Direct Link from the Velleman PC Oscilloscopes to Microsoft Excel
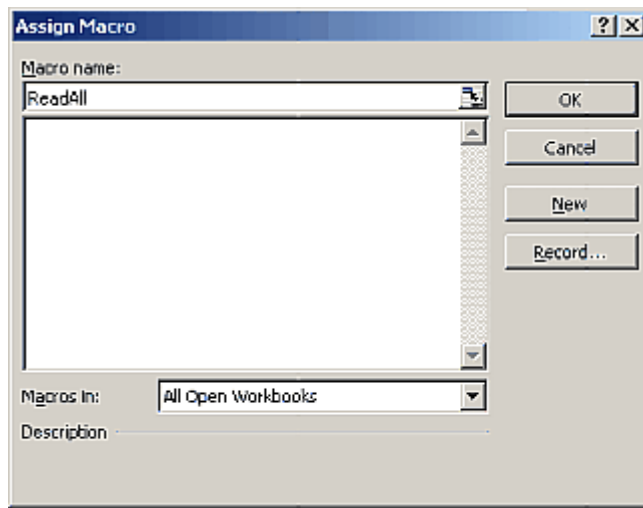
Pc-Lab2000 software package includes a DLL (Dynamic Link Library) *DSOLink.DLL,* installed to Windows' *SYSTEM32* folder.
This DLL allows you to write custom applications in Excel, Visual Basic, Delphi or any other 32-bit Windows application development tool that supports calls to a DLL.

Transferring Waveform Data to an Excel Spreadsheet

The example Excel macro shows you how to collect data directly into the spreadsheet from the Velleman PC oscilloscopes without the need for other software.

1. Open **Microsoft Excel** and start a new workbook document.
2. Select the **View / Toolbars** Menu and Select **Forms.**
   - The Forms toolbar appears.
3. Create a **Button**
   - In the Forms toolbar click on the "Button" button: the mouse-pointer will become a small cross.
   - On Excel worksheet, use the mouse to draw a rectangle to mark where you want your button to appear.
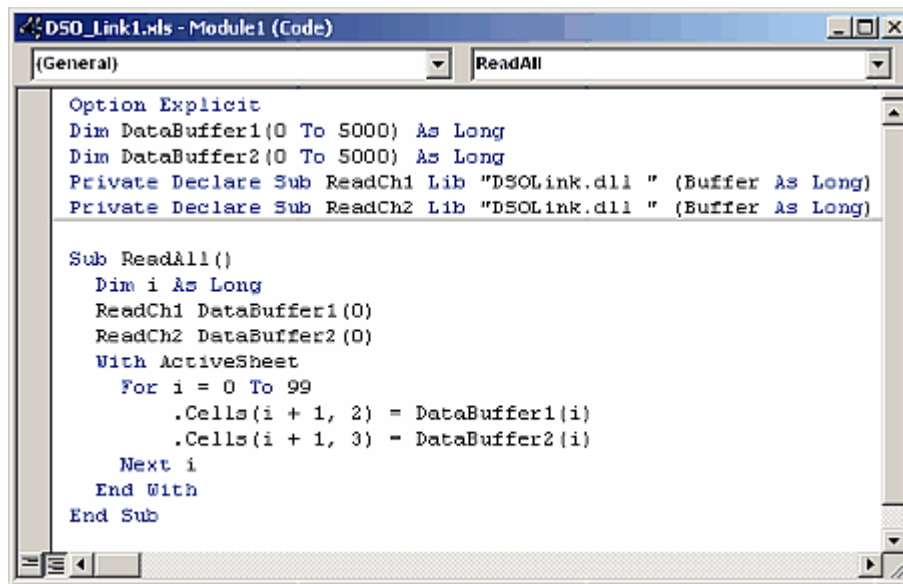   - When you release the mouse after drawing the rectangle the "Assign Macro" dialog-box will appear.

4. Type Macro name: ***ReadAll*** and click **New** button.
   - Microsoft Visual Basic edit window will open. A subroutine called *ReadAll* has been created.
5. Substitute the default text:

```
Sub ReadAll()
End Sub
```

with the following text in the edit window:
(Use Copy and Paste.)

```
Option Explicit
Dim DataBuffer1(0 To 5000) As Long
Dim DataBuffer2(0 To 5000) As Long
Private Declare Sub ReadCh1 Lib "DSOLink.dll " (Buffer As Long)
Private Declare Sub ReadCh2 Lib "DSOLink.dll " (Buffer As Long)

Sub ReadAll()
  Dim i As Long
  ReadCh1 DataBuffer1(0)
  ReadCh2 DataBuffer2(0)
  With ActiveSheet
    For i = 0 To 99
        .Cells(i + 1, 2) = DataBuffer1(i)
        .Cells(i + 1, 3) = DataBuffer2(i)
    Next i
  End With
End Sub
```
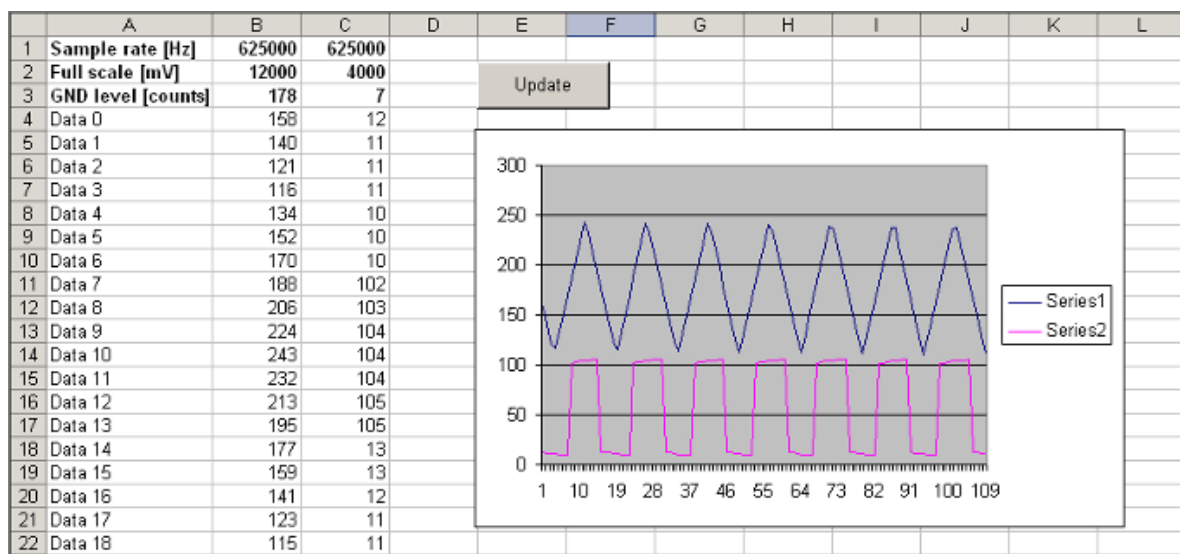
6. Press **Alt+F11** to return to Excel.
7. Type following texts to column **A**:

Sample rate [Hz]
Full scale [mV]
GND level [counts]
Data 0
Data 1
Data 2
...

8. Start oscilloscope program for PCS500, PCS100 or K8031 and click **Run** or **Single** button.
9. Click the button on the Excel worksheet. The created macro will execute and the data described in column **A** will appear to the worksheet columns **B** and **C**.
   - Rows 4...4099 contain the acquired data in A/D converter counts (0...255) for PCS500.
   - Rows 4...4083 contain the acquired data in A/D converter counts (0...255) for PCS100 and K8031.
   - The triggering point of PCS500 is on row 1030 and of PCS100 and K8031 on row 4.

   The three first rows contain the scope settings and the rest of the rows contain the raw oscilloscope data in A/D converter counts (0...255).
   Using the *Sample rate*, *Full scale* and *GND level* values it is possible to reconstruct the waveform data into engineering units (e.g. Volts and seconds) for further analysis.

	A	B	C	D	E	F	G	H	I	J	K	L
1	Sample rate [Hz]	625000	625000									
2	Full scale [mV]	12000	4000									
3	GND level [counts]	178	7									
4	Data 0	158	12									
5	Data 1	140	11									
6	Data 2	121	11									
7	Data 3	116	11									
8	Data 4	134	10									
9	Data 5	152	10									
10	Data 6	170	10									
11	Data 7	188	102									
12	Data 8	206	103									
13	Data 9	224	104									
14	Data 10	243	104									
15	Data 11	232	104									
16	Data 12	213	105									
17	Data 13	195	105									
18	Data 14	177	13									
19	Data 15	159	13									
20	Data 16	141	12									
21	Data 17	123	11									
22	Data 18	115	11									

Update

Data acquisition to other applications

The DSOLink.DLL gives you direct access to real-time data and settings information from the oscilloscope to custom applications in Visual Basic, Delphi or any other 32-bit Windows application development tool that supports calls to a DLL..

Description of the procedures of the DSOLink.DLL

ReadCh1
ReadCh2

Syntax
```
PROCEDURE ReadCh1(Buffer: Pointer);
PROCEDURE ReadCh2(Buffer: Pointer);
```

Parameter
`Buffer`: A pointer to the data array of 5000 long integers where the data will be read.

Description
Read all the data and the settings of channel 1 or channel 2 of the PCS500, PCS100 or K8031.
As a return the following data is put to the buffer:
   [0] : Sample rate in Hz
   [1] : Full scale voltage in mV
   [2] : Ground level in A/D converter counts. The value may be beyond the 0...255 range if GND level
          is adjusted beyond the waveform display area.
   [3...4098] : The acquired data in A/D converter counts (0...255), from PCS500.
   [3...4082] : The acquired data in A/D converter counts (0...255), from PCS100 and K8031.

   The triggering point of the PCS500 is at the data location [1027] and of the PCS100 and K8031at the location [3].

Example (in Delphi)

```
var
  data: array[0..5000] of longint;

procedure ReadCh1(Buffer: Pointer); stdcall; external 'DSOLink.dll';

procedure TForm1.Button1Click(Sender: TObject);
var i: longint;
p:pointer;
begin
  p:= @data[0];
  ReadCh1(p);
```

```
memo1.clear;
  memo1.lines.add('Sample rate [Hz]'+chr(9)+inttostr(data[0]));
  memo1.lines.add('Full scale [mV]'+chr(9)+inttostr(data[1]));
  memo1.lines.add('GND level [counts]'+chr(9)+inttostr(data[2]));
  memo1.lines.add('');
  begin
    for i:=0 to 20 do
    memo1.lines.add('Data ('+inttostr(i)+')'+chr(9)+chr(9)+inttostr(data[i+3]));
  end;
end;
```

Example (in Visual Basic)

```
Option Explicit

Dim DataBuffer(0 To 5000) As Long
Private Declare Sub ReadCh1 Lib "DSOLink.dll " (Buffer As Long)

'This reads the settingsd and 4096 bytes of data from CH1 to the data buffer.
'The first 21 values are displayed.

Private Sub Read_CH1_Click(Index As Integer)
    Dim i As Long
    List1.Clear
    ReadCh1 DataBuffer(0)
    List1.AddItem "Sample rate [Hz]" + Chr(9) + Str(DataBuffer(0))
    List1.AddItem "Full scale [mV]" + Chr(9) + Str(DataBuffer(1))
    List1.AddItem "GND level [counts]" + Chr(9) + Str(DataBuffer(2))
    List1.AddItem ""
    For i = 0 To 20
      List1.AddItem "Data(" + Str(i) + ")" + Chr(9) + Chr(9) + Str(DataBuffer(i + 3))
    Next
End Sub
```

The complete example programs in Delphi and Visual Basic are located on the Velleman CD. Those may be used as a starting point how to construct your customized application programs.

Running the DSOLink Demo under Visual Basic
Make sure that the file *DSOLink.DLL* is copied to Windows' *SYSTEM32* folder.
Check the **\PC-Lab2000 tools** folder on the Velleman CD to locate the **DSOLink_Demo_VB.ZIP** file.
This file contains a ready to run *DSOLink_Demo.EXE* program and its source code.
You may unzip the files to any folder and use Visual Basic to examine, edit and compile the files.

Running the DSOLink Demo under Delphi
Check the **\PC-Lab2000 tools** folder on the Velleman CD to locate the **DSOLink_Demo_Delphi.ZIP** file.
This file contains a ready to run *DSOLink_Demo.EXE* program and its source code.
You may unzip the files to any folder and use Delphi to examine, edit and compile the files.

Note: The oscilloscope software must be running and "Run" or "Single" button pressed and trace

displayed on the oscilloscope screen.

```
DSOLink.DLL demo                                    _ □ ×

  [ Read CH1 ]    [ Read CH2 ]    Sample rate [Hz]    125000
                                  Full scale [mV]      40
                                  GND level [counts]   127

  This demonstration program reads the    Data (0)     131
  settings and the data from the PC       Data (1)     132
  oscilloscopes PCS100, PCS500 or         Data (2)     130
  K8031.                                  Data (3)     129
                                          Data (4)     134
  Oscilloscope software must be           Data (5)     127
  running and "Run" or "Single" button    Data (6)     130
  pressed and trace displayed on the      Data (7)     132
  screen.                                 Data (8)     129
                                          Data (9)     129
  DSOLink.DLL acts as a link between      Data (10)    129
  the scope software and this             Data (11)    129
  demonstration software.                 Data (12)    132
                                          Data (13)    131
  DSOLink.DLL must be located in the      Data (14)    127
  same folder as this program or in       Data (15)    131
  Windows' SYSTEM32 folder.               Data (16)    128
                                          Data (17)    128
                                          Data (18)    127
                                          Data (19)    129
                                          Data (20)    134
```