

# ***Sentinel SuperPro Microsoft Visual C/C++ Interface***



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**RAINBOW TECHNOLOGIES, INC.**

50 Technology Drive, Irvine, CA 92618

Telephone: (949) 450-7300, (800) 852-8569 Fax: (949) 450-7450

**RAINBOW TECHNOLOGIES LTD.**

4 The Forum, Hanworth Lane, Chertsey, Surrey KT16 9JX, United Kingdom

Telephone: (44) 1932 579200 Fax: (44) 1932 570743

**RAINBOW TECHNOLOGIES**

122, Avenue Charles de Gaulle, 92522 Neuilly-sur-Seine Cedex, France

Telephone: (33) 1 41 43 29 02 Fax: (33) 1 46 24 76 91

**RAINBOW TECHNOLOGIES GMBH**

Streiflacher Str. 7, Germering, D 82110, Germany

Telephone: (49) 89 32 17 98 15 Fax: (49) 89 32 17 98 50

Additional offices and distributors are located worldwide.

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# About This Document

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This document contains information on using the Sentinel SuperPro Microsoft Visual C/C++ interface. It describes the interface requirements, build examples, Sentinel SuperPro library APIs and API status codes.

## Conventions Used in This Document

Please note the following conventions regarding text this document:

Convention	Meaning
COURIER	Denotes syntax, prompts and code examples. If bold, denotes the text you type.
<i>Italics</i>	Text in italics denotes the parameter names, file names and directories, or for emphasis in notes and tips.
<b>Bold Lettering</b>	In procedures, words in boldface type represent keystrokes, menu items, window names or mouse commands.

## Suggested References

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Refer to the following documentation for more detailed information on Sentinel SuperPro.

Document	What's in it ?
<i>Sentinel SuperPro 6.1 Developer's Guide.</i>	For detailed information about the product features and APIs.
<i>Sentinel SuperPro 6.3 Documentation Addendum</i>	Contains information about the product changes since 6.1.1 release.

# Getting Help

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If you have questions, need additional assistance, or encounter a problem, please contact Rainbow Technologies Technical Support using one of the methods listed in the following table:

**Rainbow Technologies Technical Support Contact Information**

<b>Corporate Headquarters North America and South America</b>	
Internet	Rainbow Technologies North America <a href="http://www.rainbow.com/support.html">http://www.rainbow.com/support.html</a>
E-mail	<a href="mailto:techsupport@irvine.rainbow.com">techsupport@irvine.rainbow.com</a>
Telephone	(800) 959-9954 (Monday – Friday, 6:00 a.m. – 6:00 p.m. PST)
Fax	(949) 450-7450
<b>Australia and New Zealand</b>	
E-mail	<a href="mailto:techsupport@au.rainbow.com">techsupport@au.rainbow.com</a>
Telephone	(61) 3 9820 8900
Fax	(61) 3 9820 8711
<b>China</b>	
E-mail	<a href="mailto:sentinel@isecurity.com.cn">sentinel@isecurity.com.cn</a>
Telephone	(86) 10 8266 3936
Fax	(86) 10 8266 3948
<b>France</b>	
E-mail	<a href="mailto:EuTechSupport@rainbow.com">EuTechSupport@rainbow.com</a>
Telephone	(33) 1 41.43.29.00
Fax	+44 (0) 1932 570743
<b>Germany</b>	
E-mail	<a href="mailto:EuTechSupport@rainbow.com">EuTechSupport@rainbow.com</a>
Telephone	0183 RAINBOW (7246269)
Fax	+44 (0) 1932 570743
<b>Taiwan and Southeast Asia</b>	
E-mail	<a href="mailto:techsupport@tw.rainbow.com">techsupport@tw.rainbow.com</a>
Telephone	(886) 2 2570-5522
Fax	(886) 2 2570-1988
<b>United Kingdom</b>	
E-mail	<a href="mailto:EuTechSupport@rainbow.com">EuTechSupport@rainbow.com</a>
Telephone	0870 7529200
Fax	+44 (0) 1932 570743
<b>Countries not listed above</b>	
Please contact your local distributor for assistance.	





# Interface Requirements

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This section contains information on what is required to use this interface.

## Compiler Compatibility

This interface is compatible with the following compilers:

- Microsoft Visual C++ 5.0
- Microsoft Visual C++ 6.0

## Specific Requirements

The interface requires the following:

- Sentinel System Driver 5.41 or higher
- Sentinel SuperPro Server version 6.3 or higher (for network operations only; not required for cases where *direct-to-driver* communication takes place. Also note that in case of the *direct-to-driver* communication, the network APIs—RNBOsproGetSubLicense, RNBOsproSetProtocol and RNBOsproSetHeartBeat—will return an error whenever called.)

## Testing

This interface has been tested on the following platforms:

- Windows 98
- Windows NT
- Windows 2000
- Windows ME
- Windows XP (32-bit)

## Build Example Information

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The following information can be used for building the example program given with this interface.

## Evaluation Program Files

File Name	Description
<i>Resource.h</i>	An include file for <i>sproeval.rc</i> .
<i>Rnbo.ico</i>	The icon file for <i>sproeval.exe</i> .
<i>SPROEVAL.c</i>	The source code of the example program.

File Name	Description
<i>SPROEVAL.dsp</i>	The Microsoft Visual C++ 6.0 project file for <i>sproeval.exe</i> .
<i>SPROEVAL.dsw</i>	The Microsoft Visual C++ 6.0 project workspace for <i>sproeval.exe</i> .
<i>SPROEVAL.h</i>	An include file for <i>sproeval.c</i> .
<i>SPROEVAL.mak</i>	The make file used for building <i>sproeval.exe</i> .
<i>SPROEVAL.rc</i>	A resource file for the evaluation program.
<i>Spromeaps.h</i>	An include file for all the SuperPro APIs.
<i>.\MT\Spromeaps.lib</i>	The Sentinel SuperPro static link library built with the multi-threaded (MT) flag.
<i>.\MD\ Spromeaps.lib</i>	The Sentinel SuperPro static link library built with the multi-threaded DLL (MD).
<i>.\MD\Sx32w.dll</i>	The Sentinel SuperPro dynamic link library built with the multi-threaded DLL (MD).
<i>.\MD\Sx32w.lib</i>	The import library for <i>sx32w.dll</i> .
<i>Build.bat</i>	The batch file for building the sproeval.
<i>SuperPro Microsoft VC Interface.pdf</i>	(this document)

## Build Example Instructions

To build *sproeval.exe* program, follow the steps given below:

1. Open *sproeval.dsw* in the Microsoft Visual C++ 5.0/6.0 IDE.
2. Click **Build sproeval.exe** under the **Build** menu to build the example program.

---

**Tip!** In your application you need to use the following files to call the SuperPro APIs:

- *spromeaps.h*
  - *spromeaps.lib* or *sx32w.dll* (and *sx32w.lib*)
- 

## Sentinel SuperPro Interface APIs

### The RB\_SPRO\_APIPACKET Structure

All the SuperPro APIs require a pointer to an RB\_SPRO\_APIPACKET structure. The structure must reside on a DWORD boundary.

The Sentinel System Driver uses the data in the RB\_SPRO\_APIPACKET structure to communicate with the SuperPro key. A programmer should never modify the data in the RB\_SPRO\_APIPACKET structure and must allocate memory for the structure.

## Packet Definition

```
typedef RB_DWORD[SPRO_APIPACKET_SIZE/sizeof(RB_DWORD)] RB_SPRO_APIPACKET;  
typedef RBP_VOID RB_SPRO_APIPACKET;
```

The following APIs are supported by this interface:

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***Note:** For information on the structures, constants and data types used here, refer to the section on “Data Type, Constant and Structure Definitions.”*

---

## RNBOsproFormatPacket

This API initializes and validates the RB\_SPRO\_APIPACKET based on its size.

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***Note:** This API must be called before any other RNBOspro API.*

---

### Format

```
SP_STATUS SP_API RNBOsproFormatPacket(RBP_SPRO_APIPACKET packet,  
                                       RB_WORD packetSize);
```

### Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.
<i>packetSize</i>	IN	RB_WORD	The size of the RB_SPRO_APIPACKET structure.

### Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document.

## RNBOsproInitialize

This API initializes the packet and sets the SuperPro server to be contacted if anything is set in the NSP\_HOST environment variable.

### Format

```
SP_STATUS SP_API RNBOsproInitialize(RBP_SPRO_APIPACKET packet);
```

### Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.

### Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document.

## RNBOsproSetProtocol

This API registers the communication protocol of a client to the SuperPro server. It is called after initializing the structure and before RNBOsproFindFirst API is called. If this API is not used, the default protocol setting remains TCP/IP.

This API will not work if the API packet already has a license; in that case it will return an SP\_INVALID\_OPERATION error code.

### Format

```
SP_STATUS SP_API RNBOsproSetProtocol(RBP_SPRO_APIPACKET packet,
                                     PROTOCOL_FLAG protocol);
```

### Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.
<i>protocol</i>	IN	PROTOCOL_FLAG	The protocol chosen by a client for communication with the SuperPro server. The valid values are: NSPRO_TCP_PROTOCOL = 1 NSPRO_IPX_PROTOCOL = 2 NSPRO_NETBEUI_PROTOCOL = 3 NSPRO_SAP_PROTOCOL = 8 <sup>†</sup>

<sup>†</sup>Service Advertising Protocol (SAP) is used for finding the key plugged in the Novell server through broadcast only.

### Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document.

## RNBOsproSetContactServer

This API is used to set the SuperPro server to be contacted for a particular API packet. The contact server can be set as RNBO\_STANDALONE, RNBO\_SPN\_DRIVER, RNBO\_SPN\_LOCAL, RNBO\_SPN\_BROADCAST, RNBO\_SPN\_ALL\_MODES, RNBO\_SPN\_SERVER\_MODES or as an IP address, IPX address, NetBEUI name or the name of the machine.

This API will not work if the API packet already has a license; in that case it will return an SP\_INVALID\_OPERATION error code.

### Format

```
SP_STATUS SP_API RNBOsproSetContactServer(RBP_SPRO_APIPACKET packet,
                                           char *serverName);
```

### Parameters

Name	Direction	Parameter Type	Description
<i>Packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.

Name	Direction	Parameter Type	Description
<i>serverName</i>	IN	char*	Any of the following reserved strings: <ul style="list-style-type: none"> <li>▪ RNBO_STANDALONE</li> <li>▪ RNBO_SPN_DRIVER</li> <li>▪ RNBO_SPN_LOCAL</li> <li>▪ RNBO_SPN_BROADCAST</li> <li>▪ RNBO_SPN_ALL_MODES</li> <li>▪ RNBO_SPN_SERVER_MODES</li> <li>▪ no-net<sup>†</sup></li> </ul> Or, the name of the contact server (Servername/IP address/IPX address <sup>††</sup> )

<sup>†</sup> The no-net mode is deprecated. See the Sentinel SuperPro 6.3 Documentation Addendum for details.

<sup>††</sup> The IPX address should be represented in the "xx-xx-xx-xx,xx-xx-xx-xx-xx-xx" format, for example 12-34-56-78,9A-BC-DE - F0-12-34.

## Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the "API Status Codes" section at the end of this document.

## RNBOsproFindFirstUnit

This API finds the first SuperPro key with the specified developer ID and gets a license from the key. If RNBOsproFindFirstUnit is called with an API packet, which already has a license, then the SP\_INVALID\_OPERATION error is returned.

## Format

```
SP_STATUS SP_API RNBOsproFindFirstUnit(RBP_SPRO_APIPACKET packet,
                                         RB_WORD          developerID);
```

## Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.
<i>developerID</i>	IN	RB_WORD	The developer ID of the Sentinel SuperPro key to find.

## Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the "API Status Codes" section at the end of this document.

## RNBOsproGetContactServer

This API is used to return the contact SuperPro server set for a particular API packet.

## Format

```
SP_STATUS SP_API RNBOsproGetContactServer(RBP_SPRO_APIPACKET packet,
                                           char                *serverNameBuf,
                                           RB_WORD            serverNameBufSz);
```

## Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.
<i>serverNameBuf</i>	OUT	char *	A pointer to the buffer in which the server name is copied. Memory need to be allocated for the buffer.
<i>serverNameBufSz</i>	IN	RB_WORD	The length of the buffer. The maximum length recommended is up to 64 bytes.

## Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document.

## RNBOsproSetHeartBeat

This API customizes the heartbeat of a client. It has to be called only after RNBOsproFindFirst is called. It can be used in following ways:

1. To set an infinite heartbeat for a client by setting the time to INFINITE\_HEARTBEAT. In this case, the SuperPro server will not release the license acquired by a client until RNBOsproReleaseLicense is received by the server for this client.
2. To set the heartbeat to any value between MIN\_HEARTBEAT to MAX\_HEARTBEAT in multiples of 1 second.

If the API is not used, the default heartbeat setting is 120 seconds.

## Format

```
SP_STATUS SP_API RNBOsproSetHeartBeat(RBP_SPRO_APIPACKET packet,
                                       RB_DWORD          heartBeatValue);
```

## Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.
<i>heartBeatValue</i>	IN	RB_DWORD	A value that represents time in seconds.

## Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document.

## RNBOsproFindNextUnit

This API finds the next SuperPro key based on the developer ID maintained in the RB\_SPRO\_APIPACKET structure. This API should not be called, unless RNBOsproFindFirstUnit has returned a successful value or, if the licenses available with the contacted SuperPro server are exhausted (SP\_NO\_LICENSE\_AVAILABLE).

If this API returns success, the system will release the license obtained by RNBOsproFindFirstUnit API call and will contain the data for the next SuperPro key. However, if this API returns an error value, the RB\_SPRO\_APIPACKET structure will be marked invalid.

To re-initialize the RB\_SPRO\_APIPACKET structure, use RNBOsproFindFirstUnit and optionally, RNBOsproFindNextUnit depending on the number of SuperPro keys found and the one your program accesses.

### Format

```
SP_STATUS SP_API RNBOsproFindNextUnit(RBP_SPRO_APIPACKET packet);
```

### Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.

### Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document.

## RNBOsproRead

This API reads a word at the specified address of the SuperPro key identified by the RB\_SPRO\_APIPACKET structure. On success, the data variable will contain information from the SuperPro key.

If SP\_ACCESS\_DENIED error code is returned, an attempt was made to read a non-readable (algorithm) word. For security reasons, algorithm words *cannot* be read.

### Format

```
SP_STATUS SP_API RNBOsproRead(RBP_SPRO_APIPACKET packet,
                               RB_WORD          address,
                               RBP_WORD          data);
```

### Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.
<i>address</i>	IN	RB_WORD	The cell address to be read.
<i>data</i>	OUT	RBP_WORD	A pointer to the variable that contains the data read from the key.

### Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document.

## RNBOsproExtendedRead

This API reads the word and access code at the specified address of the SuperPro key identified by the RB\_SPRO\_APIPACKET structure. On success, the data variable will contain the information from the SuperPro key and the access code variable will contain the access code.

If SP\_ACCESS\_DENIED error code is returned, an attempt was made to read a non-readable (algorithm) word. For security reasons, algorithm words cannot be read.

### Format

```
SP_STATUS SP_API RNBOsproExtendedRead(RBP_SPRO_APIPACKET packet,
                                       RB_WORD address,
                                       RBP_WORD data,
                                       RBP_BYTE accessCode);
```

### Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.
<i>address</i>	IN	RB_WORD	The cell address to be read.
<i>data</i>	OUT	RBP_WORD	A pointer to a variable that contains the data read from the key.
<i>accessCode</i>	OUT	RBP_BYTE	A pointer to a variable that contains the access code associated with the word read.

### Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document.

## RNBOsproWrite

This API is used to write a word and its associated access code to the SuperPro key identified by the RB\_SPRO\_APIPACKET structure.

Writing to the SuperPro key requires a write password. The word data is placed in the data variable and its associated access code is placed in the access code variable.

On success, the data and its associated access code are written to the specified word on the SuperPro key. If SP\_ACCESS\_DENIED error code is returned, either the write password was incorrect or an attempt was made to write/overwrite a locked cell.

The write API can be used only to write/overwrite words with an access code of 0. To overwrite words with other access codes, use the RNBOsproOverwrite API.

### Format

```
SP_STATUS SP_API RNBOsproWrite(RBP_SPRO_APIPACKET packet,
                               RB_WORD writePassword,
                               RB_WORD address,
                               RB_WORD data,
                               RBP_BYTE accessCode);
```



## Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.
<i>writePassword</i>	IN	RB_WORD	The write password of the key.
<i>address</i>	IN	RB_WORD	The cell address to be written.
<i>data</i>	IN	RB_WORD	Contains the word to write in the key.
<i>accessCode</i>	IN	RB_BYTE	Contains the access code associated with the word to write.

## Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document.

## RNBOSproOverwrite

This API writes a word and its associated access code to the SuperPro key identified by the RB\_SPRO\_APIPACKET structure.

Overwriting to the SuperPro key requires the write and overwrite passwords. The word data is placed in the data variable and its associated access code is placed in the access code variable. On success, the data and its associated access code are written to the specified word on the SuperPro key. If SP\_ACCESS\_DENIED error code is returned, the write password and/or the overwrite passwords were incorrect.

This API can be used to overwrite any word on the SuperPro key with an exception of the words at addresses 0-7.

## Format

```
SP_STATUS SP_API RNBOSproOverwrite(RBP_SPRO_APIPACKET packet,
                                     RB_WORD writePassword,
                                     RB_WORD overwritePassword1,
                                     RB_WORD overwritePassword2,
                                     RB_WORD address,
                                     RB_WORD data,
                                     RB_BYTE accessCode);
```

## Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.
<i>writePassword</i>	IN	RB_WORD	The write password of the key.
<i>overwritePassword1</i>	IN	RB_WORD	The word 1 of the overwrite password.
<i>overwritePassword2</i>	IN	RB_WORD	The word 2 of the overwrite password.
<i>address</i>	IN	RB_WORD	The cell address to be written.
<i>data</i>	IN	RB_WORD	Contains the word to write in the key.
<i>accessCode</i>	IN	RB_BYTE	Contains the access code associated with the word to write.

## Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document.

## RNBOsproDecrement

This API decrements the counter at the specified address of the SuperPro key identified by the RB\_SPRO\_APIPACKET structure. If the API is successful, the counter is decremented by 1. Errors are returned if you try to decrement a locked or hidden word, the counter is already 0, the word at the address is not a counter or, the write password is incorrect.

If the counter is associated with an active algorithm and the counter is decremented to 0, the associated algorithm will be made inactive.

The counter and associated algorithm can appear in the SuperPro as:

Address	Data
N - 2	Counter
N - 1	Counter
N	Algorithm Word 1
N + 1	Algorithm Word 2

If either or both counters exist, the counter is associated with the algorithm. This association will exist only for N = 0C, 14, 1C, 24, 2C, 34, 3C Hex. An algorithm can have both an associated password and associated counters. The counters can be used to make the algorithm inactive and the password can be used to make the algorithm active. See RNBOsproActivate.

## Format

```
SP_STATUS SP_API RNBOsproDecrement (RBP_SPRO_APIPACKET packet,  
                                     RB_WORD writePassword,  
                                     RB_WORD address);
```

## Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.
<i>writePassword</i>	IN	RB_WORD	The write password of the key.
<i>address</i>	IN	RB_WORD	The cell address of the counter to decrement.

## Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document.

## RNBOsproActivate

This API is used to activate an inactive algorithm at the specified address of the SuperPro key identified by the RB\_SPRO\_APIPACKET structure. If the API is successful, the algorithm is made active. Errors are returned if the write password is invalid, the activate password is invalid, or the address is not word 1 of an algorithm having an activation password.

The algorithm and associated password will appear in the SuperPro as:

Address	Data
N	Algorithm Word 1
N + 1	Algorithm Word 2
N + 2	Activate Password 1
N + 3	Activate Password 1

The association will only exist for N = 08, 0C, 10, 14, 18, 1C, 20, 24, 28, 2C, 30, 34, 38, 3C Hex. An algorithm can have both an associated password and associated counters. The counters can be used to make an algorithm inactive and the password can be used to make an algorithm active. See RNBOsproDecrement.

## Format

```
SP_STATUS SP_API RNBOsproActivate(RBP_SPRO_APIPACKET packet,
                                   RB_WORD writePassword,
                                   RB_WORD activatePassword1,
                                   RB_WORD activatePassword2,
                                   RB_WORD address);
```

## Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A Pointer to the RB_SPRO_APIPACKET structure.
<i>writePassword</i>	IN	RB_WORD	The write password of the SuperPro key.
<i>activatePassword1</i>	IN	RB_WORD	The first word of the activate password.
<i>activatePassword2</i>	IN	RB_WORD	The second word of the activate password.
<i>address</i>	IN	RB_WORD	The cell address of the first word of an algorithm to activate.

## Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document.

## RNBOsproQuery

This API is used to query an active algorithm at the specified address of the SuperPro key identified by the RBP\_SPRO\_APIPACKET structure. The address should be the first word of an active algorithm. The query data will point to the first byte of the data to be passed to an active algorithm. The length of the query data is specified in the length variable. On success, the query response of the same length is placed in the buffer pointed by the response variable. The last 4 bytes of the response will also be placed in the response32 variable.

Each query byte may contain any value varying from 0 to 255. Each response byte may also contain any value between 0-255. The length of the response will always be the same as the length of the query bytes. It is the programmer's responsibility to allocate memory for the buffers.

However, if the address is not the first word of an active algorithm, the return status will be SP\_SUCCESS and the response buffer data will be the same as the query buffer data.

## Format

```
SP_STATUS SP_API RNBOsproQuery(RBP_SPRO_APIPACKET packet,
                                RB_WORD address,
                                RBP_VOID queryData,
                                RBP_VOID response,
                                RBP_DWORD response32,
                                RB_WORD length);
```

## Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.
<i>address</i>	IN	RB_WORD	The cell address of the word to query.
<i>queryData</i>	IN	RBP_VOID	A pointer to the first byte of the query bytes.
<i>response</i>	OUT	RBP_VOID	A pointer to the first byte of the response bytes.
<i>response32</i>	OUT	RBP_DWORD	A pointer that will contain a copy of the last 4 bytes of the query response.
<i>length</i>	IN	RB_WORD	The number of query bytes to be sent to an active algorithm and also the length of the response buffer.

## Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document.

# RNBOsproGetVersion

This API returns the driver's version number and type.

## Format

```
SP_STATUS SP_API RNBOsproGetVersion(RBP_SPRO_APIPACKET packet,
                                     RBP_BYTE majVer,
                                     RBP_BYTE minVer,
                                     RBP_BYTE rev,
                                     RBP_BYTE osDrvrType);
```

## Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.
<i>majVer</i>	OUT	RBP_BYTE	A pointer to the location for the returned major version number.
<i>minVer</i>	OUT	RBP_BYTE	A pointer to the location for the returned minor version number.
<i>Rev</i>	OUT	RBP_BYTE	A pointer to the location for the returned revision number.

Name	Direction	Parameter Type	Description
<i>osDrvType</i>	OUT	RBP_BYTE	<p>A pointer to the location where the operating system driver type information is stored. Currently defined types are:</p> <ol style="list-style-type: none"> <li>1. DOS local driver</li> <li>2. Windows 3.x local driver</li> <li>3. Windows Win32s local driver</li> <li>4. Windows 3.x system driver</li> <li>5. Windows NT system driver</li> <li>6. OS/2 system driver</li> <li>7. Windows 95 system driver</li> <li>8. NetWare local driver</li> <li>9. QNX local driver</li> </ol>

### Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document.

## RNBOsproGetHardLimit

This API is used to retrieve the maximum number of licenses supported by a key (the hard limit).

### Format

```
SP_STATUS SP_API RNBOsproGetHardLimit(RBP_SPRO_APIPACKET packet,
                                       RBP_WORD          HardLimit);
```

### Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.
<i>HardLimit</i>	OUT	RBP_WORD	A pointer to the buffer that will hold the hard limit for a key. Memory should be allocated by the developer.

### Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document.

## RNBOsproGetKeyInfo

This API is used to get information about a key attached on a stand-alone system or a network computer.

### Format

```
SP_STATUS SP_API RNBOsproGetKeyInfo(RBP_SPRO_APIPACKET packet,
                                     RB_WORD          devId,
                                     RB_WORD          keyIndex,
                                     NSPRO_MONITOR_INFO *nsproMonitorInfo);
```

## Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.
<i>devId</i>	IN	RB_WORD	The developer ID of the key at the position specified by the <i>keyIndex</i> parameter.
<i>keyIndex</i>	IN	RB_WORD	The index of the key whose information is being sought.
<i>nsproMonitorInfo</i>	OUT	NSPRO_MONITOR_INFO	A pointer to the NSPRO_MONITOR_INFO structure. Memory needs to be allocated by the developer for this structure. This structure has various fields which provide information about the key.

## Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document.

## RNBOsproGetFullStatus

This API is used for obtaining the return code of the last called API. It is provided for support purposes only.

## Format

```
RB_WORD SP_API RNBOsproGetFullStatus(RBP_SPRO_APIPACKET packet);
```

## Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.

## Return Code

Returns an RB\_WORD value that can be interpreted by Rainbow's technical support department.

## RNBOsproGetSubLicense

This API is used to get a sublicense from the read-only data cell.

## Format

```
SP_STATUS SP_API RNBOsproGetSubLicense(RBP_SPRO_APIPACKET packet,  
                                         RB_WORD address);
```

## Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.
<i>address</i>	IN	RB_WORD	The address of the cell to get a sublicense from.

## Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document

## RNBOsproReleaseLicense

This API can be used in two ways:

1. To release the main license by specifying the cell address as zero.
2. To release the sublicense from a particular cell by specifying the cell address of the sublicensing cell as well as the number of sublicenses to be released.

## Format

```
SP_STATUS SP_API RNBOsproReleaseLicense(RBP_SPRO_APIPACKET packet,  
                                         RB_WORD address,  
                                         RBP_WORD numSubLic);
```

## Parameters

Name	Direction	Parameter Type	Description
<i>packet</i>	IN	RBP_SPRO_APIPACKET	A pointer to the RB_SPRO_APIPACKET structure.
<i>address</i>	IN	RB_WORD	The cell address of the sublicense. If a sublicense is to be released, specify the sublicense cell number, otherwise specify 0.
<i>numSubLic</i>	IN	RBP_WORD	A pointer to the variable that contains the number of sublicenses to be released. If the main license is to be released, this can be specified as null.

## Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document.

## RNBOsproEnumServer

This API is used to enumerate the number of SuperPro servers running in a subnet for the particular developer ID specified.

## Format

```
SP_STATUS SP_API RNBOsproEnumServer(ENUM_SERVER_FLAG enumFlag,  
                                     RB_WORD developerId,  
                                     NSPRO_SERVER_INFO serverInfo,  
                                     RBP_WORD numServerInfo);
```

## Parameters

Name	Direction	Parameter Type	Description
<i>enumFlag</i>	IN	ENUM_SERVER_FLAG	The flag used for contacting either: - the first-found server that has licenses to offer (NSPRO_RET_ON_FIRST_AVAILABLE), or - the first-found server that may have licenses (NSPRO_RET_ON_FIRST), or - all the SuperPro servers in the network (NSPRO_GET_ALL_SERVERS).
<i>developerId</i>	IN	RB_WORD	The developer ID of the SuperPro key to find. Only the SuperPro servers running on the system having a key of matching developer ID will respond. If developer ID is specified as 0xFFFF then all the SuperPro servers ( for a specified protocol) in the subnet will respond.
<i>serverInfo</i>	OUT	NSPRO_SERVER_INFO	A pointer to a buffer that will contain the SuperPro server information, such as the computer address and the number of licenses available. A developer needs to allocate memory for the buffer.
<i>numServerInfo</i>	IN/OUT	RBP_WORD	A pointer to a variable that contains the desired number of SuperPro servers. When the function returns, this variable contains the actual number of servers found running on the network.

## Return Code

On success, returns SP\_SUCCESS. Else, returns an error code as defined in the “API Status Codes” section at the end of this document.

# Data Type, Constant and Structure Definitions

This section provides information about the data types, constants and structures used in this document.

## Data Type Definitions

- `typedef unsigned long int* RBP_DWORD;`
- `typedef unsigned long int RB_DWORD;`
- `typedef int ENUM_SERVER_FLAG;`
- `typedef unsigned short int* RBP_WORD;`
- `typedef unsigned short int RB_WORD;`
- `typedef unsigned short int SP_STATUS;`
- `typedef unsigned short int PROTOCOL_FLAG;`
- `typedef unsigned char* RBP_BYTE;`
- `typedef unsigned char RB_BYTE;`
- `typedef void* RBP_VOID;`



## Constants

```
■ #define SP_SUCCESS                0
■ #define SP_API
■ #define MAX_ADDR_LEN              32 /* Maximum host address length */
■ #define MAX_NAME_LEN              64 /* Maximum host name length */
```

## Enumeration Flag Definition

```
/* Flags to specify the way of enumerating the SuperPro servers */

#define NSPRO_RET_ON_FIRST           1
#define NSPRO_GET_ALL_SERVERS       2
#define                             4
NSPRO_RET_ON_FIRST_AVAILABLE
```

## Protocol Flag Definition

```
/* To set the communication protocol flags */

typedef RB_WORD PROTOCOL_FLAG;
#define NSPRO_TCP_PROTOCOL           1
#define NSPRO_IPX_PROTOCOL           2
#define NSPRO_NETBEUI_PROTOCOL       4
#define NSPRO_SAP_PROTOCOL           8
```

## Access Modes Definition

```
/* To set an access modes for the protected application */

#define RNBO_STANDALONE               __TEXT("RNBO_STANDALONE")
#define RNBO_SPN_DRIVER               __TEXT("RNBO_SPN_DRIVER")
#define RNBO_SPN_LOCAL                __TEXT("RNBO_SPN_LOCAL")
#define RNBO_SPN_BROADCAST            __TEXT("RNBO_SPN_BROADCAST")
#define RNBO_SPN_ALL_MODES            __TEXT("RNBO_SPN_ALL_MODES")
#define RNBO_SPN_SERVER_MODES        __TEXT("RNBO_SPN_SERVER_MODES")
```

## Heartbeat Definition

```
/* To make the license update time programmable */

#define MAX_HEARTBEAT                 2592000 /* 30*24*60*60 seconds */
#define MIN_HEARTBEAT                 60     /* 60 seconds */
#define INFINITE_HEARTBEAT            0xFFFFFFFF /* For infinite heartbeat */
```

## Monitoring Information Structure Definition

```
/* Information about the key, used as a part of the tag_nsproMonitorInfo
structure */

typedef struct tag_nsproKeyMonitorInfo
{
    RB_WORD    devId;
    RB_WORD    hardLimit;
    RB_WORD    inUse;
    RB_WORD    numTimeOut;
    RB_WORD    highestUse;
}NSPRO_KEY_MONITOR_INFO;

/* Provides information of the SuperPro server with key details */

typedef struct tag_nsproMonitorInfo
{
    char        serverName[MAX_NAME_LEN];
    char        serverIPAddress[MAX_ADDR_LEN];
    char        serverIPXAddress[MAX_ADDR_LEN];
    char        version[MAX_NAME_LEN];
    RB_WORD     protocol;
    NSPRO_KEY_MONITOR_INFO  sproKeyMonitorInfo;
}NSPRO_MONITOR_INFO;
```

## Server Structure Definition

```
/* The SuperPro Server information with the number of licenses
available */

typedef struct
{
    char        serverAddress[MAX_ADDR_LEN];
    RB_WORD     numLicAvail;
}NSPRO_SERVER_INFO;
```

## API Status Codes

On success, all APIs discussed earlier return SP\_SUCCESS. Else, they return an error code defined below. This section enumerates all the recoverable API status codes with their description. However, if you receive any unknown error numbers, please report the error number (extended error number if possible) to Rainbow Technologies Technical Support.

---

**Note** – API Status Codes not listed below are obsolete even though they appear in the spromeeps.h header file.

---

Status Code (Decimal)	Description
0	<b>SP_SUCCESS</b> The fuction completed successfully.

Status Code (Decimal)	Description
1	<b>SP_INVALID_FUNCTION_CODE</b> An invalid function code was specified. See your language's include file for valid API function codes. Generally, this error should not occur if you are using a Rainbow-provided interface to communicate with the driver.
2	<b>SP_INVALID_PACKET</b> A checksum error was detected in the command packet, indicating an internal inconsistency. The packet structure may have been tampered with. Generally, this error should not occur if you are using a Rainbow-provided interface to communicate the driver.
3	<b>SP_UNIT_NOT_FOUND</b> The specific unit could not be found. Make sure you are sending the correct information to find the unit. This error is returned by other functions if the unit has disappeared or unplugged.
4	<b>SP_ACCESS_DENIED</b> You attempted to perform an illegal action on a word. For example, you may have tried to read an algorithm/hidden word, write to a locked word, or decrement a word that is not a data nor a counter word.
5	<b>SP_INVALID_MEMORY_ADDRESS</b> You specified an invalid Sentinel SuperPro memory address. Valid addresses are 0-63 decimal(0-3F hex). Cells 0-7 are invalid for many operations. Algorithm descriptors must be referenced by the first (even) address.
6	<b>SP_INVALID_ACCESS_CODE</b> You specified an invalid access code. The access code must be 0 (read/write data), 1 (read only data), 2 (counter), or 3 (algorithm/hidden).
7	<b>SP_PORT_IS_BUSY</b> The port is busy in some other operation.
8	<b>SP_WRITE_NOT_READY</b> The write or decrement action could not be performed due to a momentary lack of sufficient power. Attempt the operation again.
9	<b>SP_NO_PORT_FOUND</b> No ports could be found on the workstation.
10	<b>SP_ALREADY_ZERO</b> You tried to decrement a counter or data word that already contains the value 0. If you are using the counter to control demo program executions, this condition may occur after corresponding algorithm descriptor has been reactivated with its activation password.
12	<b>SP_DRIVER_NOT_INSTALLED</b> The system device driver was not installed or detected. Communication with the unit was not possible. Please verify that the device driver is properly loaded.
13	<b>SP_IO_COMMUNICATIONS_ERROR</b> The system device driver is having problems communicating with the unit. Please verify that the device driver is properly installed.
15	<b>SP_PACKET_TOO_SMALL</b> The API packet is too small.
16	<b>SP_INVALID_PARAMETER</b> The API packet contained an invalid parameter.
18	<b>SP_VERSION_NOT_SUPPORTED</b> The current system device driver is outdated. Please update the system device driver.
19	<b>SP_OS_NOT_SUPPORTED</b> The Operating System or environment is currently not supported by the client library. Please contact Rainbow Technical Support.

Status Code (Decimal)	Description
20	<b>SP_QUERY_TOO_LONG</b> The maximum length of a query string supported is 56 characters. Retry with a shorter string.
21	<b>SP_INVALID_COMMAND</b> An invalid SuperPro command was specified in the API call.
30	<b>SP_DRIVER_IS_BUSY</b> The system device driver is busy. Try the operation again.
31	<b>SP_PORT_ALLOCATION_FAILURE</b> Failed to allocate a parallel port through the Operating System's parallel port contention handler.
32	<b>SP_PORT_RELEASE_FAILURE</b> Failed to release a previously allocated parallel port through the Operating System's parallel port contention handler.
39	<b>SP_ACQUIRE_PORT_TIMEOUT</b> Failed to acquire access to a parallel port within the defined time-out.
42	<b>SP_SIGNAL_NOT_SUPPORTED</b> The particular machine does not support a signal line. For example, an attempt was made to use the ACK line on a NEC 9800 computer. The NEC 9800 does not have an ACK line. Therefore, this error is reported.
57	<b>SP_INIT_NOT_CALLED</b> Failed to call the client library's initialize API. This API must be called prior to the API that generated this error.
58	<b>SP_DRV_TYPE_NOT_SUPPORTED</b> The type of driver access, either direct I/O or system driver, is not supported for the defined Operating System and client library.
59	<b>SP_FAIL_ON_DRIVER_COMM</b> The client library failed on communicating with a Rainbow system driver.
60	<b>SP_SERVER_PROBABLY_NOT_UP</b> The SuperPro server is not responding and the client has been timed out.
61	<b>SP_UNKNOWN_HOST</b> Unknown host. The SuperPro server host does not seem to be on the network. Invalid hostname.
62	<b>SP_SENDTO_FAILED</b> Client was unable to send message to the SuperPro server.
63	<b>SP_SOCKET_CREATION_FAILED</b> Client was unable to open the network socket. Make sure the TCP/IP or IPX protocol stack is properly installed on the system.
64	<b>SP_NORESOURCES</b> Could not locate enough resources. Insufficient resources (such as memory) are found to complete the request. An error occurred in attempting to allocate memory needed by function.
65	<b>SP_BROADCAST_NOT_SUPPORTED</b> Broadcast is not supported by the network interface on the machine.
66	<b>SP_BAD_SERVER_MESSAGE</b> Could not understand the message received from the SuperPro server. An error occurred in decrypting(or decoding) the message on the client side.
67	<b>SP_NO_SERVER_RUNNING</b> Cannot talk to the SuperPro server. Verify that the specified SuperPro server is running. No SuperPro server seems to be running. Server on specified host is not available for processing the client request.
68	<b>SP_NO_NETWORK</b> Unable to talk to the specified host. Network communication problems encountered.

Status Code (Decimal)	Description
69	<b>SP_NO_SERVER_RESPONSE</b> No SuperPro server responded to the client broadcast. Either there is no server running in the subnet or no server in the subnet has a desired key attached. Also can be the case, when a particular server is not responding back.
70	<b>SP_NO_LICENSE_AVAILABLE</b> All licenses are currently in use. The SuperPro server has no more licenses available for this request.
71	<b>SP_INVALID_LICENSE</b> The license is no longer valid. License expired due to timeout.
72	<b>SP_INVALID_OPERATION</b> The specified operation cannot be performed. A license has already been issued for the given APIPACKET. Trying to set the contact server after obtaining a license for the given APIPACKET, or trying to make another findfirst call.
73	<b>SP_BUFFER_TOO_SMALL</b> The size of the buffer is not sufficient to hold the expected data.
74	<b>SP_INTERNAL_ERROR</b> Internal error faced in licensing.
75	<b>SP_PACKET_ALREADY_INITIALIZED</b> The given APIPACKET has already been initialized.
76	<b>SP_PROTOCOL_NOT_INSTALLED</b> The protocol specified is not installed.