



GPS ActiveX Control Reference Guide

A Programmer's Guide to the Linkspoint GPS ActiveX Control

For Microsoft® Windows 95/98/ME/NT/CE/2000/XP Operating Systems

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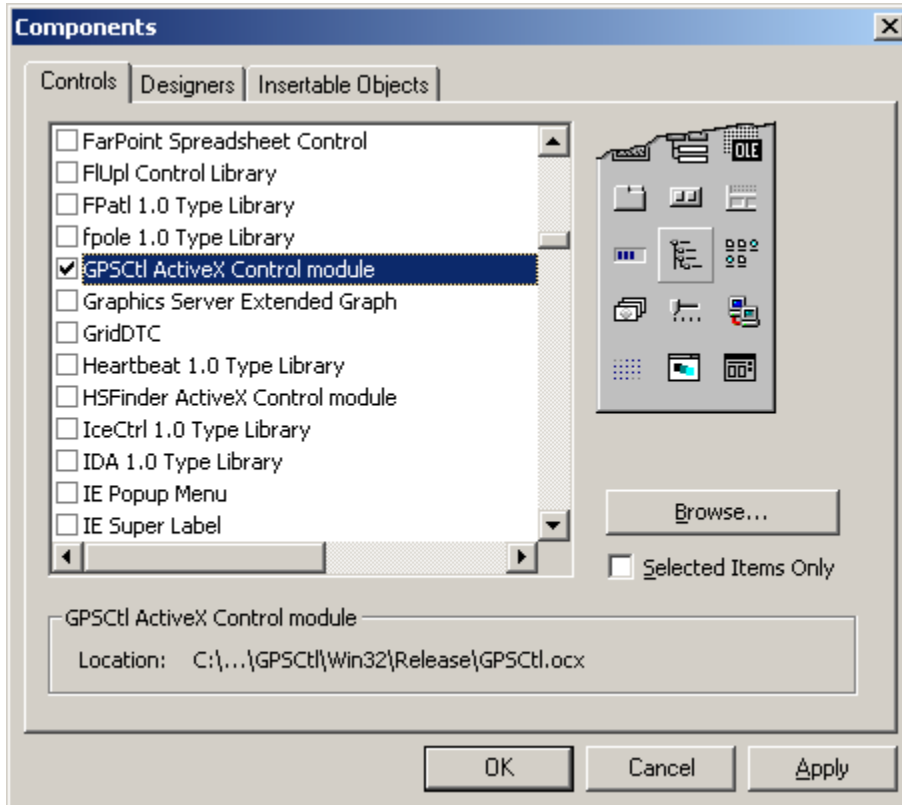
Introduction

Thank you for the purchase of the Linkspoint GPS ActiveX Control. This GPS ActiveX Control was designed for use with Linkspoint hardware and is subject to the terms of the associated End User License Agreement (EULA).

This guide is designed for programmers who have familiarity with the use of ActiveX controls. Please contact Linkspoint if you have any questions or issues regarding this guide.

Inserting the GPSCtl Control into a Visual Basic Form

Select the GPSCtl ActiveX Control module, as shown below.



Use code similar to the Visual Basic code sample below, based on the properties and methods listed in this guide, to access the GPSCtl control.

VISUAL BASIC CODE SAMPLE

```
Private Sub Form_OKClick()
    App.End
End Sub

Private Sub Command1_Click()
    If GPSCtl1.Enable Then
        GPSCtl1.Enable = False
        Command1.Caption = "Enable"
    Else
        GPSCtl1.Enable = True
        Command1.Caption = "Disable"
    End If
End Sub

Private Sub Form_Load()
```

```
Dim I
ListView1.ColumnHeaders.Add , , "ID"
ListView1.ColumnHeaders.Add , , "SNR"
ListView1.ColumnHeaders.Add , , "Azimuth"
ListView1.ColumnHeaders.Add , , "Elevation"
For I = 0 To 11
    ListView1.ListItems.Add , , "0"
Next I
End Sub

Private Sub Form_Unload(Cancel As Integer)
    GPSCtl1.Enable = False
End Sub

Private Sub Timer1_Timer()
    Dim itmX As ListItem
    Dim I
    Lat.Caption = GPSCtl1.Latitude
    Lon.Caption = GPSCtl1.Longitude
    UTC.Caption = GPSCtl1.UTCTime
    For I = 0 To 11
        Set itmX = ListView1.ListItems.Item(I + 1)
        itmX.Text = GPSCtl1.SatelliteID(I)
        itmX.SubItems(1) = GPSCtl1.SatelliteSNR(I)
        itmX.SubItems(2) = Int(GPSCtl1.SatelliteAzimuth(I) * 180 / 3.14)
        itmX.SubItems(3) = Int(GPSCtl1.SatelliteElevation(I) * 180 / 3.14)
    Next I
End Sub
```

Using the GPS Control with Visual Basic as an Object

Use code similar to the Visual Basic Code Sample, below, to access the GPS ActiveX Control as an object.

VISUAL BASIC CODE SAMPLE

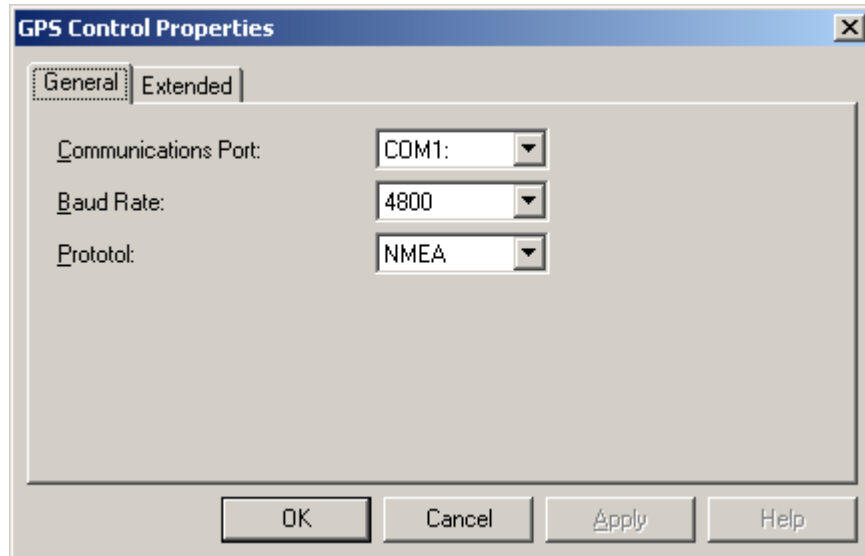
```
Dim objGPS As GPSPos

Private Sub Command1_Click()
    MsgBox "Latitude is " & objGPS.Latitude & ", Longitude is " & objGPS.Longitude
End Sub

Private Sub Form_Load()
    Set objGPS = CreateObject("GPS.GPSPos")
    objGPS.Port = "COM1:"
    objGPS.BaudRate = 38400
    objGPS.Protocol = GPSPROTOCOL_SIRF
    objGPS.Enable = True
End Sub

Private Sub Form_Unload(Cancel As Integer)
    objGPS.Enable = False
    Set objGPS = Nothing
End Sub
```

GPS Control Properties Form



The screenshot shows a dialog box titled "GPS Control Properties" with a close button (X) in the top right corner. It has two tabs: "General" (selected) and "Extended". Under the "General" tab, there are three settings, each with a dropdown menu:

- Communications Port: COM1
- Baud Rate: 4800
- Prototol: NMEA

At the bottom of the dialog box, there are four buttons: "OK", "Cancel", "Apply", and "Help".

The communications settings for talking to a GPS device can be set from the Properties form of the GPS control which is usually available by selecting the control in the development environment and choosing the Properties menu item.

Properties

Latitude

Returns the current WGS84 latitude in degrees.

Syntax

Object.**Latitude**

The **Latitude** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.

Data Type

Double

Longitude

Returns the current WGS84 longitude in degrees.

Syntax

Object.**Longitude**

The **Longitude** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.

Data Type

Double

HDOP

Returns the current Horizontal Dilution of Precision.

Syntax

Object.**HDOP**

The **HDOP** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.

Data Type

Double

UTMEasting

Returns the current UTM Easting in meters referenced to the current UTM zone.

Syntax

Object.**UTMEasting**

The **UTMEasting** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.

Data Type

Long

UTMNorthing

Returns the current UTM northing in meters referenced to the current UTM zone.

Syntax

Object.**UTMNorthing**

The **UTMNorthing** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.

Data Type

Long

UTMZone

Returns the current UTM zone number.

Syntax

Object.**UTMZone**

The **UTMZone** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.

Data Type

Short

Quality

Returns the quality of the GPS fix.

Syntax

Object.Quality

The **Quality** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.

GPSQUALITY

Value	Description
GPSQUALITY_INVALID = 0	Invalid
GPSQUALITY_UNCORRECTED = 1	Uncorrected.
GPSQUALITY_CORRECTED = 2	Corrected
GPSQUALITY_PPS = 3	PPS.
GPSQUALITY_INT_RTK = 4	Int RTF
GPSQUALITY_FLOAT_RTK = 5	Float RTK
GPSQUALITY_ESTIMATED = 6	Estimated.
GPSQUALITY_MANUAL_INPUT = 7	Manual Input.
GPSQUALITY_SIMULATOR = 8	Simulator.
GPSQUALITY_STALE = 9	Stale.
GPSQUALITY_AUTONOMOUS = 10	Autonomous.
GPSQUALITY_DIFFERENTIAL = 11	Differential.
GPSQUALITY_VALID = 12	Valid.

Data Type

GPSQUALITY

Notes

The majority of the time the values of the **Quality** property will be either GPSQUALITY_INVALID when no fix is available, GPSQUALITY_UNCORRECTED when a normal fix is available, or GPSQUALITY_CORRECTED when a corrected fix is available using a WAAS satellite.

UTCTime

Returns the current UTC Time in the format HH:MM:SS.

Syntax

Object.**UTCTime**

The **UTCTime** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.

Data Type

String

UTCHour

Returns the current UTC hour.

Syntax

Object.**UTCHour**

The **UTCHour** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.

Data Type

Short

UTCMinute

Returns the current UTC minute.

Syntax

Object.UTCMinute

The **UTMTime** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.

Data Type

Short

UTCSecond

Returns the current UTC second.

Syntax

Object.UTCSecond

The **UTCSecond** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.

Data Type

Short

Port

Returns/sets the communication port for the connected device..

Syntax

Object.**Port** [= value]

The **Port** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.
value	The communications port where the GPS device is connected, i.e. COM1: or COM2:

Data Type

String

Notes

If the value of the **Port** property is set to COM0: and the **Protocol** property is set to GPSPROTOCOL_UNKNOWN, the control will attempt to auto-detect the correct port and protocol by trying each valid port, baud rate and protocol. However, if the **Port** is set to any valid port, the auto-detect will only look at the specified port when trying to detect the correct baud rate and protocol.

Protocol

Returns/sets the GPS protocol for communicating with the device.

Syntax

Object.**Protocol** [= value]

The **Longitude** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.
value	An enumeration value that represents a type of protocol as defined in GPSPROTOCOL.

GPSPROTOCOL

Value	Description
GPSPROTOCOL_NMEA = 0	NMEA ASCII protocol.
GPSPROTOCOL_ROCKWELL = 1	Rockwell binary protocol.
GPSPROTOCOL_SIRF = 2	SiRF Binary.
GPSPROTOCOL_JRC = 3	A Japan Radio Corporation binary protocol.
GPSPROTOCOL_NAVICOM = 4	Navicom ASCII protocol.
GPSPROTOCOL_SONY = 5	Sony binary protocol.
GPSPROTOCOL_GARMIN = 6	Sony binary protocol.
GPSPROTOCOL_UNKNOWN = 7	Unknown protocol.

Data Type

GPSPROTOCOL

Notes

If the **Protocol** value is set to GPSPROTOCOL_UNKNOWN, this will initiate an Auto-Detect of the correct port, baud rate and protocol if the **AutoDetectEnabled** property is set to TRUE.

BaudRate

Returns/sets the baud rate for the connected device.

Syntax

Object.**BaudRate** [= value]

The **BaudRate** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.
value	A baud rate whose value is 2400, 4800, 9600, 19200, 38400 or 57600 bits/second.

Data Type

Long

Receiver

Returns the GPS receiver device type if known.

Syntax

Object.**Receiver** [= value]

The **Receiver** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.
value	An enumeration value that represents a type of receiver as defined in GPSRECEIVER.

GPSRECEIVER

Value	Description
GPSRECEIVER_SIRF = 0	A receiver using the SiRF chipset.
GPSRECEIVER_ROCKWELL = 1	A Rockwell receiver.
GPSRECEIVER_GARMIN = 2	A Garmin receiver.
GPSRECEIVER_MAGELLAN = 3	A Magellan receiver.
GPSRECEIVER_JRC = 4	A Japan Radio Corporation receiver.
GPSRECEIVER_NAVICOM = 5	A Navicom receiver.
GPSRECEIVER_SONY = 6	A Sony receiver.
GPSRECEIVER_EMTAC = 7	An Emtac Bluetooth receiver.
GPSRECEIVER_UNKNOWN = 8	Receiver type is unknown.

Data Type

GPSRECEIVER

Enable

Returns/sets whether or not the GPS is enabled for use.

Syntax

Object.**Enable** [= Value]

The **Enable** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.
Value	True – The GPS is enabled. False – The GPS is disabled (Default).

Data Type

Boolean

Speed

Returns the current ground speed in meters per second.

Syntax

Object.**Speed**

The **Speed** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.

Data Type

Double

Altitude

Returns the current height above mean geoid in meters referenced to the WGS84 ellipsoid.

Syntax

Object.**Altitude**

The **Altitude** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.

Data Type

Double

SatellitesUsed

Returns the number of satellites used in the navigation solution.

Syntax

Object.**SatellitesUsed**

The **SatellitesUsed** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.

Data Type

Short

SatellitesVisible

Returns the number of satellites visible in the sky.

Syntax

Object.**SatellitesVisible**

The **SatellitesVisible** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.

Data Type

Short

FixType

Returns the type of GPS fix.

Syntax

Object.**FixType**

The **Longitude** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.

GPSFIXTYPE

Value	Description
GPSFIX_UNAVAILABLE = 0	Fix type is unavailable.
GPSFIX_1_SATELLITE_SOLUTION = 1	One Satellite Fix Type.
GPSFIX_2_SATELLITE_SOLUTION = 2	Two Satellite Fix Type.
GPSFIX_3_SATELLITE_SOLUTION = 3	Three Satellite Fix Type.
GPSFIX_3_PLUS_SATELLITE_SOLUTION = 4	Three Plus Satellite Fix Type.
GPSFIX_2D = 5	2 Dimensional Fix Type.
GPSFIX_3D = 6	3 Dimensional Fix Type.
GPSFIX_DEAD_RECKONING = 7	Dead Reckoning Fix Type.

Data Type

GPSFIXTYPE

AutoDetectEnabled

Returns/sets the current auto-detect mode setting. The auto-detect setting determines whether or not the control will try to auto-detect the communication and protocol settings.

Syntax

Object.AutoDetectEnabled [= Value]

The **AutoDetectEnabled** property has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.
Value	True – Auto-Detect is enabled (Default). False – Auto-Detect is disabled.

Data Type

Boolean

Methods

SatelliteID

Returns the ID of a specific satellite.

Syntax

Object.**SatelliteID**(Index)

The **SatelliteID** method has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.
Index	A satellite index in the range of 0 to 11.

Data Type

Short

SatelliteSNR

Returns the carrier signal to noise ratio of a specific satellite.

Syntax

Object. **SatelliteSNR**(Index)

The **SatelliteSNR** method has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.
Index	A satellite index in the range of 0 to 11.

Data Type

Short

SatelliteElevation

Returns the position of a specified satellite in degrees in the elevation plane.

Syntax

Object. **SatelliteElevation**(Index)

The **SatelliteElevation** method has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.
Index	A satellite index in the range of 0 to 11.

Data Type

Double

SatelliteAzimuth

Returns the position of a specified satellite in degrees in the azimuth plane.

Syntax

Object. **SatelliteAzimuth**(Index)

The **SatelliteAzimuth** method has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.
Index	A satellite index in the range of 0 to 11.

Data Type

Double

SatelliteVisible

Returns whether or not the specified satellite is currently visible in the sky.

Syntax

Object. **SatelliteVisible**(index)

The **SatelliteVisible** method has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.
Index	A satellite index in the range of 0 to 11.

Data Type

Boolean

SatelliteUsed

Returns whether or not the specified satellite is used in the current position calculation.

Syntax

Object. **SatelliteUsed**(Index)

The **SatelliteUsed** method has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.
Index	A satellite index in the range of 0 to 11.

Data Type

Boolean

SatelliteValid

Returns whether or not the satellite information for the specified satellite index is valid.

Syntax

Object.**SatelliteValid**(Index)

The **SatelliteValid** method has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.
Index	A satellite index in the range of 0 to 11.

Data Type

Boolean

InitializeReceiver

Initializes the GPS receiver.

Syntax

Object.**InitializeReceiver**(gimMode)

The **InitializeReceiver** method has the following parts:

Part	Description
<i>Object</i>	An object expression that evaluates to a GPSCtl control.
gimMode	An enumeration value that represents the type of initialization to send to the receiver as defined in GPSINITMODE.

GPSINITMODE

Value	Description
GPSINIT_HOT_START = 0	Perform a Hot Start.
GPSINIT_WARM_START=2	Perform a Warm Start.
GPSINIT_COLD_START=3	Perform a Cold Start.
GPSINIT_FACTORY_START=4	Perform a Factor Default Reset.

Events

PositionChange

This event is fired when the GPS Control receives information from the receiver that either position or satellite information has been updated.

Syntax

PositionChange(double dLatitude, double dLongitude, double dHDOP)

The **PositionChange** event has the following parts:

Part	Description
dLatitude	The current latitude in degrees.
dLongitude	The current longitude in degrees.
dHDOP	The current Horizontal Dilution of Precision.

Notes

When using the **PositionChange** event it is important to check the **Quality** property to determine if the position information passed as parameters is the result of a valid fix.