A Graphicbox with Scrollbars

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Horizscrollbar and Vertscrollbar

Liberty BASIC v4 gives us more control of the horizontal and vertical scrollbars of the Graphics window and even a Graphicbox. From the *What's New* of the ***Liberty BASIC v4 Help File*** -

- print #handle "horizscrollbar on/off [min max]"
- This command manages the horizontal scrollbar. If the value is "on", the scrollbar is made visible. If the value is "off", the scrollbar is hidden. When turning on the scrollbar the optional parameters for min and max set the minimum and maximum scrollbar range in pixels (these parameters do nothing when turning the scrollbar off.) Without these parameters the default range is set to 0 and the width of the graphics view in pixels. A large scrollbar range allows the graphics window to scroll a long distance, while a short range allows it to scroll a short distance.

A Graphics Window with Scrollbars

A window opened for Graphics contains scrollbars by default.

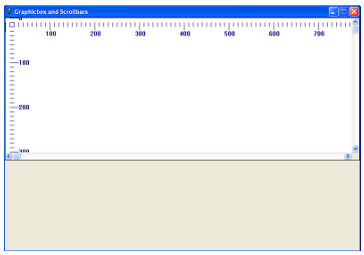
```
Open "A Graphics Window" for Graphics as #1
#1 "Trapclose EndDemo"
Wait

Sub EndDemo handle$
    Close #1
    End
    End Sub
```

These scrollbars can be removed using the Vertscrollbar off and Horizscrollbar off commands.

```
Open "A Graphics Window" for Graphics as #1
#1 "Trapclose EndDemo"
#1 "Horizscrollbar Off"
#1 "Vertscrollbar Off"
Wait

Sub EndDemo handle$
    Close #1
    End
    End Sub
```

A Graphicbox with Scrollbars

Normally, a graphicbox opened within another window does not contain scrollbars. Scrollbars can be added with the Vertscrollbar On and Horizscrollbar On commands.



```
Nomainwin
WindowWidth = 800
WindowHeight = 554

UpperLeftX = Int((DisplayWidth - WindowWidth)/2)
UpperLeftY = Int((DisplayHeight - WindowHeight)/2)

Graphicbox #main.gb, 0, 0, 794, 320
```

```
Open "Graphicbox and Scrollbars" for Window_nf as #main
#main "Trapclose EndDemo"
#main "Font Verdana 10 Bold"
#main.gb "Horizscrollbar On"
#main.gb "Vertscrollbar On"
#main.gb "Down; Color Darkblue"
For x = 0 to 1550 Step 10
    #main.gb "Place ";x;" 10"
    #main.gb "North; Turn 180; Go 10"
    If x / 100 = Int( x / 100 ) Then
        #main.gb "Go 10"
        #main.gb "Place ";x - 10;" 40"
        #main.gb "\";x
    End If
Next x
For y = 0 to 1500 Step 10
    #main.gb "Place 10 ";y
    #main.gb "North; Turn 90; Go 10"
    If y / 100 = Int( y / 100 ) Then
        #main.gb "Go 10"
        #main.gb "Place 30 ";y + 5
        #main.gb "\";y
    End If
Next y
#main.gb "Flush"
Wait

Sub EndDemo handle$
    Close #main
    End
    End Sub
```

A Word About the Actual size of the Graphicbox

The defined size of a graphicbox includes the graphicbox borders as well. This means that a 200 x 200 graphicbox can only display a 198 x 198 graphic. The display size is further compromised by the addition of scrollbars. Windows automatically subtracts the width of the scrollbar from the client area, so that painting on the client area does not run over the scrollbars. Increasing the width and height of the graphicbox by 20 pixels each should fully compensate for this loss. A 500 x 500 graphicbox with scrollbars has an approximate 480 x 480 display area.

Setting the Scrollbar min and max Parameters

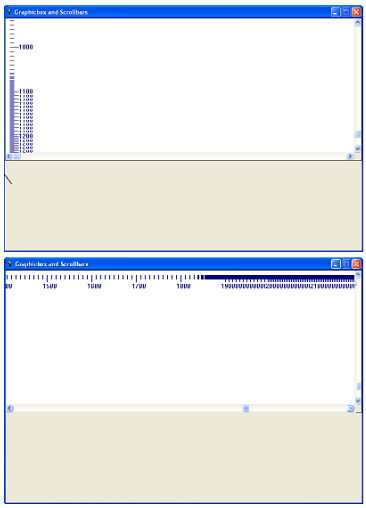
The Scrollbar commands support optional min and max parameters. By including these limits, the programmer can define the exact area to be scrolled. The min of both width and height is usually zero, but it can be any number, even a negative number. It is important to note that the max is not the actual final limit of the display. Rather, it is the Upper Left value. The size of the graphicbox (both width and height) extends this values. If the max width parameter is set to 500 for a graphicbox that is 400 pixels wide, the actual display area becomes approximately 880 pixels wide (900 pixels minus the scrollbar width). The same is true for the max height parameter.

```
    Nomainwin
    WindowWidth = 806
    WindowHeight = 554

    UpperLeftX = Int((DisplayWidth - WindowWidth)/2)
    UpperLeftY = Int((DisplayHeight - WindowHeight)/2)

    Graphicbox #main.gb, 0, 0, 800, 320
    Open "Graphicbox and Scrollbars" for Window_nf as #main
    #main "Trapclose EndDemo"
    #main "Font Verdana 10 Bold"
    #main.gb "Vertscrollbar On 0 500"
    #main.gb "Horizscrollbar On 0 1000"
    #main.gb "Down; Color Darkblue"
    For x = 0 to 1780 Step 10
'1000 (max) + 800 (graphicbox width) - 20 = 1780
        #main.gb "Place ";x;" 10"
        #main.gb "North; Turn 180; Go 10"
        If x / 100 = Int( x / 100 ) Then
            #main.gb "Go 10"
            #main.gb "Place ";x - 10;" 40"
            #main.gb "\";x
        End If
    Next x
    For y = 0 to 800 Step 10
'500 (max) + 320 (graphicbox height) - 20 = 800
        #main.gb "Place 10 ";y
        #main.gb "North; Turn 90; Go 10"
        If y / 100 = Int( y / 100 ) Then
            #main.gb "Go 10"
            #main.gb "Place 30 ";y + 5
            #main.gb "\";y
        End If
    Next y
    #main.gb "Flush"
    Wait
```

```
    Sub EndDemo handle$
        Close #main
        End
        End Sub
```

Fixing a Glitch

As the scrolled area becomes greater, a known glitch will appear with the graphics. The graphics at lower and/or rightmost become distorted.



The following code shows this glitch. Run the code and then scroll all the way down and then all the way to the right.

```
    Nomainwin
    WindowWidth = 806
    WindowHeight = 554

    UpperLeftX = Int((DisplayWidth - WindowWidth)/2)
    UpperLeftY = Int((DisplayHeight - WindowHeight)/2)

    Graphicbox #main.gb, 0, 0, 800, 320
    Open "Graphicbox and Scrollbars" for Window_nf as #main
    #main "Trapclose EndDemo"
    #main "Font Verdana 10 Bold"
    #main.gb "Horizscrollbar On 0 2000"
    #main.gb "Vertscrollbar On 0 1000"
    #main.gb "Down; Color Darkblue"
'    #main.gb "Place -20, -20; Boxfilled 2800 1320"
    For x = 0 to 2780 Step 10
'2000 (max) + 800 (graphicbox width) - 20 = 1780
```

```
        #main.gb "Place ";x;" 10"
        #main.gb "North; Turn 180; Go 10"
        If x / 100 = Int( x / 100 ) Then
            #main.gb "Go 10"
            #main.gb "Place ";x - 10;" 40"
            #main.gb "\";x
        End If
    Next x
    For y = 0 to 1300 Step 10
'1000 (max) + 320 (graphicbox height) - 20 = 1300
        #main.gb "Place 10 ";y
        #main.gb "North; Turn 90; Go 10"
        If y / 100 = Int( y / 100 ) Then
            #main.gb "Go 10"
            #main.gb "Place 30 ";y + 5
            #main.gb "\";y
        End If
    Next y
    #main.gb "Flush"
    Wait

    Sub EndDemo handle$
        Close #main
        End
        End Sub
```

The fix? Uncomment the line

```
'    #main.gb "Place -20, -20; Boxfilled 2800 1320"
```

and try the code again. The graphics now flush and persist properly. The filled box should fully extend beyond the borders of the desired visible scrolled area to be effective. Note that if you ever issue a CLS command you will need to reissue the above boxfilled instruction to continue to avoid distortion.

Scrolling Within the Program

The API call "SetScrollPos" allows the programmer to set the scrollbar positions. Pass Windows constants to the call to define the scrollbar (horizontal or vertical) and the amount to scroll. The position is the position of the Upper Left Corner. Some Windows constants include

- _SBS_HORZ ' Designates the Horizontal Scrollbar

- _WM_HSCROLL ' Windows Message to the Horizontal Scrollbar
- _SBS_VERT ' Designates the Vertical Scrollbar
- _WM_VSCROLL ' Windows Message to the Vertical Scrollbar
- _SB_THUMBPOSITION ' The Value Within the Range of the Scroll Limits

Setting the Scrollbar position requires first designating the Scrollbar to be set, then defining the desired position, and lastly posting that message to the scrollbar.

```
    CallDLL #user32, "SetScrollPos", _
        handle as Ulong, _ 'handle of the graphicbox
        scrollDir as Long, _ '_SBS_HORZ or _SBS_VERT
        pos as Long, _ 'Desired Position
        1 as long, _ 'Flag to Repaint the Scrollbar Control
        result as Long 'Returned Value
'The position must then be multiplied by &H10000 and added to _SB_THUM
BPOSITION
        hPos = pos * HexDec("&H10000") + _SB_THUMBPOSITION
    CallDLL #user32, "PostMessageA", _
        handle as Ulong, _ 'handle of the Graphicbox
        scrollFlag as Long, _ '_WM_HSCROLL or _WM_VSCROLL
            hPos as Long, _ 'Position in hexadecimal + H10000
            0 as Long, _ 'No significance
            result as long 'Returned Value
```

The API call "GetScrollPos" returns the current position of the Scrollbar.

```
    CallDLL #user32, "GetScrollPos", _
        handle As Ulong, _ 'handle of the Graphicbox
        scrollDir as Long, _ '_SBS_HORZ or _SBS_VERT
        resultPos as Long 'The Position in decimal format
```

Graphicbox and Scrollbars Demo

Copy and paste the following demo to your favorite Liberty BASIC IDE. No external files are required.

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```
    Nomainwin
    WindowWidth = 800
    WindowHeight = 554

    UpperLeftX = Int((DisplayWidth - WindowWidth)/2)
    UpperLeftY = Int((DisplayHeight - WindowHeight)/2)

    Graphicbox #main.gb, 0, 0, 520, 520
    Button #main.b1, "Scroll Left Most"
, ScrollButtonSet, UL, 560, 50, 180, 40
    Button #main.b2, "Scroll Right Most"
, ScrollButtonSet, UL, 560, 100, 180, 40
    Button #main.b3, "Scroll To Top"
, ScrollButtonSet, UL, 560, 150, 180, 40
    Button #main.b4, "Scroll To Bottom"
, ScrollButtonSet, UL, 560, 200, 180, 40
    Button #main.b5, "HScroll --> "
, ScrollButtonSet, UL, 560, 250, 120, 40
    Textbox #main.tb5, 690, 255, 50, 30
    Button #main.b6, "VScroll --> "
, ScrollButtonSet, UL, 560, 300, 120, 40
    Textbox #main.tb6, 690, 305, 50, 30
    Stylebits #main.b7, _BS_MULTILINE, 0, 0, 0
    Button #main.b7,
"Horizontal Thumbposition", ScrollButtonGet, UL, 560, 370, 120, 40
    Statictext #main.st7, "0", 690, 380, 50, 30
    Stylebits #main.b8, _BS_MULTILINE, 0, 0, 0
    Button #main.b8, "Vertical Thumbposition"
, ScrollButtonGet, UL, 560, 420, 120, 40
    Statictext #main.st8, "0", 690, 430, 50, 30
    Open "Graphicbox and Scrollbars" for Window as #main
    #main "Trapclose EndDemo"
```

```
    #main "Font Verdana 10 Bold"
    #main.gb "Vertscrollbar On 0 500"
    #main.gb "Horizscrollbar On 0 500" '
    #main.gb
"Down; Fill Darkblue; Color Lightgray; Backcolor Darkblue"
    For x = 0 to 1000 Step 10
        #main.gb "Place ";x;" 10"
        #main.gb "North; Turn 180; Go 10"
        If x / 100 = Int( x / 100 ) Then
            #main.gb "Go 10"
            #main.gb "Place ";x - 10;" 20"
            #main.gb "\";x
        End If
    Next x
    For y = 0 to 1000 Step 10
        #main.gb "Place 10 ";y
        #main.gb "North; Turn 90; Go 10"
        If y / 100 = Int( y / 100 ) Then
            #main.gb "Go 10"
            #main.gb "Place 30 ";y + 5
            #main.gb "\";y
        End If
    Next y
    #main.gb "Flush"
    Wait

    Sub EndDemo handle$
        Close #main
        End
        End Sub

    Sub ScrollButtonSet handle$
        nExtension$ = Right$(handle$, 1)
        Select Case Val(nExtension$)
            Case 1
                pos = 0
                scrollDir = _SBS_HORZ
                scrollFlag = _WM_HSCROLL
            Case 2
                pos = 500
                scrollDir = _SBS_HORZ
                scrollFlag = _WM_HSCROLL
            Case 3
                pos = 0
                scrollDir = _SBS_VERT
                scrollFlag = _WM_VSCROLL
```

```
        Case 4
            pos = 500
            scrollDir = _SBS_VERT
            scrollFlag = _WM_VSCROLL
        Case 5
            #main.tb5, "!Contents? pos$"
            pos = Val(pos$)
            scrollDir = _SBS_HORZ
            scrollFlag = _WM_HSCROLL
        Case 6
            #main.tb6, "!Contents? pos$"
            pos = Val(pos$)
            scrollDir = _SBS_VERT
            scrollFlag = _WM_VSCROLL
    End Select
    Call SetScrollPos hWnd(#main.gb), pos, scrollDir, scrollFlag
    End Sub

Sub ScrollButtonGet handle$
    nExtension$ = Right$(handle$, 1)
    Select Case Val(nExtension$)
        Case 7
            scrollDir = _SBS_HORZ
        Case 8
            scrollDir = _SBS_VERT
    End Select
    pos = GetScrollPos(hWnd(#main.gb), scrollDir)
    handle$ = "#main.st";nExtension$
    #handle$ pos
    End Sub


Sub SetScrollPos handle, pos, scrollDir, scrollFlag
    CallDLL #user32, "SetScrollPos", _
        handle as Ulong, _
        scrollDir as Long, _
        pos as Long, _
        1 as long, _
        result as Long
        hPos = pos * HexDec("&H10000") + _SB_THUMBPOSITION
    CallDLL #user32, "PostMessageA", _
        handle as Ulong, _
        scrollFlag as Long, _
        hPos as Long, _
        0 as Long, _
        result as long
```

```
    End Sub

Function GetScrollPos(handle, scrollDir)
    CallDLL #user32, "GetScrollPos", _
        handle As Ulong, _
        scrollDir as Long, _
        GetScrollPos as Long
    End Function
```

This article first appeared in Issue #139 (December 2005) of the Liberty BASIC Newsletter.