

# Chapter 2

## Controlling the Properties Window

**When creating forms and classes, the Properties Window is a major player. VFP 9 includes many improvements to this tool, from more control over fonts to the ability to add custom editors for properties.**

Since its introduction in VFP 3, the Properties Window (known to most VFP developers as the Property Sheet, the term we'll use throughout this chapter) has seen mostly minor changes. Each new version brought a few tweaks. VFP 9 ups the ante significantly. Minor changes include more control over fonts and the addition of icons to the items. More significantly, the Property Sheet now includes a Favorites tab, and provides a mechanism to let you customize its behavior.

### Cosmetic changes

No doubt, the first thing you'll notice when you open VFP 9's Property Sheet is that each item now includes an icon to the left of its name. The icons are the same as those used elsewhere in VFP (including IntelliSense's List Members and the Procedure dropdown in the method editor).

The next thing likely to hit your eye is that there are more colors than before. In VFP 8, everything in the Property Sheet is black, except for properties, events, and methods (PEMs) of ActiveX controls, which are blue by default, but can be changed. VFP 9 separates the Property Sheet colors into five groups described in **Table 1**. You can change the color for the first four groups, but the Default color is always black.

**Table 1.** *The Property Sheet now lets you use up to five different colors.*

Color group	Includes
ActiveX Color	PEMs of any ActiveX controls.
Non-Default Properties Color	PEMs set at the current level of the class hierarchy.
Custom Properties Color	PEMs added at any level other than the current level of the class hierarchy.
Instance Properties Color	PEMs added at the current level of the class hierarchy
Default	All other PEMs, that is, built-in PEMs not set at this level of the class hierarchy.

To change the color of any group, right-click the Property Sheet and choose the appropriate setting.



*To see the Property Sheet's shortcut menu, don't right-click the main body of the Property Sheet (the part where the PEMs are listed). Instead, right-click the border area, the tabs, the object dropdown, or the Property Description section.*

The color groups are not mutually exclusive. For example, an instance property or a custom property might also be non-default. The rules are as follows:

- PEMs added at the current level of the class hierarchy use the Instance Properties setting, whether they're changed or not.
- Other PEMs changed at the current level, whether they're inherited or built-in, use the Non-Default Properties setting. This includes PEMs of ActiveX controls.
- Custom PEMs inherited from the parent class and not changed at this level use the Custom Properties setting. This includes PEMs of ActiveX controls.
- PEMs of ActiveX controls not changed at any level of the class hierarchy use the ActiveX color.
- All remaining PEMs are shown in black.

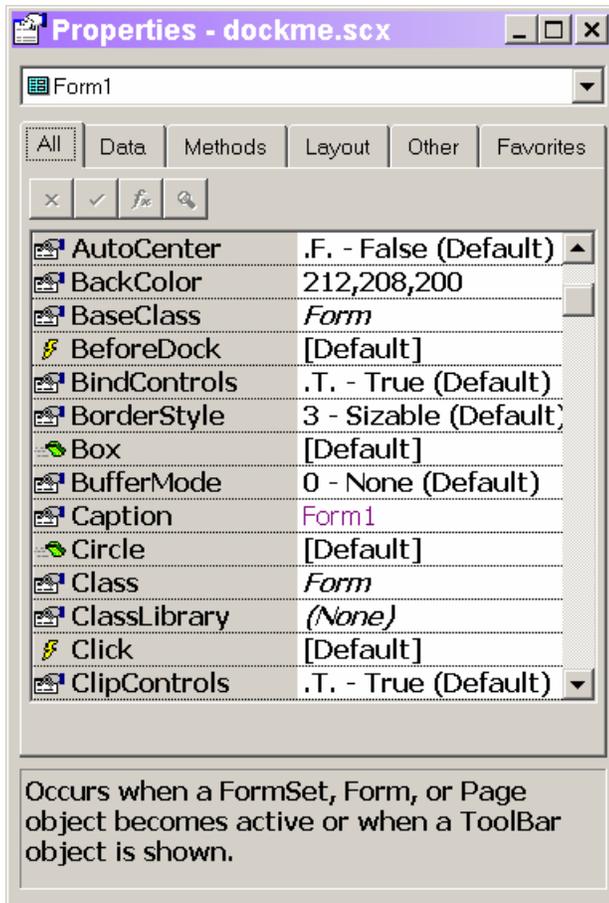
In addition to colors, the VFP 9 Property Sheet gives you control over the font and font size. In VFP 8 and earlier versions, the shortcut menu gives you three choices: Small Font (the default), Medium Font, and Large Font. VFP 9 replaces those choices with a single **Font...** item; choose it to bring up the Font picker dialog. **Figure 1** shows the Property Sheet after changing the font to 12-point Tahoma bold.

The figure points out one interesting side effect of changing the font. Normally, changed properties are in bold and read-only properties are in italics. It turns out, however, those property attributes actually toggle the specified characteristics. So, in **Figure 1**, where the specified font is bold, the Caption property, which has been assigned at this level, is not bold. Similarly, if you specify an italic font for the Property Sheet, read-only properties are shown as not italic.

## Specifying property values

In VFP 8 and earlier versions, the Property Sheet can accept no more than 255 characters for a property value. The introduction of the CursorAdapter class in VFP 8 and the need to specify its CursorSchema property made this limit a significant problem. In VFP 9, the limit has been raised to 8,191 characters.

In addition, earlier versions couldn't handle extended characters, like CHR(13) and CHR(10) (carriage return and line feed, respectively) in the Property Sheet. When you wanted to include them in a property, you had to specify it as an expression, such as "Line 1" + CHR(13) + CHR(10) + "Line 2". VFP 9 accepts these values. (This change was undoubtedly made to accommodate the `_MemberData` property, discussed in "Customizing the Property Sheet" later in this chapter.)



**Figure 1.** VFP 9 lets you specify the font to use in the Property Sheet.

Despite the new limit, some properties, like Caption and Alias, are limited to 255 characters by their nature. The same properties don't accept extended characters.

To enter long property values or extended characters, you can't just type the value in as usual. You have to use either the Zoom dialog or the Expression Builder. To make the process easier, a Zoom button has been added to the group of buttons above the list of properties. (See **Figure 1.**) In addition, the Zoom dialog is much larger in VFP 9 than in earlier versions.

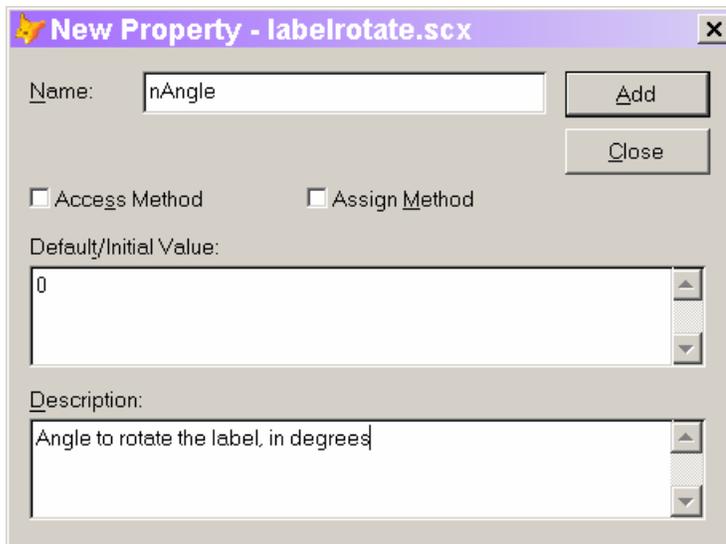
To store longer property values and extended characters, the technique for parsing classes and forms has changed. As a result, classes and forms that include properties exceeding the limit or using extended characters cannot be opened in earlier versions of VFP. However, forms and classes created in VFP 9 that don't use long property values or extended characters can be opened in earlier versions.

The new format applies to the Properties memo field of the record in the SCX or VCX that represents the object in question. This field stores a list of the properties assigned in the Property Sheet in the form:

**Property = Value**

When the value is more than 255 characters or contains any of the extended characters, the format changes. The equal sign is followed by a space, and then 517 instances of CHR(1). After that, the length of the value is stored as an 8-byte character string. The length is followed by the actual value.

Another change makes it easier to get values into the Property Sheet in the first place. In earlier versions, when you add a custom property using the New Property dialog, you have to remember to switch to the Property Sheet and set the initial value for the property. In VFP 9, the New Property dialog (shown in **Figure 2**) includes an editbox to specify the initial value.



**Figure 2.** The New Property dialog lets you specify the initial value of the property you're adding, so you don't have to remember to set it in the Property Sheet.



Although the caption says "Default/Initial Value," the value you specify is only an initial value. That is, it specifies the property value when the form or class is created, but not the value you get if you choose *Reset to Default* in the Property Sheet.

## Customizing the Property Sheet

The biggest change relating to the Property Sheet in VFP 9 is the ability to customize the contents in a number of ways. All of the customization is tied to a new, optional, property, `_MemberData`, which contains an XML string. You can set `_MemberData` manually or use the new MemberData Editor.

What kind of things can you do with `_MemberData`? First, `_MemberData` controls the new Favorites tab. For each property, event, or method (PEM) of a class or form, you can indicate whether it should be on the Favorites tab. `_MemberData` also lets you specify capitalization for custom PEMs. In earlier versions of VFP, once you add a property or

method, it appears in lower-case on the Property Sheet and in IntelliSense. With `_MemberData`, you can specify the way it appears. Finally, for properties, you can specify a “property editor” to use for entering the property’s initial value.

Unlike other properties, `_MemberData` is not included in new forms and classes automatically. You have to add it. (This is actually analogous to the Builder property you can add to a class to specify a custom builder.) However, the MemberData Editor can add it for you automatically.

### The structure of `_MemberData`

`_MemberData` is an XML string containing VFP data (in the same format created by `CursorToXML()`, surely no coincidence). Between the `<VFPData>` and `</VFPData>` tags, there’s one element, called `memberdata`, for each PEM with customization specified. The element has an attribute for each customization item for that PEM. For example, here’s the `_MemberData` string for a form with a custom property, `IFlag`, and a custom method, `MyMethod`, capitalized as shown here, and with the `AutoCenter` property added to the Favorites page:

```
<VFPData><memberdata name="autocenter" type="property"
favorites="True"/><memberdata name="lflag" type="property"
display="lFlag"/><memberdata name="mymethod" type="method"
display="MyMethod" /></VFPData>
```

The definition for the `memberdata` element includes six attributes, as shown in **Table 2**. The schema is open, however, so you can add custom attributes and use them at runtime. Note that capitalization is significant in the `_MemberData` string, both for the attribute names and for True/False values. It appears not to matter for the value of the type attribute.

**Table 2.** *The memberdata element for each property, event, or method includes a subset of these attributes.*

Attribute	Values	Purpose
name		Contains the name of the PEM. Required.
type	“property” “event” “method”	Contains the type of PEM. Required.
display		Contains the name as it should display in the Property Sheet and with IntelliSense. Must be the same string as the name; only the capitalization can vary. Applies only to custom PEMs.
favorites	“True” “False”	Indicates whether the PEM is included on the Favorites page.
override	“True” “False”	Indicates whether settings unspecified at this level should be inherited from the parent class (False) or draw their values from the default settings for this PEM (True).
script		Contains VFP code to run as a Property Editor. (See “Creating property editors” later in this chapter.)



*The Property Sheet is sorted alphabetically using a case-sensitive sort. That's why custom properties, which always displayed in lower-case, are listed at the bottom. If the display attribute you specify for a PEM begins with an upper-case letter, that PEM will be sorted in with the native PEMs.*

The behavior of the override attribute is somewhat non-intuitive. For attributes specified at the current level, it's irrelevant. They have whatever value you assign at the current level. Override applies only to attributes you don't specify at the current level, and determines where those attributes get their values.

For example, consider a command button class (cmdTopLevel) with two custom properties: cMyFirstProp and cMySecondProp. In the button class, both have display and favorites attributes. The MemberData XML for the class is:

```
<VFPData>
<memberdata name="cmyfirstprop" type="property" display="cMyFirstProp"
favorites="True"/>
<memberdata name="cmysecondprop" type="property" display="cMySecondProp"
favorites="True"/>
</VFPData>
```

With these settings, both properties appear on the Favorites page and they're capitalized as you'd want them.

Now consider a subclass (cmdMiddleLevel). Suppose you set the override attribute for cMySecondProp to True, but also specify the display attribute. The MemberData XML for this class is:

```
<VFPData>
<memberdata name="cmysecondprop" type="property" display="cMySecondProp"
override="True"/>
</VFPData>
```

There's nothing specified for cMyFirstProp, so it draws its behavior from the parent class. That means cMyFirstProp appears on the Favorites page (and the property is capitalized as cMyFirstProp). However, with override set to True, cMySecondProp uses only the settings provided at this level. So, it doesn't appear on the Favorites page, though it's still properly capitalized, because that attribute is specified for this class.

Now consider a subclass of cmdMiddleLevel, called cmdBottomLevel. If you change none of the attributes at this level (that is, specify nothing for \_MemberData), cFirst inherits its behavior from cmdTopLevel, so it appears on the Favorites page. cSecond inherits from cmdMiddleLevel and does not appear in Favorites.



*The Developer Downloads for this chapter, available at [www.hentzenwerke.com](http://www.hentzenwerke.com), include Chapter2.VCX, a class library that contains the cmdTopLevel, cmdMiddleLevel, and cmdBottomLevel classes described here.*

## Setting attributes globally

In addition to customizing a particular PEM in a particular class, you can specify that some customization applies to a PEM in every form or class with that PEM. For example, by default, the Caption and Anchor properties appear on the Favorites page.

Information about global customization is not stored in the `_MemberData` property of individual forms or classes, but in the IntelliSense table (referenced by the `_FoxCode` system variable and by default, `FoxCode.DBF` in the directory indicated by `HOME(7)`). PEM customization items have “E” in the Type field, the name of the PEM in the Abbrev field, and a MemberData string in the Tip field. For example, the default IntelliSense table contains a record for the Caption property, with the values shown in **Table 3**.

**Table 3.** You can specify custom behavior globally by adding records to the IntelliSense table. Here, the Caption property is added to the Favorites page and a custom property editor is specified.

Field	Value
Type	E
Abbrev	Caption
Expanded	
Cmd	{CaptionScript}
Tip	<VFPData><memberdata name="caption" type="property" favorites="True" script="DO (_ CODESENSE) WITH 'RunPropertyEditor',';caption'"/></VFPData>
Data	

You’re not stuck with the global customization for a PEM; to override it in a particular form or class, just change it in the `_MemberData` string for that PEM in the form or class.

## Inheriting `_MemberData`

`_MemberData` can be inherited either through the inheritance hierarchy or the containership hierarchy. The rules make sense, but they’re different from those for other properties. Here’s the order VFP will use to search for a memberdata attribute. Once it finds a value for a particular attribute, VFP stops searching.

- The `_MemberData` property of the object itself.
- The `_MemberData` property of classes in the inheritance hierarchy for the object, working upwards in the normal way.
- The `_MemberData` property of any containers, working upwards through the containership hierarchy.
- Any global memberdata settings, stored in the IntelliSense table.

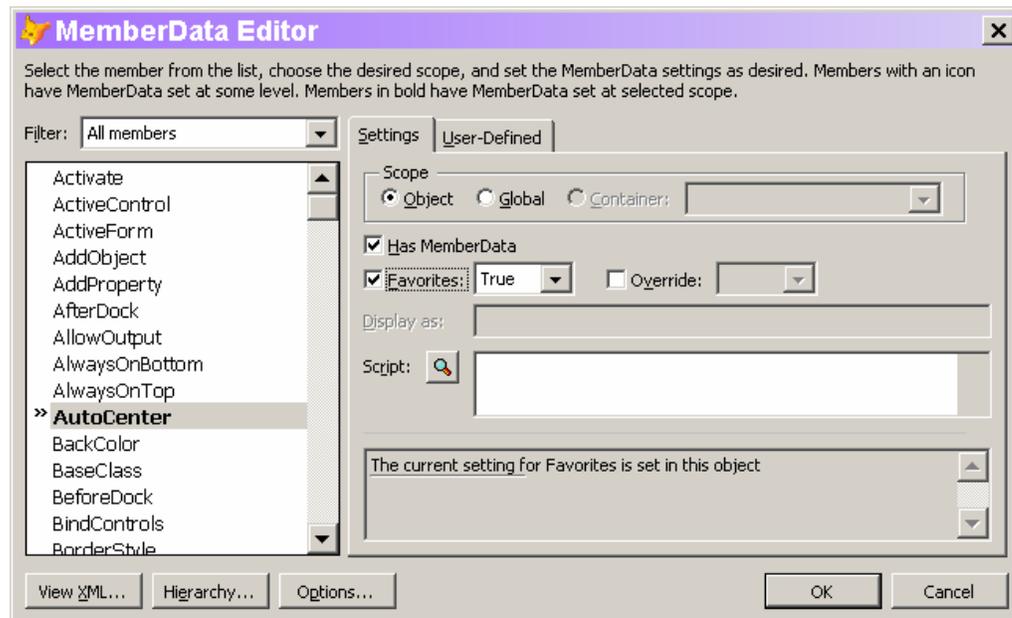
For a given PEM, each attribute may be found in memberdata at a different point in the list.

 Although memberdata can be “inherited” through the containership hierarchy, you can’t add the `_MemberData` property to an object once you put it on a form or class. (That’s because you can’t ever add a property to a contained object.) However, if a contained object already has a `_MemberData` property, you can edit it for the instance on the form or class.

## The MemberData Editor

Once you understand the structure of MemberData, it’s not hard to specify it, but it’s tedious enough that you’re not likely to do so. That’s especially true for global member data, where you have to modify the IntelliSense table.

Fortunately, there’s an alternative. VFP 9 includes a new tool called the MemberData Editor, available from the Form or Class menu. The MemberData Editor (**Figure 3**) handles all the heavy lifting involved in adding the `_MemberData` property and populating it.



**Figure 3.** The MemberData Editor makes it easy to customize the Property Sheet.

The MemberData Editor lists all PEMs of the form or class in alphabetical order. PEMs with customization are shown in bold (like `AutoCenter` in **Figure 3**). You can limit the display in the list using the Filter dropdown. Filters include custom members only, custom members added in this class, native members only, and favorites only.

To customize a PEM, choose it in the list and select the `Has MemberData` checkbox. Next, specify the attributes you want. **Table 4** shows the relationship between the controls in the MemberData Editor and the `_MemberData` attributes.

**Table 4.** The items in the MemberData Editor map to the attributes of the `_MemberData` string.

Control(s)	Attribute	Notes
Object/Global/Container	None	Determines whether the settings for this PEM are stored in the local <code>_MemberData</code> property (Object), the IntelliSense table (Global), or in the container's <code>_MemberData</code> property (Container).
Has member data	None	Indicates the PEM has member data. Provides a one-click way to remove all customization for a PEM.
Favorites checkbox and dropdown	favorites	Determines whether this PEM appears on the Favorites page. The checkbox indicates whether the memberdata element for this PEM has the favorites attribute. The dropdown specifies the setting for that attribute.
Override checkbox and dropdown	override	Determines whether unspecified settings at this level use the inherited settings or the defaults. The checkbox indicates whether the memberdata element for this PEM has the override attribute. The dropdown specifies the setting for the attribute.
Display as	display	Specifies the capitalization for this PEM.
Script	script	Specifies the code for a property editor for this property. (See "Creating property editors" later in this chapter.)

If a control on a form or class is selected when you open the MemberData Editor, the tool attempts to edit `_MemberData` for that control. If the control's class doesn't have a `_MemberData` property, you get a warning, after which the MemberData Editor opens showing the PEMs for the object, but saving any changes you make to the `_MemberData` property of the containing form or class.



*Be aware that "global" here really means global. If you change any settings when scope is set to global, the corresponding record in the IntelliSense table is modified or deleted and your customizations change or disappear for every form and class with the specified PEM.*

The Description Pane (the disabled editbox near the bottom) shows you the current settings for the selected PEM. It indicates, for each attribute with memberdata at some level, which setting is in control. **Figure 3** shows the simplest case, with the attribute set at the local level. The listing can also indicate a global setting, a setting drawn from a container (in which the container is named), and a setting inherited from a parent class (in which case, the parent class is named).

Two buttons on the MemberData Editor also help you see exactly what settings apply. Click **View XML** to see the string that will be stored to the object's `_MemberData` property if you click OK. Click **Hierarchy...** for a detailed look at each level in the inheritance and containership hierarchy that affects the currently selected PEM, as well as the result, the settings that will be used for that PEM.

**Listing 1** shows the result for the Caption property of the cmdMiddleLevel class in Chapter2.VCX.

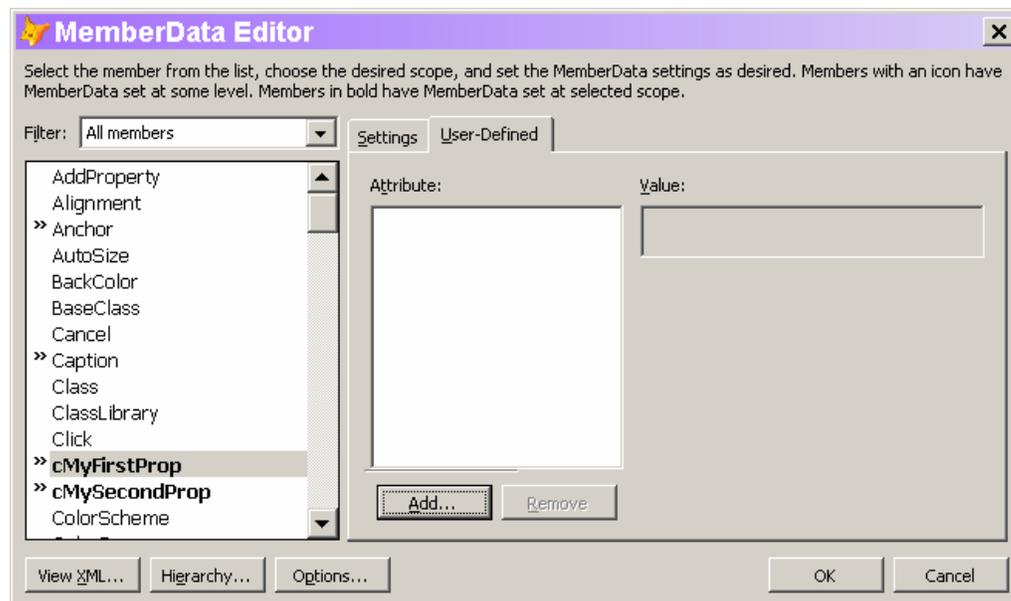
**Listing 1.** When you click *Hierarchy...* in the MemberData Editor, you see each setting that has an effect on the selected PEM's memberdata.

```
Class - cmdmiddlelevel
<memberdata name="cmYsecondprop" type="property" display="cMySecondProp"
override="True"/>
  Class - cmdtoplevel of chapter2.vcx
  <memberdata name="cmYsecondprop" type="property" display="cMySecondProp"
  override="True"/>
Effective settings:
<memberdata name="cmYsecondprop" type="property" display="cMySecondProp"
override="True"/>
```

### Adding custom attributes

In addition to specifying the standard memberdata attributes, the MemberData Editor lets you define and specify your own attributes. While VFP itself won't use your custom attributes, they give you a place to store information (even code) for a class and have that information always present whatever you do with the class.

The user-defined page of the MemberData Editor (**Figure 4**) lets you add custom attributes. The page is available for a PEM only if **Has MemberData** is checked. Click the **Add** button to add an attribute—an input box appears for you to specify the name. Once you do that, use the **Value** textbox to provide the attribute's value.



**Figure 4.** The User-Defined page of the MemberData Editor allows you to add custom attributes, which you can use to ensure information travels with a class.

What can you do with custom attributes? Here's one example. While you can specify a property editor for a custom property (see "Creating Property Editors" later in this chapter), you can't force people to use it. So imagine having an attribute called Valid that contains an expression determining the validity of the property's value. Of course, you need code to look for the attribute and evaluate the expression—you could put such code in a project hook. Here's a simple example of code to do so in the BeforeBuild method:

```

LPARAMETERS cOutputName, nBuildAction, lRebuildAll, lShowErrors, lBuildNewGuids

#DEFINE CRLF CHR(13) + CHR(10)

LOCAL oFile, aObj[1], cMembData, lFileResult, lResult
LOCAL cProblems

lResult = .T.

FOR EACH oFile IN This.oProject.Files
  DO CASE
  CASE INLIST(oFile.Type, "K", "V")
    * Open without running code
    IF oFile.Type="K"
      MODIFY FORM (oFile.Name) NOWAIT
    ELSE
      MODIFY CLASS (oFile.Name) NOWAIT
    ENDIF

    cProbs = "Validity checking " + oFile.Name + CRLF

    * Grab memberdata
    ASELOBJ(aObj, 1)
    IF PEMSTATUS(aObj[1], "_MemberData", 5)
      cMembData = aObj[1]._MemberData
      * Convert to cursor
      XMLTOCURSOR(cMembData, "__MembData")
      * Look for Valid specs
      SELECT __MembData
      IF TYPE("__MembData.Valid") <> "U"
        * At least one item has a Valid attribute, so process it.
        lFileResult = .T.
        SCAN
          IF NOT EMPTY(__MembData.Valid)
            cValidExpr = __MembData.Valid
            * Substitute for "This"
            cValidExpr = STRTRAN(cValidExpr, "This", "aObj[1]")
            IF NOT EVALUATE(cValidExpr)
              cProbs = cProbs + "Failed test: " + __MembData.Valid + CRLF
              lFileResult = .F.
            ENDIF
          ENDIF
        ENDSCAN
      ENDIF
    ENDIF

    * Close the form or class
    OTHERWISE
      * Do nothing
    ENDCASE
  ENDCASE

```

```

cProbs = cProbs + CRLF
lResult = lResult AND lFileResult
ENDIFOR

IF NOT lResult
  MESSAGEBOX(cProbs)
ENDIF

RETURN lResult

```

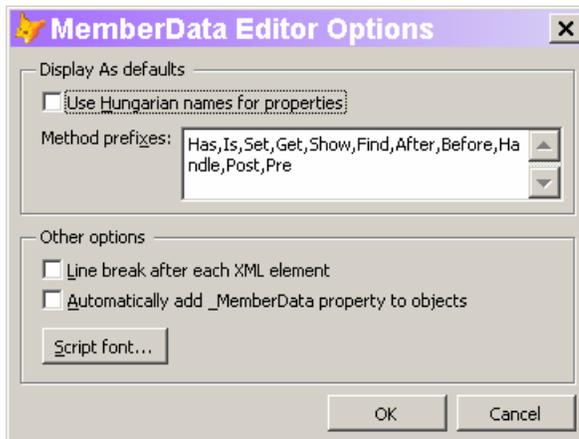
This simple version doesn't drill down to check for a Valid attribute at another level of the inheritance or containership hierarchy, but should give you a sense of the possibilities offered by custom attributes.



*The project hook described above is included in Chapter2.VCX in the Developer Downloads for this chapter, available from [www.hentzenwerke.com](http://www.hentzenwerke.com)*

### Customizing the MemberData Editor

The Options button on the MemberData Editor lets you control several aspects of its behavior. When you click it, the MemberData Options dialog (**Figure 5**) opens. The settings there are remembered between invocations of the MemberData Editor, and between classes. They're stored in the Resource table (by default, FoxUser.DBF in the directory specified by HOME(7)); the relevant record's ID field contains "MEMBERDATAED" while the Name field is "MemberDataEditor".



**Figure 5.** You can control the behavior of the MemberData Editor using the settings in the Options dialog.

The Display As defaults section simplifies the task of setting capitalization through the display attribute. When Use Hungarian names for properties is selected and you check Has Member Data for a property, its name is shown in the Display as textbox with the

first letter in lowercase and the second letter in uppercase; this is useful for those of us who use the first letter of a property name to specify the type and begin the actual name with the second character.

It's not unusual for many method names to begin with one of just a few words. **Method prefixes** lets you specify a list of strings that should be seen as words at the beginning of a method and capitalized appropriately. That is, when a method name begins with one of the specified strings, the suggested **Display as** value capitalizes the first letter of that string and the first letter following the string. For example, using the default settings (shown in **Figure 5**), the suggested capitalization for a method named `isnumeric` would be "IsNumeric".

The **Other options** section lets you control appearances. If you select the **Line break after each XML element** checkbox, the XML created for `_MemberData` puts the `memberdata` element for each PEM on a separate line in the XML string. For example, with this setting selected, the `_MemberData` string shown in "The structure of `_MemberData`" section would appear as:

```
<VFPData>
<memberdata name="lflag" type="property" display="lFlag"/>
<memberdata name="mymethod" type="method" display="MyMethod"/>
</VFPData>
```

Newly created forms and classes don't have a `_MemberData` property. The `MemberData` Editor adds it as needed. However, you may prefer for each form or class to have the property; if so, select the **Automatically add `_MemberData` property to objects** checkbox. When that item is selected, a record is added to your IntelliSense table that automatically adds the `_MemberData` property to each form or class as you create or open it.

Finally, the **Script font** button lets you set the font used for the Script editbox on the `Member Data` page. Note that the font you choose isn't used for the window that opens when you click the **Zoom** button for the script; that's controlled by your setting for PRG files on the IDE tab of the VFP Options dialog.

When you click the **OK** button and at least one PEM has local customization specified, the `MemberData` Editor checks whether the current form or class has a `_MemberData` property, adds it if necessary, and generates the appropriate string. At the same time, any global customization specified is handled by adding records to the table specified by `_FoxCode`.

### Replacing the `MemberData` Editor

Like many other tools in the VFP development environment, the `MemberData` Editor is written in VFP. (In fact, it was written by Doug Hennig, one of the authors of this book.) That means you can replace it with your own tool if you prefer.

However, the mechanism for replacing the `MemberData` Editor is different than for other tools written in VFP. Rather than providing a system variable (like `_GenMenu` or `_CodeSense`), the `MemberData` Editor is hooked into the Builder system. The table that drives the built-in Builder system (by default, `Builder.DBF` in the Wizards directory) contains a record for the `MemberData` Editor that points to `MemberDataEditor.APP` in the VFP home directory.

If you prefer to use another `MemberData` Editor, you have several choices. Once you create or acquire another application to serve this purpose, you can put it in the VFP home directory and name it `MemberDataEditor.APP`. (Of course, if you choose to name your

replacement MemberDataEditor.APP, you should probably save a copy of the version that comes with VFP 9.) Alternatively, you can modify the record in the Builder table to point to the application you want to use. A third choice is to add another record to Builder.DBF for your editor; and then, when you invoke the MemberData Editor, you're prompted to choose between the editor provided and your custom version.

Finally, as with the other VFP tools written in VFP, the source code for the MemberData Editor comes with VFP. (Look in the XSource.ZIP file located in VFP's Tools\XSource directory.) If you just want to make minor changes, your best bet may be to modify the source code and build a custom version of the tool.

## Playing favorites

While you can add PEMs to the Favorites tab using the MemberData Editor, there's actually an easier way. Right-click any PEM in the Property Sheet and choose **Add to Favorites**. Doing so automatically generates the appropriate MemberData string, adding the `_MemberData` property, if necessary.

Removing a PEM from the Favorites page isn't quite as easy; there's no Remove from Favorites item on the shortcut menu. You have to edit the `_MemberData` string directly or use the MemberData Editor.

## Creating property editors

While a Favorites page and displaying the names of custom PEMs as you want them are both useful, the truly exciting feature enabled by `_MemberData` is the ability to create custom property editors.

A number of VFP's built-in properties provide a mechanism for choosing a value other than simply typing it in. For example, the various color properties (such as `BackColor`) use the Color Picker, while the Icon and Picture properties use a special version of the Open dialog (the same as the `GetPict()` function). You invoke these editors by clicking the ellipsis (...) button next to the textbox (called the "Property settings box" in Help) in the Property Sheet. In VFP 9, you can create your own dialogs or call on built-in dialogs for any property.

VFP 9 includes two property editors, both defined globally in `FoxCode.DBF` for the relevant property. The first uses the `InputBox()` function to let you specify a Caption. It's designed so you can use it for other properties as well. (See "Using IntelliSense for property editors" later in this chapter.)

The second Property Editor is for the new Anchor property. Anchor requires a numeric value, computed by adding the values of the appropriate settings. The Anchor Editor (`AnchorEditor.App` in the VFP home directory) lets you choose the settings you want and test them. Details of both the Anchor property and the Anchor Editor are discussed in Chapter 13, "Forms and Controls."

A Property Editor is, essentially, a builder, though it's generally focused on one or a few properties, where a builder addresses many properties of a control. Like a builder, a Property Editor has to do the heavy lifting involved in setting properties at design-time in its code. It receives no parameters and must figure out what object it's addressing and what property it's intended to change. (For global property editors, IntelliSense offers a somewhat smarter alternative; see "Using IntelliSense for property editors" later in this chapter.)

Use the `ASELOBJ()` function to figure out which object you're working on. There's one complication; if the property belongs to a form or container class rather than a control, `ASELOBJ()` doesn't find a selected object. In that case, you need to call it again, passing 1 for

the optional second parameter, so it can find the form or container. This code finds the selected control, if there is one, and the form or container, if no control is selected. If it can't find either, it gives up:

```
IF ASELOBJ(aControl) = 0
  IF ASELOBJ(aControl, 1) = 0
    RETURN
  ENDIF
ENDIF
```

After executing this code (if it doesn't issue RETURN), aControl[1] contains an object reference to the selected control, form, or container. (In fact, if multiple objects are selected, the array contains references to all of them.)

Unfortunately, there's no generic way to figure out which property called the Property Editor, so you have to hard code the property name. **Listing 2** shows a Property Editor for a custom nEmphasisColor property; it brings up the Color Picker dialog.

**Listing 2.** *This Property Editor lets you use the Color Picker to choose a value for a custom property called nEmphasisColor.*

```
LOCAL aControl[1], nColor

IF ASELOBJ(aControl) = 0
  IF ASELOBJ(aControl, 1) = 0
    RETURN
  ENDIF
ENDIF

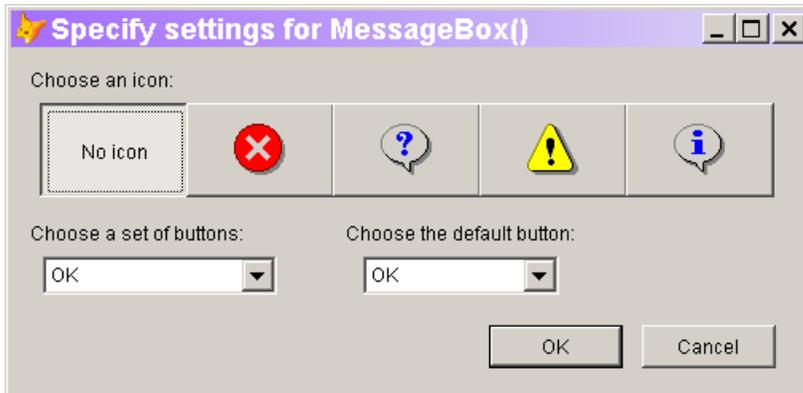
* Grab default value
IF VARTYPE(aControl[1].nEmphasisColor) = "N"
  nColor = aControl[1].nEmphasisColor
ELSE
  nColor = 0
ENDIF

nColor = GETCOLOR(nColor)

aControl[1].nEmphasisColor = nColor

RETURN
```

Clearly, a Property Editor is most useful for items that can't be easily typed in, like RGB color values. Another such item is the second parameter to the MessageBox() function, which specifies the icon and buttons to use. **Figure 6** shows a form that lets you make your choices and computes the value to pass. A Property Editor that calls on this form is shown in **Listing 3**; it's connected to a property called nMessageBoxParam. (Of course, if the parameter form is in a different directory than the form you're creating, the DO FORM command needs to include the appropriate path.)



**Figure 6.** Calculating the second parameter for `MessageBox()` is complicated. A Property Editor like this one makes it much easier.

**Listing 3.** Using the form in **Figure 6** as a Property Editor is simple.

```
LOCAL aControl[1], nParam

IF ASELOBJ(aControl) = 0
  IF ASELOBJ(aControl, 1) = 0
    RETURN
  ENDIF
ENDIF

DO FORM MessageBoxParams WITH aControl[1].nMessageBoxParams TO nParam

aControl[1].nMessageboxParams = nParam
```



The Developer Downloads for this chapter, available from [www.hentzenwerke.com](http://www.hentzenwerke.com), include `MessageBoxParams.SCX` (the form in **Figure 6**) and `PropertyEditors.SCX`, a form that demonstrates the Color Picker Property Editor and the Property Editor for `MessageBox()` parameters.

### Using IntelliSense for property editors

Defining a Property Editor every time you need it would get tedious enough that you'd do it only for the most complicated properties. Fortunately, the VFP team included an alternative approach that takes advantage of the existing IntelliSense script system.

In addition to the new "E" record in the FoxCode table to support global `_MemberData`, the IntelliSense engine was enhanced with a method called `RunPropertyEditor`; this method lets you execute the code in a script record (type "S") as a Property Editor.

The Property Editor for the Caption property uses this mechanism, so we'll examine it to see how it works. The "E" record for Caption has "{CaptionScript}" in the `Cmd` field. The `Tip` field contains:

```
<VFPData><memberdata name="caption" type="property" favorites="True" script="DO
( CODESENSE) WITH 'RunPropertyEditor','','caption'"/>
</VFPData>
```

The key item there is the script attribute, with the value:

```
DO ( _CODESENSE) WITH 'RunPropertyEditor','','caption'
```

This line runs the IntelliSense engine, telling it to execute its RunPropertyEditor method and pass “caption” to that method. RunPropertyEditor finds the type “E” record in FoxCode corresponding to the parameter it receives. If the Cmd field of that record contains the name of a script record, the method locates that script record and executes the contents of the script record’s Data field. For the Caption record, therefore, RunPropertyEditor looks for a record in FoxCode with Type = “S” and Abbrev = “CaptionScript”. There is such a record; its Data field contains the code in **Listing 4**, which receives the property name as a parameter, finds all selected controls (or the form or container if no control is selected), prompts the user for a new caption, and then assigns the new value to the specified property of each selected object.

**Listing 4.** This script (which comes with VFP 9) uses InputBox() to prompt for a new string value.

```
#DEFINE IBOX_CAPTION "Caption Property Editor"
#DEFINE IBOX_TEXT "Enter value for property: "
#DEFINE USER_CANCEL "__usercancelled__"

LPARAMETERS tcProp
LOCAL ARRAY laObjs[1]
LOCAL lcRetVal, lnCnt, loCtl,lcDefValue, lnSuccess
IF ASELOBJ( laObjs)=0
  IF ASELOBJ( laObjs,1)=0
    RETURN
  ENDIF
ENDIF
lcDefValue=IIF( ALEN( laObjs,1)=1,laObjs[1].&tcProp,"")
lcRetVal=INPUTBOX( IBOX_TEXT + tcProp, IBOX_CAPTION, lcDefValue, 0, ;
  "", USER_CANCEL)
IF lcRetVal==USER_CANCEL
  RETURN
ENDIF
FOR lnCnt = 1 TO ALEN( laObjs,1)
  loCtl = laObjs[lnCnt]
  IF PEMSTATUS( loCtl, tcProp, 5 )
    loCtl.&tcProp = lcRetVal
  ENDIF
ENDFOR
```

This two-record architecture makes it easy to use a single Property Editor (defined in a type “S” record) for many different properties. For example, to use the CaptionScript for the Name property, add a type “E” record for Name with “{CaptionScript}” in the Cmd field and specify this line as the script for Name (using the MemberData Editor):

```
DO (_CODESENSE) WITH 'RunPropertyEditor','','name'
```

Note that the line of code is identical to the one used for Caption, except for the final parameter.

You can apply the same mechanism to other property editors. For example, you might want to make the MessageBox() parameters Property Editor available as a script. To do so, first add a record to the FoxCode table, with the values in **Table 5**.

**Table 5.** To create a new script record for the MessageBox() parameters, add a record to FoxCode with these settings.

Field	Value
Type	"S"
Abbrev	"MessageScript"
Cmd	"{}"
Data	<pre>LPARAMETERS tcProp  LOCAL ARRAY laObjs[1] LOCAL lnRetVal, lnCnt, loCtl, lnDefValue, lnSuccess IF ASELOBJ( laObjs)=0   IF ASELOBJ( laObjs,1)=0     RETURN   ENDIF ENDIF  lnDefValue=IIF(ALEN( laObjs,1)=1,laObjs[1].&amp;tcProp,0) lnRetVal =0 DO FORM "d:\writing\books\newin9\code\chapter2\MessageBoxParams.SCX" ;   WITH lnDefValue to lnRetVal  FOR lnCnt = 1 TO ALEN( laObjs,1)   loCtl = laObjs[lnCnt]   IF PEMSTATUS( loCtl, tcProp, 5 )     loCtl.&amp;tcProp = lnRetVal   ENDIF ENDIF ENDFOR</pre>



*Debugging IntelliSense scripts is difficult. If a script contains any compile-time errors, it will fail to run without any messages. If you're having trouble getting a script to run, try copying it to a PRG and compiling to find your errors. In addition, tracing may or may not work with property editors; in some cases, issuing SYS(2030,1) prior to running your Property Editor may work.*

Once you have the script record set up, add a record to FoxCode for each property name you want to be able to set with this script. **Table 6** shows an example, for a property called nMessageParam. You can set up type "E" records that use the same script for as many properties as you want. Unfortunately, there doesn't appear to be a way to call on a script

record without adding a type “E” record; it would handy to be able to create MemberData at the class level (ideally, using the MemberData Editor) that calls RunPropertyEditor to use a property editor defined in the IntelliSense table.

**Table 6.** To use the `MessageBox()` parameters script, add a record like this to FoxCode.

Field	Value
Type	“E”
Abbrev	nMessageParam
Cmd	{MessageScript}
Tip	<pre>&lt;VFPData&gt;&lt;memberdata name="nmessageparam" type="property" display="nMessageParam" script="DO (_CODESENSE) WITH 'RunPropertyEditor', ' ', 'nmessageparam' "/&gt; &lt;/VFPData&gt;</pre>



The Developer Downloads for this chapter, available at [www.hentzenwerke.com](http://www.hentzenwerke.com), include `AddMessageScript.PRG`, a program that adds the records needed for the `MessageBox()` parameter Property Editor to the IntelliSense table.

## The bottom line

FoxPro developers spend a lot of their time working in the Property Sheet. With VFP 9, working there is easier and more configurable. We expect the FoxPro community to create and make available a number of property editors that will smooth your way through form and class definition.

Updates and corrections for this chapter can be found on Hentzenwerke’s website, [www.hentzenwerke.com](http://www.hentzenwerke.com). Click “Catalog” and navigate to the page for this book.

