

SNTP ActiveX Control for Microsoft® Windows™

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1 SNTP Overview

1.1 Introduction

The Magneto Software SNTP (Simple Network Time Protocol) ActiveX control (sksntp.ocx) can be used for very accurate local clock synchronization with a remote time server across the Internet.

The Magneto Software sksntp ActiveX control (sksntp.ocx) allows developers to integrate the SNTP protocol message sending capability into their 32-Bit or 64-Bit applications.

Additional information about SNTP User Information Protocol can be found at this location:

[RFC2030 – Simple Network Time Protocol \(SNTP\) Version 4 for IPv4, IPv6, and OSI.](#)

1.2 Usage

Sksntp ActiveX control can retrieve the exact time from any SNTP compliant time server across the Internet, and synchronize your computer' local clock accurately to the order of milliseconds.

1.3 Property Summary

[optPort](#)

SNTP service port on server

[optSntpServer](#)

SNTP Server to be used for time synchronization

[optSyncInterval](#)

Specify how frequently to synchronize local clock.

[optSyncOnStartup](#)

Specify if local clock has to be synchronized whenever sksntp.ocx is invoked.

[optTimeout](#)

Specify timeout value in milliseconds to wait for replies.

1.4 Event Summary

[SntpCompleted](#)

Indicate that sksntp.ocx has stopped processing SNTP requests.

[SntpQueryCompleted](#)

Indicate that sksntp.ocx has stopped processing a single SNTP request.

1.5 Method Summary

[AboutBox](#)

Display a dialog box with Sksntp ActiveX control license and version information.

[ResetSntpSettings](#)

Reset all SNTP settings back to default values.

[SntpGetReply](#)

Get a SNTP reply.

[SntpReset](#)

Stop SNTP messages.

[SntpSendRequest](#)

Send a SNTP request.

1.6 Error codes

The following provides a complete listing of error codes returned by Sksntp ActiveX control.

ERROR_SUCCESS (0)	No errors.
ERROR_CANCELLED (1223)	User canceled the operation.
ERROR_TIMEOUT (1460)	This operation returned because the timeout period expired.
WSAEFAULT (10014)	The <i>name</i> or the <i>namelen</i> parameter is not a valid part of the user address space, the <i>namelen</i> parameter is too small, or the <i>name</i> parameter contains incorrect address format for the associated address family.
WSAEPFNOSUPPORT (10046)	The protocol family has not been configured into the system or

	no implementation for it exists.
WSAEADDRNOTAVAIL (10049)	The remote address is not a valid address (such as ADDR_ANY).
WSAENETDOWN (10050)	The network subsystem has failed.
WSAENETUNREACH (10051)	The network cannot be reached from this host at this time.
WSAENOBUFS (10055)	No buffer space is available. The socket cannot be connected.
WSAENOTCONN (10057)	The socket is not connected.
WSAETIMEDOUT (10060)	Attempt to connect timed out without establishing a connection.
WSAECONNREFUSED (10061)	The attempt to connect was forcefully rejected.

2 Properties

2.1 *optPort*

Summary

SNTP service port on server

Description

This property specifies the remote port on the server on which the SNTP service resides.

This property is of type int.

The default value is 123.

VB Example

```
Dim Port As Int
```

```
Port = 123
```

```
SKSNTP.optPort = Port
```

2.2 *optSntpServer*

Summary

SNTP Server to be used for time synchronization.

Description

This property specifies the SNTP server to query. Note that this value will be used only in conjunction with *optSyncOnStartup* or with *optSyncInterval* options.

By default this value is set to “time.mit.edu”.

This property is of type string.

VB Example

```
Dim TimeServer As String
```

```
TimeServer = “time.nist.gov”
```

```
SKSNTP.optSntpServer = TimeServer
```

2.3 *optSyncInterval*

Summary

Specify how frequently to synchronize local clock.

Description

SkSNTP can synchronize local clock on demand (via method *SntpSendRequest*), or periodically (when *optSyncInterval* is set to a non-zero value).

This property specifies how frequently to synchronize local clock.

To enable periodic local clock synchronization set this property to non-zero value.

Note that SkSNTP will be querying the server, defined by the property *optSntpServer*.

To disable periodic local clock synchronization set this property to zero.

By default this value is set to 0 (Periodic local clock synchronization is disabled).

This property is of type short.

VB Example

```
Dim SyncInterval As Int
```

```
SyncInterval = 24           ' we want to synchronize our computer' clock every 24 hours
```

```
SKSNTP.optSyncInterval = SyncInterval
```


2.4 optSyncOnStartup

Summary

Specify if local clock has to be synchronized whenever SkSNTP is invoked.

Description

This property specifies if local clock has to be synchronized whenever SkSNTP is invoked.

This property is of type short.

VB Example

```
Dim Time As Long
```

```
Time = 3000
```

```
SKSNTP.optTimeout = Time
```

2.5 optTimeout

Summary

Timeout value to wait for replies, in milliseconds.

Description

This property specifies the timeout value in milliseconds that is used to wait for a reply when a request packet is sent. The application must set this value before the request is sent. By default this value is set to 3 seconds (3000 milliseconds).

This property is of type long.

VB Example

```
Dim Time As Long
```

```
Time = 3000
```

```
SKSNTP.optTimeout = Time
```

3 Events

3.1 SntpCompleted

Summary

Indicate that sksntp.ocx has stopped processing SNTP requests.

Syntax

SntpCompleted (void);

Description

Indicate that sksntp.ocx has stopped processing SNTP requests.

Parameters

None.

3.2 SntpQueryCompleted

Summary

Indicate that sksntp.ocx has stopped processing a single SNTP request.

Syntax

SntpQueryCompleted(BSTR *bstrSntpServer*, long *lStatus*, VARIANT *varSntpData*);

Description

Indicate that sksntp.ocx has stopped processing a single SNTP request.

Parameters

strSntpServer is the name of the remote server that was queried.

lStatus is the return status of each individual reply. See section [1.6 Error Codes](#) the complete list of supported error codes,

pvarIcmpInfo is a variant, containing two-dimensional SAFEARRAY of data.

Each element of this SAFEARRAY is a VARIANT.

There are two columns in this array (column #0 – Description, column #1 – Value).

The SAFEARRAY row element indexes and their definitions are as follows:

0 – *varLeapIndicator*, a code warning of an impending leap second to be inserted/deleted in the last minute of the current day, with bit 0 and bit 1, respectively, coded as follows:

Value	Meaning
-------	---------

0 - no warning

1 - last minute has 61 seconds

2 - last minute has 59 seconds)

3 - alarm condition (clock not synchronized).

1 – *varVersion*, the NTP/SNTP version number. The version number is 3 for Version 3 (IPv4 only) and 4 for Version 4 (IPv4, IPv6 and OSI). If necessary to distinguish between IPv4, IPv6 and OSI, the encapsulating context must be inspected.

2 – *varMode*, the mode, with values defined as follows:

Mode	Meaning
------	---------

0 reserved

1 symmetric active

2 symmetric passive

3 client

4 server

5 broadcast

6 reserved for NTP control message

7 reserved for private use

3 – *varStratum*, the stratum level of the local clock, with values defined as follows:

Stratum	Meaning
---------	---------

0 unspecified or unavailable

- 1 primary reference (e.g., radio clock)
- 2-15 secondary reference (via NTP or SNTP)
- 16-255 reserved

4 - varPollInterval, the maximum interval between successive messages, in seconds. The values that can appear in this field presently range from 16 seconds to 16284 seconds; however, most applications use only the sub-range 64 seconds to 1024 seconds.

5 - varPrecision, the precision of the local clock, in seconds. The values that normally appear in this field range from 2 by the power of -6 for mains-frequency clocks to 2 by the power -20 for microsecond clocks found in some workstations.

6 - varRootDelay, the total roundtrip delay to the primary reference source, in seconds. Note that this variable can take on both positive and negative values, depending on the relative time and frequency offsets. The values that normally appear in this field range from negative values of a few milliseconds to positive values of several hundred milliseconds.

7 - varRootDispersion, the nominal error relative to the primary reference source, in seconds. The values that normally appear in this field range from 0 to several hundred milliseconds.

8 - varReferenceIdentifier, a string identifying the particular reference source. In the case of NTP Version 3 or Version 4 stratum-0 (unspecified) or stratum-1 (primary) servers, this is an ASCII string. In NTP Version 3 secondary servers, this is the 32-bit IPv4 address of the reference source. In NTP Version 4 secondary servers, this is the low order 32 bits of the latest transmit timestamp of the reference source. NTP primary (stratum 1) servers should set this field to a code identifying the external reference source according to the following list. If the external reference is one of those listed, the associated code should be used. Codes for sources not listed can be contrived as appropriate.

Code	External Reference Source
------	---------------------------

LOCL	uncalibrated local clock used as a primary reference for a subnet without external means of synchronization
------	---

PPS	atomic clock or other pulse-per-second source individually calibrated to national standards
-----	---

ACTS	NIST dialup modem service
------	---------------------------

USNO	USNO modem service
------	--------------------

PTB	PTB (Germany) modem service
-----	-----------------------------

TDF	Allouis (France) Radio 164 kHz
-----	--------------------------------

DCF	Mainflingen (Germany) Radio 77.5 kHz
-----	--------------------------------------

MSF	Rugby (UK) Radio 60 kHz
-----	-------------------------

WWV	Ft. Collins (US) Radio 2.5, 5, 10, 15, 20 MHz
-----	---

WWVB	Boulder (US) Radio 60 kHz
------	---------------------------

WWVH	Kauai Hawaii (US) Radio 2.5, 5, 10, 15 MHz
------	--

CHU	Ottawa (Canada) Radio 3330, 7335, 14670 kHz
-----	---

LORC	LORAN-C radionavigation system
------	--------------------------------

OMEG OMEGA radionavigation system
GPS Global Positioning Service
GOES Geostationary Orbit Environment Satellite

9 – varOriginateTimestamp, the time at which the request departed the client for the server, in DATE timestamp format.

10 – varOriginateTimestampMsecs, the milliseconds part of the Originate Time (see element 9).

11 – ReceiveTimestamp, the time at which the request arrived at the server, in DATE timestamp format.

12 – varReceiveTimestampMsecs, the milliseconds part of the Receive Time (see element 11).

13 - varTransmitTimestamp, the time at which the reply departed the server for the client, in DATE timestamp format.

14 – varTransmitTimestampMsecs, the milliseconds part of the Transmit Time (see element 13).

15 – varDestinationTimestamp, the time when the SNTP reply was received by the client.

16 – varDestinationTimestampMsecs, the milliseconds part of the Destination Time (see element 13).

17 – varRoundTripDelay, the round trip time in seconds for the SNTP request.
This is calculated as:

$$\text{RoundTripDelay} = (\text{DestinationTime} - \text{OriginateTime}) - (\text{ReceiveTime} - \text{TransmitTime});$$

18 – varLocalClockOffset, the local clock offset relative to the server.
This is calculated as:

$$\text{LocalClockOffset} = ((\text{ReceiveTime} - \text{OriginateTime}) + (\text{TransmitTime} - \text{DestinationTime})) / 2.$$

4 Methods

4.1 AboutBox

Summary

Display a dialog box with Sksntp ActiveX control license and version information.

Syntax

```
void AboutBox();
```

Description

This method could be used to display version license information or to register sksntp.ocx control.

Parameters

None.

4.2 *ResetSntpSettings*

Summary

Reset all SNTP settings back to default values.

Syntax

```
void ResetSntpSettings(void)
```

Description

All SNTP related settings would be reset to defaults.

Parameters

None.

4.3 SntpGetReply

Summary

Get a SNTP reply.

Syntax

long SntpGetReply(BSTR *bstrSntpServer*, VARIANT* *pvarStatus*, VARIANT* *varSntpData*)

Description

Retrieves SNTP reply when SNTP query is sent.

Note that this method should be used only when SkSNTP control is used as a COM server, not an ActiveX control, for instance, when SkSNTP is instantiated from ASP page or Windows Scripting Host.

When SkSNTP is used as regular ActiveX control, notification event [SntpQueryCompleted](#) should be used instead.

Parameters

strSntpServer is the name of the remote server that was queried.

lStatus is the return status of each individual reply. See section [1.6 Error Codes](#) the complete list of supported error codes,

pvarIcmpInfo is a variant, containing two-dimensional SAFEARRAY of data.

Each element of this SAFEARRAY is a VARIANT. See [SntpQueryCompleted](#) for the complete description of this argument.

Return value

Return value indicates current state.

Possible values:

997 (ERROR_IO_PENDING), control is still processing SNTP request.

234 (ERROR_MORE_DATA), a SNTP reply is retrieved.

259 (ERROR_NO_MORE_ITEMS), there is no more data to retrieve.

4.4 SntpReset

Summary

Stop SNTP messages.

Syntax

void SntpReset (void)

Description

The SntpReset method terminates any pending SNTP requests.

Parameters

None.

4.5 SntpSendRequest

Summary

Send a SNTP request.

Syntax

```
long SntpSendRequest(BSTR bstrSntpServer, short bSynchronizeClock);
```

Description

The SntpSendRequest method sends a SNTP request to the host specified by *bstrSntpServer*. It returns a long, which is set to 0 (ERROR_SUCCESS) if the method is successfully executed, otherwise it will be set to the error code from section [1.6 Error Codes](#).

Parameters

bstrSntpServer is the name of the remote SNTP server to query.

bSynchronizeLocalClock specifies if local clock needs to be synchronized (1 – if “Yes”, 0 – if “No”).

Note that when SkSNTP used by IIS server, or some other services, it might fail to synchronize local clock due to the limited security privileges of the running process.