WAVEMASTER
WAVEPRO 7000 SERIES
DDA5005
SERIAL DATA ANALYZER

AUTOMATION MANUAL

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About this Manual

This manual is a reference guide to the "Automation" capabilities of LeCroy's X-Stream™ DSOs.

The manual includes a complete list of all instrument controls that are available to a controlling application. In contrast to previously available remote control possibilities for LeCroy instruments, Automation enables the controlling application to run on the instrument itself.

Part One, "About Automation," covers the principles of control via Automation and offers practical examples. It also presents the overall hierarchy of controls accessible via Automation.

Part Two, "Control Reference," presents each of the controls in detail, including examples of use in many cases.

Part Three, "Math/Measure Control Reference," presents controls available in each of the multitude of the Math/Measure 'processors' available in X-Stream DSOs.

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ABOUT AUTOMATION

This section presents an overview of the Automation capabilities of X-Stream DSOs along with an overview of the technology itself.

CHAPTER ONE: *Overview*

In this chapter learn about

- ***Microsoft's COM-based "OLE Automation"***
- ***How to create simple applications in Visual Basic to control the instrument***
- ***How to use the X-Stream Browser to interactively control the instrument***

OVERVIEW OF AUTOMATION

In addition to supporting the familiar ASCII-based remote commands that have been used to control all LeCroy DSOs for many years, all of the Windows-based "X-Stream" instruments fully support control by Automation interfaces based on Microsoft's Component Object Model (COM). Using COM, the controlling application can run directly on the instrument without requiring an external controller; or, alternatively, it can run using Microsoft's distributed COM standard (DCOM) on a networked computer.

Standards

Automation is a Microsoft technology, formerly referred to as "OLE Automation," that has primarily been used to enable cross-application macro programming. It is based upon the Component Object Model (COM), which is similar in nature to CORBA, more commonly found in the UNIX world.

An application that "exposes Automation Objects" is referred to as an "Automation Server." Automation Objects expose "Automation Interfaces" to the controlling "Automation Client." This manual describes these Automation objects and interfaces in detail.

It is important to note that Automation itself is not language dependent; it can be used from any programming language that supports COM. This manual, however, concentrates mainly on the use of Automation from the Visual Basic Script (VBScript) language for several reasons, including the fact that it is one of the easiest to use. Also, it is the language that X-Stream instruments use for setup files (more on this later). In addition, the VBScript interpreter is installed by default on all X-Stream instruments and, therefore, is available without your having to purchase any additional software.

Compatibility with Other LeCroy Scopes

Throughout LeCroy's history, we have striven to maximize compatibility, and this policy remains in force. However, due to the fact that the underlying technologies used by Automation require the 32-bit Windows operating system, and that this system is available only on our X-Stream instruments, Automation is not available on the older LeCroy scope families.

Automation and IEEE 488.2 Remote Control – How Do They Compare?

Automation does not replace the IEEE 488.2-based remote command set, which is also supported by X-Stream instruments (and will continue to be). Instead, it augments it and allows a new class of application to be created that can run on the DSO itself.

Automation however can be considered as the "Native Language," or "Mother Tongue" of X-Stream instruments. All of the instrument's controls and features are available to the Automation Client.

Automation controls generally are more granular than 488.2 remote commands. That is, many 488.2 remote commands set more than one control at the same time; whereas, via Automation, this is not the case.

The following table summarizes the differences between the two remote control possibilities:

	IEEE 488.2 Control	Automation Control
Physical Transport	GPIB, TCP/IP over Ethernet	Inter-process using COM, inter-PC using DCOM (TCP/IP)
Textual parsing of instrument responses required	Yes. All instrument responses need 'parsing' to extract useful information.	No. Each element in the Automation hierarchy appears as a "variable" to the Automation client.
Compatibility with previous LeCroy DSOs	Very good. In most cases remote control applications written for older DSOs will work without modification.	None. Automation is a new standard first introduced with LeCroy's X-Stream DSOs.
Ability to run controlling application "in the box"	Yes, by using the TCP/IP (VICP) protocol to talk to the "local host"	Yes, natively
Ease of Use	Not trivial. It's easier using a tool such as ActiveDSO that hides some of the complexities.	Very easy to use from scripting languages and office productivity tools
Format of Waveform results	Binary or ASCII. Both require parsing before use.	Waveforms are presented as arrays of floating point values.
Control from MS Office suite	Possible via ActiveDSO utility	Yes, natively (see examples later in this manual)

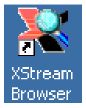
General Characteristics

- When an application is running locally on the instrument and requests a connection to the DSO via Automation (for example, by using **CreateObject("LeCroy.XStreamDSO")** from Visual Basic), one of two things will happen. If the X-Stream DSO application is already running, the object returned will be a "pointer" to the running application. If the DSO application is not running, it will be started. It is not possible to run two simultaneous instances of the X-Stream DSO application.
- More than one simultaneous connection to the instrument via Automation will be accepted, but simultaneous connections are not recommended.
- When the final client has been disconnected from the instrument (server), the X-Stream DSO application will remain running and will accept further client connections.
- Operations that cause Modal Dialogs to appear in the instrument's display will, by default, disrupt access from Automation. This behavior can be changed using the **app.SystemControl.ModalDialogTimeout** and **app.SystemControl.EnableMessageBox** controls. Refer to the description of each of these controls in the reference section for more information.
- The instrument application can be minimized in order to allow the controlling application to take over the display and touch panel by means of the **app.Minimize** control. It can also be resized and repositioned on the display by means of the **app.Top**, **app.Left**, **app.Bottom**, **app.Right** controls.

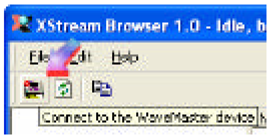
INTRODUCTION TO THE X-STREAM BROWSER

The easiest way to get up and running with Automation, and also to visualize the "X-Stream Object Model" is to use the X-Stream browser tool, which is pre-installed on all instruments.

To launch the tool, first minimize the instrument application (**File->Minimize**), then double-click on the X-Stream Browser icon on the desktop:

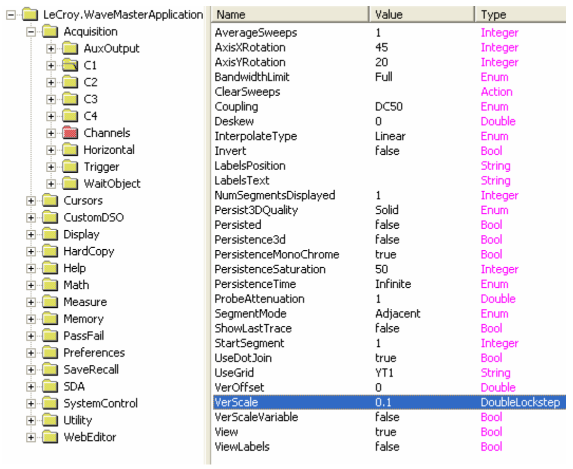


To connect to the running DSO application, click the **Connect** toolbar icon:

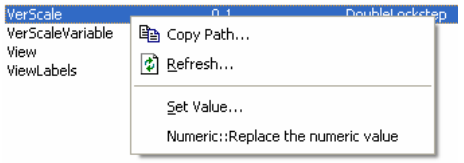

XStream Browser 1.0 - Idle, b
File Edit Help
Connect to the WaveMaster device

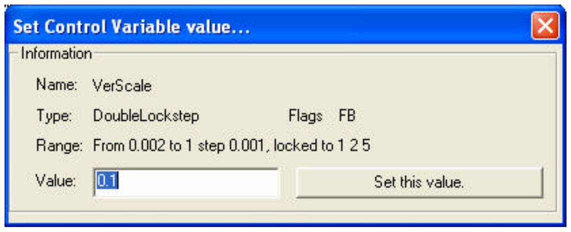
Upon connection, the root of the object hierarchy is shown in a layout similar to that presented when a file system is browsed using Windows Explorer.

As a quick demonstration of how the X-Stream Browser can be used, open the **Acquisition** folder, then click on the **C1** folder. Find the **VerScale** (Volts/Div) control in the right-hand window and right-click on it, then select the **Set Value** menu option.



Name	Value	Type
AverageSweeps	1	Integer
AxisXRotation	45	Integer
AxisYRotation	20	Integer
BandwidthLimit	Full	Enum
ClearSweeps		Action
Coupling	DC50	Enum
Deskew	0	Double
InterpolateType	Linear	Enum
Invert	false	Bool
LabelsPosition		String
LabelsText		String
NumSegmentsDisplayed	1	Integer
Persist3DQuality	Solid	Enum
Persisted	false	Bool
Persistence3d	false	Bool
PersistenceMonoChrome	true	Bool
PersistenceSaturation	50	Integer
PersistenceTime	Infinite	Enum
ProbeAttenuation	1	Double
SegmentMode	Adjacent	Enum
ShowLastTrace	false	Bool
StartSegment	1	Integer
UseDotJoin	true	Bool
UseGrid	YT1	String
VerOffset	0	Double
VerScale	0.1	DoubleLockstep
VerScaleVariable	false	Bool
View	true	Bool
ViewLabels	false	Bool





Information

Name: VerScale

Type: DoubleLockstep Flags FB

Range: From 0.002 to 1 step 0.001, locked to 1 2 5

Value: 0.1

Enter a new value for **VerScale** and click the **Set this value** button. Restore the DSO's X-Stream window and note that the V/Div value for C1 should have changed to reflect the entered value.

STEP-BY-STEP INTRODUCTION TO AUTOMATION USING VBScript

This section of the manual presents a walk-through of how to create a simple remote control application, which will run on the instrument, from scratch. It doesn't rely upon any 3rd-party development tools, since it uses Windows' built-in text editor (Notepad) and the Visual Basic Script interpreter (VBScript), which is also installed on all instruments.

1. Use the **File? Windowed** menu option to place the DSO application into windowed mode. This allows the windows start-bar to be accessed.
2. Open Windows **Notepad** via Start->Programs->Accessories->Notepad
3. Write the following text into the editor:

```
Set app = CreateObject("LeCroy.XStreamDSO")
app.AutoSetup
app.Display.GridMode = "Quad"
myVerScale = app.Acquisition.C1.VerScale
MsgBox myVerScale
```

4. Save the file to drive **D:\** and name it **Exercise1.vbs**. Leave Notepad open, we'll need it again.
5. Open Windows Explorer, via **Start? Programs? Accessories? Windows Explorer**.
6. Navigate to drive **D:\** and double-click on **Exercise1.vbs**.
7. That's it. If these steps were followed correctly, you should hear relays clicking while the scope performs an auto-setup operation and enters its quad-grid display mode.

So, what did this "program" actually do?

- The **CreateObject** statement.

  ```
  Set app = CreateObject("LeCroy.XStreamDSO")
  ```

  CreateObject is the Visual Basic function that creates an instance of a COM Server (a.k.a. ActiveX Control). The argument **"LeCroy.XStreamDSO"** refers to our DSO application. Once it has instantiated (connected to) our DSO application we need some kind of 'handle' (pointer) to it so that we can use it later to communicate with the instrument. **CreateObject** returns a handle to us, which we store in the **app** variable.

NOTE: Only a single instance of the X-Stream DSO software can run on a system at one time. If the DSO software is already running when CreateObject is called, a handle to that running instance is returned. If the DSO software is not running, it will be started.

- The **app.AutoSetup** statement.

  ```
  app.AutoSetup
  ```

  Using the **app** handle, this line of code calls the **AutoSetup** method, which performs the same task as the front-panel Auto-Setup button. Documentation for this method can be found later in the reference section.

- The **app.Display.GridMode = "Quad"** statement.

  ```
  app.Display.GridMode = "Quad"
  ```

Using the **app** handle, this line of code sets the **GridMode** control of the **Display** system to the value "Quad". It's important to note that the controls are arranged in a hierarchy, with each 'level' of the hierarchy delimited with a decimal point (**.**).

- The **myVerScale = app.Acquisition.C1.VerScale** statement.

  ```
  myVerScale = app.Acquisition.C1.VerScale
  ```

  Instead of setting the value of a control, this line of code retrieves the current value of a control, in this case the Vertical Scale (Volts/Div) of Channel 1. The value returned is stored within the variable **myVerScale**.

  NOTE: In Visual Basic Script it is not necessary to "Dimension" variables before using them (for example, using statements like "Dim myVerScale as Double").

- The **MsgBox myVerScale** statement

  ```
  MsgBox myVerScale
  ```

  This line of code does not communicate with the scope at all, but calls the standard Visual Basic Script function **MsgBox**. This function displays a dialog containing the value of the variable following "MsgBox". In our case the value of Channel 1's vertical scale, and waits for the **OK** button to be clicked.

  Documentation about the MsgBox function can be found in Microsoft's Visual Basic Scripting documentation at www.microsoft.com\scripting.

Another point that should be mentioned here is something that is used extensively in Setup files created by the instrument: the ability to use "abbreviations" to simplify programs. Following is an example in which a shorthand method is used to replace some rather long-winded code. It is also important to note that this also enhances performance. For example, the "lookup" of the object `app.Acquisition.C1` occurs only once in the modified code, but three times in the original code.

Instead of:

```
app.Acquisition.C1.VerScale = 0.5
app.Acquisition.C1.VerOffset = 0.1
app.Acquisition.C1.Coupling = "DC50"
```

The following may be used:

```
set myChannel1 = app.Acquisition.C1
myChannel1.VerScale = 0.5
myChannel1.VerOffset = 0.1
myChannel1.Coupling = "DC50"
```

WHERE IS AUTOMATION USED?

Automation is used in several places in the X-Stream based instrument.

- Instrument Setups (Panel Files)
- Custom Math/Measurements
- CustomDSO, User Interface customization
- Control from external applications (COM/DCOM)

Each of these uses is described in more detail in the following sections.

SETUPS (PANEL FILES) ARE PROGRAMS!

Setup files, used to save and recall the state of the instrument between runs, are traditionally binary files whose internal structure is neither documented nor obvious to the user.

In X-Stream DSOs, however, this is no longer the case. Setups are ASCII text files that contain a complete Visual Basic Script “program” that, when “executed,” will restore the instrument to a previously recorded state. **In effect, each time a panel is saved, the instrument effectively writes you a program that, when executed, returns the instrument to the saved state.**

Due to the fact that these setups are already programs, they are a great way to get started quickly with Automation. As an example, try saving a setup into a file and examine it using a text-editor, as follows:

1. Touch **File** in the menu bar, then **Save Setup** from the drop-down menu.
2. Touch the **Browse** button and specify drive **D:** as the location to save the .lss (LeCroy setup script) file.
3. Touch **Save Now!**

4. Minimize the application using the **Minimize** option from the **File** menu
5. Open Microsoft’s Notepad application from the **Accessories** program folder (**Start? Programs? Accessories**).
6. Open the file saved above. You will see a Visual Basic Script program that begins like this:

```
' XStreamDSO ConfigurationVBScript ...
' LECROY,WM8300,WM000001,0.0.0
' Thursday, February 20, 2003 11:26:55 AM

On Error Resume Next
set XStreamDSO = CreateObject("LeCroy.XStreamDSO")
XStreamDSO.RecallingSetup = True

' AladdinPersona ...
XStreamDSO.HideClock = False
XStreamDSO.TouchScreenEnable = True

…
```

Since the entire state of the instrument, including all controls for all installed software options, is saved, this panel may look fairly complex. But don’t let this fool you; the basic concept is, in fact, fairly simple.

As a quick example of how setups can be used as the starting point for controlling applications, scroll down to the end of the file and add the following code (shown in bold-type) to the file.

' Place any custom VBScript code after this point
'

' Perform an Auto Setup
XStreamDSO.AutoSetup

Add this code

When this setup is recalled, the complete state of the instrument will be restored, followed by an Auto-Setup operation.

Obviously this is a fairly trivial “application,” but it is easy to imagine how automated testing could be performed with the introduction of loops and conditional execution.

NOTE: Setup files stored by the instrument have file extension ".lss" (LeCroy Setup Script). These files are syntactically identical to Microsoft Visual Basic Script (VBScript) files, which have a ".vbs" extension.

TIP: A simple alternative to recalling the panel into the instrument is to execute it, either by double-clicking on the .lss file in Windows Explorer, or by executing it from the command line.

CUSTOM MATH AND MEASUREMENTS

Custom Math and Measurements can be coded using VBScript or JavaScript in instruments equipped with the XDEV and/or XMAP software options. Using Automation control of the instrument, decisions can be made during custom processing that reconfigure the DSO.

When you are developing custom processing routines using the reference section of this manual, **app.Acquisition.Cx.Out.Result** may be used as a comprehensive reference to the **Result Object**, which is used to describe waveform data (InResult, InResult1, InResult2, OutResult).

For more detail about this capability, see the “Customization” section of the on-line Help Manual.

CustomDSO

CustomDSO enables customization of the instrument’s UI in instruments equipped with the XDEV and/or XMAP options. Two modes of operation are supported: Basic mode and Plug-in mode.

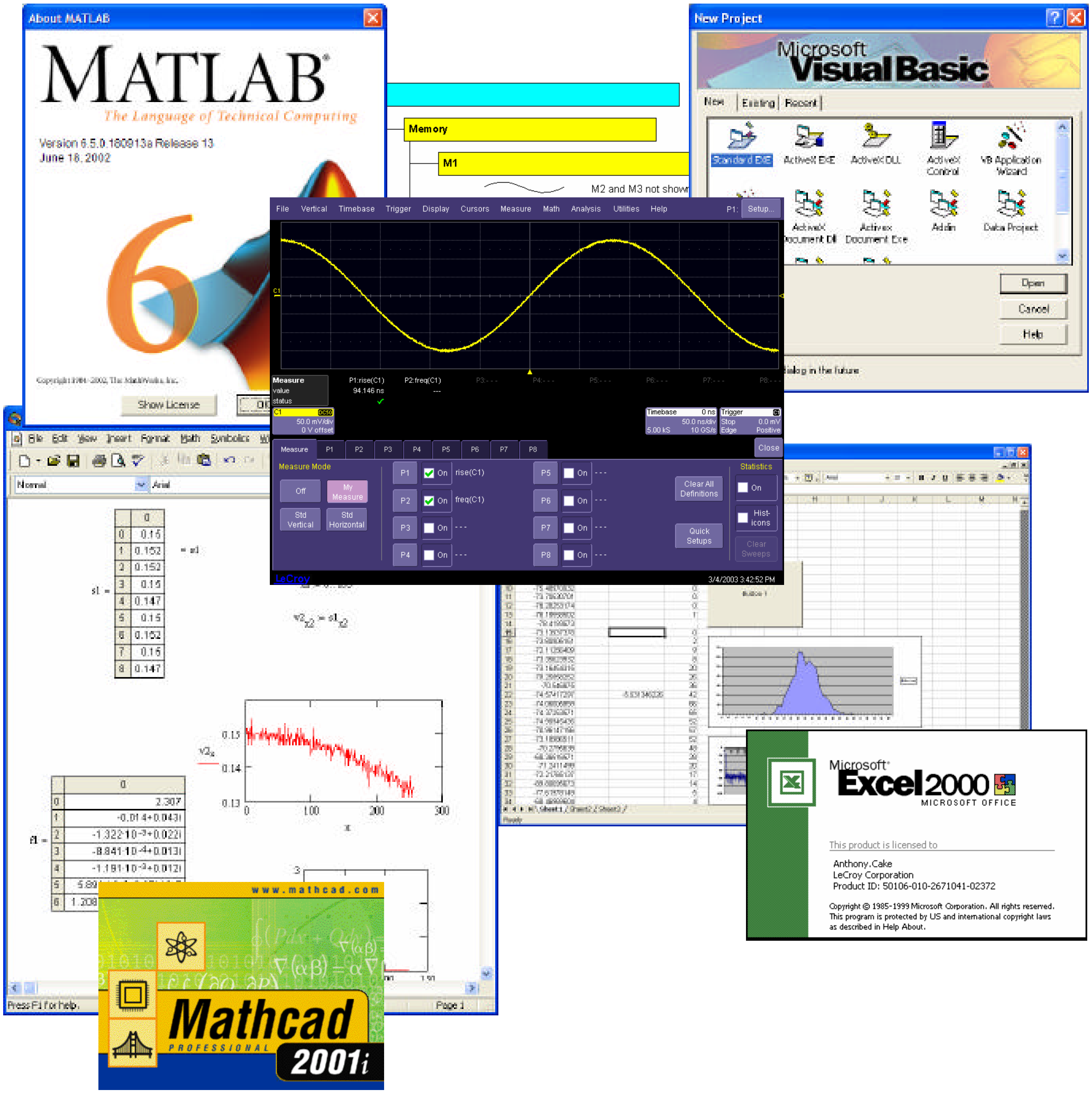
In Basic mode a Visual Basic Script (VBScript) program can be assigned to each of 8 buttons that can, optionally, appear at the bottom of the instrument’s display. By means of Automation, each of these may further reconfigure all 8 buttons, which would allow simple menu hierarchies to be generated.

In Plug-in mode an ActiveX control, created in any of a number of programming languages, can be inserted into the instrument’s menu system. Once “embedded,” this Plug-in can take full control of the DSO using Automation.

Full documentation on CustomDSO is available in the CustomDSO section of the on-line Help Manual.

Control from External Applications

Control of an X-Stream based instrument by Automation is possible from most modern programming languages (interpreted and/or compiled), and also from the “macro” capability of office productivity suites such as Microsoft Office.



From Visual Basic

From Visual Basic the **CreateObject** method is used to create the connection to an instrument by Automation.

The following code example creates this connection and sets up some of the instrument's controls:

```
‘ Connect to the X-Stream DSO
Dim app as Object
Set app = CreateObject(“LeCroy.XStreamDSO”)

‘ Setup Vertical and Horizontal settings
app.Acquisition.C1.VerScale = 0.5
app.Acquisition.C1.VerOffset = 0.25

app.Acquisition.Horizontal.HorScale = 0.000001

‘ Disconnect from the DSO
Set app = Nothing
```

From MATLAB

MATLAB uses the **actxserver** keyword to connect to the instrument.

The following code example creates this connection, enables variable vertical scale, reads the vertical scale value for C1, and increases it by a factor of 0.75.

```
DSO = actxserver(‘Lecroyxstreamdso’)
set(DSO.Acquisition.C1.VerScaleVariable,’value’,-1)
verscale = get(DSO.Acquisition.C1.VerScale,’value’)
verscale = 0.75 * verscale
set(DSO.Acquisition.C1.VerScale,’value’,verscale)
```

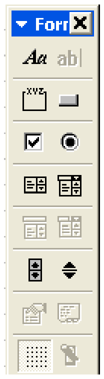
NOTE: Don't confuse the control of the instrument from MATLAB (MATLAB “drives”) with the use of MATLAB from within a custom processing function (the instrument “drives”).

From MS Office (Excel)

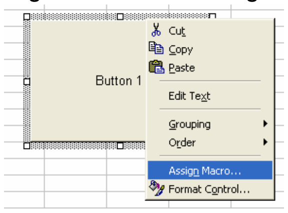
Using Automation, control of the instrument from Microsoft Excel is very similar to control from Visual Basic. This is because the "macro language" used in the office suite is Visual Basic for Applications, a lightweight version of Visual Basic.

The following example shows how to add a button to an Excel spreadsheet that connects to, and controls, the instrument on which Excel is running. Note that this example was generated using Excel 2000, other versions of Excel support similar functionality, but the specific sequence of commands may be slightly different:

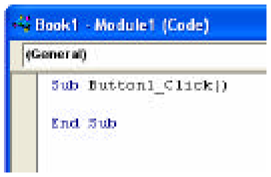
1. Enable the Forms toolbar using the **View**? **Toolbars**? **Forms** menu option.



2. Click the button icon on the toolbar and draw a button on the spreadsheet. The button will be labeled "Button 1" by default.
3. Right-click on the edge of the button and select **Assign Macro** from the drop-down menu.



4. Select the **New** button from the **Assign Macro** dialog; the macro editor will appear:



```
Sub Button1_Click()

End Sub
```

5. Type the following code into the subroutine:

```
Set app = CreateObject("LeCroy.XStreamDSO")
app.AutoSetup
Set app = Nothing
```

Clicking on the newly created button will now execute this code segment, which connects to the DSO and performs an Auto Setup.

CONTROL BY DISTRIBUTED COM (DCOM)

Distributed COM (DCOM) can be used to control an X-Stream based instrument remotely over any network supporting TCP/IP (including the Internet).

For obvious security reasons all LeCroy instruments are shipped with this feature disabled, but the fairly simple procedure detailed below can be followed to enable DCOM and define network user accounts that have the access permissions to use it.

There are two basic ways to configure DCOM (User-Level or Share-Level), the choice of which really depends upon whether the client and server (controlling PC and instrument) are both members of the same NT Domain or not.

Security Settings on the Instrument (Server): User Level

This mode requires that the client and server be logged into the same NT Domain. Use the share-level configuration (below) if this is not the case.

1. Run **DCOMCnfg.exe** from either **Start? Programs? Accessories? Command Prompt** or from **Start**? **Run…**
2. Select **LeCroyXStreamDSO** from the list of applications.
3. Click the **Properties** button.
4. Click the **General** tab and set the Authentication Level control to **Connect**.
5. Click the **Security** tab. Select **Use custom access permissions** and add the list of users that are allowed to control this scope via DCOM. Select **Everyone** (All Users) if you wish everyone to have access.
6. Click the **Identity** tab and select **The Interactive User**.

Security Settings on the Instrument (Server): Share Level

1. Run **DCOMCnfg.exe** from either **Start? Programs? Accessories? Command Prompt** or from **Start**? **Run…**
2. Select **LeCroyXStreamDSO** from the list of applications.
3. Click the **Properties** button.
4. Click the **General** tab and set the Authentication Level control to **(None)**.
5. Click the **Security** tab. Select **Use custom access permissions** and add **Everyone** to the list.
6. Click the **Identity** tab and select **The interactive user**.

Initialize the Controlling PC (Client)

1. Copy LeCroyXStreamDSO.exe from the **C:\Program Files\LeCroy\XStream** directory onto the controlling PC (location not important).
2. Execute LeCroyXStreamDSO.exe. Note that it will not run, but it will install enough information into the registry to allow remote control of other instruments.

Connecting to a Remote Instrument

1. **Visual Basic:** Add a second argument to the **CreateObject** method, which specifies the network location of the remote instrument:

```
Set o = CreateObject("LeCroy.XStreamDSO.1", "wavemaster00121")
```

```
        o.AutoSetup
```

2. **MATLAB:** Add a second argument to the actxserver call:

```
        h = actxserver (progid [, MachineName])
```

Once connection is made using one of the above techniques, the remainder of the communication with the instrument is the same as it would be in the case where the application runs directly on the instrument.

Remember, however, that because the connection is via a network, the performance of DCOM control of an instrument will not equal that of a direct connection created by running the client application directly on the instrument.

NOTE: Use version 2.6.0.0 or later for DCOM remote operation.

CONTROL VARIABLES EXPLAINED

Traditionally, properties presented to an Automation Client are simple "variables" with types such as Integer (int), String (BSTR), Floating Point (single, double), etc.

Control variables in X-Stream are an extension of the traditional Automation pattern, without affecting how they appear to most Automation clients (see section below on early/late bound clients).

As an example of what this enables, consider the following:

Take a control such as **VerScale** (Volts/Div), this may be set and queried in Visual Basic as follows:

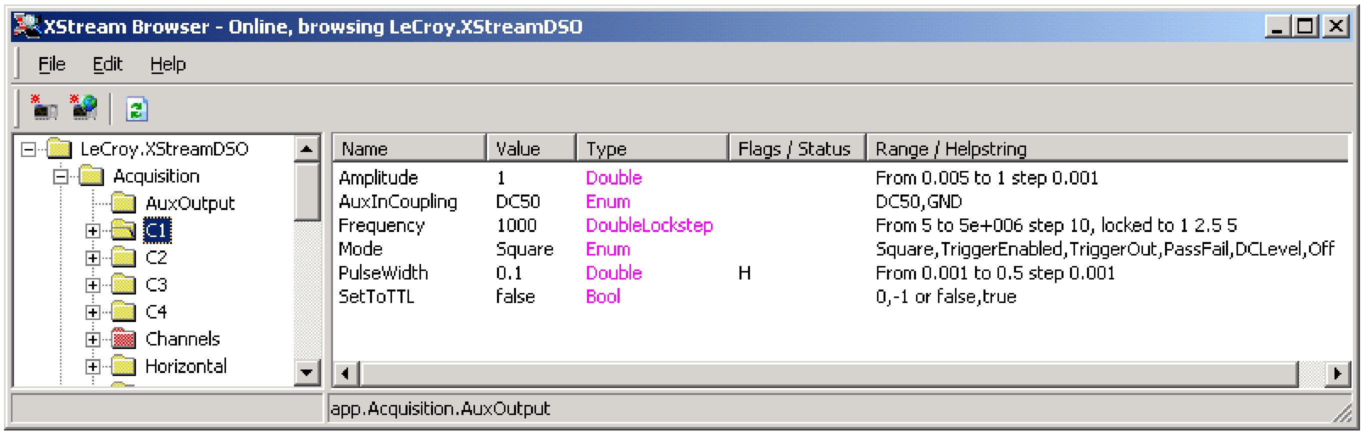
```
app.Acquisition.C1.VerScale = 0.5
CurrentValue = app.Acquisition.C1.VerScale
```

In addition, the following is supported:

```
minValue = app.Acquisition.C1.VerScale.GetMinValue
maxValue = app.Acquisition.C1.VerScale.GetMaxValue
```

This enables an Automation Client to not only set and query the current value of a control, but also to query its limits. This is useful in the generation of instrument-independent applications, or applications that present scope controls in a graphical user interface in which limits are required.

Various types of control variables are supported. The **Type** column in the X-Stream browser shows the control type:



Name	Value	Type	Flags / Status	Range / Helpstring
Amplitude	1	Double		From 0.005 to 1 step 0.001
AuxInCoupling	DC50	Enum		DC50,GND
Frequency	1000	DoubleLockstep		From 5 to 5e+006 step 10, locked to 1 2.5 5
Mode	Square	Enum		Square,TriggerEnabled,TriggerOut,PassFail,DCLevel,Off
PulseWidth	0.1	Double	H	From 0.001 to 0.5 step 0.001
SetToTTL	false	Bool		0,-1 or false,true

app.Acquisition.AuxOutput

The type designations are also given in the reference section of this manual, and are defined as follows:

Integer	32-bit Integer Value
Double	Double-precision floating point value
DoubleLockstep	Double-precision floating point value locked to a non-linear (e.g., 1, 2, 5) sequence.
Enum	List Value (e.g., "Orange," "Apple," "Pear")
String	String value
Bool	Boolean Value { True, False }, { 0, -1 }
Action	Action (no arguments or value)

The properties and methods available for each control are type-specific. Listed below are the most commonly used:

TYPE	PROPERTIES
Integer	VARIANT Value Value(VARIANT) int GetAdaptedValue SetRequestedValue(int) int GetRequestedValue int GetDefaultValue int GetGrain int GetMax int GetMin Increment(int)
Double	VARIANT Value Value(VARIANT) double GetAdaptedValue SetRequestedValue(double) double GetRequestedValue double GetDefaultValue double GetGrainValue double GetMaxValue double GetMinValue Increment(int)
DoubleLockstep	See Double
Enum	VARIANT Value Value(VARIANT) int GetAdaptedValue SetRequestedValue(int) int GetRequestedValue int GetDefaultValue int GetMax int GetMin int GetNumberOfValueStates Increment(int) BSTR GetRangeStringScreen BSTR GetRangeStringRemote
String	VARIANT Value Value(VARIANT) int GetMaxLength BSTR GetRequestedValue BSTR GetAdaptedValue SetRequestedValue(BSTR)
Bool	VARIANT Value Value(VARIANT) BOOL GetAdaptedValue BOOL GetRequestedValue BOOL GetDefaultValue Set Clear
Action	ActNow

ACCESSING WAVEFORM/MEASUREMENT RESULTS

Waveforms

Waveform data is exposed by a 'Result' object, which appears at various places in the object hierarchy depending upon which waveform is to be accessed. Some examples follow:

```
app.Acquisition.C1.Out.Result
app.Math.F1.Out.Result
app.Memory.M1.Out.Result
```

Waveform data is exposed as a simple array, no deciphering of proprietary binary formats is performed, as was necessary in the past. An example of how it is used follows.

The example is coded as an Excel macro, and should be assigned to a button as described earlier. The macro reads the number of samples in the waveform and places it in cell B1 of the Excel spreadsheet. It then reads all available sample data values and copies them into cells in the first column of the spreadsheet (A1...Axx).

```
Sub Button1_Click()
    ' Connect to the DSO
    Set app = CreateObject("LeCroy.XStreamDSO")

    ' Query the number of samples in C1 and store in cell "B1"
    numSamples = app.Acquisition.C1.Out.Result.Samples
    Cells(1, 2).Value = numSamples

    ' Access the waveform data array, and fill the first column
    ' of the spreadsheet with it
    wave = app.Acquisition.C1.Out.Result.DataArray
    For i = 0 To numSamples - 1
        Cells(i + 1, 1).Value = wave(i)
    Next i
End Sub
```

NOTE: Ensure that the record length is < 32kSamples, since Excel has a limit on the number of rows in a spreadsheet. Ideally, you should start experimenting with short (500 point) records.

Measurements

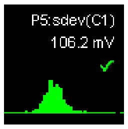
Measurement results are read in the same way as Waveforms. The following example, when copied into an Excel macro, will enable Standard Vertical parameters. It will then transfer the eight parameter values into the spreadsheet (cells C1…C8):

```
    Sub Button1_Click()
        ' Connect to the DSO
        Set app = CreateObject("LeCroy.XStreamDSO")

        ' Enable Standard Vertical Parameters
        app.Measure.MeasureMode = "StdVertical"

        ' Transfer the 8 parameter values into the spreadsheet
        Cells(1, 3).Value = app.Measure.P1.Out.Result.Value
        Cells(2, 3).Value = app.Measure.P2.Out.Result.Value
        Cells(3, 3).Value = app.Measure.P3.Out.Result.Value
        Cells(4, 3).Value = app.Measure.P4.Out.Result.Value
        Cells(5, 3).Value = app.Measure.P5.Out.Result.Value
        Cells(6, 3).Value = app.Measure.P6.Out.Result.Value
        Cells(7, 3).Value = app.Measure.P7.Out.Result.Value
        Cells(8, 3).Value = app.Measure.P8.Out.Result.Value

        Set app = Nothing
    End Sub
```

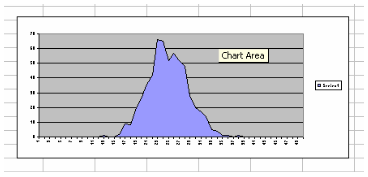
Statistics are also available for each parameter:

```
    app.Measure.P1.Statistics("mean").Result
    app.Measure.P1.Statistics("max").Result
    app.Measure.P1.Statistics("min").Result
    app.Measure.P1.Statistics("num").Result
    app.Measure.P1.Statistics("sdev").Result
```

In addition, the data used to display the Histicon is available using the “histo” statistic:



```
    Sub Button1_Click()
        Set app = CreateObject("LeCroy.XStreamDSO")

        bins = app.Measure.P5.Statistics("histo").Result.BinPopulations
        numBins = app.Measure.P5.Statistics("histo").Result.bins
        For i = 0 To numBins - 1
            Cells(i + 1, 4).Value = bins(i)
        Next I

        Set App = Nothing
    End Sub
```



Result Status

The waveform result object described above includes a status property (bit-field) that reflects the current status of the trace. This includes both ‘warning’ and ‘error’ conditions, as described below.

Description	Value	Bit #
LEC_Valid	0x0	N/A
LEC_Invalid	0x0000000000001	0
LEC_Overflow	0x0000000000002	1
LEC_Underflow	0x0000000000004	2
LEC_ContainsUndefinedValues	0x0000000000008	3
LEC_LessThan	0x0000000000010	4
LEC_GreaterThan	0x0000000000020	5
LEC_NotAPulse	0x0000000000040	6
LEC_NotCyclic	0x0000000000080	7
LEC_Averaged	0x0000000000100	8
LEC_UnlockedPLL	0x0000000000200	9
LEC_OtherError	0x0000000000400	10
LEC_OtherWarning	0x0000000000800	11
LEC_OtherInfo	0x0000000001000	12
LEC_InputsIncompatible	0x0000100000000	28
LEC_AlgorithmLimitsReached	0x0000200000000	29
LEC_BadDefinition	0x0000400000000	30
LEC_TooFewData	0x0000800000000	31
LEC_TooManyData	0x0001000000000	32
LEC_UniformHorizIntervalRequired	0x0002000000000	33
LEC_BadUnits	0x0004000000000	34
LEC_DataRangeTooLow	0x0008000000000	35
LEC_DataUndersampled	0x0010000000000	36
LEC_PoorStatistics	0x0020000000000	37
LEC_SlowTransitionTime	0x0040000000000	38
LEC_DataResampled	0x0080000000000	39
LEC_DataInterpolated	0x0100000000000	40
LEC_MeasurementScaleImprecise	0x0200000000000	41
LEC_NoDataAvailable	0x0400000000000	42
LEC_SomeCummulatedResultsInvalid	0x0800000000000	43
LEC_InsufficientMemory	0x1000000000000	44
LEC_ChannelNotActive	0x2000000000000	45
LEC_UseStatusDescription	0x4000000000000	46

SYNCHRONIZATION

Synchronization or, more specifically, knowing when to read results, is critical when working with a digital oscilloscope by remote control (it is just as important by IEEE488.2 control as by Automation). This is especially true when working with an oscilloscope that uses a multithreaded architecture.

A classic problem seen in the majority of custom applications that control LeCroy (or other) DSOs is that the scope is left to free-run in Auto-trigger mode while simultaneously (and asynchronously) results are queried.

While working with the instrument via the Automation interface, there are a few techniques that can be used to guarantee the synchronization and consistency of results, whether they be waveform or parameter measurements.

The following example demonstrates a useful technique for ensuring synchronization. This example runs as an Excel macro:

```
Sub Button1_Click()
    ' Connect to the DSO
    Set app = CreateObject("LeCroy.XStreamDSO")

    ' Enable Standard Vertical parameters
    app.Measure.MeasureMode = "StdVertical"

    ' Stop the free-running trigger and take a single acquisition
    ' Use a 10 second timeout in the case that a trigger is not detected
    app.Acquisition.TriggerMode = "Stopped"
    app.Acquisition.Acquire (10, True)

    ' Read the first parameter value and transfer into the spreadsheet
    Cells(1, 3).Value = app.Measure.P1.Out.Result.Value

End Sub
```

The **Acquire** method arms the acquisition system and waits for a user-specified time for a trigger. The second argument, a Boolean, specifies whether or not to force a trigger before returning if a trigger doesn't arrive within the allotted time period. The method also returns a Boolean value signifying whether or not a trigger arrived. See the reference section for more information on this useful method.

Another scenario where synchronization is necessary is between changing settings and reading results, even when no acquisition took place. For this the **WaitUntilIdle** method is used. This method is "blocking" and will not return control until the setup request has completed.

*Note that the **Acquire** method is equivalent to setting the Trigger Mode to "Single", then executing **WaitUntilIdle.***

An example of **WaitUntilIdle** usage follows:

```
Sub Button1_Click()
    ' Connect to the DSO
    Set app = CreateObject("LeCroy.XStreamDSO")

    ' Enable Standard Vertical parameters
    app.Measure.MeasureMode = "StdVertical"

    ' Wait for the change to take place for a max. of 5 seconds
    app.WaitUntilIdle(5)

    ' Read the value of measurement P1 (pkpk) and transfer into the spreadsheet
    Cells(1, 2).Value = app.Measure.P1.Out.Result.Value

    ' Enable Standard Horizontal parameters
    app.Measure.MeasureMode = "StdHorizontal"

    ' Wait for the change to take place for a max. of 5 seconds
    app.WaitUntilIdle(5)

    ' Read the value of measurement P1 (rise time) and transfer into the
spreadsheet
    Cells(1, 3).Value = app.Measure.P1.Out.Result.Value
End Sub
```

NOTE: In almost all remote control applications, it is HIGHLY RECOMMENDED that you STOP acquisitions before accessing result data. Most remote control problems are caused by failure to follow this practice.

GOOD PRACTICES

- Using the **app.SetToDefaultSetup** action, restore the instrument to its default state before setting the controls required by an application. This eliminates any dependency on the previous configuration of the instrument. LeCroy strives to ensure that the default state of the instrument is constant from one software release to the next.
- Synchronization is an important concept that needs to be understood before you work with an X-Stream DSO via Automation. Attempting to read results while acquisitions are in progress could cause inconsistent results.
- Use the X-Stream Browser while developing Automation applications. This tool is guaranteed to show the up-to-date status of the Automation hierarchy since it retrieves it from a running instrument. It is also a very quick and easy way to exercise controls in real-time without your having to write a single line of code.
- When using a result object, verify that the status is valid to ensure that the acquisition and/or processing was valid.

EXAMPLES

Following are fairly complete examples of automating an X-Stream DSO, including configuration, acquisition, and reading results. Examples are given both as Excel macros, and as Visual Basic Scripts, which can run without Excel being loaded on the instrument.

Example 1: Excel Macro to Perform FFT of C1

```
Sub Button1_Click()
    ' Connect to the DSO
    Set app = CreateObject("LeCroy.XStreamDSO")

    ' Restore the instrument to its default state
    app.SetToDefaultSetup

    ' Stop acquisitions during setup
    app.Acquisition.TriggerMode = "Stopped"

    ' Turn C2 off (default state leaves C1 and C2 On)
    app.Acquisition.C2.View = False

    ' Configure F1=FFT(C1), using a Blackman-Harris filter
    app.Math.F1.View = True
    app.Math.F1.Source1 = "C1"
    app.Math.F1.Operator1 = "FFT"
    app.Math.F1.Operator1Setup.Window = "BlackmanHarris"

    ' Take a single acquisition, force after 2 seconds if it doesn't trigger
    app.Acquisition.Acquire 2, True

    ' Read out the FFT
    ' Query the number of samples in F1 and store in cell "B1"
    numSamples = app.Math.F1.Out.Result.Samples
    Cells(1, 2).Value = numSamples

    ' Access the waveform data array, and fill the first column
    ' of the spreadsheet with it
    wave = app.Math.F1.Out.Result.DataArray
    For i = 0 To numSamples - 1
```

```
        Cells(i + 1, 1).Value = wave(i)
    Next

End Sub
```

Example 2: VBScript Program to Perform FFT of C1 and Store Results in Text File

This example requires no additional software to be installed on the instrument, since it relies upon the built-in Visual Basic Script interpreter. The example is very similar to the previous Excel example, the most notable difference being the use of a standard system ActiveX control, **"Scripting.FileSystemObject"**, to enable the creation of files containing waveform data in ASCII format.

```
' VBScript example
' Configure the DSO to perform an FFT on Channel 1 and store
' the resulting data in a text file in ASCII format

' Connect to the DSO
Set app = CreateObject("LeCroy.XStreamDSO")

' Restore the instrument to its default state
app.SetToDefaultSetup

' Stop acquisitions during setup
app.Acquisition.TriggerMode = "Stopped"

' Turn C2 off (default state leaves C1 and C2 On)
app.Acquisition.C2.View = False

' Configure F1=FFT(C1), using a Blackman-Harris filter
app.Math.F1.View = True
app.Math.F1.Source1 = "C1"
app.Math.F1.Operator1 = "FFT"
app.Math.F1.Operator1Setup.Window = "BlackmanHarris"

' Take a single acquisition, force after 2 seconds if it doesn't trigger
app.Acquisition.Acquire 2, True

' Readout the FFT
numSamples = app.Math.F1.Out.Result.Samples

Set fso = CreateObject("Scripting.FileSystemObject")
Set MyFile= fso.CreateTextFile("c:\XStreamFFT.txt", True)

' Write the FFT power spectrum into the file, sample by sample
wave = app.Math.F1.Out.Result.DataArray
For i = 0 To numSamples - 1
    MyFile.WriteLine(wave(i))
Next

' Clean up
MyFile.Close
Set fso = Nothing
Set app = Nothing
```

Example 3: Script to Measure the Rise Time of the Signal on C1 and Display It in a Popup Window

This example configures the DSO to measure the rise time of the signal on C2, take a single acquisition, and present the results in a popup dialog. The example requires no additional software to be installed on the instrument, since it relies on the built-in Visual Basic Script interpreter.

```
' VBScript example
' Configure the DSO to measure the rise time of the signal
' on Channel 1 and display it in a popup message box.

' Connect to the DSO
Set app = CreateObject("LeCroy.XStreamDSO")

' Restore the instrument to its default state
app.SetToDefaultSetup

' Stop acquisitions during setup
app.Acquisition.TriggerMode = "Stopped"

' Turn C2 off (default state leaves C1 and C2 On)
app.Acquisition.C2.View = False

' Configure P1=rise(C1)
app.Measure.MeasureMode = "MyMeasure"
app.Measure.P1.View = True
app.Measure.P1.ParamEngine = "rise"

' Take a single acquisition, force after 2 seconds if it doesn't trigger
app.Acquisition.Acquire 2, True

' Present the rise time in a popup message box
MsgBox app.Measure.P1.Out.Result.Value & "s", vbOKOnly, "Rise time of C1"

' Clean up
Set app = Nothing
```

EARLY AND LATE BINDING

The COM standard on which Automation is built supports two kinds of "binding" between client and server: early (static), and late (dynamic, dispatch). Static binding usually involves a type library and is used primarily by compiled languages such as C++. In this case, function entry points are resolved at compile time. Dynamic binding (also known as late binding) involves resolving method and property calls at run time, as opposed to compile time.

The Automation interfaces in X-Stream based DSOs use primarily the latter: Dynamic binding. From most programming languages (VB, VBScript, etc.) this is transparent. But when you are developing applications in C++, which doesn't provide late-binding natively, the use of a "helper" class is required. This is demonstrated below:

```
#include "stdafx.h"

#include "AtlBase.h"
CComModule _Module;
#include "AtlCom.h"

CComPtr<IDispatch> spDso;
CComDispatchDriver ddDso;     // dispatch ptr. to root of object model (app)

int main(int argc, char* argv[])
{
    printf("Hello X-Stream World!\n");

    ::CoInitialize(NULL);

    HRESULT hr = spDso.CoCreateInstance(L"LeCroy.XStreamDSO");
    if(SUCCEEDED(hr))
    {
        ddDso = spDso;

        // perform an Auto-Setup (app.Autosetup)
        hr = ddDso.Invoke0(L"AutoSetup");

        // retrieve a Dispatch ptr. to the app.Display object
        CComVariant displayPtr;
        hr = ddDso.GetPropertyByName(L"Display", &displayPtr);
        CComDispatchDriver ddDisplay(displayPtr.pdispVal);

        // enter Dual-grid mode (app.Display.GridMode = "Dual")
        hr = ddDisplay.PutPropertyByName(L"GridMode", &CComVariant("Dual"));
    }

    return 0;
}
```

VBS REMOTE COMMAND

For users who wish to harness the power of Automation control of an instrument, but are currently using "traditional" remote commands via GPIB or the network (using the VICP protocol), there is a solution. This is primarily of interest in controlling the advanced features of X-Stream DSOs, which are not supported by a traditional remote command.

X-Stream instruments, in addition to supporting LeCroy's standard remote command set, also support a new command/query called **VBS**[?]. This command may be used in traditional remote control applications to access Automation controls.

This example shows two methods for setting the V/Div of Channel 1, the former using a traditional remote command, **VDIV**, and the latter using an Automation control via the new remote command, **VBS**. These two commands are equivalent:

```
C1:VDIV 0.5

VBS 'app.Acquisition.C1.VerScale = 0.5'
```

In its query form the following are equivalent:

```
C1:VDIV?

VBS? 'return = app.Acquisition.C1.VerScale'
```

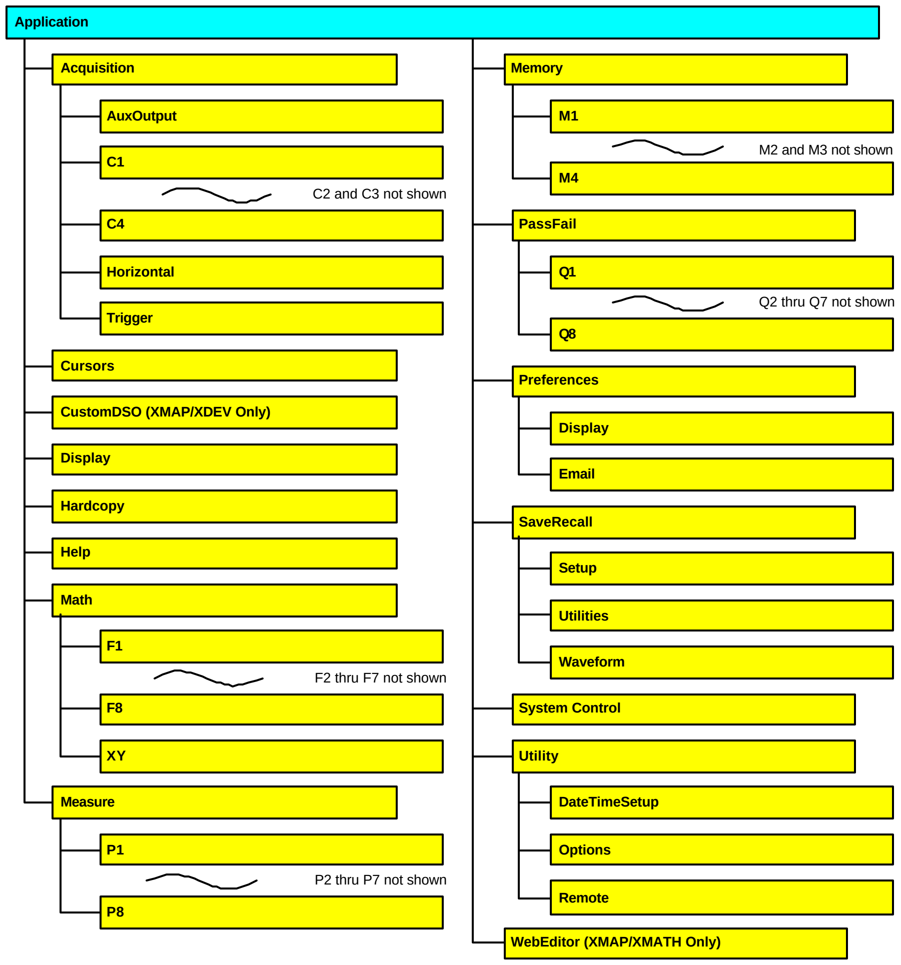
A couple of points to note here are that the **app** variable is pre-defined and refers to the root of the Automation hierarchy. Also note that for the query form the **return =** is important, it indicates which value you wish to return to the caller.

The VBS[?] Command/Query is documented in more detail in the *Remote Control Manual* for X-Stream DSOs.

X-STREAM DSO OBJECTS

The object hierarchy exposed by X-Stream based instruments is rooted at the Application object. This is the object returned when the **CreateObject("LeCroy.XStreamDSO")** method is executed in Visual Basic. All major instrument subsystems are available from this object, and many of these subsystems themselves are broken down further. Note that to simplify this figure only the first and last of the collections of Channels, Memories, Math, and Measurements are shown.

The reference section of this manual describes the controls presented by each of these objects.



NOTE: The root of the object hierarchies of some software options are not shown in this diagram.

CONTROL REFERENCE

This section presents a reference guide for each object and control in the X-Stream object hierarchy.

LeCroy.XStreamDSO.1 *app*

This is the root of the automation hierarchy, all other nodes are accessed from this point.

AddZoomTrace	Action
AutoSetup	Action
ClearSweeps	Action
DoPrint	Action
ExitWithoutConfirm	Action
FirmwareVersion	String
Height	Property
HideClock	Bool
InstrumentID	String
InstrumentModel	String
Left	Property
Minimize	Action
Quit()	Method
ResetPreferences	Action
SetToDefaultSetup	Action
Shutdown	Action
Sleep([in] double timeoutMilliseconds)	Method
Top	Property
TouchScreenEnable	Bool
WaitUntilIdle([in] double timeoutSeconds)	Method
Width	Property
Windowed	Action
WindowState	Property

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Pop up a dialog containing the instrument model
MsgBox "Model is: " & app.InstrumentModel
```

AddZoomTrace *Action*

Description

Creates function traces, defined as zoom, for each visible channel trace.
Equivalent to the front-panel zoom button.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Create zooms of all visible channel traces
app.AddZoomTrace
```

AutoSetup *Action*

Description

Starts an AutoSetup operation. When input channels are visible, AutoSetup operates only on those visible channels. If no channels are visible, all channels are affected by AutoSetup. When more than one channel is visible, the first visible channel in numerical order (that has a detectable signal applied to it) is automatically set up for edge triggering.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Start an Auto-Setup process.
app.AutoSetup
```

ClearSweeps *Action*

Description

Clears all accumulated sweeps for all subsystems. These include Channel Pre-Processing, Math, Measure, and Display Persistence. Subsystem-specific clear sweeps controls are also available. For details, please refer to the ClearSweeps control for each subsystem.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Clear all accumulated sweeps for all subsystems.
app.ClearSweeps
```

DoPrint *Action*

Description

Executes a printout of the currently displayed screen image. The destination printer or file, and various other options, are defined in the Hardcopy subsystem (app.Hardcopy).

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Start a print of the screen to the pre-determined destination.
app.DoPrint
```

ExitWithoutConfirm ***Action***

Description

Causes the instrument application to exit without prompting for a confirmation. Any acquisition in progress will be canceled.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Shut down the instrument application.
app.ExitWithoutConfirm
```

FirmwareVersion ***String***

Range: Any number of characters

Description

Queries the firmware version of the instrument. The response takes the form: "1.0.0 (build 12345)"

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Query the firmware version number of the instrument.
MsgBox "Firmware Version is: " + app.FirmwareVersion
```

Height ***Property***

Description

Sets/Queries the height in pixels of the instrument display on the PC screen.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the height of the instrument window to 400 pixels.
app.Height = 400
```

HideClock ***Bool***

Description

Hides/Shows the clock that resides in the lower-right corner of the display of the instrument.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Hide the clock for 3 seconds.
```

```
app.HideClock = True
app.Sleep(3000)
app.HideClock = False
```

InstrumentID ***String***

Range: Any number of characters

Description

Reads the complete ID of the instrument in the format: "LECROY,WM8500,WM000001,0.0.0", which includes the maker, instrument model number, serial number, and version number.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Present the ID of the instrument.
MsgBox app.InstrumentID
```

InstrumentModel ***String***

Range: Any number of characters

Description

Queries the model number of the instrument.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Present the model number of the instrument.
MsgBox app.InstrumentModel
```

Left ***Property***

Description

Sets/Queries the position in pixels of the left edge of the instrument display on the PC screen. The position is measured from the left edge of the screen to the left edge of the instrument window.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
' Set the position of the left edge of the instrument window to
100 pixels.
app.Left = 100
```

Minimize ***Action***

Description

Minimizes the instrument window to reveal the underlying desktop. It will display a small window in the bottom-right corner of the display, which, when clicked, will restore the window to full-screen mode. To programmatically restore the window, refer to the app.WindowState control.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Minimize the instrument display.
app.Minimize
```

Quit() ***Method***

Description

Closes the instrument application. The instrument will prompt you with an “Are you sure?” dialog before closing down. Until you respond to the dialog, control via Automation will be blocked.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Quit the instrument application with a confirmation prompt.
app.Quit
```

ResetPreferences ***Action***

Description

Resets all scope preferences to their default states. The set includes the current remote communications port, the color palette settings, etc., but does not include main DSO controls such as V/Div, T/Div, etc. These main instrument controls can be reset using the SetToDefaultSetup control.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Reset all instrument preferences.
app.ResetPreferences
```

SetToDefaultSetup ***Action***

Description

Restores the instrument setup to its default state. However, certain settings will not be restored to the default state. These are the user preferences such as current remote communications port and color settings, which can be reset, if required, using the ResetPreferences action.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Restore the instrument to its default state.
app.SetToDefaultSetup
```

Shutdown ***Action***

Description

Shuts down the instrument. It will prompt you with an “Are you sure?” dialog before shutting down. Until you respond to the dialog, control via Automation will be blocked.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Shut down the instrument with a confirmation prompt.
app.Shutdown
```

Sleep([in] double timeoutMilliseconds) ***Method***

Description

Causes the main execution thread of the instrument application to sleep for the specified time period, defined in milliseconds.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

MsgBox "Sleeping for 10 seconds..."
app.Sleep(10000)
MsgBox "Sleep finished"
```

Top ***Property***

Description

Sets/Queries the position in pixels of the top edge of the instrument display on the PC screen. The position is measured from the top of the screen to the top of the instrument window.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the position of the top edge of the instrument window to
100 pixels.
app.Top = 100
```

TouchScreenEnable ***Bool***

Description

Sets/Queries the state of the touch-screen enable control. This = the front-panel Touch Screen button.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Disable touch-screen if it is enabled.
if app.TouchScreenEnable = True then
   app.TouchScreenEnable = False
End if
```

WaitUntilIdle([in] double timeoutSeconds) ***Method***

Description

Waits until either the application is idle or the specified timeout (in seconds) expires. This evaluates to True if the application completes before the timeout expires, and to False if a timeout occurs. When the trigger mode is Auto or Run, the application is never Idle. In this case the call to WaitUntilIdle returns after the next acquisition and any configured processing.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Wait with a timeout of five seconds.
app.WaitUntilIdle(5)
```

Width *Property*

Description

Sets/Queries the width in pixels of the instrument display on the PC screen.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the width of the instrument window to 800 pixels.
app.Width = 800
```

Windowed *Action*

Description

Places the instrument application in windowed mode (as opposed to full-screen mode). Places the application in the upper part of the display screen with a sizable border.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the instrument display into the windowed mode.
app.Windowed
```

WindowState *Property*

Description

Sets/Queries the state of the PC window used by the instrument display.

0	windowed
1	full screen
2	minimized

Trying to set values greater than 2 or less than 0 will result in the value

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the instrument window state to windowed.
app.WindowState = 0
```

ACQUISITION *app.Acquisition*

This group of variables controls the input channels (C1, C2, C3, C), the timebase, the trigger, and the Aux Output.

Names of the form app.Acquisition.Channels.xxxx are aliases for simpler names, which are described in this section of the manual. Examples of alias pairs are as follows:

app.Acquisition.Channels("Cx") = app.Acquisition.Cx

app.Acquisition.Channels(1) = app.Acquisition.C1

app.Acquisition.Channels("Cx").Out.Result = app.Acquisition.Cx.Out.Result

These longer names may be more suitable than the shorter ones for certain programming structures.

Acquisition

Acquire([in] double timeoutSeconds, [in] long bForceTriggerOnTimeout)	Method
Calibrate	Action
ClearSweeps	Action
TriggerMode	Enum

Acquire([in] double timeoutSeconds, [in] long ***Method***

Description

Action/Query. Takes a single acquisition. The first of the two arguments specifies a timeout; the second, which is optional, specifies whether or not to force a trigger when the timeout occurs.

Evaluates to True if a trigger occurred, or False if a timeout occurred.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Start an acquisition, wait for up to 5 seconds for a trigger
' event, force a software trigger if a hardware trigger is not
' detected before the 5 second timeout expires.
triggerDetected = app.Acquisition.Acquire(5, true)
```

Calibrate ***Action***

Description

Initiates a full calibration of the acquisition system of the instrument.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Start a calibration.
app.Acquisition.Calibrate
```

ClearSweeps ***Action***

Description

Resets any accumulated average data or persistence data for channel waveforms (C1– C4). Valid only when one or more channels have waveform averaging or persistence enabled in their preprocessing settings. An average can be reset on an individual basis using app.Acquisition.Cx.ClearSweeps control.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Clear accumulated sweeps for channels C1...C4
app.Acquisition.ClearSweeps

' Clear accumulated sweeps for only C1
app.Acquisition.C1.ClearSweeps
```

TriggerMode ***Enum***

Description

Sets/Queries the trigger mode, using values from the following list:

Auto	After a timeout, if a real hardware trigger is not received, the instrument will force a trigger so that there are frequent automatic updates.
Normal	Accepts triggers as rapidly as the system permits, but will wait indefinitely for a trigger, without updating data.
Single	Arms the acquisition system to acquire once, and does not rearm automatically afterward. Once a trigger is received and the data is processed, the instrument enters the "Stopped" state.
Stop	Finishes the current acquisition and does not re-arm.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Place the instrument in stopped mode and take one acquisition.
app.Acquisition.TriggerMode = "Stopped"
app.Acquisition.Acquire(5)
```

Values

Auto	Auto-trigger
Normal	Normal Trigger
Single	Single Trigger
Stopped	No trigger possible, Stopped

AUXOUTPUT *app.Acquisition.AuxOutput*

Controls for the Auxiliary output BNC can be programmed as a simple square-wave signal source, or as a pulse that is asserted when various events occur, including Trigger Enabled, Trigger Out, and Pass/Fail.

Amplitude	Double
AuxInCoupling	Enum
Frequency	DoubleLockstep
Mode	Enum
PulseWidth	Double
SetToTTL	Bool

Example

```
    ' Microsoft Visual Basic Script
    Set app = CreateObject("LeCroy.XStreamDSO")

    ' Setup the Auxiliary output to be a square wave with an amplitude

    ' of 500mV a frequency of 5kHz
    app.Acquisition.AuxOutput.Mode = "Square"
    app.Acquisition.AuxOutput.Amplitude = 0.5
```

Amplitude ***Double***

Range: From 0.005 to 1, step 0.001

Description

Sets/Queries the amplitude of the signal on the AUX OUT connector. This is the amplitude of the signal into a 1 Mohm load. Into 50 ohms the output voltage will be halved (since the source impedance is nominally 50 ohms). Units are Volts.

Example

```
        ' Visual Basic Script
        Set app = CreateObject("LeCroy.XStreamDSO")

        ' Set the amplitude of the signal from the AUX OUT connector
        ' to 0.6 V into 1 Mohm, or 0.3 V into 50 ohms.
        app.Acquisition.AuxOutput.Amplitude = 0.6
```

AuxInCoupling *Enum*

Description

Sets the input coupling for the Auxiliary input path.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the coupling of the Auxiliary socket, when used as an
input, to ground.
' In this condition, no input signal reaches the instrument.
app.Acquisition.AuxOutput.AuxInCoupling = "GND"
```

Values

DC50	DC, 50 ohms coupling
GND	Grounded

Frequency *DoubleLock step*

Range: From 5 to 5e+006 step 10, locked to 1 2.5 5

Description

Sets/Queries the auxiliary output frequency of the square wave. Units are Hertz. WaveMaster models (and derivatives) have a limit of 5 MHz. WavePro 7000 models (and derivatives) have a limit of 1 MHz.

This control only has effect when the AuxOutput mode is "Square".

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the frequency of the signal from the AUX OUT
' connector to 1 MHz.
app.Acquisition.AuxOutput.Frequency = 1e6
```

Mode *Enum*

Description

Sets/Queries the output mode of the AUX OUT connector.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the output of the AUX OUT connector to output
' a pulse on a pre-determined Pass-Fail decision.
app.Acquisition.AuxOutput.Mode = "PassFail"
```

Values

DCLevel	Emit a DC level
Off	Output Disabled
PassFail	Pulse-out controlled by Pass/Fail system
Square	Square-wave signal generator
TriggerEnabled	Pulse-out when trigger is enabled
TriggerOut	Pulse-out when trigger occurs

PulseWidth ***Double***

Range: From 0.001 to 0.5, step 0.001

Description

This control has effect only if the Aux Output is in pulse mode (e.g., pass/fail, trigger out). It has no effect for modes that do not produce a pulse.

Sets the duration of the output pulse from the AUX OUT connector. Units are seconds.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the duration of the pulse from AUX OUT
' to 15 ms.
app.Acquisition.AuxOutput.PulseWidth = 15e-3
```

SetToTTL ***Bool***

Description

Overrides the Amplitude setting when true. This control Sets the Auxiliary output to produce TTL levels.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the levels of the signal from the AUX OUT
' connector to produce TTL levels.
app.Acquisition.AuxOutput.SetToTTL = True
```

CHANNELS *app.Acquisition.Channels*

This group of variables controls the acquisition channels C1, C2, C3, and C4.

Names of the form app.Acquisition.Channels.xxxx are aliases for simpler names, which are described in the section of the manual devoted to app.Acquisition. Examples of alias pairs are as follows:

app.Acquisition.Channels("Cx") = app.Acquisition.Cx

app.Acquisition.Channels(1) = app.Acquisition.C1

app.Acquisition.Channels("Cx").Out.Result = app.Acquisition.Cx.Out.Result

Channels

Example

```
Set app = CreateObject("LeCroy.XStreamDSO")
For X = 1 To 4
    app.Acquisition.Channels(X).VerScale = 0.2
Next
```

CX *app.Acquisition.Cx*

This group of variables controls the input channels C1, C2, C3, and C4.

Names of the form app.Acquisition.Channels.xxxx are aliases for simpler names, which are described in the section of the manual devoted to app.Acquisition. Examples of alias pairs are as follows:

app.Acquisition.Channels("Cx") = app.Acquisition.Cx

app.Acquisition.Channels("Cx").Out.Result = app.Acquisition.Cx.Out.Result

AverageSweeps	Integer
AxisXRotation	Integer
AxisYRotation	Integer
BandwidthLimit	Enum
ClearSweeps	Action
Coupling	Enum
Deskew	Double
InterpolateType	Enum
Invert	Bool
LabelsPosition	String
LabelsText	String
Persist3DQuality	Enum
Persisted	Bool
Persistence3d	Bool
PersistenceMonoChrome	Bool
PersistenceSaturation	Integer
PersistenceTime	Enum
ProbeAttenuation	Double
ShowLastTrace	Bool
UseDotJoin	Bool
UseGrid	String
VerOffset	Double
VerScale	DoubleLockstep

VerScaleVariable	Bool
View	Bool
ViewLabels	Bool

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Setup Channel C1
app.Acquisition.C1.VerScale = 0.5
app.Acquisition.C1.VerOffset = 0.0
app.Acquisition.C1.Coupling = "DC50"

' Setup Channel C2
app.Acquisition.C2.VerScale = 0.1
app.Acquisition.C2.VerOffset = 0.2
app.Acquisition.C2.Coupling = "DC50"
```

AverageSweeps ***Integer***

Range: From 1 to 1000000, step 1

Description

Sets/Queries the number of averaging sweeps for input channel Cx. This is distinct from the math function app.Math.Fx. If the number of sweeps is 1 (the default value), the data will not be averaged.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the number of sweeps for channel C1 to 25.
app.Acquisition.C1.AverageSweeps = 25
```

AxisXRotation ***Integer***

Range: From –90 to 90, step 1

Description

Sets/Queries the state of the X-axis rotation control, used only in 3-D persistence modes to control the viewing position.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the rotation about the X-axis to 35 degrees for trace C3.
app.Acquisition.C3.AxisXRotation = 35
```

AxisYRotation ***Integer***

Range: From –90 to 90, step 1

Description

Sets/Queries the state of the Y-axis rotation control, used only in 3-D persistence modes to control the viewing position.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the rotation about the Y-axis to 25 degrees for trace C3.
app.Acquisition.C3.AxisYRotation = 25
```

BandwidthLimit ***Enum***

Description

Sets/Queries the bandwidth limit for input channel Cx, in Hz. This control is an enum, and therefore requires a string value, and not a scalar value. Bandwidth limit choices vary between DSO models.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the bandwidth limit for C2 to 20 MHz.
app.Acquisition.C2.BandwidthLimit = "20MHz"
```

Values

1GHz
200MHz
20MHz
3GHz
4GHz
Full

ClearSweeps ***Action***

Description

Clears all accumulated average data and persistence data for this channel. See **app.Acquisition.ClearSweeps** for a control that clears accumulated data for channels 1 to 4, or app.ClearSweeps for a control that clears accumulated data for all subsystems (including Math/Measure/Display, etc.)

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Reset channel C1
app.Acquisition.C1.ClearSweeps
```

```
' Reset channels C1..C4
app.Acquisition.ClearSweeps
```

Coupling ***Enum***

Description

Sets/Queries the input coupling of input channel Cx. Coupling choices vary between instrument models. WavePro 7000 instruments, for example, support AC1M and DC1M modes in addition to DC50 and GND.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the input coupling for channel C2
CoupleC2 = app.Acquisition.C2.Coupling

' Set the coupling to DC, 50 ohms
app.Acquisition.C2.Coupling = "DC50"
```

Values

DC50
Gnd

Deskew ***Double***

Range: From –0.1 to 0.1, step 1e-012

Description

Sets/Queries the deskew of input channel Cx to produce a required alignment with another trace.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the deskew of channel C2 to 3.0 ns
app.Acquisition.C2.Deskew = 3.0e-9
```

InterpolateType ***Enum***

Description

Sets/Queries the type of interpolation used for input channel Cx. Because Sinx/x interpolation increases the size of the trace by a factor of 10, beware when using this option with long records.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

'  Set the interpolation for channel C3 to (sin x)/x
app.Acquisition.C3.InterpolateType = "Sinxx"
```

Values

Linear	Linear interpolation
Sinxx	Sinx/x interpolation

Invert ***Bool***

Description

Sets/Queries whether input channel Cx is inverted.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set channel C2 to be inverted.
app.Acquisition.C2.Invert = True
```

LabelsPosition ***String***

Range: Any number of characters

Description

Sets/Queries the horizontal position of the label attached to acquisition trace Cx. The unit of measurement is the unit of the horizontal scale. The measurement is made from the trigger point. This control is a string, not a numeric value. This allows multiple labels to be positioned, as shown in the example below.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Add a couple of labels to trace C1, one at 0ns, and one at 55ns

app.SetToDefaultSetup
app.Acquisition.C1.ViewLabels = True
app.Acquisition.C1.LabelsPosition = "0.0,55e-9"
```

LabelsText ***String***

Range: Any number of characters

Description

Sets/Queries the text that appears in labels attached to acquisition trace Cx. Multiple labels can be specified by using comma as a delimiter.

Persist3DQuality ***Enum***

Description

Sets/Queries the state of the 3-D Persistence quality control, which controls the way that the persistence trace is rendered.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set persistence 3-D to shaded for trace C2.


app.Acquisition.C2.Persist3DQuality = "Shaded"
```

Values

Shaded
Solid
WireFrame

Persisted ***Bool***

Description

Sets/Queries the persisted state of the channel waveform. If the Display.LockPersistence control is set to “AllLocked” then the persisted state of all displayed waveforms will be the same. If the Display.LockPersistence control is set to “PerTrace” then the persisted state of each waveform can be independently controlled.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set persistence on for trace C1
app.Display.LockPersistence = "PerTrace"
app.Acquisition.C1.Persisted = True
```

Persistence3d ***Bool***

Description

Sets/Queries the 3-D persistence state. When True, the persistence display for this channel will be displayed as a three-dimensional surface map.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set persistence plot as 3-D for trace C1
app.Acquisition.C1.Persistence3D = True
```

PersistenceMonoChrome ***Bool***

Description

Sets/Queries the monochrome persistence state. When True, the persistence display for this channel will be monochromatic, whether 2-D or 3-D.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set persistence monochrome on for trace C4.
app.Acquisition.C4.PersistenceMonoChrome = True
```

PersistenceSaturation ***Integer***

Range: From 1 to 100, step 1

Description

Sets/Queries the saturation threshold for persisted waveforms. All information at this level or above will be recorded with the same color or intensity.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the persistence saturation level for trace C1.
app.Acquisition.C1.PersistenceSaturation = 60
```

PersistenceTime ***Enum***

Description

Sets/Queries the state of the Persistence Time control. Controls the persistence decay time for this trace.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the persistence time for the persistence trace of channel
C1 to 10 seconds.
app.Acquisition.C1.PersistenceTime = "10s"
```

Values

0.5s	5s
10s	Infinite
1s	2s
20s	

ProbeAttenuation ***Double***

Range: From 1e-006 to 10000, step 1e-006

Description

Sets/Queries the probe attenuation. The probe attenuation is the factor by which the signal is made smaller, for example, 10 means that the probe divides by 10, and is referred to as a ÷10 probe. Certain passive probes can be marked as “x10”, even though they actually divide the input signal by a factor of 10.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

'  Set the probe attenuation for channel C1 to 100
app.Acquisition.C1.ProbeAttenuation = 100
```

ShowLastTrace ***Bool***

Description

Sets/Queries the state of the Show Last Trace control. If True, when this trace is displayed in persistence mode, the last acquired waveform will be superimposed on the accumulating persistence map.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Makes the last acquired trace invisible for the
' persistence trace of channel C1.
app.Acquisition.C1.ShowLastTrace = False
```

UseDotJoin ***Bool***

Description

Sets/Queries the DotJoin state of the channel. If True then straight line segments will be drawn between sample points. If false then only the sample points will be shown. See **Display.TraceStyle** for a control that can change the setting for all displayed traces simultaneously.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Turn dot joining off for trace C1.
app.Acquisition.C1.UseDotJoin = False
```

UseGrid ***String***

Range: Any number of characters

Description

Sets/Queries the graticule on which the trace is displayed. Typical values include:

YT1 to YT8	One of the YT graticules used in Single, Dual, Quad, and Octal display modes
NotOnGrid	Not displayed on any graticule

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Switch to dual grid mode, place C1 on the lower graticule
' and C2 on the upper graticule.
app.Display.GridMode = "Dual"
app.Acquisition.C1.UseGrid = "YT2"
app.Acquisition.C2.UseGrid = "YT1"
```

VerOffset ***Double***

Range: From –0.75 to 0.75, step 0.001

Description

Sets/Queries the vertical offset of input channel Cx. The setting resolution in volts lies in the range 0.25% to 0.5%, depending on the numerical value. The available offset range depends on the current V/Div setting, and also the instrument model.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the vertical offset for C1 to 10 mV.
app.Acquisition.C1.VerOffset = 0.01
```

VerScale ***DoubleLock step***

Range: From 0.002 to 1, step 0.0005, locked to 1 2 5

Description

Sets/Queries the vertical scale (in Volts/Division) of an input channel. When variable gain (VerScaleVariable control) is disabled, the control will clip values to a 1-2-5 sequence. When it is enabled, the setting resolution lies in the range 1% to 2%, depending upon the numerical value.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
```

```
' Set C1 to a scale of 250mV/Div in Variable Scale mode
app.Acquisition.C1.VerScaleVariable = True
app.Acquisition.C1.VerScale = 0.25
```

VerScaleVariable ***Bool***

Description

Sets/Queries the state of the variable vertical scale control for channel Cx. When the variable scale is enabled, the setting resolution lies in the range 1% to 2%, depending on the numerical value. If a knowledge of the exact value is important, the value should be read back after a setting has been made.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the variable vertical scale for C1 to On.
app.Acquisition.C1.VerScaleVariable = True
```

View ***Bool***

Description

Sets/Queries the channel's “Viewed” state. When True, the channel waveform is displayed on one of the display graticules. Even when a channel is not visible, it can be used as a source for Math, Measure, etc.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Make channel C3 visible.
app.Acquisition.C3.View = True
```

ViewLabels ***Bool***

Description

Sets/Queries whether the user-defined labels for trace Cx is visible. See Also: **LabelsPosition** and **LabelsText** controls.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Show the user-defined label for trace C2.
app.Acquisition.C2.ViewLabels = True
```

RESULT app.Acquisition.Cx.Out.Result

Properties of the type xxxx.Out.Result.yyyy are those of the last completed acquisition. They are not affected if other controls are changed after that acquisition was completed. This distinction between "Out.Result" properties and other controls is most important when the trigger mode is Single or Stopped. You should treat "Out.Result" properties as read-only.

Several of these properties mention the “frame” ? the term used to describe the visible portion of the trace, which is generally smaller than the acquired waveform. For example, the frame could be used to display a 500 pt. window onto a 1 Mpt. trace; or, vertically it could be used to show the “center” 10 mV of a result.

DataArray	Property
FirstEventTime	Property
HorizontalFrameStart	Property
HorizontalFrameStop	Property
HorizontalOffset	Property
HorizontalPerStep	Property
HorizontalResolution	Property
HorizontalUnits	Property
IndexOfFirstSampleInFrame	Property
LastEventTime	Property
NumFrameDimensions	Property
NumSamplesInFrame	Property
Samples	Property
Status	Property
StatusDescription	Property
Sweeps	Property
VerticalFrameStart	Property
VerticalFrameStop	Property
VerticalMaxPossible	Property
VerticalMinPossible	Property
VerticalOffset	Property
VerticalPerStep	Property
VerticalResolution	Property
VerticalUnits	Property

DataArray *Property*

Description

This is the array of data that can be read out to represent the input waveform. The data will have 16-bit resolution ? VerticalPerStep, though the physical resolution will usually be less. See **VerticalResolution**. The optional boolean argument can be used to determine whether 16-bit integer data, or floating-point data is returned. True indicates that floating-point values are required; False indicates that integer values are required.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Copy the output data array (floats) for trace C3 into an array.
```

```
Dim C3DataArray
C3DataArray = app.Acquisition.C3.Out.Result.DataArray(True)


' Emit the first two data values into a popup message box
```

FirstEventTime ***Property***

Description

Queries the absolute trigger time of the acquisition, or that of the first sequence in a segmented acquisition.Times are returned encoded as a currency value (VT_CY) within a variant, which allows the use of the full 64-bit resolution of the timestamp value. Values are referenced to 1 Jan 2000, with 1 ns resolution. VT_CY values are stored as 64-bit (8 byte) two's complement integers, scaled by 10,000 to give a fixed-point number with 15 digits to the left of the decimal point, and 4 digits to the right.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Read the time of the first event.
EventFirst = app.Acquisition.C1.Out.Result.FirstEventTime
MsgBox EventFirst
```

HorizontalFrameStart ***Property***

Description

Reads the time, in seconds, that corresponds to the left edge of the graticule, relative to the trigger instant.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Read the horizontal frame start for trace C1
HorStart = app.Acquisition.C1.Out.Result.HorizontalFrameStart
MsgBox HorStart
```

HorizontalFrameStop ***Property***

Description

Reads the time, in seconds, that corresponds to the right-hand edge of the graticule, relative to the trigger instant.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Read the horizontal frame stop for trace C1
HorStop = app.Acquisition.C1.Out.Result.HorizontalFrameStop
```

```
MsgBox HorStop
```

HorizontalOffset ***Property***

Description

Reads/Queries the time between the trigger point and the left edge of the screen. If the trigger point is off the left edge of the screen, the result is positive. If the trigger point is on the screen, the result is negative. The value is very close to: app.Acquisition.Horizontal.HorOffsetOrigin + app.Acquisition.Horizontal.HorOffset, when both are expressed in seconds. A small discrepancy occurs because the trigger point is not synchronous with the sampling clock, so variations occur with a range of one sample period.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the value of the horizontal offset for trace C2
HorOffsetC2 = app.Acquisition.C2.Out.Result.HorizontalOffset
MsgBox HorOffsetC2
```

HorizontalPerStep ***Property***

Description

Reads the time, in units of seconds, between successive sampling instants.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the value of the horizontal step size for trace C3
HorStepC3 = app.Acquisition.C3.Out.Result.HorizontalPerStep
MsgBox HorStepC3
```

HorizontalResolution ***Property***

Description

Reads the resolution of the readout of horizontal values. It is not directly related to the sample period.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the readout resolution of the horizontal axis of trace C4
C4HRes = app.Acquisition.C4.Out.Result.HorizontalResolution
MsgBox C4HRes
```

HorizontalUnits *Property*

Description

Reads the unit in which the horizontal displacements are specified for trace Cx.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the units of the horizontal axis for trace C2.
C2HorUnits = app.Acquisition.C2.Out.Result.HorizontalUnits
MsgBox C2HorUnits
```

IndexOfFirstSampleInFrame *Property*

Description

Reads the index number of the first sample that appears in the frame.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the index of the first sample in the frame for trace C2.
FrameSampleC2 =
app.Acquisition.C2.Out.Result.IndexOfFirstSampleInFrame
MsgBox FrameSampleC2
```

LastEventTime *Property*

Description

Queries the time of the last contributing event in a set. Useful only when the result includes data produced by a sequence acquisition, or a cumulative operation such as averaging. See description for **FirstEventTime** for encoding details.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the time of the last event.
EventLast = app.Acquisition.C1.Out.Result.LastEventTime
MsgBox EventLast
```

NumFrameDimensions ***Property***

Description

Reads the dimensionality of the trace Cx: 2 for a Y-T plot, 3 for an X-Y plot.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the dimensionality of trace C3.
DimC3 = app.Acquisition.C3.Out.Result.NumFrameDimensions
MsgBox DimC3
```

NumSamplesInFrame ***Property***

Description

Reads the nominal number of samples in the displayed frame. In the case of sequence mode, the frame refers to one segment, not the whole graticule.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the number of samples in the frame for trace C1
FrameSamplesC1 = app.Acquisition.C1.Out.Result.NumSamplesInFrame
MsgBox FrameSamplesC1
```

Samples ***Property***

Description

Reads the number of samples in a record, as read out. It will usually be two more than NumSampleInFrame (but may be much larger) to allow for the two samples that are just to the left and right of the displayed graticule. For a trace acquired in sequence mode, "frame" refers to one segment, not the whole graticule.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the number of samples in trace C1.
C1Samples = app.Acquisition.C1.Out.Result.Samples
MsgBox C1Samples
```

Status *Property*

Description

Queries the status of the waveform result. Status is a 64-bit bitfield, encoded in a VARIANT of VT_CY (currency) type, with the meaning associated with each bit described earlier in Chapter 1. Status should be read twice, once before reading the result, and once again after reading the result. This is due to the streaming nature of processing in the X-stream DSO software.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


stat = app.Acquisition.C1.Out.Result.Status
MsgBox stat
```

StatusDescription *Property*

Description

Returns a textual equivalent of the status returned in the “Status” bitfield.

Sweeps *Property*

Description

Reads the number of trigger events (sweeps) that contributed to a cumulative result. Useful only for sequence acquisitions. Cumulative processing, such as Averaging. Accumulation, can be reset using the ClearSweeps method.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Read the number of accumulated sweeps for trace C1
' and display in a popup
numSweeps = app.Acquisition.C1.Out.Result.Sweeps
MsgBox numSweeps
```

VerticalFrameStart *Property*

Description

Reads the amplitude that corresponds to the bottom of the displayed frame.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Read the vertical frame start for trace C1.
VerStart = app.Acquisition.C1.Out.Result.VerticalFrameStart
MsgBox VerStart
```

VerticalFrameStop *Property*

Description

Reads the amplitude that corresponds to the top of the displayed frame.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the vertical frame stop for trace C1.
VerStop = app.Acquisition.C1.Out.Result.VerticalFrameStop
MsgBox VerStop
```

VerticalMaxPossible *Property*

Description

Reads the highest value that an actual array element can have. It will be a little less than VerticalFrameStop.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the vertical maximum possible value for trace C1.
VerMax = app.Acquisition.C1.Out.Result.VerticalMaxPossible
MsgBox VerMax
```

VerticalMinPossible *Property*

Description

Reads the lowest value that an actual array element can have. It will be a little greater than VerticalFrameStart.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the vertical minimum possible value for trace C1.
VerMin = app.Acquisition.C1.Out.Result.VerticalMinPossible
MsgBox VerMin
```

VerticalOffset *Property*

Description

Reads the difference in potential between ground and the center of the screen. With an offset of +50 mV, the center of the screen represents –50 mV; with an offset of –21 mV, the center represents +21 mV.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Read the vertical offset for trace C1
VerOffset = app.Acquisition.C1.Out.Result.VerticalOffset
MsgBox VerOffset
```

VerticalPerStep ***Property***

Description

Reads the smallest step in the numerical values that can be read out, whether or not the step has physical meaning. For the basic 8-bit ADC, with values returned as 16-bit short values, the step is 1/65536 of the vertical range.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Read the vertical step size for trace C3.
VerStep = app.Acquisition.C3.Out.Result.VerticalPerStep
MsgBox VerStep
```

VerticalResolution ***Property***

Description

Reads the vertical resolution, which is the actual smallest difference that can be practically resolved. For an 8-bit ADC it is 1/256 of the height of the vertical range VR. But if 16 averages are set, the resolution is improved by a factor of 4, and it becomes 1/1024 of VR, and for 100 sweeps it becomes 1/2560.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Read the readout resolution of the vertical axis of trace C1
VRes = app.Acquisition.C1.Out.Result.VerticalResolution
MsgBox VRes
```

VerticalUnits ***Property***

Description

Reads the unit in which the vertical displacements are specified.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
```

```
' Read the units of the vertical axis of trace C1
VertUnits = app.Acquisition.C1.Out.Result.VerticalUnits
MsgBox VertUnits
```

HORIZONTAL *app.Acquisition.Horizontal*

This group of variables controls the timebase, the sampling, and the trigger delay.

Horizontal

AcquisitionDuration	Double
ActiveChannels	Enum
HorOffset	Double
HorOffsetControl	Enum
HorOffsetOrigin	Double
HorScale	DoubleLockstep
HorUnits	String
MaxSamples	DoubleLockstep
NumPoints	Integer
NumSegments	Integer
ReferenceClock	Enum
SampleClock	Enum
SampleMode	Enum
SampleRate	DoubleLockstep
SamplingRate	Double
SequenceTimeout	Double
SequenceTimeoutEnable	Bool
SmartMemory	Enum
TimePerPoint	Double
ZeroDelay	Action

AcquisitionDuration *Double*

Range: From 1e-012 to 1e+012, step 1e-015

Description

Queries the duration of the last completed acquisition. The result may depend on the spacing of the triggers in sequence mode, and it may depend on the number of averages when a channel is in averaging mode.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Obtain the duration of the last completed acquisition.
AcqDuration = app.Acquisition.Horizontal.AcquisitionDuration
MsgBox AcqDuration
```

ActiveChannels *Enum*

Description

Sets/Queries the number of active DSO input channels. This is a string value, with allowed values “4”, “2”, and “Auto”; and 0, 1, and 2. Beware of using 2 as a numerical value for 2 channels: you will get Auto mode instead.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the instrument to use two channels.
app.Acquisition.Horizontal.ActiveChannels = "2"
```

Values

2	Use 2 channels, with increased sample rate
4	Use all channels
Auto	Maximize sample rate based upon the # displayed channels

HorOffset *Double*

Range: From -0.0005 to 5e-007, step 1e-009

Description

Sets/Queries the horizontal position of the trigger time, relative to the origin set by HorOffsetOrigin, in seconds. Positive to the right, negative to the left. The setting resolution is about 1% to 2&.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the horizontal trigger offset to 200 ns.
app.Acquisition.Horizontal.HorOffset = 2.0e-7
```

HorOffsetControl *Enum*

Description

Sets the unit for HorOffset to either Time or Div, using "Time" and "Div", or 0 and 1.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the horizontal offset control to divisions.
app.Acquisition.Horizontal.HorOffsetControl = "Div"
```

Values

Div
Time

HorOffsetOrigin ***Double***

Range: From 0 to 10, step 1

Description

Sets/Queries the origin, in graticule divisions, of the time scale in which HorOffset is measured. The value 0 corresponds to the left edge of the graticule. The value 10 corresponds to the right edge of the graticule. Requesting a value outside the range will select the nearest allowed value.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the origin of the horizontal trigger offset to 4.0
divisions.
```

HorScale ***DoubleLock step***

Range: From 2e-011 to 10, step 5e-010, locked to 1 2 5

Description

Sets/Queries the horizontal scale in time per division.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the horizontal acquisition scale to 200 ns/div.
app.Acquisition.Horizontal.HorScale = 2.0e-7
```

HorUnits ***String***

Range: Any number of characters

Description

Queries the units in which the horizontal scale is measured.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Obtain the units of the horizontal scale.
HorizUnit = app.Acquisition.Horizontal.HorUnits
```

MaxSamples ***DoubleLock step***

Range: From 500 to 2.4e+007, step 1000, locked to 1 2.5 5

Description

Sets/Queries the maximum permissible number of samples to be used in the acquisition memories. At the faster sample rates, the actual number used can be less than this maximum.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the available memory length per channel to 500
app.Acquisition.Horizontal.MaxSamples = 500
```

NumPoints ***Integer***

Range: From 2 to 100000000, step 1

Description

Queries the number of samples in the current setting of the acquisition memory. For sequence mode, this refers to the number if samples per segment, not to the number in the complete set. Use **MaxSamples** to limit the number of samples acquired.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Obtain the number of points being used in the acquisition
memory.
NumberOfPoints = app.Acquisition.Horizontal.NumPoints
```

NumSegments ***Integer***

Range: From 2 to 20000, step 1

Description

Sets/Queries the number of segments in the sequence mode of acquisition. Only valid when SampleMode = "Sequence”.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Enable sequence mode and capture 500 segments
app.Acquisition.Horizontal.SampleMode = "Sequence"
app.Acquisition.Horizontal.NumSegments = 500
```

ReferenceClock ***Enum***

Description

Sets/Queries the source of the acquisition reference clock.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the source of the reference clock to External.
app.Acquisition.Horizontal.ReferenceClock = "EXT"
```

Values

EXT	External reference (use rear-panel BNC)
INT	Internal reference clock

SampleClock ***Enum***

Description

Sets/Queries the source for the sample clock.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the sample clock to expect an external source.
app.Acquisition.Horizontal.SampleClock = "External"
```

Values

External
Internal

SampleMode ***Enum***

Description

Sets/Queries the mode of acquisition as real-time, sequence, or random interleaved sampling. RIS mode and sequence mode are not available over the entire range of timebases, and are not available simultaneously.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the mode of acquisition to random interleaved sampling.
app.Acquisition.Horizontal.SampleMode = "RIS"
```

Values

RealTime
RIS
Sequence

SampleRate ***DoubleLock step***

Range: From 500 to 1e+010, step 1e+008, locked to 1 2.5 5

Description

Queries the sample rate of the ADCs. If random interleaved sampling (RIS) is in use, this value will be less than the effective sampling rate of the traces.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Inspect the sample rate of the ADCs.
SampleRate = app.Acquisition.Horizontal.SampleRate
```

SamplingRate ***Double***

Range: From 500 to 1e+010, step (2 digits)

Description

Queries the sampling rate. This is the effective sampling rate of the traces, rather than the sampling rate of the ADCs. When random interleaved sampling (RIS) is not in use, both values are the same.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Inspect the effective sampling rate of the signal.
SamplingRate = app.Acquisition.Horizontal.SamplingRate
```

SequenceTimeout ***Double***

Range: From 0.01 to 100, step 0.01

Description

Sets/Queries the timeout in segment mode of acquisition if insufficient triggers are received.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set the sequence mode timeout to 10 seconds
app.Acquisition.Horizontal.SequenceTimeout = 10.0
```

SequenceTimeoutEnable ***Bool***

Description

Sets/Queries the enabling of the sequence mode timeout.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
```

```
' Enable the sequence mode timeout.
app.Acquisition.Horizontal.SequenceTimeoutEnable = True
```

SmartMemory ***Enum***

Description

Sets the mode of memory management to one of the two modes:

SetMaximumMemory – Maximizes the memory length for the given timebase setting; limited by the maximum length that is compatible with the maximum sampling rate that the DSO can achieve.

FixedSampleRate – Keeps the sampling rate the same when the timebase is changed; limited by the maximum sampling rate that the DSO can achieve.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the Smart memory mode as fixed sample rate.
app.Acquisition.Horizontal.SmartMemory = "FixedSampleRate"
```

Values

FixedSampleRate	Maximizes the memory length for the given timebase setting
SetMaximumMemory	Keeps the sampling rate the same when the timebase is changed

TimePerPoint ***Double***

Range: From 1e-012 to 1e+012, step 1e-012

Description

Queries the time interval between successive samples in the acquisition.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Obtain the time per point of the acquisition.
timePerPt = app.Acquisition.Horizontal.TimePerPoint
MsgBox timePerPt
```

ZeroDelay ***Action***

Description

Sets the trigger delay to zero, relative to the time origin set by **Horizontal.HorOffsetOrigin**.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the trigger delay to zero, relative to the time origin
' set by Horizontal.HorOffsetOrigin.
app.Acquisition.Horizontal.ZeroDelay
```

TRIGGER *app.Acquisition.Trigger*

This group of CVars controls all aspects of the trigger, except for trigger delay, which is in Acquisition. Horizontal.Names of the form app.Acquisition.Trigger.Sources.xxxx are aliases for simpler names, which are described in this section of the manual. Examples of alias pairs are as follows:

app.Acquisition.Trigger.Sources("Cx") = app.Acquisition.Trigger.Cx

app.Acquisition.Trigger.Sources("Ext") = app.Acquisition.Trigger.Ext

app.Acquisition.Trigger.Sources("Line") = app.Acquisition.Trigger.Line

Trigger

DropoutTime	Double
Glitch	Enum
GlitchHigh	Double
GlitchLow	Double
HoldoffEvents	Integer
HoldoffTime	Double
HoldoffType	Enum
Interval	Enum
IntervalDelta	Double
IntervalHigh	Double
IntervalLow	Double
IntervalNominal	Double
IntervalRange	Enum
PatternType	Enum
QualEvents	Integer
QualFirst	Bool
QualState	Enum
QualTime	Double
QualWait	Enum
Source	Enum
TrigLevel	Double
Type	Enum
ValidateSource	Enum
Width	Enum
WidthDelta	Double
WidthNominal	Double
WidthRange	Enum
ZeroLevel	Action

DropoutTime *Double*

Range: From 2e-009 to 20, step 5e-010

Description

Sets/Queries the trigger dropout time. The setting resolution ranges from about 1.5% to about 2.5%, depending on the numerical value.

app.Acquisition.Trigger.Line is effective only when trigger type is set to "Dropout." See Acquisition.Channels("Cx") for a programming example.

Glitch ***Enum***

Description

Sets/Queries the type of glitch trigger.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the glitch trigger to trigger on a glitch with duration
between 5 and 10us
app.Acquisition.Trigger.Type = "Glitch"
app.Acquisition.Trigger.Glitch = "InRange"
app.Acquisition.Trigger.GlitchHigh = 10e-6
app.Acquisition.Trigger.GlitchLow = 5e-6
```

Values

InRange	Trigger on glitch within High/Low range specified
LessThan	Trigger on glitch narrower than limit specified (GlitchHigh)

GlitchHigh ***Double***

Range: From 6e-010 to 20, step 2e-010

Description

Sets/Queries the upper limit for a glitch trigger. Valid in both the InRange and LessThan glitch trigger types. The setting resolution ranges from about 1.5% to about 2.5%, depending on the numerical value.

GlitchLow ***Double***

Range: From 6e-010 to 20, step 2e-010

Description

Sets/Queries the lower limit for a glitch trigger specified as InRange type. The setting resolution ranges from about 1.5% to about 2.5%, depending on the numerical value.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the lower limit for an in-range glitch trigger to 375 ms.
app.Acquisition.Trigger.GlitchLow = 0.375
```

HoldoffEvents ***Integer***

Range: From 1 to 1000000000, step 1

Description

Sets/Queries the number of events by which the trigger is to be held off. The resolution is 1 at all values.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Enable 'holdoff by events' mode and configure
' to holdoff by 4095 events.
app.Acquisition.Trigger.Type = "Edge"
app.Acquisition.Trigger.HoldoffType = "Events"
app.Acquisition.Trigger.HoldOffEvents = 4095
```

HoldoffTime ***Double***

Range: From 2e-009 to 20, step 1e-009

Description

Sets/Queries the trigger holdoff time. The setting resolution ranges from about 1.5% to about 2.5%, depending on the numerical value.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Enable 'holdoff by time' mode and configure
' to holdoff by 2 seconds.
app.Acquisition.Trigger.Type = "Edge"
app.Acquisition.Trigger.HoldoffType = "Time"
app.Acquisition.Trigger.HoldoffTime = 2.0
```

HoldoffType ***Enum***

Description

Sets/Queries the type of hold-off trigger.

Values

Events	Holdoff by events, specified in HoldoffEvents
Off	No Trigger Holdoff
Time	Holdoff by time, specified in HoldoffTime

Interval ***Enum***

Description

Sets/Queries the interval trigger type. This is only valid when the trigger type is set to Interval.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure the interval trigger, to trigger when the interval
' is within the limits 5us to 10us
app.Acquisition.Trigger.Type = "Interval"
app.Acquisition.Trigger.Interval = "InRange"
app.Acquisition.Trigger.IntervalRange = "Limits"
app.Acquisition.Trigger.IntervalHigh = 10e-6
app.Acquisition.Trigger.IntervalLow = 5e-6
```

Values

GreaterThan	Trigger when interval is > specified limits
InRange	Trigger when interval is within range
LessThan	Trigger when interval is < specified limits
OutOfRange	Trigger when interval is outside specified range

IntervalDelta ***Double***

Range: From 2e-009 to 20, step 2e-010

Description

Sets/Queries the tolerance on the pulse interval for an interval trigger specified as InRange type or OutOfRange type. The setting resolution ranges from about 1.5% to about 2.5%, depending on the numerical value.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure the interval trigger, to trigger when the interval
' is 6us +/- 34ns
app.Acquisition.Trigger.Type = "Interval"
app.Acquisition.Trigger.Interval = "InRange"
app.Acquisition.Trigger.IntervalRange = "Delta"
app.Acquisition.Trigger.IntervalDelta = 34e-9
app.Acquisition.Trigger.IntervalNominal = 6e-6
```

IntervalHigh ***Double***

Range: From 2e-009 to 20, step 2e-010

Description

Sets/Queries the upper limit for an interval trigger specified as InRange type. The setting resolution ranges from about 1.5% to about 2.5%, depending on the numerical value.

IntervalLow ***Double***

Range: From 2e-009 to 20, step 2e-010

Description

Sets/Queries the lower limit for an interval trigger specified as InRange type. The setting resolution ranges from about 1.5% to about 2.5%, depending on the numerical value.

IntervalNominal ***Double***

Range: From 4e-009 to 20, step 2e-010

Description

Sets/Queries the nominal pulse interval for an interval trigger specified as InRange type or OutOfRange type. The setting resolution ranges from about 1.5% to about 2.5%, depending on the numerical value.

Example

See IntervalDelta

IntervalRange ***Enum***

Description

Sets/Queries the interval trigger setting as either Delta or Limits. Delta is set as a center value with a tolerance. In limits mode the criteria are a lower limit and an upper limit.

Values

Delta	Specify interval as a nominal value and delta.
Limits	Specify interval by a lower and upper limit.

PatternType ***Enum***

Description

Sets/Queries the pattern (Logic) trigger type.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set the pattern trigger type to Nand.
app.Acquisition.Trigger.Type = "Logic"
app.Acquisition.Trigger.PatternType = "Nand"
```

Values

And	Nor
Nand	Or

QualEvents ***Integer***

Range: From 1 to 99999999, step 1

Description

Sets/Queries the number of events for which the qualified trigger is to wait. The setting resolution is 1 at all values.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set the number of events for trigger holdoff to 8191.
app.Acquisition.Trigger.Type = "Qualify"
app.Acquisition.Trigger.QualWait = "Events"
app.Acquisition.Trigger.QualEvents = 8191
```

QualFirst ***Bool***

Description

Sets/Queries the state of the "Qualify First" trigger. In sequence mode, this control, when set, allows subsequent triggers to be detected without qualification, after the first segment of a sequence has had a fully qualified trigger. If the control is set to False, every segment has to be qualified individually. When not in sequence mode this control is not used.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set the qualified trigger in sequence mode to qualify in
' the first segment only.
app.Acquisition.Horizontal.SampleMode = "Sequence"
app.Acquisition.Trigger.Type = "Qualify"
app.Acquisition.Trigger.QualFirst = True
```

QualState ***Enum***

Description

Sets/Queries the qualifying state to Above or Below the specified level for the specified input source.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the qualification to Below the specified level.
app.Acquisition.Trigger.QualState = "Below"
```

Values

Above
Below

QualTime ***Double***

Range: From 2e-009 to 20, step 2e-010

Description

Sets/Queries the threshold time for a qualified trigger. The setting resolution ranges from about 1.5% to about 2.5%, depending on the numerical value.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the tolerance for the interval trigger 144 microseconds.
app.Acquisition.Trigger.QualTime = 1.44e-4
```

QualWait ***Enum***

Description

Sets/Queries the wait type for qualified trigger.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the qualified trigger to wait for the given time to pass.
app.Acquisition.Trigger.QualWait = "GreaterThan"
```

Values

Events
GreaterThan
LessThan
Off

Source ***Enum***

Description

Sets/Queries the trigger source.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the trigger source to external.
app.Acquisition.Trigger.Source = "Ext"
```

Values

C1	ExtDivide10
C2	ExtTimes
C3	Line
C4	Pattern
Ext	

TrigLevel ***Double***

Range: From -0.25 to 0.25, step 0.0005

Description

Sets/Queries the trigger level.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the trigger level to 20 mV.
app.Acquisition.Trigger.TrigLevel = 0.020
```

Type ***Enum***

Description

Sets/Queries the trigger type (mode).

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the trigger type to glitch.
app.Acquisition.Trigger.Type = "Glitch"
```

Values

Dropout
Edge
Glitch
Interval
Logic
Qualify
State
Width

ValidateSource ***Enum***

Description

Sets/Queries the second trigger source in modes with two sources.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the validation trigger source to C3.
app.Acquisition.Trigger.ValidateSource = "C3"
```

Values

C1
C2
C3

C4
Ext
ExtDivide10
ExtTimes10
Pattern

Width ***Enum***

Description

Sets/Queries the width trigger type.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure Width Trigger to trigger on a pulse with
' width of 10ns +/- 5ns
app.Acquisition.Trigger.Type = "Width"
app.Acquisition.Trigger.Width = "InRange"
app.Acquisition.Trigger.WidthRange = "Delta"
app.Acquisition.Trigger.WidthNominal = 10e-9
app.Acquisition.Trigger.WidthDelta = 5e-9
```

Values

GreaterThan	Trigger when width > specified limit
InRange	Trigger when width is within specified limits
LessThan	Trigger when width < specified limit
OutOfRange	Trigger when width is outside specified range

WidthDelta ***Double***

Range: From 2e-010 to 20, step 2e-010

Description

Sets/Queries the tolerance on pulse width for a width trigger specified as InRange type or OutOfRange type. The setting resolution ranges from about 1.5% to about 2.5%, depending on the numerical value.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the tolerance for the width trigger to 55 ns.
app.Acquisition.Trigger.WidthDelta = 5.5e-8
```

WidthNominal ***Double***

Range: From 8e-010 to 20, step 2e-010

Description

Sets/Queries the nominal pulse width for a width trigger specified as InRange type or OutOfRange type. The setting resolution ranges from about 1.5% to about 2.5%, depending on the numerical value.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the nominal value for the width trigger 55 ns.
app.Acquisition.Trigger.WidthNominal = 5.5e-8
```

WidthRange ***Enum***

Description

Sets/Queries the width setting as either Delta or Limits. When in Delta mode, the controls WidthNominal and WidthDelta are used to specify the nominal value and tolerance. When in Limits mode, the GlitchLow and GlitchHigh controls are used instead.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure Width Trigger to trigger on a pulse with
' width within limits of 5ns and 10ns
app.Acquisition.Trigger.Type = "Width"
app.Acquisition.Trigger.Width = "InRange"
app.Acquisition.Trigger.WidthRange = "Limits"
app.Acquisition.Trigger.GlitchLow = 10e-9
app.Acquisition.Trigger.GlitchHigh = 5e-9
```

Values

Delta
Limits

ZeroLevel ***Action***

Description

Sets the trigger level to zero volts.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the trigger level to zero volts.
app.Acquisition.Trigger.ZeroLevel
```

CX *app.Acquisition.Trigger.Cx*

This group of variables controls triggering from the input channels C1, C2, C3 and C4.

Cx

InputImpedance	Enum
Level	Double
PatternState	Enum
Slope	Enum

InputImpedance *Enum*

Description

Reads the input impedance of channel C1, in ohms.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the input impedance of C1 trigger.
ZinC1 = app.Acquisition.Trigger.C1.InputImpedance
MsgBox ZinC1
```

Values

50

Level *Double*

Range: From –0.25 to 0.25, step 0.0005

Description

Sets/Queries the trigger level for the int ernal trigger from channel Cx. The setting resolution ranges from about 1.5% to about 2.5%, depending on the numerical value.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the trigger level to 55 mV for triggering on channel C1.
app.Acquisition.Trigger.C1.Level = 0.055
```

PatternState *Enum*

Description

Sets/Queries the pattern state for the input channel Cx. Only valid when the trigger mode is set to “Logic.”

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the pattern state for channel C1 to low.
app.Acquisition.Trigger.C1.PatternState = "Low"
```

Values

DontCare
High
Low

Slope *Enum*

Description

Sets/Queries the direction of the transition to be used for internal triggering from channel Cx.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the direction of the transition as negative
' for triggering on channel C1.
app.Acquisition.Trigger.C1.Slope = "Negative"
```

Values

Negative
Positive

EXT

app.Acquisition.Trigger.Ext

This group of variables controls the external trigger.

Ext

Coupling	Enum
InputImpedance	Enum
Level	Double
PatternState	Enum
Slope	Enum

Coupling *Enum*

Description

Sets/Reads the input coupling of the external trigger input.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the input coupling of the external trigger input.
ZinCoupling = app.Acquisition.Trigger.Ext.Coupling
MsgBox ZinCoupling
```

Values

DC50
Gnd
DC 50 ohms

InputImpedance *Enum*

Description

Reads the input impedance of the external trigger.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the input impedance of external trigger input.
ZinExt = app.Acquisition.Trigger.Ext.InputImpedance
MsgBox ZinExt
```

Values

50

Level ***Double***

Range: From –1 to 1, step 0.001

Description

Sets/Queries the trigger level for the external trigger.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the trigger level to 55 mV for triggering from
' the external trigger socket.
app.Acquisition.Trigger.Ext.Level = 0.055
```

PatternState ***Enum***

Description

Sets/Queries the pattern state for the external trigger input.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the pattern state to low for triggering from
' the external trigger socket.
app.Acquisition.Trigger.Ext.PatternState = "Low"
```

Values

DontCare
High
Low

Slope ***Enum***

Description

Sets/Queries the direction of the transition used for the external trigger.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the direction of the transition as positive for triggering

' from the external trigger socket.
```

Values

Negative
Positive

LINE

app.Acquisition.Trigger.Line

This group of variables controls the line trigger: 50 Hz or 60 Hz.

SOURCES *app.Acquisition.Trigger.Sources*

Names of the form app.Acquisition.Trigger.Sources.xxxx are aliases for simpler names, which are described in this section of the manual. Examples of alias pairs are as follows:

app.Acquisition.Trigger.Sources("Cx") = app.Acquisition.Trigger.Cx

app.Acquisition.Trigger.Sources("Ext") = app.Acquisition.Trigger.Ext

app.Acquisition.Trigger.Sources("Line") = app.Acquisition.Trigger.Line

CURSORS

app.Cursors

This set of variables controls the cursor system.

Pos1	Double
Pos2	Double
Readout	Enum
Track	Bool
Type	Enum
View	Bool
XPos1	Double
XPos2	Double
YPos1	Double
YPos2	Double

Pos1 ***Double***

Range: From –1.79769e+308 to 1.79769e+308, step 0

Description

Sets/Queries the position of the first cursor. For vertical cursors the range is -3.99 to 3.99 divisions. For horizontal cursors the range is from left edge to right edge of the graticule, in the units of the horizontal variable.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the position of the two cursors
app.Cursors.View = "On"
app.Cursors.Type = "HorizRel"
app.Cursors.Pos1 = 50e-9
app.Cursors.Pos2 = -50e-9
```

Pos2 ***Double***

Range: From –1.79769e+308 to 1.79769e+308, step 0

Description

Sets/Queries the position of the second cursor. For vertical cursors the range is –3.99 to 3.99 divisions. For horizontal cursors the range is from left to right of the graticule, in the units of the horizontal variable.

Readout *Enum*

Description

Sets/Queries whether the readout of a pair of cursors is Absolute (two separate values), Delta (one value giving the distance between the cursors), or Slope, giving the dv/dt value.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the cursors readout to absolute.
app.Cursors.Readout = "Absolute"
```

Values

Absolute	Readout each cursor's value
Delta	Readout cursor value differences
Slope	Readout slope, i.e. dv/dt

Track *Bool*

Description

Sets/Queries the state of tracking of a pair of cursors. If tracking is enabled, as the first cursor is moved the second will track at a constant distance from it.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set cursors tracking on.
app.Cursors.Track = True
```

Type *Enum*

Description

Sets/Queries the currently selected type of cursor.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the cursor type to vertical relative.
app.Cursors.View = "On"
app.Cursors.Type = "VertRel"
```

Values

HorizAbs	Single cursor, position specified in time
HorizRel	Dual cursors, positions specified in time
VertAbs	Single cursor, position specified in divisions vertically
VertRel	Dual cursors, positions specified in divisions vertically

View ***Bool***

Description

Sets/Queries visibility of the cursors.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Make the cursors visible.
app.Cursors.View = "On"
```

XPos1 ***Double***

Range: From –1.79769e+308 to 1.79769e+308, step 0

Description

Sets/Queries the horizontal position of the first cursor, in the units of the horizontal variable.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the horizontal position of the first cursor to 50 ns.
app.Cursors.XPos1 = 50e-9
```

XPos2 ***Double***

Range: From –1.79769e+308 to 1.79769e+308, step 0

Description

Sets/Queries the horizontal position of the second cursor, in the units of the horizontal variable.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the horizontal position of the second cursor to 4.5 ms.
app.Cursors.XPos2 = 4.5e-3
```

YPos1 ***Double***

Range: From –3.99 to 3.99, step 0.01

Description

Sets/Queries the vertical position of the first cursor, in graticule divisions.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
```

```
' Set the vertical position of the first cursor.
app.Cursors.YPos1 = 3.4
```

YPos2 ***Double***

Range: From –3.99 to 3.99, step 0.01

Description

Sets/Queries the vertical position of the second cursor, in graticule divisions.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the vertical position of the second cursor.
app.Cursors.YPos2 = 2.1
```

CUSTOMDSO *app.CustomDSO*

This set of variables controls the CustomDSO system. CustomDSO operates in one of two modes. "Basic" mode, where panel setups can be assigned to named buttons that can be displayed at the bottom of the instrument's display, and "Plug-In" mode, where user-created ActiveX controls can be embedded into the instrument's menu system.

CustomDSO

ActionEnable1	Bool
ActionEnable2	Bool
ActionEnable3	Bool
ActionEnable4	Bool
ActionEnable5	Bool
ActionEnable6	Bool
ActionEnable7	Bool
ActionEnable8	Bool
ActionScript1	FileName
ActionScript2	FileName
ActionScript3	FileName
ActionScript4	FileName
ActionScript5	FileName
ActionScript6	FileName
ActionScript7	FileName
ActionScript8	FileName
Mode	Enum
PlugIn1Install	Action
PlugIn1ProgId	String
PlugIn1Remove	Action
PresentAtPowerUp	Bool

ActionEnable1 *Bool*

Description

Sets/Queries enabling of the first button in the Basic mode of CustomDSO. Disabled buttons will be grayed out.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Enable the action of button 1 of basic CustomDSO.
app.CustomDSO.ActionEnable1 = True
```

ActionEnable2 *Bool*

Description

See ActionEnable1.

Example

See ActionEnable1.

ActionEnable3 ***Bool***

Description

See ActionEnable1.

ActionEnable4 ***Bool***

Description

See ActionEnable1.

ActionEnable5 ***Bool***

Description

See ActionEnable1.

ActionEnable6 ***Bool***

Description

See ActionEnable1.

ActionEnable7 ***Bool***

Description

See ActionEnable1.

ActionEnable8 ***Bool***

Description

See ActionEnable1.

ActionScript1 ***FileName***

Range: Any number of characters

Description

Sets/Queries the name of the script file to be recalled by button 1 of basic CustomDSO.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the name of the script file to be recalled by button 1 of
basic CustomDSO.
app.CustomDSO.ActionScript1 =
"C:\LeCroy\XStream\CustomDSO\CustomSet3Script1.lss"
```

ActionScript2 ***FileName***

Range: Any number of characters

Description

See ActionScript1.

ActionScript3 ***FileName***

Range: Any number of characters

Description

See ActionScript1.

ActionScript4 ***FileName***

Range: Any number of characters

Description

See ActionScript1.

ActionScript5 ***FileName***

Range: Any number of characters

Description

See ActionScript1.

ActionScript6 ***FileName***

Range: Any number of characters

Description

See ActionScript1.

ActionScript7 ***FileName***

Range: Any number of characters

Description

See ActionScript1.

ActionScript8 ***FileName***

Range: Any number of characters

Description

See ActionScript1.

Mode **Enum**

Description

Sets/Queries the current mode of Custom DSO.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the CustomDSO mode to Basic
app.CustomDSO.Mode = "Basic"
```

Values

Basic	Basic mode, assign setups to named buttons
Off	CustomDSO Disabled
PlugIn	Plug-In mode, use ActiveX controls to define menu

PlugIn1Install ***Action***

Description

Installs the currently nominated COM program for use with the Plug-In mode of Custom DSO.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Install the currently specfified plug-in program.
app.CustomDSO.PlugIn1ProgID = "LeCroy.CustomDSODemo.1"
app.CustomDSO.PlugIn1Install
```

PlugIn1ProgId ***String***

Range: Any number of characters

Description

Sets/Queries the ProgID of the ActiveX control to use during Plug-In mode of CustomDSO. The ProgID "LeCroy.CustomDSODemo.1" can be used to test the system since this simple ActiveX control is installed by default in all X-Stream instruments.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Sets the name of the current plug-in program.
app.CustomDSO.PlugIn1ProgID = "LeCroy.CustomDSODemo.1"
```

PlugIn1Remove ***Action***

Description

Removes the ActiveX component that is currently in use with the Plug-In mode of Custom DSO.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Remove the currently installed plug-in program.
app.CustomDSO.PlugIn1Remove
```

PresentAtPowerUp ***Bool***

Description

Sets/Queries whether the Custom DSO menu is to be shown at power up, and when no standard instrument menu is open.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set CustomDSO to be in use at power-up.
app.CustomDSO.PresentAtPowerUp = True
```

DISPLAY

app.Display

This set of variables controls the properties of the screen display of the instrument.

AxisLabels	Bool
AxisXRotation	Integer
AxisYRotation	Integer
C1Color	Color
C1PrintColor	Color
C2Color	Color
C2PrintColor	Color
C3Color	Color
C3PrintColor	Color
C4Color	Color
C4PrintColor	Color
ClearSweeps	Action
DisplayMode	Enum
F1Color	Color
F1PrintColor	Color
F2Color	Color
F2PrintColor	Color
F3Color	Color
F3PrintColor	Color
F4Color	Color
F4PrintColor	Color
F5Color	Color
F5PrintColor	Color
F6Color	Color
F6PrintColor	Color
F7Color	Color
F7PrintColor	Color
F8Color	Color
F8PrintColor	Color
FactoryDefault	Action
GridIntensity	Integer
GridMode	Enum
GridOnTop	Bool
LockPersistence	Enum
M1Color	Color
M1PrintColor	Color
M2Color	Color
M2PrintColor	Color
M3Color	Color
M3PrintColor	Color
M4Color	Color
M4PrintColor	Color
NumSegmentsDisplayed	Integer
Persist3DQuality	Enum
Persisted	Bool
Persistence3d	Bool

PersistenceLastTrace	Bool
PersistenceMonoChrome	Bool
PersistenceSaturation	Integer
PersistenceStyle	Enum
PersistenceTime	Enum
PreviewPrintColors	Action
ResetAll	Action
SegmentMode	Enum
StartSegment	Integer
TraceStyle	Enum

AxisLabels *Bool*

Description

Sets/Queries the visibility of the labels that show the horizontal and vertical limits of each grid.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Show the axis labels.
app.Display.AxisLabels = True
```

AxisXRotation *Integer*

Range: From –90 to 90, step 1

Description

Sets/Queries the rotation angle of the 3-D persistence display about the X-axis. The X-axis runs horizontally in the plane of the screen. Positive or negative angles can be used, in the range –90 to +90 degrees. Zero produces a direct plan view if AxisYRotation is also zero.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the rotation about the X axis to 45 degrees.
app.Display.AxisXRotation = 45
```

AxisYRotation *Integer*

Range: From –90 to 90, step 1

Description

Sets/Queries the rotation angle of the 3-D persistence display about the Y-axis. The Y-axis runs vertically in the plane of the screen. Positive or negative angles in the range –90 to +90 degrees can be used. A positive angle makes the left side look closer than the right side.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
```

```
' Set the rotation about the Y axis to 35 degrees.

app.Display.AxisYRotation = 35
```

C1Color ***Color***

Range: From 0 to 16777215

Description

Sets/Queries the color of trace C1, using a number in the range 0 to FFFFFF in hexadecimal. The possible colors are made from any combination of the primary colors, which are set in hexadecimal as Blue = &HFF0000, Green = &HFF00, Red = &HFF. The value may be entered in decimal or in hexadecimal form, though hexadecimal is usually more convenient. If the intensity of a color is to be reduced or increased by a numerical factor, an AND operation must be used afterwards, to prevent corruption of other primary colors.

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")


Red = &Hff: Green = &H80: Blue = &H00


' Set the color of channel C1 trace to orange

app.Display.C1Color = (Blue * &H10000) + (Green * &H100) + Red
```

C1PrintColor ***Color***

Range: From 0 to 16777215

Description

Sets/Queries the color, in the printing palette, of trace C1, using a number in the range 0 to FFFFFF in hexadecimal. The primary colors are Blue = &HFF0000, Green = &HFF00, Red = &HFF in hexadecimal. The value may be entered in decimal or in hexadecimal form.

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")


Red = &Hff: Green = &H80: Blue = &H00


' Set the color of channel C1 trace to orange for printing.

app.Display.C1PrintColor = (Blue * &H10000) + (Green * &H100) +
```

C2Color ***Color***

Range: From 0 to 16777215

Description

See C1Color.

C2PrintColor ***Color***

Range: From 0 to 16777215

Description

See C1Printcolor.

C3Color ***Color***

Range: From 0 to 16777215

Description

See C1Color.

C3PrintColor ***Color***

Range: From 0 to 16777215

Description

See C1Printcolor.

C4Color ***Color***

Range: From 0 to 16777215

Description

See C1Color.

C4PrintColor ***Color***

Range: From 0 to 16777215

Description

See C1Printcolor.

ClearSweeps ***Action***

Description

Initiates a Clear Sweeps operation. Clears history only for persistence traces, see the main Clear Sweeps control **app.ClearSweeps**, or the ClearSweeps control in other subsystems for other options.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Initiate a clear sweeps action for persistence traces.
app.Display.ClearSweeps
```

DisplayMode ***Enum***

Description

Sets/Queries the display mode as either "Scope," showing the normal instrument screen, or "WebEdit," showing the web processor editing panel. WebEdit mode is available only with certain software options, including XMATH and XMAP.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Switch to WebEdit mode
app.Display.DisplayMode = "WebEdit"
```

Values

Scope
WebEdit

F1Color ***Color***

Range: From 0 to 16777215

Description

See C1Color.

F1PrintColor ***Color***

Range: From 0 to 16777215

Description

See C1Printcolor.

F2Color ***Color***

Range: From 0 to 16777215

Description

See C1Color.

F2PrintColor ***Color***

Range: From 0 to 16777215

Description

See C1Printcolor.

F3Color ***Color***

Range: From 0 to 16777215

Description

See C1Color.

F3PrintColor ***Color***

Range: From 0 to 16777215

Description

See C1Printcolor.

F4Color ***Color***

Range: From 0 to 16777215

Description

See C1Color.

F4PrintColor ***Color***

Range: From 0 to 16777215

Description

See C1Printcolor.

F5Color ***Color***

Range: From 0 to 16777215

Description

See C1Color.

F5PrintColor ***Color***

Range: From 0 to 16777215

Description

See C1Printcolor.

F6Color ***Color***

Range: From 0 to 16777215

Description

See C1Color.

F6PrintColor ***Color***

Range: From 0 to 16777215

Description

See C1Printcolor.

F7Color ***Color***

Range: From 0 to 16777215

Description

See C1Color.

F7PrintColor ***Color***

Range: From 0 to 16777215

Description

See C1Printcolor.

F8Color ***Color***

Range: From 0 to 16777215

Description

See C1Color.

F8PrintColor ***Color***

Range: From 0 to 16777215

Description

See C1Printcolor.

FactoryDefault ***Action***

Description

Restores the display of the instrument to the factory default settings.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Restore the display to the factory pre-set state.
app.Display.FactoryDefault
```

GridIntensity ***Integer***

Range: From 0 to 100, step 1

Description

Sets/Queries the grid intensity as a percentage of the maximum value, with a resolution of 1%.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the grid intensity to 60% of the maximum.
app.Display.GridIntensity = 60
```

GridMode ***Enum***

Description

Sets/Queries the grid mode. For example, the commands "Single" and "Dual" set the grid mode until countermanded. "Auto" allows the instrument to set the grid mode most suitable for the current number of visible traces.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Enter Octal grid mode
app.Display.GridMode = "Octal"
```

Values

Auto	Automatically choose grid mode, one trace per grid
Dual	Dual grid mode
Octal	Octal grid mode

Quad	Quad grid mode
Single	Single grid mode
XY	XY grid mode
XYDual	XY + Dual grid mode
XYSingle	XY + Single grid mode

GridOnTop ***Bool***

Description

Sets/Queries whether the grid lines lie over the traces or vice versa.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the grid lines to be over the trace lines.
app.Display.GridOnTop = True
```

LockPersistence ***Enum***

Description

Sets/Queries whether the persistence states of the visible traces are locked together or separate.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the persistence display to per trace, not locked.
app.Display.LockPersistence = "PerTrace"
```

Values

AllLocked
PerTrace

M1Color ***Color***

Range: From 0 to 16777215

Description

See C1Color.

M1PrintColor ***Color***

Range: From 0 to 16777215

Description

See C1Printcolor.

M2Color ***Color***

Range: From 0 to 16777215

Description

See C1Color.

M2PrintColor ***Color***

Range: From 0 to 16777215

Description

See C1Printcolor.

M3Color ***Color***

Range: From 0 to 16777215

Description

See C1Color.

M3PrintColor ***Color***

Range: From 0 to 16777215

Description

See C1Printcolor.

M4Color ***Color***

Range: From 0 to 16777215

Description

See C1Color.

M4PrintColor ***Color***

Range: From 0 to 16777215

Description

See C1Printcolor.

NumSegmentsDisplayed ***Integer***

Range: From 1 to 80, step 1

Description

In sequence mode, sets/queries the number of segments displayed on the screen.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the number of displayed segments to 20
app.Acquisition.Horizontal.SampleMode = "Sequence"
app.Acquisition.Horizontal.NumSegments = 20
app.Display.NumSegmentsDisplayed = 20
app.Display.SegmentMode = "Mosaic"
```

Persist3DQuality ***Enum***

Description

Sets/Queries the type of 3-D plot that is displayed.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the type of the 3-D persistence plot.
app.Display.Persist3DQuality = "WireFrame"
```

Values

Shaded
Solid
WireFrame

Persisted ***Bool***

Description

Sets/Queries whether persistence mode is in use. If the previously set persistence mode is per trace, the persisted cvar will be set to True by this command, even if none of the traces has been set to persistence.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the state of persistence mode.
Persist = app.Display.Persisted
```

Persistence3d ***Bool***

Description

Sets/Queries whether the persistence 3-D mode is activated.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the 3-D display to off.
app.Display.Persistence3d = False
```

PersistenceLastTrace ***Bool***

Description

Sets/Queries whether the last created trace is shown over the persistence trace.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the persistence display to show the last trace
' on top of the persistence trace.
app.Display.PersistenceLastTrace = True
```

PersistenceMonoChrome ***Bool***

Description

Sets/Queries whether the persistence mode is monochrome.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the persistence mode as color.
app.Display.PersistenceMonoChrome = False
```

PersistenceSaturation ***Integer***

Range: From 0 to 100, step 1

Description

Sets/Queries the population level, relative to the maximum possible level, at which the persistence traces reach maximum intensity, and above which there are no further changes in color or intensity.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the persistence saturation level to 60%.
app.Display.PersistenceSaturation = 60
```

PersistenceStyle ***Enum***

Description

Sets/Queries the type of persistence trace displayed.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the persistence style to color graded.
app.Display.PersistenceStyle = "ColorGraded"
```

Values

3d
Analog
ColorGraded

PersistenceTime ***Enum***

Description

Sets/Queries decay time for trace persistence, expressed as a number of seconds or as infinite.

Example

```
' Visual Basic Script
```

```
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the persistence time to 10 seconds.
app.Display.PersistenceTime = "10s"
```

Values

0.5s
10s
1s
20s
2s
5s
Infinite

PreviewPrintColors ***Action***

Description

Shows the instrument display in the current color scheme selected for printing.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Show the current color scheme selected for printing.
app.Display.PreviewPrintColors
```

ResetAll ***Action***

Description

Turns off persistence on all traces where it has been turned on.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Reset all persistence traces to non-persisted mode.
app.Display.ResetAll
```

SegmentMode ***Enum***

Description

Sets/Queries the display mode for segmented input channels. All visible channels are set to the same display mode by a single command.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the display mode for segments in C2 to perspective.
app.Acquisition.C2.SegmentMode = "Perspective"
```

Values

Adjacent	All segments displayed end-to-end, left to right
Mosaic	Segments displayed in a mosaic, top-left to bottom right
Overlay	Segments are overlaid, similar to persistence
Perspective	Segments are displayed in a perspecfive view
Waterfall	Successive segments are displayed with increasing vertical offset

StartSegment ***Integer***

Range: From 1 to 100000, step 1

Description

Sets/Queries the selection of the first segment to be shown on the screen.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the first shown segment to 10.
app.Display.StartSegment = 10
```

TraceStyle ***Enum***

Description

Sets/Queries the style in which traces are drawn.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the state of the persistence mode.
TraceStyle = app.Display.TraceStyle
```

Values

Line	Connect adjacent samples with straight lines
Points	Show only the sample points

HARDCOPY *app.HardCopy*

This set of variables controls the transfer of information about the screen display to destinations such as disk files, internal memories, printers, and remote computers.

Destination	Enum
Directory	FileName
EMailMessage	String
GridAreaOnly	Bool
HardcopyArea	Enum
ImageFileFormat	Enum
Orientation	Enum
PreferredFilename	String
Print	Action
PromptForMessage	Bool
SelectedPrinter	Enum
StripChart	Bool
StripChartFactor	Enum
UsePrintPalette	Bool

Destination ***Enum***

Description

Sets/Queries the destination for hard copy.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the destination for hard copy to e-mail.
app.Hardcopy.Destination = "EMail"
```

Values

Clipboard	Send to clipboard for pasting into other applications
EMail	Send image in an E-Mail
File	Store image in a file
Printer	Print to a local, or networked printer

Directory ***FileName***

Range: Any number of characters

Description

Sets/Queries the directory for hard copy to a file.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the directory for hard copy to files as "D:\HC"
app.Hardcopy.Directory = "D:\HC"
```

EMailMessage ***String***

Range: Any number of characters

Description

Sets/Queries the e-mail message.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Create the e-mail message - "Results for run 89".
app.Hardcopy.EMailMessage = "Results for run 89"
```

GridAreaOnly ***Bool***

Description

Sets/Queries whether hard copy is of grid area only.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the status of Grid Area Only.
GridArea = app.Hardcopy.GridAreaOnly
```

HardcopyArea ***Enum***

Description

Sets/Queries the area of the screen to be included in a hard copy.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Select the DSO screen area for hard copy.
app.Hardcopy.HardCopyArea = "DSOWindow"
```

Values

DSOWindow	Include only the DSO window
FullScreen	Include the full display screen
GridAreaOnly	Include the grid area only (doesn't include menus)

ImageFileFormat ***Enum***

Description

Sets/Queries the file format for hard copy data.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Select the format PNG for a file of hard copy data.
app.Hardcopy.Destination = "File"
app.Hardcopy.ImageFileFormat = "PNG"
```

Values

BMP	Windows Bitmap
BMPCOMP	8-bit Windows Bitmap
JPEG	JPEG - JFIF Compliant
PNG	Portable Network Graphics
PSD	Adobe Photoshop 3.0
TIFF	Tagged Image File Format

Orientation ***Enum***

Description

Sets/Queries the orientation for hard copy to landscape. Valid only when outputting to a printer as opposed to a file, the clipboard, or an e-mail.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the orientation for hardcopy to landscape.
app.Hardcopy.Orientation = "Landscape"
```

Values

Landscape
Portrait

PreferredFilename ***String***

Range: Any number of characters

Description

Sets/Queries the preferred filename to use for hard copy.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the preferred filename to PrintFile.
app.Hardcopy.PreferredFilename = "PrintFile"
```

Print ***Action***

Description

Initiates a hard copy.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Initiate a hard copy.
app.Hardcopy.Print
```

PromptForMessage ***Bool***

Description

Sets/Queries whether a prompt will be given when screen dump to e-mail is requested. The prompt offers the possibility of sending a message with the e-mail.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Enable the prompt for message with e-mail.
app.Hardcopy.PromptForMessage = True
```

SelectedPrinter ***Enum***

Description

Sets/Queries the selection of the printer for hard copy. White space and punctuation are removed from the string.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Select BarbondaleTintJet as the printer for hardcopy
app.Hardcopy.SelectedPrinter = "BarbondaleTintJet"
```

StripChart ***Bool***

Description

Sets/Queries the status of strip chart mode of printing. Valid only when outputting to the internal printer.

StripChartFactor ***Enum***

Description

Sets/Queries the scale factor for strip chart printing. Valid only when outputting to the internal printer.

Example

```
' Visual Basic Script
```

```
Set app = CreateObject("LeCroy.XStreamDSO")


' Set the strip chart scale to 5 cm/division.
app.Hardcopy.StripChartFactor = "5cmdiv"
```

Values

100cmdiv
10cmdiv
1cmdiv
200cmdiv
20cmdiv
2cmdiv
50cmdiv
5cmdiv

UsePrintPalette ***Bool***

Description

Sets/Queries the status of the color palette for hard copy. The screen palette or the print palette can be used. The print palette defaults to a white background, but keeps the approximate colors of all other objects. This mode saves ink/toner when printing onto paper.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Ignore the special print color palette for hard copy.
app.Hardcopy.UsePrintPalette = False
```

MATH

app.Math

Variables of the form app.Math.xxxx control the mathematical functions F1 through F8.

Names of the form app.Math.Functions("Fx").xxxx are aliases for simpler names, which are described in this section of the manual. Examples of alias pairs are as follows:

app.Math.Functions("Fx") = app.Math.Fx

app.Math.Functions("Fx").Out.Result = app.Math.Fx.Out.Result

app.Math.Functions("Fx").Zoom = app.Math.Zoom.Fx

ClearSweeps	Action
ResetZoom	Action

ClearSweeps *Action*

Description

Clears sweeps for history functions such as average, histogram, and trend. See also the general **app.ClearSweeps** control which clears accumulated data for all subsystems, including persistence.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Clear sweeps for all history functions.
app.Math.ClearSweeps
```

ResetZoom *Action*

Description

Resets zoom to its default settings.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Reset zoom.
app.Math.ResetZoom
```

FUNCTIONS *app.Math.Functions*

Names of the form app.Math.Functions("Fx").xxxx are aliases for simpler names, which are described in the section of the manual devoted to app.Math. Examples of alias pairs are as follows:

app.Math.Functions("Fx") = app.Math.Fx

app.Math.Functions("Fx").Out.Result = app.Math.Fx.Out.Result

app.Math.Functions("Fx").Zoom = app.Math.Zoom.Fx

See Acquisition.Channels for a programming example.

FX *app.Math.Fx*

This set of variables controls the math functions F1 through F8.

AxisXRotation	Integer
AxisYRotation	Integer
ClearSweeps	Action
DoResetZoom	Action
DoStoreToMemoryTrace	Action
Equation	String
GraphOp	Enum
LabelsPosition	String
LabelsText	String
MathMode	Enum
MeasureOp	Enum
Operator1	Enum
Operator2	Enum
Persist3DQuality	Enum
Persisted	Bool
Persistence3d	Bool
PersistenceMonoChrome	Bool
PersistenceSaturation	Integer
PersistenceTime	Enum
ShowLastTrace	Bool
Source1	Enum
Source2	Enum
Source3	Enum
UseDotJoin	Bool
UseGrid	String
View	Bool
ViewLabels	Bool

AxisXRotation *Integer*

Range: From –90 to 90, step 1

Description

Sets/Queries the state of the X-axis rotation control, used only in 3-D persistence mode to control the apparent viewing position.

Example

```
' Visual Basic Script
```

```
Set app = CreateObject("LeCroy.XStreamDSO")


Set the rotation about the X-axis to 35 degrees for trace F3.
app.Acquisition.F3.AxisXRotation = 35
```

AxisYRotation ***Integer***

Range: From –90 to 90, step 1

Description

Sets/Queries the state of the Y-axis rotation control, used only in 3-D persistence mode to control the apparent viewing position.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


Set the rotation about the Y-axis to 25 degrees for trace F3.
app.Acquisition.F3.AxisYRotation = 25
```

ClearSweeps ***Action***

Description

Clears accumulated data for a single function trace.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Reset accumulation for trace F1
app.Math.F1.ClearSweeps
```

DoResetZoom ***Action***

Description

Resets the zoom state of math trace Fx.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Reset zoom of math function F3.
app.Math.F3.DoResetZoom
```

DoStoreToMemoryTrace ***Action***

Description

Stores data from math function Fx to a memory trace.

Destination for F1 will be M1, F2 will be M2, etc.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Store math function F2 to a memory trace.
app.Math.F2.DoStoreToMemoryTrace
```

Equation ***String***

Range: Any number of characters.

Description

Queries the equation that defines the math function Fx.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the definition of math function F3.
EquationF3 = app.Math.F3.Equation
MsgBox EquationF3
```

GraphOp ***Enum***

Description

Sets/Queries the graph operator of math function Fx. This can be used to produce a Histogram, Track, or Trend of a selected measurment directly within the Math subsystem, without the need to use the measurement subsystem. This control is only valid when MathMode is set to "Graphing."

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure F1 to show the histogram of the amplitude of C1
app.Math.F1.View = True
app.Math.F1.MathMode = "Graphing"
app.Math.F1.GraphOp = "Histogram"
app.Math.F1.MeasureOp = "Amplitude"
app.Math.F1.Source1 = "C1"
```

Values

Histogram
Track
Trend

LabelsPosition ***String***

Range: Any number of characters.

Description

Sets/Queries the horizontal position of the label attached to the acquisition trace Fx. The unit of measure is the unit of the horizontal scale. Measurement is made from the trigger point.

This control is a string, not a numeric value, which allows multiple labels to be positioned, as shown in the following example.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Add a couple of labels to trace F1, one at 0ns, and one at 55ns

app.SetToDefaultSetup
app.Math.F1.View = True
app.Math.F1.ViewLabels = True
app.Math.F1.LabelsPosition = "0.0, 55e-9"
```

LabelsText ***String***

Range: Any number of characters.

Description

Sets/Queries the text that appears in labels attached to acquisition trace Cx. Multiple labels can be specified by using a comma as a delimiter.

MathMode ***Enum***

Description

Sets/Queries the math mode.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the mode of the math function F1
app.Math.F1.MathMode = "TwoOperators"
```

Values

Graphing	Graphing mode, chain a measurement and a graphing operator
OneOperator	Single math operator
TwoOperators	Chain two math operators
WebEdit	Measurement is defined using the Processing Web Editor

MeasureOp ***Enum***

Description

Sets/Queries the measure operator of math function Fx. Valid only when MathMode = "Graph".

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the measure operator of math function F1
app.Math.F1.View = True
app.Math.F1.MathMode = "Graph"
app.Math.F1.GraphOp = "Histogram"
app.Math.F1.MeasureOp = "Amplitude"
```

Values

Amplitude
Area
Base
Cycles
Delay
DeltaDelay
DeltaPeriodAtLevel
DeltaTimeAtLevel
DeltaWidthAtLevel
Duration
DutyAtLevel
DutyCycle
EdgeAtLevel
ExcelParam
ExtinctionRatio
EyeAmplitude
EyeAvgPower
EyeBER
eyecrossing
EyeHeight
EyeOneLevel
EyeQ
EyeWidth
EyeZeroLevel
Fall
Fall8020
FallAtLevel
FirstPoint
Frequency
FrequencyAtLevel
FullWidthAtHalfMaximum
FullWidthAtXX
HalfPeriod
HistogramAmplitude
HistogramBase
HistogramMaximum
HistogramMean
HistogramMedian
HistogramMinimum

HistogramRms
HistogramSdev
HistogramTop
HoldTime
LastPoint
LevelAtX
MathcadParam
MATLABParameter
Maximum
MaximumPopulation
Mean
Median
Minimum
Mode
NarrowBandPhase
NarrowBandPower
npoints
Null
NumberOfModes
OvershootNegative
OvershootPositive
ParamScript
Peaks
PeakToPeak
Percentile
Period
PeriodAtLevel
Phase
PopulationAtX
Range:
Rise
Rise2080
RiseAtLevel
RootMeanSquare
Setup
Skew
StandardDeviation
TIE
TimeAtLevel
Top
TotalPopulation
Width
WidthAtLevel
XAtMaximum
XAtMinimum
XAtPeak

Operator1 ***Enum***

Description

Sets/Queries the first operator of math function Fx. When MathMode = "OneOperator", this is the only math operator, when MathMode = "TwoOperators", this is the first of two operators. When MathMode = "Graph", this control has no effect. Note also that the list of available math operators varies, depending upon the instrument model number and the list of installed software.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Define the first operator of math function F1 as an Average
app.Math.F1.View = True
app.Math.F1.MathMode = "OneOperator"
app.Math.F1.Operator1 = "Average"
```

Values

AbsoluteValue
Average
Boxcar
Copy
Correlation
Derivative
Deskew
Difference
EnhancedResolution
Envelope
ExcelMath
Exp
Exp10
FFT
Filter
Floor
Histogram
Integral
Interpolate
Invert
Ln
Log10
MathcadMath
MATLABWaveform
Null
PersistenceHistogram
PersistenceTraceMean
PersistenceTraceRange
PersistenceTraceSigma
Product
Ratio
Reciprocal
Rescale
options.Roof
SegmentSelect
SinXOverX
Sparse
Square
SquareRoot

Sum
Track
Trend
WaveScript
Zoom

Operator2 *Enum*

Description

Sets/Queries the second operator of math function Fx. This control is valid only when MathMode = "TwoOperators", indicating that two math operators are chained to produce a single result.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Define the first operator of math function F1 as an Average
app.Math.F1.View = True
app.Math.F1.MathMode = "TwoOperators"
app.Math.F1.Operator1 = "Invert"
app.Math.F1.Operator2 = "Average"
```

Values

AbsoluteValue
Average
Boxcar
Copy
Correlation
Derivative
Deskew
Difference
EnhancedResolution
Envelope
ExcelMath
Exp
Exp10
FFT
Filter
Floor
Histogram
Integral
Interpolate
Invert
Ln
Log10
MathcadMath
MATLABWaveform
Null
PersistenceHistogram
PersistenceTraceMean
PersistenceTraceRange

PersistenceTraceSigma
Product
Ratio
Reciprocal
Rescale
Roof
SegmentSelect
SinXOverX
Sparse
Square
SquareRoot
Sum
Track
Trend
WaveScript
Zoom

Persist3DQuality *Enum*

Description

Sets/Queries the state of the 3-D Persistence quality control. Controls the way that the persistence trace is rendered.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set persistence 3-D to shaded for trace F1
app.Math.F1.Persist3DQuality = "Shaded"
```

Values

Shaded
Solid
WireFrame

Persisted *Bool*

Description

Sets/Queries the persisted state of the function waveform. If the Display.LockPersistence control is set to “AllLocked,” the persisted state of all displayed waveforms will be the same. If the Display.LockPersistence control is set to “PerTrace,” the persisted state of each waveform can be independently controlled.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set persistence on for trace F3.
app.Math.F3.Persisted = True
```

Persistence3d ***Bool***

Description

Sets/Queries the 3-D persistence state. When True, the persistence display for this channel will be displayed as a three dimensional surface map.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


Set persistence plot as 3-D for trace F4.
app.Acquisition.F4.Persistence3D = True
```

PersistenceMonoChrome ***Bool***

Description

Sets/Queries the monochrome persistence state. When True, the persistence display for this channel will be monochromatic, whether 2-D or 3-D.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set persistence monochrome on for trace F1
app.Math.F1.PersistenceMonoChrome = True
```

PersistenceSaturation ***Integer***

Range: From 1 to 100, step 1

Description

Sets/Queries the saturation threshold for persisted waveforms. All information at this level or higher will be recorded with the same color or intensity.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set the persistence saturation level for trace F1.
app.Math.F1.PersistenceSaturation = 40
```

PersistenceTime ***Enum***

Description

Sets/Queries the state of the Persistence Time control. Controls the persistence decay time for this trace.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
```

```
' Set the persistence time for the trace F1 to 10 seconds.
app.Math.F1.PersistenceTime = "10s"
```

Values

0.5s
10s
1s
20s
2s
5s
Infinite

ShowLastTrace ***Bool***

Description

Sets/Queries the state of the Show Last Trace control. If True, then when this trace is displayed in persistence mode, the last acquired waveform will be superimposed on the accumulating persistence map. See the general description above for a discussion of the locked and unlocked persistence modes.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Do not show the last trace for the persistence trace of trace
F1.
```

Source1 ***Enum***

Description

Sets/Queries the first source of the first operator in Fx. The two possible sources of Operator1 are Source1 and Source2. Source3 is the second source to Operator2, with the first source of Operator2 being the ouput of Operator1. The list of available sources depends on the instrument model and its installed software options.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Define the first source of math function F1 as C3.
app.Math.F1.Source1 = "C3"
```

Values

BadBits
Bits
C1
C2
C3
C4
Eye

F2
F3
F4
F5
F6
F7
F8
M1
M2
M3
M4
P1
P2
P3
P4
P5
P6
P7
P8
PRBS

Source2 ***Enum***

Description

Sets/Queries the second source of the first operator in Fx. The list of available sources depends on the instrument model and its installed software options.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Define the second source of math function F2 as C4.
app.Math.F1.Source2 = "C4"
```

Values

BadBits
Bits
C1
C2
C3
C4
Eye
F2
F3
F4
F5
F6
F7
F8
M1
M2
M3
M4

None

PRBS

Source3 ***Enum***

Description

Sets/Queries the second source of the second operator in Fx. Only valid when MathMode = "Dual". The list of available sources depends on the instrument model and its installed software options.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Define the third source of math function F1 as C1.
app.Math.F1.Source3 = "C1"
```

Values

BadBits

Bits

C1

C2

C3

C4

Eye

F2

F3

F4

F5

F6

F7

F8

M1

M2

M3

M4

None

PRBS

UseDotJoin ***Bool***

Description

Sets/Queries the DotJoin state of the trace. When True, straight line segments will be drawn between sample points. When False, only the sample points will be shown. See **Display.TraceStyle** for a control that can change the setting for all displayed traces simultaneously.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Turn dot join off for trace F1.
app.Math.F1.UseDotJoin = False
```

UseGrid ***String***

Range: Any number of characters.

Description

Sets/Queries the grid in use for the math trace Fx. See also **app.Acquisition.Cx.UseGrid**.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Place math trace F3 on grid YT4.
app.Math.F3.UseGrid = "YT4"
```

View ***Bool***

Description

Sets/Queries whether the trace of math function Fx is visible. Even when math traces are not visible, but are being used as inputs to other math functions and/or measurements, they are computed.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Show math trace F3.
app.Math.F3.View = True
```

ViewLabels ***Bool***

Description

Sets/Queries whether trace labels, defined with LabelsText and LabelsPosition controls, are shown.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Show the user-defined trace label for trace F1
app.Math.F1.ViewLabels = True
```

OPERATOR1SETUP *app.Math.Fx.Operator1Setup*

This node is dynamically created, and will contain the controls for the operator currently selected into Operator1. See the Math/Measure Control reference at the end of this manual for a list of these controls.

RESULT app.Math.Fx.Out.Result

Properties of the type xxxx.Out.Result.yyyy are those of the last completed acquisition. They are not affected if other CVars are changed after that acquisition was completed. This distinction between "Out.Result" properties and other CVars is most important when the trigger mode is Single or Stopped. You should treat "Out.Result" properties as read-only.

See **app.Acquisition.C1.Out.Result** for a detailed description of all properties available for the output of a Math function.

ZOOM *app.Math.Fx.Zoom*

This set of variables controls the zoom functions for math trace Fx.

Zoom

HorPos	Double
HorZoom	Double
ResetZoom	Action
VariableHorZoom	Bool
VariableVerZoom	Bool
VerPos	Double
VerZoom	Double

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Turn on trace F1, will default to Zoom-Only
app.Math.F1.View = True
app.Math.F1.Source1 = "C1"

' Zoom trace F1 by a factor of 2 horizontally and vertically
app.Math.F1.Zoom.ResetZoom
app.Math.F1.Zoom.HorZoom = 2.0
app.Math.F1.Zoom.VerZoom = 2.0
```

HorPos ***Double***

Range: From –0.5 to 0.5, step (8 digits)

Description

Sets/Queries the horizontal position of the center of the grid on the zoomed trace Fx. The unit of measure is the screen width, that is, 0.3 means a shift of three of the ten divisions. A positive value moves the trace to the left.

HorZoom ***Double***

Range: From 0.1 to 1e+006, step (8 digits)

Description

Sets/Queries the horizontal magnification of the trace Fx. The magnification will be in a 1 2 5 10 sequence unless variable horizontal magnification has been set.

ResetZoom ***Action***

Description

Resets the trace Fx to x1 zoom and zero offset in both axes, so that it is identical to its input trace.

VariableHorZoom ***Bool***

Description

Sets/Queries the ability to zoom horizontally by a continuously variable factor. If a horizontal zoom of 0.9 is set, while variable zoom is off, the horizontal zoom will be set to 1.0. If the variable zoom is then enabled, the factor of 0.9 will have been remembered, and it will be used.

VariableVerZoom ***Bool***

Description

Sets/Queries the ability to zoom vertically by a continuously variable factor. If a vertical zoom of 0.9 is set, while variable zoom is off, the vertical zoom will be set to 1.0. If the variable zoom is then enabled, the factor of 0.9 will have been remembered, and it will be used.

VerPos ***Double***

Range: From –1.5 to 1.5, step (8 digits)

Description

Sets/Queries the vertical position of the center of the grid on the zoomed trace Fx. The unit of measure is the screen height, that is, 0.375 means a shift of three of the eight divisions. A positive value moves the trace downwards.

VerZoom ***Double***

Range: From 0.1 to 100, step (8 digits)

Description

Sets/Queries the vertical magnification of the trace Fx. The magnification will be in a 1 2 5 10 sequence unless VariableVerZoom has been set to True, in which case it will be continuously variable.

XY *app.Math.XY*

This set of variables controls the display of data in X-vs.-Y mode. Only valid when the instrument is in XY, XYSingle, or XYDual display modes.

AxisXRotation	Integer
AxisYRotation	Integer
ClearSweeps	Action
InputX	Enum
InputY	Enum
Persist3DQuality	Enum
Persisted	Bool
Persistence3d	Bool
PersistenceMonoChrome	Bool
PersistenceSaturation	Integer
PersistenceTime	Enum
ShowLastTrace	Bool
UseDotJoin	Bool

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Switch to XY+Dual Grid Mode
app.Display.GridMode = "XYDual"

' Configure XY to show C1 vs. C2 in 3D Persistence mode
app.Math.XY.InputX = "C1"
app.Math.XY.InputY = "C2"
app.Math.XY.Persisted = True
app.Math.XY.Persistence3d = True
app.Math.XY.PersistenceMonoChrome = False
app.Math.XY.PersistenceTime = "Infinite"
```

AxisXRotation *Integer*

Range: From –90 to 90, step 1

Description

Sets/Queries the state of the X-axis rotation control, used only in 3-D persistence modes to control the viewing position. See the general description above for a discussion of the locked and unlocked persistence modes.

AxisYRotation *Integer*

Range: From –90 to 90, step 1

Description

Sets/Queries the state of the Y-axis rotation control, used only in 3-D persistence modes to control the viewing position.

ClearSweeps ***Action***

Description

Clears the persistence X-Y plot.

InputX ***Enum***

Description

Sets/Queries the name of the input channel for the X-axis of the X-Y plot.

Values

BadBits
Bits
C1
C2
C3
C4
Eye
F1
F2
F3
F4
F5
F6
F7
F8
M1
M2
M3
M4
PRBS

InputY ***Enum***

Description

Sets/Queries the name of the input channel for the Y-axis of the X-Y plot.

Values

BadBits
Bits
C1
C2
C3
C4
Eye
F1
F2
F3
F4
F5
F6
F7

F8
M1
M2
M3
M4
PRBS

Persist3DQuality ***Enum***

Description

Sets/Queries the state of the 3-D Persistence quality control. Controls the way that the persistence trace is rendered.

Values

Shaded
Solid
WireFrame

Persisted ***Bool***

Description

Sets/Queries the persisted state of the X-Y plot. If the Display.LockPersistence control is set to "AllLocked", the persisted state of all displayed waveforms will be the same. If the Display.LockPersistence control is set to "PerTrace", the persisted state of each waveform can be independently controlled.

Persistence3d ***Bool***

Description

Sets/Queries the 3-D persistence state. When True, the persistence display for the X-Y plot will be displayed as a three dimensional surface map.

PersistenceMonoChrome ***Bool***

Description

Sets/Queries the monochrome persistence state. When True, the persistence display for the X-Y plot will be monochromatic, whether 2-D or 3-D.

PersistenceSaturation ***Integer***

Range: From 1 to 100, step 1

Description

Sets/Queries the saturation threshold for persisted X-Y plot. All information at this level or above will be recorded with the same color or intensity.

PersistenceTime ***Enum***

Description

Sets/Queries the state of the Persistence Time control. Controls the persistence decay time for the X-Y persistence.

Values

0.5s
10s

1s
20s
2s
5s
Infinite

ShowLastTrace ***Bool***

Description

Sets/Queries the state of the Show Last Trace control. If True, when this trace is displayed in persistence mode, the last acquired waveform will be superimposed on the accumulating persistence map.

UseDotJoin ***Bool***

Description

Sets/Queries whether dot joining is used in the X-Y plot.

RESULT *app.Math.XY.Out.Result*

Properties of the type xxxx.Out.Result.yyyy are those of the last completed acquisition. They are not affected if other CVars are changed after that acquisition was completed. This distinction between "Out.Result" properties and other CVars is most important when the trigger mode is Single or Stopped. You should treat "Out.Result" properties as read-only.

This XY result object is very similar to, but not identical to, the result object exposed by the channel and math traces. The differences are due to the fact that the XY trace returns pairs of data values, one for X, one for Y.

DataArray	Property
FirstEventTime	Property
HorizontalFrameStart	Property
HorizontalFrameStop	Property
HorizontalOffset	Property
HorizontalPerStep	Property
HorizontalResolution	Property
HorizontalUnits	Property
LastEventTime	Property
NumFrameDimensions	Property
Samples	Property
Sweeps	Property
XFrameStart	Property
XFrameStop	Property
XMaxPossible	Property
XMinPossible	Property
XOffset	Property
XPerStep	Property
XResolution	Property
XUnits	Property
YFrameStart	Property
YFrameStop	Property
YMaxPossible	Property
YMinPossible	Property
YOffset	Property
YPerStep	Property
YResolution	Property
YUnits	Property

DataArray *Property*

Description

This is the array of data that can be read out to represent the calculated waveform. The returned array will have numSamples rows, and two columns. The first column will contain X values, and the second column Y values. For example: (0, 0) indicates the X value of the first sample, (10, 1) indicates the Y value of the 10th sample. If DataArray(True) is specified, floating-point values are retrieved. If DataArray(False) is specified, 16-bit integer values are returned.

FirstEventTime *Property*

Description

Reads the time of the first event.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Read the time of the first event.
EventFirst = app.Math.XY.Out.Result.FirstEventTime
```

HorizontalFrameStart ***Property***

Description

Reads the start of the horizontal scale of the Y-T traces that contribute to the X-Y plot. If the input traces have been shifted to different offsets, this CVar refers to the X-trace. The values for both traces can be obtained using app.Math.Cx.Out.Result.HorizontalFrameStart.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Read the horizontal frame start for the input traces of an X-Y
plot.
HorStart = app.Math.XY.Out.Result.HorizontalFrameStart
```

HorizontalFrameStop ***Property***

Description

Reads the end of the horizontal scale of the Y-T traces that contribute to the X-Y plot. If the input traces have been shifted to different offsets, this control variable refers to the X-trace.

HorizontalOffset ***Property***

Description

Reads the offset of the horizontal scale of the Y-T traces that contribute to the X-Y plot. If the input traces have been shifted to different offsets, this cvar refers to the X-trace. The values for both traces can be obtained using app.Math.Cx.Out.Result.HorizontalFrameStart.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Read the horizontal offset of the input traces of an XY plot.
HorOffset = app.Math.XY.Out.Result.HorizontalOffset
```

HorizontalPerStep ***Property***

Description

This is the time between successive sampling instants of the input traces of an X-Y plot.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the value of the horizontal step size for the input traces
 of an X-Y plot.
HorStepXY = app.Math.XY.Out.Result.HorizontalPerStep
```

HorizontalResolution ***Property***

Description

This is the resolution of the readout of horizontal values of the input traces of an X-Y plot. It is not directly related to the sampling period.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the readout resolution of the horizontal axis of input
traces of an X-Y plot.
HRes = app.Math.XY.Out.Result.HorizontalResolution
```

HorizontalUnits ***Property***

Description

Reads the name of the horizontal units of the data of the X-Y plot. The horizontal dimension is not visible on the X-Y plot, but is implicit in the data. If both inputs are normal channel traces, units are in seconds; while if both are FFTs, units are in Hz.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the horizontal units of the input traces of an XY plot.
HUnits = app.Math.XY.Out.Result.HorizontalUnits
```

LastEventTime ***Property***

Description

Reads the time of the last event.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the time of the last event.
EventLast = app.Math.XY.Out.Result.LastEventTime
```

NumFrameDimensions ***Property***

Description

Reads the dimensionality of trace XY: 2 for a Y-T plot, 3 for an X-Y plot.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the dimensionality of trace XY.
DimXY = Math.XY.Out.Result.NumFrameDimensions
```

Samples ***Property***

Description

Reads the number of points in the input traces of an X-Y plot.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the number of samples in the input traces of an X-Y plot.
XYSamples = app.Math.XY.Out.Result.Samples
```

Sweeps ***Property***

Description

This is the number of sweeps since the last clearance, for example a clearance caused by the last change in time per division.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the number of sweeps for trace XY.
XYSweeps = app.Math.XY.Out.Result.Sweeps
```

XFrameStart ***Property***

Description

Reads the value at the left edge of the X-Y plot.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read  the value at the left hand edge for the X-Y plot.
XLeft = app.Math.XY.Out.Result.XFrameStart
```

XFrameStop ***Property***

Description

See the corresponding control variable in **app.Acquisition.Cx.Out.Result**.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read  the value at the right hand edge for the X-Y plot.
XRight = app.Math.XY.Out.Result.XFrameStop
```

XMaxPossible ***Property***

Description

This is the highest value that an actual array element can have. It will be a little less than XFrameStop.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the maximum possible value of X for trace XY.
XMaxXY = app.Math.XY.Out.Result.XMaxPossible
```

XMinPossible ***Property***

Description

This is the lowest value that an actual array element can have. It will be a little greater than XFrameStart.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the minimum possible value of X for trace XY.
XMinXY = app.Math.XY.Out.Result.XMinPossible
```

XOffset ***Property***

Description

See the corresponding control variable in **app.Acquisition.Cx.Out.Result**.

XPerStep ***Property***

Description

This is the smallest step in the numerical X values that can be read out, whether or not the step has physical meaning. For the basic 8-bit ADC the step is 1/65536 of the X-range.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the step size in X for trace XY.
XStepXY = app.Math.XY.Out.Result.XPerStep
```

XResolution *Property*

Description

X resolution is the actual smallest difference that can be practically resolved. For an 8-bit ADC it is 1/256 of the height of the vertical range. But if 16 averages are set, the resolution is improved by a factor of 4, and it becomes 1/1024 of the vertical range, and for 100 sweeps it becomes 1/2560.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the resolution of the X-axis of trace XY.
XRes = app.Math.XY.Out.Result.Xresolution
```

XUnits *Property*

Description

Reads the name of the units of the horizontal scale of an XY plot. This is not the same as the horizontal unit, app.Math.XY.Out.Result.HorizontalUnits, which refers to the horizontal units of the original traces that contribute to the XY plot.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the units of the horizontal axis of an XY plot.
XUnits = app.Math.XY.Out.Result.Xunits
```

YFrameStart *Property*

Description

Reads the value at the bottom edge for the X-Y plot.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read  the value at the bottom edge for the X-Y plot.
YBottom = app.Math.XY.Out.Result.YFrameStart
```

YFrameStop ***Property***

Description

Reads the value at the top edge for the X-Y plot.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read  the value at the top edge for the X-Y plot.
YTop = app.Math.XY.Out.Result.YFrameStop
```

YMaxPossible ***Property***

Description

This is the highest value that an actual array element can have. It will be a little less than YFrameStop.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the maximum possible value of Y for trace XY.
YMaxXY = app.Math.XY.Out.Result.YMaxPossible
```

YMinPossible ***Property***

Description

This is the lowest value that an actual array element can have. It will be a little greater than YFrameStart.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the minimum possible value of Y for trace XY.
YMinXY = app.Math.XY.Out.Result.YMinPossible
```

YOffset **Property**

Description

Please see the corresponding control variable in app.Acquisition.Cx.Out.Result.

YPerStep ***Property***

Description

This is the smallest step in the numerical Y values that can be read out, whether or not the step has physical meaning. For the basic 8-bit ADC, the step is 1/65536 of the Y-range.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the step size in Y for trace XY.
YStepXY = app.Math.XY.Out.Result.YPerStep
```

YResolution *Property*

Description

Y-resolution is the actual smallest difference that can be practically resolved. For an 8-bit ADC, it is 1/256 of the height of the Y-range. But if 16 averages are set in the channel, the resolution is improved by a factor of 4, and it becomes 1/1024. For 100 sweeps it becomes 1/2560.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the resolution of the Y-axis of trace XY.
YRes = app.Math.XY.Out.Result.Yresolution
```

YUnits *Property*

Description

Reads the name of the units of the vertical scale of an XY plot.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the units of the vertical axis of an XY plot.
YUnits = app.Math.XY.Out.Result.Yunits
```

MEASURE *app.Measure*

Variables of the form app.Measure control the parameters P1 through P8, and their associated statistical results and histicons.

Names of the form app.Measure.Measure("Premote").xxxx and app.Measure.Measure("Px").xxxx are aliases for simpler names, which are described in this section of the manual. Examples of alias pairs are as follows:

app.Measure.Measure("Premote").OutResult = app.Measure."Premote".OutResult
app.Measure.Measure("Px").Statistics = app.Measure.Px.Statistics

ClearAll	Action
ClearSweeps	Action
HelpMarkers	Enum
HistoOn	Bool
MeasureMode	Enum
SetGateToDefault	Action
StatsOn	Bool
StdGateStart	Double
StdGateStop	Double
StdSource	Enum

Example

```
    ' Visual Basic Script
    Set app = CreateObject("LeCroy.XStreamDSO")

    ' get into the custom parameter mode
    app.Measure.MeasureMode = "MyMeasure"
    app.Measure.ClearAll
    app.Measure.StatsOn = True
    app.Measure.HistoOn = False

    ' Configure P1 to measure amplitude
    app.Measure.P1.View = True
    app.Measure.P1.ParamEngine = "ampl"
```

ClearAll *Action*

Description

Resets all parameter setups, turning each of the parameters view to "off", the MeasurementType to "measure" and the selected paramEngine to "Null". See **Acquisition.Channels** for a programming example.

ClearSweeps *Action*

Description

Clears the accumulated statistics for parameters P1 to P8, as well as the accumulated statistics for their associated histicons.

HelpMarkers ***Enum***

Description

Sets/Queries the level of detail for help markers (if any of the selected parameter definitions have help markers). These markers are displayed on the source traces, but only if those traces are viewed simultaneously with the parameter measurements. **Note:** This setting is global for all Px.

Values

Detailed	Detailed help markers
Off	No help markers
Simple	Simple help markers

HistoOn ***Bool***

Description

Sets/Queries the visibility of the histicons of the parameters that are viewed.

MeasureMode ***Enum***

Description

Sets/Queries the set of parameters to be displayed.

Values

MyMeasure	Completely customizable user defined parameter list, .
Off	
StdHorizontal	Standard horizontal parameters
StdVertical	Standard vertical parameters

SetGateToDefault ***Action***

Description

Sets the measure gate to its default state. Valid only when in either Std. Vertical or Std. Horizontal measurement modes. For MyMeasure, see the equivalent controls under Px.

StatsOn ***Bool***

Description

Sets/Queries the display of parameter statistics. **Note:** Statistics are accumulated whether or not they are displayed, i.e., you do not need to set StatsOn = "On" to collect statistics.

StdGateStart ***Double***

Range: From 0 to 10, step 0.01

Description

Sets/Queries the position of the left limit of the measure gate (in divisions). Valid only in either Std. Vertical or Std. Horizontal measurement modes. For MyMeasure, see the equivalent controls under Px.

StdGateStop ***Double***

Range: From 0 to 10, step 0.01

Description

Sets/Queries the position of the right-hand limit of the measure gate (in divisions). Valid only in either Std. Vertical or Std. Horizontal measurement modes. For MyMeasure see the equivalent controls under Px.

StdSource ***Enum***

Description

Sets/Queries the channel that is the source of ALL standard voltage or time parameters. In “My Measure” mode, each parameter has its own Source selection, and this setting is ignored.

Values

BadBits
Bits
C1
C2
C3
C4
Ctie
Eye
F1
F2
F3
F4
F5
F6
F7
F8
M1
M2
M3
M4
PRBS
TIE

MEASURE *app.Measure.Measure*

Names of the form app.Measure.Measure("Premote").xxxx and app.Measure.Measure("Px").xxxx are aliases for simpler names, which are described in the section of the manual devoted to app.Measure. Examples of alias pairs are as follows:

app.Measure.Measure("Premote").OutResult = app.Measure."Premote".OutResult

app.Measure.Measure("Px").Statistics = app.Measure.Px.Statistics

PX **app.Measure.Px**

This set of variables controls parameters P1 through P8, and the statistical results and histicons that depend on them. Valid only when the MeasureMode is "MyMeasure", otherwise they are predefined.

ArithEngine	Enum
Equation	String
GateStart	Double
GateStop	Double
MeasurementType	Enum
ParamEngine	Enum
PSource1	Enum
PSource2	Enum
Source1	Enum
Source2	Enum
View	Bool

Example

```
    ' Visual Basic Script
    Set app = CreateObject("LeCroy.XStreamDSO")

    app.Measure.MeasureMode = "MyMeasure"

    ' Set parameter P1 to math on parameters.
    App.Measure.P1.MeasurementType = "math"
```

ArithEngine *Enum*

Description

Sets/Queries the parameter arithmetic function for parameter Px. The setting is only used when Px.MeasurementType is set to "math".

Example

```
        ' Visual Basic Script
        Set app = CreateObject("LeCroy.XStreamDSO")

        ' Set the parameter arithmetic for P1 to product of two
        parameters.
        app.Measure.MeasureMode = "MyMeasure"
        app.Measure.P1.MeasurementType = "math"
```

```
app.Measure.P1.ArithEngine = "ParamProduct"
app.Measure.P1.PSource1 = "P2"
app.Measure.P1.PSource2 = "P3"

'of course to get an answer, you should also define P2 and P3
app.Measure.P2.MeasurementType = "measure"
app.Measure.P2.ParamEngine = "Ampl"
app.Measure.P2.Source1 = "C1"

app.Measure.P3.MeasurementType = "measure"
app.Measure.P3.ParamEngine = "Mean"
```

Values

MathcadParamArith

ParamConst

ParamDifference

app.Measure.P3.Source1 = "C2"ParamInvert

ParamProduct

ParamRatio

ParamScript

ParamSum

Equation ***String***

Range: Any number of characters.

Description

Reads the text equation that summarizes the setup for parameter Px.

GateStart ***Double***

Range: From 0 to 10, step 0.01

Description

Sets/Reads the position of the left edge of the measure gate for parameter Px.

GateStop ***Double***

Range: From 0 to 10, step 0.01

Description

Sets/Reads the position of the right-hand edge of the measure gate for parameter Px.

MeasurementType ***Enum***

Description

Sets/Queries the measurement type of the parameter Px.

Values

math	Measurement is a mathematical combination of one or two other Py,Pz
measure	Standard measurement mode (parametric of a trace waveform)
WebEdit	Measurement is defined using the Processing Web Editor

ParamEngine ***Enum***

Description

Sets/Queries the parameter (measurement on a trace) for Px. This setting applies only if the MeasurementType control is set to "measure".

Values

Amplitude
Area
Base
Cycles
Delay
DeltaDelay
DeltaPeriodAtLevel
DeltaTimeAtLevel
DeltaWidthAtLevel
Duration
DutyAtLevel
DutyCycle
EdgeAtLevel
ExcelParam
ExtinctionRatio
EyeAmplitude
EyeAvgPower
EyeBER
eyecrossing
EyeHeight
EyeOneLevel
EyeQ
EyeWidth
EyeZeroLevel
Fall
Fall8020
FallAtLevel
FirstPoint
Frequency
FrequencyAtLevel
FullWidthAtHalfMaximum
FullWidthAtXX
HalfPeriod
HistogramAmplitude
HistogramBase
HistogramMaximum
HistogramMean
HistogramMedian
HistogramMinimum
HistogramRms
HistogramSdev
HistogramTop
HoldTime
LastPoint
LevelAtX
MathcadParam

MATLABParameter
Maximum
MaximumPopulation
Mean
Median
Minimum
Mode
NarrowBandPhase
NarrowBandPower
npoints
Null
NumberOfModes
OvershootNegative
OvershootPositive
ParamScript
Peaks
PeakToPeak
Percentile
Period
PeriodAtLevel
Phase
PopulationAtX
Range:
Rise
Rise2080
RiseAtLevel
RootMeanSquare
Setup
Skew
StandardDeviation
TIE
TimeAtLevel
Top
TotalPopulation
Width
WidthAtLevel
XAtMaximum
XAtMinimum
XAtPeak

PSource1 ***Enum***

Description

Sets/Queries the first parameter source of parameter Px. This choice is only applicable if the MeasurementType is set to "math". The choices are limited to other parameters.

Values

P1
P2
P3
P4
P5
P6

P7

P8

PSource2 ***Enum***

Description

Sets/Queries the second parameter source of the parameter Px, when the MeasurementType is "math".

Values

P1

P2

P3

P4

P5

P6

P7

P8

Source1 ***Enum***

Description

Sets/Queries the first trace source of the parameter Px. Used only when MeasurementType = "measure". For MeasurementType = "math", refer to PSource1.

Values

C1

C2

C3

C4

F1

F2

F3

F4

F5

F6

F7

F8

M1

M2

M3

M4

Source2 ***Enum***

Description

Sets/Queries the second trace source of the parameter Px. Only applicable when the MearementType is "measure". The choices are limited to waveforms.

Values

C1

C2

C3

C4

F1

F2

F3

F4

F5

F6

F7

F8

M1

M2

M3

M4

None

View ***Bool***

Description

Sets/Queries the display of parameter Px.

Note: It is not necessary for a parameter to be displayed in order for it to be used in combinatorial math (i.e., as a source for another parameter in MeasurementType "math").

OPERATOR *app.Measure.Px.Operator*

This path specifies that the selected ParamEngine or ArithEngine control variables are "here."

RESULT app.Measure.Px.Out.Result

Properties of the type xxxx.Out.Result.yyyy are those of the last completed acquisition. They are not affected if other CVars are changed after that acquisition was completed. This distinction between "Out.Result" properties and other CVars is most important when the trigger mode is Single or Stopped. You should treat "Out.Result" properties as read-only.

HorizontalResolution	Property
HorizontalUnits	Property
Value	Property
VerticalResolution	Property
VerticalUnits	Property

HorizontalResolution *Property*

Description

Reads the readout resolution of horizontal values. This is not directly related to the sample rate.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the readout resolution of the horizontal axis of the trace
' on which the parameter P4 is based.
HRes = app.Measure.P4.Out.Result.HorizontalResolution
```

HorizontalUnits *Property*

Description

Reads the horizontal unit of the trace on which the parameter Px is based.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the horizontal unit for parameter P1.
HorUnit = app.Measure.P1.Out.Result.HorizontalUnits
```

Value *Property*

Description

Reads the value of the parameter.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the value of the parameter P3.
P3Value = app.Measure.P3.Out.Result.Value
```

VerticalResolution ***Property***

Description

Vertical resolution is the actual smallest difference that can be practically resolved. For an 8-bit ADC, it is 1/256 of the height of the vertical range (VR). But if 16 averages are set in the channel, the resolution is improved by a factor of 4, and it becomes 1/1024 of VR. For 100 sweeps it becomes 1/2560.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Read the readout resolution of the vertical axis of the trace
' on which the parameter P4 is based.
VRes = app.Measure.P4.Out.Result.VerticalResolution
```

VerticalUnits ***Property***

Description

Reads the vertical unit of the trace on which parameter Px is based.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Inspect the vertical unit for parameter P1.
VerUnit = app.Measure.P1.Out.Result.VerticalUnits
```

STATISTICS *app.Measure.Px.Statistics*

This set of variables controls the statistical summaries that are provided for all the parameters.

RESULT *app.Measure.Px.Statistics("histo").Result*

This set of variables provides data from the histicons that are provided for all the parameters.

Base	Property
BinPopulations	Property
Bins	Property
BinWidth	Property
FirstPopulatedBin	Property
HorizontalFrameStart	Property
HorizontalFrameStop	Property
HorizontalUnits	Property
LastPopulatedBin	Property
Max	Property
MaxPopulation	Property
MaxPopulationBin	Property
Mean	Property
Min	Property
OffsetAtLeftEdge	Property
PeakInfo	Property
Peaks	Property
PopulationInside	Property
PopulationOver	Property
PopulationUnder	Property
Rms	Property
Sdev	Property
Sweeps	Property
Top	Property
VerticalFrameStart	Property
VerticalFrameStop	Property
VerticalUnits	Property

Base ***Property***

Description

Reads the base value of the distribution.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.MeasureMode = "MyMeasure"
app.Measure.P1.ParamEngine = "StandardDeviation"
' Read the base value in the histicon for parameter P1.
baseValue = app.Measure.P1.Statistics("histo").Result.Base
```

BinPopulations ***Property***

Description

Reads the array of bin populations for the distribution.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.MeasureMode = "MyMeasure"
' Collect the number of bins in the histicon of parameter P1.
Bins = app.Measure.P1.Statistics("histo").Result.Bins
' Collect the array of bin populations for the histogram of
parameter P1.
dim BinPop(100)
for i = 0 to 100
BinPop(i) =
app.Measure.P1.Statistics("histo").Result.BinPopulations(i)
next
```

Bins ***Property***

Description

Reads the number of bins in the histogram.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.MeasureMode = "MyMeasure"

' Read the number of bins in the histogram for parameter P1.
numberOfBins = app.Measure.P1.Statistics("histo").Result.Bins
```

BinWidth ***Property***

Description

Reads the width of the bins of the histogram.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure

' Inspect the histicon bin width for parameter P8.
HB8Width = app.Measure.P8.Statistics("histo").BinWidth
```

FirstPopulatedBin ***Property***

Description

Reads the position of the leftmost populated bin of the histogram.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.MeasureMode = "MyMeasure"
' Read the position of the leftmost populated bin
'  of the histogram for parameter P1.
BinLeftP1 =
app.Measure.P1.Statistics("histo").Result.FirstPopulatedBin
```

HorizontalFrameStart ***Property***

Description

Queries the left edge of the frame of the histicon for parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the horizontal frame start of the histicon for
parameter P3.
LeftEdge =
app.Measure.P3.Statistics("histo").Result.HorizontalFrameStart
```

HorizontalFrameStop ***Property***

Description

Reads the right-hand edge of the frame of the histicon of parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the horizontal frame stop of the histicon for parameter
 P3.
RightEdge =
app.Measure.P3.Statistics("histo").Result.HorizontalFrameStop
```

HorizontalUnits ***Property***

Description

Reads the horizontal dimensional or physical units for the histogram. **Note:** These are nominally identical to the physical units of the parametric measurement that has been histogrammed.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.MeasureMode = "MyMeasure"
' Inspect the horizontal unit for the histicon for parameter P1.
HorUnit =
```

LastPopulatedBin ***Property***

Description

Reads the index of the rightmost populated bin of the histiogram.

Max ***Property***

Description

Reads the maximum value for the histicon of parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.MeasureMode = "MyMeasure"
' Read the maximum value for the histicon for parameter P1.
coordinateOfRightmostPopulated =
app.Measure.P1.Statistics("histo").Max
```

MaxPopulation ***Property***

Description

Reads the population of the most populated bin of the histogram.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the population of the most populated bin
' of the histicon for parameter P6.
BinMaxHP6 =
```

MaxPopulationBin ***Property***

Description

Reads the index of the most populated bin of the histogram.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
```

```
' Read the index of the bin with the maximum population
indexOfMaxPopulation =
app.Measure.P1.Statistics("histo").Result.MaxPopulationBin
```

Mean ***Property***

Description

Reads the mean of the distribution of the histogram.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.MeasureMode = "MyMeasure"
' Inspect the mean of the histicon for the parameter P1.
mean = app.Measure.P1.Statistics("histo").Mean
```

Min ***Property***

Description

Reads the minimum value of the histogram.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.MeasureMode = "MyMeasure"
' Read the maximum value for the histicon for parameter P1.
coordinateOfLeftmostPopulated =
app.Measure.P1.Statistics("histo").Result.Min
```

OffsetAtLeftEdge ***Property***

Description

Reads the horizontal coordinate of the left edge of the leftmost bin in the histogram.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Look at the left edge offset of the histicon for parameter P1.
leftEdge =
app.Measure.P1.Statistics("histo").Result.OffsetAtLeftEdge
```

PeakInfo ***Property***

Description

Reads three values about a peak of the histicon of parameter Px. The first two results are the mean and the standard deviation. The third value is unused.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Collects the information array for second peak of
' the histicon of parameter P3.
ReDim InfoArray2
InfoArray2 = app.Measure.P3.Statistics("histo").Result.PeakInfo(2)
```

Peaks ***Property***

Description

Reads the number of peaks in the distribution (according to a peak indentification process).

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the number of peaks found
numPeaks = app.Measure.P1.Statistics("histo").Result.Peaks
```

PopulationInside ***Property***

Description

Reads the total number of data points inside the frame of the histicon of parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the population inside the histicon for parameter P3.
PopInP3 = app.Measure.P3.Statistics("histo").Result.PopulationInside
```

PopulationOver ***Property***

Description

Reads the number of data points outside the histicon to the right of the last bin in the histogram

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the population to the right of the frame
' of the histicon for parameter P1.
populationInOverflow =
app.Measure.P1.Statistics("histo").Result.PopulationOver
```

PopulationUnder ***Property***

Description

Reads the number of data points outside the histogram to the left of the leftmost bin.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.MeasureMode = "MyMeasure"
' Read the population that are NOT binned because the values were
 to the left of the leftmost bin
numUnderflows =
app.Measure.P1.Statistics("histo").Result.PopulationUnder
```

Rms ***Property***

Description

Reads the root mean square of the distribution.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.MeasureMode = "MyMeasure"
' Read the rms value of the histicon for parameter P1.
rms = app.Measure.P1.Statistics("histo").Rms
```

Sdev ***Property***

Description

Reads the standard deviation of the distribution.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the standard deviation of the histogrammed distribution
standardDeviation = app.Measure.P1.Statistics("histo").Sdev
```

Sweeps ***Property***

Description

Reads the number of sweeps contributing to the histogram.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the number of sweeps for the histicon for parameter P1.
```

Top ***Property***

Description

Reads the top value of the histicon for the parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the top value in the histicon for parameter P6.
TopHP6 = app.Measure.P6.Statistics("histo").Top
```

VerticalFrameStart ***Property***

Description

Reads the value at the bottom of the frame (display graticule)of the histogram.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the vertical frame start of the histicon for parameter P1.
BottomEdge = app.Measure.P1.Statistics("histo").VerticalFrameStart
```

VerticalFrameStop ***Property***

Description

Reads the value at the top of the frame of the histogram.

VerticalUnits ***Property***

Description

Reads the vertical units for the histogram. These are almost always "Events."

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the vertical units of the histicon of parameter P4.
UVert = app.Measure.P4.Statistics("histo").Result.VerticalUnits
```

RESULT *app.Measure.Px.Statistics("last").Result*

This set of variables controls the readout of data from the last event in the statistics that are provided for all the parameters.

Value	Property
ValueArray	Property
VerticalResolution	Property
VerticalUnits	Property

Value *Property*

Description

Reads the last recorded value of parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Inspect the last recorded value for the parameter P3.
LastValue = app.Measure.P3.Statistics("last").Result.Value
```

ValueArray *Property*

Description

Some measurements return multiple values for a single waveform input.This array contains all of the values.

VerticalResolution *Property*

Description

Reads the vertical resolution of the result.

VerticalUnits *Property*

Description

Reads the vertical unit of measurement for parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Inspect the vertical unit of measurement for the parameter P1.
VerUnit = app.Measure.P1.Statistics("last").Result.VerticalUnits
```

RESULT ***app.Measure.Px.Statistics("max").Result***

This set of variables controls the readout of data about the maximum value in the statistics that are provided for all the parameters.

HorizontalResolution	Property
HorizontalUnits	Property
Value	Property
VerticalResolution	Property
VerticalUnits	Property

HorizontalResolution ***Property***

Description

Reads the horizontal resolution for the parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the horizontal resolution for the parameter P1.
HorRes = app.Measure.P1.Statistics("max").Result.HorizontalResolution
```

HorizontalUnits ***Property***

Description

Reads the horizontal units of measurement for parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the horizontal unit for the parameter P1.
HorUnit = app.Measure.P1.Statistics("max").Result.HorizontalUnits
```

Value ***Property***

Description

Reads the maximum recorded value of parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the highest recorded value for the parameter P5.
MaxValue = app.Measure.P5.Statistics("max").Result.Value
```

VerticalResolution *Property*

Description

Reads the vertical resolution for the parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the vertical resolution for the parameter P1.
VerRes = app.Measure.P1.Statistics("max").Result.VerticalResolution
```

VerticalUnits *Property*

Description

Reads the vertical unit of measurement for parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the vertical unit for the parameter P5.
VerUnit = app.Measure.P5.Statistics("max").Result.VerticalUnits
```

RESULT app.Measure.Px.Statistics("mean").Result

This set of variables controls the readout of data about the mean value in the statistics that are provided for all the parameters.

Result

HorizontalResolution	Property
HorizontalUnits	Property
Value	Property
VerticalResolution	Property
VerticalUnits	Property

HorizontalResolution ***Property***

Description

Reads the horizontal resolution for parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the horizontal resolution for the parameter P1.
HorRes =
app.Measure.P1.Statistics("mean").Result.HorizontalResolution
```

HorizontalUnits ***Property***

Description

Reads the horizontal units of measurement for parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the horizontal unit for the parameter P1.
HorUnit = app.Measure.P1.Statistics("mean").Result.HorizontalUnits
```

Value ***Property***

Description

Reads the mean value of parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the mean recorded value for the parameter P3.
MeanValue = app.Measure.P3.Statistics("mean").Result.Value
```

VerticalResolution ***Property***

Description

Reads the vertical resolution for parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the vertical resolution for the parameter P1.
VerRes = app.Measure.P1.Statistics("mean").Result.VerticalResolution
```

VerticalUnits ***Property***

Description

Reads the vertical unit of measurement for the parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the vertical uni for the parameter P1.
VerUnit = app.Measure.P1.Statistics("mean").Result.VerticalUnits
```

RESULT ***app.Measure.Px.Statistics("min").Result***

This set of variables controls the readout of data about the minimum value in the statistics that are provided for all the parameters.

HorizontalResolution	Property
HorizontalUnits	Property
Value	Property
VerticalResolution	Property
VerticalUnits	Property

HorizontalResolution ***Property***

Description

Reads the horizontal resolution for parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the horizontal resolution for the parameter P1.
HorRes = app.Measure.P1.Statistics("min").Result.HorizontalResolution
```

HorizontalUnits ***Property***

Description

Reads the horizontal units of measurement for parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the horizontal unit for the parameter P1.
HorUnit = app.Measure.P1.Statistics("min").Result.HorizontalUnits
```

Value ***Property***

Description

Reads the lowest recorded value of parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the minimum recorded value for the parameter P3.
MinValue = app.Measure.P3.Statistics("min").Result.Value
```

VerticalResolution ***Property***

Description

Reads the vertical resolution for parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the vertical resolution for the parameter P1.
VerRes = app.Measure.P1.Statistics("min").Result.VerticalResolution
```

VerticalUnits ***Property***

Description

Reads the vertical unit of measurement for parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the vertical unit for the parameter P1.
VerUnit = app.Measure.P1.Statistics("min").Result.VerticalUnits
```

RESULT *app.Measure.Px.Statistics("num").Result*

This set of variables controls the readout of data about the number of data values in the statistics that are provided for all the parameters.

HorizontalResolution	Property
HorizontalUnits	Property
Value	Property
VerticalResolution	Property
VerticalUnits	Property

HorizontalResolution *Property*

Description

Reads the horizontal resolution for parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the horizontal resolution for the parameter P1.
HorRes = app.Measure.P1.Statistics("num").Result.HorizontalResolution
```

HorizontalUnits *Property*

Description

Reads the horizontal units of measurement for parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the horizontal unit for the parameter P1.
HorUnit = app.Measure.P1.Statistics("num").Result.HorizontalUnits
```

Value *Property*

Description

Reads the number of recorded values of parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the number of values of the parameter P3.
NumValues = app.Measure.P3.Statistics("num").Result.Value
```

VerticalResolution *Property*

Description

Reads the vertical resolution for parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the vertical resolution for the parameter P1.
VerRes = app.Measure.P1.Statistics("num").Result.VerticalResolution
```

VerticalUnits *Property*

Description

Reads the vertical unit of measurement parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the vertical unit for the parameter P1.
VerUnit = app.Measure.P1.Statistics("num").Result.VerticalUnits
```

RESULT app.Measure.Px.Statistics("sdev").Result

This set of variables controls the readout of data about the standard deviation of the values in the statistics that are provided for all the parameters.

Result

HorizontalResolution	Property
HorizontalUnits	Property
Value	Property
VerticalResolution	Property
VerticalUnits	Property

HorizontalResolution ***Property***

Description

Reads the horizontal resolution for the parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the horizontal resolution for the parameter P1.
HorRes =
app.Measure.P1.Statistics("sdev").Result.HorizontalResolution
```

HorizontalUnits ***Property***

Description

Reads the horizontal units of measure for parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the horizontal unit for the parameter P1.
HorUnit = app.Measure.P1.Statistics("sdev").Result.HorizontalUnits
```

Value ***Property***

Description

Reads the standard deviation of the recorded values of parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the standard deviation of therecorded values
' of the parameter P5.
```

```
SDevValue = app.Measure.P5.Statistics("sdev").Result.Value
```

VerticalResolution ***Property***

Description

Reads the vertical resolution for parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the vertical resolution for the parameter P1.
VerRes = app.Measure.P1.Statistics("sdev").Result.VerticalResolution
```

VerticalUnits ***Property***

Description

Reads the vertical units for parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the vertical unit for the parameter P1.
VerUnit = app.Measure.P1.Statistics("sdev").Result.VerticalUnits
```

MEMORY *app.Memory*

Variables of the form app.Memory.xxxx control the memories (M1 to M4). Names of the form app.Memory.Memories("Mx").xxxx are aliases for simpler names, which are described in this section of the manual. Examples of alias pairs are as follows:

app.Memory.Memories("Mx").Out.Result = app.Memory.Mx.Out.Result

app.Memory.Memories("Mx").Zoom = app.Memory.Mx.Zoom

See app.Acquisition.Channels("Cx") for a programming example.

ClearAllMem *Action*

Description

Clears the contents of all trace memories.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Clear the contents of all trace memories.
app.Memory.ClearAllMem
```

MEMORIES *app.Memory.Memories*

Names of the form app.Memory.Memories("Mx").xxxx are aliases for simpler names, which are described in the section of the manual devoted to app.Memory. Examples of alias pairs are as follows:

app.Memory.Memories("Mx").Out.Result = app.Memory.Mx.Out.Result

app.Memory.Memories("Mx").Zoom = app.Memory.Mx.Zoom

See under **Acquisition.Channels** for a programming example.

MX *app.Memory.Mx*

This set of variables controls the memories (M1 to M4).

ClearMem	Action
Copy	Action
IncludedInMZgroup	Bool
LabelsPosition	String
LabelsText	String
Source1	Enum
SourceTimeText	String
UseDotJoin	Bool
UseGrid	String
UserText	String
View	Bool
ViewLabels	Bool

ClearMem *Action*

Description

Initiates a clear memory operation for memory Mx.

Copy *Action*

IncludedInMZgroup *Bool*

Description

Sets/Queries the inclusion of trace MZ in the group to be multi-zoomed.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


‘ Include M2 in the multi-zoom group.
app.Memory.M2.IncludedInMZgroup = True
```

LabelsPosition *String*

Range: Any number of characters

LabelsText *String*

Range: Any number of characters.

Source1 *Enum*

Values

BadBits
Bits
C1
C2
C3
C4

Eye
F1
F2
F3
F4
F5
F6
F7
F8
M2
M3
M4
PRBS

SourceTimeText ***String***

Range: Any number of characters.

UseDotJoin ***Bool***

Description

Sets/Queries the style of memory trace Mx.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set memory trace M2 to dot joining off.
app.Memory.M2.UseDotJoin = False
```

UseGrid ***String***

Range: Any number of characters.

Description

Sets/Queries the grid used for memory trace Mx.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set memory trace M2 to use grid YT3.
app.Memory.M2.UseGrid = "YT3"
```

UserText ***String***

Range: Any number of characters

View ***Bool***

Description

Sets/Queries whether memory trace Mx is visible.

ViewLabels ***Bool***

Description

Sets/Queries whether labels are visible for trace Mx.

RESULT ***app.Memory.Mx.Out.Result***

See **app.Acquisition.Cx.Out.Result** for a definition of methods and properties used to access the Mx waveform result.

ZOOM *app.Memory.Mx.Zoom*

This set of variables controls zooming of the memory traces (M1 to M4).

HorPos	Double
HorZoom	Double
ResetZoom	Action
VariableHorZoom	Bool
VariableVerZoom	Bool
VerPos	Double
VerZoom	Double

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Save C1 into M1
app.SaveRecall.Waveform.SaveTo = "Memory"
app.SaveRecall.Waveform.SaveSource = "C1"
app.SaveRecall.Waveform.SaveDestination = "M1"
app.SaveRecall.Waveform.DoSave

' Zoom M1 by x10 Horizontally, and x2 Vertically
app.Memory.M1.Zoom.ResetZoom
app.Memory.M1.Zoom.HorZoom = 10.0
app.Memory.M1.Zoom.HorPos = 0.0
app.Memory.M1.Zoom.VerZoom = 2.0
app.Memory.M1.Zoom.VerPos = 0.0
```

HorPos *Double*

Range: From –0.5 to 0.5, step (8 digits)

Description

Sets/Queries the horizontal position of the center of the grid on the zoomed trace Mx. The unit of measure is the screen width, that is, 0.3 means a shift of three of the ten divisions. A positive value moves the trace to the left.

HorZoom *Double*

Range: From 0.1 to 100000, step (8 digits)

Description

Sets/Queries the horizontal magnification of trace Mx. The magnification will be in a 1-2-5-10 sequence unless variable horizontal magnification has been set.

ResetZoom ***Action***

Description

Resets the zoom for trace Mx.

VariableHorZo om ***Bool***

Description

Sets/Queries the ability to zoom horizontally by a continuously variable factor as opposed to a factor that follows a 1-2-5 sequence.

VariableVerZoom ***Bool***

Description

Sets/Queries the ability to zoom vertically by a continuously variable factor as opposed to a factor that follows a 1-2-5 sequence.

VerPos ***Double***

Range: From –1.5 to 1.5, step (8 digits)

Description

Sets/Queries the vertical position of the center of the grid on zoomed trace Mx. The unit of measure is the screen height, that is, 0.375 means a shift of three of the eight divisions. A positive value moves the trace downwards.

VerZoom ***Double***

Range: From 0.1 to 256, step (8 digits)

Description

Sets/Queries the vertical magnification of trace Mx. The magnification will be in a 1-2-5-10 sequence unless variable vertical magnification has been set.

PASSFAIL

app.PassFail

Names of the form app.PassFail("Qremote").xxxx and app.PassFail("Qx").xxxx are aliases for simpler names, which are described in this section of the manual. Examples of alias pairs are as follows:

app.PassFail.PassFail("Qremote").Operator = app.PassFail.Qremote.Operator

app.PassFail.PassFail("Qx").Out.Result = app.PassFail.Qx.Out.Result

ActionOn	Enum
Alarm	Bool
EnableActions	Bool
ExecuteScript	Bool
PredefinedConditions	Enum
PrintScreen	Bool
Pulse	Bool
Save	Bool
Stop	Bool
StopAfter	Integer
StopTesting	Bool
Testing	Bool

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Setup Parameter P1 to be the amplitude of C1
app.Measure.MeasureMode = "MyMeasure"
app.Measure.P1.ParamEngine = "Ampl"
app.Measure.P1.Source1 = "C1"
app.Measure.P1.View = True

' Setup Pass/Fail condition Q1 to be a parameter comparison of P1

' condition is false when Ampl(C1) < 100mV
app.PassFail.Q1.ConditionEngine = "ParameterCompare"
app.PassFail.Q1.Present = True
app.PassFail.Q1.Source1 = "P1"
app.PassFail.Q1.Operator.Limit = 0.1
app.PassFail.Q1.Operator.Condition = "Less"
app.PassFail.Q1.View = True

' Enable the Alarm action, enable actions, and start testing
app.PassFail.EnableActions = True
app.PassFail.ActionOn = "Fail"
app.PassFail.Alarm = True
app.PassFail.PredefinedConditions = "AnyTrue"
```

ActionOn ***Enum***

Description

Sets/Queries whether a Pass condition or a Fail condition will initiate the pre-selected actions.

See **app.Acquisition.Channels("Cx")** for a programming example.

Values

Fail
Pass

Alarm ***Bool***

Description

Sets/Queries whether Alarm is included in the PassFail actions.

EnableActions ***Bool***

Description

Sets/Queries whether the selected actions will be executed if the selected PassFail condition is met.

ExecuteScript ***Bool***

Description

Sets/Queries whether ExecuteScript is included in the PassFail actions.

PredefinedConditions ***Enum***

Description

Sets/Queries the logical criteria that must be met in a pass-fail test. For example, the condition "AnyTrue" means that the pass-fail criterion is met if at least one of the test conditions results in a True result.

Values

AllFalse
AllQ1ToQ4OrAllQ5ToQ8
AllTrue
AnyFalse
AnyQ1ToQ4AndAnyQ5ToQ8
AnyTrue

PrintScreen ***Bool***

Description

Sets/Queries whether Print Screen is included in the PassFail actions.

Pulse ***Bool***

Description

Sets/Queries whether Pulse is included in the PassFail actions. This action emits a pulse from the Aux output socket.

Save ***Bool***

Description

Sets/Queries whether Save is included in the PassFail actions.

Stop ***Bool***

Description

Sets/Queries whether Stop is included in the PassFail actions.

StopAfter ***Integer***

Range: From 1 to 1000000000, step 1

Description

Sets/Queries the maximum number of sweeps that will be acquired before testing is halted.

StopTesting ***Bool***

Description

If Enabled, testing will stop after a number of sweeps defined by the StopAfter control.

Testing ***Bool***

Description

Sets/Queries whether PassFail testing is on.

QX app.PassFail.Qx

This set of variables controls the tests Q1 through Q8 in the pass fail system.

ConditionEngine	Enum
Equation	String
Source1	Enum
Source2	Enum
View	Bool

ConditionEngine *Enum*

Description

Sets/Queries whether pass-fail test Qx uses mask testing or parameter comparison.

Values

MaskTestCondition
ParameterCompare

Equation *String*

Range: Any number of characters

Description

Inspects the equation for pass-fail test Qx. A typical equation would be "All P3 < 0.7071".

Source1 *Enum*

Description

Sets/Queries the first (parameter) source of pass-fail test Qx.

Values

P1
P2
P3
P4
P5
P6
P7
P8

Source2 *Enum*

Description

Sets/Queries the second (waveform) source of pass-fail test Qx.

Values

C1
C2
C3
C4
F1
F2

F3
F4
F5
F6
F7
F8
M1
M2
M3
M4

View ***Bool***

Description

Sets/Queries whether pass-fail test Qx is visible.

RESULT — *app.PassFail.Qx.Out.Result*

Properties of the type xxxx.Out.Result.yyyy are those of the last completed acquisition. They are not affected if other CVars are changed after that acquisition was completed. This distinction between "Out.Result" properties and other CVars is most important when the trigger mode is Single or Stopped. You should treat "Out.Result" properties as read-only.

Result

HorizontalResolution	Property
HorizontalUnits	Property
Status	Property
StatusDescription	Property
Value	Property
ValueArray	Property

HorizontalResolution ***Property***

Description

Reads the readout resolution of horizontal values.

HorizontalUnits ***Property***

Description

Reads the horizontal unit of the horizontal axis.

Status ***Property***

StatusDescription ***Property***

Value ***Property***

Description

Reads the result of test Qx in the pass-fail system.

ValueArray ***Property***

PREFERENCES *app.Preferences*

This set of variables controls user preferences for the instrument setup and operation.

Preferences

AudibleFeedback	Bool
OffsetControl	Enum
Performance	Enum

AudibleFeedback *Bool*

Description

Sets/Queries whether audible feedback is enabled, to sound when a control is touched.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Turn on the audible feedback function.
app.Preferences.AudibleFeedback = True
```

OffsetControl *Enum*

Description

Sets/Queries whether the Vertical Offset constant is in Volts or Divisions when the vertical scale control is changed.

Values

Div
Volts

Performance *Enum*

Description

Sets/Queries the variable value that controls the Optimization of the instrument in terms of analysis or display. When set to “Analysis” the display is given low priority and will update less frequently. Use this mode where analysis performance is much more important than display rate.

Values

Analysis
AnalysisMid
Default
Display
DisplayMid

EMAIL

app.Preferences.EMail

This set of variables controls user preferences for the instrument e-mail system. E-mail can be sent when the hardcopy button is pressed, with the hardcopy system appropriately configured. Two standards are supported, SMTP (Simple Mail Transport Protocol), and MAPI (Messaging Application Programming).

DefaultRecipient	String
Mode	Enum
OriginatorAddress	String
SendTestMail	Action
SMTPServer	String

Example

```
    ' Visual Basic Script
    Set app = CreateObject("LeCroy.XStreamDSO")

    ' Configure the originator and recipient addresses, replace these
     with
    ' appropriate values for your corporate network.
    app.Preferences.Email.DefaultRecipient =
    "recipientAddress@domain.com"
    app.Preferences.Email.Mode = "SMTP"
    app.Preferences.Email.OriginatorAddress = "myScope@myDomain.com"
    app.Preferences.Email.SMTPServer =
    "companySMTPServer.companydomain.com"

    ' Send a simple test mail
    app.Preferences.Email.SendTestMail
```

DefaultRecipient — *String*

Range: Any number of characters

Description

Sets/Queries the default recipient of e-mail transmissions.

Mode — *Enum*

Description

Sets/Queries the transmission mode for e-mail.

Example

```
    ' Visual Basic Script
        Set app = CreateObject("LeCroy.XStreamDSO")

        '  Set e-Mail mode to MAPI.
        app.Preferences.EMail.Mode = "MAPI"
```

Values

MAPI	Messaging Application Programming Interface (Uses Outlook Express by default)
SMTP	Simple Mail Transfer Protocol, requires an SMTP server

OriginatorAddress ***String***

Range: Any number of characters

Description

Sets/Queries the originator address for e-mail. This can be any address, and will be used when the recipient replies to an e-mail. The instrument doesn't necessarily have to have its own E-Mail account in order to use this.

SendTestMail ***Action***

Description

Sends a message by e-mail to test the system.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


'  Send an e-Mail message to test the system.
app.Preferences.EMail.SendTestMail
```

SMTPServer ***String***

Range: Any number of characters.

Description

Sets/Queries the name of the SMTP Server for e-mail. Ask your system administrator if you are unsure of what value to set this to.

SAVERECALL

app.SaveRecall

Controls for the Save/Recall subsystem. Includes nodes for saving and recalling Waveforms and Panels (Setups).

SETUP *app.SaveRecall.Setup*

These are controls for Saving and Recalling instrument setups.

DoRecallDefaultNvlPanel	Action
DoRecallDefaultPanel	Action
DoRecallPanel	Action
DoSavePanel	Action
InternalName1	String
InternalName2	String
InternalName3	String
InternalName4	String
InternalName5	String
InternalName6	String
PanelFilename	FileName
RecallInternal1	Action
RecallInternal2	Action
RecallInternal3	Action
RecallInternal4	Action
RecallInternal5	Action
RecallInternal6	Action
SaveInternal1	Action
SaveInternal2	Action
SaveInternal3	Action
SaveInternal4	Action
SaveInternal5	Action
SaveInternal6	Action

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Reset to default setup
app.SaveRecall.Setup.DoRecallDefaultPanel


' Store the current setup into the first of the 6 setup stores.
app.SaveRecall.Setup.InternalName1 = "My Setup1"
app.SaveRecall.Setup.SaveInternal1
```

DoRecallDefaultNvlPanel *Action*

Description

Recalls the factory set NVL (preference) panel settings. These are controls that are not affected when the default panel is recalled, and includes items such as the color preferences, remote control preferences, etc. **Caution:** Use with care, especially when invoking by means of the VBS? remote command via GPIB or TCP/IP, which could result in the controller being disconnected when the default port is selected.

Example

```
' Visual Basic Script
     Set app = CreateObject("LeCroy.XStreamDSO")

     ' Recall the factory default nvl panel settings.
     app.SaveRecall.Setup.DoRecallDefaultNvlPanel
```

DoRecallDefaultPanel ***Action***

Description

Recalls the factory set panel settings.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Recall the factory default panel settings.
app.SaveRecall.Setup.DoRecallDefaultPanel
```

DoRecallPanel ***Action***

Description

Recall the panel file named in the PanelFilename control.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Create the filename for the next panel setup to be recalled.
app.SaveRecall.Setup.PanelFilename = "Setup89"

' Recall the panel setup from the named file.
app.SaveRecall.Setup.DoRecallPanel
```

DoSavePanel ***Action***

Description

Saves the current panel settings to the previously specified file. If the filename already exists, the file will be overwritten without a prompt.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Create the filename for the next panel setup save.
app.SaveRecall.Setup.PanelFilename = "TestSave"
```

```
' Save the panel setup to the named file.
app.SaveRecall.Setup.DoSavePanel
```

InternalName1 ***String***

Range: Any number of characters

Description

Sets/Queries the name of internal panel setup memory 1.

InternalName2 ***String***

Range: Any number of characters

Description

Sets/Queries the name of internal panel setup memory 2.

InternalName3 ***String***

Range: Any number of characters

Description

Sets/Queries the name of internal panel setup memory 3.

InternalName4 ***String***

Range: Any number of characters

Description

Sets/Queries the name of internal panel setup memory 4.

InternalName5 ***String***

Range: Any number of characters

Description

Sets/Queries the name of internal panel setup memory 5.

InternalName6 ***String***

Range: Any number of characters

Description

Sets/Queries the name of internal panel setup memory 6.

PanelFilename ***FileName***

Range: Any number of characters

Description

Sets/Queries the current filename for saving a panel setup. An ".lss" extension is automatically appended if not supplied.

RecallInternal1 ***Action***

Description

Recalls the settings that are stored in internal panel memory 1.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Recall the settings from internal panel memory 1.
app.SaveRecall.Setup.RecallInternal1
```

RecallInternal2 ***Action***

Description

Recalls the settings that are stored in internal panel memory 2.

RecallInternal3 ***Action***

Description

Recalls the settings that are stored in internal panel memory 3.

RecallInternal4 ***Action***

Description

Recalls the settings that are stored in internal panel memory 4.

RecallInternal5 ***Action***

Description

Recalls the settings that are stored in internal panel memory 5.

RecallInternal6 ***Action***

Description

Recalls the settings that are stored in internal panel memory 6.

SaveInternal1 ***Action***

Description

Saves the current instrument settings into internal panel memory 1.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Save the current settings into internal panel memory 1.
app.SaveRecall.Setup.SaveInternal1
```

SaveInternal2 ***Action***

Description

Saves the current instrument settings into internal panel memory 2.

SaveInternal3 ***Action***

Description

Saves the current instrument settings into internal panel memory 3.

SaveInternal4 ***Action***

Description

Saves the current instrument settings into internal panel memory 4.

SaveInternal5 ***Action***

Description

Saves the current instrument settings into internal panel memory 5.

SaveInternal6 ***Action***

Description

Saves the current instrument settings into internal panel memory 6.

UTILITIES

app.SaveRecall.Utilities

These controls are used to manage files and folders, including the ability to create and delete folders, and to delete files.

Utilities

CreateDir	Action
DeleteAll	Action
DeleteAllWithPrompt	Action
DeleteFile	Action

CreateDir *Action*

Description

Creates the directory specified in the Directory control.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Create a named directory
app.SaveRecall.Utilities.Directory = "C:\MyDir"
app.SaveRecall.Utilities.CreateDir
```

DeleteAll *Action*

Description

Deletes all files in the directory specified by the Directory control without a cautionary prompt. Use with care! Files cannot be recovered if deleted accidentally.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Delete all files without showing a yes/no prompt.
app.SaveRecall.Utilities.Directory = "C:\MyDir"
app.SaveRecall.Utilities.DeleteAll
```

DeleteAllWithPrompt *Action*

Description

Deletes all files, but only after showing a prompt that allows the action to be abandoned. Until this prompt is acknowledged by the user, automation control is blocked.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
```

```
' Delete all files after showing a yes/no prompt.
app.SaveRecall.Utilities.Directory = "C:\MyDir"
app.SaveRecall.Utilities.DeleteAllWithPrompt
```

DeleteFile ***Action***

Description

Deletes the file named by the Filename control.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Delete the named file
app.SaveRecall.Utilities.Filename = "C:\MyDir\MyFile.txt"
app.SaveRecall.Utilities.DeleteFile
```

WAVEFORM

app.SaveRecall.Waveform

Contains controls used for saving and recalling waveforms.

Delimiter	Enum
DoRecall	Action
DoSave	Action
RecallDestination	Enum
RecallFrom	Enum
RecallSource	Enum
SaveDestination	Enum
SaveSource	Enum
SaveTo	Enum
SubFormat	Enum
TraceTitle	String
WaveFormat	Enum
WaveformDir	FileName

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Save C1 into M1
app.SaveRecall.Waveform.SaveTo = "Memory"
app.SaveRecall.Waveform.SaveSource = "C1"
app.SaveRecall.Waveform.SaveDestination = "M1"
app.SaveRecall.Waveform.DoSave

' Save C2 into C:\MyDir in binary format
app.SaveRecall.Waveform.SaveTo = "File"
app.SaveRecall.Waveform.SaveSource = "C2"
app.SaveRecall.Waveform.WaveformDir = "C:\MyDir"
app.SaveRecall.Waveform.WaveFormat = "Binary"
app.SaveRecall.Waveform.DoSave

' Save C3 into C:\MyDir in text format
app.SaveRecall.Waveform.SaveTo = "File"
app.SaveRecall.Waveform.SaveSource = "C3"
app.SaveRecall.Waveform.WaveformDir = "C:\MyDir"
app.SaveRecall.Waveform.WaveFormat = "ASCII"
app.SaveRecall.Waveform.DoSave
```

Delimiter *Enum*

Description

Sets/Queries the delimiter to use when saving data in ASCII text mode.

Values

Comma
Semicolon
Space
Tab

DoRecall *Action*

Description

Recall waveform data into a trace memory. Source can be either an internal memory (M1 to M4), or a file on a mass-storage device, depending on the state of the “RecallFrom” control.

DoSave *Action*

Description

Save waveform data into an internal memory, or file on a mass-storage device, using the pre-specified source and destination.

RecallDestination *Enum*

Description

Sets/Queries the destination for waveform recall. When the DoRecall action is executed the waveform will be transferred into this destination trace.

Values

M1
M2
M3
M4

RecallFrom *Enum*

Description

Sets/Queries the type of source for waveform recall.

Values

File	Recall from file on a mass-storage device
Memory	Recall from one of the internal memories (M1..M4)

RecallSource *Enum*

Description

Sets/Queries the source for recalling waveform data. Used only when recalling from an internal memory, with RecallSource = "Memory".

Values

M1
M2

M3
M4

SaveDestination ***Enum***

Description

Sets/Queries the destination to which waveform data will be saved. Used only when SaveTo = "Memory".

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

'  Setup to store trace C2 into M4 and perform the save operation

app.SaveRecall.Waveform.SaveTo = "Memory"
app.SaveRecall.Waveform.SaveSource = "C2"
app.SaveRecall.Waveform.SaveDestination = "M4"
```

Values

M1
M2
M3
M4

SaveSource ***Enum***

Description

Sets/Queries the source from which waveform data will be saved.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

'  Set the destination to memory for waveform save.
app.SaveRecall.Waveform.SaveTo = "Memory"
'  Set the source to C2, for saving a waveform.
app.SaveRecall.Waveform.SaveSource = "C2"
'  Set the destination to memory M4, for saving a waveform.
app.SaveRecall.Waveform.SaveDestination = "M4"
'  Save waveform data as previously specified.
app.SaveRecall.Waveform.DoSave
```

Values

AllDisplayed
BadBits
Bits
C1

C2
C3
C4
Eye
F1
F2
F3
F4
F5
F6
F7
F8
M1
M2
M3
M4
PRBS

SaveTo ***Enum***

Description

Sets/Queries the type of destination for waveform save.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


'  Set the destination to Memory for waveform save.
app.SaveRecall.Waveform.SaveTo = "Memory"
```

Values

File	Save into file on a mass-storage device
Memory	Save into an internal memory (M1..M4)

SubFormat ***Enum***

Description

Sets/Queries the sub-format of the waveform data when saving in ASCII mode. Defines whether data is saved as Amplitude values only, Time and Amplitude pairs, or a standard format that includes the header.

Values

AmplitudeOnly
Header
TimeAmplitude

TraceTitle ***String***

Range: Any number of characters.

Description

Sets/Queries the title (prefix) to use when naming saved traces. This prefix will have the family (sequence) number appended to it when forming the filename.

WaveFormat ***Enum***

Description

Sets/Queries the format to use when saving waveform data into a file. “Binary” is the most efficient, storing one or two bytes per data sample, depending upon the number of significant bits. In ASCII mode, the Subformat and Delimiter controls define the data format.

Values

ASCII	Plain ASCII files with choice of various delimiters
Binary	LeCroy's standard binary waveform format
Excel	
MathCad	
MATLAB	

WaveformDir ***FileName***

Range: Any number of characters.

Description

Sets/Queries the directory for storing waveform files.

SDA *app.SDA*

These controls are used for SDA (Serial Data Analyzer) models only.

BERParamsOn	Bool
CalcType	Enum
ClockSource	Enum
DarkCalLevel	Double
DataSource	Enum
ErrorMapOn	Bool
EyeMode	Enum
FindFrequency	Action
FindScale	Action
HiPassFreq	Double
LowPassFreq	Double
MaskFailTraceOn	Bool
MaskFileName	String
NumPatternBits	Integer
PLLOn	Bool
RefReceiver	Bool
SDAMode	Enum
ShowFailLocation	Bool
SignalFrequency	Double
SignalMode	Enum
SignalType	Enum
StartN	Integer
StepN	Integer
StopN	Integer
Units	Enum
UserSignal	Enum
VerAutoFit	Bool

BERParamsOn *Bool*

Description

Sets/Queries whether the bit error rate parameters are shown.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the BER parameters on.
app.SDA.BERParamsOn = True
```

CalcType *Enum*

Description

Sets/Queries the type of SDA calculation.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Sets the calculation type as peak to peak.
app.SDA.CalcType = "PeaktoPeak
```

Values

Average
PeaktoPeak

ClockSource ***Enum***

Description

Sets/Queries the clock source trace for SDA.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the instrument into SDA mode.
app.SDA.SDAMode = "MaskTest"
' Set the clock source as trace C2.
app.SDA.ClockSource = "C2"
```

Values

C1
C2
C3
C4
F1
F2
F3
F4
F5
F6
F7
F8
M1
M2
M3
M4
PRBS

DarkCalLevel ***Double***

Range: From –0.05 to 0.05, step 1e-006

Description

Sets/Queries the dark calibration level.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the dark calibration level to 0.01.
app.SDA.DarkCalLevel = 0.01
' Visual Basic Script
```

Description

Sets/Queries the data source trace for SDA.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the instrument into SDA mode.
app.SDA.SDAMode = "MaskTest"
' Set the data source as trace C3.
app.SDA.DataSource = "C3"
```

Values

C1
C2
C3
C4
F1
F2
F3
F4
F5
F6
F7
F8
M1
M2
M3
M4
PRBS

ErrorMapOn *Bool*

Description

Sets/Queries whether the error map is on.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
```

```
' Set the error map on.
app.SDA.ErrorMapOn = True
```

EyeMode ***Enum***

Description

Sets/Queries the type of eye diagram.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the eye mode as traditional.
app.SDA.EyeMode = "Traditional"
```

Values

Sequential
Traditional

FindFrequency ***Action***

Description

Instruct the instrument to find the frequency of the signal.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Find the frequency.
app.SDA.FindFrequency
```

FindScale ***Action***

Description

Find the scale for SDA Jitter NCycle vs. N Plot.

HiPassFreq ***Double***

Range: From 10 to 1e+010, step 1

Description

Set the SDA jitter filter high-pass frequency.

LowPassFreq ***Double***

Range: From 10 to 1e+010, step 1

Description

Set the SDA jitter filter low-pass frequency.

MaskFailTraceOn ***Bool***

Description

Sets/Queries whether the failed section of the trace should be shown.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set mask fail trace on.
app.SDA.MaskFailTraceOn = True
```

MaskFileName ***String***

Range: Any number of characters.

Description

Sets/Queries the current mask filename.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the instrument into SDA mode.
app.SDA.SDAMode = "MaskTest"
' Set the mask filename.
app.SDA.MaskFileName = "D:\XStreamMasks\FIB4181"
```

NumPatternBits ***Integer***

Range: From 1 to 2147483647, step 1

Description

Number of bits in the data pattern. Used for the periodic jitter parameter.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the number of bits as 32.
app.SDA.NumPatternBits = 32
```

PLLOn ***Bool***

Description

Sets/Queries the use of a PLL to track the clock frequency.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the PLL off.
app.SDA.PLLOn = False
```

RefReceiver *Bool*

Description

Sets/Queries the status of a reference receiver. With an optical-to-electrical converter connected to the instrument, this variable enables or disables the use of information from the receiver.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set reference receiver as on.
app.SDA.RefReceiver = True
```

SDAMode *Enum*

Description

Sets/Queries the mode of operation of the instrument. Values: Scope, MaskTest, Jitter, BER, Clock, Summary for SDA+ASDA. Values: Scope, MaskTe st for SDM

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the instrument into Mask Test mode.
app.SDA.SDAMode = "MaskTest"
```

Values (SDA, ASDA)

Scope
MaskTest
Jitter
BER
Clock
Summary

Values (SDM)

Scope
MaskTest

ShowFailLocation *Bool*

Description

Sets/Queries whether mask failures are to be shown by markers.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Show locations of failures.
app.SDA.ShowFailLocation = True
```

SignalFrequency ***Double***

Range: From 5e+007 to 4e+010, step 1

Description

Sets/Queries the signal frequencies.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the signal frequency to 15 MHz.
app.SDA.SignalFrequency = 15e6
```

SignalMode ***Enum***

Description

Values for this control depend upon the SDA standard set by the “SignalType” control.

Values

Receiver
TransAbs
TransNrm

SignalType ***Enum***

Description

Sets/Queries the signal type for SDA.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the instrument into SDA mode.
app.SDA.SDAMode = "MaskTest"
' Set signal type as STM16.
app.SDA.SignalType = "STM16"
```

Values

1000BaseCX
1000BaseLX
1000BaseSX
1000baseX
10GBASELX4
Custom
DVI
FC1063
FC133
FC2125
FC266
FC531
IEEE1394b

Infini2.5Gbs
OC1
OC12
OC3
OC48
PCIExpress
SATA1.5
STM1
STM16
STM4
STS1Eye
STS3Interface
STS3Transmit
USB2.0
XAUI

StartN ***Integer***

Range: From 1 to 100000, step 1

Description

Sets/Queries the unit interval where measurement is to start.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the UI where measurement is to start.
app.SDA.StartN =5
```

StepN ***Integer***

Range: From 1 to 100000, step 1

Description

Sets/Queries the gap between measurement groups, in unit intervals.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the step between measurements.
app.SDA.StepN = 2
```

StopN ***Integer***

Range: From 1 to 100000, step 1

Description

Sets/Queries the unit interval where measurement is to stop.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
```

```
' Set the UI where measurement is to stop.
app.SDA.StopN = 5000
```

Units ***Enum***

Description

Sets/Queries the unit of measure.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the units as UI
app.SDA.Units = "UI"
```

Values

S
UI

UserSignal ***Enum***

Description

A trace selected by the user to be displayed with horizontal scaling set by the Mask Te st failed bit locator. For example, data source is C1 and user signal is C2. There is a mask failure on the data signal C2 between 40 ns and 80 ns. C2 would zoom to 40 ns–80 ns.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the instrument into SDA mode.
app.SDA.SDAMode = "MaskTest"

' Set the user signal source as trace C4.
app.SDA.UserSignal = "C4"
```

Values

C1
C2
C3
C4
F1
F2
F3
F4
F5
F6
F7
F8

M1
M2
M3
M4
NONE

VerAutoFit ***Bool***

Description

Controls whether data is fit vertically to the mask automatically.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set vertical auto fitting off.
app.SDA.VerAutoFit = False
```

BADBITS

app.SDA.BadBits

AbsLevel	Double
AxisXRotation	Integer
AxisYRotation	Integer
BitsInLocator	Integer
C1ReceiverStandard	Enum
C2ReceiverStandard	Enum
C3ReceiverStandard	Enum
C4ReceiverStandard	Enum
ClearSweeps	Action
ClockTIESlope	Enum
DarkCal	Action
DarkCalLevel	Double
DataSource	Enum
EyeMode	Enum
EyeThresholdType	Enum
FailCursorsOn	Bool
FailedList	Enum
FailedSymbolsFilter	Enum
LabelsPosition	String
LabelsText	String
MaskFailTraceOn	Bool
MaskFailX	Double
MaskFailY	Double
MaskType	Enum
MaxFailures	Integer
MeasurementMode	Enum
MonochromeEye	Enum
PercentLevel	Integer
Persist3DQuality	Enum
Persisted	Bool
Persistence3d	Bool
PersistenceMonoChrome	Bool
PersistenceSaturation	Integer
PersistenceTime	Enum
RefReceiver	Bool
SDAMode	Enum
ShowFailLocation	Bool
ShowLastTrace	Bool
SignalFrequency	Double
SignalType	Enum
SliceWidth	Integer
Stop	Bool
TrackMaskFail	Action
UseDotJoin	Bool
UseGrid	String
UserSignal	Enum
VerAutoFit	Bool
View	Bool
ViewLabels	Bool
XMargin	Integer
YMargin	Integer

AbsLevel ***Double***

Range: From –100 to 100, step 1e-007

Description

Voltage level to set in the TIE at level.

AxisXRotation ***Integer***

Range: From –90 to 90, step 1

Description

Refer to the corresponding variable in **Display**, using SDA.BadBits.Persisted.

AxisYRotation ***Integer***

Range: From –90 to 90, step 1

Description

Refer to the corresponding variable in **Display**, using SDA.BadBits.Persisted.

BitsInLocator ***Integer***

Range: From 1 to 101, step 1

Description

Number of bits to display in the Mask Test bottom grid, where the bit that failed the mask is displayed in the center of the grid. For example, BitsInLocator = 5 means that 2 bits before and 2 bits after the failing bit are going to be displayed in the bottom grid.

C1ReceiverStandard ***Enum***

Description

Read only. Indicates what reference receiver filter the optical-to-electrical converter uses on the SDA signal.

Values

DISABLED
FC1063
FC2125
L1000BASE
OC12
OC3
OC48
OTHER

C2ReceiverStandard ***Enum***

Description

Read only. Indicates what reference receiver filter the optical-to-electrical converter uses on the SDA signal.

Values

DISABLED
FC1063
FC2125
L1000BASE
OC12

OC3
OC48
OTHER

C3ReceiverStandard ***Enum***

Description

Read only. Indicates what reference receiver filter the optical-to-electrical converter uses on the SDA signal.

Values

DISABLED
FC1063
FC2125
L1000BASE
OC12
OC3
OC48
OTHER

C4ReceiverStandard ***Enum***

Description

Read only. Indicates what reference receiver filter the optical-to-electrical converter uses on the SDA signal.

Values

DISABLED
FC1063
FC2125
L1000BASE
OC12
OC3
OC48
OTHER

ClearSweeps ***Action***

Description

Refer to the corresponding variable in **Acquisition.Cx**, using SDA.BadBits.Persisted.

ClockTIESlope ***Enum***

Description

Sets the preferred edge for eye diagram alignment.

Values

Both
Negative
Positive

DarkCal ***Action***

Description

Press to start a no-signal calibration of an optical-to-electrical probe.

DarkCalLevel ***Double***

Range: From -0.05 to 0.05, step 1e-006

Description

A read only variable that shows the dark level after calibration.

DataSource ***Enum***

Description

Using SDA.BadBits, refer to the corresponding variable in SDA.

Values

C1
C2
C3
C4
F1
F2
F3
F4
F5
F6
F7
F8
M1
M2
M3
M4
PRBS

EyeMode ***Enum***

Description

Refer to the corresponding variable in **SDA**, using SDA.BadBits.

Values

Sequential
Traditional

EyeThresholdType ***Enum***

Description

Threshold type for Eye Diagram TIE level. Change the Eye Diagram TIE settings to match the expected eye crossings, for example, SDA default for eye crossing at 50%. You can set it to EyeThresholdType = Percent and PercentLevel=32.

Values

Absloute
Percent

FailCursorsOn ***Bool***

Description

Turns on round cursors surrounding points in the eye diagram that penetrate the mask.

FailedList ***Enum***

Description

Reads the indices of the bits that failed the mask test.

FailedSymbolsFilter ***Enum***

Description

Sets what failed indices to get in the FailedList. Values: All, NearXY. For NearXY, see **MaskFailX** and **MaskFailY**.

LabelsPosition ***String***

Range: Any number of characters.

Description

Refer to the corresponding variable in **Acquisition.Cx**, using SDA.BadBits.Persisted.

LabelsText ***String***

Range: Any number of characters.

Description

Refer to the corresponding variable in **Acquisition.Cx**, using SDA.BadBits.Persisted.

MaskFailTraceOn ***Bool***

Description

Refer to the corresponding variable in **SDA**, using SDA.BadBits.

MaskFailX ***Double***

Range: From 0 to 1, step 0.01

Description

Shows the relative horizontal position of the selected mask failure cursors. For example, the user clicks on a mask failure cursor in the middle of the display. MaskFailX shows the selected horizontal position that would be 0.5.

MaskFailY ***Double***

Range: From 0 to 1, step 0.01

Description

Shows the relative vertical position of the selected mask failure cursors. For example, the user clicks on a mask failure cursor in the middle of the display.

MaskType ***Enum***

Description

Refer to the corresponding variable in **SDA**, using SDA.BadBits.

Values

Absolute

Normalized

MaxFailures ***Integer***

Range: From 1 to 10000, step 1

Description

Sets the number of failed bits to display in FailedList.

MeasurementMode ***Enum***

Description

Display a set of parameters measuring various properties of the eye diagram.

Values

Amplitude
Eye
Off
Timing

MonochromeEye ***Enum***

Values

Colored
Monochrome

PercentLevel ***Integer***

Range: From 0 to 100, step 1

Persist3DQuality ***Enum***

Description

Refer to the corresponding variable in **Acquisition.Cx**, using SDA.BadBits.Persisted.

Values

Shaded
Solid
WireFrame

Persisted ***Bool***

Description

Refer to the corresponding variable in **Acquisition.Cx**, using SDA.BadBits.Persisted.

Persistence3d ***Bool***

Description

Refer to the corresponding variable in **Acquisition.Cx**, using SDA.BadBits.Persisted.

PersistenceMonoChrome ***Bool***

Description

Refer to the corresponding variable in **Acquisition.Cx**, using SDA.BadBits.Persisted.

PersistenceSaturation ***Integer***

Range: From 1 to 100, step 1

Description

Refer to the corresponding variable in **Acquisition.Cx**, using SDA.BadBits.Persisted.

PersistenceTime ***Enum***

Description

Refer to the corresponding variable in **Acquisition.Cx**, using SDA.BadBits.Persisted.

Values

0.5s
10s
1s
20s
2s
5s
Infinite

RefReceiver ***Bool***

Description

Refer to the corresponding variable in **SDA**, using SDA.BadBits.

SDAMode ***Enum***

Description

Refer to the corresponding variable in **SDA**, using SDA.BadBits.

Values

MaskTest
Scope

ShowFailLocation ***Bool***

Description

Refer to the corresponding variable in **SDA**, using SDA.BadBits.

ShowLastTrace ***Bool***

Description

Refer to the corresponding variable in **Acquisition.Cx**, using SDA.BadBits.Persisted.

SignalFrequency ***Double***

Range: From 5e+007 to 4e+010, step 1

Description

Refer to the corresponding variable in **SDA**, using SDA.BadBits.

SignalType ***Enum***

Description

Refer to the corresponding variable in **SDA**, using SDA.BadBits.

Values

1000BaseCX
1000BaseLX
1000BaseSX
1000baseX
10GBASELX4
Custom
DVI
FC1063
FC133
FC2125
FC266
FC531
IEEE1394b
Infini2.5Gbs
OC1
OC12
OC3
OC48
PCIExpress
SATA1.5
STM1
STM16
STM4
STS1Eye
STS3Interface
STS3Transmit
USB2.0
XAUI

SliceWidth ***Integer***

Range: From 0 to 100, step 1

Description

Eye Diagram measurement aid. Applies a vertical slice around the middle of the eye diagram for narrowing measurement areas.

Stop ***Bool***

Description

Stop acquisition when the signal penetrates the mask.

TrackMaskFail ***Action***

Description

Refer to the corresponding variable in **SDA**, using SDA.BadBits.

UseDotJoin ***Bool***

Description

Refer to the corresponding variable in Acquisition.Cx, using SDA.BadBits.

UseGrid ***String***

Range: Any number of characters

Description

Using SDA.BadBits.Persisted, please refer to the corresponding variable in Acquisition.Cx

UserSignal ***Enum***

Description

Using SDA.BadBits, refer to the corresponding variable in SDA.

Values

C1
C2
C3
C4
F1
F2
F3
F4
F5
F6
F7
F8
M1
M2
M3
M4
NONE

VerAutoFit ***Bool***

Description

Using SDA.BadBits, refer to the corresponding variable in SDA.

View ***Bool***

Description

Using SDA.BadBits.Persisted, please refer to the corresponding variable in Acquisition.Cx

ViewLabels ***Bool***

Description

Using SDA.BadBits.Persisted, please refer to the corresponding variable in Acquisition.Cx

XMargin ***Integer***

Range: From 0 to 100, step 1

Description

Inflate the mask horizontally. Values: 0-100 in percent. 0 Means original mask; 100% means the mask stretches all the way over the horizontal span.

YMargin ***Integer***

Range: From 0 to 100, step 1

Description

Inflate the mask vertically. Values: 0-100 in percent. 0 Means original mask; 100% means the mask stretches all the way over the vertical

RESULT ***app.SDA.BadBits.Out.Result***

DataArray	Property
ExtendedStatus	Property
FirstEventTime	Property
HorizontalFrameStart	Property
HorizontalFrameStop	Property
HorizontalOffset	Property
HorizontalPerStep	Property
HorizontalResolution	Property
HorizontalUnits	Property
HorizontalVarianceArray	Property
HorizontalVariances	Property
IndexOfFirstSampleInFrame	Property
LastEventTime	Property
NumFrameDimensions	Property
NumSamplesInFrame	Property
Samples	Property
Status	Property
StatusDescription	Property
Sweeps	Property
UpdateTime	Property
VerticalFrameStart	Property
VerticalFrameStop	Property
VerticalMaxPossible	Property
VerticalMinPossible	Property
VerticalOffset	Property
VerticalPerStep	Property
VerticalResolution	Property
VerticalUnits	Property

DataArray ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

ExtendedStatus ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

FirstEventTime ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalFrameStart ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalFrameStop ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalOffset ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalPerStep ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalResolution ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalUnits ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalVarianceArray ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalVariances ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

IndexOfFirstSampleInFrame ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

LastEventTime ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.

NumFrameDimensions ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

NumSamplesInFrame ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

Samples ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

Status ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

StatusDescription ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

Sweeps ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

UpdateTime ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalFrameStart ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalFrameStop ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalMaxPossible ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalMinPossible ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalOffset ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalPerStep ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalResolution ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalUnits ***Property***

Description

Using SDA.BadBits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

BITS

app.SDA.Bits

AxisXRotation	Integer
AxisYRotation	Integer
ClearSweeps	Action
EyeMode	Enum
LabelsPosition	String
LabelsText	String
MaskType	Enum
Persist3DQuality	Enum
Persisted	Bool
Persistence3d	Bool
PersistenceMonoChrome	Bool
PersistenceSaturation	Integer
PersistenceTime	Enum
ShowLastTrace	Bool
SignalFrequency	Double
SignalType	Enum
UseDotJoin	Bool
UseGrid	String
VerAutoFit	Bool
View	Bool
ViewLabels	Bool

AxisXRotation *Integer*

Range: From –90 to 90, step 1

Description

Using SDA.Bits.View, please refer to the corresponding variable in Acquisition.Cx

AxisYRotation *Integer*

Range: From –90 to 90, step 1

Description

Using SDA.Bits.View, please refer to the corresponding variable in Acquisition.Cx

ClearSweeps *Action*

Description

Using SDA.Bits.View, please refer to the corresponding variable in Acquisition.Cx

EyeMode *Enum*

Description

Using SDA.Bits, please refer to the corresponding variable in SDA.

Values

Sequential
Traditional

LabelsPosition *String*

Range: Any number of characters

Description

Using SDA.Bits.View, please refer to the corresponding variable in Acquisition.Cx

LabelsText ***String***

Range: Any number of characters

Description

Using SDA.Bits.View, please refer to the corresponding variable in Acquisition.Cx

MaskType ***Enum***

Description

Using SDA.Bits, please refer to the corresponding variable in SDA.

Values

Absolute
Normalized

Persist3DQuality ***Enum***

Description

Using SDA.Bits.View, please refer to the corresponding variable in Acquisition.Cx

Values

Shaded
Solid
WireFrame

Persisted ***Bool***

Description

Using SDA.Bits.View, please refer to the corresponding variable in Acquisition.Cx

Persistence3d ***Bool***

Description

Using SDA.Bits.View, please refer to the corresponding variable in Acquisition.Cx

PersistenceMonoChrome ***Bool***

Description

Using SDA.Bits.View, please refer to the corresponding variable in Acquisition.Cx

PersistenceSaturation ***Integer***

Range: From 1 to 100, step 1

Description

Using SDA.Bits.View, please refer to the corresponding variable in Acquisition.Cx

PersistenceTime ***Enum***

Description

Using SDA.Bits.View, please refer to the corresponding variable in Acquisition.Cx

Values

0.5s
10s
1s
20s
2s
5s
Infinite

ShowLastTrace ***Bool***

Description

Using SDA.Bits.View, please refer to the corresponding variable in Acquisition.Cx

SignalFrequency ***Double***

Range: From 5e+007 to 4e+010, step 1

Description

Sets/Queries the signal frequency.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the signal frequency to 2.13 MHz
app.SDA.Bits.SignalFrequency = 2.13e6
```

SignalType ***Enum***

Description

Using SDA.Bits, please refer to the corresponding variable in SDA.

Values

1000BaseCX
1000BaseLX
1000BaseSX
1000baseX
10GBASELX4
Custom
DVI
FC1063
FC133
FC2125
FC266
FC531
IEEE1394b
Infini2.5Gbs
OC1
OC12
OC3
OC48
PCIExpress

SATA1.5
STM1
STM16
STM4
STS1Eye
STS3Interface
STS3Transmit
USB2.0
XAUI

UseDotJoin ***Bool***

Description

Using SDA.Bits.View, please refer to the corresponding variable in Acquisition.Cx

UseGrid ***String***

Range: Any number of characters

Description

Using SDA.Bits.View, please refer to the corresponding variable in Acquisition.Cx

VerAutoFit ***Bool***

Description

Using SDA.Bits, please refer to the corresponding variable in SDA.

View ***Bool***

Description

Using SDA.Bits.View, please refer to the corresponding variable in Acquisition.Cx

ViewLabels ***Bool***

Description

Using SDA.Bits.View, please refer to the corresponding variable in Acquisition.Cx

RESULT *app.SDA.Bits.Out.Result*

Properties of the type xxxx.Out.Result.yyyy are those of the last completed acquisition. They are not affected if other CVars are changed after that acquisition was completed. This distinction between "Out.Result" properties and other CVars is most important when the trigger mode is Single or Stopped. You should treat "Out.Result" properties as read-only.

DataArray	Property
ExtendedStatus	Property
FirstEventTime	Property
HorizontalFrameStart	Property
HorizontalFrameStop	Property
HorizontalOffset	Property
HorizontalPerStep	Property
HorizontalResolution	Property
HorizontalUnits	Property
HorizontalVarianceArray	Property
HorizontalVariances	Property
IndexOfFirstSampleInFrame	Property
LastEventTime	Property
NumFrameDimensions	Property
NumSamplesInFrame	Property
Samples	Property
Status	Property
StatusDescription	Property
Sweeps	Property
UpdateTime	Property
VerticalFrameStart	Property
VerticalFrameStop	Property
VerticalMaxPossible	Property
VerticalMinPossible	Property
VerticalOffset	Property
VerticalPerStep	Property
VerticalResolution	Property
VerticalUnits	Property

DataArray *Property*

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

ExtendedStatus *Property*

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

FirstEventTime *Property*

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalFrameStart ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalFrameStop ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalOffset ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalPerStep ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalResolution ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalUnits ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalVarianceArray ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalVariances ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

IndexOfFirstSampleInFrame ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

LastEventTime ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

NumFrameDimensions ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

NumSamplesInFrame ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

Samples ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

Status ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

StatusDescription ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

Sweeps ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

UpdateTime ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalFrameStart ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalFrameStop ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalMaxPossible ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalMinPossible ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalOffset ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalPerStep ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalResolution ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalUnits ***Property***

Description

Using SDA.Bits.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

EYE *app.SDA.Eye*

AxisXRotation	Integer
AxisYRotation	Integer
ClearSweeps	Action
DataSource	Enum
EyeMode	Enum
LabelsPosition	String
LabelsText	String
MaskType	Enum
Persist3DQuality	Enum
Persisted	Bool
Persistence3d	Bool
PersistenceMonoChrome	Bool
PersistenceSaturation	Integer
PersistenceTime	Enum
ShowLastTrace	Bool
SignalFrequency	Double
SignalType	Enum
UseDotJoin	Bool
UseGrid	String
UseMonochrome	Bool
VerAutoFit	Bool
View	Bool
ViewLabels	Bool

AxisXRotation *Integer*

Range: From –90 to 90, step 1

Description

Using SDA.Eye, please refer to the corresponding variable in Acquisition.Cx.

AxisYRotation *Integer*

Range: From –90 to 90, step 1

Description

Using SDA.Eye, please refer to the corresponding variable in Acquisition.Cx.

ClearSweeps *Action*

Description

Using SDA.Eye, please refer to the corresponding variable in Acquisition.Cx.

DataSource *Enum*

Description

Sets/Queries the source of the data for the eye diagram.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
```

```
'  Set the source for the eye diagram to input channel C3.
app.SDA.eye.DataSource = "C3"
```

Values

C1
C2
C3
C4
F1
F2
F3
F4
F5
F6
F7
F8
M1
M2
M3
M4
PRBS

EyeMode ***Enum***

Description

Using SDA.Eye, please refer to the corresponding variable in SDA.

Values

Sequential
Traditional

LabelsPosition ***String***

Range: Any number of characters.

Description

Using SDA.Eye, please refer to the corresponding variable in Acquisition.Cx.

LabelsText ***String***

Range: Any number of characters

Description

Using SDA.Eye, please refer to the corresponding variable in Acquisition.Cx.

MaskType ***Enum***

Description

Using SDA.Eye, please refer to the corresponding variable in SDA.

Values

Absolute
Normalized

Persist3DQuality ***Enum***

Description

Using SDA.Eye, please refer to the corresponding variable in

Acquisition.Cx.

Values

Shaded
Solid
WireFrame

Persisted ***Bool***

Description

Using SDA.Eye, please refer to the corresponding variable in Acquisition.Cx.

Persistence3d ***Bool***

Description

Using SDA.Eye, please refer to the corresponding variable in Acquisition.Cx.

PersistenceMonoChrome ***Bool***

Description

Using SDA.Eye, please refer to the corresponding variable in Acquisition.Cx.

PersistenceSaturation ***Integer***

Range: From 1 to 100, step 1

Description

Using SDA.Eye, please refer to the corresponding variable in Acquisition.Cx.

PersistenceTime ***Enum***

Description

Using SDA.Eye, please refer to the corresponding variable in Acquisition.Cx.

Values

0.5s
10s
1s
20s
2s
5s
Infinite

ShowLastTrace ***Bool***

Description

Using SDA.Eye, please refer to the corresponding variable in Acquisition.Cx.

SignalFrequency ***Double***

Range: From 5e+007 to 4e+010, step 1

Description

Please see the corresponding variable in app.Measure.Px.Operator (ParamEngine = "Dperiod@level").

SignalType ***Enum***

Description

Using SDA.Eye, please refer to the corresponding variable in SDA.

Values

1000BaseCX
1000BaseLX
1000BaseSX
1000baseX
10GBASELX4
Custom
DVI
FC1063
FC133
FC2125
FC266
FC531
IEEE1394b
Infini2.5Gbs
OC1
OC12
OC3
OC48
PCIExpress
SATA1.5
STM1
STM16
STM4
STS1Eye
STS3Interface
STS3Transmit
USB2.0
XAUI

UseDotJoin ***Bool***

Description

Using SDA.Eye, please refer to the corresponding variable in Acquisition.Cx.

UseGrid ***String***

Range: Any number of characters

Description

Using SDA.Eye, please refer to the corresponding variable in Acquisition.Cx.

UseMonochrome ***Bool***

Description

Sets/Queries whether the display is monochrome.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

'  Set monochrome off.
app.SDA.Eye.UseMonochrome = False
```

VerAutoFit ***Bool***

Description

Using SDA.Eye, please refer to the corresponding variable in SDA.

View ***Bool***

Description

Using SDA.Eye, please refer to the corresponding variable in Acquisition.Cx.

ViewLabels ***Bool***

Description

Using SDA.Eye, please refer to the corresponding variable in Acquisition.Cx.

RESULT *app.SDA.Eye.Out.Result*

Properties of the type xxxx.Out.Result.yyyy are those of the last completed acquisition. They are not affected if other CVars are changed after that acquisition was completed. This distinction between "Out.Result" properties and other CVars is most important when the trigger mode is Single or Stopped. You should treat "Out.Result" properties as read-only.

Columns	Property
DataArray	Property
FirstEventTime	Property
HorizontalFrameStart	Property
HorizontalFrameStop	Property
HorizontalOffset	Property
HorizontalPerColumn	Property
HorizontalUnits	Property
LastEventTime	Property
MaxPopulationInRectangle	Property
NumFrameDimensions	Property
PopulationOfRectangle	Property
Rows	Property
Sweeps	Property
UpdateTime	Property
VerticalFrameStart	Property
VerticalFrameStop	Property
VerticalOffset	Property
VerticalPerRow	Property
VerticalUnits	Property

Columns *Property*

Description

Queries the number of columns in the display.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the number of columns.
Columns = app.SDA.Eye.Out.Result.Columns
```

DataArray *Property*

Description

Using SDA.Eye.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

FirstEventTime *Property*

Description

Using SDA.Eye.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalFrameStart ***Property***

Description

Using SDA.Eye.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalFrameStop ***Property***

Description

Using SDA.Eye.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalOffset ***Property***

Description

Using SDA.Eye.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalPerColumn ***Property***

Description

Queries the column spacing.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the horizontal spacing.
HSpace = app.SDA.Eye.Out.Result.HorizontalPerColumn
```

HorizontalUnits ***Property***

Description

Using SDA.Eye.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

LastEventTime ***Property***

Description

Using SDA.Eye.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

MaxPopulationInRectangle ***Property***

Description

Queries the highest population in the array.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the total population.
MaxPop = app.SDA.Eye.Out.Result.MaxPopulationInRectangle
```

NumFrameDimensions ***Property***

Description

Using SDA.Eye.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

PopulationOfRectangle ***Property***

Description

Queries the total population of the array.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the total population.
TotalPop = app.SDA.Eye.Out.Result.PopulationOfRectangle
```

Rows ***Property***

Description

Queries the number of rows in the display.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the number of rows.
Rows = app.SDA.Eye.Out.Result.Rows
```

Sweeps ***Property***

Description

Using SDA.Eye.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

UpdateTime ***Property***

Description

Using SDA.Eye.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalFrameStart ***Property***

Description

Using SDA.Eye.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalFrameStop ***Property***

Description

Using SDA.Eye.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalOffset ***Property***

Description

Using SDA.Eye.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalPerRow ***Property***

Description

Queries the vertical spacing.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Inspect the vertical spacing.
VSpace = app.SDA.Eye.Out.Result.VerticalPerRow
```

VerticalUnits ***Property***

Description

Using SDA.Eye.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

TIE

app.SDA.TIE

AbsLevel	Double
EyeThresholdType	Enum
FindFrequency	Action
PercentLevel	Integer
PLLOn	Bool
SignalFrequency	Double
Slope	Enum
View	Bool

AbsLevel ***Double***

Range: From –100 to 100, step 1e-007

Description

Please see the corresponding variable in app.Measure.Px.Operator (ParamEngine = "TIE@level")

EyeThresholdType ***Enum***

Description

Sets/Queries whether the eye threshold is measured in absolute units or percentage.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the eye threshold to percent.
app.SDA.TIE.EyeThresholdType = "Absolute"
```

Values

Absolute
Percent

FindFrequency ***Action***

Description

Determine the signal frequency from the waveform data.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Calculate the signal frequency from the trace data.
app.SDA.TIE.FindFrequency
```

PercentLevel ***Integer***

Range: From 0 to 100, step 1

Description

Please see the corresponding variable in app.Measure.Px.Operator (ParamEngine = "TIE@level")

PLLOn ***Bool***

Description

Please see the corresponding variable in app.SDA.

SignalFrequency ***Double***

Range: From 1000 to 1e+011, step 1

Description

Sets/Queries the signal frequency for TIE.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the signal frequency to 2.00 MHz
app.SDA.TIE.SignalFrequency = 2.0e6
```

Slope ***Enum***

Description

Please see the corresponding variable in app.Measure.Px.Operator (ParamEngine = "TIE@level")

Values

Both
Neg
Pos

View ***Bool***

Description

Sets/Queries the visibility of the function.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Show the TIE function.
app.SDA.TIE.View = True
```

RESULT *app.SDA.TIE.Out.Result*

Properties of the type xxxx.Out.Result.yyyy are those of the last completed acquisition. They are not affected if other cvars are changed after that acquisition was completed. This distinction between "Out.Result" properties and other cvars is most important when the trigger mode is Single or Stopped. You should treat "Out.Result" properties as read-only.

Result

ExtendedStatus	Property
FirstEventTime	Property
HorizontalResolution	Property
HorizontalUnits	Property
LastEventTime	Property
NumFrameDimensions	Property
Status	Property
StatusDescription	Property
UpdateTime	Property
Value	Property
ValueArray	Property
VerticalResolution	Property
VerticalUnits	Property

ExtendedStatus ***Property***

Description

Using SDA.TIE.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

FirstEventTime ***Property***

Description

Using SDA.TIE.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalResolution ***Property***

Description

Using SDA.TIE.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

HorizontalUnits ***Property***

Description

Using SDA.TIE.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

LastEventTime ***Property***

Description

Using SDA.TIE.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

NumFrameDimensions ***Property***

Description

Using SDA.TIE.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

Status ***Property***

Description

Using SDA.TIE.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

StatusDescription ***Property***

Description

Using SDA.TIE.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

UpdateTime ***Property***

Description

Using SDA.TIE.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

Value ***Property***

Description

Using SDA.TIE.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

ValueArray ***Property***

Description

Using SDA.TIE.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalResolution ***Property***

Description

Using SDA.TIE.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

VerticalUnits ***Property***

Description

Using SDA.TIE.Out.Result, please refer to the corresponding variable in Acquistion.Cx.Out.Result

DATETIMESETUP *app.Utility.DateTimeSetup*

This set of variables controls the date and time setup. In addition to manual controls for hh/mm/ss and dd/mm/yy, there is the ability to set the time and date from an Internet clock, using the SNTP protocol.

CurrentDateAndTime	String
Day	Integer
Hour	Integer
Minute	Integer
Month	Integer
Second	Integer
SetFromSNTP	Action
Validate	Action
Year	Integer

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set time/date from the NIST Internet clock
app.Utility.DateTimeSetup.SetFromSNTP
```

CurrentDateAndTime *String*

Range: Any number of characters.

Description

Reads the current date and time from the real-time calendar and clock.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the current date and time from the real-time calendar and
clock.
app.Utility.DateTimeSetup.CurrentDateAndTime
```

Day *Integer*

Range: From 1 to 31, step 1

Description

Sets/Queries the day of the month setting of the real-time clock as a number. The value will not be accepted by the clock until app.Utility.DateTimeSetup.Validateis sent. All time/date controls are validated at the same time.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the day of the month as 21.
```

```
app.Utility.DateTimeSetup.Day = 21

app.Utility.DateTimeSetup.Validate
```

Hour ***Integer***

Range: From 0 to 23, step 1

Description

Sets/Queries the hours setting of the real-time clock as a number.The value will not be accepted by the clock until app.Utility.DateTimeSetup.Validate is sent. All time/date controls are validated at the same time.

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")


' Set the hour as 13.

app.Utility.DateTimeSetup.Hour = 13

app.Utility.DateTimeSetup.Validate
```

Minute ***Integer***

Range: From 0 to 59, step 1

Description

Sets/Queries the minutes setting of the real-time clock as a number.The value will not be accepted by the clock until app.Utility.DateTimeSetup.Validate is sent. All time/date controls are validated at the same time.

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")


' Set the minute as 34.

app.Utility.DateTimeSetup.Minute = 34

app.Utility.DateTimeSetup.Validate
```

Month ***Integer***

Range: From 1 to 12, step 1

Description

Sets/Queries the month setting of the real-time clock as a number.The value will not be accepted by the clock until app.Utility.DateTimeSetup.Validate is sent. All time/date controls are validated at the same time.

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")


' Set the month as August.

app.Utility.DateTimeSetup.Month = 8
app.Utility.DateTimeSetup.Validate
```

Second ***Integer***

Range: From 0 to 59, step 1

Description

Sets/Queries the seconds setting of the real-time clock as a number.The value will not be accepted by the clock until app.Utility.DateTimeSetup.Validate is sent. All time/date controls are validated at the same time.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the seconds as 55.
app.Utility.DateTimeSetup.Second = 55
app.Utility.DateTimeSetup.Validate
```

SetFromSNTP ***Action***

Description

Sets the real time clock from the simple network time protocol.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the real time clock from the simple network time protocol.
app.Utility.DateTimeSetup.SetFromSNTP
```

Validate ***Action***

Description

Validates any new settings. This action = clicking “Validate Changes” on the Date/Time page.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the day, hour, and minute, and validate.
app.Utility.DateTimeSetup.Day = 3
app.Utility.DateTimeSetup.Hour = 5
app.Utility.DateTimeSetup.Minute = 8

app.Utility.DateTimeSetup.Validate
```

Year ***Integer***

Range: From 2000 to 2099, step 1

Description

Sets/Queries the year setting of the real-time clock as a number.The value will not be accepted by the clock until app.Utility.DateTimeSetup.Validate is sent. All time/date controls are validated at the same time.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set the year as 2003.
app.Utility.DateTimeSetup.Year = 2003
app.Utility.DateTimeSetup.Validate
```

OPTIONS *app.Utility.Options*

The options subsystem contains controls to query the list of installed software and hardware options.

InstalledHWOptions	String
InstalledSWOptions	String
ScopeID	String

InstalledHWOptions ***String***

Range: Any number of characters.

Description

Shows a list of the installed hardware options.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the list of installed hardware options and present
' in a popup dialog
MsgBox app.Utility.Options.InstalledHWOPtions
```

InstalledSWOptions ***String***

Range: Any number of characters.

Description

Shows list of installed software options.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the list of installed software options and display
' in a popup dialog
MsgBox app.Utility.Options.InstalledSWOPtions
```

ScopeID ***String***

Range: Any number of characters.

Description

Queries the ID of the instrument. This ID should be specified when purchasing software options for your instrument.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Read the ID of the instrument.
MsgBox app.Utility.Options.ScopeID
```

REMOTE

app.Utility.Remote

These controls are related to the remote control section of the instrument. In this context Automation is not considered part of “Remote”. Remote control currently includes control using ASCII remote commands from GPIB or TCP/IP.

AllowControlFrom	String
Assistant	Enum
GpibAddress	Integer
Interface	Enum
RestrictControl	Enum
SetToErrorsOnlyAndClearAtStartup	Bool

AllowControlFrom *String*

Range: Any number of characters.

Description

Sets/Queries an IP address from which remote control is allowed, if remote control has been restricted to specified clients using the RestrictControl control. This string contains a comma-delimited list of addresses, which can be supplied either in IP or DNS form. For example: "126.2.2.34,dansWorkstation"

Assistant *Enum*

Description

Sets/Queries the setting of the remote assistant.

Values

EO	Log errors only
FD	Log all remote commands/queries
OFF	Turn the assistant off

GpibAddress *Integer*

Range: From 1 to 30, step 1

Description

Queries the current GPIB address for remote control.

Interface *Enum*

Description

Sets/Queries the currently selected type of remote control interface.

Values

GPIB
Off
TCPIP

RestrictControl *Enum*

Description

Sets/Queries whether remote control is restricted to certain hosts, where the host name is defined either by IP address or DNS name.

Values

No
Yes

SetToErrorsOnlyAndClearAtStartup ***Bool***

Description

Enables the resetting of the remote assistant to '"Errors Only" mode whenever the instrument is reset. Also ensures that the remote assistant log is cleared upon startup. This control is set by default to lower the risk that the remote assistant will be set to "Full Dialog" mode and be forgotten, causing a decrease in remote control performance.

WEBEDITOR *app.WebEditor*

This set of variables controls the web editor, which shows the paths for data flow in the instrument. This feature is not supported on all instruments. Currently it is supported on DDA and SDA models, and models with XMAP and/or XMATH software options.

WebEditor

AddConnection([in] VARIANT destProcessor, [in] VARIANT destInputPin, [in] VARIANT sourceProcessor, [in]	Method
AddPreview([in] VARIANT sourceProcessor, [in] VARIANT sourcePin, [in] BSTR previewName, [in] double	Method
AddProcessor([in] VARIANT processorOrClassId, [in] BSTR requestedName, [in] double xPosition, [in]	Method
ClearSweeps	Action
GetProcessor([in] VARIANT processor)	Method
RemoveAll()	Method
RemoveConnection([in] VARIANT destProcessor, [in] VARIANT destInputPin)	Method
RemovePreview([in] VARIANT processor)	Method
RemoveProcessor([in] VARIANT processor)	Method

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Enter auto-trigger mode
app.Acquisition.TriggerMode = "Auto"

' Show the web editor and remove all processors from it
app.ActiveView = "WebEdit"
app.WebEditor.RemoveAll

' Create a Waveform Adder, name it "MyAvg", and place it at
x=200, y=30
app.WebEditor.AddProcessor "LeCroy.WaveformAdder", "MyAdder",
200, 30

' Connect the output of channel 1 "C1Exec", to the first input of

' the adder, and the output of channel 2 "C2Exec" to the second
app.WebEditor.AddConnection "MyAdder", 0, "C1Exec", 0
app.WebEditor.AddConnection "MyAdder", 1, "C2Exec", 0

' Add a preview window to show the averaged output
app.WebEditor.AddPreview "MyAdder", 0, "MyAvgPreview", 370, 40
```

```
' Place function F1 into WebEdit mode, and hook the adder output
to it
app.Math.F1.View = True
```

AddConnection([in] VARIANT destProcessor, [in] VARIANT destInputPin, [in] VARIANT sourceProcessor, [in] VARIANT sourceOutputPin) ***Method***

Description

Adds a connection between two 'pins' of nodes placed within the Web Editor. Pins are described by the name of the node, and the zero-based index of the pin on that node.

```
app.Math.F1.MathMode = "WebEdit"
```

AddPreview([in] VARIANT sourceProcessor, [in] VARIANT sourcePin, [in] BSTR previewName, [in] double xPosition, [in] double xPosition) ***Method***

Description

Adds a Preview to the specified pin of the specified node. The coordinates specify where the preview will appear on the Web, with 0,0 being the top-left corner.

AddProcessor([in] VARIANT processorOrClassId, [in] BSTR requestedName, [in] double xPosition, [in] double yPosition) ***Method***

Description

Adds a named “processor” to the web. To determine the name of a processor, just place it on the web using the GUI and hover the mouse over the node. The “ProgID” of the node, in the format 'LeCroy.<procName>' will appear. When processors are added from automation, there is no distinction between Measure, Math, and Pass/Fail processors.

ClearSweeps ***Action***

Description

Clears any accumulated data for nodes such as Average, Persistence, etc. that reside in the processing web.

GetProcessor([in] VARIANT processor) ***Method***

Description

Retrieves a reference to a processor that has been added to the Web. This reference may then be used to access the processor's controls. See the Math/Measure control reference section of this manual for a list of the available controls for each processor.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Show the web editor and remove all processors from it
app.ActiveView = "WebEdit"
app.WebEditor.RemoveAll

' Create a Waveform Averager, name it "MyAvg", and place it at
```

```
x=200, y=30
app.WebEditor.AddProcessor "LeCroy.Average", "MyAvg", 200, 30

' Retrieve a pointer to the averager and set it's number of
sweeps
' to the value 1234
set myAverager = app.WebEditor.GetProcessor("MyAvg")
```

RemoveAll() ***Method***

Description

Removes all processors from the web.

RemoveConnection([in] VARIANT destProcessor, [in] VARIANT destInputPin) ***Method***

Description

Removes a connection between two pins on the web.

RemovePreview([in] VARIANT processor) ***Method***

Description

Removes the named preview display.

RemoveProcessor([in] VARIANT processor) ***Method***

Description

Removes the named processor from the Web.

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MATH/MEASURE CONTROL REFERENCE

This section provide s a reference guide for all controls used by the various ‘processors’ available in the instrument’s Math and Measure subsystems.

Math/Measure Control Reference

This section of the manual is concerned with documenting the controls used by the numerous Math/Measure "processors" in the X-Stream DSO. The basic structure is very similar to that used in the preceding section, with one basic exception.

In the Math and Measure sections of the DSO, the automation hierarchy is more dynamic than it is elsewhere. When a math or measure operator is selected, its controls "appear" in the hierarchy, switching out the controls used by the previously selected operator.

For example, when the FFT operator is selected as Operator 1 of Math Function F1:

```
app.Math.F1.Operator1 = "FFT"
```

The following controls will be available:

```
app.Math.F1.Operator1Setup.Algorithm
app.Math.F1.Operator1Setup.FillType
app.Math.F1.Operator1Setup.SuppressDC
app.Math.F1.Operator1Setup.Type
app.Math.F1.Operator1Setup.Window
```

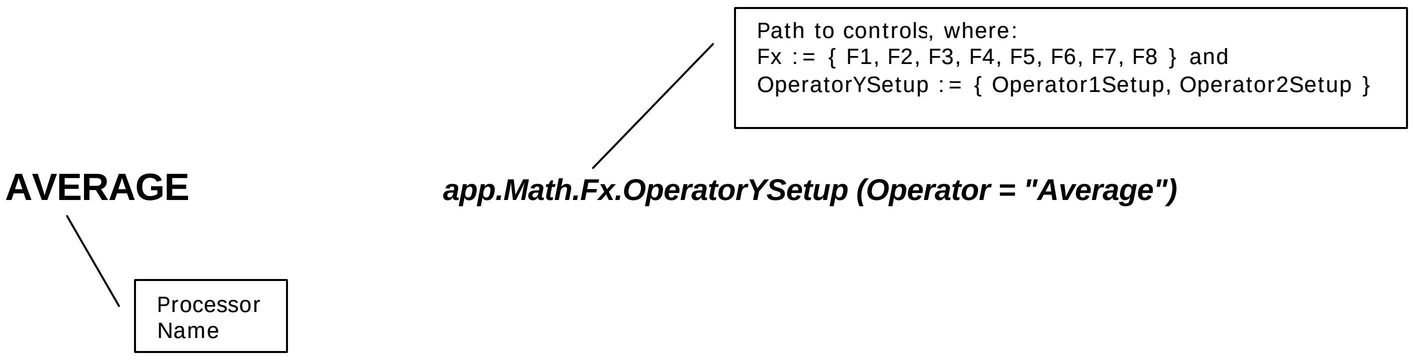
The nodes in the automation hierarchy that behave in this way include:

```
app.Math.Fx.Operator1Setup
app.Math.Fx.Operator2Setup

app.Measure.Px.Operator

app.PassFail.Q1.Operator
```

In order to clarify this dependency, the titles of each of the sections in this chapter follow this format:


Path to controls, where:
Fx := { F1, F2, F3, F4, F5, F6, F7, F8 } and
OperatorYSetup := { Operator1Setup, Operator2Setup }
AVERAGE
app.Math.Fx.OperatorYSetup (Operator = "Average")
Processor Name

AVERAGE *app.Math.Fx.OperatorYSetup (Operator = "Average")*

Description

Waveform Averaging.

AverageType	Enum
ClearSweeps	Action
Sweeps	Integer

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Turn trace F1 on and setup to average the data from C1
' Average mode is set to Continuous
app.Math.F1.View = True
app.Math.F1.Operator1 = "Average"
app.Math.F1.MathMode = "OneOperator"
app.Math.F1.Source1 = "C1"
app.Math.F1.Operator1Setup.AverageType = "Continuous"
app.Math.F1.Operator1Setup.Sweeps = 50
```

AverageType *Enum*

Description

Sets/Queries the averaging mode. Continuous and Summation modes are supported.

Values

Continuous
Summed

ClearSweeps *Action*

Description

Clears all averaged sweeps.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Clear sweeps for average in trace F1.
app.Math.F1.Operator1Setup.ClearSweeps
```

Sweeps ***Integer***

Range: From 1 to 1000000, step 1

Description

Sets/Queries the number of sweeps to be averaged when trace Fx is set to averaging: continuous or summed.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set number of sweeps to be averaged in trace F1 as 20.
app.Math.F1.Operator1Setup.Sweeps = 20
```

BOXCAR *app.Math.Fx.OperatorYSetup (Operator = "Boxcar")*

Rectangular BoxCar filter (local running average) of specified length.

Length ***Integer***

Range: From 2 to 50, step 1

Description

Sets / Queries the length, in samples, of the boxcar FIR filter (i.e., the running average of a local set of "length" points)

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the filter length for the boxcar function in trace F1
app.Math.F1.View = True
app.Math.F1.MathMode = "OneOperator"
app.Math.F1.Operator1 = "Boxcar"
app.Math.F1.Operator1Setup.Length = 20
```

CORRELATION *app.Math.Fx.OperatorYSetup (Operator = "Correlation")*

Correlates a portion of one waveform to another.

CorrLength	Double
CorrStart	Double

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure correlation in F3 using a length of 3.5 divisions,
' starting at the first division.
app.Math.F3.View = True
app.Math.F3.Operator1 = "Correlation"
app.Math.F3.Operator1Setup.CorrLength = 3.5
app.Math.F3.Operator1Setup.CorrStart = 1
```

CorrLength ***Double***

Range: From 0.001 to 10, step 0.001

Description

Sets/Queries the length (in graticule divisions) of the section of the first input trace that is used in the calculation of correlation.

CorrStart ***Double***

Range: From 0 to 9.999, step 0.001

Description

Sets/Queries the position (in graticule divisions) of the start of the section of trace 1 that is used in the correlation function in trace Fx.

DERIVATIVE *app.Math.Fx.OperatorYSetup (Operator = "Derivative")*

Computes the derivative of the waveform: (next_sample_value – this_sample_value) / horizontal_sample_interval.

EnableAutoScale	Bool
FindScale	Action
VerOffset	Double
VerScale	DoubleLockstep

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")


' Start a find scale operation for derivative function trace F1

app.Math.F1.View = True

app.Math.F1.MathMode = "OneOperator"

app.Math.F1.Operator1 = "Derivative"

app.Math.F1.Operator1Setup.FindScale
```

EnableAutoScale ***Bool***

Description

Sets/Queries whether the Autoscale function is enabled for derivative function trace Fx. If enabled, an Autoscale operation is performed whenever the setup changes.

FindScale ***Action***

Description

Initiates a Find Scale action, to set a suitable vertical scale for the derivative function trace Fx.

VerOffset ***Double***

Range: From -1e+006 to 1e+006, step 1e-009

Description

Sets/Queries the vertical offset of derivative function trace Fx.

VerScale ***DoubleLock step***

Range: From 1e-012 to 1e+013, step 10000, locked to 1-2-5

Description

Sets/Queries the vertical scale of derivative function Fx.

DESKEW *app.Math.Fx.OperatorYSetup (Operator = "Deskew")*

Deskew waveform by shifting it in time.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set the displacement of the trace F3 to 3.7e-9
app.Math.F3.View = True
app.Math.F3.MathMode = "OneOperator"
app.Math.F3.Operator1 = "Deskew"
app.Math.F3.Operator1Setup.WaveDeskew = 3.7e-9
```

WaveDeskew ***Double***

Range: From -0.1 to 0.1, step 1e-012

Description

Sets/Queries the displacement in time of trace Fx. A positive value delays the signal: a negative one makes it appear earlier.

ENVELOPE *app.Math.Fx.OperatorYSetup (Operator = "Envelope")*

Envelope of minimum and maximum values for an ensemble of sweeps.

ClearSweeps	Action
Sweeps	Integer

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure F3 to be an envelope of C1
app.Math.F3.View = True
app.Math.F3.Source1 = "C1"
app.Math.F3.MathMode = "OneOperator"
app.Math.F3.Operator1 = "Envelope"
app.Math.F3.Operator1Setup.Sweeps = 1000
```

ClearSweeps *Action*

Description

Initiates a Clear Sweeps operation for envelope function trace Fx.

Sweeps *Integer*

Range: From 1 to 1000000, step 1

Description

Sets/Queries the maximum number of sweeps to be used by envelope function trace Fx.

ERES *app.Math.Fx.OperatorYSetup (Operator = "EnhancedResolution")*

Enhanced resolution achieved through FIR filtering, using well behaved filters, with precalculated noise gain.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure F3 to be an ERes of C1
app.Math.F3.View = True
app.Math.F3.Source1 = "C1"
app.Math.F3.MathMode = "OneOperator"
app.Math.F3.Operator1 = "Eres"
app.Math.F3.Operator1Setup.Bits = "2"
```

Bits ***Enum***

Description

Sets/Queries the increase in resolution in bits for the enhanced resolution function. Be sure to specify the value as a string, and not as a floating point number, for example, "0.5", "1", "1.5", "2", "2.5", or "3".

Values

0.5
1
1.5
2
2.5
3

EXCELMATH *app.Math.Fx.OperatorYSetup (Operator = "ExcelMath")*

Performs Math in Excel. Transfers 1 or 2 waveforms into Excel and reads the resulting waveform.

AddChart	Action
AddLabels	Action
Advanced	Bool
ClearSheet	Action
CreateDemoSheet	Action
FindScale	Action
NewSheet	Bool
OutputCell	String
OutputEnable	Bool
OutputHeaderCell	String
Scaling	Enum
Source1Cell	String
Source1Enable	Bool
Source1HeaderCell	String
Source2Cell	String
Source2Enable	Bool
Source2HeaderCell	String
SpreadsheetFilename	FileName
Status	String
WithHeader	Bool

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure F3 to process C1 in Excel using a demo-sheet
app.Math.F3.View = True
app.Math.F3.Source1 = "C1"
app.Math.F3.MathMode = "OneOperator"
app.Math.F3.Operator1 = "ExcelMath"
app.Math.F3.Operator1Setup.CreateDemoSheet
```

AddChart *Action*

Description

Adds a chart to the current Excel spreadsheet.

AddLabels *Action*

Description

Adds labels to the cells of the array headers in the Excel spreadsheet.

Advanced ***Bool***

Description

Enables/Disables/Queries the advanced Excel settings. By default, the cell ranges used to store the input waveform, and to retrieve the calculated waveform, are preset.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set function trace F3 to be an Excel function.
app.Math.F3.Operator1 = "ExcelMath"


' Enable the use of the advanced settings.
app.Math.F3.Operator1Setup.Advanced = True
```

ClearSheet ***Action***

Description

Clears the contents of the current Excel spreadsheet.

CreateDemoSheet ***Action***

Description

Creates a "demo sheet," an excel spreadsheet pre-labeled, and with the output column equation preset to invert the input data.

FindScale ***Action***

Description

Sets a suitable scale for the output data from Excel on the instrument graticule when scaling has been set to manual.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set function trace F3 to be an Excel function.
app.Math.F3.Operator1 = "ExcelMath"

' Set the scaling from the Excel spreadsheet to automatic.
app.Math.F3.Operator1Setup.Scaling = "Manual"

' Find a suitable scale for the output data
' on the instrument graticule.
app.Math.F3.Operator1Setup.FindScale
```

NewSheet *Bool*

Description

Enables/Disables/Queries the creation of a new Excel spreadsheet. If a new sheet is not to be created, an existing file name must be specified in the SpreadsheetFilename control.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set function trace F3 to be an Excel function.
app.Math.F3.Operator1 = "ExcelMath"


' Enable the creation of a new Excel spreadsheet.
app.Math.F3.Operator1Setup.NewSheet = True
```

OutputCell *String*

Range: Any number of characters

Description

Sets/Queries the cell label for output in the Excel function Fx. This cell marks the start (top) of the array of data to be taken from Excel into the instrument.

OutputEnable *Bool*

Description

Enables/Disables/Queries the transfer of output data from Excel to the instrument. If a one-way computation is required, where results of the Excel processing are not required, this should be set to False to increase performance.

OutputHeaderCell *String*

Range: Any number of characters

Description

Sets/Queries the header cell label for output in Excel function Fx. This is the starting cell for the header that carries setup information about the output waveform, from Excel to the instrument. Only used if the WithHeader control is set to True.

Scaling ***Enum***

Description

Sets/Queries the method of scaling the output trace from the Excel spreadsheet.

Values

Automatic	Automatically scale the output waveform to full-scale
FromSheet	Retrieve scaling information from the output header in the spreadsheet
Manual	Manually auto-scale when FindScale is pressed

Source1Cell ***String***

Range: Any number of characters

Description

Sets/Queries the cell label for source 1 in Excel function Fx. This cell marks the start (top) of the array into which data from the first source waveform is transferred.

Source1Enable ***Bool***

Description

Enables/Disables/Queries the transfer of source 1 data from the instrument to Excel.

Source1HeaderCell ***String***

Range: Any number of characters

Description

Sets/Queries the header cell label for source 1 in Excel function Fx. This is the starting cell for the header that carries setup information about waveform 1, from the instrument to Excel. This information includes waveform length, vertical and horizontal units, vertical and horizontal framing information, and horizontal scaling and offset information. Only used when the WithHeader control is set to True.

Source2Cell ***String***

Range: Any number of characters

Description

Sets/Queries the cell label for source 2 in Excel function Fx. This cell marks the start (top) of the array into which data from the second source waveform is transferred.

Source2Enable ***Bool***

Description

Enables/Disables/Queries the transfer of source 2 data from the instrument to Excel.

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")
```

```
' Set function trace F1 to be an Excel function.
app.Math.F1.Operator1 = "ExcelMath"
' Enable the transfer of source 2 data from the instrument to
Excel.
```

Source2HeaderCell ***String***

Range: Any number of characters

Description

Sets/Queries the header cell label for source 2 in Excel function Fx. This is the starting cell for the header that carries setup information about waveform 2 from the instrument to Excel. This information includes waveform length, vertical and horizontal units, vertical and horizontal framing information, and horizontal scaling and offset information. Only used when the WithHeader control is set to True.

SpreadsheetFilename ***FileName***

Range: Any number of characters

Description

Sets/Queries the file name of the current Excel spreadsheet.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set function trace F3 to be an Excel function.
app.Math.F3.Operator1 = "ExcelMath"

' Disable the creation of a new Excel spreadsheet.
app.Math.F3.Operator1Setup.NewSheet = False

' Select the filename of the existing Excel spreadsheet to be
used.
```

Status ***String***

Range: Any number of characters

Description

Inspects the status of the Excel-and-instrument combination. Examples are "OK", or "Excel not installed".

WithHeader ***Bool***

Description

Enables/Disables/Queries the presence of headers with the waveform

FFT *app.Math.Fx.OperatorYSetup (Operator = "FFT")*

Fast Fourier Transform of waveform data.

Algorithm	Enum
FillType	Enum
SuppressDC	Bool
Type	Enum
Window	Enum

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure F3 to perform an FFT of C1
app.Math.F3.View = True
app.Math.F3.Source1 = "C1"
app.Math.F3.MathMode = "OneOperator"
app.Math.F3.Operator1 = "FFT"
app.Math.F3.Operator1Setup.Algorithm = "Power2"
app.Math.F3.Operator1Setup.Window = "VonHann"
app.Math.F3.Operator1Setup.Type = "PowerSpectrum"
```

Algorithm *Enum*

Description

Sets/Queries the algorithm for the FFT in function trace Fx.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set function trace F4 to FFT.
app.Math.F4.Operator1 = "FFT"
' Set the FFT algorithm to power of two.
app.Math.F4.Operator1Setup.Algorithm = "Power2"
```

Values

LeastPrime
Power2

FillType *Enum*

Description

Sets/Queries the type of trace fill to use in the FFT function trace Fx.

Values

Truncate
ZeroFill

SuppressDC ***Bool***

Description

Enables/Disables suppression of the value at zero frequency in the FFT spectrum.

Type ***Enum***

Description

Sets/Queries the type of FFT spectrum for function trace Fx.

Values

Imaginary	Imaginary part of the complex spectrum
Magnitude	Magnitude with linear vertical scale
Phase	Phase
PowerDensity	Power Density
PowerSpectrum	Power Spectrum
Real	Real part of the complex spectrum

Window ***Enum***

Description

Sets/Queries the type of window for FFT function trace Fx.

Values

BlackmanHarris
FlatTop
Hamming
Rectangular
VonHann

FILTER *app.Math.Fx.OperatorYSetup (Operator = "Filter")*

Processes waveform using specified digital filter.

AutoLength	Bool
CosineBeta	Double
CustomFilename	FileName
FilterKind	Enum
FilterType	Enum
FirOrIir	Enum
GaussianBT	Double
HighFreqPass	Double
LowFreqPass	Double
NumberOfTaps	Integer
PassBandAttenuation	Double
PassBandRipple	Double
Rolloff	Double
StopBandAttenuation	Double
TransitionWidth	Double
Window	Enum

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure F1 to filter C1
app.Math.F1.View = True
app.Math.F1.Source1 = "C1"
app.Math.F1.MathMode = "OneOperator"
app.Math.F1.Operator1 = "Filter"
app.Math.F1.Operator1Setup.FirOrIir = "FIR"
app.Math.F1.Operator1Setup.FilterKind = "LowPass"
app.Math.F1.Operator1Setup.AutoLength = True
```

AutoLength *Bool*

Description

Enables/Disables/Queries status of the auto-length feature for the filter.

CosineBeta *Double*

Range: From 0 to 100, step 1

Description

Sets/Queries the constant beta for the raised root cosine filter Fx, as a percentage.

CustomFilename ***FileName***

Range: Any number of characters

Description

Sets/Queries the name of the current custom file for filter Fx. Valid only when FilterKind is set to "Custom".

FilterKind ***Enum***

Description

Sets/Queries kind of filter to use in function Fx.

Values

BandPass
BandStop
Custom
Gaussian
HighPass
LowPass
RaisedCosine
RaisedRootCosine

FilterType ***Enum***

Description

Sets/Queries the type of filter to use in function Fx.

Values

Bessel
Butterworth
Chebyshev
InverseChebyshev

FirOrIir ***Enum***

Description

Sets/Queries whether filter Fx is an FIR filter or an IIR filter.

Values

FIR	Finite Impulse Response Filter
IIR	Infinite Impulse Response Filter

GaussianBT *Double*

Range: From 0 to 100, step 1

Description

Sets/Queries the value of the Gaussian BT constant for filter Fx. Valid only when FilterKind is set to "Gaussian".

HighFreqPass *Double*

Range: From 1000 to 1e+010, step 1

Description

Sets/Queries the higher cut-off frequency for high-pass filter Fx.

LowFreqPass *Double*

Range: From 1000 to 1e+010, step 1

Description

Sets/Queries the lower cut-off frequency for band-pass filter Fx.

NumberOfTaps *Integer*

Range: From 0 to 2001, step 1

Description

Sets/Queries the number of taps in filter Fx. Valid only when the AutoLength control is set to False.

PassBandAttenuation *Double*

Range: From 0.5 to 20, step 0.1

Description

Sets/Queries the pass-band attenuation of filter Fx.

PassBandRipple *Double*

Range: From 0.5 to 20 step 0.1

Description

Sets/Queries the pass-band ripple.

Rolloff ***Double***

Range: From 1 to 1000, step 0.1

Description

Sets/Queries the roll-off of filter Fx.

StopBandAttenuation ***Double***

Range: From 10 to 100, step 0.001

Description

Sets/Queries the stop-band attenuation of filter Fx.

TransitionWidth ***Double***

Range: From 0 to 1e+010, step 1

Description

Sets/Queries the width of the transition in the frequency spectrum of filter Fx.

Window ***Enum***

Description

Sets/Queries the type of window for filter Fx.

Values

Bartlett
Blackman
Hamming
Hanning
Kaiser
Rectangular

FLOOR *app.Math.Fx.OperatorYSetup (Operator = "Floor")*

Most negative or minimum values for an ensemble of sweeps.

ClearSweeps	Action
Sweeps	Integer

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure F1 to measure the Floor of the first 1000
' sweeps of C1
app.Math.F1.View = True
app.Math.F1.Source1 = "C1"
app.Math.F1.MathMode = "OneOperator"
app.Math.F1.Operator1 = "Floor"
app.Math.F1.Operator1Setup.Sweeps = 1000
```

ClearSweeps *Action*

Description

Initiates a Clear Sweeps action for Floor function trace Fx.

Sweeps *Integer*

Range: From 1 to 1000000, step 1

Description

Sets/Queries the maximum number of sweeps for Floor function trace Fx.

HISTOGRAM *app.Math.Fx.OperatorYSetup (Operator = "Histogram")*

Histogram of the values of a parameter. Or, if a waveform is used as the input, histogram the waveform sample amplitudes.

AutoFindScale	Bool
Bins	DoubleLockstep
Center	Double
ClearSweeps	Action
FindScale	Action
HorScale	DoubleLockstep
Values	Integer
VerScaleType	Enum

Example

```
    ' Visual Basic Script
    Set app = CreateObject("LeCroy.XStreamDSO")

    ' Configure F1 to histogram the first 200000 sample
    ' values from source waveform C1 into 50 bins.
    ' Auto find-scale is enabled.
    app.Math.F1.View = True
    app.Math.F1.Source1 = "C1"
    app.Math.F1.MathMode = "OneOperator"
    app.Math.F1.Operator1 = "Histogram"
    app.Math.F1.Operator1Setup.AutoFindScale = True
    app.Math.F1.Operator1Setup.Bins = 50
    app.Math.F1.Operator1Setup.Values = 200000
```

AutoFindScale *Bool*

Description

Enables/Disables automatic scale setting for histogram function Fx.

Bins *DoubleLock step*

Range: From 20 to 2000, step 1, locked to 1-2-5

Description

Sets/Queries the number of bins in histogram function Fx.

Center ***Double***

Range: From -1e+010 to 1e+010, step 1e-012

Description

Sets/Queries the horizontal value at the center of the graticule of histogram function Fx.

ClearSweeps ***Action***

Description

Clears the contents of all the bins of histogram function Fx.

FindScale ***Action***

Description

Creates a suitable horizontal position and scale to include all the non-empty bins of histogram Fx.

HorScale ***DoubleLock step***

Range: From 1e-012 to 1e+012, step 0.01, locked to 1-2-5

Description

Sets/Queries the horizontal scale in units per division for histogram function Fx. Use the FindScale control to automatically determine the scale by looking at the non-zero populated bins.

Values ***Integer***

Range: From 20 to 2000000000, step 1

Description

Sets/Queries the maximum number of values from the source result to include in the histogram function Fx.

VerScaleType ***Enum***

Description

Sets/Queries the way that the vertical scale is calculated as histogram Fx grows.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set function F1 as histogram.
app.Math.F1.Operator1 = "Histogram"
' Set the vertical scale type to linear with constant maximum.
app.Math.F1.Operator1Setup.VerScaleType = "LinConstMax"
```

Values

LinConstMax	Linear scale with constant maximum value
Linear	Linear scale

INTEGRAL *app.Math.Fx.OperatorYSetup (Operator = "Integral")*

Integral of the linearly rescaled (multiplier and adder) input.

Adder	Double
FindScale	Action
Multiplier	Double
VerOffset	Double
VerScale	DoubleLockstep

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure F1 to integrate C1
app.Math.F1.View = True
app.Math.F1.Source1 = "C1"
app.Math.F1.MathMode = "OneOperator"
app.Math.F1.Operator1 = "Integral"
app.Math.F1.Operator1Setup.Multiplier = 2
app.Math.F1.Operator1Setup.Adder = 0.1
app.Math.F1.Operator1Setup.FindScale
```

Adder ***Double***

Range: From -1e-009 to 1e-009, step 1e-012

Description

Sets/Queries the additive A for integral function Fx.

FindScale ***Action***

Description

Initiates an action to find suitable vertical offset and scale for integral function trace Fx.

Multiplier ***Double***

Range: From -1e+006 to 1e+006, step 1e-006

Description

Sets/Queries the multiplying constant M for integral function Fx.

VerOffset ***Double***

Range: From -1e+006 to 1e+006, step 1e-012

Description

Sets/Queries the vertical offset for integral function trace Fx.

VerScale ***DoubleLock step***

Range: From 1e-009 to 1e+007 step 0.01, locked to 1-2-5

Description

Sets/Queries the vertical scale for integral function trace Fx.

INTERPOLATE *app.Math.Fx.OperatorYSetup (Operator = "Interpolate")*

Interpolate, producing more points in the resulting waveform using linear, cubic, or weighted sin(x)/x algorithms.

Expand	DoubleLockstep
InterpolateType	Enum

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure F1 to interpolate C1
app.Math.F1.View = True
app.Math.F1.Source1 = "C1"
app.Math.F1.MathMode = "OneOperator"
app.Math.F1.Operator1 = "Interpolate"
app.Math.F1.Operator1Setup.InterpolateType = "Cubic"
app.Math.F1.Operator1Setup.Expand = 5
```

Expand *DoubleLock step*

Range: From 2 to 50, step 0.1, locked to 1-2-5

Description

Sets/Queries the sampling expansion ratio for the interpolation function Fx.

InterpolateType *Enum*

Description

Sets/Queries the type of interpolation for function trace Fx.

Values

Cubic
Linear
SinXX

MATH SCRIPT *app.Math.Fx.OperatorYSetup (Operator = "WaveScript")*

Visual basic script that produces a waveform from one or two input waveforms.

Math script

Code	String
Language	Enum
Status	String

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Place sample program code in a string
' This will invert the first 200 points of the waveform
code =        "function Update()" + vbcrlf
code = code + "    unscaledData = InResult.DataArray(False)" +
vbcrlf
code = code + "    For i = 0 to 200" + vbcrlf
code = code + "        unscaledData(i) = -unscaledData(i)" +
vbcrlf
code = code + "    next" + vbcrlf
code = code + "    OutResult.DataArray(False) = unscaledData" +
vbcrlf
code = code + "end Function"

' Configure F1 to integrate C1
app.Math.F1.View = True
app.Math.F1.Source1 = "C1"
app.Math.F1.MathMode = "OneOperator"
app.Math.F1.Operator1 = "Math Script"
```

Code *String*

Range: Any number of characters

Description

Sets/Queries the scripting code used in math script function Fx. For complete details of programming the instrument in VBScript, please view the online Help and the relevant section of this manual.

Language ***Enum***

Description

Sets/Queries the language used for math script function Fx.

Values

JScript	Java Script
VBScript	Visual Basic Script

Example

```
app.Math.F1.Operator1Setup.Language = "VBScript"
app.Math.F1.Operator1Setup.Code = code
```

Status ***String***

Range: Any number of characters

Description

Inspects the status of the script operation. A typical message would be "Error at line 23, Type mismatch"; or "OK" if the supplied code executed successfully.

MATHCADMATH *app.Math.Fx.OperatorYSetup (Operator = "MathcadMath")*

Produces a waveform using a user specified Mathcad function.

Advanced	Bool
FindScale	Action
NewSheet	Bool
OutputEnable	Bool
OutputHeaderVar	String
OutputVar	String
Reload	Action
Scaling	Enum
Source1Enable	Bool
Source1HeaderVar	String
Source1Var	String
Source2Enable	Bool
Source2HeaderVar	String
Source2Var	String
Status	String
WithHeader	Bool
WorksheetFilename	FileName

Example

```
    ' Visual Basic Script
    Set app = CreateObject("LeCroy.XStreamDSO")

    ' Configure F1 to process C1 using Mathcad
    app.Math.F1.View = True
    app.Math.F1.Source1 = "C1"
    app.Math.F1.MathMode = "OneOperator"
    app.Math.F1.Operator1 = "MathcadMath"
```

Advanced *Bool*

Description

Enables/Disables/Queries the use of the advanced features. When in advanced mode the names used for source and output vectors, in addition to names used for source and output headers, may be modified from their default values.

FindScale *Action*

Description

Sets a suitable vertical scale of the Mathcad output trace on the instrument graticule. Valid only when Manual scaling is specified.

NewSheet ***Bool***

Description

Enables/Disables/Queries the creation of a new Mathcad worksheet.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set function F1 as Mathcad calculation.
app.Math.F1.Operator1 = "MathcadMath"
' Enable creation of a new Mathcad worksheet.
app.Math.F1.Operator1Setup.NewSheet = True
```

OutputEnable ***Bool***

Description

Enables/Disables/Queries the transmission of output data from Mathcad to the instrument.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set function F1 as Mathcad calculation.
app.Math.F1.Operator1 = "MathcadMath"
' Enable transmission of output data.
app.Math.F1.Operator1Setup.OutputEnable = True
```

OutputHeaderVar ***String***

Range:	Any number of characters

Description

Sets/Queries the name in Mathcad of the output header variable.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set function F1 as Mathcad calculation.
app.Math.F1.Operator1 = "MathcadMath"
' Enables use of headers.
app.Math.F1.Operator1Setup.WithHeader = True
' Sets the name of the output header variable
app.Math.F1.Operator1Setup.OutputHeaderVar = "header1"
```

OutputVar ***String***

Range: Any number of characters

Description

Sets/Queries the name in Mathcad of the output variable.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set function F1 as Mathcad calculation.
app.Math.F1.Operator1 = "MathcadMath"
' Sets the name of the output variable in Mathcad.
app.Math.F1.Operator1Setup.OutputVar = "output3"
```

Reload ***Action***

Description

Reloads a specified Mathcad worksheet. If the worksheet does exist, the system creates an empty one with a name of the form "UntitledN", where N is an integer.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set function F1 as Mathcad calculation.
app.Math.F1.Operator1 = "MathcadMath"
' Specifies a Mathcad worksheet name.
app.Math.F1.Operator1Setup.WorksheetFilename = "XStream34.mcd"
' Reload a Mathcad worksheet.
app.Math.F1.Operator1Setup.Reload
```

Scaling ***Enum***

Description

Sets/Queries the method of vertical scaling of the Mathcad output trace on the instrument graticule.

Values

Automatic
Manual

Source1Enable ***Bool***

Description

Enables/Disables/Queries the transmission of source 1 data from the instrument to Mathcad.

Source1HeaderVar ***String***

Range: Any number of characters

Description

Sets/Queries the name in Mathcad of input 1 header variable.

Source1Var ***String***

Range: Any number of characters

Description

Sets/Queries the name in Mathcad of input variable 1.

Source2Enable ***Bool***

Description

Enables/Disables/Queries the transmission of source 2 data from the instrument to Mathcad.

Source2HeaderVar ***String***

Range: Any number of characters

Description

Sets/Queries the name in Mathcad of input 2 header variable.

Source2Var ***String***

Range: Any number of characters

Description

Sets/Queries the name in Mathcad of input variable 2.

Status ***String***

Range: Any number of characters

Description

Inspects the status of the Mathcad calculation.

WithHeader ***Bool***

Description

Enables/Disables/Queries inclusion of headers in the Mathcad calculation.

WorksheetFilename ***FileName***

Range: Any number of characters

Description

Sets/Queries a Mathcad worksheet file name.

MATLAB MATH *app.Math.Fx.OperatorYSetup (Operator = "MATLABWaveform")*

Produces a waveform using a user specified MATLAB function.

MATLABCode	String
MATLABPlot	Bool
MATLABScalePerDiv	Double
MATLABZeroOffset	Double

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure F1 to process C1 using MATLAB
app.Math.F1.View = True
app.Math.F1.Source1 = "C1"
app.Math.F1.MathMode = "OneOperator"
app.Math.F1.Operator1 = "MATLAB math"
app.Math.F1.Operator1Setup.MATLABCode = "WformOut = -0.5 * WformIn"
```

MATLABCode *String*

Range: Any number of characters

Description

Sends/Inspects the MATLAB code.

MATLABPlot *Bool*

Description

Enables/Disables a MATLAB plot.

MATLABScalePerDiv *Double*

Range: From 1e-009 to 1e+009, step 1e-009

Description

Sets/Queries the vertical scale in units per division, of the MATLAB output trace on the instrument graticule.

MATLABZeroOffset ***Double***

Range: From -1e+009 to 1e+009, step 1e-009

Description

Sets/Queries the vertical zero offset of the MATLAB output trace on the scope graticule. This is the position on the graticule where zero is found: a positive offset moves the trace downwards; a negative offset moves it upwards.

PHISTOGRAM *app.Math.Fx.OperatorYSetup (Operator = "PersistenceHistogram")*

Histogram of a slice of a persistence map.

CenterCursor	Action
ClearSweeps	Action
CutDirection	Enum
HorCutCenter	Double
HorCutWidth	Double
PctCutWidth	Double
VerCutCenter	Double
VerCutWidth	Double

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure F1 to generate a slice of the persistence map of C1
app.Math.F1.View = True
app.Math.F1.Source1 = "C1"
app.Math.F1.MathMode = "OneOperator"
app.Math.F1.Operator1 = "PHistogram"
app.Math.F1.Operator1Setup.CutDirection = "Horizontal"
app.Math.F1.Operator1Setup.HorCutWidth = 10e-3
app.Math.F1.Operator1Setup.CenterCursor
```

CenterCursor *Action*

Description

Centralizes the cut on the graticule for persistence histogram Fx.

ClearSweeps *Action*

Description

Initiates a clearance of the contents of persistence histogram Fx.

CutDirection *Enum*

Description

Sets/Queries the direction of the cut the persistence histogram Fx.

Values

Horizontal	Cut persistence map horizontally
Vertical	Cut persistence map vertically

HorCutCenter ***Double***

Range: From -10 to 10, step 0.0001

Description

Sets/Queries the position of the center of the horizontal cut (measured in the units of vertical scale) of the slice to be used in the persistence histogram Fx.

HorCutWidth ***Double***

Range: From -10 to 10, step 0.0001

Description

Sets/Queries the width of the horizontal cut (measured in the units of vertical scale) of the slice to be used in persistence histogram Fx.

PctCutWidth ***Double***

Range: From 0 to 100, step 0.1

Description

Sets/Queries the width of the cut in percent.

VerCutCenter ***Double***

Range: From -1 to 1, step 1e-009

Description

Sets/Queries the position of the center of the vertical cut (measured in the units of horizontal scale) of the slice to be used in persistence histogram Fx.

VerCutWidth ***Double***

Range: From -1 to 1, step 1e-009

Description

Sets/Queries the width of the vertical cut (measured in the units of horizontal scale) of the slice to be used in the persistence histogram Fx.

PTRACE MEAN *app.Math.Fx.OperatorYSetup (Operator = "PersistenceTraceMean")*

Create a waveform from the mean of a persistence map.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure F1 to generate a waveform from the
' mean value of the persistence map of C1
app.Math.F1.View = True
app.Math.F1.Source1 = "C1"
app.Math.F1.MathMode = "OneOperator"
app.Math.F1.Operator1 = "Ptrace mean"
app.Math.F1.Operator1Setup.ClearSweeps
```

ClearSweeps ***Action***

Description

Clears the contents of persistence mean trace Fx.

PTRACE RANGE *app.Math.Fx.OperatorYSetup (Operator = "PersistenceTraceRange")*

Generates a waveform with a width derived from a population range of a persistence map.

ClearSweeps	Action
PctPopulation	Double

Example

```
     ' Visual Basic Script
     Set app = CreateObject("LeCroy.XStreamDSO")


     ' Configure F1
     app.Math.F1.View = True
     app.Math.F1.Source1 = "C1"
     app.Math.F1.MathMode = "OneOperator"
     app.Math.F1.Operator1 = "Ptrace range"
     app.Math.F1.Operator1Setup.ClearSweeps
app.Math.F1.Operator1Setup.PctPopulation = 50.0
```

ClearSweeps ***Action***

Description

Clears the contents of persistence range trace Fx.

PctPopulation ***Double***

Range: From 0.5 to 100, step 0.5

Description

Sets/Queries the percentage of the persistence population that is spanned by persistence range trace Fx.

PTRACE SIGMA *app.Math.Fx.OperatorYSetup (Operator = "PersistenceTraceSigma")*

Generates a waveform with a width derived from the sigma of a persistence map.

ClearSweeps	Action
Sigma	Double

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")


' Configure F1

app.Math.F1.View = True

app.Math.F1.Source1 = "C1"

app.Math.F1.MathMode = "OneOperator"

app.Math.F1.Operator1 = "Ptrace sigma"

app.Math.F1.Operator1Setup.ClearSweeps

app.Math.F1.Operator1Setup.Sigma = 5.0
```

ClearSweeps *Action*

Description

Clears the contents of persistence sigma trace Fx.

Sigma *Double*

Range: From 0.5 to 10, step 0.1

Description

Sets/Queries the number of standard deviations of the persistence population that is spanned by sigma trace Fx.

RESCALE *app.Math.Fx.OperatorYSetup (Operator = "Rescale")*

Linearly transform the vertical values of a waveform.

Adder	Double
CustomUnit	Bool
Multiplier	Double
Unit	String

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure F1
app.Math.F1.View = True
app.Math.F1.Source1 = "C1"
app.Math.F1.MathMode = "OneOperator"
app.Math.F1.Operator1 = "Rescale"
app.Math.F1.Operator1Setup.Adder = 2.0
app.Math.F1.Operator1Setup.Multiplier = 3.0
app.Math.F1.Operator1Setup.CustomUnit = True
app.Math.F1.Operator1Setup.Unit = "DEG"
```

Adder ***Double***

Range: From -1.79769e+308 to 1.79769e+308, step 0

Description

Sets/Queries the additive constant A in the rescale function Fx = M.Input + A

CustomUnit ***Bool***

Description

Enables/Disables the application of a custom unit of measurement to rescale function trace Fx.

Multiplier ***Double***

Range: From -1.79769e+308 to 1.79769e+308 step 0

Description

Sets/Queries the multiplicative constant M in the rescale function Fx = M.Input + A.

Unit ***String***

Range: Any number of characters

Description

Sets/Queries the custom unit for rescale function trace Fx. Only used when the CustomUnit control is set to True.

ROOF *app.Math.Fx.OperatorYSetup (Operator = "Roof")*

The most positive or maximum values for an ensemble of sweeps, or "Roof."

ClearSweeps	Action
Sweeps	Integer

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure F1 to measure the Roof of the first 1000
' sweeps of C1
app.Math.F1.View = True
app.Math.F1.Source1 = "C1"
app.Math.F1.MathMode = "OneOperator"
app.Math.F1.Operator1 = "Roof"
app.Math.F1.Operator1Setup.Sweeps = 1000
```

ClearSweeps *Action*

Description

Initiates a clear sweeps action for roof function trace Fx.

Sweeps *Integer*

Range: From 1 to 1000000, step 1

Description

Sets/Queries the maximum number of sweeps for Roof function trace Fx.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set function trace F2 to roof.
app.Math.F2.Operator1 = "Roof"
' Set the maximum number of sweeps to 150.
app.Math.F2.Operator1Setup.Sweeps = 150
```

SEGMENT *app.Math.Fx.OperatorYSetup (Operator = "SegmentSelect")*

Selects one waveform from a group of waveforms.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Enable sequence acquisition mode, collect 10 segments
app.Acquisition.Horizontal.NumSegments = 10
app.Acquisition.Horizontal.SampleMode = "Sequence"

' Configure F1 to show the 5th of the 10 collected segments
app.Math.F1.View = True
app.Math.F1.Source1 = "C1"
app.Math.F1.MathMode = "OneOperator"
app.Math.F1.Operator1 = "Segment"
app.Math.F1.Operator1Setup.SelectedSegment = 5
```

SelectedSegment ***Integer***

Range: From 1 to 1000000000, step 1

Description

In sequence mode, sets/queries the number of the segment selected from a set.

SPARSE *app.Math.Fx.OperatorYSetup (Operator = "Sparse")*

Waveform sparser, will reduce the number of points in the output waveform by skipping points in the input, and starting at a given offset.

SparsingFactor	Integer
SparsingPhase	Integer

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Configure F1 to sparse C1 by a factor of 100
app.Math.F1.View = True
app.Math.F1.Source1 = "C1"
app.Math.F1.MathMode = "OneOperator"
app.Math.F1.Operator1 = "Sparse"
app.Math.F1.Operator1Setup.SparsingFactor = 100
```

SparsingFactor ***Integer***

Range: From 1 to 1000000, step 1

Description

Sets/Queries the factor by which the number of samples is reduced in the sparsing function Fx.

SparsingPhase ***Integer***

Range: From 0 to 0, step 1

Description

Sets/Queries the number of the first sample that will be accepted by the sparsing function Fx.

TRACK ***app.Math.Fx.OperatorYSetup (Operator = "Track")***

The "Track" function gives a waveform of equivalent horizontal scale to the source waveform, but of a measurement on that waveform.

AutoFindScale	Bool
Center	Double
FindScale	Action
VerScale	DoubleLockstep

AutoFindScale ***Bool***

Description

Enables/Disables the automatic setting of the vertical scale and vertical offset for Track trace Fx.

Center ***Double***

Range: From -1e+010 to 1e+010, step 1e-012

Description

Sets/Queries the vertical position of the center of Track trace Fx.

FindScale ***Action***

Description

Sets the vertical scale and offset to optimum values to display Track trace Fx.

VerScale ***DoubleLock step***

Range: From 1e-012 to 1e+012 step 0.01, locked to 1-2-5

Description

Sets/Queries the vertical scale of Track trace Fx.

TREND *app.Math.Fx.OperatorYSetup (Operator = "Trend")*

Trend of the values of a parameter, if connected to a parameter result source, or a trend of the sample values of a waveform, if connected to a waveform result.

AutoFindScale	Bool
Center	Double
ClearSweeps	Action
FindScale	Action
Values	Integer
VerScale	DoubleLockstep

AutoFindScale ***Bool***

Description

Enables/Disables the automatic setting of the vertical scale and vertical offset for Trend trace Fx.

Center ***Double***

Range: From -1e+010 to 1e+010, step 1e-012

Description

Sets/Queries the vertical position of the center of Trend trace Fx.

ClearSweeps ***Action***

Description

Clears the contents of Trend trace Fx.

FindScale ***Action***

Description

Sets the vertical scale and offset to optimum values to display Trend trace Fx.

Values ***Integer***

Range: From 20 to 1000000, step 1

Description

Sets/Queries the number of visible values in Trend trace Fx.

VerScale ***DoubleLock step***

Range: From 1e-012 to 1e+012 step 0.01, locked to 1-2-5

Description

Sets/Queries the vertical scale of Trend trace Fx.

MATHCADPARAMARITH *app.Measure.Px.Operator (ArithEngine = "MathcadParamArith")*

Advanced	Bool
NewSheet	Bool
OutputEnable	Bool
OutputHeaderVar	String
OutputVar	String
Reload	Action
Source1Enable	Bool
Source1HeaderVar	String
Source1Var	String
Source2Enable	Bool
Source2HeaderVar	String
Source2Var	String
Status	String
WithHeader	Bool
WorksheetFilename	FileName

Advanced *Bool*

Description

Enables/Disables/Queries use of advanced features for Mathcad parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P3 as Mathcad calculation.
app.Measure.P3.ParamEngine = "MathcadParam"
' Enables use of advanced features.
app.Measure.P3.Operator.Advanced = True
```

NewSheet *Bool*

Description

Enables/Disables/Queries the use of a new Mathcad worksheet for parameters.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P3 as Mathcad calculation.
app.Measure.P3.ParamEngine = "MathcadParam"
' Enable new Mathcad worksheet.
app.Measure.P3.Operator.NewSheet = True
```

OutputEnable ***Bool***

Description

Enables/Disables/Queries transmission of output data from Mathcad to the instrument.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P3 as Mathcad calculation.
app.Measure.P3.ParamEngine = "MathcadParam"
' Enables transmission of Mathcad output to the instrument.
app.Measure.P3.Operator.OutputEnable = True
```

OutputHeaderVar ***String***

Range: Any number of characters

Description

Sets/Queries the name of the output variable header in Mathcad parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P3 as Mathcad calculation.
app.Measure.P3.ParamEngine = "MathcadParam"
' Sets the name of the Mathcad output header variable
app.Measure.P3.Operator.OutputHeaderVar = "outputheader"
```

OutputVar ***String***

Range: Any number of characters

Description

Sets/Queries the name of the output variable in Mathcad parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P3 as Mathcad calculation.
app.Measure.P3.ParamEngine = "MathcadParam"
' Sets the name of the Mathcad output variable
app.Measure.P3.Operator.OutputVar = "output7"
```

Reload ***Action***

Description

Reloads the specified Mathcad file.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P3 as Mathcad calculation.
app.Measure.P3.ParamEngine = "MathcadParam"
' Specfify a Mathcad worksheet filename.
app.Measure.P3.Operator.WorksheetFilename =
"C:\XStreamMathcad\Param233.mcd"
' Reload the specified Mathcad file.
app.Measure.P3.Operator.Reload
```

Source1Enable ***Bool***

Description

Enables/Disables/Queries transmission of source data 1 from instrument to Mathcad.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P3 as Mathcad calculation.
app.Measure.P3.ParamEngine = "MathcadParam"
' Enables transmission of source 1 data to instrument.
app.Measure.P3.Operator.Source1Enable = True
```

Source1HeaderVar ***String***

Range: Any number of characters

Description

Sets/Queries the name of the input variable 1 header in Mathcad parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P3 as Mathcad calculation.
app.Measure.P3.ParamEngine = "MathcadParam"
' Sets the name of the Mathcad source 1 header variable
app.Measure.P3.Operator.Source1HeaderVar = "input1header"
```

Source1Var ***String***

Range: Any number of characters

Description

Sets/Queries the name of input variable 1 in Mathcad parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P3 as Mathcad calculation.
app.Measure.P3.ParamEngine = "MathcadParam"
' Sets the name of the source 1 variable
app.Measure.P3.Operator.Source1Var = "input1"
```

Source2Enable ***Bool***

Description

Enables/Disables/Queries transmission of source data 2 from instrument to Mathcad.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P3 as Mathcad calculation.
app.Measure.P3.ParamEngine = "MathcadParam"
' Enables transmission of source 2 data to instrument.
app.Measure.P3.Operator.Source2Enable = True
```

Source2HeaderVar ***String***

Range: Any number of characters

Description

Sets/Queries the name of input variable 2 header in Mathcad parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P3 as Mathcad calculation.
app.Measure.P3.ParamEngine = "MathcadParam"
' Sets the name of the Mathcad source 2 header variable
app.Measure.P3.Operator.Source2HeaderVar = "input2header"
```

Source2Var ***String***

Range: Any number of characters

Description

Sets/Queries the name of input variable 2 in Mathcad parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P3 as Mathcad calculation.
app.Measure.P3.ParamEngine = "MathcadParam"
' Sets the name of the source 2 variable
app.Measure.P3.Operator.Source2Var = "input2"
```

Status **String**

Range: Any number of characters

Description

Inspects the status of Mathcad parameter calculation Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P3 as Mathcad calculation.
app.Measure.P3.ParamEngine = "MathcadParam"
' Inspect status of Mathcad parameter calculation.
MathcadStatus = app.Measure.P3.Operator.Status
```

WithHeader ***Bool***

Description

Enables/Disables/Queries the presence of headers with variables with Mathcad parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P3 as Mathcad calculation.
app.Measure.P3.ParamEngine = "MathcadParam"
' Enables inclusion of headers with data.
app.Measure.P3.Operator.WithHeader = True
```

WorksheetFilename ***FileName***

Range: Any number of characters

Description

Sets/Queries the name of the current Mathcad file for parameter Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P3 as Mathcad calculation.
app.Measure.P3.ParamEngine = "MathcadParam"
' Specfify a Mathcad worksheet filename.
app.Measure.P3.Operator.WorksheetFilename =
"C:\XStreamMathcad\Param233.mcd"
```

P INVERT *app.Measure.Px.Operator (ArithEngine = "ParamInvert")*

This engine produces the reciprocal of the input parameter.

CycleForTimeUnits ***Bool***

Description

Sets/Queries the use of period as the measurement for time units, rather than 1/Hz.

When true, if there are seconds in the vertical dimensions of the source parameter, it is assumed that there is an implicit "cycles" per second. Thus the resulting units upon inversion is Hertz (cycles per second).

P SCRIPT *app.Measure.Px.Operator (ArithEngine = "ParamScript")*

Calculates a parameter result from one or two parameter inputs

Code	String
Language	Enum
Status	String
Timeout	Double

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Place sample program code in a string
' This will the square of the input value times 3.1
code =        "function Update()" + vbcrlf
code = code + "    value = InResult.Value(False)" + vbcrlf
code = code + "    OutResult.Value(False) = value * value * 3.1"
+ vbcrlf
code = code + "end Function"

' Configure P1 as a scripting component
app.Measure.P1.View = True
app.Measure.P1.Source1 = "C1"
app.Measure.P1.MeasurementType = "math"
app.Measure.P1.ArithEngine = "P Script"
app.Measure.P1.Operator.Language = "VBScript"
app.Measure.P1.Operator.Code = code
```

Code ***String***

Range: Any number of characters

Description

Sets/Queries the code used to calculate parameter Px. This code is, of course, text.

Language ***Enum***

Description

Sets/Queries the language for parameter script Fx (i.e., choice of scripting language).

Values

JScript
VBScript

Status *String*

Range: Any number of characters

Description

Inspects the status of parameter script Px. A typical message is "Error in line 14, Expected end of statement."

Timeout *Double*

Range: From 1 to 12000, step 0.001

Description

Sets/Queries the time-out for parameter script Px.

Q *app.Measure.Px.Operator (ParamEngine = "EyeQ")*

Calculates the Q-factor based on a vertical slice from the (assumed input) eye diagram. The width of the vertical slice is specified through PctCutWidth

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")

app.Measure.P1.ParamEngine = "EyeQ"
```

PctCutWidth ***Double***

Range: From 0 to 100, step 0.1

Description

Sets/Queries the vertical slice or cut width in percent.

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")


' Sets the cut width to 8%.

app.Measure.P1.Operator.PctCutWidth = 8
```

AREA *app.Measure.Px.Operator (ParamEngine = "Area")*

Calculates the area of the input waveform relative to zero.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to area.
app.Measure.P1.View = True
app.Measure.P1.MeasurementType = "measure"
app.Measure.P1.ParamEngine = "Area"
app.Measure.P1.Source1 = "C1"

' Enable cyclic calculation of area.
app.Measure.P1.Operator.Cyclic = True

' Set markers to simple.
app.Measure.P1.Operator.CursorDisplay = "Simple"
```

Cyclic *Bool*

Description

Enables/Disables cyclic calculation of area parameter Px, which is calculated using a whole number of cycles of the signal.

Note: Help Markers aid in selecting the region of the waveform where measurement is made.

AVG POWER *app.Measure.Px.Operator (ParamEngine = "EyeAvgPower")*

The measurement is assumed to be on an eye-diagram, and the percentage of a unit-interval at the center of the eye is used to estimate the average power.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


app.Measure.P1.ParamEngine = "EyeAvgPower"


' Sets the cut width to 8% of the unit interval.
app.Measure.P1.Operator.PctCutwidth = 8
```

PctCutWidth ***Double***

Range: From 0 to 100, step 0.1

Description

Sets/Queries the cut width in percent.

DPERIOD@LEVEL *app.Measure.Px.Operator (ParamEngine = "DeltaPeriodAtLevel")*

Delta-period at level, the difference between successive (adjacent periods), also known as "cycle-to-cycle jitter."

AbsLevel	Double
BaseFrequency	Double
FindBaseFrequency	Action
FindLevel	Action
GroupSize	Integer
Hysteresis	Double
LevelType	Enum
PercentLevel	Double
SignalType	Enum
Slope	Enum
StartCycle	Integer
StdBaseFrequency	Enum
UseBaseFrequency	Enum

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta period at level.
app.Measure.MeasureMode = "MyMeasure"
app.Measure.P1.MeasurementType = "measure"
app.Measure.P1.ParamEngine = "DeltaPeriodAtLevel"
' Set level type to absolute.
app.Measure.P1.Operator.LevelType = "Absolute"
' Set the measurement level to 5 mV.
app.Measure.P1.Operator.AbsLevel = 0.005
```

AbsLevel ***Double***

Range: From -100 to 100, step 1e-007

Description

Sets/Queries the absolute measuring level for parameter period at level Px.

BaseFrequency ***Double***

Range: From 1 to 4e+010, step 1000

Description

Sets/Queries the base frequency of the signal for the parameter delta period at level. This only has effect when the UseBaseFrequency = "Custom", otherwise the base frequency is set directly from the standard selection.

When the period measurements are made on a data-stream instead of a clock, the engine needs to be told, or to learn, the base frequency (effective clock frequency). Since precision is exceptionally important, it's most often the case that the engine is asked to find the frequency, and then this control is queried to verify that the correct frequency has been found.

FindBaseFrequency ***Action***

Description

Finds the base frequency of the signal by inspecting the signal, if you are not supplying a standard value or a custom value.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta period at level.
app.Measure.P1.ParamEngine = "DeltaPeriodAtLevel"
' Find the base frequency of the signal.
app.Measure.P1.Operator.FindBaseFrequency
```

FindLevel ***Action***

Description

Finds the 50 percent level for delta period measurements. Level type may be either absolute or percentage.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta period at level.
app.Measure.P1.ParamEngine = "DeltaPeriodAtLevel"
' Find the 50 percent level.
app.Measure.P1.Operator.FindLevel
```

GroupSize ***Integer***

Range: From 1 to 128, step 1

Description

Sets/Queries the size of a group of consecutive cycles for the delta period at level parameter Px. This is an advanced feature.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta period at level.
app.Measure.P1.ParamEngine = "DeltaPeriodAtLevel"
' Set up for clock signal.
app.Measure.P1.Operator.SignalType = "Clock"
' Set the group size to 8.
app.Measure.P1.Operator.GroupSize = 8
```

Hysteresis ***Double***

Range: From 0 to 10, step 0.1

Description

Sets the hysteresis range for parameter delta-period at level Px, specified in divisions. Hysteresis can be used to obtain good noise rejection.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta period at level.
app.Measure.P1.ParamEngine = "DeltaPeriodAtLevel"
' Set the hysteresis range to 0.9 division. (+- 0.45 divisions)
app.Measure.P1.Operator.Hysteresis = 0.9
```

LevelType ***Enum***

Description

Sets/Queries whether the level is absolute or a percentage of the amplitude of the signal for Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta period at level.
app.Measure.P1.ParamEngine = "DeltaPeriodAtLevel"
```

```
' Set level type to absolute.
app.Measure.P1.Operator.LevelType = "Absolute"
```

Values

Absolute
Percent

PercentLevel ***Double***

Range: From 0 to 100, step 1

Description

Sets/Queries the percentage measuring level for parameter delta-period at level Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta period at level.
app.Measure.P1.ParamEngine = "DeltaPeriodAtLevel"
' Set level type to percentage.
app.Measure.P1.Operator.LevelType = Percent
' Set the measurement level to 55%
app.Measure.P1.Operator.PercentLevel = 55
```

SignalType ***Enum***

Description

Sets/Queries the type of data specified for the measurement of delta-period at level.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta period at level.
app.Measure.P1.ParamEngine = "DeltaPeriodAtLevel"
' Set the signal type to data.
app.Measure.P1.Operator.SignalType = "Data"
```

Values

Clock
Data

Slope ***Enum***

Description

Sets/Queries the polarity of the transitions for measuring parameter delta-period at level.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set parameter P1 to delta period at level.
app.Measure.P1.ParamEngine = "DeltaPeriodAtLevel"
' Set transtion polarity to negative.
app.Measure.P1.Operator.LevelType = "Neg"
```

Values

Both
Neg
Pos

StartCycle ***Integer***

Range: From 0 to 0, step 1

Description

Sets/Queries the start cycle when measuring over groups of clock cycles

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta period at level.
app.Measure.P1.ParamEngine = "DeltaPeriodAtLevel"
' Set up for clock signal.
app.Measure.P1.Operator.SignalType = "Clock"
' Set the group size to 8.
app.Measure.P1.Operator.GroupSize = 8
' Set the start cycle to 2.
app.Measure.P1.Operator.StartCycle = 2
```

StdBaseFrequency ***Enum***

Description

Sets/Queries the standard base frequency, sending or receiving a string from the list of standard frequencies.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta period at level.
app.Measure.P1.ParamEngine = "DeltaPeriodAtLevel"
' Set up to use the standard frequency
app.Measure.P1.Operator.UseBaseFrequency = "Standard"
' Set the standard base frequency to 2.048 MHz.
app.Measure.P1.Operator.StdBaseFrequency = "2.048MHz"
```

Values

1.544MHz
139.264MHz
155.52MHz
2.048MHz
2488.32MHz
34.368MHz
44.736MHz

51.84MHz
622.08MHz
8.448MHz

UseBaseFrequency ***Enum***

Description

Sets/Queries the choice of a specified base frequency as custom or standard. When "custom" is selected, you must specify or find the base frequency.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set parameter P1 to delta period at level.
app.Measure.P1.ParamEngine = "DeltaPeriodAtLevel"
' Set up to use a standard base frequency.
app.Measure.P1.Operator.UseBaseFrequency = "Standard"
```

Values

Custom
Standard

DTIME@LEVEL *app.Measure.Px.Operator (ParamEngine = "DeltaTimeAtLevel")*

A calculation of the time between two highly specific transitions.

AbsLevel1	Double
AbsLevel2	Double
FindLevel1	Action
FindLevel2	Action
Hysteresis1	Double
Hysteresis2	Double
LevelType1	Enum
LevelType2	Enum
PercentLevel1	Double
PercentLevel2	Double
Slope1	Enum
Slope2	Enum

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta time at level.
app.Measure.MeasureMode = "MyMeasure"
app.Measure.P1.MeasurementType = "measure"
app.Measure.P1.ParamEngine = "DeltaTimeAtLevel"
' Set level type for trace 1 to absolute.
app.Measure.P1.Operator.LevelType1 = "Absolute"
' Set the measurement level for trace 1 to 25 mV
app.Measure.P1.Operator.AbsLevel1 = 0.025
```

AbsLevel1 *Double*

Range: From -100 to 100, step 1e-005

Description

Sets/Queries the absolute measuring level for the first transition time, if LevelType1 = “Absolute".

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta time at level.
app.Measure.P1.ParamEngine = "DeltaTimeAtLevel"
' Set level type for trace 1 to absolute.
app.Measure.P1.Operator.LevelType1 = "Absolute"
' Set the measurement level for trace 1 to 25 mV
app.Measure.P1.Operator.AbsLevel1 = 0.025
```

AbsLevel2 ***Double***

Range: From -100 to 100, step 1e-005

Description

Sets/Queries the absolute measuring level for the second transition time, if LevelType2 = “Absolute".

FindLevel1 ***Action***

Description

Sets the measurement level automatically for the first transition time. (Works for both percent and absolute level modes.)

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set parameter P1 to delta time at level.
app.Measure.P1.ParamEngine = "DeltaTimeAtLevel"
' Find the level for trace 1.
app.Measure.P1.Operator.FindLevel1
```

FindLevel2 ***Action***

Description

Sets the measurement level automatically for second transition (for LevelType2 either "Percent" or "Absolute").

Hysteresis1 ***Double***

Range: From 0 to 10, step 0.1

Description

Sets/Queries the hysteresis level in graticule divisions for first transition time. (This is an advanced feature.)

Hysteresis2 ***Double***

Range: From 0 to 10, step 0.1

Description

Sets/Queries the hysteresis level in graticule divisions for the second transition. (This is an advanced feature.)

LevelType1 ***Enum***

Description

Sets/Queries whether to use absolute level or percent level for the first transition time.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta time at level.
app.Measure.P1.ParamEngine = "DeltaTimeAtLevel"
' Set level type for trace 1 to percentage.
app.Measure.P1.Operator.LevelType1 = "Percent"
' Set the measurement level for trace 1 to 55%
app.Measure.P1.Operator.PercentLevel1 = 55
```

Values

Absolute
Percent

LevelType2 ***Enum***

Description

Sets/Queries whether to use absolute level or percent level for specifying the second transition.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta time at level.
app.Measure.P1.ParamEngine = "DeltaTimeAtLevel"
' Set level type for trace 2 to absolute.
app.Measure.P1.Operator.LevelType2 = "Absolute"
' Set the measurement level for trace 2 to 15 mV
app.Measure.P1.Operator.AbsLevel2 = 0.015
```

Values

Absolute
Percent

PercentLevel1 ***Double***

Range: From 0 to 100, step 1

Description

Sets/Queries the measuring level, in percent, for the first transition if LevelType1 = “Percent".

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta time at level.
app.Measure.P1.ParamEngine = "DeltaTimeAtLevel"
' Set level type for trace 1 to percentage.
app.Measure.P1.Operator.LevelType1 = "Percent"
' Set the measurement level for trace 1 to 55%
app.Measure.P1.Operator.PercentLevel1 = 55
```

PercentLevel2 ***Double***

Range: From 0 to 100, step 1

Description

Sets/Queries the measuring level, in percent, for the second transition if LevelType2 = “Percent".

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta time at level.
app.Measure.P1.ParamEngine = "DeltaTimeAtLevel"
' Set level type for trace 2 to percentage.
app.Measure.P1.Operator.LevelType2 = "Percent"
' Set the measurement level for trace 2 to 45%
app.Measure.P1.Operator.PercentLevel2 = 45
```

Slope1 ***Enum***

Description

Sets/Queries the transition polarity of trace 1 for delta time at level Fx.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta time at level.
app.Measure.P1.ParamEngine = "DeltaTimeAtLevel"
' Set edge polarity for trace 1 to positive.
app.Measure.P1.Operator.Slope1 = "Pos"
```

Values

Both
Neg
Pos

Slope2 *Enum*

Description

Sets/Queries the transition polarity of the second transition time.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set parameter P1 to delta time at level.
app.Measure.P1.ParamEngine = "DeltaTimeAtLevel"
' Set edge polarity for the second transition to both.
app.Measure.P1.Operator.Slope2 = "Both"
```

Values

Both
Neg
Pos

DUTY@LEVEL

app.Measure.Px.Operator (ParamEngine = "DutyAtLevel")

AbsLevel	Double
FindLevel	Action
Hysteresis	Double
HysteresisPct	Double
HysteresisType	Enum
LevelType	Enum
PercentLevel	Double
Slope	Enum

AbsLevel *Double*

Range: From -100 to 100, step 1e-007

Description

Sets/Queries the absolute level used if LevelType = “Absolute"

FindLevel *Action*

Description

Causes the engine to find a suitable level for either LevelType ("Absolute" or "Percent").

Hysteresis *Double*

Range: From 0 to 10, step 0.1

Description

Sets/Queries the hysteresis range in divisions for duty at level Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta time at level.
app.Measure.P1.ParamEngine = "DutyAtLevel"
' Set hysteresis measurement type to divisions.
app.Measure.P1.Operator.HysteresisType = "Divisions"
' Set the hysteresis to 0.8 divisions.
app.Measure.P1.Operator.Hysteresis = 0.8
```

HysteresisPct ***Double***

Range: From 0 to 100, step 0.1

Description

Sets/Queries the percent hysteresis range for duty at level Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta time at level.
app.Measure.P1.ParamEngine = "DutyAtLevel"
' Set hysteresis measurement type to percentage.
app.Measure.P1.Operator.HysteresisType = "Percent"
' Set the percent hysteresis  to 55%
app.Measure.P1.Operator.HysteresisPct = 55
```

HysteresisType ***Enum***

Description

Sets/Queries whether to set the hysteresis range in divisions or percent of the signal amplitude.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to delta time at level.
app.Measure.P1.ParamEngine = "DutyAtLevel"
' Set hysteresis measurement type to percentage.
app.Measure.P1.Operator.HysteresisType = "Percent"
' Set the percent hysteresis  to 55%
app.Measure.P1.Operator.HysteresisPct = 55
```

Values

Divisions
Percent

LevelType ***Enum***

Values

Absolute
Percent

PercentLevel ***Double***

Range: From 0 to 100, step 1

Description

Using ParamEngine = "DutyAtLevel", refer to the corresponding variable for the Delta Time At Level parameter.

Slope ***Enum***

Description

Sets/Queries the polarity of the first transition used (i.e., classic duty factor is for setting "Pos")

Values

Neg
Pos

DWIDTH@LEVEL *app.Measure.Px.Operator (ParamEngine = "DeltaWidthAtLevel")*

Calculates the Difference (delta) between adjacent width measurements.

AbsLevel	Double
FindLevel	Action
Hysteresis	Double
LevelType	Enum
PercentLevel	Double
Slope	Enum

AbsLevel ***Double***

Range: From -100 to 100, step 1e-007

Description

Sets/Queries the absolute level used if LevelType = “Absolute"

FindLevel ***Action***

Description

Causes the engine to find a suitable level for either LevelType ("Absolute" or "Percent")

Hysteresis ***Double***

Range: From 0 to 10, step 0.1

Description

Sets/Queries the hysteresis setting for this measurement. (This is an advanced feature.)

LevelType ***Enum***

Description

Sets/Queries whether to use absolute level or percent level for the last (ending) transition time.

Values

Absolute
Percent

PercentLevel ***Double***

Range: From 0 to 100, step 1

Description

Sets/Queries the percentage level to be used if the LevelType = “Percent”.

Slope ***Enum***

Description

Sets/Queries which polarity transition is used as the start (first) of the width measurement.

Values

Both

Neg

Pos

EDGE@LEVEL *app.Measure.Px.Operator (ParamEngine = "EdgeAtLevel")*

Counts the number of transitions or edges in the input waveform.

AbsLevel	Double
FindLevel	Action
Hysteresis	Double
LevelType	Enum
PercentLevel	Double
Slope	Enum

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


app.Measure.P1.ParamEngine = "EdgeAtlevel"
```

AbsLevel ***Double***

Range: From -100 to 100, step 1e-007

Description

Sets/Queries the absolute level used to detect edges, when LevelType = "Absolute"

FindLevel ***Action***

Description

Causes the engine to find a suitable level for either LevelType ("Absolute" or "Percent")

Hysteresis ***Double***

Range: From 0 to 10, step 0.1

Description

Sets/Queries the hysteresis used for edge detection in divisions. (This is an advanced feature.)

LevelType ***Enum***

Description

Sets/Queries whether to use absolute or percent levels.

Values

Absolute
Percent

PercentLevel ***Double***

Range: From 0 to 100, step 1

Description

Sets/Queries the percent level threshold used for detection of edges when LevelType = “Percent".

Slope ***Enum***

Description

Sets/Queries the polarity of the edges detected.

Values

Both
Neg
Pos

EXCELPARAM

app.Measure.Px.Operator (ParamEngine = "ExcelParam")

AddChart	Action
AddLabels	Action
Advanced	Bool
ClearSheet	Action
CreateDemoSheet	Action
NewSheet	Bool
OutputCell	String
OutputEnable	Bool
OutputHeaderCell	String
Source1Cell	String
Source1Enable	Bool
Source1HeaderCell	String
Source2Cell	String
Source2Enable	Bool
Source2HeaderCell	String
SpreadsheetFilename	FileName
Status	String
WithHeader	Bool

AddChart *Action*

Description

Adds a chart to the output worksheet.

AddLabels *Action*

Description

Using ParamEngine = "ExcelParam", refer to the corresponding variable for the ExcelMath function.

Advanced *Bool*

Description

Sets/Queries whether advanced features of this component are enabled.

ClearSheet *Action*

Description

Using ParamEngine = "ExcelParam", refer to the corresponding variable for the ExcelMath function.

CreateDemoSheet *Action*

Description

Using ParamEngine = "ExcelParam", refer to the corresponding variable for the ExcelMath function.

NewSheet ***Bool***

Description

Using ParamEngine = "ExcelParam", refer to the corresponding variable for the ExcelMath function.

OutputCell ***String***

Range: Any number of characters

Description

Using ParamEngine = "ExcelParam", refer to the corresponding variable for the ExcelMath function.

OutputEnable ***Bool***

Description

Using ParamEngine = "ExcelParam", refer to the corresponding variable for the ExcelMath function.

OutputHeaderCell ***String***

Range: Any number of characters

Description

Using ParamEngine = "ExcelParam", refer to the corresponding variable for the ExcelMath function.

Source1Cell ***String***

Range: Any number of characters

Description

Using ParamEngine = "ExcelParam", refer to the corresponding variable for the ExcelMath function.

Source1Enable ***Bool***

Description

Using ParamEngine = "ExcelParam", refer to the corresponding variable for the ExcelMath function.

Source1HeaderCell ***String***

Range: Any number of characters

Description

Using ParamEngine = "ExcelParam", refer to the corresponding variable for the ExcelMath function.

Source2Cell ***String***

Range: Any number of characters

Description

Using ParamEngine = "ExcelParam", refer to the corresponding variable for the ExcelMath function.

Source2Enable ***Bool***

Description

Using ParamEngine = "ExcelParam", refer to the corresponding variable for the ExcelMath function.

Source2HeaderCell ***String***

Range: Any number of characters

Description

Using ParamEngine = "ExcelParam", refer to the corresponding variable for the ExcelMath function.

SpreadsheetFilename ***FileName***

Range: Any number of characters

Description

Using ParamEngine = "ExcelParam", refer to the corresponding variable for the ExcelMath function.

Status ***String***

Range: Any number of characters

Description

Using ParamEngine = "ExcelParam", refer to the corresponding variable for the ExcelMath function.

WithHeader ***Bool***

Description

Using ParamEngine = "ExcelParam", refer to the corresponding variable for the ExcelMath function.

EXT. RATIO

app.Measure.Px.Operator (ParamEngine = "ExtinctionRatio")

Extinction Ratio assumes it is operating on an eye diagram (persistence result).

CalcType	Enum
PctCutWidth	Double

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set parameter P1 to ExtinctionRatio
app.Measure.P1.ParamEngine = "ExtinctionRatio"
```

CalcType *Enum*

Description

Sets/Queries the calculation type.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


app.Measure.P1.ParamEngine = "ExtinctionRatio"
' Set the calculation type to linear.
app.Measure.P1.Operator.CalcType = "Linear"
```

Values

dB
linear

PctCutWidth *Double*

Range: From 0 to 100, step 0.1

Description

Sets/Queries the percent cut width. This specifies which region of the eye diagram (about the center of the eye) will be used to estimate extinction ratio.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set parameter P1 to delta time at level.
app.Measure.P1.ParamEngine = "ExtinctionRatio"
' Set the percent cut width to 15%.
app.Measure.P1.Operator.PctCutWidth = 15
```

EYE AMPLITUDE *app.Measure.Px.Operator (ParamEngine = "EyeAmplitude")*

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")


app.Measure.P1.ParamEngine = "EyeAmplitude"
```

PctCutWidth ***Double***

Range: From 0 to 100, step 0.1

Description

Sets/Queries the percent cut width. This specifies which region of the eye diagram (about the center of the eye) will be used to estimate eye amplitude.

EYE BER *app.Measure.Px.Operator (ParamEngine = "EyeBER")*

Estimates the BER based on a cut through the (assumed input) Eye Diagram.

Example

```
    ' Visual Basic Script
    Set app = CreateObject("LeCroy.XStreamDSO")
    app.Measure.P1.ParamEngine = "EyeBER"
```

PctCutWidth ***Double***

Range: From 0 to 100, step 0.1

Description

Sets/Queries the percent cut width. This specifies which region of the eye diagram (about the center of the eye) will be used to estimate Bit Error Rate

EYE HEIGHT *app.Measure.Px.Operator (ParamEngine = "EyeHeight")*

Estimates the difference between the high (one level) and low (zero level) of the (assumed input) eye diagram, based on a vertical slice centered on the eye diagram of a specified width, PctCutWidth.

CalcUnits	Enum
PctCutWidth	Double

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")

app.Measure.P1.ParamEngine = "EyeHeight"

app.Measure.P1.Operator.PctCutWidth = 7
```

CalcUnits *Enum*

Description

Using ParamEngine = "EyeHeight", refer to the corresponding variable for the Extinction Ratio parameter.

Values

dB
linear

PctCutWidth *Double*

Range: From 0 to 100, step 0.1

Description

Sets/Queries the percent cut width. This specifies which region of the eye diagram (about the center of the eye) will be used to estimate eye height.

FALL@LEVEL *app.Measure.Px.Operator (ParamEngine = "FallAtLevel")*

Calculates the fall time at specified arbitrary levels.

HighAbs	Double
HighPct	Double
LevelsAre	Enum
LowAbs	Double
LowPct	Double

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.P1.ParamEngine = "FallAtLevel"

' Set measurement level type to percent.
app.Measure.P1.Operator.LevelsAre = "Percent"
' Set the higher percent level to 85 percent.
app.Measure.P1.Operator.HighPct = 85
' Set the higher percent level to 15 percent.
app.Measure.P1.Operator.HighPct = 15
```

HighAbs *Double*

Range: From -100 to 100, step 1e-007

Description

Sets/Queries the upper (first) transition level, if LevelsAre = “Absolute".

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to fall time at set levels.
app.Measure.P1.ParamEngine = "FallAtLevel"
' Set measurement level type to absolute.
app.Measure.P1.Operator.LevelsAre = "Absolute"
' Set the higher absolute level to 120 mV.
app.Measure.P1.Operator.HighAbs = 0.12
```

HighPct *Double*

Range: From 11 to 95, step 1

Description

Sets/Queries the upper (first) transition level, if LevelsAre = “Percent".

LevelsAre ***Enum***

Description

Sets/Queries whether the measurement levels are absolute or relative to the trace.

Values

Absolute
Percent

LowAbs ***Double***

Range: From -100 to 100, step 1e-007

Description

Sets/Queries the lower (second) transition level, if LevelsAre = “Absolute”.

LowPct ***Double***

Range: From 5 to 89, step 1

Description

Sets/Queries the lower (second) transition level, if LevelsAre = “Percent”.

FREQ@LEVEL *app.Measure.Px.Operator (ParamEngine = "FrequencyAtLevel")*

Calculates the frequency based on a specified transition level.

AbsLevel	Double
BaseFrequency	Double
FindBaseFrequency	Action
FindLevel	Action
Hysteresis	Double
LevelType	Enum
PercentLevel	Double
SignalType	Enum
Slope	Enum
StdBaseFrequency	Enum
UseBaseFrequency	Enum

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.P1.ParamEngine = "FrequencyAtlevel"
```

AbsLevel *Double*

Range: From -100 to 100, step 1e-007

Description

Sets/Queries the transition level, if LevelType = "Percent".

BaseFrequency *Double*

Range: From 1 to 4e+010, step 1000

Description

Sets/Queries a custom (non-standard) base frequency to be used when SignalType = "Data" and when UseBaseFrequency = "Custom"

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to frequency at level.
app.Measure.P1.ParamEngine = "FrequencyAtLevel"
' Set the instrument to treat the input waveform as a data
stream.
app.Measure.P1.Operator.SignalType = "Data"
' Set the instrument to use a non-standard base frequency.
app.Measure.P1.Operator.UseBaseFrequency = "Custom"
' Set the base frequency to 23.79 MHz. (note this is a number not
 a string,
'however a string would work just as well)
app.Measure.P1.Operator.BaseFrequency = 23.79e6
```

FindBaseFrequency ***Action***

Description

Set the base frequency by inspection of the data signal, is SignalType = "Data"

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to frequency at level.
app.Measure.P1.ParamEngine = "FrequencyAtLevel"
' Set the instrument to use a non-standard base frequency.
app.Measure.P1.Operator.UseBaseFrequency = "Custom"
' Find the base freqency from the signal.
app.Measure.P1.Operator.FindBaseFrequency
```

FindLevel ***Action***

Description

Causes the engine to find a suitable level for either LevelType ("Absolute" or "Percent").

Hysteresis ***Double***

Range: From 0 to 10, step 0.1

Description

Sets/Queries the hysteresis level. (This is an advanced feature.)

LevelType ***Enum***

Description

Sets/Queries whether the levels used are specified in "Percent" or "Absolute".

Values

Absolute
Percent

PercentLevel ***Double***

Range: From 0 to 100, step 1

Description

Sets/Queries the transition level, if LevelType = "Percent".

SignalType ***Enum***

Description

Sets/Queries the input signal type. When "Data" is selected, the periods are the same as for an NRZ datastream, with changing states on whole periods of the assumed "clock."

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to frequency at level.
app.Measure.P1.ParamEngine = "FrequencyAtLevel"
' Set input signal type to data
app.Measure.P1.Operator.SignalType = "Data"
```

Values

Clock
Data

Slope ***Enum***

Description

Sets/Queries the polarity of the transitions to be used to estimate whole cycles.

Values

Neg
Pos

StdBaseFrequency ***Enum***

Description

Sets/Queries the selection of standard frequencies (an enumerated list).This setting only has effect if UseBaseFrequency = "Standard".

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to frequency at level.
app.Measure.P1.ParamEngine = "FrequencyAtLevel"
' Set the instrument to use a standard base frequency.
app.Measure.P1.Operator.UseBaseFrequency = "Standard"
' Set the standard base frequency to 155.52MHz
app.Measure.P1.Operator.StdBaseFrequency = "155.52MHz"
'or alternately set to third choice in (zero based index) list
app.Measure.P1.Operator.StdBaseFrequency = 2
```

Values

1.544MHz
139.264MHz
155.52MHz
2.048MHz
2488.32MHz
34.368MHz
44.736MHz
51.84MHz
622.08MHz
8.448MHz

UseBaseFrequency ***Enum***

Description

Sets/Queries whether to use a custom base frequency or a standard base frequency for frequency at level.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set parameter P1 to frequency at level.
app.Measure.P1.ParamEngine = "FrequencyAtLevel"
' Set the instrument to use a standard base frequency.
app.Measure.P1.Operator.UseBaseFrequency = "Standard"
```

Values

Custom
Standard

FWXX *app.Measure.Px.Operator (ParamEngine = "FullWidthAtXX")*

Calculates the full width (of a histogram or distribution) at a specified fraction of the maximum height.

(This is a generalized case of FWHM, or full width at half maximum.)

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")

app.Measure.P1.ParamEngine = "FullWidthAtXX"

'set the fraction to 25 percent

app.Measure.P1.Operator.HFractionHt = .25
```

HFractionHt ***Double***

Range: From 0 to 100, step 1

Description

Sets/Queries the fraction (as a percentage) of the maximum height at which the full width of a histogram will be measured.

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")


' Sets the fraction of the height for parameter P2 to 25%.

app.Measure.P2.Operator.HFractionHt = 25
```

HALF PERIOD *app.Measure.Px.Operator (ParamEngine = "HalfPeriod")*

AbsLevel	Double
FindLevel	Action
Hysteresis	Double
LevelType	Enum
PercentLevel	Double
Slope	Enum

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.P1.ParamEngine = "HalfPeriod"
```

AbsLevel *Double*

Range: From -100 to 100, step 1e-007

Description

Sets/Queries the transition level, if LevelType = "Absolute".

FindLevel *Action*

Description

Causes the engine to find a suitable level for either LevelType ("Absolute" or "Percent").

Hysteresis *Double*

Range: From 0 to 10, step 0.1

Description

Sets/Queries the hysteresis level in divisions (this is an advanced feature).

LevelType *Enum*

Description

Sets/Queries whether the levels used are specified in "Percent" or "Absolute".

Values

Absolute
Percent

PercentLevel *Double*

Range: From 0 to 100, step 1

Description

Sets/Queries the transition level, if LevelType = "Percent".

Slope *Enum*

Description

Sets/Queries the polarity of the transitions to be used to estimate whole cycles.

Values

Both
Neg
Pos

HOLD TIME *app.Measure.Px.Operator (ParamEngine = "HoldTime")*

Calculates the "Hold" time for a data or clock signal.

ClockAbsLevel	Double
ClockFindLevel	Action
ClockHysteresis	Double
ClockLevelIs	Enum
ClockPctLevel	Double
ClockSlope	Enum
CursorDisplay	Enum
DataAbsLevel	Double
DataFindLevel	Action
DataHysteresis	Double
DataLevelIs	Enum
DataPctLevel	Double
DataSlope	Enum

Example
```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to hold time
app.Measure.P1.ParamEngine = "HoldTime"
' Set clock level type to absolute.
app.Measure.P1.Operator.ClockLevelIs = "Absolute"
' Set the absolute clock level to 30 mV.
app.Measure.P1.Operator.ClockAbsLevel = 0.03
'or alternatively to 32 millivolts
app.Measure.P1.Operator.ClockAbsLevel = "32mV"
```

ClockAbsLevel *Double*

Range: From -100 to 100, step 1e-007

Description

Sets/Queries the absolute measuring level for the clock input, if ClockLevelIs = "Absolute".

ClockFindLevel *Action*

Description

Causes the engine to find a suitable level for either ClockLevelIs setting ("Absolute" or "Percent").

Example
```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
```

```
' Set parameter P1 to hold time at set levels.
app.Measure.P1.ParamEngine = "HoldTime"
' Find the measuring level for the clock signal.
app.Measure.P1.Operator.ClockFindLevel
```

ClockHysteresis ***Double***

Range: From 0 to 10, step 0.1

Description

Sets/Queries the hysteresis range in divisions for the clock input signal.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to hold time at set levels.
app.Measure.P1.ParamEngine = "HoldTime"
' Set the clock hysteresis to 0.8 divisions.
app.Measure.P1.Operator.ClockHysteresis = 0.8
```

ClockLevelIs ***Enum***

Description

Sets/Queries whether the clock level is set as absolute or percent for hold time Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to hold time at set levels.
app.Measure.P1.ParamEngine = "HoldTime"
' Set clock level type to absolute.
app.Measure.P1.Operator.ClockLevelIs = "Absolute"
```

Values

Absolute
Percent

ClockPctLevel ***Double***

Range: From 0 to 100, step 1

Description

Sets/Queries the percent measuring level for the clock input.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to hold time at set levels.
app.Measure.P1.ParamEngine = "HoldTime"
' Set clock level type to percent.
app.Measure.P1.Operator.ClockLevelIs = "Percent"
' Set the percent clock level to 45
app.Measure.P1.Operator.ClockPctLevel = 45
```

ClockSlope ***Enum***

Description

Sets/Queries the slope for the measured transitions for the clock input signal.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to hold time at set levels.
app.Measure.P1.ParamEngine = "HoldTime"
' Set the clock slope to positive.
app.Measure.P1.Operator.ClockSlope = "Pos"
```

Values

Both
Neg
Pos

CursorDisplay ***Enum***

Description

Sets/Queries the type of cursor display for hold time.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to hold time at set levels.
```

```
app.Measure.P1.ParamEngine = "HoldTime"
' Set the type of cursor display as simple.
app.Measure.P1.Operator.CursorDisplay = "Simple"
```

Values

Detailed
Off
Simple

DataAbsLevel ***Double***

Range: From -100 to 100, step 1e-007

Description

Sets/Queries the absolute measuring level for the data input.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to hold time at set levels.
app.Measure.P1.ParamEngine = "HoldTime"
' Set data level type to absolute.
app.Measure.P1.Operator.DataLevelIs = "Absolute"
' Set the absolute data level to 30 mV.
app.Measure.P1.Operator.DataAbsLevel = 0.03
```

DataFindLevel ***Action***

Description

Automatically finds a suitable level for the Data signal, for either DataLevelIs ("Absolute" or "Percent").

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to hold time at set levels.
app.Measure.P1.ParamEngine = "HoldTime"
' Find the measuring level for the data signal.
app.Measure.P1.Operator.DataFindLevel
```

DataHysteresis ***Double***

Range: From 0 to 10, step 0.1

Description

Sets/Queries the hysteresis range in divisions for the data input signal.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to hold time at set levels.
app.Measure.P1.ParamEngine = "HoldTime"
' Set the data hysteresis to 0.8 divisions.
app.Measure.P1.Operator.DataHysteresis = 0.8
```

DataLevelIs ***Enum***

Description

Sets/Queries whether the data level is set as absolute or percent for hold time Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set parameter P1 to hold time at set levels.
app.Measure.P1.ParamEngine = "HoldTime"
' Set data level type to percent.
app.Measure.P1.Operator.DataLevelIs = "Percent"
```

Values

Absolute
Percent

DataPctLevel ***Double***

Range: From 0 to 100, step 1

Description

Sets/Queries the percent measuring level for the data input.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set parameter P1 to hold time at set levels.
app.Measure.P1.ParamEngine = "HoldTime"
' Set data level type to percent.
```

```
app.Measure.P1.Operator.DataLevelIs = "Percent"
' Set the percent data level to 55
app.Measure.P1.Operator.DataPctLevel = 55
```

DataSlope ***Enum***

Description

Sets/Queries the polarity of the transitions measured for the data input signal.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to hold time at set levels.
app.Measure.P1.ParamEngine = "HoldTime"
' Set the data slope to negative.
app.Measure.P1.Operator.DataSlope = "Neg"
```

Values

Both
Neg
Pos

LEVEL@X *app.Measure.Px.Operator (ParamEngine = "LevelAtX")*

CursorShape	Enum
HorValue	Double
LevelCursor	Bool
Marker	Bool
PinToData	Bool
TimeCursor	Bool

CursorShape *Enum*

Description

Sets/Queries the cursor shape.

Example

```
Set app = CreateObject("LeCroy.XStreamDSO")


' Set parameter P1 to level at X
app.Measure.P1.ParamEngine = "LevelAtX"
' Sets the cursor to difference.
app.Measure.P1.Operator.CursorShape = "Difference"
```

Values

Absolute
Difference
Reference

HorValue *Double*

Range: From -1.79769e+308 to 1.79769e+308, step 0

Description

Sets/Queries the horizontal position at which the level is to be measured.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set parameter P1 to level at X
app.Measure.P1.ParamEngine = "LevelAtX"
' Set the horizontal value to 120 ns.
app.Measure.P1.Operator.HorValue = 0.12e-6
```

LevelCursor ***Bool***

Description

Sets/Queries whether the level cursor is visible.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to level at X
app.Measure.P1.ParamEngine = "LevelAtX"
' Remove the level cursor.
app.Measure.P1.Operator.LevelCursor = False
```

Marker ***Bool***

Description

Sets/Queries whether the marker is visible.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to level at X
app.Measure.P1.ParamEngine = "LevelAtX"
' Remove the marker.
app.Measure.P1.Operator.Marker = False
```

PinToData ***Bool***

Description

Sets/Queries whether the measurement is taken from the nearest data point (pin to data) or not (based on the interpolated value at X).

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to level at X
app.Measure.P1.ParamEngine = "LevelAtX"
' Disables pin to data to allow interpolated measurements.
app.Measure.P1.Operator.PinToData = False
```

TimeCursor ***Bool***

Description

Sets/Queries whether the time cursor is visible.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to level at X
app.Measure.P1.ParamEngine = "LevelAtX"
' Remove the time cursor.
app.Measure.P1.Operator.TimeCursor = False
```

MATHCADPARAM *app.Measure.Px.Operator (ParamEngine = "MathcadParam")*

Advanced	Bool
NewSheet	Bool
OutputEnable	Bool
OutputHeaderVar	String
OutputVar	String
Reload	Action
Source1Enable	Bool
Source1HeaderVar	String
Source1Var	String
Source2Enable	Bool
Source2HeaderVar	String
Source2Var	String
Status	String
WithHeader	Bool
WorksheetFilename	FileName

Advanced ***Bool***

Description

Using ParamEngine = "MathcadParam", refer to the corresponding variable for the MathcadMath function.

NewSheet ***Bool***

Description

Using ParamEngine = "MathcadParam", refer to the corresponding variable for the MathcadMath function.

OutputEnable ***Bool***

Description

Using ParamEngine = "MathcadParam", refer to the corresponding variable for the MathcadMath function.

OutputHeaderVar ***String***

Range: Any number of characters

Description

Using ParamEngine = "MathcadParam", refer to the corresponding variable for the MathcadMath function.

OutputVar ***String***

Range: Any number of characters

Description

Using ParamEngine = "MathcadParam", refer to the corresponding variable for the MathcadMath function.

Reload ***Action***

Description

Using ParamEngine = "MathcadParam", refer to the corresponding variable for the MathcadMath function.

Source1Enable ***Bool***

Description

Using ParamEngine = "MathcadParam", refer to the corresponding variable for the MathcadMath function.

Source1HeaderVar ***String***

Range: Any number of characters

Description

Using ParamEngine = "MathcadParam", refer to the corresponding variable for the MathcadMath function.

Source1Var ***String***

Range: Any number of characters

Description

Using ParamEngine = "MathcadParam", refer to the corresponding variable for the MathcadMath function.

Source2Enable ***Bool***

Description

Using ParamEngine = "MathcadParam", refer to the corresponding variable for the MathcadMath function.

Source2HeaderVar ***String***

Range: Any number of characters

Description

Using ParamEngine = "MathcadParam", refer to the corresponding variable for the MathcadMath function.

Source2Var ***String***

Range: Any number of characters

Description

Using ParamEngine = "MathcadParam", refer to the corresponding variable for the MathcadMath function.

Status ***String***

Range: Any number of characters

Description

Using ParamEngine = "MathcadParam", refer to the corresponding variable for the MathcadMath function.

WithHeader ***Bool***

Description

Using ParamEngine = "MathcadParam", refer to the corresponding variable for the MathcadMath function.

WorksheetFilename ***FileName***

Range: Any number of characters

Description

Using ParamEngine = "MathcadParam", refer to the corresponding variable for the MathcadMath function.

MATLAB PARAM *app.Measure.Px.Operator (ParamEngine = "MATLABParameter")*

MATLABCode	String
MATLABPlot	Bool
MATLABScalePerDiv	Double
MATLABZeroOffset	Double

MATLABCode ***String***

Range: Any number of characters

Description

Using ParamEngine = "MATLAB param", refer to the corresponding variable for the MATLABMath function.

MATLABPlot ***Bool***

Description

Using ParamEngine = "MATLAB param", refer to the corresponding variable for the MATLABMath function.

MATLABScalePerDiv ***Double***

Range: From 1e-009 to 1e+009, step 1e-009

Description

Using ParamEngine = "MATLAB param", refer to the corresponding variable for the MATLABMath function.

MATLABZeroOffset ***Double***

Range: From -1e+009 to 1e+009, step 1e-009

Description

Using ParamEngine = "MATLAB param", refer to the corresponding variable for the MATLABMath function.

MAXIMUM *app.Measure.Px.Operator (ParamEngine = "Maximum")*

Calculates the maximum vertical value of the waveform.

Example

```
    ' Visual Basic Script
    Set app = CreateObject("LeCroy.XStreamDSO")
    app.Measure.P1.ParamEngine = "Maximum"
```

MEAN *app.Measure.Px.Operator (ParamEngine = "Mean")*

Calculates the mean value of the input waveform's vertical values. When Cyclic = true, the range of values used is limited to a whole number of cycles.

Example

```
     ' Visual Basic Script
     Set app = CreateObject("LeCroy.XStreamDSO")

     ' Set parameter P1 to mean.
     app.Measure.P1.ParamEngine = "Mean"
     ' Set the mean parameter for cyclic measurements.
app.Measure.P1.Operator.Cyclic = true
```

Cyclic ***Bool***

Description

Sets/Queries whether the mean parameter Px is to be measured over a number of complete cycles.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P2 to mean.
app.Measure.P2.ParamEngine = "Mean"
' Set the mean parameter for cyclic measurements.
app.Measure.P2.ParamEngine.Cyclic = True
```

MEDIAN *app.Measure.Px.Operator (ParamEngine = "Median")*

Calculates the median (division between two halves) of the probability distribution of an input waveform. For periodic signals it is advisable to use Cyclic = True.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.P1.ParamEngine = "Median"
' Set the measurement for a periodic signal
app.Measure.P1.Operator.Cyclic = true
```

Cyclic ***Bool***

Description

Sets/Queries whether the median parameter Px is to be measured over an integral number of complete cycles.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P2 to median.
app.Measure.P2.ParamEngine = "Median"
' Set the median parameter for cyclic measurements.
app.Measure.P2.Operator.Cyclic = True
```

MINIMUM *app.Measure.Px.Operator (ParamEngine = "Minimum")*

Calculates the minimum value of a waveform.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


app.Measure.P1.ParamEngine = "Minimum"
```

NB PHASE *app.Measure.Px.Operator (ParamEngine = "NarrowBandPhase")*

Estimates the phase of the frequency component at the specified Frequency.

Example

```
    ' Visual Basic Script
    Set app = CreateObject("LeCroy.XStreamDSO")

    ' Set parameter P1 to narrow band phase.
    app.Measure.P1.ParamEngine = "NarrowBandPhase"
    ' Set the frequency at which the phase is to be measured to 691
    MHz.
    app.Measure.P1.Operator.Frequency = "691MHz"
' or alternatively to 299MHz
```

Frequency ***Double***

Range: From 10 to 1e+010, step 1

Description

Sets/Queries the frequency at which the narrow band phase is to be measured.

NB POWER *app.Measure.Px.Operator (ParamEngine = "NarrowBandPower")*

Measures the power found at a given frequency.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to narrow band phase.
app.Measure.P1.ParamEngine = "NarrowBandPower"
' Set the frequency at which the power is to be measured to 235
MHz.
```

Frequency ***Double***

Range: From 10 to 1e+010, step 1

Description

Sets/Queries the frequency at which the narrow band power is to be measured.

NPTS ***app.Measure.Px.Operator (ParamEngine = "npoints")***

Counts the number of (sample or data) points in the input waveform.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.P3.ParamEngine = "npoints"

' Also count the points extending off the grid
app.Measure.P3.Operator.UsePointsInFrame = false
```

UsePointsInFrame ***Bool***

Description

Sets/Queries whether to use the number of points in the graticule, or the total number of points in the trace.

Note: In many cases there are points off screen in the source waveform; but in particular, in the X-Stream standard architecture, waveforms are often "clipped to frame" already. This setting is most useful when using the WebEdit mode.

ONE LEVEL *app.Measure.Px.Operator (ParamEngine = "EyeOneLevel")*

Estimates the high level for the (assumed input) eye diagram, based on a slice through the middle of the eye diagram of specified width, PctCutWidth.

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")

app.Measure.P1.ParamEngine = "EyeOneLevel"

app.Measure.P1.Operator.PctCutWidth = 8
```

PctCutWidth ***Double***

Range: From 0 to 100, step 0.1

Description

Sets/Queries the width of the vertical slice through the eye, from which the one level is estimated.

PARAM SCRIPT *app.Measure.Px.Operator (ParamEngine = "ParamScript")*

Calculates a parameter from a waveform based on VBScript or JavaScript.

Code	String
Language	Enum
Status	String
Timeout	Double

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Place sample program code in a string
' This will calculate the mean of all of the data points
code =        "Function Update()" + vbcrlf
code = code + "    numSamples = InResult.Samples" + vbcrlf
code = code + "    unscaledData = InResult.DataArray(False)" +
vbcrlf
code = code + "    mean = 0" + vbcrlf
code = code + "    For i = 0 to numSamples-1" + vbcrlf
code = code + "        mean = mean + unscaledData(i)" + vbcrlf
code = code + "    next" + vbcrlf
code = code + "    if numSamples > 0 then mean = mean/numSamples"
 + vbcrlf
code = code + "    OutResult.Value = mean" + vbcrlf
code = code + "end Function"

' Configure P1 as a scripting component
app.Measure.P1.View = True
app.Measure.P1.Source1 = "C1"
app.Measure.P1.MeasurementType = "measure"
app.Measure.P1.ParamEngine = "ParamScript"
app.Measure.P1.Operator.Language = "VBScript"
```

Code ***String***

Range: Any number of characters

Language ***Enum***

Description

Sets/Queries which scripting language is to be used

Values

JScript
VBScript

Status ***String***

Range: Any number of characters

Description

Queries status, as reported by the scripting engine (errors).

Timeout ***Double***

Range: From 1 to 12000, step 0.001

Description

Sets/Queries Timeout for scripting calculation.

PERCENTILE *app.Measure.Px.Operator (ParamEngine = "Percentile")*

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.P1.ParamEngine = "Percentile"

' Set the percentile level to 67%.(i.e. will calculate percentile
 @ 67%)
app.Measure.P1.Operator.HPctPop = 67
```

HPctPop ***Double***

Range: From 0 to 100, step 1

Description

Sets/Queries the percentage of the population that falls to the left of (or below) the desired percentile. For example, the median is the 50th percentile, or the horizontal coordinate of the histogram at which 50% of the population falls to the left.

PERIOD@LEVEL *app.Measure.Px.Operator (ParamEngine = "PeriodAtLevel")*

Calculates the period of the input, using a specified level and slope.

AbsLevel	Double
BaseFrequency	Double
FindBaseFrequency	Action
FindLevel	Action
Hysteresis	Double
LevelType	Enum
PercentLevel	Double
SignalType	Enum
Slope	Enum
StdBaseFrequency	Enum
UseBaseFrequency	Enum

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")

app.Measure.P1.ParamEngine = "PeriodAtLevel"
```

AbsLevel ***Double***

Range: From -100 to 100, step 1e-007

Description

Using ParamEngine = "PeriodAtLevel", refer to the corresponding variable for the Delta Time At Level parameter.

BaseFrequency ***Double***

Range: From 1 to 4e+010, step 1000

Description

Sets/Queries the frequency to be used as a reference when SignalType = "Data"; otherwise, not used.

FindBaseFrequency ***Action***

Description

Automatically finds (by analyzing the input) the base frequency for a SignalType = "Data".

FindLevel ***Action***

Description

Causes the engine to find a suitable level for either LevelType ("Absolute" or "Percent")

Hysteresis ***Double***

Range: From 0 to 10, step 0.1

Description

Sets/Queries the Hysteresis level used for edge or transition detection. (This is an advanced feature.)

LevelType ***Enum***

Description

Sets/Queries whether the levels of the signal amplitude are "Percent" or "Absolute".

Values

Absolute
Percent

PercentLevel ***Double***

Range: From 0 to 100, step 1

Description

Sets/Queries the percent level to be used when LevelType = "Percent".

SignalType ***Enum***

Description

Using ParamEngine = "PeriodAtLevel", refer to the corresponding variable for the Frequency At Level parameter.

Values

Clock
Data

Slope ***Enum***

Description

Using ParamEngine = "PeriodAtLevel", refer to the corresponding variable for the Delta Time At Level parameter.

Values

Neg
Pos

StdBaseFrequency ***Enum***

Description

Using ParamEngine = "PeriodAtLevel", refer to the corresponding variable for the Frequency At Level parameter.

Values

1.544MHz
139.264MHz
155.52MHz
2.048MHz
2488.32MHz
34.368MHz
44.736MHz
51.84MHz
622.08MHz
8.448MHz

UseBaseFrequency ***Enum***

Description

Sets/Queries which frequency to use, a "Standard" frequency or "Custom" frequency, as specified by BaseFrequency. This control only has effect when the SignalType = “Data".

Values

Custom
Standard

PHASE *app.Measure.Px.Operator (ParamEngine = "Phase")*

OutputType	Enum
RefAbsLevel	Double
RefFindLevel	Action
RefHysteresis	Double
RefLevelType	Enum
RefPercentLevel	Double
RefSlope	Enum
SigAbsLevel	Double
SigFindLevel	Action
SigHysteresis	Double
SigLevelType	Enum
SigPercentLevel	Double
SigSlope	Enum

OutputType *Enum*

Description

Sets/Queries the output type for Phase Px.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set parameter P1 to phase difference.
app.Measure.P1.ParamEngine = "Phase"
' Set the output unit as radians.
app.Measure.P1.Operator.OutputType = "Radians"
```

Values

Degrees
Percent
Radians

RefAbsLevel *Double*

Range: From -100 to 100, step 1e-007

Description

Sets/Queries the test level for the reference trace in absolute units.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")


' Set parameter P1 to phase difference.
app.Measure.P1.ParamEngine = "Phase"
```

```
' Set the reference trace test level in absolute units as 10 mV.
app.Measure.P1.Operator.RefAbsLevel = 0.01
```

RefFindLevel ***Action***

Description

Finds the test level for the reference trace.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P3 to phase difference.
app.Measure.P3.ParamEngine = "Phase"
' Find the test level for the reference trace.
app.Measure.P3.Operator.RefFindLevel
```

RefHysteresis ***Double***

Range: From 0 to 10, step 0.1

Description

Sets/Queries the hysteresis range for the reference trace.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to phase difference.
app.Measure.P1.ParamEngine = "Phase"
' Set the reference hysteresis in graticule divisions.
app.Measure.P1.Operator.RefHysteresis = 0.7
```

RefLevelType ***Enum***

Description

Sets/Queries the unit of measurement for the test level of the reference trace.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to phase difference.
app.Measure.P1.ParamEngine = "Phase"
' Set the reference level to be measured in absolute units.
app.Measure.P1.Operator.RefLevelType = "Absolute"
```

Values

Absolute
Percent

RefPercentLevel ***Double***

Range: From 0 to 100, step 1

Description

Sets/Queries the test level for the reference trace in percent.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P3 to phase difference.
app.Measure.P3.ParamEngine = "Phase"
' Set the reference test level in percent.
app.Measure.P3.Operator.RefPercentLevel = 55
```

RefSlope ***Enum***

Description

Sets/Queries the polarity of the measured reference transitions.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P1 to phase difference.
app.Measure.P1.ParamEngine = "Phase"
' Set the reference slope to negative.
app.Measure.P1.Operator.RefSlope = "Neg"
```

Values

Both
Neg
Pos

SigAbsLevel ***Double***

Range: From -100 to 100, step 1e-007

Description

Sets/Queries the test level for the signal in absolute units.

SigFindLevel ***Action***

Description

Causes the engine to find a suitable level for either SigLevelType ("Absolute" or "Percent").

SigHysteresis ***Double***

Range: From 0 to 10, step 0.1

Description

Sets/Queries the hysteresis range for the signal.

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")

' Set parameter P3 to phase difference.
app.Measure.P3.ParamEngine = "Phase"
' Set the signal hysteresis in graticule divisions.
app.Measure.P3.Operator.SigHysteresis = 0.7
```

SigLevelType ***Enum***

Description

Sets/Queries which level to use "Percent" or "Absolute" for transitions on the signal.

Values

Absolute
Percent

SigPercentLevel **Double**

Range: From 0 to 100, step 1

Description

Sets/Queries the test level for the signal in percent.

SigSlope ***Enum***

Description

Sets/Queries the polarity of the measured signal transitions.

Values

Both
Neg
Pos

RISE@LEVEL *app.Measure.Px.Operator (ParamEngine = "RiseAtLevel")*

Calculat es the rise time (transition time on a rising edge) using two specified levels.

HighAbs	Double
HighPct	Double
LevelsAre	Enum
LowAbs	Double
LowPct	Double

Example
```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.MeasureMode = "MyMeasure"
app.Measure.P1.ParamEngine = "RiseAtLevel"
app.Measure.P1.Operator.LevelsAre = "Percent"
app.Measure.P1.Operator.HighPct = 70
app.Measure.P1.Operator.LowPct = 30
```

HighAbs *Double*

Range: From -100 to 100, step 1e-007

Description

Sets/Queries the higher (second) level crossing used, if LevelsAre = "Absolute".

HighPct *Double*

Range: From 11 to 95, step 1

Description

Sets/Queries the higher (second) level crossing used, if LevelsAre = "Percent".

LevelsAre *Enum*

Description

Sets/Queries whether the levels used are "Absolute" or "Percent".

Values

Absolute
Percent

LowAbs *Double*

Range: From -100 to 100, step 1e-007

Description

Sets/Queries the lower (first) level crossing used, if LevelsAre = "Absolute".

LowPct **Double**

Range: From 5 to 89, step 1

Description

Sets/Queries the lower (first) level crossing used, if LevelsAre = “Percent”.

RMS *app.Measure.Px.Operator (ParamEngine = "RootMeanSquare")*

Calculates the root mean square of the values of the input waveform.

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")

app.Measure.MeasureMode = "MyMeasure"

app.Measure.P1.ParamEngine = "RMS"
```

Cyclic ***Bool***

Description

Sets/Queries whether the RMS is measured over an integral number of cycles (suggested for periodic signals).

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")


' Set parameter P2 to RMS.

app.Measure.P2.ParamEngine = "RMS"

' Set the RMS parameter for cyclic measurements.

app.Measure.P2.ParamEngine.Cyclic = True
```

SETUP *app.Measure.Px.Operator (ParamEngine = "Setup")*

Calculates the setup time associated with a pair of input waveforms for Clock and Data.

ClockAbsLevel	Double
ClockFindLevel	Action
ClockHysteresis	Double
ClockLevelIs	Enum
ClockPctLevel	Double
ClockSlope	Enum
CursorDisplay	Enum
DataAbsLevel	Double
DataFindLevel	Action
DataHysteresis	Double
DataLevelIs	Enum
DataPctLevel	Double
DataSlope	Enum
Summary	String

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")

app.Measure.MeasureMode = "MyMeasure"

app.Measure.P1.ParamEngine = "Setup"
```

ClockAbsLevel *Double*

Range: From -100 to 100, step 1e-007

Description

Sets/Queries the level used if ClockLevelIs = “Absolute".

ClockFindLevel *Action*

Description

Causes the engine to find a suitable level for either ClockLevelIs ("Absolute" or "Percent").

ClockHysteresis *Double*

Range: From 0 to 10, step 0.1

Description

Using ParamEngine = "Setup", refer to the corresponding variable for the Hold Time parameter.

ClockLevelIs ***Enum***

Description

Sets/Queries whether the Clock signal levels are specified in "Percent" or "Absolute".

Values

Absolute
Percent

ClockPctLevel ***Double***

Range: From 0 to 100 step 1

Description

Using ParamEngine = "Setup", please refer to the corresponding variable for the Hold Time parameter.

ClockSlope ***Enum***

Description

Sets/Queries the polarity of transitions of the Clock signal.

Values

Both
Neg
Pos

CursorDisplay ***Enum***

Description

Using ParamEngine = "Setup", refer to the corresponding variable for the Hold Time parameter.

Values

Detailed
Off
Simple

DataAbsLevel ***Double***

Range: From -100 to 100, step 1e-007

Description

Sets/Queries the level used if the ClockLevelIs = “Percent"

DataFindLevel ***Action***

Description

Causes the engine to find a suitable level for either DataLevelIs ("Absolute" or "Percent")

DataHysteresis ***Double***

Range: From 0 to 10, step 0.1

Description

Using ParamEngine = "Setup", refer to the corresponding variable for the Hold Time parameter.

DataLevelIs ***Enum***

Description

Sets/Queries whether the Data signal level is DataAbsLevel or DataPctLevel.

Values

Absolute
Percent

DataPctLevel ***Double***

Range: From 0 to 100, step 1

Description

Using ParamEngine = "Setup", refer to the corresponding variable for the Hold Time parameter.

DataSlope ***Enum***

Description

Sets/Queries the polarity of transitions to be used for the Data signal.

Values

Both
Neg
Pos

Summary ***String***

Range: Any number of characters

Description

Using ParamEngine = "Setup", refer to the corresponding variable for the Hold Time parameter.

SKEW *app.Measure.Px.Operator (ParamEngine = "Skew")*

Calculates the skew between two clock signal waveforms.

Clock1AbsLevel	Double
Clock1FindLevel	Action
Clock1Hysteresis	Double
Clock1LevelIs	Enum
Clock1PctLevel	Double
Clock1Slope	Enum
Clock2AbsLevel	Double
Clock2FindLevel	Action
Clock2Hysteresis	Double
Clock2LevelIs	Enum
Clock2PctLevel	Double
Clock2Slope	Enum

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")

app.Measure.MeasureMode = "MyMeasure"

app.Measure.P1.ParamEngine = "Skew"
```

Clock1AbsLevel ***Double***

Range: From -100 to 100, step 1e-007

Clock1FindLevel ***Action***

Description

Automatically find a suitable level for Clock1, for either "Percent" or "Absolute" levels.

Clock1Hysteresis ***Double***

Range: From 0 to 10, step 0.1

Description

Sets/Queries hysteresis for transition detection used for Clock1.

Clock1LevelIs ***Enum***

Description

Sets/Queries whether to use Percent or Absolute levels for Clock1.

Values

Absolute
Percent

Clock1PctLevel ***Double***

Range: From 0 to 100, step 1

Description

Sets/Queries the "Percent" of the amplitude of Clock1 to use for a transition level, if Clock1LevelIs = "Percent".

Clock1Slope ***Enum***

Description

Sets/Queries the polarity of transitions detected on Clock1.

Values

Both
Neg
Pos

Clock2AbsLevel ***Double***

Range: From -100 to 100, step 1e-007

Description

Using ParamEngine = "Skew", refer to the corresponding variable for the Hold Time parameter.

Clock2FindLevel ***Action***

Description

Using ParamEngine = "Skew", refer to the corresponding variable for the Hold Time parameter.

Clock2Hysteresis ***Double***

Range: From 0 to 10, step 0.1

Description

Sets/Queries hysteresis for transition detection used for Clock1.

Clock2LevelIs ***Enum***

Description

Sets/Queries whether to use Percent or Absolute levels for Clock2.

Values

Absolute
Percent

Clock2PctLevel ***Double***

Range: From 0 to 100, step 1

Description

Sets/Queries the "Percent" of the amplitude of Clock2 to use for a transition level, if Clock2LevelIs = "Percent".

Clock2Slope ***Enum***

Description

Sets/Queries the polarity of transitions detected on Clock2.

Values

Both
Neg
Pos

STD DEV *app.Measure.Px.Operator (ParamEngine = "StandardDeviation")*

Calculates the standard deviation of the input waveform's vertical values.

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")

app.Measure.MeasureMode = "MyMeasure"

' Set parameter P1 to standard deviation.

app.Measure.P1.ParamEngine = "StandardDeviation"

' Set the RMS parameter for cyclic measurements.

app.Measure.P1.Operator.Cyclic = True
```

Cyclic ***Bool***

Description

Sets/Queries whether the standard deviation is to be measured over an integral number of complete cycles.

TIE@LEVEL *app.Measure.Px.Operator (ParamEngine = "TIE")*

Calculates the Time Interval Error: the errors in observed transition times relative to a series of expected times (virtual clock).

AbsLevel	Double
BaseFrequency	Double
CutOffDivisor	Double
DataIsNRZ	Bool
FindBaseFrequency	Action
FindLevel	Action
Hysteresis	Double
IncludeVirtualEdges	Bool
LevelType	Enum
PercentLevel	Double
ResultScaling	Enum
SignalType	Enum
Slope	Enum
StdBaseFrequency	Enum
UseBaseFrequency	Enum
UseGoldenPLL	Bool

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.MeasureMode = "MyMeasure"
app.Measure.P1.ParamEngine = "TIE"
```

AbsLevel *Double*

Range: From -100 to 100, step 1e-007

Description

Sets/Queries the absolute transition level to be used when LevelType = "Absolute".

BaseFrequency *Double*

Range: From 1 to 4e+010, step 1000

Description

Using ParamEngine = "TIE", refer to the corresponding variable for the Delta Period At Level parameter.

CutOffDivisor *Double*

Range: From 20 to 10000, step 1

Description

Sets/Queries the cut-off divisor for the "Golden PLL".

DataIsNRZ ***Bool***

Description

Sets/Queries whether the signal is of NRZ type.

FindBaseFrequency ***Action***

Description

Automatically determines the Base Frequency for the expected virtual clock.

FindLevel ***Action***

Description

Using ParamEngine = "TIE", refer to the corresponding variable for the Delta Period At Level parameter.

Hysteresis ***Double***

Range: From 0 to 10, step 0.1

Description

Sets/Queries hysteresis for transition detection used for the input waveform.

IncludeVirtualEdges ***Bool***

Description

Sets/Queries whether to include virtual edges in the series of interval errors reported by this measurement.

LevelType ***Enum***

Description

Sets/Queries whether to use Percent or Absolute levels.

Values

Absolute
Percent

PercentLevel ***Double***

Range: From 0 to 100, step 1

Description

Sets/Queries the "Percent" of the amplitude of the input waveform for a transition detection, if LevelType = "Percent".

ResultScaling *Enum*

Description

Sets/Queries whether the measurement is to be displayed in seconds (Time) or in unit intervals (UI).

Values

Time
UI

SignalType *Enum*

Description

Sets/Queries whether the input signal is a Clock or Data.

Values

Clock
Data

Slope *Enum*

Description

Sets/Queries the polarity of transitions detected.

Values

Both
Neg
Pos

StdBaseFrequency *Enum*

Description

Sets/Queries a standard base frequency from a list of frequencies. This value is only used if the UseBaseFrequency = "Standard".

Values

1.544MHz
139.264MHz
155.52MHz
2.048MHz
2488.32MHz
34.368MHz
44.736MHz
51.84MHz
622.08MHz
8.448MHz

UseBaseFrequency ***Enum***

Description

Sets/Queries whether to use the custom base frequency or one chosen from a list of standard frequencies.

Values

Custom
Standard

UseGoldenPLL ***Bool***

Description

Sets/Queries whether to use a golden PLL for the expected times.

TIME@LEVEL *app.Measure.Px.Operator (ParamEngine = "TimeAtLevel")*

AbsLevel	Double
FindLevel	Action
Hysteresis	Double
HysteresisPct	Double
HysteresisType	Enum
LevelType	Enum
PercentLevel	Double
Slope	Enum

AbsLevel *Double*

Range: From -100 to 100, step 1e-007

Description

Sets/Queries the level for transitions detected on the input waveform if LevelType = "Absolute".

FindLevel *Action*

Description

Using ParamEngine = "TimeAtLevel", please refer to the corresponding variable for the Delta Time At Level parameter.

Hysteresis *Double*

Range: From 0 to 10, step 0.1

Description

Sets/Queries hysteresis for transition detection used.

HysteresisPct *Double*

Range: From 0 to 100, step 0.1

Description

Sets/Queries the hysteresis as a percentage of signal amplitude, if HysteresisType = "Percent".

HysteresisType *Enum*

Description

Sets/Queries whether hysteresis is specified in divisions, or if it is a percentage of the input waveform amplitude.

Values

Divisions
Percent

LevelType ***Enum***

Description

Using ParamEngine = "TimeAtLevel", refer to the corresponding variable for the Delta Time At Level parameter.

Values

Absolute
Percent

PercentLevel ***Double***

Range: From 0 to 100, step 1

Description

Sets/Queries the "Percent" of the amplitude of the input waveform is used for detecting transitions if LevelType = "Percent".

Slope ***Enum***

Description

Sets/Queries the polarity of transitions detected.

Values

Both
Neg
Pos

WIDTH@LEVEL *app.Measure.Px.Operator (ParamEngine = "WidthAtLevel")*

Calculates the width of pulses in the input waveform at specified levels.

AbsLevel	Double
FindLevel	Action
FirstWhenBoth	Enum
Hysteresis	Double
HysteresisPct	Double
HysteresisType	Enum
LevelType	Enum
PercentLevel	Double
Slope	Enum

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.MeasureMode = "MyMeasure"
' Set parameter P1 to width at level.
app.Measure.P1.ParamEngine = "WidthAtLevel"
' Set first used polarity to negative.
app.Measure.P1.Operator.Slope = "Both"
app.Measure.P1.Operator.FirstWhenBoth = "Neg"
```

AbsLevel *Double*

Range: From -100 to 100 step 1e-007

Description

Sets/Queries the level for transitions detected on the input waveform, if LevelType = "Absolute".

FindLevel *Action*

Description

Automatically finds a suitable level for the width measurement, for either case of LevelType.

FirstWhenBoth *Enum*

Description

Sets/Queries the polarity of the first accepted transition when both polarities are used.

Values

Neg
Pos

Hysteresis ***Double***

Range: From 0 to 10, step 0.1

Description

Sets/Queries hysteresis for transition detection if HysteresisType = "Absolute".

HysteresisPct ***Double***

Range: From 0 to 100, step 0.1

Description

Sets/Queries hysteresis in percent for transition detection if HysteresisType = "Percent".

HysteresisType ***Enum***

Description

Sets/Queries whether to use Percent or Divisions for hysteresis.

Values

Divisions
Percent

LevelType ***Enum***

Description

Sets/Queries whether to use Percent or Absolute levels.

Values

Absolute
Percent

PercentLevel ***Double***

Range: From 0 to 100, step 1

Description

Sets/Queries the "Percent" of the amplitude of the input waveform, if LevelType = "Percent".

Slope ***Enum***

Description

Sets/Queries the polarity of transitions detected.

Values

Both
Neg
Pos

X AT PEAK *app.Measure.Px.Operator (ParamEngine = "XAtPeak")*

Estimates the horizontal position of the Nth most significant peak in a distribution

Example

```
' Visual Basic Script
Set app = CreateObject("LeCroy.XStreamDSO")
app.Measure.MeasureMode = "MyMeasure"
app.Measure.P1.ParamEngine = "XAtPeak"
' Set the parameter to measure location of the 4th peak.
app.Measure.P1.Operator.PeakNumber = 4
```

PeakNumber ***Integer***

Range: From 1 to 10000, step 1

Description

Sets/Queries the horizontal position of the Nth highest peak of a histogram.

ZERO LEVEL *app.Measure.Px.Operator (ParamEngine = "EyeZeroLevel")*

Estimates the low level for the (assumed input) eye diagram, based on a slice through the middle of the eye diagram of specified width, PctCutWidth.

Example

```
' Visual Basic Script

Set app = CreateObject("LeCroy.XStreamDSO")

app.Measure.P1.ParamEngine = "EyeZeroLevel"

app.Measure.P1.Operator.PctCutWidth = 8
```

PctCutWidth ***Double***

Range: From 0 to 100, step 0.1

Description

Sets/Queries the width of the vertical slice through the eye, from which the zero level is estimated.

X-STREAM

Glossary

ACTIVEX

Microsoft's brand name for the technologies that enable interoperability using the Component Object Model (COM). ActiveX technology includes, but is not limited to, OLE.

AUTOMATION

COM-based technology that enables binding at run time, or late binding, to an object's methods and properties and also makes possible cross-application macro programming. Formerly referred to as OLE Automation.

AUTOMATION CLIENT

An application, programming tool, or scripting language that accesses services provided by Automation objects. Formerly referred to as Automation controller.

AUTOMATION OBJECT

An instance of a class defined within an application that is exposed for access by other applications or programming tools by Automation interfaces.

AUTOMATION SERVER

An application, type library, or other source that makes Automation objects available for programming by other applications, programming tools, or scripting languages.

COM (COMPONENT OBJECT MODEL)

The programming model and binary standard on which OLE is based. COM defines how objects and their clients interact within processes or across process boundaries.

DCOM (DISTRIBUTED COMPONENT OBJECT MODEL)

Distributed form of COM, enables communication between computers using the COM standard.

DISPATCH INTERFACES (DISPINTERFACE)

An IDispatch interface that responds only to a certain fixed set of names. The properties and methods of the dispinterface are not in the virtual function table (VTBL) for the object.

EARLY BINDING

Also known as static binding (converting symbolic addresses in the program to storage-related addresses) this is binding that occurs during program compilation or linkage.

LATE BINDING

The ability to bind member names to dispatch identifiers (IDs) at run time, rather than at compile time.