

## Lab Exercise – Build a Custom Trend

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This module supports **TotalPlant** Solution (TPS) system network.

TPS is the evolution of TDC 3000<sup>X</sup>.

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# Lab Exercise

## Objectives

After completing this lab exercise, you will be able to:

- Add Trend Control into a display
- Script the Trend Control
- Create a Custom Trend

## Prerequisites

Before you begin this lab make sure that the following are met:

1. Must have the Native Window loaded on the Global User Station.
2. Must have the Display Builder running.
3. The HOPC indicator must be green which indicates that a valid connection to the LCN has been made.

**Time to complete this lab is ~90 Minutes**

## **Lab Exercise**

### **CONSTRUCTION of CUSTOM TREND**

#### **Introduction**

The Trend can allow an operator to observe and change the following:

- Add tagname.parameter on line.
- Change the trace color.
- Select the data source.
- Range
- Change the timebase
- Scrolling.
- Show axes
- Show grid
- Change background color

#### **Lab Exercise: Building\Designing the Trend**

1. The first step is to determine what the Trend will look like. Most users have used and seen a typical Trend.
2. Use the following example to help design your trend. You do not need to build your trend with all the functionality of the example trend, but you are required to have at least the following features.
  - Add tagname.parameter on line
  - Select data source
  - Range
  - Change timebase.
  - Scrolling.

## Example of a Trend Control

### Build Time

Visible

Show Axes

Show Grid

Inherit Background

Hairline Cursor

Hairline Readout

Display Relative

TimeBase Index

RunTimeScrolling

Background Color

Grid Color

Axes Color

Hairline Color

Scroll Back

Scroll Forward

Seconds to Scroll:

Honeywell IIGUS Trend Control "Trend"

Active Trace List

No Active Traces Defined for this Trend.

10 9 8 7 6 5 4 3 2 1 0 MIN

12:00:00 01/01/70 12:00:00 01/01/70

Static

Static

Static

Static

Trace #

Click inside colored rectangle to choose point.parameter

Modify Trace

Trace Color

Data Source  Static

Y Range High

Y Range Low

YScaleHigh

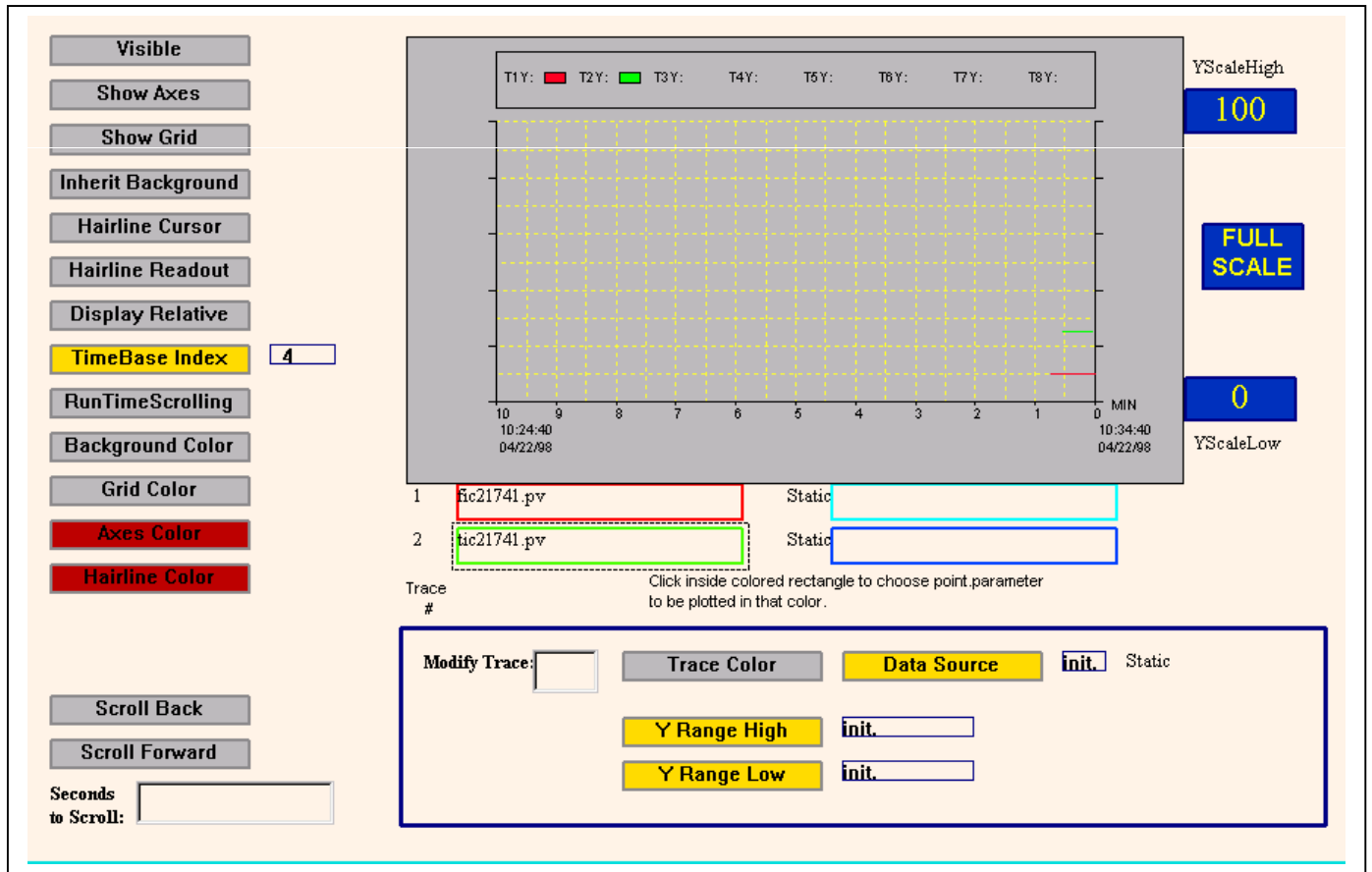
Static

FULL SCALE

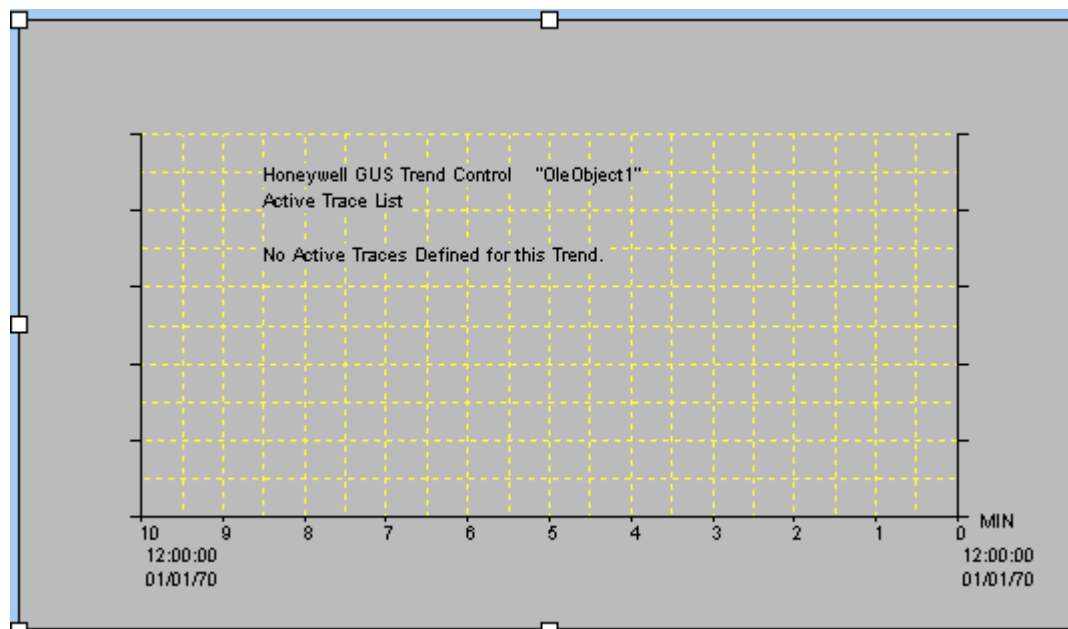
Static

YScaleLow

## Run Time



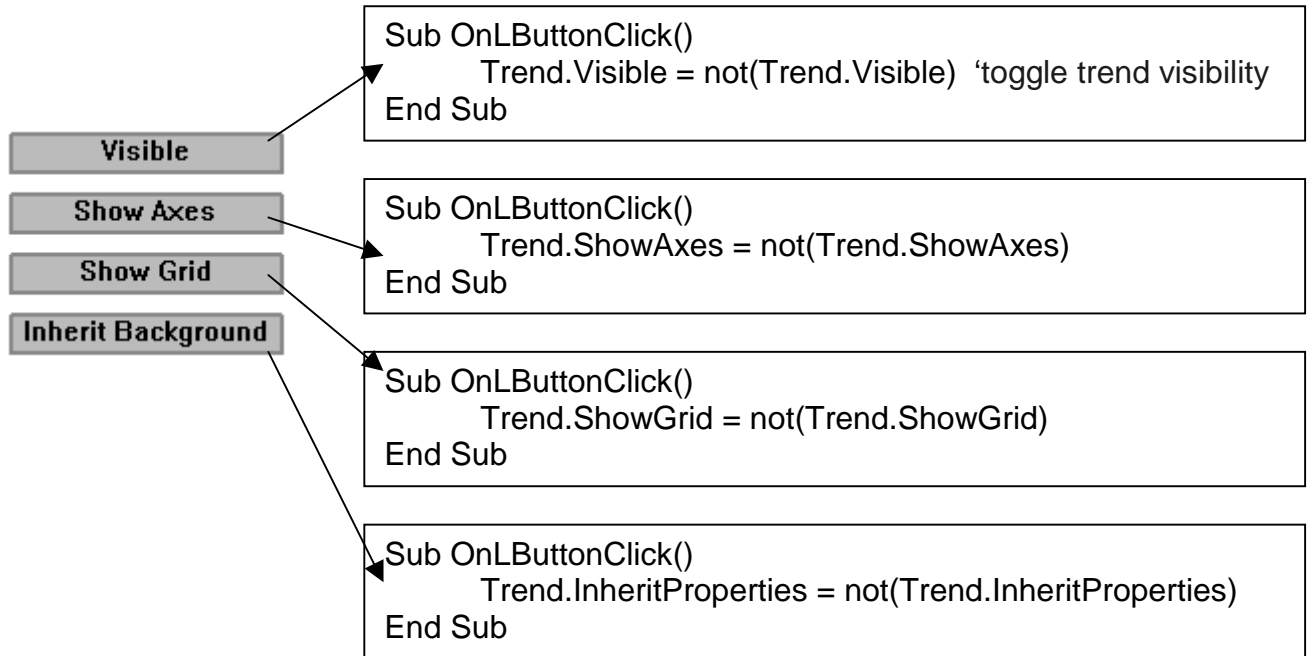
## Dismantling the Trend Example



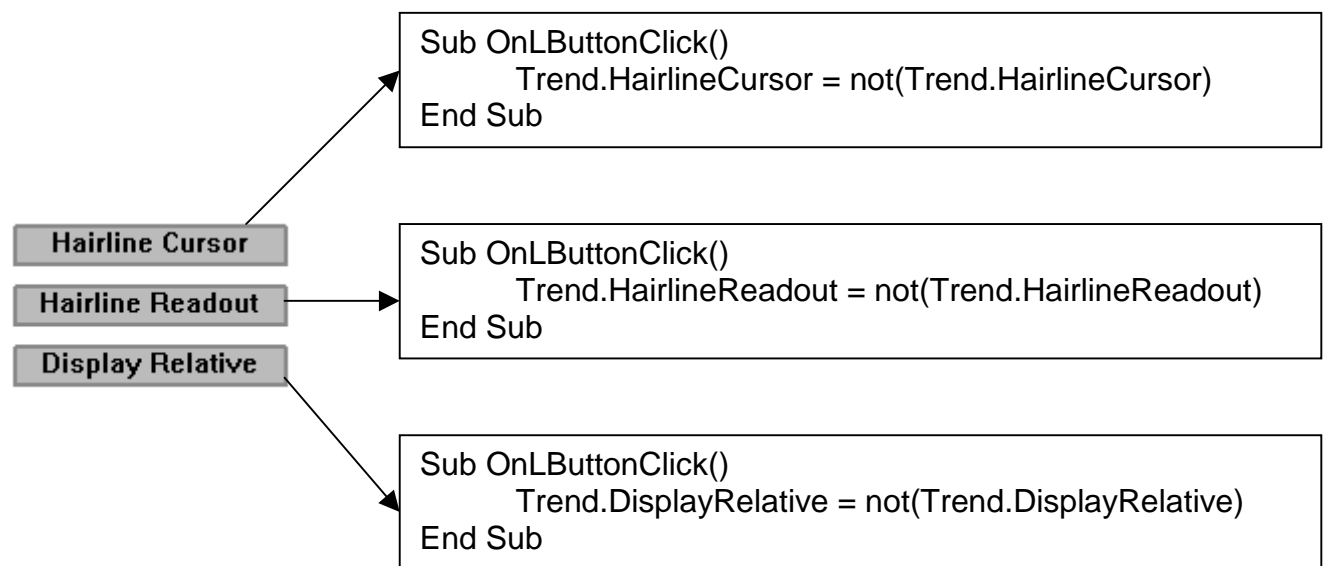
The above trend can be inserted into a display in the usual way you add OCX controls. (Insert>Controls...)

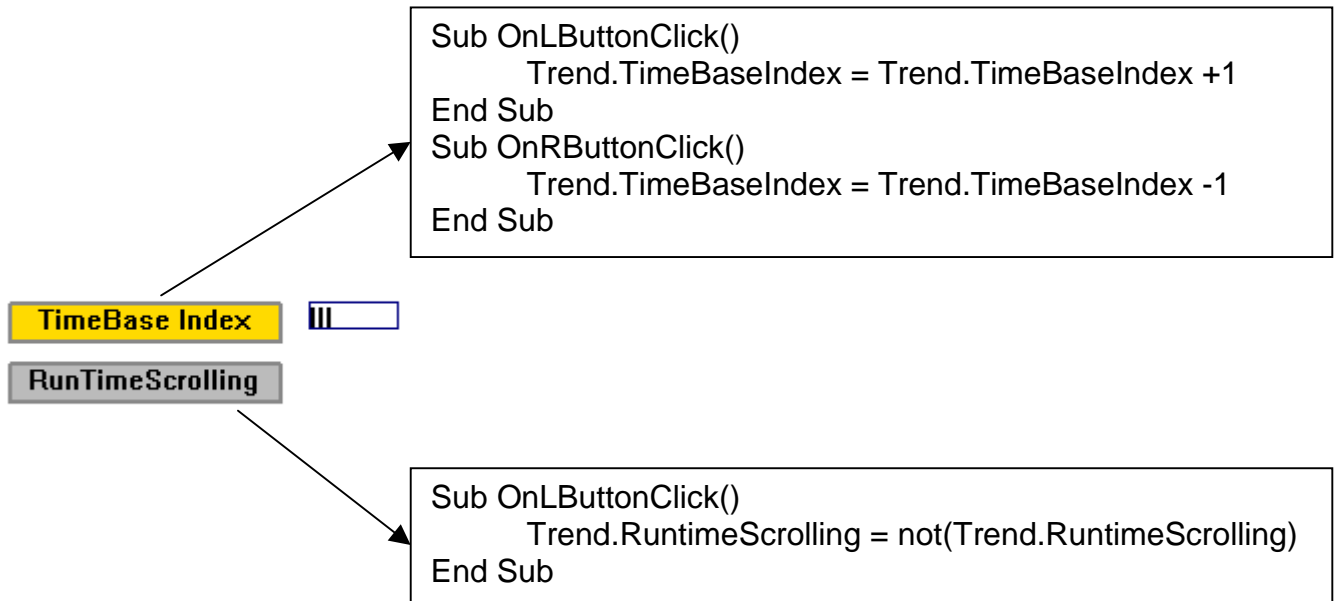
### Script for the Display

```
Sub OnDisplayStartup()  
    Max.text = 100 'text object that displays the maximum trend range  
    Min.text = 0   'text object that displays the minimum trend range  
End Sub
```

**Script Example for Portions of Trend**







**Background Color**

```
Public ClrCnt as Integer      'Counter to increment Color
Public Color as Long         'ColorValue

Sub OnDisplayStartup()
    Color = TDC_Half_White
    ClrCnt = 0
End Sub

Sub OnLButtonClick()
    ClrCnt = ClrCnt + 1
    If ClrCnt = 1 then
        Color = tdc_red
    else if ClrCnt = 2 then
        Color = tdc_magenta
    else if ClrCnt = 3 then
        Color = tdc_blue
    else if ClrCnt = 4 then
        Color = tdc_yellow
    else if ClrCnt = 5 then
        Color = tdc_cyan
    else if ClrCnt = 6 then
        Color = tdc_white
    else if ClrCnt = 7 then
        Color = tdc_green
    else
        Color = tdc_half_white
        ClrCnt = 0
    end if
    end if
    end if
    end if
    end if
    end if
    end if
    trend.backgroundcolor = Color
End Sub
```

**Grid Color**

```
Public GNCL as Long           'Line Color
public Lcnt as integer

Sub OnDisplayStartup()
    GNCL = TDC_BLACK
    Lcnt = 0
End Sub

Sub OnLButtonClick()
    LCnt = LCnt + 1
    If LCnt = 1 then
        gncl = tdc_red
    else if LCnt = 2 then
        gncl = tdc_magenta
    else if LCnt = 3 then
        gncl = tdc_blue
    else if LCnt = 4 then
        gncl = tdc_yellow
    else if LCnt = 5 then
        gncl = tdc_cyan
    else if LCnt = 6 then
        gncl = tdc_white
    else if LCnt = 7 then
        gncl = tdc_green
    else
        Gncl = tdc_Black
        LCnt = 0
    end if
end if
end if
end if
end if
end if
end if
Trend.GridColor = Gncl

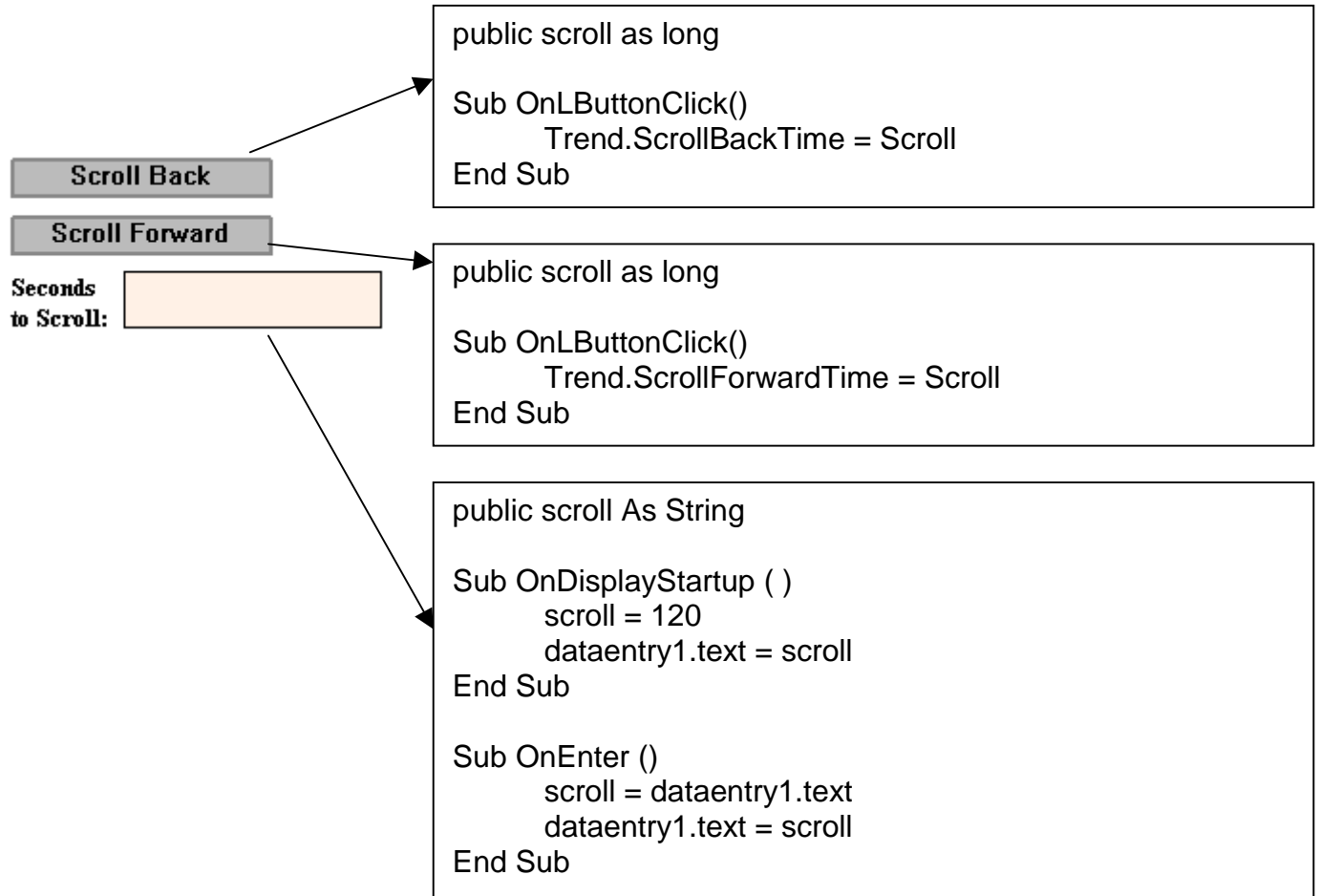
End Sub
```

**Axes Color**

```
Public AXcl as Long 'Line Color
public Acnt as integer

Sub OnDisplayStartup()
    AXcl = TDC_BLACK
    Acnt = 0
End Sub

Sub OnLButtonClick()
    Acnt = Acnt + 1
    If Acnt = 1 then
        AXcl = tdc_red
    else if Acnt = 2 then
        AXcl = tdc_magenta
    else if Acnt = 3 then
        AXcl = tdc_blue
    else if Acnt = 4 then
        AXcl = tdc_yellow
    else if Acnt = 5 then
        AXcl = tdc_cyan
    else if Acnt = 6 then
        AXcl = tdc_white
    else if Acnt = 7 then
        AXcl = tdc_green
    else
        AXcl = tdc_Black
        Acnt = 0
    end if
end if
end if
end if
end if
end if
end if
end if
Trend.AxesColor = AXcl
End Sub
```



<b>1</b>	Static <input type="text"/>	Static <input type="text"/>	<b>3</b>
<b>2</b>	Static <input type="text"/>	Static <input type="text"/>	<b>4</b>

Click inside colored rectangle to choose point parameter to be plotted in that color.

<b>1</b>	<pre>Public Trace (1 to 4) as String Public ID (1 to 4) as Integer  Sub OnLButtonClick()     Trace(1) = inputbox("New Tag","RED",Trace(1))     if Trace(1) &gt; " " then         If ID(1) &gt; 0 then             ID(1) = Trend.DeleteTrace(ID(1))         end if         ID(1) = Trend.AddTrace(Trace(1),TDC_RED)         TN1.text = ID(1)         TS1.text = Trace(1)     else         ID(1) = Trend.DeleteTrace(ID(1))         if ID(1) &gt; 0 then             ID(1) = 0         end if         TN1.text = ID(1)         TS1.text = ""     end if End Sub</pre>	<b>2</b>	<pre>Public Trace (1 to 4) as String Public ID (1 to 4) as Integer  Sub OnLButtonClick()     Trace(2) = inputbox("New Tag","GREEN",Trace(2))     if Trace(2) &gt; " " then         If ID(2) &gt; 0 then             ID(2) = Trend.DeleteTrace(ID(2))         end if         ID(2) = Trend.AddTrace(Trace(2),makecolor(0,255,0))         TN2.text = ID(2)         TS2.text = Trace(2)     else         ID(2) = Trend.DeleteTrace(ID(2))         if ID(2) &gt; 0 then             ID(2) = 0         end if         TN2.text = ID(2)         TS2.text = ""     end if End Sub</pre>
<b>3</b>	<pre>Public Trace (1 to 4) as String Public ID (1 to 4) as Integer  Sub OnLButtonClick()     Trace(3) = inputbox("New Tag","CYAN",Trace(3))     if Trace(3) &gt; " " then         If ID(3) &gt; 0 then             ID(3) = Trend.DeleteTrace(ID(3))         end if         ID(3) = Trend.AddTrace(Trace(3),TDC_CYAN)         TN3.text = ID(3)         TS3.text = Trace(3)     else         ID(3) = Trend.DeleteTrace(ID(3))         if ID(3) &gt; 0 then             ID(3) = 0         end if         TN3.text = ID(3)         TS3.text = ""     end if End Sub</pre>	<b>4</b>	<pre>Public Trace (1 to 4) as String Public ID (1 to 4) as Integer  Sub OnLButtonClick()     Trace(4) = inputbox("New Tag","BLUE",Trace(4))     if Trace(4) &gt; " " then         If ID(4) &gt; 0 then             ID(4) = Trend.DeleteTrace(ID(4))         end if         ID(4) = Trend.AddTrace(Trace(4),TDC_BLUE)         TN4.text = ID(4)         TS4.text = Trace(4)     else         ID(4) = Trend.DeleteTrace(ID(4))         if ID(4) &gt; 0 then             ID(4) = 0         end if         TN4.text = ID(4)         TS4.text = ""     end if End Sub</pre>

**Modify Trace:**

**Trace Color** **Data Source** **init.** Static

**Y Range High** **init.**

**Y Range Low** **init.**

```

public atrace as integer

Sub GoodEntry(sData As String)
    atrace = val (sData)
    source.text =
Trend.DataSource(atrace)
    yhigh.text = Trend.YRangehigh(atrace)
    Ylow.text = Trend.YRangelow(atrace)
    Dsource.text =
Trend.GetDataSourceString(atrace)
End Sub

Sub OnDisplayStartup()
    atrace = 1
End Sub
    
```

### Data Source

```

Public atrace as integer

Sub OnLButtonClick()
    Trend.DataSource(atrace) =
Trend.DataSource(atrace) +1
    source.text =
Trend.DataSource(atrace)
    Dsource.text =
Trend.GetDataSourceString(atrace)

End Sub
Sub OnRButtonClick()
    Trend.DataSource(atrace) =
Trend.DataSource(atrace) -1
    source.text =
Trend.DataSource(atrace)
    Dsource.text =
Trend.GetDataSourceString(atrace)

End Sub
    
```

### Trace Color

```

Public TrCI as Long 'Line Color
public Tcnt as integer
public atrace as integer

Sub OnDisplayStartup()
    Tcnt = 1
End Sub

Sub OnLButtonClick()
    Tcnt = Tcnt + 1
    If Tcnt = 1 then
        TrCI = tdc_red
    else if Tcnt = 2 then
        TrCI = tdc_green
    else if Tcnt = 3 then
        TrCI = tdc_blue
    else if Tcnt = 4 then
        TrCI = tdc_cyan
    else if Tcnt = 5 then
        TrCI = tdc_half_red
    else if Tcnt = 6 then
        TrCI = tdc_white
    else
        TrCI = tdc_Black
        Tcnt = 0
    end if
end if
end if
end if
end if
end if
Trend.TraceColor(atrace) = TrCI

End Sub
    
```



**Y Range High**

```
public atrace as integer

Sub OnLButtonClick()
    Trend.YRangehigh(atrace) =
Trend.YRangehigh(atrace) +50
    Yhigh.text =
Trend.YRangehigh(atrace)
End Sub
Sub OnRButtonClick()
    Trend.YRangehigh(atrace) =
Trend.YRangehigh(atrace) -50
    Yhigh.text =
Trend.YRangehigh(atrace)
End Sub
```

**Y Range Low**

```
public atrace as integer

Sub OnLButtonClick()
    Trend.YRangelow(atrace) =
Trend.YRangelow(atrace) +10
    Ylow.text =
Trend.YRangelow(atrace)
End Sub
Sub OnRButtonClick()
    Trend.YRangelow(atrace) =
Trend.YRangelow(atrace) -10
    Ylow.text =
Trend.YRangelow(atrace)
End Sub
```

YScaleHigh

**Static**

```
Public Highest as single
Public Lowest as single
Public ID (1 to 4) as Integer
Dim Temp as Double
Dim i as integer

Sub OnLButtonClick()
    Temp = val(inputbox("new value", "Maximum", str(Highest)))
    if Temp <= Lowest then
        msgbox "Maximum must be greater than Minimum"
    else
        Highest = temp
        me.text = temp
        For i = 1 to 4
            if ID(i) > 0 then
                trend.YrangeHigh(id(i)) = temp
            end if
        next
    end if
End Sub

Sub OnDisplayStartup()
    Highest = 100
End Sub
```

**FULL  
SCALE**

```

Public Trace (1 to 4) as String
Public ID (1 to 4) as Integer
Public Highest as Single
Public Lowest as Single
Dim i as integer
Dim vh as single
Dim    vl as single
dim ptr as integer
dim    ts as string

Sub Set_Range (tid as integer, rl as single, rh as single)
    if rh > Highest then
        Highest = rh
    end if
    if trend.yrangeLow(tid) > rh then
        trend.yrangeLow(tid) = rh - 1
    end if
    trend.yrangeHigh(tid) = rh

    if rl < Lowest then
        Lowest = rl
    end if
    trend.yrangeLow(tid) = rl
End Sub

Sub OnLButtonClick()
    Max.text = "100%"
    Min.text = "0%"
    For i = 1 to 4
        if ID(i) > 0 then
            set dispdb.var01 = GetVar(Trace(i))
            dispdb.ent01.external =
Left(dispdb.var01.name,instr(dispdb.var01.name,".")-1 )
On Error Goto RANGES
set dispdb.var02 = GetVar(dispdb.ent01.external & ".PVEUHI")
    vh = dispdb.ent01.pveuhi
    vl = dispdb.ent01.pveulo
        Goto CONT
RANGES:
            Resume RANGE_A
RANGE_A:
            On Error goto DEFAULTS
set dispdb.var02 = GetVar(dispdb.ent01.external & ".rangeHi")
    vh = dispdb.ent01.rangehi
    vl = dispdb.ent01.rangelo
        goto CONT
DEFAULTS:
            vh = 100
            vl = 0
            Resume CONT
CONT:
            Call Set_Range (ID(i),vl,vh)
    end if
Next
End Sub

```



YScaleLow

```
Public Highest as single
Public Lowest as single
Public ID (1 to 4) as Integer
Dim Temp as Double
Dim i as integer

Sub OnLButtonClick()
    Temp = val(inputbox("new value", "Minimum", str(Lowest)))
    if Temp >= Highest then
        msgbox "Maximum must be greater than Minimum"
    else
        me.text = temp
        For i = 1 to 4
            if ID(i) > 0 then
                trend.YrangeLow(id(i)) = temp
            end if
        next
    end if
End Sub

Sub OnDisplayStartup()
    Lowest = 0
End Sub
```

**End of Lab Exercise**

**Last Page**