg-out:&lt;val&gt;</b>	<p>Sets how the run-time user messages are displayed. Possible values are:</p> <ul style="list-style-type: none"> <li>1 - Windows: Displays messages in a message box on Windows.</li> <li>2 - Eventlog: Logs all the events related to the execution of the protected application in the Windows Administration Tools Event Viewer.</li> <li>4 - Stderr: Logs all the errors encountered during the execution of the command-line-protected applications in standard error (stderr). This functionality is not available for GUI-based Windows applications.</li> <li>You can also specify a combination of the available values (using the OR operator).</li> </ul>	1
<b>-S1:&lt;secret&gt;...-S7:&lt;secret&gt;</b>	<p>Use this option to specify the secret strings for the challenge-response mechanism.</p> <p>The challenge-response mechanism is a technique used for authenticating the License Manager. The challenge strings (secrets) you define are encrypted within the license, with only the License Manager knowing how to decrypt them.</p> <p>The License Manager associates a secret with a feature, provided by the license code. The application also contains this secret.</p> <p>In the License Manager validation process, the protected application sends a “challenge” to the License Manager with a data string. The License Manager computes a response based on to the arranged algorithm, the values, the data string, and the secret, which it to the protected application. The protected application computes the expected response locally using data string and the secret, and verifies that the expected response matches</p>	Disabled.


Option	Description	Default Setting
	<p>the response returned by the License Manager.</p> <p><b>Notes</b></p> <ul style="list-style-type: none"> <li>You can define up to 7 secrets (1 to 7) for the challenge-response mechanism.</li> <li>Each secret can contain up to 12 printable characters.</li> <li>The secrets specified here should match with the secrets defined in the license.</li> <li>If the license contains multiple secrets, you can specify fewer secrets in an exact sequence. For example, If the license contains 7 secrets (S1...S7), you can choose to specify only 3 of the secrets (S1, S2, and S3).</li> </ul>	
<b>-t: --enable-ts:&lt;val&gt;</b>	<p>Enables the protected application to run on a Terminal Server/ Remote Desktop.</p> <p>The available options are:</p> <ul style="list-style-type: none"> <li>0 - Disable server(TS), Disable RDP</li> <li>1 - Disable server(TS), Enable RDP</li> <li>2 - Enable server(TS), Enable RDP</li> </ul>	1
<b>-v: --ver:&lt;feature ver&gt;</b>	<p>Feature version. Mandatory if a version is specified in the license.</p> <p>The maximum length of the version is 11 characters.</p> <ul style="list-style-type: none"> <li>The specified feature version should match the feature version specified in the license.</li> <li>Do not use this option if the license does not contain a feature version.</li> </ul>	-

## Advanced Protection Options

The table below describes the advanced protection options available:

Option	Description	Default Setting
<b>-0 --stk</b>	Enables moderate protection through partial obfuscation of the original application's entry point.	The original application's entry point is fully obfuscated.
<b>-C --csum</b>	Disables the checksum-based integrity check.	Enabled.
<b>-customFunction:&lt;name&gt;</b>	Custom lock function name. The maximum length of the custom function name is 32 characters. The custom function name should match the name defined in custom library.	Optional.
<b>-customLib:&lt;name&gt;</b>	Absolute path of the customized 32/64-bit library. Use this option for locking licenses to a hardware device or software-based implementation, to generate a unique extended custom value for each machine. For more information about extended custom locking, refer to the <a href="#">Callback API</a> section of the Sentinel RMS SDK API Reference Guide. <b>Notes</b> <ul style="list-style-type: none"> <li>• Provide the path of the customized library.</li> <li>• Make sure that the customized library is available inside the RMS Envelope directory when the protected application is executed.</li> <li>• The maximum length of the custom library name is 32 characters.</li> <li>• To protect a 32-bit application/DLL, provide the path of the customized 32-bit library</li> <li>• To protect a 64-bit application/DLL, provide the path of the 64-bit customized library.</li> </ul>	Optional.
<b>-d --dbg</b>	Allows debugging of the protected application.	Enabled.
<b>-e --oep</b>	Disables obfuscation of the original application's entry point.	Enabled.
<b>-H --nhook</b>	Disallows hook API functions.	Allowed.
<b>-i --imp</b>	Disables the protection of import of an application or DLL. If you are trying to protect the import of system DLLs, use the <b>-u</b> ( <b>--unkimp</b> ) option. Use this option only if you have encountered specific problems and Gemalto Technical Support has advised you to use it. If this option is used, the level of security for the application or DLL is significantly reduced.	Enabled.



Option	Description	Default Setting
<b>-I --noig</b>	<p>Enables modification in the manner in which function calls are handled in the application. However, if the program code contains non-standard function calls, the application may not work correctly. If this occurs, do not use this option.</p> <p>If the protected application executes successfully after using this option, it is recommended to use it for achieving a higher level of security.</p>	Disabled.
<b>-ig: --ignore:&lt;count&gt;</b>	<p>Defines the number of times an application can be resumed in the absence of a valid license. Possible values are:</p> <ul style="list-style-type: none"> <li>• 0= Abort or Retry</li> <li>• 1...254 - Ignore count value. For example, if the ignore count value is 5, you can ignore the license unavailability error 5 times.</li> <li>• 255= No limit</li> </ul> <p> <b>Note:</b> If the value of <code>--msg-out:&lt;val&gt;</code> option is specified as <i>Eventlog</i> or <i>Stderr</i>, this option is not supported for console applications.</p>	0
<b>-O --dlx</b>	<p>Data encryption support for overlays.</p> <p>Use this option to protect programs that use overlays. Protected programs that utilize overlays will not execute properly if this option is not used. This option is only available for executables, not for DLLs.</p>	Disabled.
<b>-P --exp</b>	<p>Removes exports functions from the executable file.</p> <p>The executable files sometimes use export functions. If these export functions are used by a statically-linked DLL (such as Borland Runtime), the application will crash.</p> <p>This can be seen with Borland C compiled applications. In such cases, this option should be used.</p>	The exports functions are not removed from the executable file.
<b>-q --quiet</b>	Displays error and warning messages only.	Optional.
<b>-R --res</b>	Disables PE32 resource encryption.	The resource encryption is enabled.
<b>-s --sdbg</b>	<p>Allows system debugging of the protected application.</p> <p>This option should be used only when the protected program is executed in a development environment.</p>	The protected program is enabled to counter system debugging.

Option	Description	Default Setting
<b>-S:</b> <b>--seed:&lt;val&gt;</b>	<p>If set to 0, RMS Envelope uses a random seed when protecting an application.</p> <p>If set to any other value, RMS Envelope uses the specified value as the seed.</p> <p>This ensures that each time that RMS Envelope protects a given application using the same Options, the generated binary will be identical.</p>	0
<b>-u --unkimp</b>	<p>Disables the import of system DLLs.</p>	Enabled.
<b>-U</b> <b>--nsuspend</b>	<p>If this option is used, the protected application is allowed to execute, even when the application fails to renew a license from the License Manager.</p> <p>However, the protected application will display an error due to unavailability of the license.</p> <p><b>Notes</b></p> <ul style="list-style-type: none"> <li>• This option is available for protected applications that are not able to renew their licenses due to unavailability of the License Manager.</li> <li>• If the application fails to get a license on launch, it will be terminated.</li> </ul>	<p>The application terminates when it fails to renew license from the license manager.</p>

## Known Issues

The following known issues exist in RMS Envelope v1.0:

User Story/Service Request ID	Description
LDK-6235	If a protected DLL is launched by an unprotected console application, and the DLL code is in sleep() mode, the DLL does not detect a debugger, if present. <b>Workaround:</b> Ensure that the console application is also protected.
LDK-3424	Although a Win32 DLL file can be protected with debug detection enabled, the C# application that calls the DLL can run successfully in debug mode. However, the C# application uses a CLI debugger. This debugger cannot debug x86 DLL code. Therefore, this debugger is not detected for the protected Win32 DLL file.
LDK-6695	When the "Debugger Detected" error is generated, the protected application cannot determine which process is regarded as a debugger.
LDK-8850	When the protected application detects that a debugger is present, it may generate multiple "Debugger Detected" message windows.
182883 (MKS)	If the log-on user name for Envelope contains multi-byte UTF-8 characters, then when the user attempts to protect an application, the error "Undefined engine error (1)" is generated.
SM-15325	If the application uses an RMS Envelope protected DLL, the license may not be released on application exit. This problem occurs when the <a href="#">general recommendations</a> are not followed for protecting applications using RMS Envelope. <b>Workaround</b> <ul style="list-style-type: none"> <li>• Disable background check. However, this is NOT recommended due to the possibility of licensing misuse.</li> <li>• Wait for the key lifetime (KLT) to expire. The License Manager will release the license due to KLT expiration.</li> </ul>
SM-19968	The <a href="#">Cloud Served - Lease Standalone</a> license deployment mode is not supported with an enveloped DLL. <b>Workaround</b> Protect your application using RMS Envelope.

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## Frequently Asked Questions

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The following are frequently-asked questions related to RMS Envelope:

### Related to Applications Supported for RMS Envelope Protection

**Question: Which type of applications can be protected using RMS Envelope?**

RMS Envelope can protect Windows 32/64-bit native C applications/DLLs.

**Question: Can I protect .NET and Java executables using RMS Envelope?**

No. RMS Envelope does not support protection of .NET and Java executables.

### Related to Sentinel RMS SDK Compliance

**Question: Which version of the RMS SDK is supported for using RMS Envelope?**

RMS Envelope supports v9.2.1 (or later) of the RMS SDK.

**Question: Which RMS license versions are supported by RMS Envelope?**

RMS Envelope supports RMS [license version](#) 18 (or later).

**Question: Does RMS Envelope support extended [custom \(CustomEx\) locking](#)?**

Yes. You can lock licenses to a hardware device or to a software-based implementation to generate a unique fingerprint value not exceeding 64-bytes for each machine.

Supporting this requires you to implement the customized locking logic in your application first. For more information about the extended custom locking, refer to the [Callback API](#) section of the Sentinel RMS SDK API Reference Guide.

### Related to Sentinel RMS Licenses

**Question: How can I generate a license for an RMS Envelope-protected application?**

See the topic: [For Generating Licenses](#).

**Question: How can I generate a license for an RMS Envelope-protected application using the Sentinel Entitlement Management System (Sentinel EMS)?**

The Sentinel EMS users can perform product activation (license generation) using the instructions provided [here](#).

**Question: How does an RMS Envelope-protected application find a license?**

The license search mechanism is defined [here](#). To enhance the license search mechanism for protected applications, do one of the following:

- Define the contact server while protecting an application.
- Use the LSHOST and LSFORCEHOST environment variables on the computer that is running a protected application.

## Technical Support

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You can contact us using any of the following options:

### Business Contacts

To find the nearest office or distributor, use the following URL:

<https://sentinel.gemalto.com/contact-us-sm/>

### Technical Support

To obtain assistance in using Gemalto Sentinel products, feel free to contact our Technical Support team:

- Customer Support Portal: (Preferred)
  - <https://supportportal.gemalto.com/csm?id=sentinel>
- Phone:
  - AMER: 800-545-6608 (US toll free), +1-410-931-7520 (International)
  - EMEA/APAC: <https://supportportal.gemalto.com/csm?id=sentinel>  
Click “Contact us”
- E-mail (only if having issue submitting the technical issue via portal)  
[technical.support@gemalto.com](mailto:technical.support@gemalto.com)

### Downloads

You may want to explore updated installers and other components here:

<https://sentinelcustomer.gemalto.com/sentineldownloads/>