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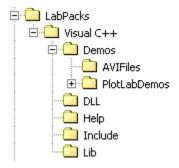
Installation

PlotLab comes with an installation program. Just start the installation by double-clicking on the Setup.exe file and follow the installation instructions.

Where is PlotLab?

After the installation PlotLab is located under a single root directory. The default location is C:\Program Files\LabPacks. During the installation the user has the option to select alternative directory.

Here is how the directory structure should look like after the installation:



Under the PlotLabDemos directory are located the demo files. The help files and the documentation are located under the Help directory. The DLL directory contains the redistributable DLL files. The header files needed for your projects are located under the Include directory. The Release and Debug version of the library is located under the Lib directory.

It is a great idea to start by opening and compiling the demo files. The demo projects ware designed with Visual C++ 6.0. They can be opened and compiled under Visual C++.NET as well. In this case the IDE will create the necessary solution files.

Creating a new PlotLab project in Visual C++

All of the examples in this manual start with creating a MFC Dialog based project. This is not a PlotLab requirement, but using the resource editor to design the application makes writing the examples much easier.

The following chapters will assume that you have created the project and will teach you how to add specific PlotLab functionality.

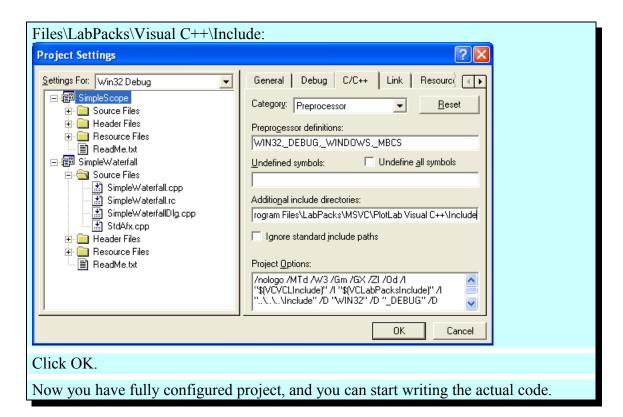
Visual C++ 6.0:

Start by creating a new project. From the VC++ menu, select File New	
Microsoft Visual C++	I
File Edit View Insert Project	
New Ctrl+N	
Open Workspace	
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Close Workspace	
Save Ctrl+S	
Save <u>A</u> s	
🗇 Save Alj	
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Recent Workspaces	
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The project type dialog will appear Select t	he MEC AppWizord:
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New Files Projects Workspaces Other Documents ATL COM AppWizard Cluster Resource Type Wizard Custor AppWizard Custor AppWizard Database Project DevStudio Add-in Wizard Extended Stored Proc Wizard Extended Stored Proc Wizard ISAPI Extension Wizard Makefile MFC ActiveX ControlWizard MFC AppWizard (dll) MFC AppWizard (exe) Win32 Application Win32 Console Application Win32 Dynamic-Link Library	Project name: Logation: C:\MyTreasureLabProjects\ C:\MyTreasureLabProjects\ Add to current workspace Dependency of: Platforms: Win32
Files Projects Workspaces Other Documents Image: ATL COM AppWizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluster Resource Type Wizard Image: Cluste	Project name: Logation: C:\MyTreasureLabProjects\ C:\MyTreasureLabProjects\ C:\MyTreasureLabProjects\ Dependency of: Dependen

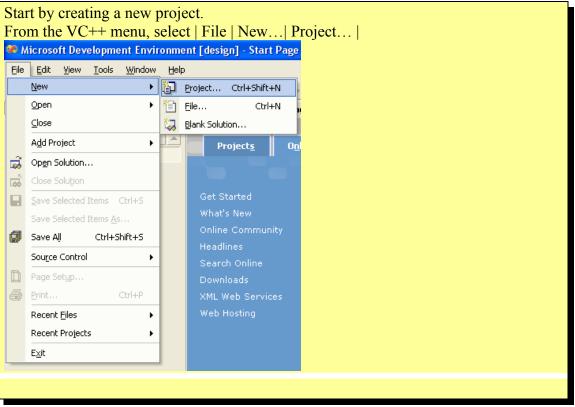
Type a project name. For each example the	project name will be different:
New	? 🔀
Files Projects Workspaces Other Documents	
ATL COM AppWizard	Project name:
Cluster Resource Type Wizard	MyFirstProject
🔚 🛅 Database Project	Logation: C:\MyTreasureLabProjects\MyFi
DevStudio Add-in Wizard Sterended Stored Proc Wizard	
ISAPI Extension Wizard	
uri⊴ Makefile MFC ActiveX ControlWizard	Create new workspace Add to current workspace
MFC AppWizard (dll)	Dependency of:
MFC AppWizard (exe)	
Win32 Application	
Win32 Dynamic-Link Library	Platforms:
Win32 Static Library	
	OK Cancel
Click OK.	
Select a Dialog base project from Step 1 and	d click Next:
MFC AppWizard - Step 1	
Application	uld you like to create?
OK <u>Single document</u>	
<u>Multiple documents</u> <u>Dialog based</u>	
☐ Document/ <u>V</u> iew arch	itecture support?
What Janguage would you l	ike your resources in?
English [United States] (
< <u>B</u> ack <u>N</u> ext> <u>F</u> inish	Cancel

For simplicity disable the	ActiveX Controls on Step 2 and c	lick Next:
MFC AppWizard - Step 2 of 4	? 🔀	
	What features would you like to include?	
Application	☐ <u>A</u> bout box	
Cancel	Context-sensitive H <u>e</u> lp	
	☑ <u>3</u> D controls	
	What other support would you like to include?	
	Automation	
	ActiveX Controls	
Editing Control: Record	Would you like to include WOSA support?	
Check Box Radio Button	☐ <u>W</u> indows Sockets	
Radio Bettos		
	Please enter a <u>t</u> itle for your dialog:	
	SimpleVideoPlayer	
<u> </u>	<u>N</u> ext > <u>F</u> inish Cancel	
Leave the default options		
MFC AppWizard - Step 3 of 4	? 🔀	
Microsoft Developer Studio	What style of project would you like ?	
File Edit Yiew Insert Build Help	MFC Standard	
Project Project.cpp	C Windows Explorer	
	Would you like to generate source file comments?	
	Yes, please	
Ready	O No, thank you	
	How would you like to use the MFC library?	
	As a shared <u>D</u> LL	
	S As a statically linked library	
(D 1	News Emile Course	
<u> </u>	<u>N</u> ext > <u>F</u> inish Cancel	

At this point you should have a new project created. From the menu select Project Settings : pject - Microsoft Visual C++ - [MyFirstProject.rc - II] View Insert Project Build Layout Iools Window Help Set Active Project Add To Project tDlg Dependencies Settings Alt+F7 Export Makefile Insert Project into Workspace
In the Project Settings dialog select the Link tab and in the ". Switch to the "Input" cathegory. In the "Additional library path:" edit box add the path to the library files. If you have followed the default installation it should be located at C:\Program Files\LabPacks\Visual C++\Lib:
Project Settings Image: Control of the section of the sectin of the section of the section of the section of the section of t
Switch to the C/C++ tab. In the "Additional include directories:" edit box add the path to the header files. If you have followed the default installation they should be located at C:\Program



Visual C++ 2003:



	alog will appea	r. Select t	he MFC A	Application:	
New Project				X	
Project Types:	т	emplates:		0 0 0-0- 0 0 0 0 0-0-	
Visual C# Projects Visual C++ Projects Visual C# Projects Visual C# Projects		MFC ActiveX Control MFC ISAPI Extension Dll	MFC Application	MEC DLL	
An application that uses the I	Microsoft Foundation Cla	ss Library.			
	ter name>				
- ,	1yTreasureLabProjects		•	Browse	
Project will be created at C:\M	lyTreasureLabProjects\<	Enter name>.			
¥ Mor <u>e</u>		ок	Cancel	Help	
New Project Project Types:	I	emplates:			
Visual C# Projects Visual C++ Projects Visual C++ Projects Visual C++ Projects Visual C++ Projects Visual C# Projects Visual C# Projects	nt Projects	MFC ActiveX Control MFC ISAPI Extension Dll	MFC Application	MFC DLL	
	Microsoft Foundation Cla	ss Library.			
An application that uses the I					
An application that uses the I	irstProject				
An application that uses the I			T	Browse	
An application that uses the I	irstProject IyTreasureLabProjects	yFirstProject.	•	Browse	
An application that uses the I Name: MyFi Location: C:\M	irstProject IyTreasureLabProjects IyTreasureLabProjects\M	yFirstProject.	Cancel	<u>B</u> rowse Help	
An application that uses the I <u>N</u> ame: MyFi Location: C:\M Project will be created at C:\M ▼Mor <u>e</u>	irstProject IyTreasureLabProjects IyTreasureLabProjects\M		Cancel		
An application that uses the I <u>Name:</u> <u>Location:</u> C:\M Project will be created at C:\M	irstProject IyTreasureLabProjects IyTreasureLabProjects\M		Cancel		

Select a Dialog base pr	oject from Step 1 and o	click Next:
MFC Application Wizard - My	FirstProject	
Application Type Specify Document/View architect application.	ure support, language, and interface	style options for your
Overview Application Type Compound Document Support Document Template Strings Database Support User Interface Features Advanced Features Generated Classes	Application type: Single document Multiple documents Use HTML dialog Multiple top-level documents Document/View architecture sup Resource language: English (United States)	Project style: Windows Explorer MFC standard Use of MFC: Use MFC in a shared DLL WFC in a static library port
For simplicity disable t MFC Application Wizard - My Advanced Features Specify additional support to build	FirstProject	n Step 2 and click Next:
Overview Application Type Compound Document Support Document Template Strings Database Support User Interface Features Advanced Features Generated Classes	Advanced features: Context-sensitive Help WinHelp Format HTML Help format Printing and print preview Automation ActiveX controls MAPI (Messaging API) Windows sockets Active Accessibility Common Control Manifest	Number of files on recent file list:
Click Finish.		

From the menu select ect - Microsoft Visual C++ [d Project Build Debug Tool Add Class Add Resource Add New Item Ctrl+	esign] - My	reated.
Set as StartUp Project MyFirstProject Properties		
library directories:" e default installation it MyFirstProject Property Pa	dit box add the path to t should be located at C:\}	er General page. In the "Additional he library files. If you have followed the Program Files\LabPacks\Visual C++\Lib:
Configuration: Active(Debug) Image: Configuration Properties General Debugging Configuration Properties General Input Debugging Image: C/C++ Image: C/C++ Image: C/C++ Image: C/C++ <tr< th=""><th>Platform: Active(Win Output File Show Progress Version Enable Incremental Linking Suppress Startup Banner Ignore Import Library Register Output Additional Library Directories Additional Library Directories Specifies one or more additional pat semi-colon delimited list if more than OK</th><th>\$(OutDir)/\$(ProjectName).exe Not Set Yes (/INCREMENTAL) No No C:\Program Files\LabPacks\Visual C++\Lib </th></tr<>	Platform: Active(Win Output File Show Progress Version Enable Incremental Linking Suppress Startup Banner Ignore Import Library Register Output Additional Library Directories Additional Library Directories Specifies one or more additional pat semi-colon delimited list if more than OK	\$(OutDir)/\$(ProjectName).exe Not Set Yes (/INCREMENTAL) No No C:\Program Files\LabPacks\Visual C++\Lib
Switch to the C/C++ In the "Additional inc		ox add the path to the header files. If you
		ould be located at C:\Program

Files\LabPacks\Visua	ul C++\Include:	
MyFirstProject Property Pa	ages	
Configuration: Active(Debug)	Platform: Active(Win32) Configuration Manager
🚖 Configuration Propertie 🔨	Additional Include Directories	C:\Program Files\LabPacks\Visual C++\I 🛄
General	Resolve #using References	
Debugging	Debug Information Format	Program Database for Edit & Continue (/ZI)
🔁 C/C++	Suppress Startup Banner	Yes (/nologo)
💠 General	Warning Level	Level 3 (/W3)
Optimization	Detect 64-bit Portability Issues	Yes (/Wp64)
Preprocessor Code Generatio	Treat Warnings As Errors	No
Precompiled He. Output Files Browse Informa Advanced Command Line Linker Resources Browse Information Build Events Custom Build Step	Additional Include Directories Specifies one or more directories to ad list if more than one. (/I[path])	dd to the include path; use semi-colon delimited
	ОК	Cancel <u>A</u> pply Help
Click OK.		
Now you have fully c	configured project, and yo	u can start writing the actual code.

Creating a simple Scope application

Create and setup a new project named ScopeDemo as described in the "Creating a new PlotLab project in Visual C++" chapter.

Select the components on the dialog form:

ScopeDemo	×
	OK Cancel o
TODO: Place dialog controls here.	

April 29, 2010

Click the "Del" key. They will be deleted from the form:

<u> </u>	
ScopeDemo	×

From the controls toolbar select a "Static Text" control:

VC++ 6:	VC++ 2003/2005:	
Con 🔀	Toolbox 🗜 🗙 🖉	C
	Dialog Editor	
Aa ab	 Radio Button 	
	Aa Static Text	
	Picture Control	
	I Horizontal Scroll Bar	

Place the control on the form:

ScopeDemo	
Static	
Static	
·····	

In Visual C++ 6.0:

From the menu select View Properties :	
From the menu select View Properties :	
Properties Alt+Enter	
Change the control's ID to "ID_SCOPE": Text Properties Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Control and the styles Image: Contrely and the styl	
Switch to the "Extended Styles" tab and check the easily see the control on the dialog: Text Properties Image: Client edge Transgarent Right aligned text Image: Client edge Transgarent Right aligned text Static edge Accept files Right-to-left reading order Image: Modal frame Modal frame	"Client edge" property so you can

rom the menu select View ClassWizard :
Eile Edit View Insert Project Build Layout 1
🖀 🖙 🔚 🛣 Class <u>Wi</u> zard Ctrl+W
De Resource Symbols
Workspace Alt+0
Debug Windows
Properties Alt+Enter
n the "ClassWizard" select the "Member Variables" tab and select the "ID SCOPE"
n the "Control IDs" list box, then press "Add Variable":
AFC ClassWizard
Message Maps Member Variables Automation ActiveX Events Class Info
Project: Class name: Add Class ScopeDemo CScopeDemoDIg
C\\\ScopeDemoDlg.h, C.\\ScopeDemoDlg.cpp
Control IDs: Type Member Delete Variable ID_SCOPE Update Columns I
Bind All
Description:
OK Cancel

Set the variable "Category" to be "Control", and Add Member Variable Member variable name: Member variable name: Member variable name: Category: Cancel Category: Control Variable type: CStatic	l set the name to be m_Scope:
Description: map to CStatic member	
Click OK. In the "ClassWizard" click OK:	
MFC ClassWizard	
Message Maps Member Variables Automation ActiveX Events Class Info	
Project: Class name:	Add Class
ScopeDemo CScopeDemoDlg C:\\ScopeDemoDlg.h, C:\\ScopeDemoDlg.cp	Add Variable
Control [Ds: Type Member	Delete Variable
ID_SCOPE CStatic m_Scope	Update <u>C</u> olumns <u>Bind All</u>
Description: map to CStatic member	
	OK Cancel

In Visual C++ 2003/2005:

	2005/2005.
Change the	control's ID to "ID_SCOPE":
Properties	
	t Control) IStatEditor 🗸
Disabled	False
Help ID	
Visible	
	irue
(Name)	IDC_STATIC1 (Text Cont
Group	
ID Tabatan	
Tabstop	False
ID	
ID Specifies the identifier	of the control.
Properties 💡 🛛	Dynamic Help
Set the "Clie	ent Edge" property to True so you can easily see the control on the dialog:
Properties	⁴ x
IDC_STATIC1 (Tex	it Control) IStatEditor 🔽
🗄 🛃 🔲 🖋 [
Border	False
Caption	Scope
Center Image	False
Client Edge	True
End Ellipsis	True
Modal Frame	False
No Prefix	raise
No Wrap	False
Notify	Fake
Client Edge	
-	trol will have a border with a
😭 Properties 🛛 🕄 🛛	Dynamic Help
F (1	
From the me	enu select Project Add Variable :
ect - Microsoft Visu	ial C++ [design] - Myl
Project Build De	ebug Format Iools
NZ	and former Toop
Add Class	
🚦 🤴 🛛 Add Varia <u>b</u> le	
- 🦋 Add <u>R</u> esource.	
	h ge
Add New Item.	Ctrl+Shift+A
Add Existing Ite	em Shift+Alt+A
* New Folder	
Add Web Refer	rence

In the "Add Member Varia "Variable name" to be m_S		Variable type" to CStatic, and set the
Add Member Variable Wizard - Mył	FirstProject	
Welcome to the Add Member Va This wizard adds a member variable to y		
Access:	Control variable	
Variable type:	Control ID: IDC_SCOPE	Category:
Variable <u>n</u> ame:	Control type: CTEXT	Ma <u>x</u> chars:
	Min valge;	Max valu <u>e;</u>
	.h file:	.cpp file:
Comment (// notation not required):		
	Fit	inish Cancel Help
Click Finish.		

Add two buttons on the dialog form:

ScopeDemo	×
Static	
Button1 Button2	

In Visual C++ 6.0:

Set the Button1 properties as shown on the picture	:
Push Button Properties 🛛 🔀	
-교 양 General Styles Extended Styles	
ID: IDC_DATA_BUTTON 🗨 Caption: Plot Data	
🔽 Vi <u>s</u> ible 🦳 <u>G</u> roup 🦳 <u>H</u> elp ID	
🗖 Dis <u>a</u> bled 🔽 Ta <u>b</u> stop	
	l
Set the Button2 properties as shown on the picture	
Push Button Properties	
-교 😮 General Styles Extended Styles	
ID: IDC_CLEAR_BUTTON 💽 Caption: Clear	
▼ Vi <u>s</u> ible	
🗖 Dis <u>a</u> bled 🔽 Tab stop	

In Visual C++ 2003/2005:

Set the Button1 Caption to	"Plot Data":
Properties 🗜 🗙	
IDC_DATA_BUTTON (Button Control)	
∄ 2↓ 🔲 🗲 🖂	
Appearance	
Bitmap False	
Caption Plot Data	
Client Edge False	
Flat False	
University Alignment Default	
And the Button 1 ID to "ID VISIONE TO UP Misc (Name) IDC_DATA_BUTTON (B Group False ID IDC_DATA_BUTTON Tabstop True Caption Specifies the text displayed by the control. Properties Opnamic Help	C_DATA_BUTTON":
Set the Button2 Caption to	"Clear":

Properties		4 X
IDC_BUTTON2	(Button Control)	IButto 💌
∄ 2↓ 🗉	4 🖻	
Appearance	2	
Bitmap	False	
Caption	Clear	
Client Edge	False	
Flat	False	
Misc (Name) Group ID Tabstop	Button2 ID IDC_CLEAR_BI False IDC_CLEAR_BI True	UTTON (I
Caption Specifies the tex	t displayed by the cor	atrol
spoenties and cos		ici oli
		ici oli

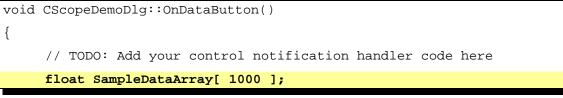
Double click on the "Plot Data" button:

ScopeDemo	×
Static	-
Plot Data Clear	
Plot Data Clear	

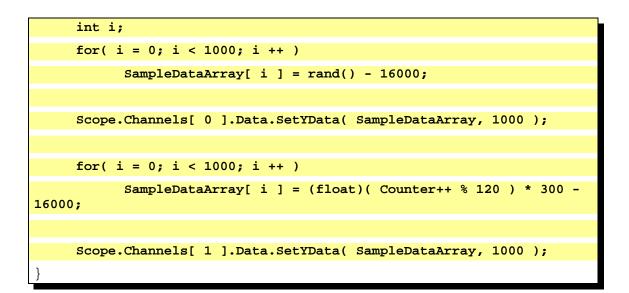
In Visual C++ 6.0:

In the "Add Member Fu	nction" dial	og click OK:
Add Member Function	? 🗙	
Member function <u>n</u> ame: Or <mark>DataButtor</mark> Message: BN_CLICKED Object ID: IDC_DATA_BUTTON	OK Cancel	

Add the highlighted lines in the button event handler:



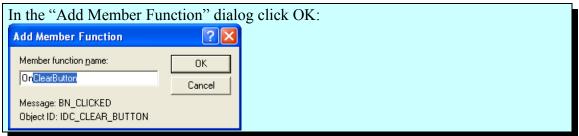
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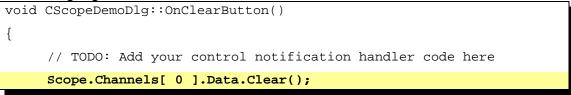
Double click on the "Clear" button:

🗆 ScopeDemo 🛛 🗙	
Static	
Plot Data Clear	

In Visual C++ 6.0:



Add the highlighted lines in the button event handler:



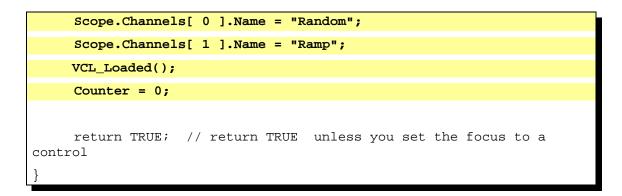
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```
Scope.Channels[ 1 ].Data.Clear();
Scope.Hold = false;
```

Scroll up and add the highlighted lines in the to the "BOOL CScopeDemoDlg::OnInitDialog()" function:

```
BOOL CScopeDemoDlg::OnInitDialog()
{
     CDialog::OnInitDialog();
     // Add "About..." menu item to system menu.
     // IDM_ABOUTBOX must be in the system command range.
     ASSERT((IDM_ABOUTBOX & 0xFFF0) == IDM_ABOUTBOX);
     ASSERT(IDM_ABOUTBOX < 0xF000);
     CMenu* pSysMenu = GetSystemMenu(FALSE);
     if (pSysMenu != NULL)
     {
           CString strAboutMenu;
           strAboutMenu.LoadString(IDS_ABOUTBOX);
           if (!strAboutMenu.IsEmpty())
           {
                 pSysMenu->AppendMenu(MF_SEPARATOR);
                 pSysMenu->AppendMenu(MF_STRING, IDM_ABOUTBOX,
strAboutMenu);
           }
     }
     // Set the icon for this dialog. The framework does this
automatically
     // when the application's main window is not a dialog
     SetIcon(m_hIcon, TRUE);
                                        // Set big icon
     SetIcon(m_hIcon, FALSE);
                                        // Set small icon
     // TODO: Add extra initialization here
     VCL_InitControls( m_hWnd );
     Scope.Open( m_Scope.m_hWnd );
     Scope.Channels.Add();
```

```
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```



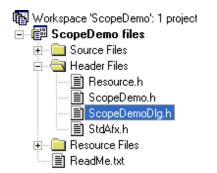
In Visual C++ 6.0: Select the "FileView" tab:



In Visual Visual C++ 2003/2005: Select the "Solution Explorer" tab:



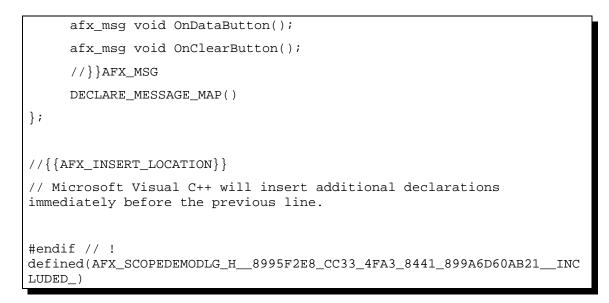
Double click on the "ScopeDemoDlg.h":



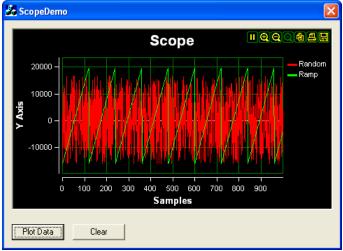
Add the highlighted lines in the header:

```
// ScopeDemoDlg.h : header file
//
#if !
defined(AFX_SCOPEDEMODLG_H_8995F2E8_CC33_4FA3_8441_899A6D60AB21__INC
LUDED_)
#define
AFX_SCOPEDEMODLG_H_8995F2E8_CC33_4FA3_8441_899A6D60AB21__INCLUDED_
#if _MSC_VER > 1000
#pragma once
#endif // _MSC_VER > 1000
#include <CSLScope.h>
```

```
////////
// CScopeDemoDlg dialog
class CScopeDemoDlg : public CDialog
// Construction
public:
    CScopeDemoDlg(CWnd* pParent = NULL); // standard
constructor
// Dialog Data
    //{{AFX_DATA(CScopeDemoDlg)
    enum { IDD = IDD_SCOPEDEMO_DIALOG };
    CStatic
               m_Scope;
    //}}AFX_DATA
    // ClassWizard generated virtual function overrides
    //{{AFX_VIRTUAL(CScopeDemoDlg)
    protected:
    virtual void DoDataExchange(CDataExchange* pDX); // DDX/DDV
support
     //}}AFX_VIRTUAL
// Implementation
protected:
    CTSLScope Scope;
     int
             Counter;
protected:
    HICON m_hIcon;
    // Generated message map functions
    //{{AFX_MSG(CScopeDemoDlg)
    virtual BOOL OnInitDialog();
    afx_msg void OnSysCommand(UINT nID, LPARAM lParam);
    afx_msg void OnPaint();
    afx_msg HCURSOR OnQueryDragIcon();
```



Compile and run the application. Click the "Plot Data" button few times:

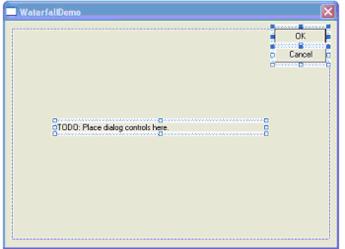


Congratulations! You have just created your first PlotLab application.

Creating a simple Waterfall application

Create and setup a new project named WaterfallDemo as described in the "Creating a new PlotLab project in Visual C++" chapter.

Select the components on the dialog form:



Click the "Del" key. They will be deleted from the form:

🔲 WaterfallDemo	

From the controls toolbar select a "Static Text" control: VC++ 6 VC++ 2003/2005

VCII	0.	VC++ 2005/200	,,	
Con 🔀		Toolbox	4 X	С
▶ ∰		Dialog Editor		
A _a ab		Radio Button		
[[×] "]		A_{lpha} Static Text		
		🕵 Picture Control		F
		🕩 Horizontal Scroll Bar		

Place the control on the form:

Static			

In Visual C++ 6.0:

From the menu select View Properties :
Eile Edit View Insert Project Build Layout
🖆 🚘 🖥 Class <u>Wi</u> zard Ctrl+W
ID= Resource Symbols Resource Includes
E [E Full Screen ple Vi
Workspace Alt+0 Output Alt+2
Debug Windows
C Refresh
Properties Alt+Enter
Change the control's ID to "ID_WATERFALL":
Text Properties 🛛 🔀
ID_WATERFALL Caption: Static
Vigible ✓ <u>G</u> roup ✓ <u>Help</u> ID Toisabled Tab_stop

Switch to the "Extended Styles" tab and check the "Client edge" property so you can easily see the control on the dialog: Text Properties General Styles Extended Styles Client edge Transparent Right aligned text Static edge Accept files Right-to-left reading order
From the menu select View ClassWizard : File Edit View Insert Project Build Layout 1 Resource Symbols Resource Includes Full Screen Vorlyspace Alt+0 Qutput Alt+2 Debug Windows Refrest Properties Alt+Enter
In the "ClassWizard" select the "Member Variables" tab and select the "ID_WATERFALL" in the "Control IDs" list box, then press "Add Variable": MFC ClassWizard Message Maps Member Variables Automation ActiveX Events Class Info Project Class pame: WaterfallDemoDlg.h. C\ WaterfallDemoDlg.cpp Control [Ds: Type Member Delete Variable DC_WATERFALL Update Columns Bind All
Description: DK Cancel

Set the variable "Category" to be "Control", and Add Member Variable Member variable game: M. Member variable game: M. Cancel Category: Control Variable type: CStatic Description: map to CStatic member	set the name to be m_Waterfall:
Click OK.	
In the "ClassWizard" click OK:	
MFC ClassWizard	
Message Maps Member Variables Automation ActiveX Events Class Info	1
Project: Class name: WaterfallDemo Class name:	Add Class 🔻
C:\\WaterfallDemoDlg.h, C:\\WaterfallDemoDlg.cpp	Add Variable
Control IDs: Type Member	Delete Variable
DC_WATERFALL CStatic m_Waterfall	Update <u>Columns</u>
	Bind All
Description: map to CStatic member	
ОК	Cancel

In Visual C++ 2003/2005:	
Change the control's ID to "ID_WATERFALL":	
IDC_STATIC1 (Text Control) IStatEditor	
Disabled False	
Help ID False	
Visible True	
Misc	
(Name) IDC_STATIC1 (Text Cont	
Group True ID IDC_WATERFALL V	
Tabstop False	
ID Specifies the identifier of the control.	
🛗 Properties 🔮 Dynamic Help	
Switch to the "Extended Styles" tab and check the "Client edge" property so you can	
easily see the control on the dialog:	
Properties 4 X	
IDC_STATIC1 (Text Control) IStatEditor	
Border False Caption Scope	
Center Image False	
Client Edge True	
End Ellipsis True	
Modal Frame False No Prefix Traise	
No Wrap False	
Notify False	
Client Edge Specifies that the control will have a border with a	
sunken edge.	
Properties O Dynamic Help	
From the menu select Project Add Variable :	
ect - Microsoft Visual C++ [design] - Myl	
Project Build Debug Format Tools	
Add Class	
Add Variable	
Add Resource	
Add New Item Ctrl+Shift+A	
Image: Add Existing Item Shift+Alt+A Image: Add Existing Item Shift+Alt+A Image: New Folder Image: Add Existing Item	

Add Web Reference...

In the "Add Member Varia "Variable name" to be m_V		'Variable type" to CStatic, and set the
Add Member Variable Wizard - Sco	peDemo	
Welcome to the Add Member Va This wizard adds a member variable to y		
Access:		
public 💽 🔽	Control variable	
Variable type:	Control ID:	Category:
CStatic	IDC_WATERFALL	Control
Variable <u>n</u> ame:	Control type:	Ma <u>x</u> chars:
m_Waterfall	CTEXT	
	Min val <u>u</u> e:	Max valu <u>e</u> :
	.h file:	.cpp file;
Courses (Woods View on the section Pr		
Comment (// notation not required):		
	F	Finish Cancel Help
Clipte Firstel		
Click Finish.		

Add two buttons on the dialog form:

🗖 WaterfallDemo 🛛 🔀	
Static	
· · · · · · · · · · · · · · · · · · ·	
Button1 Button2	

In Visual C++ 6.0:

Set the Button1 properties as shown on the picture	2.
Push Button Properties	
-교 😵 General Styles Extended Styles	
ID: IDC_DATA_BUTTON 🗨 Caption: Plot Data	
✓ Vigible ☐ Group ☐ Help ID	
☐ Dis <u>a</u> bled	
	1
Set the Button2 properties as shown on the picture	2.
Push Button Properties 🛛 🛛 🔀	
Push Button Properties 🛛 🔀 🖓 🖓 General Styles Extended Styles	
-阿 💡 General Styles Extended Styles	
-₩ 😵 General Styles Extended Styles ID: IDC_CLEAR_BUTTON 💌 Caption: Clear	
ID: IDC_CLEAR_BUTTON ▼ Caption: Clear	

Set the control's ID to "IDC_DATA_BUTTON":
Change the control's Caption to "Plot Data":
Select Button2 on the form.
Change the control's ID to "IDC_CLEAR_BUTTON":

Change the control's Captio		
Properties		×
IDC_BUTTON2 (Button Control) IButt		IButt 💌
₽ 2↓ 🗉	4 🖻	
Appearance	2	-
Bitmap	False	
Caption	Clear	
Client Edge	False	

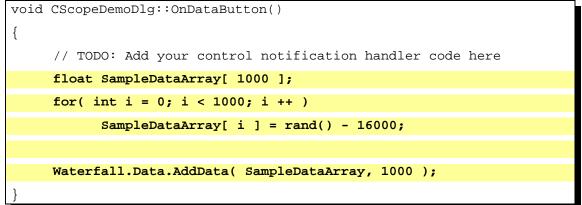
Double click on the "Plot Data" button:

WaterfallDemo	×
Static	_
Plot Data Clear	

In Visual C++ 6.0:

In the "Add Member Function" dialog click OK:				
Add Member Function				
Member function name: OK OrDataButtor Cancel Message: BN_CLICKED Object ID: IDC_DATA_BUTTON				

Add the highlighted lines in the button event handler:



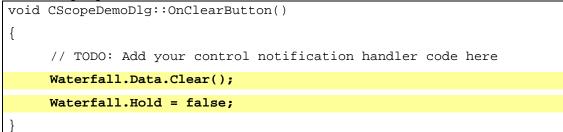
Double click on the "Clear" button:

🔲 WaterfallDe	emo 🗙
Static	
Plot Data	Clear

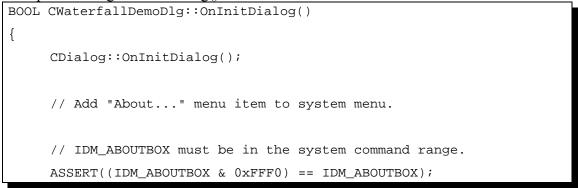
In Visual C++ 6.0:

In the "Add Member Function" dialog click OK:					
Add Member Function					
Member function <u>n</u> ame: Or <mark>ClearButtor Cancel Message: BN_CLICKED Object ID: IDC_CLEAR_BUTTON</mark>					

Add the highlighted lines in the button event handler:

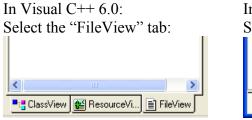


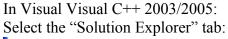
Scroll up and add the highlighted lines in the to the "BOOL CScopeDemoDlg::OnInitDialog()" function:



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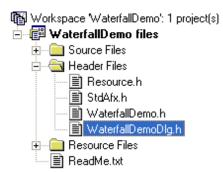
```
ASSERT(IDM_ABOUTBOX < 0xF000);
     CMenu* pSysMenu = GetSystemMenu(FALSE);
     if (pSysMenu != NULL)
     {
           CString strAboutMenu;
           strAboutMenu.LoadString(IDS_ABOUTBOX);
           if (!strAboutMenu.IsEmpty())
           {
                 pSysMenu->AppendMenu(MF_SEPARATOR);
                 pSysMenu->AppendMenu(MF_STRING, IDM_ABOUTBOX,
strAboutMenu);
           }
     }
     // Set the icon for this dialog. The framework does this
automatically
     // when the application's main window is not a dialog
     SetIcon(m_hIcon, TRUE);
                                        // Set big icon
     SetIcon(m_hIcon, FALSE);
                                        // Set small icon
     // TODO: Add extra initialization here
     VCL_InitControls( m_hWnd );
     Waterfall.Open( m_Waterfall.m_hWnd );
     VCL_Loaded();
     return TRUE; // return TRUE unless you set the focus to a
control
```





- 🐼 Solution Explorer	🔩 Class View	🕞 Res

Double click on the "ScopeDemoDlg.h":

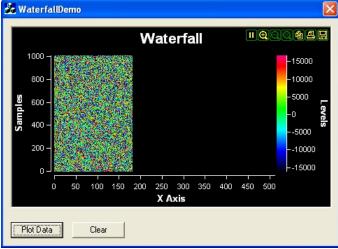


Add the highlighted lines in the header:

```
// WaterfallDemoDlg.h : header file
11
#if !
defined(AFX_WATERFALLDEMODLG_H__F20C38B5_B9AC_427B_8DA0_F5FF9A88FECE_
_INCLUDED_)
#define
AFX_WATERFALLDEMODLG_H__F20C38B5_B9AC_427B_8DA0_F5FF9A88FECE__INCLUDE
D_
#if _MSC_VER > 1000
#pragma once
#endif // _MSC_VER > 1000
#include <CSLWaterfall.h>
////////
// CWaterfallDemoDlg dialog
class CWaterfallDemoDlg : public CDialog
{
// Construction
public:
    CWaterfallDemoDlg(CWnd* pParent = NULL); // standard
constructor
// Dialog Data
    //{{AFX_DATA(CWaterfallDemoDlg)
```

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```
enum { IDD = IDD_WATERFALLDEMO_DIALOG };
     CStatic
                 m_Waterfall;
     //}}AFX_DATA
     // ClassWizard generated virtual function overrides
     //{{AFX_VIRTUAL(CWaterfallDemoDlg)
     protected:
     virtual void DoDataExchange(CDataExchange* pDX); // DDX/DDV
support
     //}}AFX_VIRTUAL
// Implementation
protected:
     CTSLWaterfall Waterfall;
protected:
     HICON m hIcon;
     // Generated message map functions
     //{{AFX_MSG(CWaterfallDemoDlg)
     virtual BOOL OnInitDialog();
     afx_msg void OnSysCommand(UINT nID, LPARAM lParam);
     afx_msg void OnPaint();
     afx_msg HCURSOR OnQueryDragIcon();
     afx_msg void OnDataButton();
     afx_msg void OnClearButton();
     //}}AFX_MSG
     DECLARE_MESSAGE_MAP()
};
//{{AFX_INSERT_LOCATION}}}
// Microsoft Visual C++ will insert additional declarations
immediately before the previous line.
#endif // !
defined(AFX_WATERFALLDEMODLG_H__F20C38B5_B9AC_427B_8DA0_F5FF9A88FECE_
 INCLUDED )
```



Compile and run the application. Click the "Plot Data" button few times:

You have learned how to use the Waterfall component from inside your Visual C++ application.

Using the TSLCRealBuffer in C++ Builder and Visual C++

The C++ Builder version of the library comes with a powerful data buffer class, called TSLCRealBuffer.

The TSLCRealBuffer is capable of performing basic math operations over the data as well as some basic signal processing functions. The data buffer also uses copy on write algorithm improving dramatically the application performance.

The TSLCRealBuffer is an essential part of the SignalLab generators and filters, but it can be used independently in your code.

You have seen already some examples of using TSLCRealBuffer in the previous chapters. Here we will go into a little bit more details about how TSLCRealBuffer can be used.

In order to use TSLCRealBuffer you must include SLCRealBuffer.h directly or indirectly (trough another include file):

#include <SLCRealBuffer.h>

Once the file is included you can declare a buffer: Here is how you can declare a 1024 samples buffer: TSLCRealBuffer Buffer(1024);

Version 4.0 and up does not require the usage of data access objects. The data objects are now obsolete and have been removed from the library.

You can obtain the current size of a buffer by calling the GetSize method: Int ASize = Buffer.GetSize(); // Obtains the size of the buffers

You can resize (change the size of) a buffer: Buffer.Resize(2048); // Changes the size to 2048 You can set all of the elements (samples) of the buffer to a value: Buffer.Set(30); // Sets all of the elements to 30.

```
You can access individual elements (samples) in the buffer:

Buffer [ 5 ] = 3.7; // Sets the fifth elment to 3.7

Double AValue = Buffer [ 5 ]; // Assigns the fifth element to a

variable
```

You can obtain read, write or modify pointer to the buffer data:

```
const double *data = Buffer.Read() // Starts reading only
double *data = Buffer.Write()// Starts writing only
double *data = Buffer.Modify()// Starts reading and writing
```

Sometimes you need a very fast way of accessing the buffer items. In this case, you can obtain a direct pointer to the internal data buffer. The buffer is based on copy on write technology for high performance. The mechanism is encapsulated inside the buffer, so when working with individual items you don't have to worry about it. If you want to access the internal buffer for speed however, you will have to specify up front if you are planning to modify the data or just to read it. The TSLCRealBuffer has 3 methods for accessing the data Read(), Write(), and Modify (). Read() will return a constant pointer to the data. You should use this method when you don't intend to modify the data and just need to read it. If you want to create new data from scratch and don't intend to preserve the existing buffer data, use Write(). If you need to modify the data you should use Modify (). Modify () returns a non constant pointer to the data, but often works slower than Read() or Write(). Here are some examples:

```
const double *pcData = Buffer.Read(); // read only data pointer
double Value = *pcData; // OK!
*pcData = 3.5; // Wrong!
double *pData = Buffer.Write(); // generic data pointer
double Value = *pData; // OK!
*pData = 3.5; // OK!
```

You can assign one buffer to another:

Buffer1 = Buffer2;

You can do basic buffer arithmetic:

You can do basic burier antimetic.
TSLCRealBuffer Buffer1(1024);
TSLCRealBuffer Buffer2(1024);
TSLCRealBuffer Buffer3(1024);
Buffer1.Set(20.5);
Buffer2.Set(5);
Buffer3 = Buffer1 + Buffer2;
Buffer3 = Buffer1 - Buffer2;
Buffer3 = Buffer1 * Buffer2;
Buffer3 = Buffer1 / Buffer2;

In this example the elements of the Buffer3 will be result of the operation (+,-,* or /) between the corresponding elements of Buffer1 and Buffer2.

```
You can add, subtract, multiply or divide by constant:

// Adds 4.5 to each element of the buffer

Buffer1 = Buffer2 + 4.5;

// Subtracts 4.5 to each element of the buffer

Buffer1 = Buffer2 - 4.5;

// Multiplies the elements by 4.5

Buffer1 = Buffer2 * 4.5;

// Divides the elements by 4.5

Buffer1 = Buffer2 / 4.5;
```

You can do "in place" operations as well:

Buffer1 += Buffer2; Buffer1 += 4.5; Buffer1 -= Buffer2; Buffer1 -= 4.5; Buffer1 *= Buffer2; Buffer1 *= 4.5; Buffer1 /= Buffer2;

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Those are just some of the basic buffer operations provided by SignalLab.

If you are planning to use some of the more advanced features of TSLCRealBuffer please refer to the online help.

SignalLab also provides TSLCComplexBuffer and TSLCIntegerBuffer. They work similar to the TSLCRealBuffer but are intended to be used with Complex and Integer data. For more information on TSLCComplexBuffer and TSLCIntegerBuffer please refer to the online help.

Distributing your application

Once you have finished the development of your application you most likely will need to distribute it to other systems. In order for the built application to work, you will have to include a set of DLL files together with the distribution. The necessary files can be found under the [install path]\DLL directory([install path] is the location where the library was installed).

You can distribute them to the [Windows]\System32 ([Windows]\SysWOW64 in 64 bit Windows) directory, or to the distribution directory of your application([Windows] is the Windows directory - usually C:\WINNT or C:\WINDOWS).

Deploying your application with the IPP DLLs

The application will work, however the performance can be improved by also copying the Intel IPP DLLs provided with the library.

The DLLs are under the [install path]\LabPacks\IppDLL directory([install path] is the location where the library was installed).

In 32 bit Windows to deploy IPP, copy the files to the [Windows]\System32 directory on the target system.

In 64 bit Windows to deploy IPP, copy the files to the [Windows]\SysWOW64 directory on the target system.

[Windows] is the Windows directory - usually C:\WINNT or C:\WINDOWS

This will improve the performance of your application on the target system.