

# Template Language Overview

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Clarion for Windows' Template Language is a flexible script language complete with control structures, user interface elements, variables, file I/O, and more. The Template Language “drives” the Application Generator both at application design time and during source code generation.

- During application design, the programmer is asked for specific information about the application being generated. These prompts for information come directly from the templates.
- During source code generation, the template is in control of the source code statements generated for each procedure in the application, and also controls what source files receive the generated code.

This process makes the Templates completely in control of the Application Generator. The benefit to the programmer of this is the complete flexibility to generate code that is directly suited to the programmer's needs.

## What Templates Are

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A template is a complete set of instructions, both Template and “target” language statements, which the Application Generator uses to process the programmer's input for application customizations then generate “target” language (usually, but not limited to, Clarion language) source code.

Clarion's templates are completely reusable. They generate only the exact code required for each specific instance of its use; they do not inherit unused methods. The templates are also polymorphic, since the programmer specifies the features and functions of each template that are required for the procedure. This means one template can generate different functionality based upon the programmer's desires.

Some of the most important aspects of template functionality supported by the Template Language include:

- Support for controls (`#PROMPT`) that gather input from the developer, storing that input in user-defined template variables (symbols).
- Pre-defined template variables (Built-in Symbols) containing information from the data dictionary and Clarion for Windows' application development environment.
- Specialized `#PROMPT` entry types, which give the programmer a list of appropriate choices for such things as data file or key selection.

- Unconditional and conditional control structures (#FOR, #LOOP, #IF, #CASE) which branch source generation execution based on an expression or the contents of a symbol (variable). This allows the Application Generator to generate only the exact source code needed to produce the programmer's desired functionality in their application.
- Statements (#EMBED) that define specific points where the developer can insert (embed) or *not* insert their own source code to further customize their application.
- Support for code templates (#CODE), control templates (#CONTROL), and extension templates (#EXTENSION) that add their specific (extended) functionality to any procedure template. This makes any procedure type polymorphic, in that, the procedure can include functionality normally performed by other types of procedures.

Template code is contained in one or more ASCII files (\*.TPL or \*.TPW) which the Application Generator pre-compiles and incorporates into the REGISTRY.TRF file. It is this template registry file that the Application Generator uses during application design.

Once in the registry, the template code is completely reusable from application to application. It generates custom source code for each application based upon the application's data dictionary and the options selected by the programmer while working with the Application Generator.

The programmer can customize the templates in the registry (or in the \*.TP\* files) to fit their own specific standard design requirements. This means that each procedure template can be designed to appear exactly as the programmer requires as a starting point for their applications. Multiple "default" starting points can be created, so the programmer can have a choice of starting point designs for each procedure type.

When the programmer has customized the template source (\*.TP\* file), the Application Generator automatically updates the registry. When the programmer has customized the registry, the template source files can be re-generated from the registry, if necessary.

The Application Generator always makes a *copy* of the template, as stored in the registry, when creating a procedure or first populating a procedure with a code, control, or extension template. Once this copy is made, the programmer further customizes it to produce exactly the functionality required by the application for that procedure.

The template language can generate more than source code: it can even be used to create add-in utilities (see #UTILITY).

## Template Types

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There are four main types of templates: procedure, code, control, and extension templates.

- Procedure templates (#PROCEDURE) generate procedures and/or functions in an application. This is the choice you make when asked to choose the starting point for a “ToDo” procedure in the Application Generator.
- Code templates (#CODE) generate executable code into a specific embed point. The developer can only insert them at an embed point within a procedure. A list of the available code templates appears from which to choose.
- Control templates (#CONTROL) place a related set (one or more) of controls on a procedure’s window and generate the executable source code into the procedure’s embed points to provide the controls’ standard functionality.
- Extension templates (#EXTENSION) generate executable source code into one or more embed points to add specific functionality to a procedure that is not “tied” to any window control.

## What Templates Do

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The template code files contain template language statements and standard “target” language source code which the Application Generator places in your generated source code files. They also contain the prompts for the Application Generator which determine the standard customizations the developer can make to the generated code.

The programmer’s response (or lack of) to the prompts “drives” the control statements that process the template language code, and produces the logic that generates the source code. The templates also contain control statements which instruct the Application Generator how to process the standard code. The function of a template is to generate the “target” language source code, customized per the programmer’s response to the prompts and design of the window or report.

There are some lines of code from templates that are inserted directly into your generated source code. For example, if you accept a default Copy command menu item in your application window, the following code is inserted in your generated source exactly as it appears in the template file:

```
ITEM('&Copy'),USE(?Copy),STD(STD:Copy),MSG('Copy item to Windows clipboard')
```

Some of the standard code in the template is a mix of “target” (Clarion)

language statements and template language statements. For example, when the contents of a template variable (symbol) needs to be inserted in the generated source code, the Application Generator expands the symbol to the value the application will use, as it generates the source code for the application. Within the template code, the percent sign (%) identifies a variable (symbol). In the example below, the Application Generator will fill in the field equate label for the control as it writes the source code file, substituting it for the %Control variable:

```
SELECT(%Control)
```

To support customizing the template starting point at design time, Clarion's template language provides prompt statements that generate the template's user interface, so that the Application Generator can query the developer for the information needed to customize the application. The basic interface consists of command buttons, check boxes, radio buttons, and entry controls placed on the Procedure Properties dialog. These statements can also create custom dialog boxes to gather input from the developer. While working with the Application Generator, therefore, some of the dialogs and other interface elements the developer sees are not part of the Application Generator—rather they are produced by the template.

For example, the following statement displays a file selection dialog from the application's data dictionary, then stores the programmer's choice for a data file in a variable (symbol) called %MyFile:

```
#PROMPT('Pick a file',FILE),%MyFile
```

It makes no difference what the programmer names the files and fields, nor what database driver is selected. The programmer picks them from a file selection dialog.

The template also contains control structures to instruct the Application Generator on how to generate the code( such as, #IF, #LOOP, #CASE). These control statements work in the same manner as Clarion language control structures.

## **Pre-Processing and Source Code Generation**

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Before allowing you to create an application using the templates, the Application Generator pre-processes the template code (.TPL and .TPW) files. The Application Generator verifies the registry is up to date by testing the time stamps and file sizes of all the template source code files.

The Application Generator utilizes the templates as stored in binary form in the registry file, as it gathers customizations from the developer with the prompts and dialogs available through the Procedure Properties dialog. The Application Generator stores the template starting point for each procedure and the customization from the programmer in the .APP file.

At source code generation time, the Application Generator processes the application's procedures as stored in the .APP file against the template, a second time. Some of the more important steps it uses to produce the source code are:

- It executes the template language control statements to process the template and the procedure's customizations in the correct order.
- It resolves the template symbols—both built-in and user-defined.
- It creates the source code files and writes the source code as generated by the template, line by line, including the previously evaluated symbols.
- It evaluates embed points and writes the source code, as embedded by the developer and stored in the .APP file, in the correct location within the generated source code.

## Embed Points

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One of the most important template language statements is #EMBED, which defines an embed point. These extend the structure and functionality of the procedure template by allowing the programmer to add their own custom code. The embed points indicate “targets” at which the developer can add their own custom code to the generated source. These are also the “targets” for the source code generated by control and extension templates.

Each procedure template allows for a certain number of default points at which embeds are allowed. These are typically points which coincide with messages (events) from the operating environment (Windows), such as when the end user moves focus from or to a field. The template programmer can add to, or subtract from, the list.

When the developer customizes the template, pressing the Embeds button in the Procedure Properties dialog provides access to all the embed points available in a procedure. The Actions popup menu selection in the Window Formatter also provides access to the embed points for a specific control.

The developer adds custom code—either hand coded from scratch in the editor, or created with a code template—at the embed point. The embed points are also the points into which control templates and extension templates generate executable code to support their functionality.

The Application Generator stores the embed point's code (no matter what its origination) in the .APP file. At code generation time, the Application Generator processes the template, producing source; when it reaches an embed point, it places the developer's code, line by line, into the generated source code document.

## Template Prompts

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Input Validation Statements and Prompt Entry types place controls on the Procedure Properties window or Actions dialog which the developer sees when using the template to design an application. These range from a simple string telling the Developer what to do (#DISPLAY), to command buttons, check boxes, or radio buttons. There are also specialized entry types which provide the programmer a list of choices for input, such as the data fields in the dictionary.

Standard Windows controls can be used to get information from the programmer on the Procedure Properties window, the Actions dialog, or custom prompt dialogs. The common control types—entry field, check box, radio button, and drop-down list—are all directly supported via the #PROMPT statement.

#PROMPT places the prompt, the input control, and the symbol in a single statement. The general format is the #PROMPT keyword, the string to display the actual prompt, a variable type for the symbol, then the symbol or variable name. The Application Generator places the prompt and the control in the Procedure Properties or Actions dialog (depending on whether the prompt comes from a the procedure template or a code, control, or extension template). When the developer fills the control with a value, then closes the dialog, the symbol holds the value.

The #BUTTON statement provides additional “space” for developer input when there is more developer input required than can fit in the one dialog. This places a button in the dialog, which displays an additional custom dialog when pressed. The additional dialogs are called “prompt pages.”

#ENABLE allows prompts to be conditionally enabled based on the programmer’s response to some other prompt. #BOXED supports logical grouping of related prompts. Once the programmer has input data into a prompt, the #VALIDATE statement allows the template to check its validity.

These tools provide a wide range of flexibility in the type of information a template can ask the programmer to provide. They also provide multiple ways to expedite the programmer’s job, by providing “pick-lists” from which the programmer may choose wherever appropriate.

## Data Dictionary Interface

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The templates use information from the Data Dictionary extensively to generate code specifically for the declared database. There are several symbols that specifically give the templates access to all the declarations: %File, %Field, %Key, and %Relation. These, and all the symbols related to them, give the templates access to all the information in the Data Dictionary.

Pay special attention to the %FileUserOptions, %FieldUserOptions, %KeyUserOptions, and %RelationUserOptions symbols. These are the symbols that contain the values the user enters in the **User Options** text control on the **Options** tab of the **File Properties**, **Field Properties**, **Key Properties**, and **Relation Properties** dialogs. This can be a powerful tool to customize any output from the Data Dictionary.

The best way to use these %UserOptions symbols is to set them up so the user enters their custom preferences which your template supports in the form of attributes with parameters, with each attribute separated by a comma. This gives them the same appearance as Clarion language data structure attributes. By doing this, you can use the EXTRACT built-in template function to get the value from the user. For example, if the user enters the following in a **User Options** for a field:

```
MYCUSTOMOPTION(On)
```

The template code can parse this using EXTRACT:

```
#IF(EXTRACT(%FieldUserOptions,'MYCUSTOMOPTION'.1) = On)
  #!Do Something related to this option being turned on
#ENDIF
```

This is a very powerful tool, which allows for infinite flexibility in the way your custom templates generate source code.

# Template Structure

## Template Source Format

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The structure of the ASCII template source file is different than the structure of a Clarion source file. To read the ASCII source for a template, start out with the following guidelines:

- Any statement beginning with a pound symbol (#) identifies a template language statement.
- A percent sign (%) before an item within any statement (template or “target” language) identifies a template symbol (variable), which the Application Generator processes at code generation time.
- Any statement that begins without the pound (#) or percent (%) is a “target” language statement which is written directly into a source code file.

The template files are organized by code sections that terminate with the beginning of the next section or the end of the file. The template code generally divides into ten sections.

- **#TEMPLATE** begins a template set (template class). This is the first statement in the template set (required) which identifies the template set for the registry.
- **#APPLICATION** begins the source generation control section. This is the section of the template that controls the “target” language code output to source files, ready to compile. One registered template set must have a **#APPLICATION** section.
- **#PROGRAM** begins the global section of the generated source code, the main program module. One registered template set must have a **#PROGRAM** section.
- **#MODULE** begins a template section that generates the beginning code for a source code module other than the global (program) file. One registered template set must have a **#MODULE** section.
- **#PROCEDURE** begins a procedure template. This is the fundamental “target” language procedure or function generation template.
- **#GROUP** begins a reusable statement group containing code which may be **#INSERTed** into any other section of the template. This is the equivalent of a template language procedure or function.

- `#CODE` begins a code template section which generates executable code into a specific embed point. The developer can only insert them at an embed point within a procedure. A list of the available code templates appears from which to choose.
- `#CONTROL` begins a control template. Control templates place a related set (one or more) of controls on a procedure's window and generate the executable source code into embed points that provides the controls' standard functionality.
- `#EXTENSION` begins an extension template. Extension templates generate executable source code into one or more embed points of a procedure to add specific functionality to the procedure that is not "tied" to any window control.
- `#UTILITY` begins a utility execution section. This is an optional section of the template that performs a utility function, such as cross-reference or documentation generation. This is similar to `#APPLICATION` in that it generates output to ASCII files.

A template set must have a `#TEMPLATE` section to name the set for registration in the `REGISTRY.TRF` template registry file. At least one registered template set must have `#APPLICATION`, `#PROGRAM`, and `#MODULE` sections.

## The Template Registry File

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The Template Registry file (`REGISTRY.TRF`) is a specialized data repository which stores template code and defaults in binary form. All the template elements available in the Application Generator come from the registry. As you add elements from the template into your application, the Application Generator retrieves the code from the registry then stores it along with your customizations, in the `.APP` file.

Storing the templates in a binary registry provides these advantages:

- Quick design-time performance.
- The ability to update the defaults in the registry using standard application development tools (such as the Window Formatter). For example, you can modify a procedure template's default window without writing template source code.

The sources for the `REGISTRY.TRF` are the template code files (`.TPL` and `.TPW`) which are installed in the `TEMPLATE` subdirectory. The Application Generator can read and register `.TPL` files, adding it to the template registry

tree. The .TPW files usually contain additional procedure or code template source, which is processed along with the .TPL file by the #INCLUDE statement in the .TPL file. This allows the template author to logically separate disparate template components.

The default template file for Clarion for Windows is CW.TPL. This file uses the #INCLUDE statement to specify processing the other .TPW files which appear in the \CW\TEMPLATE directory.

## Customizing Default Templates

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There are two methods for customizing the templates:

- You can edit the template source code in the .TPL and .TPW files.

*It is always a good idea to make a backup copy before making any modifications to the shipping templates.*

When directly editing the template source code, you can change the type of source code it generates, or the logic it uses to generate the code. This is how you can make your templates generate source code the way you would write it if you were hand-coding the application.

You can also extend the functionality of the templates by adding your own features. For example, you may want to add prompts to each procedure template that allow you to generate a “comment block” at the beginning of each procedure containing procedure maintenance comments from the programmer maintaining the application.

Adding the following code to the end of any existing template set accomplishes this modification:

```
#EXTENSION(CommentBlock,'Add a comment block to the procedure'),PROCEDURE
  #PROMPT('Comment Line',@S70),%MyComment,MULTI('Programmer Comments')
#ATSTART
  #FOR(%MyComment)
    !%MyComment
  #ENDFOR
#ENDAT
```

This code adds an extension template that is available for any procedure in the application. When you design your procedure, add the CommentBlock extension template to the procedure, then add comments to the Comment Line prompt each time you modify the procedure. At source generation time, each comment line will appear following an exclamation point (!). The block of comments appears in the code just before the PROCEDURE or FUNCTION statement.

If you want this extension to be used in all the procedures you write, go into

the Template Registry and add the extension to all the default procedures for each procedure template. This way, you can make sure it is always used, and you can even place its prompts on the Procedure Properties dialog by checking the Show on Properties box as you add the extension to the procedure template.

Once you make the changes, either choose the **Setup ► Template Registry** menu selection, open an existing application, or create a new application. Make sure the Re-register When Changed box is checked in the Registry Options dialog. The Application Generator automatically pre-processes the templates to update the registry when you have made changes to the template code files.

- You can add to or edit the default user interface procedure template elements—such as the standard window designs and report layouts, or your standard global and local data variables—using the Template Registry.

When you highlight a procedure template in the Template Registry and press the Properties button, the Procedure Properties dialog appears, without all the custom prompts you would normally see when developing an application. Any button which is not dimmed in the Template Registry is available to you to create the default starting point for the procedure.

You can set up the procedure for the starting point that will get you furthest toward a complete procedure while requiring the least amount of customization from you at application design time. If the procedure allows it, you may use the window and report formatters, or define additional data, by pressing the appropriate buttons.

Once you've customized your template registry, you can also export your customizations to template source code files. This is useful for sharing your customizations with other developers.

To update the template source code with the customizations made in the Template Registry, press the Regenerate button in the Template Properties dialog. This updates the .TPL and .TPW files with the changes made.

## Adding New Template Sets

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Adding another set of templates, whether from a third-party vendor or templates you have written yourself, is a very simple process. There is only one requirement for the new template set; a #TEMPLATE statement to identify the set for the template registry. Of course, it also needs to have the specific procedure, code, control, and extension templates to add to the template registry.

For example, the following code is completely valid as a template set with nothing else added:

```
#TEMPLATE(PersonalAddOns,'My personal Template set')
#CODE(ChangeProperty,'Change control property')
  #PROMPT('Control to change',CONTROL),%MyField,REQ
  #PROMPT('Property to change',@S20),%MyProperty,REQ
  #PROMPT('New Value',@S20),%MyValue,REQ
%MyField{%MyProperty} = '%MyValue #<|Change the %MyProperty of %MyField
```

When you register this template set, it will appear in the template registry as Class PersonalAddOns containing just the ChangeProperty code template.

Once a template set is registered in the template registry, all its components are completely available to the programmer for their application development, along with all the components of all other registered template sets. This allows the programmer the flexibility to “mix-and-match” their components during development.

For example, the programmer could create a procedure from a procedure template in the standard Clarion template set, populate it with a control template from a third-party vendor, insert a code template into an embed point from another third-party vendor, then add an extension template from their own personally written template set. At source generation time, all these separate components come together to create a fully functional procedure that performs all the tasks required by the programmer (and nothing else). This is the real power behind Clarion’s Template-oriented programming!

# Template Code Sections

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## #TEMPLATE (begin template set)

**#TEMPLATE**( *name*, *description* )

<b>#TEMPLATE</b>	Begins the Template set.
<i>name</i>	The name of the Template set which uniquely identifies it for the Template Registry and Template Language statements. This must be a valid Clarion label.
<i>description</i>	A string constant describing the Template set for the Template Registry and Application Generator.

The **#TEMPLATE** statement marks the beginning of a Template set. This should be the first non-comment statement in the Template file.

The Template Registry allows multiple Template sets to be registered for the Application Generator. Each Template Code Section (**#APPLICATION**, **#PROGRAM**, **#MODULE**, **#PROCEDURE**, **#CONTROL**, **#CODE**, **#EXTENSION**, and **#GROUP**) within a Template is uniquely identified by its **#TEMPLATE** statement's *name* and the name of the section. This allows different Template sets to contain Template Code Sections with names that duplicate those in other Template sets without ambiguity, and allows the programmer to concurrently use Template sets from multiple sources to generate applications.

Example:

```
#TEMPLATE(SampleTemplate,'This is a sample Template')
#include('FileTwo.TPX')
#include('FileThree.TPX')
```



```

#!—————Initialization Code for Global User-defined Symbols.
#IF(%SharedFiles)                                #! IF Shared Files Enabled
    #SET(%AccessMode,'42h')                       #! default access 'shared'
#ELSE                                             #! ELSE (IF NOT Shared Files ..)
    #SET(%AccessMode,'22h')                       #! default access 'open'
#ENDIF                                            #! END (IF Shared Files ...)
#IF(%INIFile = 'Program Name.INI')              #! IF using program.ini
    #SET(%INIFileName, %Application & '.INI')     #! SET the file name
#ELSE                                             #! ELSE (IF NOT using
Program.ini)
    #SET(%INIFileName,%INIFileName)              #! SET the file name
#ENDIF                                            #! END (IF using program.ini)
#!
#!————— Main Source Code Generation Loop.
#DECLARE(%GlobalRegenerate)                      #! Flag that controls generation
#IF(~%ConditionalGenerate OR %DictionaryChanged OR %RegistryChanged)
    #SET(%GlobalRegenerate,%True)                #! Generate Everything
#ELSE                                             #! ELSE (if no global change)
    #SET(%GlobalRegenerate,%False)               #! Generate changed modules only
#ENDIF                                            #! END (IF Global Change)
#SET(%BuildFile,(%Application & '.TM$'))        #! Make temp program filename
#FOR(%Module), WHERE (%Module <> %Program)       #! For all member modules
    #MESSAGE('Generating Module: ' & %Module, 1) #! Post generation message
    #IF(%ModuleChanged OR %GlobalRegenerate)    #! IF module to be generated
        #FREE(%ModuleProcs)                     #! Clear module prototypes
        #FREE(%ModuleFilesUsed)                 #! Clear files used
        #CREATE(%BuildFile)                     #! Create temp module file
        #FOR(%ModuleProcedure)                  #! FOR all procs in module
            #FIX(%Procedure,%ModuleProcedure)   #! Fix current procedure
            #MESSAGE('Generating Procedure: ' & %Procedure, 2) #! Post generation message
            #GENERATE(%Procedure)                #! Generate procedure code
        #ENDFOR                                 #! END (For all procs in module)
        #CLOSE(%BuildFile)                      #! Close last temp file
        #CREATE(%Module)                        #! Create a module file
        #GENERATE(%Module)                      #! Generate module header
        #APPEND(%BuildFile)                     #! Append the temp mod file
        #CLOSE(%Module)                         #! Close the module file
    #ENDIF                                     #! END (if module to be...)
#ENDFOR                                         #! END (For all member modules)
#FIX(%Module,%Program)                          #! FIX to program module
#MESSAGE('Generating Module: ' & %Module, 1)    #! Post generation message
#FREE(%ModuleProcs)                             #! Clear module prototypes
#FREE(%ModuleFilesUsed)                         #! Clear files used
#CREATE(%BuildFile)                             #! Create temp module file
#FOR(%ModuleProcedure)                          #! For all procs in module
    #FIX(%Procedure,%ModuleProcedure)          #! Fix current procedure
    #MESSAGE('Generating Procedure: ' & %Procedure, 2) #! Post generation message
    #GENERATE(%Procedure)                       #! Generate procedure code
#ENDFOR                                         #! EndFor all procs in module
#CLOSE()                                        #! Close last temp file

```

See Also:

**#GENERATE**

## #PROGRAM (global area)

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**#PROGRAM**( *name*, *description* [, *target*, *extension* ] ) [, **HLP**( *helpid* ) ]

<b>#PROGRAM</b>	Defines the beginning of the main program module.
<i>name</i>	The name of the #PROGRAM which identifies it for the Template Registry and Template Language statements. This must be a valid Clarion label.
<i>description</i>	A string constant describing the #PROGRAM section for the Template Registry and Application Generator.
<i>target</i>	A string constant that specifies the source language the Template generates. If omitted, it defaults to Clarion.
<i>extension</i>	A string constant that specifies the source code file extension for the <i>target</i> . If omitted, it defaults to .CLW.
<b>HLP</b>	Specifies on-line help is available.
<i>helpid</i>	A string constant containing the identifier to access the Help system. This may be either a Help keyword or "context string."

The **#PROGRAM** statement defines the beginning of the main program module of the Template. The #PROGRAM section is terminated by the next Template Code Section (#MODULE, #PROCEDURE, #CONTROL, #CODE, #EXTENSION, or #GROUP) statement encountered, or the end of the file. Only one #PROGRAM section is allowed in a Template set.

#BUTTON, #PROMPT, and #DISPLAY statements are not valid within a #PROGRAM section. Global prompts go in the #APPLICATION section.

Example:

```
#PROGRAM(CLARION,'Standard Clarion Shipping Template')
PROGRAM                                !PROGRAM statement required
INCLUDE('Keycodes.clw')
INCLUDE('Errors.clw')
INCLUDE('Equates.clw')
```

## #MODULE (module area)

```
#MODULE( name, description [, target, extension ] ) [, HLP( helpid ) ] [, EXTERNAL ]
```

<b>#MODULE</b>	Begins the module section.
<i>name</i>	The name of the Module which identifies it for the Template Registry and Template Language statements. This must be a valid Clarion label.
<i>description</i>	A string constant describing the #MODULE section for the Template Registry and Application Generator.
<i>target</i>	A string constant that specifies the source language the Template generates. The word “EXTERNAL” is convention adopted to indicate an external source or object module. If omitted, it defaults to Clarion.
<i>extension</i>	A string constant that specifies the source code file extension for the <i>target</i> . If omitted, it defaults to .CLW.
<b>HLP</b>	Specifies on-line help is available.
<i>helpid</i>	A string constant containing the identifier to access the Help system. This may be either a Help keyword or “context string.”
<b>EXTERNAL</b>	Specifies no source generates into the module.

The #MODULE statement defines the beginning of the section of the template which puts data into each generated source module’s data area. The #MODULE Section is terminated by the next Template Code Section (#PROGRAM, #MODULE, #PROCEDURE, #CONTROL, #CODE, #EXTENSION, or #GROUP) statement encountered, or the end of the file. A Template set may contain multiple #MODULE statements.

Code generated by a #MODULE section is (usually) placed at the beginning of a source code file generated by the Application Generator.

#BUTTON, #PROMPT, and #DISPLAY statements are not valid within a #MODULE section.

Example:

```
#MODULE(ExternalOBJ,'External .OBJ module','EXTERNAL','.OBJ'),EXTERNAL
#MODULE(ExternalLIB,'External .LIB module','EXTERNAL','.LIB'),EXTERNAL
#MODULE(GENERATED,'Clarion MEMBER module')
    MEMBER('%Program')                !MEMBER statement is required
%ModuleData                          !Data declarations local to the Module
```

## #PROCEDURE (begin a procedure template)

```
#PROCEDURE( name, description [, target ] ) [, REPORT ] [, WINDOW ] [, HLP( helpid ) ]
  [, PRIMARY( message [, flag ] ) ] [, QUICK( wizard ) ]
```

<b>#PROCEDURE</b>	Begins a procedure template.
<i>name</i>	The label of the procedure template. This must be a valid Clarion label.
<i>description</i>	A string constant describing the procedure Template.
<i>target</i>	A string constant that specifies the source language the template generates. If omitted, it defaults to Clarion.
<b>REPORT</b>	Tells the Application Generator to make the Report Formatter available.
<b>WINDOW</b>	Tells the Application Generator to make the Window Formatter available.
<b>HLP</b>	Specifies on-line help is available.
<i>helpid</i>	A string constant containing the help identifier. This may be either a Help keyword or “context string.”
<b>PRIMARY</b>	Specifies at least one file must be placed in the procedure’s File Schematic.
<i>message</i>	A string constant containing a message that appears in the File Schematic next to the procedure’s Primary file.
<i>flag</i>	If present, contains OPTIONAL (the file is not required), OPTKEY (the key is not required), or NOKEY (the file is not required to have a key).
<b>QUICK</b>	Specifies the procedure has a wizard #UTILITY that runs when the <b>Use Procedure Wizard</b> box is checked.
<i>wizard</i>	The identifier (including template class, if necessary) of the wizard #UTILITY template.

The **#PROCEDURE** statement begins a Procedure template. A Procedure template contains the Template and *target* language statements used to generate the source code for a procedure within your application. A #PROCEDURE section is terminated by the first occurrence of a Template Code Section (#PROGRAM, #MODULE, #PROCEDURE, #CONTROL, #CODE, #EXTENSION, or #GROUP) statement, or the end of the file. Within a Template set you may have multiple #PROCEDURE sections, but they must all have unique *name* parameters.

Example:

```
#PROCEDURE(ProcName1,'This is a sample window procedure'),WINDOW
#PROCEDURE(ProcName2,'This is a sample report procedure'),REPORT
#PROCEDURE(ProcName3,'This is a sample anything procedure'),WINDOW,REPORT
#PROCEDURE(Browse,'List with Wizard'),WINDOW,QUICK(BrowseWizard(Wizards))
```

## #GROUP (reusable statement group)

```
#GROUP( symbol [, [ type ] parameters ] ) [, AUTO ] [, HLP( helpid ) ]
```

<b>#GROUP</b>	Begins a section of template code that may be inserted into another portion of the template.
<i>symbol</i>	A user-defined symbol used as the #GROUP's identifier.
<i>type</i>	The data type of a passed <i>parameter</i> : LONG, REAL, STRING, or * (asterisk). An asterisk (*) indicates it is a variable-parameter (passed by address), whose value may be changed by the #GROUP. LONG, REAL, and STRING indicates it is a value-parameter (passed by value), whose value is not changed by the #GROUP. If <i>type</i> is omitted, the <i>parameter</i> is passed as a STRING.
<i>parameters</i>	User-defined symbols by which values passed to the #GROUP are referenced. You may pass multiple <i>parameters</i> , each separated by commas, to a #GROUP. All specified <i>parameters</i> must be passed to the #GROUP; they may not be omitted.
<b>AUTO</b>	Opens a new scope for the group. This means that any #DECLARE statements in the #GROUP would not be available to the #PROCEDURE being generated. Passing <i>parameters</i> to a #GROUP implicitly opens a new scope.
<b>HLP</b>	Specifies on-line help is available.
<i>helpid</i>	A string constant containing the identifier to access the Help system. This may be either a Help keyword or "context string."

**#GROUP** defines the beginning of a section of code which is generated into the source. A #GROUP section may contain Template and/or target language code. The #GROUP section is terminated by the first occurrence of a Template Code Section (#PROGRAM, #MODULE, #PROCEDURE, #CONTROL, #CODE, #EXTENSION, or #GROUP) statement, or the end of the file. Within a single Template, separate #GROUP sections may not be defined with the same *symbol*. The *parameters* passed to a #GROUP fall into two categories: **value-parameters** and **variable-parameters**.

**Value-parameters** are declared as user-defined symbols, with an optional *type* and are "passed by value" (a copy of the value is passed) Either symbols or expressions may be passed as value-parameters. When a multi-valued symbol is passed as a value-parameter, only the current instance is passed.

**Variable-parameters** are declared as user-defined symbols with a prepended asterisk (\*) (and no *type*). A variable-parameter is "passed by address" and any change to its value by the #GROUP code changes the value

of the passed symbol. Only symbols may be passed to a #GROUP as variable-parameters. When a multi-valued symbol is passed as a variable-parameter, all instances are passed.

The statements contained in the #GROUP section are generated by the #INSERT statement. A #GROUP may contain #EMBED statements to define embedded source code points.

Example:

```
#GROUP(%GenerateFormulas) #!A #GROUP without parameters
  #FOR(%Formula)
    #IF(%FormulaComputation)
%Formula = %FormulaComputation
    #ELSE
IF(%FormulaCondition)
    %Formula = %FormulaTrue
ELSE
    %Formula = %FormulaFalse
END
    #ENDIF
  #ENDFOR
#GROUP(%ChangeProperty,%MyField,%Property,%Value) #!A #GROUP that receives parameters
%MyField{%Property} = '%Value' #<!Change the %Property of %MyField

#GROUP(%SomeGroup, * %VarParm, LONG %ValParm)
    #!A #GROUP that receives a variable-parameter and a value-parameter
```

See Also:            **#INSERT**

## #UTILITY (utility execution section)

```
#UTILITY( name, description ) [, HLP( helpid ) ] [, WIZARD ]
```

<b>#UTILITY</b>	Begins a utility generation control.
<i>name</i>	The name of the #UTILITY which identifies it for the Template Registry. This must be a valid Clarion label.
<i>description</i>	A string constant describing the utility section.
<b>HLP</b>	Specifies on-line help is available.
<i>helpid</i>	A string constant containing the identifier to access the Help system. This may be either a Help keyword or “context string.”
<b>WIZARD</b>	Specifies the #UTILITY is used as a Wizard to generate a procedure or a complete application.

The #UTILITY statement marks the beginning of a utility execution control section. The section is terminated by the next Template Code Section (#PROGRAM, #MODULE, #PROCEDURE, #CONTROL, #CODE, #EXTENSION, #UTILITY, or #GROUP) statement. The Template statements contained in this section control the utility execution process. Multiple #UTILITY sections are allowed in a single Template set.

The #UTILITY section is very similar to the #APPLICATION section, in that it allows you to produce output from the application. The purpose of #UTILITY is to provide extensible supplemental utilities for such things as program documentation, or a tree diagram of procedure calls. The list of registered utilities appears in the Utilities menu in the Clarion for Windows environment.

#UTILITY with the WIZARD attribute specifies it contains a #SHEET with #TABs that display one tab at a time, guiding the user through the prompts.

Example:

```
#UTILITY(ProcCallTree, 'Output procedure call tree')
#CREATE(%Application & '.TRE')
Procedure Call Tree: for %Application
#INSERT(%DisplayTree, %FirstProcedure, '|', '|')
#CLOSE
#!*****
#GROUP(%DisplayTree, %ThisProc, %Level, %NextIndent)
#FIX(%Procedure, %ThisProc)
%Level+-%ThisProc (%ProcedureTemplate)
#FOR(%ProcedureCalled)
#IF(INSTANCE(%ProcedureCalled) = ITEMS(%ProcedureCalled))
#INSERT(%DisplayTree, %ProcedureCalled, %Level & %NextIndent, '|')
#ELSE
#INSERT(%DisplayTree, %ProcedureCalled, %Level & %NextIndent, '|')
#ENDIF
#ENDFOR
```

## #CODE (define a code template)

```
#CODE( name, description [, target ] ), SINGLE [, HLP( helpid ) ] [, PRIMARY( message [, flag ] ) ]
      [, DESCRIPTION( expression ) ] [, ROUTINE ]
      [, REQ( addition [, | BEFORE | ] ) ] [, | FIRST | ]
      | AFTER | | LAST |
```

<b>#CODE</b>	Begins a code template that generates source into an embedded source code point.
<i>name</i>	The label of the code template. This must be a valid Clarion label.
<i>description</i>	A string constant describing the code template. The total number of characters in the #CODE statement must be less than 255. Therefore, the <i>description</i> must not be so long that the entire #CODE statement exceeds this limit.
<i>target</i>	A string constant that specifies the source language the code template generates. If omitted, it defaults to Clarion. This restricts the #CODE to matching <i>target</i> language use, only.
<b>SINGLE</b>	Specifies the #CODE may be used only once in a given procedure (or program, if the embedded source code point is global).
<b>HLP</b>	Specifies on-line help is available.
<i>helpid</i>	A string constant containing the identifier to access the Help system. This may be either a Help keyword or “context string.”
<b>PRIMARY</b>	Specifies a primary file for the code template must be placed in the procedure’s File Schematic.
<i>message</i>	A string constant containing a message that appears in the File Schematic next to the #CODE’s Primary file.
<i>flag</i>	Either OPTIONAL (the file is not required), OPTKEY (the key is not required), or NOKEY (the file is not required to have a key).
<b>DESCRIPTION</b>	Specifies the display description of a #CODE that may be used multiple times in a given application or procedure.
<i>expression</i>	A string constant or expression that contains the description to display.
<b>ROUTINE</b>	Specifies the generated code is not automatically indented from column one.
<b>REQ</b>	Specifies the #CODE requires a previously placed #CODE, #CONTROL, or #EXTENSION before it may be used. It also means all prompts and variables of the

	required <i>addition</i> are available to it.
<i>addition</i>	The name of the previously placed #CODE, #CONTROL, or #EXTENSION template, from any template set.
<b>BEFORE</b>	Specifies the code is generated before the code is generated for the <i>addition</i> .
<b>AFTER</b>	Specifies the code is generated after the code is generated for the <i>addition</i> .
<b>FIRST</b>	Specifies the code is generated at the beginning of the embedded source code point, before any other code.
<b>LAST</b>	Specifies the code is generated at the end of the embedded source code point, after any other code.

**#CODE** defines the beginning of a code template which can generate code into embedded source code points. A #CODE section may contain Template and/or target language code. The #CODE section is terminated by the first occurrence of a Template Code Section (#PROGRAM, #MODULE, #PROCEDURE, #CONTROL, #CODE, #EXTENSION, or #GROUP) statement, or the end of the file. Within a single Template set, separate #CODE sections may not be defined with the same *name*.

#CODE generates its code into a #EMBED embedded source code point. The generated code is automatically indented when placed in ROUTINES, unless the ROUTINE attribute is present. A #CODE section may contain #PROMPT statements to prompt for the values needed to generate proper source code. It may also contain #EMBED statements, which become active only if the #CODE section is used.

You can use the #WHERE statement to limit the availability of the #CODE to those embedded source code points where the generated code would be appropriate. A #CODE may contain multiple #WHERE statements to explicitly define all the valid embedded source code points in which it may appear. #RESTRICT can also further restrict the availability of the #CODE based on an expression or Template language statements.

The #AT/#ENDAT structure allows a single #CODE to generate code into multiple embedded source code points to support its functionality.

Example:

```
#CODE(ChangeProperty,'Change control property')
  #WHERE(%SetupWindow..%ProcedureRoutines)   #!Appropriate only after window open
  #PROMPT('Control to change',CONTROL),%MyField,REQ
  #PROMPT('Property to change',@S20),%Property,REQ
  #PROMPT('New Value',@S20),%Value,REQ
  %MyField{%Property} = '%Value'                #<!Change the %Property of %MyField
```

See Also:

#EMBED, #WHERE, #RESTRICT, #AT

## #CONTROL (define a control template)

```
#CONTROL( name, description ) [, MULTI ] [, PRIMARY( message [, flag ] ) ]
    [, WINDOW ] [, REPORT]
    [, REQ( addition [, | BEFORE | ] ) [, | FIRST | ] [, DESCRIPTION( expression ) ] ]
    | AFTER | | LAST |
CONTROLS
    control statements [, #REQ ]
END
```

<b>#CONTROL</b>	Begins a code template that generates a set of controls into a window and the source code required to manipulate them into embedded source code points.
<i>name</i>	The label of the control template. This must be a valid Clarion label.
<i>description</i>	A string constant describing the control template. The total number of characters in the #CONTROL statement must be less than 255. Therefore, the <i>description</i> must not be so long that the entire #CONTROL statement exceeds this limit.
<b>MULTI</b>	Specifies the #CONTROL may be used multiple times in a given window.
<b>PRIMARY</b>	Specifies a primary file for the set of controls must be placed in the procedure's File Schematic.
<i>message</i>	A string constant containing a message that appears in the File Schematic next to the #CONTROL's Primary file.
<i>flag</i>	Either OPTIONAL (the file is not required), OPTKEY (the key is not required), or NOKEY (the file is not required to have a key).
<b>WINDOW</b>	Tells the Application Generator to make the #CONTROL available in the Window Formatter. This is the default setting if both WINDOW and REPORT are omitted.
<b>REPORT</b>	Tells the Application Generator to make the #CONTROL available in the Report Formatter. If omitted, the #CONTROL may not be placed in a REPORT.
<b>REQ</b>	Specifies the #CONTROL requires a previously placed #CODE, #CONTROL, or #EXTENSION before it may be used.
<i>addition</i>	The name of the previously placed #CODE, #CONTROL, or #EXTENSION.
<b>BEFORE</b>	Specifies the code is generated before the code is generated for the <i>addition</i> .

<b>AFTER</b>	Specifies the code is generated after the code is generated for the <i>addition</i> .
<b>FIRST</b>	Specifies the code is generated at the beginning of the embedded source code point, before any other code.
<b>LAST</b>	Specifies the code is generated at the end of the embedded source code point, after any other code.
<b>DESCRIPTION</b>	Specifies the display description of a #CONTROL that may be used multiple times in a given application or procedure.
<i>expression</i>	A string constant or expression that contains the description to display.
<b>CONTROLS</b>	Specifies the <i>controls</i> for the #CONTROL, and must be terminated with an END statement. This is a “pseudo-Clarion keyword” in that, if you replace the CONTROLS statement with a WINDOW statement, you can use the Text Editor’s Window Formatter to create the <i>controls</i> .
<i>controls</i>	Window control declarations that specify the control set belonging to the #CONTROL.
<b>#REQ</b>	Specifies the <i>control</i> is required. If deleted from the window or report, the entire #CONTROL (including all its <i>controls</i> ) is deleted.

**#CONTROL** defines the beginning of a code template containing a “matched set” of controls to populate into a window or report as a group. It also generates the source code required for their correct operation into embedded source code points. A #CONTROL section may contain Template and/or target language code. The #CONTROL section is terminated by the first occurrence of a Template Code Section (#PROGRAM, #MODULE, #PROCEDURE, #CONTROL, #CODE, #EXTENSION, or #GROUP) statement, or the end of the file. Within a single Template set, separate #CONTROL sections may not be defined with the same *name*.

#CONTROL generates the code to operate its *controls* into #EMBED embedded source code points using the #AT/#ENDAT structure. #RESTRICT can restrict use of the #CONTROL based on an expression or Template language statements.

A #CONTROL section may contain #PROMPT statements to prompt for the values needed to generate proper source code. These prompts appear on the Actions window in the environment. It may also contain #EMBED statements which become active only if the #CONTROL section is used.

The *x* and *y* parameters of the AT attribute of the *controls* in the #CONTROL set determine the positioning of the *control* relative to the last control in the #CONTROL set placed on screen (or relative to the window, if first). If these parameters are omitted, the programmer is prompted for the position to

place the *control*. This makes it simple to populate an entire set of *controls* without requiring the programmer to place each one individually.

Example:

```
#CONTROL(BrowseList,'Add Browse List controls')
  #PROMPT('Allow Inserts',CHECK),%InsertAllowed,DEFAULT(1)
  #ENABLE(%InsertAllowed)
    #PROMPT('Insert Hot Key',@s20),%InsertHotKey,DEFAULT('InsertKey')
  #ENDENABLE
  #PROMPT('Allow Changes',CHECK),%ChangeAllowed,DEFAULT(1)
  #ENABLE(%ChangeAllowed)
    #PROMPT('Change Hot Key',@s20),%ChangeHotKey,DEFAULT('CtrlEnter')
  #ENDENABLE
  #PROMPT('Allow Deletes',CHECK),%DeleteAllowed,DEFAULT(1)
  #ENABLE(%DeleteAllowed)
    #PROMPT('Delete Hot Key',@s20),%DeleteHotKey,DEFAULT('DeleteKey')
  #ENDENABLE
  #PROMPT('Update Procedure',PROCEDURE),%UpdateProc
CONTROLS
  LIST,AT(.,.270,99),USE(?List),IMM,FROM(Queue:Browse),#REQ
  BUTTON('Insert'),AT(.,.40,15),KEY(%InsertHotKey),USE(?Insert),MSG('Add record')
  BUTTON('Change'),AT(.,.40,15),KEY(%ChangeHotKey),USE(?Chg),DEFAULT,MSG('Change')
  BUTTON('Delete'),AT(.,.40,15),KEY(%DeleteHotKey),USE(?Delete),MSG('Delete record')
END
#!
  #AT(%ControlEvent),WHERE(%ControlOriginal='?Insert' AND %ControlEvent='Accepted')
  #IF(%InsertAllowed)
Action = AddRecord
%UpdateProc
  #ENDIF
  #ENDAT
#!
  #AT(%ControlEvent),WHERE(%ControlOriginal='?Chg' AND %ControlEvent='Accepted')
  #IF(%ChangeAllowed)
Action = ChangeRecord
%UpdateProc
  #ENDIF
  #ENDAT
#!
  #AT(%ControlEvent),WHERE(%ControlOriginal='?Delete' AND %ControlEvent='Accepted')
  #IF(%DeleteAllowed)
Action = DeleteRecord
%UpdateProc
  #ENDIF
  #ENDAT
```

See Also:            **#EMBED, #WHERE, #RESTRICT, #AT**

## #EXTENSION (define an extension template)

```
#EXTENSION( name, description [, target ] ) [, MULTI ] [, APPLICATION ]
[ ]
[ , REQ( addition [, BEFORE | AFTER | FIRST | LAST ] ) ] [, DESCRIPTION( expression ) ]
[ , PRIMARY( message [, flag ] ) ]
```

<b>#EXTENSION</b>	Begins an extension template that generates code into embedded source code points to add some functionality not associated with specific controls.
<i>name</i>	The label of the extension template. This must be a valid Clarion label.
<i>description</i>	A string constant describing the extension template.
<i>target</i>	A string constant that specifies the source language the extension template generates. If omitted, it defaults to Clarion.
<b>MULTI</b>	Specifies the #EXTENSION may be used multiple times in a given application or procedure.
<b>APPLICATION</b>	Tells the Application Generator to make the #EXTENSION available only at the global level.
<b>PROCEDURE</b>	Tells the Application Generator to make the #EXTENSION available only at the local level.
<b>REQ</b>	Specifies the #EXTENSION requires a previously placed #CODE, #CONTROL, or #EXTENSION before it may be used.
<i>addition</i>	The name of the previously placed #CODE, #CONTROL, or #EXTENSION.
<b>BEFORE</b>	Specifies the code is generated before the code is generated for the <i>addition</i> .
<b>AFTER</b>	Specifies the code is generated after the code is generated for the <i>addition</i> .
<b>FIRST</b>	Specifies the code is generated at the beginning of the embedded source code point, before any other code.
<b>LAST</b>	Specifies the code is generated at the end of the embedded source code point, after any other code.
<b>DESCRIPTION</b>	Specifies the display description of a #EXTENSION that may be used multiple times in a given application or procedure.
<i>expression</i>	A string constant or expression that contains the description to display.
<b>PRIMARY</b>	Specifies a primary file for the extension must be placed

in the procedure's File Schematic.

<i>message</i>	A string constant containing a message that appears in the File Schematic next to the #EXTENSION's Primary file.
<i>flag</i>	Either OPTIONAL (the file is not required), OPTKEY (the key is not required), or NOKEY (the file is not required to have a key).

**#EXTENSION** defines the beginning of an extension template containing code to generate into the application or procedure to provide some functionality not directly associated with any control. A #EXTENSION section may contain Template and/or target language code. The #EXTENSION section is terminated by the first occurrence of a Template Code Section (#PROGRAM, #MODULE, #PROCEDURE, #CONTROL, #CODE, #EXTENSION, or #GROUP) statement, or the end of the file. Within a single Template set, separate #EXTENSION sections may not be defined with the same *name*.

#EXTENSION can only generate code into #EMBED embedded source code points using the #AT/#ENDAT structure. A #EXTENSION section may contain #PROMPT statements to prompt for the values needed to generate proper source code. These prompts appear when you edit an Extension from the Extensions button in the environment. It may also contain #EMBED statements which become active only if the #EXTENSION section is used.

#RESTRICT can restrict appearance of the #EXTENSION in the list of available extensions based on an expression or Template language statements.



# Embed Points

## #EMBED (define embedded source point)

```
#EMBED( identifier, descriptor ) [, symbol ] [, HLP( helpid ) ] [, DATA ] [, HIDE ]
[, WHERE( expression ) ] [, MAP( symbol, description ) ]
```

<b>#EMBED</b>	Identifies an explicit position in the Template where the programmer may place their own source code.
<i>identifier</i>	A user-defined template symbol which identifies the embedded source code point for the Application Generator.
<i>descriptor</i>	A string constant containing a description of the embedded source code's position in the Template. This is the string displayed in the list of available embedded source code windows for a procedure Template.
<i>symbol</i>	A built-in multi-valued template symbol. You may have multiple <i>symbols</i> on a single #EMBED statement.
<b>HLP</b>	Specifies on-line help is available for the #EMBED.
<i>helpid</i>	A string constant containing the identifier to access the Help system. This may be either a Help keyword or "context string."
<b>DATA</b>	Specifies the embed point is in a data section, so the Text Editor's Window and Report Formatters can be used.
<b>HIDE</b>	Specifies the source code point does not appear in the tree of available embedded source code points. Therefore, the #EMBED is only available for #CODE, #CONTROL, or #EXTENSION code generation.
<b>WHERE</b>	Specifies the #EMBED is available only for those instances of the <i>symbol</i> where the <i>expression</i> is true.
<i>expression</i>	An expression that specifies the condition.
<b>MAP</b>	Maps the <i>description</i> to the <i>symbol</i> for display in the embedded source tree. You may have as many MAP attributes as <i>symbols</i> .
<i>description</i>	An expression that specifies the text to display in the embedded source tree.

**#EMBED** identifies an explicit position in the Template where the programmer may call a procedure, generate code from a code template, or place their own custom embedded source code within the procedure or function. The Application Generator prompts the programmer for the procedure to call, or the code template to use, or calls the Text Editor to



## #AT (insert code in an embed point)

```
#AT( location [, instances ] ) [, WHERE( expression ) ]
  statements
#ENDAT
```

<b>#AT</b>	Specifies a <i>location</i> to generate <i>statements</i> .
<i>location</i>	An #EMBED <i>identifier</i> . This may be a #EMBED for the procedure that comes from another template set.
<i>instances</i>	The <i>location</i> parameters that identify the embedded source code point for a multi-valued #EMBED <i>identifier</i> . There may as many <i>instance</i> parameters as are required to explicitly identify the embedded source code point.
<b>WHERE</b>	More closely specifies the #AT <i>location</i> as only those embed points where the <i>expression</i> is true.
<i>expression</i>	An expression that specifies exact placement.
<i>statements</i>	Template and/or target language code.
<b>#ENDAT</b>	Terminates the section.

The #AT structure specifies a *location* to generate *statements*. #AT is valid only in a #CONTROL, #CODE, or #EXTENSION templates, and is used to allow them to generate *statements* into multiple *locations*. The #AT structure must terminate with #ENDAT.

The WHERE clause allows you to create an *expression* that can specify a single specific instance of a #EMBED that has a *symbol* attribute.

Example:

```
#CONTROL(BrowseList,'Add Browse List controls')
  #AT(%ControlEvent,'?Insert','Accepted')
    #IF(%InsertAllowed)
      Action = AddRecord
    %UpdateProc
    #ENDIF
  #ENDAT
#!
```

See Also: #EMBED, #CODE, #CONTROL, #EXTENSION, #RESTRICT

## #ATSTART (template initialization code)

---

```
#ATSTART
  statements
#ENDAT
```

**#ATSTART** Specifies template code to execute before the **#PROCEDURE**, **#CODE**, **#CONTROL**, or **#EXTENSION** generates.

*statements* Template language code.

**#ENDAT** Terminates the section.

The **#ATSTART** structure specifies template code to execute before the **#PROCEDURE**, **#CODE**, **#CONTROL**, or **#EXTENSION** generates its code. Therefore, the *statements* should normally only contain Template language. **#ATSTART** is usually used to initialize internal template variables.

Example:

```
#CONTROL(BrowseList,'Add Browse List controls')
  #ATSTART
    #DECLARE(%ListQueue)
  #ENDAT
```

See Also: **#PROCEDURE**, **#CODE**, **#CONTROL**, **#EXTENSION**

## #ATEND (template reset code)

---

```
#ATEND
  statements
#ENDAT
```

**#ATEND** Specifies template code to execute after the #PROCEDURE, #CODE, #CONTROL, or #EXTENSION generates.

*statements* Template language code.

**#ENDAT** Terminates the section.

The **#ATEND** structure specifies template code to execute after the #PROCEDURE, #CODE, #CONTROL, or #EXTENSION generates its code. Therefore, the *statements* should only contain Template language. #ATEND is usually used to reset internal template variables.

Example:

```
#CONTROL(BrowseList,'Add Browse List controls')
  #ATEND
    #SET(%ListQueue,%NULL)
  #ENDAT
```

See Also:           **#PROCEDURE, #CODE, #CONTROL, #EXTENSION**

## #EMPTYEMBED (generate empty embed point comments)

**#EMPTYEMBED**( *text* [, *condition* ] )

**#EMPTYEMBED** Generates comments into empty embed points.

*text* A string constant or constant expression containing the text to place in the empty embed point.

*condition* An expression that, when true, allows the comments to generate.

The **#EMPTYEMBED** statement specifies that comments generate into all embed points in which the user has not entered code. This will not generate comments for embed points in which the user has entered code or in which the templates have generated code.

This is valid only in a **#PROGRAM** or **#MODULE** section. The output *condition* is usually the value of a global prompt.

The comment *text* may use the %EmbedID, %EmbedDescription, and %EmbedParameters built-in symbols to identify the embed point:

%EmbedID The current embed point's identifying symbol.

%EmbedDescription The current embed point's description.

%EmbedParameters The current embed point's current instance, as a comma-delimited list.

Example:

```
#EXTENSION(EmptyEmbeds,'Empty Embed Comments'),APPLICATION
#PROMPT('Generate Empty EMBED Comments',CHECK),%EmptyEmbeds
#EMPTYEMBED('!Embed: ' & %EmbedDescription & ' ' & %EmbedParameters,%EmptyEmbeds)
```

See Also: **#PREEMBED**, **#POSTEMBED**

## #POSTEMBED (generate ending embed point comments)

---

**#POSTEMBED**( *text* [, *condition* ] )

**#POSTEMBED** Generates comments at the end of embed point code.

*text* A string constant or constant expression containing the text to place in the embed point.

*condition* An expression that, when true, allows the comments to generate.

The **#POSTEMBED** statement specifies that comments generate at the end of embed points that contain code. This is valid only in a **#PROGRAM** or **#MODULE** section. The output *condition* is usually the value of a global prompt.

The comment *text* may use the %EmbedID, %EmbedDescription, and %EmbedParameters built-in symbols to identify the embed point:

%EmbedID The current embed point's identifying symbol.

%EmbedDescription The current embed point's description.

%EmbedParameters The current embed point's current instance, as a comma-delimited list.

Example:

```
#POSTEMBED('! After Embed Point: ' & %EmbedID & ' ' & %EmbedDescription & ' ' & |
          %EmbedParameters,%GenerateEmbedComments)
```

See Also: **#PREEMBED**, **#EMPTYEMBED**

## #PREEMBED (generate beginning embed point comments)

---

**#PREEMBED**( *text* [, *condition* ] )

<b>#PREEMBED</b>	Generates comments at the beginning of embed point code.
<i>text</i>	A string constant or constant expression containing the text to place in the embed point.
<i>condition</i>	An expression that, when true, allows the comments to generate.

The **#PREEMBED** statement specifies that comments generate at the beginning of embed points that contain code. This is valid only in a **#PROGRAM** or **#MODULE** section. The output *condition* is usually the value of a global prompt.

The comment *text* may use the %EmbedID, %EmbedDescription, and %EmbedParameters built-in symbols to identify the embed point:

%EmbedID	The current embed point's identifying symbol.
%EmbedDescription	The current embed point's description.
%EmbedParameters	The current embed point's current instance, as a comma-delimited list.

Example:

```
#PREEMBED('! Before Embed Point: ' & %EmbedID & ' ' & %EmbedDescription & ' ' & |
          %EmbedParameters,%GenerateEmbedComments)
```

See Also:

**#POSTEMBED**, **#EMPTYEMBED**

# Template Code Section Constraints

## #WHERE (define #CODE embed point availability)

---

### #WHERE( *embeds* )

<b>#WHERE</b>	Limits the availability of a #CODE to only those specific embedded source code points where the generated code would be appropriate.
<i>embeds</i>	A comma-delimited list of #EMBED <i>identifiers</i> that specifies the embedded source code points that may use the #CODE to generate source code.

The **#WHERE** statement limits the availability of a #CODE to only those #EMBED embedded source code points where the generated code would be appropriate. A single #CODE may contain multiple #WHERE statements to explicitly define all the valid #EMBED embedded source code points. All the #WHERE statements in a #CODE are evaluated to determine which embedded source code points have been specifically enabled.

The *embeds* list must contain individual #EMBED *identifiers* delimited by commas. It may also contain ranges of embed points in the form *FirstIdentifier.LastIdentifier*, also delimited by commas. The *embeds* list may contain both types in a “mix and match” manner to define all suitable embedded source code points.

Example:

```
#CODE(ChangeProperty,'Change control property')
  #WHERE(%AfterWindowOpening..%CustomRoutines)
                                     #!Appropriate everywhere after window open
  #PROMPT('Control to change',CONTROL),%MyField,REQ
  #PROMPT('Property to change',@S20),%MyProperty,REQ
  #PROMPT('New Value',@S20),%MyValue,REQ
%MyField{%MyProperty} = '%MyValue'
```

See Also:           **#EMBED, #CODE, #RESTRICT**

## #RESTRICT (define section use constraints)

```
#RESTRICT [ , WHERE( expression ) ]
    statements
#ENDRESTRICT
```

<b>#RESTRICT</b>	Specifies conditions where a Template Code Section (#CODE, #CONTROL, #EXTENSION, #PROCEDURE, #PROGRAM, or #MODULE) can be used.
<b>WHERE</b>	The #RESTRICT <i>statements</i> are executed only when the <i>expression</i> is true.
<i>expression</i>	A logical expression to limit execution of the #RESTRICT <i>statements</i> .
<i>statements</i>	Template language code to #ACCEPT or #REJECT use of the section which contains the #RESTRICT structure.
<b>#ENDRESTRICT</b>	Terminates the #RESTRICT structure.

The #RESTRICT structure provides a mechanism to limit the availability of a Template Code Section (#CODE, #CONTROL, #EXTENSION, #PROCEDURE, #PROGRAM, or #MODULE) at application design time to only those points where the generated code would be appropriate. Any WHERE clause on the Template Code Section is evaluated first, before #RESTRICT.

The #ACCEPT statement may be used to explicitly declare the section as appropriate for use. An implicit #ACCEPT also occurs if the #RESTRICT *statements* execute without encountering a #REJECT statement. The #REJECT statement must be used to specifically exclude the section from use. Both the #ACCEPT and #REJECT statements immediately terminate processing of the #RESTRICT code.

Example:

```
#CODE(ChangeControlSize,'Change control size')
#RESTRICT
    #CASE(%ControlType)
    #OF('LIST')
    #OROF('BUTTON')
    #REJECT
    #ELSE
    #ACCEPT
    #ENDCASE
#ENDRESTRICT
#PROMPT('Control to change',CONTROL),%MyField,REQ
#PROMPT('New Width',@n04),%NewWidth
#PROMPT('New Height',@n04),%NewHeight
%MyField{PROP:Width} = %NewWidth
%MyField{PROP:Height} = %NewHeight
```

See Also:            **#ACCEPT, #REJECT**

## #ACCEPT (section valid for use)

---

### #ACCEPT

The **#ACCEPT** statement terminates **#RESTRICT** processing, indicating that the Template Code Section (**#CODE**, **#CONTROL**, **#EXTENSION**, **#PROCEDURE**, **#PROGRAM**, or **#MODULE**) is valid.

The **#RESTRICT** structure contains Template language *statements* that evaluate the propriety of generating the section's source code. The **#ACCEPT** statement may be used to explicitly declare the section as appropriate. An implicit **#ACCEPT** also occurs if the **#RESTRICT** *statements* execute without encountering a **#REJECT** statement. The **#REJECT** statement must be used to specifically exclude the section from use. Both the **#ACCEPT** and **#REJECT** statements immediately terminate processing of the **#RESTRICT** code.

Example:

```
#CODE(ChangeControlSize,'Change control size')
  #WHERE(%EventHandling)
  #RESTRICT
    #CASE(%ControlType)
      #OF 'LIST'
      #OROF 'BUTTON'
      #REJECT
    #ELSE
      #ACCEPT
    #ENDCASE
  #ENDRESTRICT
  #PROMPT('Control to change',CONTROL),%MyField,REQ
  #PROMPT('New Width',@n04),%NewWidth
  #PROMPT('New Height',@n04),%NewHeight
%MyField{PROP:Width} = %NewWidth
%MyField{PROP:Height} = %NewHeight
```

See Also:               **#RESTRICT**, **#REJECT**

## #REJECT (section invalid for use)

---

### #REJECT

The **#REJECT** statement terminates **#RESTRICT** processing, indicating that the Template Code Section (**#CODE**, **#CONTROL**, **#EXTENSION**, **#PROCEDURE**, **#PROGRAM**, or **#MODULE**) is invalid.

The **#RESTRICT** structure contains Template language *statements* that evaluate the propriety of generating the section's source code. The **#ACCEPT** statement may be used to explicitly declare the section as appropriate. An implicit **#ACCEPT** also occurs if the **#RESTRICT** *statements* execute without encountering a **#REJECT** statement. The **#REJECT** statement must be used to specifically exclude the section from use. Both the **#ACCEPT** and **#REJECT** statements immediately terminate processing of the **#RESTRICT** code.

Example:

```
#CODE(ChangeControlSize,'Change control size')
  #WHERE(%EventHandling)
  #RESTRICT
    #CASE(%ControlType)
      #OF 'LIST'
      #OROF 'BUTTON'
        #REJECT
      #ELSE
        #ACCEPT
    #ENDCASE
  #ENDRESTRICT
  #PROMPT('Control to change',CONTROL),%MyField,REQ
  #PROMPT('New Width',@n04),%NewWidth
  #PROMPT('New Height',@n04),%NewHeight
%MyField{PROP:Width} = %NewWidth
%MyField{PROP:Height} = %NewHeight
```

See Also:                   **#RESTRICT**, **#ACCEPT**

# Default Data and Code

[Contents](#)

## #WINDOWS (default window structures)

```
#WINDOWS
  structures
#ENDWINDOWS
```

**#WINDOWS** Begins a default window data structure section.  
*structures* Default APPLICATION or WINDOW structures.  
**#ENDWINDOWS** Terminates the default window section.

The **#WINDOWS** structure contains default APPLICATION or WINDOW data structures for a procedure Template. The default window *structures* provide a starting point for the procedure's window design.

The **#WINDOWS** section may contain multiple *structures* which may be chosen as the starting point for the procedure's window design. If there is more than one window structure to choose from, the Application Generator displays a list of those *structures* available the first time the procedure's window is edited. The names of the windows which appear in the Application Generator's list comes from a preceding comment beginning with two exclamation points and a right angle bracket (!!>).

If the procedure template contains a **#DEFAULT** procedure, there is no need for **#WINDOWS**, since the default window is already in the **#DEFAULT**. Therefore, the list does not appear when the window is first edited.

Example:

```
#WINDOWS
!!> Window
Label WINDOW('Caption'),AT(0,0,100,100)
  END
!!> Window with OK & Cancel
Label WINDOW('Caption'),AT(0,1,185,92)
  BUTTON('OK'),AT(144,10,35,14),DEFAULT,USE(?Ok)
  BUTTON('Cancel'),AT(144,28,36,14),USE(?Cancel)
  END
#ENDWINDOWS
```

## #REPORTS (default report structures)

---

```
#REPORTS
  structures
#ENDREPORTS
```

**#REPORTS** Begins a default report data structure section.

*structures* Default REPORT structures.

**#ENDREPORTS** Terminates the default report section.

The **#REPORTS** structure contains default REPORT data structures for a procedure Template. The default report *structures* provide a starting point for the procedure's report design.

The **#REPORTS** section may contain multiple *structures* which may be chosen as the starting point for the procedure's report design. If there is more than one report structure to choose from, the Application Generator displays a list of those *structures* available the first time the procedure's report is edited. The names of the windows which appear in the Application Generator's list comes from a preceding comment beginning with two exclamation points and a right angle bracket (!!>).

If the procedure template contains a **#DEFAULT** procedure, there is no need for **#REPORT**, since the default report is already in the **#DEFAULT**. Therefore, the list does not appear when the report is first edited.

Example:

```
#REPORTS
!!> Report
Label  REPORT,AT(1000,2500,6000,6000),THOUS
      HEADER,AT(1000,1000,6000,1000)
      END
Detail  DETAIL
      END
      FOOTER,AT(1000,10000,6000,1000)
      END
      FORM,AT(1000,1000,6000,9000)
      END
      END
#ENDREPORTS
```

## #LOCALDATA (default local data declarations)

---

```
#LOCALDATA
  declarations
#ENDLOCALDATA
```

**#LOCALDATA** Begins a default local data declaration section.  
*declarations* Default data declarations.  
**#ENDLOCALDATA** Terminates the default local data declarations.

The **#LOCALDATA** structure contains default data *declarations* local to the procedure generated by the **#PROCEDURE** procedure Template. **#LOCALDATA** may only be placed in a **#PROCEDURE**, **#CODE**, **#CONTROL**, or **#EXTENSION** section of the Template. The *declarations* will appear in the generated procedure between the keywords **PROCEDURE** (or **FUNCTION**) and **CODE**.

Example:

```
#LOCALDATA
Action    BYTE           !Disk action variable
TempFile  CTRING(65)     !Temporary filename variable
#ENDLOCALDATA
```

## #GLOBALDATA (default global data declarations)

---

```
#GLOBALDATA
  declarations
#ENDGLOBALDATA
```

**#GLOBALDATA** Begins a default global data declaration section.  
*declarations* Default data declarations.  
**#ENDGLOBALDATA** Terminates the default global data declarations.

The **#GLOBALDATA** structure contains default data *declarations* global to the program. **#GLOBALDATA** may be placed in a **#PROGRAM**, **#PROCEDURE**, **#CODE**, **#CONTROL**, or **#EXTENSION** section of the Template. The *declarations* will appear in the global data section of the generated source code.

Example:

```
#GLOBALDATA
Action    BYTE           !Disk action variable
TempFile  CTRING(65)     !Temporary filename variable
#ENDGLOBALDATA
```

## #DEFAULT (default procedure starting point)

```
#DEFAULT
  procedure
#ENDDDEFAULT
```

**#DEFAULT** Begins a default procedure declaration section.  
*procedure* Default procedure in .TXA file format.  
**#ENDDDEFAULT** Terminates the default procedure declaration.

The **#DEFAULT** structure contains a single default *procedure* declaration in .TXA format as generated by the Application Generator's Export function. **#DEFAULT** may only be placed at the end of a **#PROCEDURE** section. You may have multiple **#DEFAULT** structures for a single **#PROCEDURE**. The enclosed *procedure* section of a .TXA file should contain a procedure of the preceding **#PROCEDURE**'s type. The recommended way to create a **#DEFAULT** structure is to edit the default procedure in the template registry, and then export the template as text, which creates a .TXA file.

Example:

```
#DEFAULT
NAME DefaultForm
[COMMON]
DESCRIPTION 'Default record update'
FROM Clarion Form
[PROMPTS]
%WindowOperationMode STRING ('Use WINDOW setting')
%INISaveWindow LONG (1)
[ADDITION]
NAME Clarion SaveButton
[INSTANCE]
INSTANCE 1
PROCPROP
[PROMPTS]
%InsertAllowed LONG (1)
%InsertMessage @S30 ('Record will be Added')
%ChangeAllowed LONG (1)
%ChangeMessage @S30 ('Record will be Changed')
%DeleteAllowed LONG (1)
%DeleteMessage @S30 ('Record will be Deleted')
%MessageHeader LONG (0)
[ADDITION]
NAME Clarion CancelButton
[INSTANCE]
INSTANCE 2
[WINDOW]
FormWindow WINDOW('Update Records...'),AT(18,5,289,159),CENTER,SYSTEM,GRAY,MDI
  BUTTON('OK'),AT(5,140,40,12),USE(?OK),DEFAULT,#SEQ(1),#ORIG(?OK),#LINK(?Cancel)
  BUTTON('Cancel'),AT(50,140,40,12),USE(?Cancel),#SEQ(2),#ORIG(?Cancel)
  STRING(@S40),AT(95,140,,),USE(ActionMessage)
END
#ENDDDEFAULT
```

# Symbol Management Statements

## #DECLARE (declare a user-defined symbol)

```
#DECLARE( symbol [, parentsymbol [, type] ] ) [, MULTI] [, UNIQUE] [, SAVE ]
```

<b>#DECLARE</b>	Explicitly declares a user-defined symbol.
<i>symbol</i>	The name of the symbol being declared. This must meet all the requirements of a user-defined symbol. This must not be a #PROMPT symbol or a variable in the same scope.
<i>parentsymbol</i>	Specifies the parent of the <i>symbol</i> , indicating its value is dependent upon the current value in another symbol. This must be a multi-valued symbol. You may specify more than one <i>parentsymbol</i> if the <i>symbol</i> is dependent upon a set of symbols. This allows implicit multi-dimensional arrays.
<i>type</i>	The data type of the <i>parentsymbol</i> : LONG, REAL, or STRING. If omitted, the data type is STRING.
<b>MULTI</b>	Specifies the <i>symbol</i> may contain multiple values.
<b>UNIQUE</b>	Specifies a multi-valued <i>symbol</i> that cannot contain duplicate values. The values are stored in ascending order. This implicitly declares the symbol as multi-valued, the MULTI attribute is not required.
<b>SAVE</b>	Specifies the value(s) in the <i>symbol</i> are saved between source generation sessions. A <i>symbol</i> with the SAVE attribute may only be declared in the #APPLICATION area.

The **#DECLARE** statement explicitly declares a user-defined *symbol*. This may contain a single value or multiple values. All user-defined symbols must be explicitly declared with #DECLARE except those declared on a #PROMPT statement and #GROUP parameters.

The MULTI attribute declares the *symbol* as multi-valued. This allows the #FIX, #FOR, #ADD, #DELETE, #SELECT, and #FREE statements to operate on the *symbol*.

A user-defined multi-valued *symbol* may be treated as an array or a queue. As an array, a single instance of the user-defined multi-valued *symbol* may be addressed as %symbol[1] in expressions.

The UNIQUE attribute ensures all instances of a multi-valued *symbol* to be unique and sorted in ascending sequence. When UNIQUE is specified, MULTI is not required. The #ADD statement builds the *symbol* values in sorted order and only allows a single instance of every value in the *symbol*

when each entry is added.

If the #DECLARE statement contains one or more *parentsymbol* parameters, the user-defined *symbol* is dependent on the *parentsymbols*. This means a separate instance (or instances, if multi-valued) of the *symbol* is available for each instance of the *parentsymbol*. If there are no *parentsymbol* parameters, it is independent.

#DECLARE may be used to create dependent *symbols*. The *parentsymbol* must be a multi-valued symbol, whether it is a built-in or user-defined symbol.

The SAVE attribute causes a *symbol's* value(s) to be saved at the end of source generation and restored when the #DECLARE statement is executed at the beginning of the next source generation session. A *symbol* with the SAVE attribute may only be declared in the #APPLICATION section.

Example:

```
#APPLICATION('Sample One')
#DECLARE(%UserSymbol),SAVE                #!Value saved after generation
                                           #! and restored for next generation
#DECLARE(%ModuleFile,%Module),UNIQUE,MULTI #!Level-1 dependent symbol
#DECLARE(%ModuleFilePut,%ModuleFile)      #!Level-2 dependent symbol
#DECLARE(%ModuleFileDelete,%ModuleFile)    #!Second Level-2 dependent symbol
```

See Also:           #FIX, #FOR, #ADD, #DELETE, #FREE

## #ALIAS (access a symbol from another instance)

---

**#ALIAS**( *oldsymbol* , *newsymbol* [, *instance* ] )

<b>#ALIAS</b>	Re-declares a user-defined symbol.
<i>oldsymbol</i>	The name of the symbol being re-declared. This must meet all the requirements of a user-defined symbol. This must not be a #PROMPT symbol or a variable in the same scope.
<i>newsymbol</i>	Specifies the new name of the <i>oldsymbol</i> .
<i>instance</i>	An expression containing the instance of the addition containing the <i>oldsymbol</i> .

The **#ALIAS** statement re-declares a user-defined *oldsymbol* declared in a #CODE, #CONTROL, or #EXTENSION template prompt for use in another.

Example:

```
#EXTENSION(GlobalSecurity,'Global Password Check'),APPLICATION
#DECLARE(%PasswordFile)
#DECLARE(%PasswordFileKey)

#EXTENSION(LocalSecurity,'Local Procedure Password Check'),PROCEDURE
#ALIAS(%PasswordFile,%PswdFile,'GlobalSecurity(Clarion)')
#ALIAS(%PasswordFileKey,%PswdFileKey,'GlobalSecurity(Clarion)')
```

See Also:           **#CODE**, **#CONTROL**, **#EXTENSION**

## #ADD (add to multi-valued symbol)

**#ADD**( *symbol*, *expression* [, *position* ] )

<b>#ADD</b>	Adds a new instance to a multi-valued user-defined symbol.
<i>symbol</i>	A multi-valued user-defined symbol.
<i>expression</i>	An expression containing the value to place in the <i>symbol's</i> instance.
<i>position</i>	An integer constant or symbol containing the instance number to add to the <i>symbol</i> . Instance numbering begins with one (1). If the <i>position</i> is greater than the number of previously existing instances plus one, the new instance is appended and no intervening instances are instantiated.

The **#ADD** statement adds a value to a multi-valued user-defined *symbol*. An implied **#FIX** to that *symbol's* instance occurs. If the *symbol* is not a multi-valued user-defined symbol then a source generation error is produced.

If the *symbol* has been declared with the **UNIQUE** attribute, then the **#ADD** is a union operation into the existing set of *symbol's* values. Only one instance of the value being added may exist. Also, the **UNIQUE** attribute implies the **#ADD** is a sorted insert into the existing set of *symbol's* values. After each **#ADD**, all of the *symbol's* values will be in sorted order.

If the *symbol* has been declared without the **UNIQUE** attribute, duplicate values are allowed. The new value is added to the end of the list and may be a duplicate. If the *symbol* is a duplicate, then any dependent children instances are inherited.

Example:

```
#DECLARE(%ProcFilesPrefix),MULTI,UNIQUE  #!Declare unique multi-valued symbol
#FIX(%File,%Primary)                    #!Build list of all file prefixes in proc
#ADD(%ProcFilesPrefix,%FilePre)        #!Start with primary file
#FOR(%Secondary)                         #!Then add all secondary files
    #FIX(%File,%Secondary)
    #ADD(%ProcFilesPrefix,%FilePre)
#ENDFOR
```

See Also:

**#DECLARE**

## #DELETE (delete a multi-valued symbol instance)

**#DELETE**( *symbol* [, *position* ] )

<b>#DELETE</b>	Deletes the value from one instance of a multi-valued user-defined symbol.
<i>symbol</i>	A multi-valued user-defined symbol.
<i>position</i>	An integer constant or symbol containing the instance number in the <i>symbol</i> . Instance numbering begins with one (1). If omitted, the default is the current fixed instance.

The **#DELETE** statement deletes the value from one instance of a multi-valued user-defined symbol. If there are any symbols dependent upon the *symbol*, they are also cleared. If this is the last instance in the *symbol*, the instance is removed. You can get the current instance number to which a symbol is fixed by using the `INSTANCE(%symbol)` built-in template function.

Example:

```
#DECLARE(%ProcFilesPrefix),MULTI      #!Declare multi-valued symbol
#ADD(%ProcFilesPrefix,'SAV')          #!Add a value
#ADD(%ProcFilesPrefix,'BAK')         #!Add a value
#ADD(%ProcFilesPrefix,'PRE')         #!Add a value
#ADD(%ProcFilesPrefix,'QUE')         #!Add a value

#DELETE(%ProcFilesPrefix,1)          #!%ProcFilesPrefix contains: SAV, BAK, PRE, QUE
                                     #!Delete first value (SAV)
#FIX(%ProcFilesPrefix,'PRE')         #!%ProcFilesPrefix contains: BAK, PRE, QUE
                                     #!Fix to a value
#DELETE(%ProcFilesPrefix)            #!Delete it
                                     #!%ProcFilesPrefix contains: BAK, QUE
```

See Also:           **#DECLARE, #ADD**

## #DELETEALL (delete multiple multi-valued symbol instances)

---

**#DELETEALL**( *symbol*, *expression* )

**#DELETEALL** Deletes the values from specified instances of a multi-valued user-defined symbol.

*symbol* A multi-valued user-defined symbol.

*expression* An expression that defines the instances to delete.

The **#DELETEALL** statement deletes all values from the *symbol* that meet the *expression*.

Example:

```
#DECLARE(%ProcFilesPrefix),MULTI          #!Declare multi-valued symbol
#ADD(%ProcFilesPrefix,'SAV')              #!Add a value
#ADD(%ProcFilesPrefix,'BAK')              #!Add a value
#ADD(%ProcFilesPrefix,'PRE')              #!Add a value
#ADD(%ProcFilesPrefix,'BAK')              #!Add a value
#ADD(%ProcFilesPrefix,'QUE')              #!Add a value
                                           #!%ProcFilesPrefix contains: SAV, BAK, PRE, BAK, QUE
#DELETEALL(%ProcFilesPrefix,'BAK')        #!Delete all BAK instances
                                           #!%ProcFilesPrefix now contains: SAV, PRE, QUE
```

See Also:           **#DECLARE, #ADD**

## #PURGE (delete all single or multi-valued symbol instances)

### #PURGE( *symbol* )

**#PURGE** Deletes the values from all instances of a user-defined symbol.

*symbol* A user-defined symbol.

The **#PURGE** statement deletes all values from the *symbol*. If there are any symbols dependent upon the *symbol*, they are also cleared. If the *symbol* is dependent upon a multi-valued symbol, all instances of that dependent *symbol* are purged for all instances of the symbol upon which it is dependent.

Example:

```
#DECLARE(%ProcFilesPrefix),MULTI           #!Declare multi-valued symbol
#ADD(%ProcFilesPrefix,'SAV')                #!Add a value
#ADD(%ProcFilesPrefix,'BAK')                #!Add a value
#ADD(%ProcFilesPrefix,'PRE')                #!Add a value
#ADD(%ProcFilesPrefix,'BAK')                #!Add a value
#ADD(%ProcFilesPrefix,'QUE')                #!Add a value
                                           #!%ProcFilesPrefix contains: SAV, BAK, PRE, BAK, QUE
#PURGE(%ProcFilesPrefix)                    #!Delete all instances
```

See Also: **#DECLARE, #ADD**

## #CLEAR (clear single-valued symbol)

### #CLEAR( *symbol* )

**#CLEAR** Removes the value from a single-valued user-defined symbol.

*symbol* A single-valued user-defined symbol.

The **#CLEAR** statement removes the value from a single-valued user-defined symbol. This statement is approximately the same as using **#SET** to assign a null value to the *symbol*, except it is more efficient.

Example:

```
#DECLARE(%SomeSymbol)                       #!Declare symbol
#SET(%SomeSymbol,'Value')                    #!Assign a value
                                           #!%SomeSymbol now contains: 'Value'
#CLEAR(%SomeSymbol)                          #!Clear value
                                           #!%SomeSymbol now contains: ''
```

See Also: **#DECLARE, #ADD**

## #FREE (free a multi-valued symbol)

---

### #FREE( *symbol* )

**#FREE** Clears all instances of a multi-valued user-defined symbol.

*symbol* A multi-valued user-defined symbol.

The **#FREE** statement clears all instances of a multi-valued user-defined symbol. If there are any symbols dependent upon the *symbol*, they are also cleared.

Example:

```
#DECLARE(%ProcFilesPrefix),MULTI          #!Declare multi-valued symbol
#ADD(%ProcFilesPrefix,'SAV')              #!Add a value
#ADD(%ProcFilesPrefix,'BAK')              #!Add a value
#ADD(%ProcFilesPrefix,'PRE')              #!Add a value
#ADD(%ProcFilesPrefix,'BAK')              #!Add a value
#ADD(%ProcFilesPrefix,'QUE')              #!Add a value
                                           #!%ProcFilesPrefix contains: SAV, BAK, PRE, BAK, QUE
#DELETEALL(%ProcFilesPrefix,'BAK')        #!Delete all BAK instances
                                           #!%ProcFilesPrefix now contains: SAV, PRE, QUE
#FREE(%ProcFilesPrefix)                   #!Free the symbol
                                           #!%ProcFilesPrefix now contains nothing
```

See Also:           **#DECLARE, #ADD**

## #FIX (fix a multi-value symbol)

**#FIX( *symbol*, *fixsymbol* )**

<b>#FIX</b>	Fixes a multi-valued symbol to the value of a single instance.
<i>symbol</i>	A multi-valued symbol.
<i>fixsymbol</i>	A symbol or expression containing the value to fix the <i>symbol</i> to.

The **#FIX** statement fixes the current value of the multi-valued *symbol* to the value contained in the *fixsymbol*. This is done so that one instance of the *symbol* may be referenced outside a **#FOR** loop structure, or so you can reference the symbols dependent upon the multi-valued *symbol*.

The *fixsymbol* must contain a valid instance of one of the *symbol*'s multiple values. If the *fixsymbol* does not contain a valid instance, the *symbol* is cleared and contains no value when referenced. Unless **#ADD** has been used to add a new value and fix to that instance, **#FIX** or **#SELECT** must be used to set the value in a *symbol* before it contains any value for Template processing outside of a **#FOR** loop.

**#FIX** is completely independent of **#FOR** in that **#FOR** always loops through every instance of the *symbol*, whether there is a previous **#FIX** for that *symbol* or not. If there is a previous **#FIX** statement for that *symbol* before the **#FOR** loop, that *symbol* reverts to that previous *fixvalue* after the **#FOR** terminates.

If **#FIX** is used within a **#FOR** structure, the scope of the **#FIX** is limited to within the **#FOR** in which it is used. It does not change the **#FOR** symbol's iteration value if both the **#FOR** and **#FIX** happen to use the same symbol.

Example:

```
#SET(%OneFile,'HEADER')           #! Put values into two User-defined symbols
#SET(%TwoFile,'DETAIL')
#FIX(%File,%OneFile)             #! %File refers to 'HEADER'
#FOR(%File)                       #! %File iteratively refers to all file names
    #FIX(%File,%TwoFile)         #! %File refers to 'DETAIL'
#ENDFOR                           #! %File refers to 'HEADER' again
```

See Also: **#SELECT**

## #FIND (“super-fix” multi-value symbols)

**#FIND**( *symbol*, *fixsymbol* [, *limit* ] )

<b>#FIND</b>	Fixes all multi-valued parent symbols to values that point to a single child instance.
<i>symbol</i>	A multi-valued symbol.
<i>fixsymbol</i>	A symbol or expression containing the value to fix the <i>symbol</i> to.
<i>limit</i>	A parent symbol which limits the search scope to the children of the <i>limit</i> symbol.

The **#FIND** statement finds the first instance of the *fixsymbol* contained within the *symbol* then fixes it and all the “parent” symbols on which the *symbol* is dependent to the values that “point to” the value of the *fixsymbol* contained in the *symbol*. This is done so that all the symbol dependencies are aligned and you can reference other symbols dependent on “parent” symbols of the *symbol*.

For example, assume %ControlUse contains CUS:Name. The **#FIND(%Field,%ControlUse,%Control)** statement:

- Finds the first instance of %Field that matches the current value in %ControlUse (the first instance of CUS:Name in %Field) in the current procedure.
- Fixes %Field to that value (CUS:Name).
- Fixes %File to the name of the file containing that field (Customer).
- This allows the Template code to reference other the symbols dependent upon %File (like %FilePre to get the file’s prefix).

The *fixsymbol* must contain a valid instance of one of the *symbol*’s multiple values. If the *fixsymbol* does not contain a valid instance, the *symbol* is cleared and contains no value when referenced.

Example:

```
#FIND(%Field,%ControlUse)      #!Fixes %Field and %File to %ControlUse parents
```

See Also:           **#SELECT**, **#FIX**

## #SELECT (fix a multi-value symbol)

---

**#SELECT**( *symbol*, *instance* )

<b>#SELECT</b>	Fixes a multi-valued symbol to a particular <i>instance</i> number.
<i>symbol</i>	A multi-valued symbol.
<i>instance</i>	An expression containing the number of the instance to which to fix.

The **#SELECT** statement fixes the current value of the multi-valued *symbol* to a specific *instance*. The result of **#SELECT** is exactly the same as **#FIX**. Each *instance* in the multi-valued *symbol* is numbered starting with one (1).

The *instance* must contain a valid instance number of one of the *symbol*'s multiple values. If the *instance* is not valid, the *symbol* is cleared and contains no value when referenced. The **INSTANCE** built-in template function can return the instance number.

Unless **#ADD** has been used to add a new value and fix to that instance, **#FIX** or **#SELECT** must be used to set the value in a *symbol* before it contains any value for Template processing outside of a **#FOR** loop.

Example:

```
#SELECT(%File,1)      #!Fix to first %File instance
```

## #SET (assign value to a user-defined symbol)

### #SET( *symbol,value* )

<b>#SET</b>	Assigns a value to a single-valued user-defined symbol.
<i>symbol</i>	A single-valued user-defined symbol. This must have been previously declared with the #DECLARE statement.
<i>value</i>	A built-in or user-defined symbol, string constant, or an expression.

The **#SET** statement assigns the *value* to the *symbol*. If the *value* parameter contains an expression, you may perform mathematics during source code generation. The expression may use any of the arithmetic, Boolean, and logical operators documented in the *Language Reference*. If the modulus division operator (%) is used in the expression, it must be followed by at least one blank space (to explicitly differentiate it from the Template symbols). Logical expressions always evaluate to 1 (True) or 0 (False). Clarion language function calls (those supported in EVALUATE()) and built-in template functions are allowed.

Example:

```
#SET(%NetworkApp,'Network')
#SET(%MySymbol,%Primary)
#FOR(%File)
    #SET(%FilesCounter,%FilesCounter + 1)
%FileStructure
#ENDFOR
```

## #UNFIX (unfix a multi-value symbol)

### #UNFIX( *symbol* )

<b>#UNFIX</b>	Unfixes a multi-valued symbol.
<i>symbol</i>	A multi-valued symbol.

The **#UNFIX** statement unfixes the current value of the multi-valued *symbol*. If the unfix *symbol* is referenced outside a #FOR loop structure, it has no value and you cannot reference any other symbols dependent upon the multi-valued *symbol*.

Example:

```
#SET(%OneFile,'HEADER')
#SET(%TwoFile,'DETAIL')
#FIX(%File,%OneFile)
#FOR(%File)
    #FIX(%File,%TwoFile)
#ENDFOR

#UNFIX(%File)
```

#! Put values into two User-defined symbols  
 #! %File refers to 'HEADER'  
 #! %File iteratively refers to all file names  
 #! %File refers to 'DETAIL'  
 #! %File refers to 'HEADER' again  
 #! %File refers to no specific value

## #DECLARE Attributes

### UNIQUE (no duplicates allowed)

---

#### UNIQUE

The **UNIQUE** attribute of a **#DECLARE** statement specifies the multi-valued symbol being declared cannot contain duplicate values. To accomplish this, the **#ADD** statement always adds instances to the symbol in ascending order.

Example:

```
#DECLARE(%ProcFilesPrefix),MULTI,UNIQUE  #!Declare unique multi-valued symbol
#FIX(%File,%Primary)                    #!Build list of all file prefixes in proc
#ADD(%ProcFilesPrefix,%FilePre)        #!Start with primary file
#FOR(%Secondary)                         #!Then add all secondary files
    #FIX(%File,%Secondary)
    #ADD(%ProcFilesPrefix,%FilePre)
#ENDFOR
```

See Also:           **#DECLARE**

### SAVE (save symbol between generations)

---

#### SAVE

The **SAVE** attribute on a **#DECLARE** statement causes the value(s) of the declared symbol to be saved at the end of source generation and restored at the beginning of the next source generation session. A **#DECLARE** statement with the **SAVE** attribute may only appear in the **#APPLICATION** section.

Example:

```
#APPLICATION('Sample One')
#DECLARE(%UserSymbol),SAVE              #!Value saved after generation
                                          #! and restored for next generation
#DECLARE(%ModuleFile,%Module),UNIQUE,MULTI  #!Level-1 dependent symbol
#DECLARE(%ModuleFilePut,%ModuleFile)      #!Level-2 dependent symbol
#DECLARE(%ModuleFileDelete,%ModuleFile)    #!Second Level-2 dependent symbol
```

See Also:           **#DECLARE**

# Input and Validation Statements

Contents

## #PROMPT (prompt for programmer input)

```
#PROMPT( string, type ) [, symbol ] [, REQ ] [, DEFAULT( value ) ] [, ICON( file ) ] [, AT( ) ]
[, PROMPTAT( ) ] [, MULTI( description ) ] [, INLINE ] [, SELECTION( description ) ]
```

<b>#PROMPT</b>	Asks the programmer for input.
<i>string</i>	A string constant containing the text to display as the input prompt. This may contain an ampersand (&) denoting a “hot” key used in conjunction with the ALT key to get to this field on the properties screen.
<i>type</i>	A picture token or prompt keyword.
<i>symbol</i>	A User-defined symbol to receive the input. A #PROMPT with a RADIO or EMBED <i>type</i> cannot have a <i>symbol</i> , all other <i>types</i> must have a <i>symbol</i> .
<b>REQ</b>	Specifies the prompt cannot be left blank or zero.
<b>DEFAULT</b>	Specifies an initial value (which may be overridden).
<i>value</i>	A string constant containing the initial value.
<b>ICON</b>	Specifies an icon for the button face of a #PROMPT with the MULTI attribute.
<i>file</i>	A string constant containing the name of the .ICO file to display on the button face.
<b>AT</b>	Specifies the position of the prompt entry area in the window, relative to the first prompt placed on the window from the Template (excluding the standard prompts on every procedure properties window). This attribute takes the same parameters as the Clarion language AT attribute.
<b>PROMPTAT</b>	Specifies the position of the prompt <i>string</i> in the window, relative to the first prompt placed on the window from the Template (excluding the standard prompts on every procedure properties window). This attribute takes the same parameters as the Clarion language AT attribute.
<b>MULTI</b>	Specifies the programmer may enter multiple values for the #PROMPT. The prompt appears as a button which pops up a list box allowing the programmer to enter multiple values, unless the INLINE attribute is also present.
<i>description</i>	A string constant containing the name to display on the button face and at the top of the list of prompt values.

- INLINE** The multiple values the programmer enters for the #PROMPT appears as a list box with update buttons which allow the programmer to enter multiple values. The MULTI attribute must also be present.
- SELECTION** Specifies the programmer may select multiple values for the #PROMPT from the list of choices presented by the FROM *type*. The prompt appears as a button which pops up a list box allowing the programmer to choose multiple values, unless the INLINE attribute is also present.

The #PROMPT statement asks the programmer for input. A #PROMPT statement may be placed in #APPLICATION, #PROCEDURE, #CODE, #CONTROL, #EXTENSION, #UTILITY, or #FIELD sections. It may not be placed in a #PROGRAM, #MODULE, #TEMPLATE, or #GROUP section.

When the #PROMPT is placed in a template section, the prompt *string* and its associated entry field are placed:

<u>Section Name</u>	<u>Window Name</u>
#APPLICATION	Global Settings
#PROCEDURE	Procedure Properties
#CODE	Embeds Dialog
#CONTROL	Control Properties Actions Tab
#EXTENSION	Extensions Dialog
#FIELD	Control Properties Actions Tab

The *type* parameter may contain a picture token to format the programmer's input, or one of the following keywords:

PROCEDURE	The label of a procedure
FILE	The label of a data file
KEY	The label of a key (can be limited to one file)
COMPONENT	The label of a key component field (can be limited to one key)
FIELD	The label of a file field (can be limited to one file)
FORMAT	Calls the listbox formatter.
PICTURE	Calls the picture token formatter.
DROP	Creates a droplist of items specified in its parameter
KEYCODE	A keycode or keycode EQUATE
OPTION	Creates a radio button structure
RADIO	Creates a radio button
CHECK	Creates a check box
CONTROL	A window control
FROM	Creates a droplist of items contained in its symbol parameter
EMBED	Allows the user to edit a specified embedded source code point
EMBEDBUTTON	Allows the user to edit a specified embedded source code point

**SPIN**                      Creates a spin control

For all *types* except RADIO and CHECK (and MULTI attribute prompts), the #PROMPT *string* is displayed on the screen immediately to the left of its data input area.

A #PROMPT with the REQ attribute cannot be left blank or zero; it is a required input field. The DEFAULT attribute may be used to provide the programmer with an initial *value* in the #PROMPT, which may be overridden at design time.

A #PROMPT with a RADIO *type* creates one Radio button for the immediately preceding #PROMPT with an OPTION *type*. There may be multiple RADIOS for one OPTION. Each RADIO's *string*, when selected, is placed in the closest preceding OPTION's *symbol*. The OPTION structure is terminated by the first #PROMPT following it that is not a RADIO.

The MULTI attribute specifies the programmer may enter multiple values for the #PROMPT. A button appears on the Properties window with the *description* on its face. Alternatively, this can have an ICON attribute to name an .ICO file to display on the button face. This button calls a window containing a list box to display all the multiple values entered for the #PROMPT, along with Insert, Change, and Delete buttons. These three buttons call another window containing the #PROMPT *string* and its data entry field to allow the programmer to update the entries in the list.

When the programmer has entered a value for the #PROMPT, the input value is assigned to the *symbol*. The value entered by the programmer may be checked for validity by one or more #VALIDATE statements immediately following the #PROMPT statement.

The value(s) placed in the *symbol* may be used or evaluated elsewhere within the Template. A *symbol* defined by a #PROMPT in the #APPLICATION section of the Template is Global, it can be used or evaluated anywhere in the Template. A *symbol* defined by #PROMPT in a #PROCEDURE section is Local, and is a dependent symbol to %Procedure; it can be used or evaluated only within that #PROCEDURE section. A *symbol* defined by #PROMPT in a #CODE, #CONTROL, or #EXTENSION section of the Template can be used or evaluated only within that section.

Example:

```
#PROMPT('Ask for Input',@s20),%InputSymbol           #!Simple input
#PROMPT('Ask for FileName',FILE),%InputFile,REQ     #!Required filename
#PROMPT('Pick One',OPTION),%InputChoice             #!Mutually exclusive options
#PROMPT('Choice One',RADIO)
#PROMPT('Choice Two',RADIO)
#PROMPT('Next Procedure',PROCEDURE),%NextProc      #!Prompt for procedure name
#PROMPT('Ask for Multiple Input',@s20),%MultiSymbol,MULTI('Input Values...')
                                                    #!Prompt for multiple input
```

See Also:

#DISPLAY, #VALIDATE, #GROUP, #BOXED, #ENABLE, #BUTTON

## #VALIDATE (validate prompt input)

---

**#VALIDATE**( *expression,message* )

<b>#VALIDATE</b>	Validates the data entered into the immediately preceding #PROMPT field.
<i>expression</i>	The expression to use to validate the entered data.
<i>message</i>	A string constant containing the error message to display if the data is invalid.

The **#VALIDATE** statement validates the data entered into the #PROMPT field immediately preceding the #VALIDATE. The *expression* is evaluated when the OK button is pressed on the Procedure Properties window. If the *expression* is false, the *message* is displayed to the programmer in a message box, and control is given to the #PROMPT field that immediately precedes the #VALIDATE. There may be multiple #VALIDATE statements following a #PROMPT to validate the entry.

Example:

```
#PROMPT('Input Value, Even numbers from 100-200',@N3),%Value
#VALIDATE((%Value > 100) AND (%Value < 200),'Value must be between 100 and 200')
#VALIDATE((%Value % 2 = 0),'Value must be an even number')
#PROMPT('Screen Field',WINDOWCONTROL),%SomeField
#VALIDATE(%ScreenFieldType = 'LIST','Must select a list box')
```

See Also:           **#PROMPT**

## #ENABLE (enable/disable prompts)

```
#ENABLE( expression ) [, CLEAR ]
      prompts
#ENDENABLE
```

<b>#ENABLE</b>	Begins a group of <i>prompts</i> which may be enabled or disabled based upon the evaluation of the <i>expression</i> .
<i>expression</i>	The expression which controls the prompt enable/disable.
<b>CLEAR</b>	Specifies the <i>prompts</i> symbol values are cleared when disabled.
<i>prompts</i>	One or more #PROMPT, #BUTTON, #DISPLAY, #ENABLE, and/or #VALIDATE statements.
<b>#ENDENABLE</b>	Terminates the group of <i>prompts</i> .

The **#ENABLE** structure contains *prompts* which may be enabled or disabled based upon the evaluation of the *expression*. If the *expression* is true, the *prompts* are enabled, otherwise they are disabled. The *prompts* appear dimmed when disabled and the programmer may not enter data in them.

Example:

```
#PROMPT('Pick One',OPTION),%InputChoice           #!Mutually exclusive options
#PROMPT('Choice One',RADIO)
#PROMPT('Choice Two',RADIO)
#ENABLE(%InputChoice = 'Choice Two')
    #PROMPT('Screen Field',WINDOWCONTROL),%SomeField #!Enabled only for Choice Two
    #VALIDATE(%ScreenFieldType = 'LIST','Must select a list box')
#ENDENABLE
```

See Also:           **#PROMPT, #GROUP, #BOXED, #BUTTON**

## #BUTTON (call another page of prompts)

```
#BUTTON( string [, icon ] ) [, HLP( id ) ] [, AT() ] [, REQ ] [, INLINE ]
          [, | FROM( multisymbol, expression ) [, WHERE( condition ) ] | ]
          | MULTI( fromsymbol, expression ) | ]
          prompts
#ENDBUTTON
```

<b>#BUTTON</b>	Creates a command button to call another page of <i>prompts</i> .
<i>string</i>	A string constant containing the text to display on the button's face. This may contain an ampersand (&) to indicate the "hot" letter for the button.
<i>icon</i>	A string constant containing the name of an .ICO file or standard icon to display on the button's face. The <i>string</i> then serves only for "hot" key definition.
<b>HLP</b>	Specifies on-line help is available for the #BUTTON.
<i>id</i>	A string constant containing the identifier to access the Help system. This may be either a Help keyword or "context string."
<b>AT</b>	Specifies the position of the button in the window, relative to the first prompt placed on the window from the Template (excluding the standard prompts on every procedure properties window). This attribute takes the same parameters as the Clarion language AT attribute.
<b>REQ</b>	Specifies the programmer must press the button at least once when the procedure is created.
<b>FROM</b>	Specifies the programmer may enter a set of values for the <i>prompts</i> for each instance of the <i>fromsymbol</i> .
<i>fromsymbol</i>	A built-in multi-valued symbol which pre-defines all instances on which the <i>prompts</i> symbols are dependent. The programmer may not add, change, or delete instances of the <i>fromsymbol</i> .
<i>expression</i>	A string expression to format data display in the multiple value display list box.
<b>WHERE</b>	Specifies the #BUTTON displays only those instances of the <i>fromsymbol</i> where the <i>condition</i> is true.
<i>condition</i>	An expression that specifies the condition for use.
<b>MULTI</b>	Specifies the programmer may enter multiple sets of values for the prompts. This allows multiple related groups of prompts.
<i>multisymbol</i>	A user-defined symbol on which all the <i>prompts</i> symbols are dependent. This symbol is internally assigned a

unique value for each set of *prompts*.

**INLINE**

The multiple values the programmer enters for the #BUTTON appears as a list box with update buttons which allow the programmer to enter multiple values. The MULTI or FROM attribute must also be present.

*prompts*

One or more #PROMPT statements. This may also contain #DISPLAY, #VALIDATE, #ENABLE, and #BUTTON statements.

**#ENDBUTTON**

Terminates the group of *prompts* which are on the page called by the #BUTTON.

The #BUTTON statement creates a command button displaying either the *string* or the *icon* on its face. When the programmer presses the button, a new page of *prompts* appears for selection and entry.

Each new page of *prompts* has its own OK, CANCEL, and TEMPLATE HELP buttons as standard fields. All other fields on the page are generated from the *prompts* within the #BUTTON structure.

Each page's OK button closes the current page of *prompts*, saving the data the programmer entered in the *prompts*, then returns to the prior window. The CANCEL button closes the current page of *prompts* without saving, then returns to the prior window. If the page calls another page with a nested #BUTTON statement and the programmer presses OK on the lowest level page, then CANCEL on the page that called it, the entire transaction is cancelled.

The MULTI attribute specifies the programmer may enter multiple sets of values for the *prompts*. The button calls a window containing a list box to display all the multiple values entered for the sets of *prompts*, along with Insert, Change, and Delete buttons. These three buttons call another window containing all the *prompts* to allow the programmer to update the entries in the list. The *expression* is used to format the information for display in the list box.

The FROM attribute also specifies the programmer may enter multiple sets of values for the *prompts*. The button calls a window containing a list box that displays each instance of the *fromsymbol*, along with an Edit button. This button calls another window containing all the *prompts* to allow the programmer to update the entries associated with that instance of the *fromsymbol*. The *expression* is used to format the information for display in the list box. The WHERE attribute may be used to limit the instances of the *fromsymbol* to only those that meet the WHERE *condition*.

## Example:

```

#PROMPT('Name a File',FILE),%FileName           #!Prompt on the first page

#BUTTON('Page Two')                               #!Button on first page calls
#PROMPT('Pick One',OPTION),%InputChoice         #!These prompts on second page
#PROMPT('Choice One',RADIO)
#PROMPT('Choice Two',RADIO)
#ENABLE(%InputChoice = 'Choice Two')
#PROMPT('Screen Field',WINDOWCONTROL),%SomeField
#VALIDATE(%ScreenFieldType = 'LIST','Must select a list box')
#ENDENABLE
#ENDBUTTON                                         #!Terminate second page prompts

#PROMPT('Enter some value',@S20),%InputValue1    #!Another prompt on first page

#BUTTON('Multiple Names'),MULTI(%ButtonSymbol,%ForeName & ' ' & %SurName)
#PROMPT('First Name',@S20),%ForeName
#PROMPT('Last Name',@S20),%SurName
#ENDBUTTON                                         #!Terminate second page prompts

#PROMPT('Enter another value',@S20),%InputValue2 #!Another prompt on first page
#!Multiple input button dependent on %File:
#BUTTON('File Options'),FROM(%File)
#PROMPT('Open Access Mode',DROP('Open|Share'),%FileOpenMode
#ENDBUTTON                                         #!Terminate second page prompts

```

See Also: **#PROMPT, #VALIDATE, #ENABLE**

## #FIELD (control prompts)

```
#FIELD, WHERE( expression )
    prompts
#ENDFIELD
```

<b>#FIELD</b>	Begins a control prompts section.
<b>WHERE</b>	Specifies the #FIELD is used only for those instances where the <i>expression</i> is true.
<i>expression</i>	An expression that specifies the condition for use.
<i>prompts</i>	Prompt (#PROMPT, #BUTTON, etc.) statements.
<b>#ENDFIELD</b>	Terminates the section.

The **#FIELD** structure contains *prompts* for controls that are populated onto a window. These *prompts* appear in the Actions... dialog.

The list of field prompts appearing in the Actions... dialog is built in the following manner:

1. #CONTROL prompts.
2. #PROCEDURE-level #FIELD prompts (also from inserted #GROUPS).
3. #PROCEDURE-level #FIELD prompts from active #EXTENSION sections.
4. #CONTROL-level #FIELD prompts.
5. #CODE-level #FIELD prompts.

The values the user inputs into the #FIELD prompts are used to generate the source to govern the behavior of the control.

Example:

```
#FIELD, WHERE(%ControlType = 'BUTTON')
    #PROMPT('Enter procedure call',PROCEDURE),%ButtonProc
#ENDFIELD
```

## #PREPARE (setup prompt symbols)

```
#PREPARE
  statements
#ENDPREPARE
```

**#PREPARE** Begins a prompts symbol setup section.

*statements* Template language statements to fix multi-valued symbols to the values needed to process the #PROMPT or #BUTTON statement following the #PREPARE.

**#ENDPREPARE** Terminates the section.

The **#PREPARE** structure contains Template language statements to fix multi-valued symbols to the values needed to process the #PROMPT or #BUTTON statements preceding the #PREPARE.

Example:

```
#BUTTON('Customize Colors'),FROM(%ControlField,%ControlField),WHERE(%CntrlHasColor)
#PREPARE
  #FIND(%ControlInstance,%ActiveTemplateInstance,%Control)
#ENDPREPARE
#BOXED('Default Colors')
  #PROMPT('&Fore Normal:',COLOR),%ControlFieldForeNormal,DEFAULT(-1)
  #PROMPT('&Back Normal:',COLOR),%ControlFieldBackNormal,DEFAULT(-1)
  #PROMPT('&Fore Selected:',COLOR),%ControlFieldForeSelected,DEFAULT(-1)
  #PROMPT('&Back Selected:',COLOR),%ControlFieldBackSelected,DEFAULT(-1)
#ENDBOXED
#BOXED('Conditional Color Assignments')
  #BUTTON('Conditional Colors'),MULTI(%ConditionalColors,%ColorCondition),INLINE
  #PROMPT('&Condition:',@S255),%ColorCondition
  #PROMPT('&Fore Normal:',COLOR),%CondControlFieldForeNormal,DEFAULT(-1)
  #PROMPT('&Back Normal:',COLOR),%CondControlFieldBackNormal,DEFAULT(-1)
  #PROMPT('&Fore Selected:',COLOR),%CondControlFieldForeSelected,DEFAULT(-1)
  #PROMPT('&Back Selected:',COLOR),%CondControlFieldBackSelected,DEFAULT(-1)
#ENDBUTTON
#ENDBOXED
#ENDBUTTON
```

## #PROMPT Entry Types

### CHECK (check box)

---

#### CHECK

The **CHECK** *type* in a #PROMPT statement indicates the prompt's *symbol* is a toggle switch which is used only for on/off, yes/no, or true/false evaluation. CHECK puts a check box on screen in the entry area for the #PROMPT. When the Check box is toggled on, the prompt's *symbol* contains one (1). When the Check box is toggled off, the prompt's *symbol* contains zero (0).

Example:

```
#PROMPT('Network Application',CHECK),%NetworkApp
```

### COMPONENT (list of KEY fields)

---

#### COMPONENT [ ( *scope* ) ]

**COMPONENT** Displays a list of KEY component fields.

*scope* A symbol containing a KEY. If omitted, the list displays all KEY components for all KEYs in all FILEs.

The **COMPONENT** *type* in a #PROMPT statement indicates the prompt's *symbol* must contain the label of one of the component fields of a KEY. A list of available KEY fields pops up when the #PROMPT is encountered on the Properties screen.

The COMPONENT may have a *scope* parameter that limits the KEY components available in the list. If *scope* is the label of a KEY, the list displays all KEY components for that KEY.

Example:

```
#PROMPT('Record Selector',COMPONENT(%Primary)),%RecordSelector
```

## CONTROL (list of window fields)

---

### CONTROL

The **CONTROL** *type* in a #PROMPT statement indicates the prompt's *symbol* must contain the field equate label of a window control. A list of available controls pops up when the #PROMPT is encountered on the Properties screen.

Example:

```
#PROMPT('Locator Field',CONTROL),%Locator
```

## DROP (droplist of items)

---

### DROP [ ( *scope* ) ]

<b>DROP</b>	Creates a droplist of items.
<i>scope</i>	A string constant containing the items for the list, delimited by the vertical bar ( ) character.

The **DROP** *type* in a #PROMPT statement indicates the prompt's *symbol* must contain one item from the list specified in the *scope* parameter. The *scope* must contain all the items for the list. The list of items drops down just like a Clarion language LIST control with the DROP attribute. If no default value is specified, the prompt's symbol defaults to the first value in the *scope* list.

Example:

```
#PROMPT('If file not found',DROP('Create the file|Halt Program')),%FileNotFound
```

## EMBED (enter embedded source)

---

**EMBED**( *identifier* [, *instance* ] )

<b>EMBED</b>	Specifies the prompt directly edits an embedded source code point.
<i>identifier</i>	The user-defined template symbol which identifies the #EMBED embedded source code point to edit.
<i>instance</i>	A string constant or expression containing one of the values in the multi-valued symbol used by the #EMBED. You must have as many <i>instances</i> as are necessary to explicitly identify the single #EMBED point instance to edit.

The **EMBED** *type* in a #PROMPT statement indicates the prompt is used to directly edit an embedded source code point. This places an an entry area with an ellipsis (...) button next to the prompt to allow the user access to the embedded source code point. The programmer may enter a procedure call in the entry area, or press the ellipsis (...) button to go into the normal source dialog.

If the #EMBED is associated with a multi-valued symbol, you must identify the specific *instance* of the #EMBED. If you use a multi-valued symbol as an *instance* expression, it must be fixed to a single value. Most commonly, this would be used in a #FIELD structure.

Example:

```
#PROMPT('Embedded Data Declarations',EMBED(%DataSection))
#FIELD, WHERE(%ControlType = 'BUTTON')
    #PROMPT('Action when button is pressed',EMBED(%ControlEvent,%Control,'Accepted'))
#ENDFIELD
```

## EMBEDBUTTON (enter embedded source)

---

**EMBEDBUTTON**( *identifier* [, *instance* ] )

**EMBEDBUTTON** Specifies the prompt directly edits an embedded source code point.

*identifier* The user-defined template symbol which identifies the #EMBED embedded source code point to edit.

*instance* A string constant or expression containing one of the values in the multi-valued symbol used by the #EMBED. You must have as many *instances* as are necessary to explicitly identify the single #EMBED point instance to edit.

The **EMBEDBUTTON** *type* in a #PROMPT statement indicates the prompt is used to directly edit an embedded source code point. This places a button next to the prompt allow the user access to the embedded source code point. The programmer may press the button to enter the embed dialog.

If the #EMBED is associated with a multi-valued symbol, you must identify the specific *instance* of the #EMBED. If you use a multi-valued symbol as an *instance* expression, it must be fixed to a single value. Most commonly, this would be used in a #FIELD structure.

Example:

```
#PROMPT('Embedded Data Declarations',EMBEDBUTTON(%DataSection))  
  
#FIELD, WHERE(%ControlType = 'BUTTON')  
  #PROMPT('Action for button press',EMBEDBUTTON(%ControlEvent,%Control,'Accepted'))  
#ENDFIELD
```

## FIELD (list of data fields)

---

**FIELD** [ ( *scope* ) ]

**FIELD**

Displays a list of fields in FILES.

*scope*

A symbol containing a FILE label. If omitted, the list displays all fields for all FILES.

The **FIELD** *type* in a #PROMPT statement indicates the prompt's *symbol* must contain the label of a field in a data file. A list of available fields pops up when the #PROMPT is encountered on the Properties screen.

There may be a *scope* parameter that limits the fields available in the list. If *scope* names a FILE, the list displays all fields in the FILE. If there is no *scope* parameter, the list displays all fields in all FILES.

Example:

```
#PROMPT('Locator Field',FIELD(%Primary)),%Locator
```

## FILE (list of files)

---

**FILE**

The **FILE** *type* in a #PROMPT statement indicates the prompt's *symbol* must contain the label of a data file. A list of available files from the procedure's File Schematic pops up when the #PROMPT is encountered on the Properties screen.

Example:

```
#PROMPT('Logout File',FILE),%LogoutFile
```

## FORMAT (call listbox formatter)

---

**FORMAT**

The **FORMAT** *type* in a #PROMPT statement indicates the prompt's *symbol* must contain a LIST or COMBO control's FORMAT attribute string, so it calls the listbox formatter to create it.

Example:

```
#PROMPT('Alternate LIST format',FORMAT),%AlternateFormatString
```

## FROM (list of symbol values)

**FROM**( *symbol* [, *expression* ] [, *value* ] )

<b>FROM</b>	Specifies a drop-down list of values from the <i>symbol</i> .
<i>symbol</i>	A multi-valued symbol.
<i>expression</i>	An expression which controls which <i>symbol</i> values are displayed. Only <i>symbol</i> values where the <i>expression</i> is true are displayed in the drop list.
<i>value</i>	The symbol containing the values to display for the prompt and assigned into the <i>symbol</i> .

The **FROM** type in a #PROMPT statement indicates the user must select one item from the list contained in the *symbol*. The *expression* can be used to limit the *values* displayed, while the *value* defines the display elements.

Example:

```
#PROMPT('Select an Event',FROM(%ControlEvent)),%WhichEvent
#PROMPT('Select a Button',FROM(%ControlField,%ControlType = 'BUTTON')),%WhichButton
#PROMPT('Pick a Field',FROM(%Control,%ControlUse <> ' ',%ControlUse)),%MyButton
```

## KEY (list of keys)

**KEY** [ ( *scope* ) ]

<b>KEY</b>	Displays a list of KEYS.
<i>scope</i>	A symbol containing a FILE. If omitted, the list displays all KEYS in all FILES.

The **KEY** type in a #PROMPT statement indicates the prompt's *symbol* must contain the label of a KEY. A list of available keys from the data dictionary pops up when the #PROMPT is encountered on the Properties screen.

There may be a *scope* parameter that limits the KEYS available in the list. If *scope* names a FILE, the list displays all KEYS in the FILE. If there is no *scope* parameter, the list displays all KEYS in all FILES.

Example:

```
#PROMPT('Which Key',KEY(%Primary)),%UseKey
```

## KEYCODE (list of keycodes)

---

### KEYCODE

The **KEYCODE** *type* in a #PROMPT statement indicates the prompt's *symbol* must contain a keycode or keycode equate label. A selection list of keycode equate labels from KEYCODES.EQU pops up when the user presses the ellipsis button next to the prompt on the Properties screen.

Example:

```
#PROMPT('Hot Key',KEYCODE),%ActiveKey
```

## OPTION (display radio buttons)

---

### OPTION

The **OPTION** *type* in a #PROMPT statement indicates the prompt's *symbol* must contain the value of one of the *strings* in one of the following RADIO #PROMPT statements. Each of the *strings* displays a radio button on the Properties screen when the #PROMPT is encountered.

Example:

```
#PROMPT('Ask for Choice',OPTION),%OptionSymbol  
#PROMPT('Option One',RADIO)  
#PROMPT('Option Two',RADIO)  
#PROMPT('Option Three',RADIO)
```

## PICTURE (call picture formatter)

---

### PICTURE

The **PICTURE** *type* in a #PROMPT statement calls the picture formatter to create a picture token used to format data for display.

Example:

```
#PROMPT('Display Format',PICTURE),%DisplayPicture
```

## PROCEDURE (add to logical procedure tree)

---

### PROCEDURE

The **PROCEDURE** *type* in a #PROMPT statement indicates the value placed in the *symbol* is the name of a procedure in your application. This procedure name is added to the Application Generator's logical procedure call tree in the appropriate place.

Example:

```
#PROMPT('Next Procedure',PROCEDURE),%NextProcedure
```

## RADIO (one radio button)

---

### RADIO

The **RADIO** *type* in a #PROMPT statement creates one RADIO button for the closest preceding OPTION prompt. When selected, the RADIO's *string* is placed in the OPTION's *symbol*.

Example:

```
#PROMPT('Ask for Choice',OPTION),%OptionSymbol
#PROMPT('Option One',RADIO)
#PROMPT('Option Two',RADIO)
#PROMPT('Option Three',RADIO)
```

## SPIN (spin box)

---

### SPIN( *picture*, *low*, *high* [, *step* ] )

<b>SPIN</b>	Creates a spin control.
<i>picture</i>	A data entry picture token.
<i>low</i>	A numeric constant or expression containing the lowest valid value.
<i>high</i>	A numeric constant or expression containing the highest valid value.
<i>step</i>	A numeric constant or expression containing the amount to change each increment between lowest and highest valid values. If omitted, the default is 1.

The **SPIN** *type* in a #PROMPT statement creates a spin control for the programmer to select a valid number.

Example:

```
#PROMPT('How Many?',SPIN(@n2,1,10)),%SpinSymbol
```

# Display and Formatting Statements

## #BOXED (prompt group box)

```
#BOXED([ string ]) [, AT( ) ] [, WHERE( expression ) ] [, CLEAR ] [, HIDE ]
      prompts
#ENDBOXED
```

<b>#BOXED</b>	Creates a group box of <i>prompts</i> .
<i>string</i>	A string constant containing the text to display as the group box caption.
<b>AT</b>	Specifies the position of the group in the window, relative to the first prompt placed on the window from the Template (excluding the standard prompts on every procedure properties window). This attribute takes the same parameters as the Clarion language AT attribute.
<b>WHERE</b>	Specifies the #BOXED is visible only for those instances where the <i>expression</i> is true.
<i>expression</i>	An expression that specifies the condition for use.
<b>CLEAR</b>	Specifies the <i>prompts</i> symbol values are cleared when disabled.
<i>prompts</i>	One or more #PROMPT statements. This may also contain #DISPLAY, #VALIDATE, #ENABLE, and #BUTTON statements.
<b>HIDE</b>	Specifies the <i>prompts</i> are hidden if the WHERE <i>expression</i> is false when the dialog is first displayed.
<b>#ENDBOXED</b>	Terminates the group box of <i>prompts</i> .

The **#BOXED** statement creates a group box displaying the *string* as its caption. If the WHERE attribute is present, the *prompts* are hidden or visible based upon the evaluation of the *expression*. If the *expression* is true, the *prompts* are visible, otherwise they are hidden.

Example:

```
#PROMPT('Pick One',OPTION),%InputChoice           #!These prompts on second page
#PROMPT('Choice One',RADIO)
#PROMPT('Choice Two',RADIO)
#BOXED('Choice Two Options'),WHERE(%InputChoice = 'Choice Two')
      #PROMPT('Screen Field',WINDOWCONTROL),%SomeField
      #VALIDATE(%ScreenFieldType = 'LIST','Must select a list box')
#ENDBOXED
```

See Also:           **#PROMPT, #VALIDATE**

## #DISPLAY (display-only prompt)

---

**#DISPLAY( [ *string* ] ), AT( )**

<b>#DISPLAY</b>	Displays a string constant on a properties window.
<i>string</i>	A string expression containing the text to display.
<b>AT</b>	Specifies the size and position of the <i>string</i> display area in the window, allowing multiple lines of text. This attribute takes the same parameters as the Clarion language AT attribute.

The **#DISPLAY** statement displays the *string* on a properties window. If the *string* is omitted, a blank line is displayed. **#DISPLAY** is not valid in a **#MODULE** section.

Example:

```
#DISPLAY()                                #!Display a blank line
#DISPLAY('Ask programmer to input some')  #!Display a string
#PROMPT(' specific value',@s20),%InputSymbol
```

See Also: **#PROMPT, #GROUP, #BOXED, #ENABLE, #BUTTON**

## #IMAGE (display graphic)

---

**#IMAGE( *string* ) [ , AT( ) ]**

<b>#IMAGE</b>	Displays a graphic image on a properties window.
<i>picture</i>	A string expression containing the name of the image file to display.
<b>AT</b>	Specifies the size and position of the <i>picture</i> display area in the window. This attribute takes the same parameters as the Clarion language AT attribute.

The **#IMAGE** statement displays the *picture* graphic image on a properties window. **#IMAGE** is not valid in a **#MODULE** section.

Example:

```
#IMAGE('SomePic.BMP')                    #!Display a bitmap
```

## #SHEET (declare a group of #TAB controls)

```
#SHEET
  tabs
#ENDSHEET
```

**#SHEET**            Declares a group of #TAB controls.

*tabs*                Multiple #TAB control declarations.

**#ENDSHEET**       Terminates the group box of *prompts*.

**#SHEET** declares a group of #TAB controls that offer the user multiple “pages” of prompts for the window. The multiple #TAB controls in the SHEET structure define the “pages” displayed to the user.

Example:

```
#UTILITY(ApplicationWizard,'Create a New Database Application'),WIZARD
#!
#SHEET
  #TAB('Application Wizard')
    #IMAGE('CMPAPP.BMP')
    #DISPLAY('This wizard will create a new Application.').AT(90,8,235,24)
    #DISPLAY('To begin creating your new Application, click Next.').AT(90)
  #ENDTAB
  #TAB('Application Wizard - File Usage'),FINISH(1)
    #IMAGE('WINAPP.BMP')
    #DISPLAY('You can gen procs for all files, or select them').AT(90,8,235,24)
    #PROMPT('Use all files in DCT',CHECK),%GenAllFiles,AT(90,,180),DEFAULT(1)
  #ENDTAB
  #TAB('Select Files to Use'),WHERE(NOT %GenAllFiles),FINISH(1)
    #IMAGE('WINAPP.BMP')
    #PROMPT('File Select',FROM(%File)),%FileSelect,INLINE,SELECTION('File Select')
  #ENDTAB
  #TAB('Application Wizard - Finally...'),FINISH(1)
    #IMAGE('WINAPP.BMP')
    #DISPLAY('Old procs can be overwritten or new procs suppressed')
    #PROMPT('Overwrite existing procs',CHECK),%OverwriteAll,AT(90,,235),DEFAULT(0)
    #IMAGE('<255,1,4,127>').AT(90,55)
    #DISPLAY('Your First Procedure is always overwritten!').AT(125,54,200,20)
  #ENDTAB
#ENDSHEET
```

## #TAB (declare a page of a #SHEET control)

```
#TAB( text ) [,FINISH( )] [,WHERE( )]
    prompts
#ENDTAB
```

<b>#TAB</b>	Declares a group of <i>prompts</i> that constitute one of the multiple “pages” within a #SHEET structure.
<i>text</i>	A string constant containing the text to display on the tab, or as the title of the window, if the WIZARD attribute is present on the #UTILITY.
<b>FINISH</b>	Specifies the “Finish” button is present. Valid only in a #UTILITY with the WIZARD attribute.
<b>WHERE</b>	Specifies the #BOXED is visible only for those instances where the <i>expression</i> is true.
<i>expression</i>	An expression that specifies the condition for use.
<i>prompts</i>	One or more #PROMPT statements. This may also contain #DISPLAY, #VALIDATE, #ENABLE, and #BUTTON statements.
<b>#ENDTAB</b>	Terminates the page of <i>prompts</i> .

The **#TAB** structure declares a group of *prompts* that constitute one of the multiple “pages” of controls contained within a #SHEET structure. The multiple #TAB controls in the #SHEET structure define the “pages” displayed to the user.

Example:

```
#UTILITY(ApplicationWizard,'Create a New Database Application'),WIZARD
#!
#SHEET
  #TAB('Application Wizard')
    #IMAGE('CMPAPP.BMP')
    #DISPLAY('This wizard will create a new Application.').AT(90,8,235,24)
    #DISPLAY('To begin creating your new Application, click Next.').AT(90)
  #ENDTAB
  #TAB('Application Wizard - File Usage'),FINISH(1)
    #IMAGE('WINAPP.BMP')
    #DISPLAY('You can gen procs for all files, or select them').AT(90,8,235,24)
    #PROMPT('Use all files in DCT',CHECK),%GenAllFiles,AT(90,,180),DEFAULT(1)
  #ENDTAB
  #TAB('Select Files to Use'),WHERE(NOT %GenAllFiles),FINISH(1)
    #IMAGE('WINAPP.BMP')
    #PROMPT('File Select',FROM(%File)),%FileSelect,INLINE,SELECTION('File Select')
  #ENDTAB
  #TAB('Application Wizard - Finally...'),FINISH(1)
    #IMAGE('WINAPP.BMP')
    #DISPLAY('Old procs can be overwritten or new procs suppressed')
    #PROMPT('Overwrite existing procs',CHECK),%OverwriteAll,AT(90,,235),DEFAULT(0)
    #IMAGE('<255,1,4,127>').AT(90,55)
    #DISPLAY('Your First Procedure is always overwritten!').AT(125,54,200,20)
  #ENDTAB
#ENDSHEET
```

# Template Logic Control Statements

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## #FOR (generate code multiple times)

```
#FOR( symbol ) [, WHERE( expression ) ] [, REVERSE ]
    statements
#ENDFOR
```

<b>#FOR</b>	Loops through all instances of a multi-valued symbol.
<i>symbol</i>	A multi-valued symbol.
<b>WHERE</b>	Specifies the <i>statements</i> in the #FOR loop are executed only for those instances of the <i>symbol</i> where the <i>expression</i> is true.
<i>expression</i>	An expression that specifies the condition for execution.
<b>REVERSE</b>	Specifies the #FOR loops through the instances of the <i>symbol</i> in reverse order.
<i>statements</i>	Target and/or Template Language statements.
<b>#ENDFOR</b>	Terminates the #FOR structure.

**#FOR** is a loop structure which generates its *statements* once for each value contained in its *symbol* during source code generation. If there are no values in the *symbol*, no code is generated. #FOR must be terminated by **#ENDFOR**. If there is no #ENDFOR, an error message is issued during Template file pre-processing. A #FOR loop may be nested within another #FOR loop.

The #FOR loop begins with the first instance of the *symbol* (or last, if the **REVERSE** attribute is present) and processes through all instances of the *symbol*—it is not affected by any #FIX statements. If the **WHERE** attribute is present, the #FOR *statements* are executed only for those instances of the *symbol* where the *expression* is true. This creates a conditional #FOR loop.

Since #FOR is a loop structure, the #BREAK and #CYCLE statements may be used to control the loop. #BREAK immediately terminates #FOR loop processing and continues with the statement following the #ENDFOR that terminates the #FOR. #CYCLE immediately returns control to the #FOR statement to continue with the next instance of the *symbol*.

Example:

```
#FOR(%ScreenField),WHERE(%ScreenFieldType = 'LIST')
    #INSERT(%ListQueueBuild)                #!Generate only for LIST controls
#ENDFOR
```

See Also:           **#BREAK, #CYCLE**

## #IF (conditionally generate code)

```
#IF( expression )
    statements
[ #ELSIF( expression )
    statements ]
[ #ELSE
    statements ]
#ENDIF
```

<b>#IF</b>	A conditional execution structure.
<i>expression</i>	Any Template Language expression which can evaluate to false (blank or zero) or true (any other value). The expression may contain Template symbols, constant values, and any of the arithmetic, Boolean, and logical operators documented in the <i>Language Reference</i> . Function calls are allowed. If the modulus division operator (%) is used in the expression, it must be delimited by at least one blank space on each side (to explicitly differentiate it from the Template symbols).
<i>statements</i>	One or more Clarion and/or Template Language statements.
<b>#ELSIF</b>	Provides an alternate <i>expression</i> to evaluate when preceding #IF and #ELSIF <i>expressions</i> are false.
<b>#ELSE</b>	Provides alternate <i>statements</i> to execute when all preceding #IF and #ELSIF <i>expressions</i> are false.
<b>#ENDIF</b>	Terminates the #IF structure.

**#IF** selectively generates a group of *statements* depending on the evaluation of the *expression(s)*. The #IF structure consists of a #IF statement and all statements following it until the structure is terminated by **#ENDIF**. If there is no #ENDIF, an error message is issued during Template file pre-processing. #IF structures may be nested within other #IF structures.

**#ELSIF** and **#ELSE** are logical separators which separate the #IF structure into *statements* groups which are conditionally generated depending upon the evaluation of the *expression(s)*. There may be multiple #ELSIF statements within one #IF structure, but only one #ELSE.

When #IF is encountered during code generation:

- If the *expression* evaluates as true, only the *statements* following #IF are generated, up to the next following #ELSIF, #ELSE, or #ENDIF.
- If the *expression* evaluates as false, #ELSIF (if present) is evaluated in the same manner. If the #ELSIF *expression* is true, only the *statements* following it are gener-

ated, up to the following #ELSIF, #ELSE, or #ENDIF.

- If all preceding #IF and #ELSIF conditions evaluate false, only the *statements* following #ELSE (if present) are generated, up to the following #ENDIF. If there is no #ELSE, no code is generated.

Example:

```
#IF(SUB(%ReportControlStatement,1,6)='HEADER')
  #SET(%Indentation,%Indentation+1)
#ELSIF(SUB(%ReportControlStatement,1,6)='FOOTER')
  #SET(%Indentation,%Indentation+1)
#ELSIF(SUB(%ReportControlStatement,1,6)='DETAIL')
  #SET(%Indentation,%Indentation+1)
#ELSIF(SUB(%ReportControlStatement,1,6)='OPTION')
  #SET(%Indentation,%Indentation+1)
#ELSIF(SUB(%ReportControlStatement,1,5)='GROUP')
  #SET(%Indentation,%Indentation+1)
#ELSIF(SUB(%ReportControlStatement,1,5)='BREAK')
  #SET(%Indentation,%Indentation+1)
#ELSIF(SUB(%ReportControlStatement,1,4)='FORM')
  #SET(%Indentation,%Indentation+1)
#ENDIF
```

## #LOOP (iteratively generate code)

```
#LOOP [ , | UNTIL( expression ) | ]
          | WHILE( expression ) |
          | FOR( counter, start, end ) [, BY( step ) ] |
  statements
#ENDLOOP
```

<b>#LOOP</b>	Initiates an iterative statement execution structure.
<b>UNTIL</b>	Evaluates its <i>expression</i> before each iteration of the #LOOP. If its <i>expression</i> evaluates to true, the #LOOP control sequence terminates.
<i>expression</i>	Any Template language expression which can evaluate to false (blank or zero) or true (any other value).
<b>WHILE</b>	Evaluates its <i>expression</i> before each iteration of the #LOOP. If its <i>expression</i> evaluates to false, the #LOOP control sequence terminates.
<b>FOR</b>	Initializes its <i>counter</i> to the <i>start</i> value, and increments it by the <i>step</i> value each time through the loop. When the <i>counter</i> is greater than the <i>end</i> value, the #LOOP control sequence terminates.
<i>counter</i>	A user-defined symbol used as the loop counter.
<i>start</i>	An expression containing the initial value to which to set the loop <i>counter</i> .
<i>end</i>	An expression containing the ending value of the loop <i>counter</i> .
<b>BY</b>	Explicitly defines the increment value for the <i>counter</i> .
<i>step</i>	An expression containing the increment value for the <i>counter</i> . If omitted, the <i>step</i> defaults to one (1).
<i>statements</i>	One or more target and/or Template Language statements.
<b>#ENDLOOP</b>	Terminates the #LOOP structure.

A **#LOOP** structure repetitively executes the *statements* within its structure. The #LOOP structure must be terminated by **#ENDLOOP**. If there is no #ENDLOOP, an error message is issued during Template file pre-processing. A #LOOP structure may be nested within another #LOOP structure.

The **#LOOP,UNTIL** or **#LOOP,WHILE** statements create exit conditions for the #LOOP. Their *expressions* are always evaluated at the top of the #LOOP, before the #LOOP is executed. A #LOOP WHILE structure continuously loops as long as the *expression* is true. A #LOOP UNTIL structure continuously loops as long as the *expression* is false. The *expression* may contain Template symbols, constant values, and any of the arithmetic, Boolean, and logical operators documented in the *Language*

*Reference.* Function calls are allowed. If the modulus division operator (%) is used in the *expression*, it must be followed by at least one blank space (to explicitly differentiate it from the Template symbols).

The **#LOOP,FOR** statement also creates an exit condition for the #LOOP. The #LOOP initializes the *counter* to the *start* value on its first iteration. The #LOOP automatically increments the *counter* by the *step* value on each subsequent iteration, then evaluates the *counter* against the *end* value. When the *counter* is greater than the *end*, the #LOOP control sequence terminates.

#LOOP (without WHILE, UNTIL, or FOR) loops continuously, unless a #BREAK or #RETURN statement is executed. #BREAK terminates the #LOOP and continues execution with the statement following the #LOOP structure. All *statements* within a #LOOP structure are executed unless a #CYCLE statement is executed. #CYCLE immediately gives control back to the top of the #LOOP for the next iteration, without executing any statements following the #CYCLE in the #LOOP.

Example:

```
#SET(%LoopBreakFlag,'NO')
#LOOP                                #!Continuous loop
  #INSERT(%SomeRepeatedCodeGroup)
  #IF(%LoopBreakFlag = 'YES')        #!Check break condition
    #BREAK
  #ENDIF
#ENDLOOP

#SET(%LoopBreakFlag,'NO')
#LOOP,UNTIL(%LoopBreakFlag = 'YES')  #!Loop until condition is true
  #INSERT(%SomeRepeatedCodeGroup)
#ENDLOOP

#SET(%LoopBreakFlag,'NO')
#LOOP,WHILE(%LoopBreakFlag = 'NO')   #!Loop while condition is true
  #INSERT(%SomeRepeatedCodeGroup)
#ENDLOOP
```

See Also:           **#BREAK, #CYCLE**

## #CASE (conditional execution structure)

```
#CASE( condition )
#OF( expression )
[ #OROF( expression ) ]
  statements
[ #ELSE
  statements ]
#ENDCASE
```

<b>#CASE</b>	Initiates a selective execution structure.
<i>condition</i>	Any Template Language expression which returns a value.
<b>#OF</b>	The #OF <i>statements</i> are executed when the #OF <i>expression</i> is equal to the <i>condition</i> of the CASE. There may be many #OF options in a #CASE structure.
<i>expression</i>	Any Template Language expression which returns a value.
<b>#OROF</b>	The #OROF <i>statements</i> are executed when the #OROF <i>expression</i> is equal to the <i>condition</i> of the #CASE. There may be many #OROF options associated with one #OF option.
<b>#ELSE</b>	The #ELSE <i>statements</i> are executed when all preceding #OF and #OROF <i>expressions</i> are not equal to the <i>condition</i> of the #CASE. #ELSE (if used) must be the last option in the #CASE structure.
<i>statements</i>	Any valid executable source code.
<b>#ENDCASE</b>	Terminates the #CASE structure.

A #CASE structure selectively executes *statements* based on equivalence between the #CASE *condition* and one of the #OF or #OROF *expressions*. If there is no exact match, the *statements* following #ELSE are executed. The #CASE structure must be terminated by #ENDCASE. If there is no #ENDCASE, an error message is issued during Template file pre-processing. #CASE structures may be nested within other #CASE structures.

Example:

```
#CASE %ScreenField
#OF '?Ok'
  #INSERT(%OkButtonGroup)
#OF '?Cancel'
#OROF '?Exit'
  #INSERT(%CancelButtonGroup)
#ELSE
  #INSERT(%OtherControlsGroup)
#ENDCASE
```

## #INSERT (insert code from a #GROUP)

```
#INSERT( symbol [ ( set ) ] [, parameters ] )
```

<b>#INSERT</b>	Inserts code from a #GROUP.
<i>symbol</i>	A symbol that names a #GROUP section.
<i>set</i>	The #TEMPLATE <i>name</i> parameter for the template set to which the #GROUP belongs. If omitted, the #GROUP must be of the same template set <i>name</i> as the #PROCEDURE in which it is used.
<i>parameters</i>	The parameters passed to the #GROUP. Each parameter must be separated by a comma. All parameters defined for the #GROUP must be passed; they may not be omitted.

The **#INSERT** statement places, at the exact position the **#INSERT** is located within the Template code, the code from the #GROUP named by the *symbol*. The *set* parameter specifies the #TEMPLATE that contains the #GROUP. This allows any Template to use #GROUP code from any other registered Template.

The *parameters* passed to the #GROUP fall into two categories: value-parameters and variable-parameters. Value-parameters are declared by the #GROUP as a user-defined symbol, while variable-parameters are declared by the #GROUP as a user-defined symbol with a prepended asterisk (\*). Either a symbol or an expression may be passed as a value-parameter. Only a symbol may be passed as a variable-parameter.

Example:

```
#INSERT(%SomeGroup)                #!Ordinary insert
#INSERT(%GenerateFormulas(Clarion)) #!Insert #GROUP from Clarion Template
#INSERT(%FileRecordFilter,%Secondary) #!Insert #GROUP with passed parameter
#INSERT(%FileRecordFilter(Clarion),%Primary,%Secondary)
                                   #!#GROUP from Clarion Template with two passed parameters
```

See Also:           **#GROUP**

## #BREAK (break out of a loop)

---

### #BREAK

The **#BREAK** statement immediately breaks out of the **#FOR** or **#LOOP** structure in which it is enclosed. Control passes to the next statement following the **#ENDFOR** or **#ENDLOOP**. **#BREAK** is only valid within a **#FOR** or **#LOOP** structure, else an error is generated during Template file pre-processing. **#BREAK** acts as a **#RETURN** statement if issued from within a **#GROUP** inserted in the loop (unless it is within a **#FOR** or **#LOOP** structure completely contained within the **#GROUP**).

Example:

```
#SET(%StopFile, 'CUSTOMER')
#FOR(%File)
  #IF (UPPER(%File) = %StopFile)
    #BREAK
  #ENDIF
  OPEN(%File)
#ENDFOR
```

## #CYCLE (cycle to top of loop)

---

### #CYCLE

The **#CYCLE** statement immediately passes control back to the top of the **#FOR** or **#LOOP** structure in which it is enclosed to begin the next iteration. **#CYCLE** is only valid within a **#FOR** or **#LOOP** structure, else an error is generated during Template file pre-processing. **#CYCLE** acts as a **#RETURN** statement if issued from within a **#GROUP** inserted in the loop (unless it is within a **#FOR** or **#LOOP** structure completely contained within the **#GROUP**).

Example:

```
#SET(%StopFile, 'CUSTOMER')
#FOR(%File)
  #IF (UPPER(%File) <> %StopFile)
    OPEN(%File)
    #CYCLE
  #ELSE
    #BREAK
  #ENDIF
#ENDFOR
```

## #RETURN (return from #GROUP)

### #RETURN

The **#RETURN** statement immediately returns control to the statement following the **#INSERT** that called the **#GROUP** containing the **#RETURN** statement. **#RETURN** is only valid in a **#GROUP** section.

Example:

```
#GROUP(%ProcessListGroup,%PassedControl)
  #FIX(%ScreenField,%PassedControl)
  #IF (%ScreenFieldType <> 'LIST')
    #UNFIX(%ScreenField)
  #RETURN
#ENDIF
```

## #GENERATE (generate source code section)

### #GENERATE( *section* )

**#GENERATE** Generates a section of the application.  
*section* One of the following built-in symbols: %Program, %Module, or %Procedure. This symbol indicates the portion of the application to generate.

The **#GENERATE** statement generates the source code for the specified *section* of the application by executing the Template Language statements contained within that *section*. **#GENERATE** should only be used within the **#APPLICATION** or a **#UTILITY** section of the Template.

When *section* is:

%Program	The <b>#PROGRAM</b> section of the Template is generated.
%Module	The appropriate <b>#MODULE</b> section of the Template is generated.
%Procedure	The appropriate <b>#PROCEDURE</b> section of the Template for the current value of %Procedure is generated.

Example:

```
#GENERATE(%Program)           #!Generate program header
#FOR(%Module)                 #!
  #GENERATE(%Module)         #!Generate module header
  #FOR(%ModuleProcedure)     #!For all procs in module
    #FIX(%Procedure,%ModuleProcedure) #!Fix current procedure
    #GENERATE(%Procedure)    #!Generate procedure code
  #ENDFOR                    #!EndFor all procs in module
#ENDFOR                       #!EndFor all modules
```

## #ABORT (abort source generation)

---

### #ABORT

The **#ABORT** statement immediately terminates source generation by the previous **#GENERATE** statement. **#ABORT** may be placed in any template section.

Example:

```
#IF(%ValidRangeKey=NULL)
  #ERROR(%Procedure & ' Range Error: The range field is not in the primary key!')
  #ABORT
#ENDIF
```

See Also:           **#GENERATE**



## #OPEN (open source file)

---

**#OPEN( *file* ) [, READ ]**

<b>#OPEN</b>	Opens a disk file to receive generated source code.
<i>file</i>	A string constant, template symbol, or expression containing a DOS file specification. This may be a fully qualified DOS pathname.
<b>READ</b>	Opens the file as read-only. The file cannot be already open for output.

The **#OPEN** statement opens a disk file to receive the source code generated by **#GENERATE**. If the *file* does not exist, it is created. If the *file* already exists, it is opened in “append source” mode. If the *file* is already open, a source generation error is produced. The *file* is automatically selected as the active source output destination.

If the **READ** attribute is present, the file is opened in read-only mode so the **#READ** statement can read it as an ASCII text file. Only one file can be open for input at one time.

Example:

```
#SET(%ProgramFile,(%Application & '.$$$'))      #!Temp program filename
#OPEN(%ProgramFile)                             #!Open existing program file
#GENERATE(%Program)                             #!Generate main program header
#CLOSE(%ProgramFile)                            #!Close output file

#OPEN(%ProgramFile),READ                        #!Open it in read-only mode
#DECLARE(%ASCIIFileRecord)
#LOOP
  #READ(%ASCIIFileRecord)
  #! Parse the line and do something with it
  #IF(%ASCIIFileRecord = %EOF)
    #BREAK
  #ENDIF
#ENDLOOP
#CLOSE(%ProgramFile),READ
```

See Also:           **#READ, #CLOSE**

## #CLOSE (close source file)

**#CLOSE( [*file*] [, READ ]**

### **#CLOSE**

Closes an open generated source code disk file.

*file*

A string constant, template symbol, or expression containing a DOS file specification. This may be a fully qualified DOS pathname. If omitted, the current disk file receiving generated source code is closed.

### **READ**

Closes the read-only input file.

The **#CLOSE** statement closes an open disk file receiving the generated source code. If the *file* is omitted, the current disk file receiving generated source code is closed. If the *file* does not exist, or is already closed, a source generation error is produced.

Example:

```
#SET(%NewProgramFile,(%Application & '.$$$'))      #!Temp new program filename
#CREATE(%NewProgramFile)                          #!Create new program file
#GENERATE(%Program)                               #!Generate main program header
#CLOSE(%NewProgramFile)                          #!Create new program file

#OPEN(%ProgramFile),READ                          #!Open it in read-only mode
#DECLARE(%ASCIIFileRecord)
#LOOP
  #READ(%ASCIIFileRecord)
  #! Parse the line and do something with it
  #IF(%ASCIIFileRecord = %EOF)
    #BREAK
  #ENDIF
#ENDLOOP
#CLOSE(%ProgramFile),READ                        #!Close the read-only file
```

See Also:           **#OPEN, #READ**

## #READ (read one line of a source file)

---

### #READ( *symbol* )

**#READ** Reads the next record from the opened read-only file.  
*symbol* The symbol to receive the text from the file.

The **#READ** statement reads the next record (up to the next CR/LF encountered) from open read-only file. The *symbol* receives the text from the file. If the last record has been read, the *symbol* will contain a value equivalent to the %EOF built-in symbol.

Example:

```
#OPEN(%ProgramFile),READ                #!Open it in read-only mode
#DECLARE(%ASCIIFileRecord)
#LOOP
  #READ(%ASCIIFileRecord)
    #! Parse the line and do something with it
  #IF(%ASCIIFileRecord = %EOF)
    #BREAK
  #ENDIF
#ENDLOOP
#CLOSE(%ProgramFile),READ                #!Close the read-only file
```

See Also:           **#OPEN, #CLOSE**



## #APPEND (add to source file)

---

### #APPEND( *file* )

<b>#APPEND</b>	Adds the <i>file</i> contents to the end of the current source output destination file.
<i>file</i>	A string constant, template symbol, or expression containing a DOS file specification. This may be a fully qualified DOS pathname.

The **#APPEND** statement adds the complete contents of the *file* to the end of the current source output destination file. The contents of the *file* are NOT interpreted for source generation purposes. Therefore, the *file* should not contain any Template Language code.

If the *file* does not exist, **#APPEND** is ignored and source generation continues.

Example:

```
#FOR(%Module)
  #SET(%TempModuleFile,(%Module & '.$$$')
  #CREATE(%TempModuleFile)
  #FOR(%ModuleProcedure)
    #FIX(%Procedure,%ModuleProcedure)
    #GENERATE(%Procedure)
  #ENDFOR
  #SET(%ModuleFile,(%Module & '.CLW'))
  #CREATE(%ModuleFile)
  #GENERATE(%Module)
  #APPEND(%TempModuleFile)
#ENDFOR
```

```
#!Set temp module file
#!Create temp module file
#!For all procs in module
#!Fix current procedure
#!Generate procedure code
#!EndFor all procs in module
#!Set to current module file
#!Create module file
#!Generate module header
#!Add generated procedures
```

## #REMOVE (delete a source file)

---

### #REMOVE( *file* )

<b>#REMOVE</b>	Deletes a source output file.
<i>file</i>	A string constant, template symbol, or expression containing a DOS file specification. This may be a fully qualified DOS pathname.

The **#REMOVE** statement deletes the specified source output *file*. If the *file* does not exist, **#REMOVE** is ignored and source generation continues.

Example:

```
#FOR(%Module)
  #SET(%TempModuleFile,(%Module & '.$$$'))
  #CREATE(%TempModuleFile)
  #FOR(%ModuleProcedure)
    #FIX(%Procedure,%ModuleProcedure)
    #GENERATE(%Procedure)
  #ENDFOR
  #SET(%ModuleFile,(%Module & '.CLW'))
  #CREATE(%ModuleFile)
  #GENERATE(%Module)
  #APPEND(%TempModuleFile)
  #REMOVE(%TempModuleFile)
#ENDFOR
```

```

  #!Set temp module file
  #!Create temp module file
  #!For all procs in module
  #!Fix current procedure
  #!Generate procedure code
  #!EndFor all procs in module
  #!Set to current module file
  #!Create module file
  #!Generate module header
  #!Add generated procedures
  #!Delete the temporary file
```

## #REPLACE (conditionally replace source file)

### #REPLACE( *oldfile*, *newfile* )

<b>#REPLACE</b>	Performs “intelligent” file replacement.
<i>oldfile</i>	A string constant, template symbol, or expression containing a DOS file specification. This may be a fully qualified DOS pathname.
<i>newfile</i>	A string constant, template symbol, or expression containing a DOS file specification. This may be a fully qualified DOS pathname.

The **#REPLACE** statement performs a binary comparison between the contents of the *oldfile* and *newfile*. If the contents of the *oldfile* are different from the contents of the *newfile* (or the *oldfile* does not exist), then the *oldfile* is deleted and the *newfile* is renamed to the *oldfile*. If the two files are identical, then no action is taken. If the *newfile* does not exist, **#REPLACE** is ignored and source generation continues.

Example:

```
#FOR(%Module)
  #SET(%TempModuleFile,(%Module & '.$$$'))
  #CREATE(%TempModuleFile)
  #GENERATE(%Module)
  #FOR(%ModuleProcedure)
    #FIX(%Procedure,%ModuleProcedure)
    #GENERATE(%Procedure)
  #ENDFOR
  #SET(%ModuleFile,(%Module & '.CLW'))
  #REPLACE(%ModuleFile,%TempModuleFile)
changed)
#ENDFOR
```

```
#!Set temp module file
#!Create temp module file
#!Generate module header
#!For all procs in module
#!Fix current procedure
#!Generate procedure code
#!EndFor all procs in module
#!Set to existing module file
#!Replace old with new (if
```

## #PRINT (print a source file)

---

**#PRINT**( *file*, *title* )

<b>#PRINT</b>	Prints a <i>file</i> to the current Windows printer.
<i>file</i>	A string constant, template symbol, or expression containing a DOS file specification. This may be a fully qualified DOS pathname.
<i>title</i>	A string constant, template symbol, or expression containing the title to generate for the <i>file</i> .

The **#PRINT** statement prints the contents of the *file* to the Windows default printer.

Example:

```
#FOR(%Module)
  #SET(%ModuleFile,(%Module & '.CLW'))          #!Set to existing module file
  #PRINT(%ModuleFile,"Printout ' & %ModuleFile)
#ENDFOR
```

# Conditional Source Generation Statements

## #SUSPEND (begin conditional source)

### #SUSPEND

The **#SUSPEND** statement marks the start of a section of source that is generated only if a **#RELEASE** statement is encountered. This allows empty unnecessary “boiler-plate” code to be easily removed from the generated source. The end of the section must be delimited by a matching **#RESUME** statement.

These **#SUSPEND** sections may be nested within each other to as many levels as necessary. A **#RELEASE** encountered in an inner nested section commits source generation for all the outer nested levels in which it is contained, also.

A **#EMBED** that contains source to generate performs an implied **#RELEASE**. Any generated source output also performs an implied **#RELEASE**. Therefore, an explicit **#RELEASE** statement is not always necessary. The **#?** statement defines an individual conditional source line that does not perform the implied **#RELEASE**.

Example:

```
ACCEPT
#SUSPEND                                     #!Begin suspended generation
  #?CASE SELECTED()
  #FOR(%ScreenField)
  #SUSPEND
  #?OF %ScreenField
    #EMBED(%ScreenSetups,'Control selected code'),%ScreenField
    #!Implied #RELEASE from the #EMBED of both nested sections
  #RESUME
END
#RESUME                                     #!End suspended generation

#SUSPEND                                     #!Begin suspended generation
  #?CASE EVENT()
  #SUSPEND
  #?OF EVENT:AlertKey
    #SUSPEND
    #?CASE KEYCODE()
    #FOR %HotKey
      #RELEASE                               #!Explicit #RELEASE
    #?OF %HotKey
      #EMBED(%HotKeyProc,'Hot Key code'),%HotKey
    #ENDFOR
  #?END
  #RESUME
#?END
#RESUME                                     #!End suspended generation
END
```

See Also: **#RELEASE, #RESUME, #?**

## #RELEASE (commit conditional source generation)

### #RELEASE

The **#RELEASE** enables source generation in a **#SUSPEND** section. This allows empty unnecessary “boiler-plate” code to be easily removed from the generated source. The code in a **#SUSPEND** section is generated only when a **#RELEASE** statement is encountered.

**#SUSPEND** sections may be nested within each other to as many levels as necessary. A **#RELEASE** encountered in an inner nested section commits source generation for all the outer nested levels in which it is contained, also.

A **#EMBED** that contains source to generate performs an implied **#RELEASE**. Any generated source output also performs an implied **#RELEASE**. Therefore, an explicit **#RELEASE** statement is not always necessary. The **#?** statement defines an individual conditional source line that does not perform the implied **#RELEASE**.

Example:

```
ACCEPT
#SUSPEND                                #!Begin suspended generation
  #?CASE SELECTED()
  #FOR(%ScreenField)
  #SUSPEND
  #?OF %ScreenField
  #EMBED(%ScreenSetups,'Control selected code'),%ScreenField
  #IMPLIED #RELEASE from the #EMBED of both nested sections
  #RESUME
  #?END
#RESUME                                #!End suspended generation

#SUSPEND                                #!Begin suspended generation
  #?CASE EVENT()
  #SUSPEND
  #?OF EVENT:AlertKey
  #SUSPEND
  #?CASE KEYCODE()
  #FOR %HotKey
  #RELEASE                                #!Explicit #RELEASE
  #?OF %HotKey
  #EMBED(%HotKeyProc,'Hot Key code'),%HotKey
  #ENDFOR
  #?END
  #RESUME
  #?END
#RESUME                                #!End suspended generation
END
```

See Also: **#SUSPEND**, **#RESUME**, **#?**

## #RESUME (delimit conditional source)

### #RESUME

The **#RESUME** statement marks the end of a section of source that is generated only if a **#RELEASE** statement is encountered. This allows empty unnecessary “boiler-plate” code to be easily removed from the generated source. The beginning of the section must be delimited by a matching **#SUSPEND** statement.

These **#SUSPEND** sections may be nested within each other to as many levels as necessary. A **#RELEASE** encountered in an inner nested section commits source generation for all the outer nested levels in which it is contained, also.

A **#EMBED** that contains source to generate performs an implied **#RELEASE**. Any generated source output also performs an implied **#RELEASE**. Therefore, an explicit **#RELEASE** statement is not always necessary. The **#?** statement defines an individual conditional source line that does not perform the implied **#RELEASE**.

When a **#RESUME** is executed without the output to the file being released, any conditional lines of code are un-done back to the matching **#SUSPEND**.

Example:

```
ACCEPT
#SUSPEND                                     #!Begin suspended generation
  #?CASE SELECTED()
  #FOR(%ScreenField)
  #SUSPEND
  #?OF %ScreenField
    #EMBED(%ScreenSetups,'Control selected code'),%ScreenField
    #!Implied #RELEASE from the #EMBED of both nested sections
  #RESUME
  #?END
#RESUME                                     #!End suspended generation
#SUSPEND                                     #!Begin suspended generation
  #?CASE EVENT()
  #SUSPEND
  #?OF EVENT:AlertKey
  #SUSPEND
  #?CASE KEYCODE()
  #FOR %HotKey
  #RELEASE #!Explicit #RELEASE
  #?OF %HotKey
  #EMBED(%HotKeyProc,'Hot Key code'),%HotKey
  #ENDFOR
  #?END
  #RESUME
  #?END
#RESUME                                     #!End suspended generation
END
```

See Also: **#SUSPEND, #RELEASE, #?**

## #? (conditional source line)

### #? statement

#?	Defines a single line of source code generated only if #RELEASE commits the conditional source section.
statement	A single line of target language code. This may contain template symbols.

The #? statement defines a single line of source code that is generated only if a #RELEASE statement is encountered. This allows empty unnecessary “boiler-plate” code to be easily removed from the generated source.

A #EMBED that contains source to generate performs an implied #RELEASE. Any generated source output also performs an implied #RELEASE. Therefore, an explicit #RELEASE statement is not always necessary. The #? statement defines an individual conditional source line that does not perform the implied #RELEASE. When a #RESUME is executed without the output to the file being released, any conditional lines of code are un-done back to the matching #SUSPEND.

Example:

```
ACCEPT                                     #!Unconditional source line
#SUSPEND
  #?CASE SELECTED()                       #!Conditional source line
  #FOR(%ScreenField)
    #SUSPEND
    #?OF %ScreenField                     #!Conditional source line
    #EMBED(%ScreenSetups,'Control selected code'),%ScreenField
    #RESUME
  #?END                                    #!Conditional source line
#RESUME
#SUSPEND
  #?CASE EVENT()                          #!Conditional source line
  #SUSPEND
  #?OF EVENT:AlertKey                     #!Conditional source line
  #SUSPEND
  #?CASE KEYCODE()                       #!Conditional source line
  #FOR %HotKey
    #RELEASE
    #?OF %HotKey                           #!Conditional source line
    #EMBED(%HotKeyProc,'Hot Key code'),%HotKey
  #ENDFOR
  #?END                                    #!Conditional source line
  #RESUME
  #?END                                    #!Conditional source line
#RESUME
END                                         #!Unconditional source line
```

See Also: #SUSPEND, #RELEASE, #RESUME

# Miscellaneous Statements

[Contents](#)

## #! (template code comments)

*#! comments*

**#!** Initiates Template Language comments.

*comments* Any text.

**#!** initiates Template Language comments. All text to the right of the **#!** to the end of the text line is ignored by the Template file processor. **#!** comments are not included in the generated source code.

Example:

```
#! These are Template comments which
#! will not end up in the generated code
```

## #< (aligned target language comments)

*#<comments*

**#<** Initiates an aligned target language comment.

*comments* Any text. This must start with the target language comment initiator.

**#<** initiates a target language comment which is included in the generated source code. The comment is generated at the column position specified by the **#COMMENT** statement. If the column position is occupied, the comment is appended one space to the right of the generated source code statement. Any standard target language syntax comments without a preceding **#<** are included in the generated code at whatever column position they occupy in the template.

Example:

```
#COMMENT(50)
#! This Template file comment will not be in the generated code
#<! This is a Clarion comment which appears in the generated code in column 50
! This Clarion comment appears in the generated code in column 2
#<// This is a C++ comment which appears in the generated code beginning in column
50
// This C++ comment appears in the generated code in column 2
```

See Also: **#COMMENT**

## #CLASS (define a formula class)

---

**#CLASS**( *string*, *description* )

<b>#CLASS</b>	Defines a formula class.
<i>string</i>	A string constant containing the formula class.
<i>description</i>	A string expression containing the description of the formula class to display in the list of those available in the Formula Editor.

The **#CLASS** statement defines a formula class for use in the Formula Editor. The Formula Class allows the Template to determine the precise logical position at which the formula appears in the generated source code.

Example:

```
#PROCEDURE(SomeProc,'An Example Template'),WINDOW
#CLASS('START','At beginning of procedure')
#CLASS('LOOP','In process loop')
#CLASS('END','At end of procedure')
%Procedure PROCEDURE
%ScreenStructure
CODE
  #INSERT(%GenerateFormulas,'START')      #!Generate START class formulas
OPEN(%Screen)
ACCEPT
  #INSERT(%GenerateFormulas,'LOOP')      #!Generate LOOP class formulas
END
  #INSERT(%GenerateFormulas,'END')       #!Generate END class formulas
```

## #COMMENT (specify comment column)

---

**#COMMENT**( *column* )

<b>#COMMENT</b>	Sets the default column number for aligned comments.
<i>column</i>	A numeric constant in the range 1 to 255.

The **#COMMENT** statement sets the default column number in which Clarion comments prefaced with the **#<** statement will be generated by the Application Generator.

Example:

```
#COMMENT(50)    #!Set comment column
IF Action = 1  #<!If adding a record
  SomeVariable = InitVariable
END
```

See Also:           #<

## #ERROR (display source generation error)

---

### #ERROR( *message* )

**#ERROR** Displays a source generation error.

*message* A string constant, user-defined symbol, or expression containing an error message to display in the Source Generation window.

**#ERROR** displays a *message* in the Source Generation window. This could be information for the user. It may also alert the user that they made some error which will cause the procedure Template to generate invalid source code which could create compiler errors.

When a **#ERROR** statement is encountered at source code generation time, its message is displayed. The user may choose to abort the compile and link process, or continue on to the compiler.

Example:

```
#PROCEDURE(SampleProc,'This is a sample procedure')
#PROMPT('Access Key',KEY),%SampleAccessKey
  #IF(%SampleAccessKey = %NULL)                #!IF the user did not enter a Key
    #SET(%ErrorSymbol,(%Procedure & ' Access Key blank')
    #ERROR(%ErrorSymbol)
    #ERROR('This error is Fatal -- DO NOT CONTINUE')
    #ABORT
  #ENDIF
```

## #EXPORT (export symbol to text)

---

### #EXPORT( *symbol* )

**#EXPORT** Creates a .TXA text file from a *symbol*.

*symbol* The template symbol to export.

**#EXPORT** outputs .TXA script text for the *symbol* to the current output file (see **#CREATE** or **#OPEN**). This .TXA file may then be used for importing to other Clarion applications.

Example:

```
#OPEN('MyExp.TXA')
#FOR(%Procedure)
  #EXPORT(%Procedure)
#ENDFOR
```

See Also: **#CREATE**, **#OPEN**, **#IMPORT**

## #HELP (specify template help file)

---

### #HELP( *helpfile* )

<b>#HELP</b>	Specifies the Template's help file.
<i>helpfile</i>	A string constant containing the name of the template's help file.

The **#HELP** statement specifies a *helpfile* which is used by this template. Once specified, the *helpfile* is used to access the help topics specified by the help id's in all HLP attributes in the template.

Example:

```
#HELP('Template.HLP')
```

## #INCLUDE (include a template file)

---

### #INCLUDE( *filename* )

<b>#INCLUDE</b>	Adds a template file to the Template file chain.
<i>filename</i>	A string constant containing the name of the template file to include.

The **#INCLUDE** statement adds a template file to the Template file chain. The template file containing the **#INCLUDE** statement continues to be processed after the included file has been processed.

Example:

```
#TEMPLATE(Clarion,'Clarion Standard Shipping Templates')
#INCLUDE('Clarion1.TPX')           #!Include a template file
#INCLUDE('Clarion2.TPX')           #!Include another template file
```

## #IMPORT (import from text script)

---

```
#IMPORT( source ) [, | RENAME | ]
                | REPLACE |
```

<b>#IMPORT</b>	Creates an .APP for Clarion for Windows from a .TXA script <i>source</i> file.
<i>source</i>	The name of the .TXA script file from which to create the .APP file.
<b>RENAME</b>	Overrides the <b>Procedure Name Clash</b> prompt dialog and renames all procedures.
<b>REPLACE</b>	Overrides the <b>Procedure Name Clash</b> prompt dialog and replaces all procedures.
<b>#IMPORT</b> adds procedure and/or function definitions to a Clarion for Windows .APP file from a .TXA script <i>source</i> file. This is used for importing from other versions of Clarion application development products.	

Example:

```
#UTILITY(SomeUtility,'Some Utility Template')
#PROMPT('File to import',@s64),%ImportFile
#IMPORT(%ImportFile)
```

## #MESSAGE (display source generation message)

---

```
#MESSAGE( message, line )
```

<b>#MESSAGE</b>	Displays a source generation message.
<i>message</i>	A string constant, or a user-defined symbol, containing a message to display in the Source Generation dialog.
<i>line</i>	An integer constant or symbol containing the line number on which to display the <i>message</i> . If out of the range 1 through 3, the <i>message</i> is displayed in the title bar as the window caption.
<b>#MESSAGE</b> displays a <i>message</i> in the Source Generation message dialog. The first <b>#MESSAGE</b> statement displays the message window. Subsequent <b>#MESSAGE</b> statements modify the display text.	

Example:

```
#MESSAGE('Generating ' & %Application,0)      #!Display Title bar text
#MESSAGE('Generating ' & %Procedure,2)        #!Display Progress message on line 2
```

## #PROTOTYPE (procedure prototype)

---

### #PROTOTYPE( *parameter list* )

**#PROTOTYPE** Assigns the *parameter list* to the **Prototype** entry field.  
*parameter list* A string constant containing the procedure's prototype parameter list (the entire procedure prototype without the leading procedure name) for the application's MAP structure (see the discussion of Function and Procedure Prototypes in the *Language Reference*).

The **#PROTOTYPE** statement assigns the *parameter list* to the **Prototype** entry field on the Application Generator's Procedure Properties window, which automatically "dims out" the field (the programmer may not override this Prototype). This allows you to create procedure Templates which require a specific parameter list without forcing the programmer to know the procedure's prototype.

The **#PROTOTYPE** statement is valid only within a **#PROCEDURE** section and only one is allowed per **#PROCEDURE** section. If there is no **#PROTOTYPE** statement in the **#PROCEDURE**, the programmer is allowed to change it.

Example:

```
#PROCEDURE(SomeProc,'Some Procedure Template')
%Procedure PROCEDURE(Parm1,Parm2,Parm3)
  #PROTOTYPE('(STRING,*LONG,<*SHORT>')
    #!This procedure expects three parameters:
    #! a STRING passed by value
    #! a LONG passed by address
    #! a SHORT passed by address which may be omitted

#PROCEDURE(SomeFunc,'Some Template Function')
%Procedure FUNCTION(Parm1,Parm2,Parm3)
  #PROTOTYPE('(STRING,*LONG,<*SHORT>),STRING')
    #!This function expects three parameters:
    #! a STRING passed by value
    #! a LONG passed by address
    #! a SHORT passed by address which may be omitted
    #!It returns a STRING
```

## #PROJECT (add file to project)

---

### #PROJECT( *module* )

<b>#PROJECT</b>	Includes a source or object code library, or Project file, in the application's Project file.
<i>module</i>	A string constant which names a source (.CLW, if Clarion is the target language), object (.OBJ), or library (.LIB) file containing procedures and/or functions required by the procedure Template. This may also name a Project (.PRJ) file to be called by the application's Project. The type of file being imported is determined by the file extension.

The **#PROJECT** statement specifies a source or object code library, or Project file, which is required to be in the application for the correct functioning of procedures created by the procedure Template.

**#PROJECT** provides a direct method of communicating *module* information to the Application Generator and Project system. It alerts the Application Generator to the required presence of the *module* for compiling and/or linking the application. Therefore, the application's Project file (generated by the Application Generator) automatically includes the *module* for making, compiling, and/or linking.

If multiple instances of the same **#PROJECT** statement are referenced by procedures created in the application, only the first is used. This would occur when multiple procedure Templates require the same *module*, or multiple application procedures are created from the same procedure Template.

**#PROJECT** allows a developer to automate the installation of third-party libraries and Templates to other developer's computers. This ensures that the application's Project is generated correctly.

**#PROJECT** for a Project (.PRJ) file provides the ability to create a hierarchy of Projects on large development projects. Where multiple libraries are being linked into a package, this allows you to ensure "make dependencies" are met for all libraries referenced in a particular project.

Example:

```
#AT(%CustomGlobalDeclarations)
  #PROJECT('Party3.LIB')
#ENDAT
```

# Built-in Template Functions

## EXTRACT (return attribute)

---

**EXTRACT**( *string*, *attribute* [, *parameter* ] )

<b>EXTRACT</b>	Returns the complete form of the specified <i>attribute</i> from the property <i>string</i> symbol.
<i>string</i>	The symbol containing the properties to parse.
<i>attribute</i>	A string constant or symbol containing the name of the property to return.
<i>parameter</i>	An integer constant or symbol containing the number of the property's parameter to return. Zero (0) returns the entire parameter list (without the <i>attribute</i> ). If omitted, the <i>attribute</i> and all its <i>parameters</i> are returned.

The **EXTRACT** function returns either the complete form of the specified *attribute* from the attribute *string* symbol, or just the specified *parameter*. This is useful if no built-in symbol exists for the particular attribute you need.

Return Data Type:      **STRING**

Example:

```
#SET(%MySymbol,EXTRACT(%ControlStatement,'DROPID')    #!Return DROPID attribute
#SET(%MySymbol,EXTRACT(%ControlStatement,'DROPID',0) #!Return all DROPID parameters
```

See Also:              **REPLACE**

## EXISTS (return embed point existence)

---

### EXISTS( *symbol* )

**EXISTS** Returns TRUE if the embedded source code point is available for use.

*symbol* The *identifier* symbol for a #EMBED embedded source code point.

The **EXISTS** function returns true ('1') if the embedded source code point is available for use, at design-time only. If the embedded source code point is not available for use, EXISTS returns false (''). An embedded source code point is available for use if the section containing it is being used. This means that all #EMBEDs in the #PROCEDURE section, and all #GROUP sections referenced in the #PROCEDURE, are always available. #EMBEDs in a #CONTROL, #CODE, or #EXTENSION section are available only if the section is being used.

Return Data Type:      LONG

Example:

```
#IF(EXISTS(%CodeTemplateEmbed))
    !Generate some source
#ENDIF
```

## FILEEXISTS (return file existence)

---

### FILEEXISTS( *file* )

**FILEEXISTS** Returns TRUE if the *file* available on disk.

*file* An expression containing the DOS filename.

The **FILEEXISTS** function returns true ('1') if the *file* is available on disk. If the *file* is not available, FILEEXISTS returns false ('').

Return Data Type: LONG

Example:

```
#IF(FILEEXISTS(%SomeFile))
  #OPEN(%SomeFile)
  #READ(%SomeFile)
  !some source
#ENDIF
```

## INLIST (return item exists in list)

---

### INLIST( *item*, *symbol* )

**INLIST** Returns the instance number of the *item* in the *symbol*.

*item* A string constant or symbol containing the name of the item to return.

*symbol* A multi-valued symbol that may contain the item.

The **INLIST** function returns the instance number of the *item* in the *symbol*. If the *item* is not contained in the *symbol*, INLIST returns zero (0).

Return Data Type: LONG

Example:

```
#IF(INLIST('?MyControl',%Control))
  !Generate some source
#ENDIF
```

## INSTANCE (return current instance number)

---

### INSTANCE( *symbol* )

**INSTANCE** Returns the current instance number to which the *symbol* is fixed.

*symbol* A multi-valued symbol.

The **INSTANCE** function returns the current instance number to which the *symbol* is fixed. If no **#FIX** or **#FOR** has been issued for the *symbol*, **INSTANCE** returns zero (0).

Return Data Type: LONG

Example:

```
#DELETE(%Control,INSTANCE(%Control))      #!Delete current instance
```

## ITEMS (return multi-valued symbol instances)

---

### ITEMS( *symbol* )

**ITEMS** Returns the number of instances contained by the *symbol*.

*symbol* A multi-valued symbol.

The **ITEMS** function returns the number of instances contained by the *symbol*.

Return Data Type: LONG

Example:

```
#DELETE(%Control,ITEMS(%Control))      #!Delete last instance
```

## QUOTE (replace string special characters)

---

### QUOTE( *symbol* )

**QUOTE** Expands the *symbol*'s string data, “doubling up” single quotes (‘), and all un-paired left angle brackets (<) and left curly braces ({} to prevent compiler errors.

*symbol* The symbol containing the properties to parse.

The **QUOTE** function returns the string contained in the symbol with all single quotes (‘), un-paired left angle brackets (<), and un-paired left curly braces ({} “doubled up” to prevent compiler errors. This allows the user to enter string constants containing apostrophes, and filter expressions containing less than signs (<) without requiring that they enter two fo each.

Return Data Type: **STRING**

Example:

```
#PROMPT('Filter Expression',@S255),%FilterExpression
#SET(%ValueConstruct,QUOTE(%FilterExpression))  #!Expand single quotes and angle
brackets
```

See Also: %'

## REPLACE (replace attribute)

---

**REPLACE**( *string*, *attribute*, *new value* [, *parameter* ] )

<b>REPLACE</b>	Finds the complete form of the specified <i>attribute</i> from the property <i>string</i> symbol and replaces it with the <i>new value</i> .
<i>string</i>	The symbol containing the properties to parse.
<i>attribute</i>	A string constant or symbol containing the name of the property to find.
<i>new value</i>	A string constant or symbol containing the replacement value for the <i>attribute</i> .
<i>parameter</i>	An integer constant or symbol containing the number of the property's parameter to affect. Zero (0) affects the entire parameter list (without the <i>attribute</i> ). If omitted, the <i>attribute</i> and all its <i>parameters</i> are affected.

The **REPLACE** function replaces either the complete form of the specified *attribute* from the attribute *string* symbol, or just the specified *parameter* with the *new value*. It returns the modified *string*.

Return Data Type: **STRING**

Example:

```
#SET(%ValueConstruct,REPLACE(%ValueConstruct,'MSG','')) #!Remove MSG attribute
```

See Also: **EXTRACT**



# Symbol Overview

[Contents](#)

Clarion for Windows' Template Language uses symbols which act as variables do in a programming language -- they contain information that can be used as-is or may be used in expressions. These symbols may come from the built-in symbol set, or can be defined by the template author. Both types may be single-valued or multi-valued.

The built-in symbols that are available to the Template writer contain information from both the Dictionary and the Application about how the programmer has designed the application. The template-defined symbols contain information provided by the programmer from prompts on the Application Generator's properties windows, or may only be for internal use.

All template symbols expand during source generation to place the value they contain in the generated source code (if included in template code that generates source).

## Expansion Symbols

---

There are several special symbol forms that expand to allow formatting and special characters to generate into the source. These may be combined with each other to produce complex effects.

- |                                   |  |
|-----------------------------------|--|
| %%                                | Expands to a single percent (%) sign. This allows the Application Generator to generate the modulus operator without confusion with any symbol.                                |
| ##                                | Expands to a single pound (#) sign. This allows the Application generator to generate an implicit LONG variable without confusion with any Template Language statement.        |
| %@ <i>picture</i> @ <i>symbol</i> | Formats the <i>symbol</i> with the specified <i>picture</i> when source generates. For example, %@D1@MyDate expands the %MyDate symbol, formatted for the @D1 <i>picture</i> . |
| %[ <i>number</i> ] <i>symbol</i>  | Expands the <i>symbol</i> to fill at least the <i>number</i> of spaces specified. This allows proper comment and data type alignment in the generated source.                  |
| %                                 | Expands the next generated source onto the same line as the last. This is the Template line continuation character.  |
| %' <i>symbol</i>                  | Expands the <i>symbol's</i> string data, "doubling up" single quotes ('), and all un-paired left angle brackets (<) and left curly braces ({} to prevent compiler errors.      |
| %( <i>expression</i> )            | Expands the <i>expression</i> into the generated source.   |

## Example:

```
%(ALL(' ', %indent))[20]Field %d3@Date
    #!Generate an indent, expand %Field to occupy at least 20 spaces, then
    #! generate the date in mmm dd, yyyy format

%[30]Null          #!Generate 30 spaces

#! %MySymbol contains: Gavin's Holiday
StringVar = '%MySymbol'    #!Expands as a valid Clarion string constant
                           #! to 'Gavin's Holiday'
```

## Symbol Hierarchy Overview

---

The Built-in Symbols all form a hierarchy of dependencies. This hierarchy starts with %Application, upon which all the other built-in symbols are dependent. The following tree diagram does not show all the dependent symbols, but does graphically represent the hierarchy of symbols. Most of these are multi-valued symbols.

- %Application**
  - %DictionaryFile**
    - %File**
      - %Field**
      - %Key**
      - %Relation**
  - %Program**
  - %GlobalData**
  - %Module**
    - %ModuleProcedure**
    - %MapItem**
    - %ModuleData**
  - %Procedure**
    - %Report**
      - %ReportControl**
        - %ReportControlField**
  - %Window**
    - %WindowEvent**
    - %Control**
      - %ControlEvent**
  - %ProcedureCalled**
  - %LocalData**
  - %ActiveTemplate**
    - %ActiveTemplateInstance**
  - %Formula**
    - %FormulaExpression**

These symbols (and all the symbols not listed here that are dependent upon these) contain all the information about the application that is available in the data dictionary (.DCT) and application (.APP) files. They enable you to write a template to generate any type of code you require.

# Built-in Symbols

## Symbols Dependent on %Application

---

%Application	The name of the .APP file. The hierarchy of built-in symbols starts with %Application.
%ApplicationDebug	Contains 1 if the application has debug enabled.
%ApplicationLocalLibrary	Contains 1 if the application is linking in the Clarion runtime library.
%Target32	Contains 1 if the application is producing a 32-bit program.
%DictionaryChanged	Contains 1 if the .DCT file has changed since the last source generation.
%RegistryChanged	Contains 1 if the .REGISTRY.TRF file has changed since the last source generation.
%ProgramDateCreated	The program creation date (a Clarion standard date).
%ProgramDateChanged	The date the program was last changed (a Clarion standard date).
%ProgramTimeCreated	The program creation time (Clarion standard time).
%ProgramTimeChanged	The time the program was last changed (a Clarion standard time).
%FirstProcedure	The label of the application's first procedure.
%HelpFile	The name of the application's help file.
%ProgramExtension	Contains EXE, DLL, or LIB.
%DictionaryFile	The name of the .DCT file for the application.
%File	Contains all file declarations in the .DCT file. Multi-valued. Dependent on %DictionaryFile.
%Program	The name of the PROGRAM file without extension).
%GlobalData	The labels of all global variable declarations made through the Global Data button on the Global Settings window. Multi-valued.

%GlobalDataStatement	The variable's declaration statement (data type and all attributes). Dependent on %GlobalData.
%Module	The names of all source code modules other than the PROGRAM module. Multi-valued.
%QuickProcedure	The name of the procedure type a #UTILITY with the WIZARD attribute is creating.
%Procedure	The names of all procedures and functions in the application. Multi-valued.

## Symbols Dependent on %File

---

%File	Contains all file declarations in the .DCT file. Multi-valued. Dependent on %DictionaryFile.
%FilePrefix	Contents of the PRE attribute (the file prefix).
%FileDescription	A short description of the file.
%FileType	Contains FILE, VIEW, or ALIAS.
%FileDriver	Contents of the DRIVER attribute first parameter.
%FileDriverParameter	Contents of the DRIVER attribute second parameter.
%FileName	Contents of the FILE statement's NAME attribute.
%FileOwner	Contents of the OWNER attribute.
%FileCreate	Contains 1 if the file has the CREATE attribute.
%FileReclaim	Contains 1 if the file has the RECLAIM attribute.
%FileEncrypt	Contains 1 if the file has the ENCRYPT attribute.
%FileBindable	Contains 1 if the file has the BINDABLE attribute.
%FileLongDesc	A long description of the file.
%FileStruct	The FILE statement (the label and all attributes).
%FileStructEnd	The keyword END.
%FileStructRec	The RECORD statement (including label and any attributes).
%FileStructRecEnd	The keyword END.
%FileStatement	Contains the FILE statement's attributes (only).
%FileThreaded	Contains 1 if the file has the THREAD attribute.
%FileExternal	Contains 1 if the file has the EXTERNAL attribute.
%FileExternalModule	Contents of the file's EXTERNAL attribute parameter.

%FilePrimaryKey	The label of the file's primary key.
%FileQuickOptions	A comma-delimited string containing the choices the user made on the Options tab for the file.
%FileUserOptions	A string containing the entries the user made in the User Options text box on the Options tab for the file.
%ViewFilter	Contents of the FILTER attribute.
%ViewStruct	The VIEW statement (including the label and all attributes).
%ViewStructEnd	The keyword END.
%ViewStatement	The VIEW statement's attributes (only).
%ViewPrimary	The label of the VIEW's primary file.
%ViewPrimaryFields	The labels of all fields in the VIEW from the primary file. Multi-valued.
%ViewPrimaryField	Dependent on %ViewPrimaryFields. Contains the label of a field in the VIEW from the primary file.
%ViewFiles	The labels of all files in the VIEW. Multi-valued.
%AliasFile	The label of the ALIASed file.
%Field	The labels of all fields in the file (including MEMO fields). Multi-valued.
%Key	The labels of all keys and indexes for the file. Multi-valued.
%Relation	The labels of all files that are related to the file. Multi-Valued.

## **Symbols Dependent on %ViewFiles**

---

%ViewFiles	The labels of all files in the VIEW. Multi-valued. Dependent on %File.
%ViewFileStruct	The JOIN statement for a secondary file in the VIEW.
%ViewFileStructEnd	The keyword END.
%ViewFile	Contains the label of the file.
%ViewJoinedTo	The label of the file to which the file is JOINed.
%ViewFileFields	The labels of all fields in the file used in the VIEW. Multi-valued.
%ViewFileField	Contains the label of the field in the file used in the VIEW. Dependent on %ViewFileFields.

## Symbols Dependent on %Field

---

%Field	The labels of all fields in the file (including MEMO fields). Multi-valued. Dependent on %File.
%FieldDescription	A short description of the field.
%FieldLongDesc	A long description of the field.
%FieldFile	The label of the file containing the field.
%FieldID	Label of the field without prefix.
%FieldDisplayPicture	Default display picture.
%FieldRecordPicture	STRING field storage definition picture.
%FieldDimension1	Maximum value of first array dimension.
%FieldDimension2	Maximum value of second array dimension.
%FieldDimension3	Maximum value of third array dimension.
%FieldDimension4	Maximum value of fourth array dimension.
%FieldHelpID	Contents of the HLP attribute.
%FieldName	Contents of the field's NAME attribute.
%FieldRangeLow	The lower range of valid values for the field.
%FieldRangeHigh	The upper range of valid values for the field.
%FieldType	Data type of the field.
%FieldPlaces	Number of decimal places for the field.
%FieldMemoSize	Maximum size of the MEMO.
%FieldMemoImage	Contains 1 if the MEMO has a BINARY attribute.
%FieldInitial	Initial value for the field.
%FieldLookup	File to access to validate this field's value.
%FieldStruct	The field's declaration statement (label, data type, and all attributes).
%FieldStatement	The field's declaration statement (data type and all attributes).
%FieldHeader	The field's default report column header.
%FieldPicture	Default display picture.
%FieldJustType	Contains L, R, C, or D for the field's justification.
%FieldJustIndent	The justification offset amount.

<code>%FieldFormatWidth</code>	The default width for the field's ENTRY control.
<code>%FieldChoices</code>	The choices the user entered for a Must Be In List field. Multi-valued.
<code>%FieldQuickOptions</code>	A comma-delimited string containing the choices the user made on the Options tab for the field.
<code>%FieldUserOptions</code>	A string containing the entries the user made in the User Options text box on the Options tab for the field.

## Symbols Dependent on %Key

---

<code>%Key</code>	The labels of all keys and indexes for the file. Multi-valued.
<code>%KeyDescription</code>	A short description of the key.
<code>%KeyLongDesc</code>	A long description of the key.
<code>%KeyFile</code>	The label of the file to which the key belongs.
<code>%KeyID</code>	The label of the key (without prefix).
<code>%KeyIndex</code>	Contains KEY, INDEX, or DYNAMIC.
<code>%KeyName</code>	Contents of the key's NAME attribute.
<code>%KeyAuto</code>	Contains the label of the auto-incrementing field.
<code>%KeyDuplicate</code>	Contains 1 if the key has the DUP attribute.
<code>%KeyExcludeNulls</code>	Contains 1 if the key has the OPT attribute.
<code>%KeyNoCase</code>	Contains 1 if the key has the NOCASE attribute.
<code>%KeyPrimary</code>	Contains 1 if the key is the file's primary key.
<code>%KeyStruct</code>	The key's declaration statement (label and all attributes).
<code>%KeyStatement</code>	The key's attributes (only).
<code>%KeyField</code>	The labels of all component fields of the key. Multi-valued.
<code>%KeyFieldSequence</code>	Contains ASCENDING or DESCENDING. Dependent on %Keyfield.
<code>%KeyQuickOptions</code>	A comma-delimited string containing the choices the user made on the Options tab for the key.
<code>%KeyUserOptions</code>	A string containing the entries the user made in the User Options text box on the Options tab for the key.

## Symbols Dependent on %Relation

---

%Relation	The labels of all files that are related to the file. Multi-Valued.
%RelationPrefix	The prefix of the related file.
%FileRelationType	Contains 1:MANY or MANY:1.
%RelationKey	The label of the related file's linking key.
%FileKey	The label of the file's linking key.
%RelationConstraintDelete	May contain: RESTRICT, CASCADE, or CLEAR.
%RelationConstraintUpdate	May contain: RESTRICT, CASCADE, or CLEAR.
%RelationKeyField	The labels of all linking fields in the related file's key. Multi-valued.
%RelationKeyFieldLink	The label of the linking field in the file's key. Dependent on %RelationKeyField.
%FileKeyField	The labels of all linking fields in the file's key. Multi-valued.
%FileKeyFieldLink	The label of the linking field in the related file's key. Dependent on %FileKeyField.
%RelationQuickOptions	A comma-delimited string containing the choices the user made on the Options tab for the relation.
%RelationUserOptions	A string containing the entries the user made in the User Options text box on the Options tab for the relation.

## Symbols Dependent on %Module

---

%Module	Thes names of all source code modules other than the PROGRAM module. Multi-valued.%ModuleDescription %Module
%ModuleLanguage	Contains the module target language.
%ModuleTemplate	The name of the Module Template used to generate the module.
%ModuleChanged	Contains 1 if anything in the module has changed since the last source generation.

<code>%ModuleExternal</code>	Contains 1 if the module is external. (not generated by Clarion for Windows).
<code>%ModuleExtension</code>	The file extension for the module.
<code>%ModuleBase</code>	The name of the module (without extension).
<code>%ModuleInclude</code>	The file to INCLUDE in the program MAP containing the module's prototypes.
<code>%ModuleProcedure</code>	The names of all procedures and functions in the module. Multi-valued.
<code>%ModuleData</code>	The labels of all module variable declarations made through the Data button on the Module Properties window. Multi-valued.
<code>%ModuleDataStatement</code>	The variable's declaration statement (data type and all attributes). Dependent on <code>%ModuleData</code> .

## Symbols Dependent on `%Procedure`

---

<code>%Procedure</code>	The names of all procedures and functions in the application. Multi-valued.
<code>%ProcedureType</code>	Contains PROCEDURE or FUNCTION.
<code>%ProcedureReturnType</code>	The data type returned, if the procedure is a FUNCTION.
<code>%ProcedureDateCreated</code>	The procedure creation date (a Clarion standard date).
<code>%ProcedureDateChanged</code>	The date the procedure was last changed (a Clarion standard date).
<code>%ProcedureTimeCreated</code>	The time the procedure was created (a Clarion standard time).
<code>%ProcedureTimeChanged</code>	The time the procedure was last changed (a Clarion standard time).
<code>%Prototype</code>	The procedure's prototype for the MAP structure.
<code>%ProcedureTemplate</code>	The name of the Procedure Template used to generate the procedure.
<code>%ProcedureDescription</code>	A short description of the procedure.

<code>%ProcedureExported</code>	Contains 1 if the procedure is in a DLL and is callable from outside the DLL.
<code>%ProcedureLongDescription</code>	A long description of the procedure.
<code>%ProcedureLanguage</code>	The target language the procedure template generates.
<code>%ProcedureCalled</code>	The names of all procedures listed by the Procedures button on the Procedure Properties window. Multi-valued.
<code>%LocalData</code>	The labels of all local variable declarations made through the Data button on the Procedure Properties window. Multi-valued.
<code>%LocalDataStatement</code>	The variable's declaration statement (data type and all attributes). Dependent on <code>%LocalData</code> .
<code>%ActiveTemplate</code>	The name of all control templates used in the procedure. Multi-valued.
<code>%ActiveTemplateInstance</code>	The instance numbers of all control templates used in the procedure. Multi-valued. Dependent on <code>%ActiveTemplate</code> .
<code>%ActiveTemplateParentInstance</code>	The instance number of the control template's parent control template. This is the control template that it is "attached" to. Dependent on <code>%ActiveTemplateInstance</code> .
<code>%ActiveTemplatePrimaryInstance</code>	The instance number of the control template's primary control template. This is the first control template in a succession of multiple related control templates. Dependent on <code>%ActiveTemplateInstance</code> .

## Window Control Symbols

---

<code>%Window</code>	The label of the procedure's window. Dependent on <code>%Procedure</code> .
<code>%WindowStatement</code>	The WINDOW or APPLICATION declaration statement (and all attributes). Dependent on <code>%Window</code> .
<code>%MenuBarStatement</code>	The MENUBAR declaration statement (and all attributes). Dependent on <code>%Window</code> .

%ToolbarStatement	The TOOLBAR declaration statement (and all attributes). Dependent on %Window.
%WindowEvent	All field-independent events, as listed in the EQUATES.CLW file (without EVENT: prepended). Multi-valued. Dependent on %Window.
%Control	The field equate labels of all controls in the window. Multi-valued. Dependent on %Window.
%ControlUse	The control's USE variable (not field equate). Dependent on %Control.
%ControlStatement	The control's declaration statement (and all attributes). Dependent on %Control.
%ControlType	The type of control (MENU, ITEM, ENTRY, BUTTON, etc.). Dependent on %Control.
%ControlTemplate	The name of the control template which populated the control onto the window. Dependent on %Control.
%ControlTool	Contains 1 if the control is in a TOOLBAR. Dependent on %Control.
%ControlMenu	Contains 1 if the control is in a MENUBAR. Dependent on %Control.
%ControlIndent	The control declaration's indentation level in the generated data structure. Dependent on %Control.
%ControlInstance	The instance number of the control template which populated the control onto the window. Dependent on %Control.
%ControlOriginal	The original field equate label of the control as listed in the control template from which it came. Dependent on %Control.
%ControlFrom	The FROM attribute of a LIST or COMBO control. Dependent on %Control.
%ControlAlert	All ALRT attributes for the control. Multi-valued. Dependent on %Control.
%ControlEvent	All field-specific events appropriate for the control, as listed in the EQUATES.CLW file (without the EVENT: prepended). Multi-valued. Dependent on %Control.
%ControlField	All fields populated into the LIST, COMBO, or SPIN control. Multi-valued. Dependent on %Control.
%ControlFieldHasIcon	Contains 1 if the field in the LIST or COMBO control is formatted to have an icon. Dependent on %ControlField.

- %ControlFieldHasColor**  
Contains 1 if the field in the LIST or COMBO control is formatted to have colors. Dependent on %ControlField.
- %ControlFieldHasTree**  
Contains 1 if the field in the LIST or COMBO control is formatted to be a tree. Dependent on %ControlField.
- %ControlFieldHasLocator**  
Contains 1 if the field in the LIST or COMBO control is formatted to be a locator. Dependent on %ControlField.

## Report Control Symbols

---

- %Report** The label of the procedure's report. Dependent on %Procedure.
- %ReportStatement** The REPORT declaration statement (and all attributes). Dependent on %Report.
- %ReportControl** The field equate labels of all controls in the report. Multi-valued. Dependent on %Report.
- %ReportControlUse** The control's USE variable (not field equate). Dependent on %ReportControl.
- %ReportControlStatement** The control's declaration statement (and all attributes). Dependent on %ReportControl.
- %ReportControlType** The type of control (MENU, ITEM, ENTRY, BUTTON, etc.). Dependent on %ReportControl.
- %ReportControlTemplate** The name of the control template which populated the control onto the report. Dependent on %ReportControl.
- %ReportControlIndent** The control declaration's indentation level in the generated data structure. Dependent on %ReportControl.
- %ReportControlInstance** The instance number of the control template which populated the control onto the report. Dependent on %ReportControl.
- %ReportControlOriginal** The original field equate label of the control as listed in the control template from which it came. Dependent on %ReportControl.

- %ReportControlLabel**  
The label of the report STRING control. Dependent on %ReportControl.
- %ReportControlField**  
All fields populated into the LIST, COMBO, or SPIN control. Multi-valued. Dependent on %ReportControl.

## Formula Symbols

---

- %Formula**  
The label of the result field for each formula. Multi-valued. Dependent on %Procedure.
- %FormulaDescription**  
A description of the formula.
- %FormulaClass**  
An identifier for the position in generated source to place the formula.
- %FormulaInstance**  
The control template instance number for a formula whose class has been declared in a control template.
- %FormulaExpression**  
The expression to conditionally evaluate or assign to the result field for each formula. Multi-valued. Dependent on %Formula.
- %FormulaExpressionType**  
Contains =, IF, ELSE, CASE, or OF. Dependent on %FormulaExpression.
- %FormulaExpressionTrue**  
Contains the line number of the true expression in the generated formula. Dependent on %FormulaExpression.
- %FormulaExpressionFalse**  
Contains the line number of the false expression in the generated formula. Dependent on %FormulaExpression.
- %FormulaExpressionOf**  
Contains the line number of the OF expression in the generated formula. Dependent on %FormulaExpression.
- %FormulaExpressionCase**  
Contains the line number of the assignment in the generated formula. Dependent on %FormulaExpression.

## File Schematic Symbols

---

- %Primary**  
The label of a Primary file listed in the procedure's File Schematic for the procedure or a control template used in the procedure.

%PrimaryKey	The label of the access key for the primary file. Dependent on %Primary.
%PrimaryInstance	The control template instance number for which the file is primary. Dependent on %Primary.
%Secondary	The labels of all Secondary files listed in the File Schematic for the procedure or a control template used in the procedure. Multi-valued. Dependent on %Primary.
%SecondaryTo	The label of the Secondary or Primary file to which the Secondary file is related (the file "above" it as listed in the procedure's File Schematic). Dependent on %Secondary.
%SecondaryType	Contains 1:MANY or MANY:1. Dependent on %Secondary.
%OtherFiles	The labels of all Other Data files listed for the procedure. Multi-valued.

## File Driver Symbols

---

%Driver	The names of all registered file drivers.
%DriverDLL	The name of the driver's .DLL file. Dependent on %Driver.
%DriverLIB	The name of the driver's .LIB file. Dependent on %Driver.
%DriverDescription	A description of the file driver. Dependent on %Driver.
%DriverCreate	Contains 1 if the driver supports the CREATE attribute. Dependent on %Driver.
%DriverOwner	Contains 1 if the driver supports the OWNER attribute. Dependent on %Driver.
%DriverEncrypt	Contains 1 if the driver supports the ENCRYPT attribute. Dependent on %Driver.
%DriverReclaim	Contains 1 if the driver supports the RECLAIM attribute. Dependent on %Driver.
%DriverMaxKeys	The maximum number of keys the driver supports for each data file. Dependent on %Driver.
%DriverUniqueKey	Contains 1 if the driver supports unique (no DUP attribute) keys. Dependent on %Driver.
%DriverRequired	Contains 1 if the driver supports the RECLAIM attribute. Dependent on %Driver.
%DriverMemo	Contains 1 if the driver supports MEMO fields. Dependent on %Driver.

%DriverBinMemo	Contains 1 if the driver supports the BINARY attribute on MEMO fields. Dependent on %Driver.
%DriverSQL	Contains 1 if the driver is an SQL driver. Dependent on %Driver.
%DriverType	All data types supported by the driver. Multi-valued. Dependent on %Driver.
%DriverOpcode	All operations supported by the driver. Multi-valued. Dependent on %Driver.

## Miscellaneous Symbols

---

%ConditionalGenerate	Contains 1 if the Conditional Generation box is checked on the Application Options window.
%Null	Contains nothing. This is used for comparison to detect empty symbols.
%True	Contains 1.
%False	Contains an empty string (‘’).
%EOF	Contains the value that flags the end of file when reading a file with #READ.
%BytesOutput	Contains the number of bytes written to the current output file. This can be used to detect empty embed points (if no bytes were written, it contained nothing).
%EmbedID	Contains the current embed point’s identifying symbol.
%EmbedDescription	The current embed point’s description.
%EmbedParameters	The current embed point’s current instance, as a comma-delimited list.

## Procedure Template: Window

Contents

The *Window* Procedure template is the generic template that creates any window handling procedure. Since most (if not all) procedures in a Windows application have a window, the type of code this template generates forms the basis of the generated source code for most procedures.

The Window template is also the fundamental template upon which all the other Procedure templates are built. For example, the Browse template is actually a Window template with BrowseBox and BrowseUpdateButtons Control templates pre-defined for the procedure.

The following template language code is all the code for the Window Template:

**NOTE:** For this and all other code examples in this book, the template line continuation character (%) is used to split code lines that are too long to fit on the page. In the template files on disk these characters are not (and should not be) used to continue a template code line; they are used here only for readability.

```
#PROCEDURE(Window,'Generic Window Handler'),WINDOW,HLP('~TPLProcWindow')
#LOCALDATA
LocalRequest          LONG,AUTO
OriginalRequest       LONG,AUTO
LocalResponse         LONG,AUTO
WindowOpened          LONG
WindowInitialized     LONG
ForceRefresh          LONG,AUTO
#ENDLOCALDATA
#CLASS('Procedure Setup','Upon Entry into the Procedure')
#CLASS('Before Lookups','Refresh Window ROUTINE, before lookups')
#CLASS('After Lookups','Refresh Window ROUTINE, after lookups')
#CLASS('Procedure Exit','Before Leaving the Procedure')
#PROMPT('&Parameters:',@s255). %Parameters
#ENABLE(%ProcedureType='FUNCTION')
  #PROMPT('Return Value:',FIELD),%ReturnValue
#ENDENABLE
#PROMPT('Window Operation Mode:',DROP('Use WINDOW setting|Normal|MDI|Modal')) %|
                                     ,%WindowOperationMode
#ENABLE(%INIActive)
  #BOXED('INI File Settings')
    #PROMPT('Save and Restore Window Location',CHECK) %|
                                     ,%INISaveWindow,DEFAULT(1),AT(10,,150)
  #ENDBOXED
#ENDENABLE
#AT(%CustomGlobalDeclarations)
  #INSERT(%StandardGlobalSetup)
#ENDAT
#INSERT(%StandardWindowCode)
```

This code starts with the #PROCEDURE statement, which names the Procedure template and indicates that it will have a WINDOW (or APPLICATION) structure, but no REPORT. The #LOCALDATA section defines six local variables that generate automatically as part of the procedure. These are common local variables for most generated procedures.

The #CLASS statements define the formula classes for the Formula Editor. These identify the source code positions at which formulas generate.

The #PROMPT statements create the prompts on the **Procedure Properties** window. The first allows the programmer to name the parameters passed into the procedure. The #ENABLE structure enables its #PROMPT only when the %ProcedureType symbol contains “FUNCTION.” This occurs only when the **Prototype** prompt (standard on all procedures) contains a procedure prototype with a return data type.

The next #PROMPT allows the programmer to override the window’s operation mode as specified on the WINDOW structure. The next #ENABLE structure enables its #BOXED #PROMPT only when the %INIActive symbol contains a value. This symbol comes from a check box on the Global Settings window.

The #AT structure calls the %StandardGlobalSetup #GROUP. This contains code to determine if the procedure is using any .VBX controls. If so, they are added to the list of files to ship with the application that generates into the *ProgramName.SHP* file.

You will note that none of these statements generates any target language (Clarion) source code other than the six variable declarations. The last #INSERT statement places all the code the %StandardWindowCode #GROUP generates at the end of these statements. This is the #GROUP that handles all the source generation for the template.

## **%StandardWindowCode #GROUP**

---

This #GROUP actually generates all the source code for the Window template. This includes all the local data declarations, standard window handling code, and provides all the “hooks” for all the control and extension templates to attach into the generated procedure.

```
#GROUP(%StandardWindowCode)
#IF(NOT %Window)
  #ERROR(%Procedure & ' Error: No Window Defined!')
  #RETURN
#ENDIF
#DECLARE(%FirstField)
#DECLARE(%LastField)
#DECLARE(%ProgressWindowRequired)
#INSERT(%FieldTemplateStandardButtonMenuPrompt)
#INSERT(%FieldTemplateStandardEntryPrompt)
#INSERT(%FieldTemplateStandardCheckBoxPrompt)
#EMBED(%GatherSymbols,'Gather Template Symbols'),HIDE
#INSERT(%FileControlInitialize)
%Procedure %ProcedureType%Parameters

#FOR(%LocalData)
  %[20]LocalData %LocalDataStatement
#ENDFOR
```

```

#INSERT(%StandardWindowGeneration)
#IF(%ProgressWindowRequired)
#INSERT(%StandardProgressWindow)
#ENDIF
CODE
#EMBED(%ProcedureInitialize,'Initialize the Procedure')
LocalRequest = GlobalRequest
OriginalRequest = GlobalRequest
LocalResponse = RequestCancelled
ForceRefresh = False
CLEAR(GlobalRequest)
CLEAR(GlobalResponse)
#EMBED(%ProcedureSetup,'Procedure Setup')
IF KEYCODE() = MouseRight
    SETKEYCODE(0)
END
#INSERT(%StandardFormula,'Procedure Setup')
#INSERT(%FileControlOpen)
#INSERT(%StandardWindowOpening)
#EMBED(%PrepareAlerts,'Preparing Window Alerts')
#EMBED(%BeforeAccept,'Preparing to Process the Window')
#MESSAGE('Accept Handling',3)
ACCEPT
#EMBED(%AcceptLoopBeforeEventHandling,'Accept Loop, Before CASE EVENT() handling')
CASE EVENT()
#EMBED(%EventCaseBeforeGenerated,'CASE EVENT() structure, before generated code')
#INSERT(%StandardWindowHandling)
#EMBED(%EventCaseAfterGenerated,'CASE EVENT() structure, after generated code')
END
#EMBED(%AcceptLoopAfterEventHandling,'Accept Loop, After CASE EVENT() handling')
#SUSPEND
#?CASE ACCEPTED()
#INSERT(%StandardAcceptedHandling)
#?END
#RESUME
#EMBED(%AcceptLoopBeforeFieldHandling,'Accept Loop, Before CASE FIELD() handling')
#SUSPEND
#?CASE FIELD()
#EMBED(%FieldCaseBeforeGenerated,'CASE FIELD() structure, before generated code')
#INSERT(%StandardControlHandling)
#EMBED(%FieldCaseAfterGenerated,'CASE FIELD() structure, after generated code')
#?END
#RESUME
END
DO ProcedureReturn
!-----
ProcedureReturn ROUTINE
#INSERT(%FileControlClose)
#INSERT(%StandardWindowClosing)
#EMBED(%EndOfProcedure,'End of Procedure')
#INSERT(%StandardFormula,'Procedure Exit')
IF LocalResponse
    GlobalResponse = LocalResponse
ELSE
    GlobalResponse = RequestCancelled
END
#IF(%ProcedureType='FUNCTION')
RETURN(%ReturnValue)
#ELSE
RETURN
#ENDIF
!-----
InitializeWindow ROUTINE

```

```

#EMBED(%WindowInitializationCode,'Window Initialization Code')
DO RefreshWindow
!-----
RefreshWindow ROUTINE
  IF %Window{Prop:AcceptAll} THEN EXIT.
  #EMBED(%RefreshWindowBeforeLookup,'Refresh Window routine, before lookups')
  #INSERT(%StandardFormula,'Before Lookups')
  #INSERT(%StandardSecondaryLookups)
  #INSERT(%StandardFormula,'After Lookups')
  #EMBED(%RefreshWindowAfterLookup,'Refresh Window routine, after lookups')
  #EMBED(%RefreshWindowBeforeDisplay,'Refresh Window routine, before DISPLAY()')
  DISPLAY()
  ForceRefresh = False
!-----
SyncWindow ROUTINE
  #EMBED(%SyncWindowBeforeLookup,'Sync Record routine, before lookups')
  #INSERT(%StandardFormula,'Before Lookups')
  #INSERT(%StandardSecondaryLookups)
  #INSERT(%StandardFormula,'After Lookups')
  #EMBED(%SyncWindowAfterLookup,'Sync Record routine, after lookups')
!-----
#EMBED(%ProcedureRoutines,'Procedure Routines')

```

This starts with the required `#GROUP` statement which identifies the group for use in `#INSERT` statements.

The `#IF(NOT %Window)` error check detects whether the programmer has forgotten to create a window for the procedure. The `#ERROR` statement alerts the programmer to the mistake and `#RETURN` immediately aborts any further source generation for the procedure. The `#DECLARE` statements declare two template symbols for internal use by other `#GROUPs` that are called to generate source for the procedure, and a “flag” that determines whether a “progress” window is required by the procedure.

The next three `#INSERT` statements insert `#GROUPs` that contain `#FIELD` structures to define the standard prompts that appear on the **Actions** tab for `BUTTON`, `ENTRY` and `CHECK` controls placed on the procedure’s window. These prompts allow the programmer to specify the standard actions these controls can take from this procedure.

The `%GatherSymbols #EMBED` statement has the `HIDE` attribute. This means that it will not appear in the list of available embed points for the programmer to insert code, making the embed point only available for internal use (for Code, Control, or Extension templates to generate code into).

The `#INSERT(%FileControlInitialize)` statement inserts a `#GROUP` that updates the symbols that keep track of the files used in the application with the files used by this procedure.

The `%Procedure %ProcedureType%Parameters` statement generates the first Clarion language source code for the procedure. It generates the procedure’s `PROCEDURE` or `FUNCTION` statement, with or without a parameter list, as appropriate.

The `#FOR(%LocalData)` loop generates all the local variable declarations for the procedure. The  `%[20]LocalData` syntax means that the `%LocalData` symbol expands to fill at least 20 spaces before the `%LocalDataStatement` symbol expands. This aligns the data types for each variable declaration starting in column 22.

The `#INSERT(%StandardWindowGeneration)` statement generates the procedure's `WINDOW` or `APPLICATION` data structure. This `#GROUP` also contains two `#EMBED` statements that allow the programmer to embed code either before or after the window structure.

The `#IF(%ProgressWindowRequired)` statement conditionally `#INSERTs` the `%StandardProgressWindow` group, which generates the `ProgressWindow WINDOW` structure for the procedure.

Next, the `CODE` statement generates, to begin the procedure's executable code section. The `%ProcedureInitialize #EMBED` statement is the first programmer-available embed point in the executable code portion of the procedure.

The next six Clarion language statements are directly generated into the procedure to set it up for the action it should perform, as signaled to the procedure through the `GlobalRequest` variable. The `%ProcedureSetup #EMBED` statement is the next programmer-available embed point in the executable code portion of the procedure.

The `IF KEYCODE() = MouseRight` structure detects when the procedure has been called as a result of a `RIGHT-CLICK` popup menu. If so, it ensures that the `keycode` is cleared to prevent multiple execution.

The `%StandardFormula #INSERT` statement generates all the "Procedure Setup" class formulas. Following that, the `#INSERT(%FileControlOpen)` generates the code to open all the files used in the procedure (if they are not already open). This `#GROUP` also contains two `#EMBED` statements that allow the programmer to embed code either before or after the files are opened.

The `#INSERT(%StandardWindowOpening)` generates the `OPEN(window)` statement, and the `.INI` file handling code (if the programmer has checked the **Use .INI file to save and restore program settings** box). This `#GROUP` also includes two `#EMBED` statements that allow the programmer to embed code either before or after opening the window.

The next two `#EMBED` statements allow the programmer to embed code before entering the procedure's `ACCEPT` loop. `#MESSAGE` displays its message during source generation.

The `ACCEPT` loop is Clarion's event handling structure. The next `#EMBED (%AcceptLoopBeforeEventHandling)` allows the programmer to add code that will be the first to "see" any event that `ACCEPT` passes on. The `CASE`

EVENT() structure contains all the code to handle field-independent events, generated from the #INSERT(%StandardWindowHandling) statement. This #GROUP is discussed in detail in its own section. The two #EMBED statements that surround this #INSERT and the one following the CASE EVENT structure all give the programmer the opportunity to explicitly handle any field-independent event not covered by the generated code.

The #SUSPEND statement means that conditional code statements (those prefaced with #?) will only generate if an explicit code statement (without #?) is also generated for the event, or if the programmer has placed some embedded source or used a Code template in an embed point associated with the event being processed. This is the mechanism that allows Clarion's Template Language to only generate code that is actually required for the procedure, eliminating unnecessary generated code.

The #?CASE ACCEPTED() structure contains all the code to handle all the Accepted events for menu items. Since menu items only generate Accepted events, this structure keeps the following CASE FIELD() structure from becoming unwieldy. This line of code, since it is prefaced with #?, will only generate if there is some other code generated within it, eliminating an empty CASE structure. The code for the CASE structure is generated by the #INSERT(%StandardAcceptedHandling) statement. This #GROUP is also discussed in detail in its own section. The #?END statement will only generate an END statement if other code has already been generated.

The #RESUME statement terminates the #SUSPEND section. If no source code has actually been generated, none of the conditional source statements (prefaced by #?) between the #SUSPEND and the #RESUME generate.

The #?CASE FIELD() structure (also bracketed within #SUSPEND and #RESUME statements) contains all the code to handle all the field-specific events. The code for the CASE structure is generated by the #INSERT(%StandardControlHandling) statement (between its two #EMBED statements). This #GROUP is also discussed in detail in its own section. The #?END statement will only generate an END statement if other code has already been generated.

The END statement terminates the ACCEPT loop. This statement is always generated (as is the ACCEPT) because every window requires an ACCEPT loop directly associated with it to process the events for that window. The DO ProcedureReturn statement calls the "cleanup code" for the procedure.

The first line of code in the ProcedureReturn ROUTINE is the #INSERT(%FileControlClose) statement. This generates the code to close the files that were opened by the procedure. This #GROUP also contains two #EMBED statements that allow the programmer to embed code either before or after the files are closed.

The #INSERT(%StandardWindowClosing) generates the CLOSE(*window*)

statement , and the .INI file handling code (if the programmer has checked the **Use .INI file to save and restore program settings** box). This #GROUP also includes two #EMBED statements that allow the programmer to embed code either before or after closing the window.

The next #EMBED allows the programmer to embed code before closing the procedure's window. The next #INSERT statement generates all the "Procedure Exit" class formulas. The next five Clarion language statements set up the procedure to alert the calling procedure to the action it performed, signaled back to the calling procedure through the GlobalRequest variable. The #IF structure then determines whether the procedure is a FUNCTION and generates the correct RETURN statement.

The InitializeWindow ROUTINE is a standard routine in all of Clarion's shipping Templates. The #EMBED allows the programmer to perform any initialization code for themselves, and provides Code, Control ,and Extension templates a place to generate their window initialization code. The DO RefreshWindow statement calls the routine to display the current contents of all the controls' USE variables at the time the window is initialized.

The RefreshWindow ROUTINE is another standard routine in all of Clarion's shipping Templates that performs the procedure's MANY:1 lookups and refreshes the screen to ensure any changed data correctly displays to the user at all times. The ROUTINE starts with the IF %Window{PROP:AcceptAll} THEN EXIT. statement. This detects when the procedure is on "non-stop" mode performing all data validity checks prior to writing a record to disk, and aborts the re-display.

The first #EMBED allows the programmer to embed code before the lookups. The next #INSERT generates all the "Before Lookups" class formulas, then #INSERT(%StandardSecondaryLookups) generates the code to get all the related records for the procedure. The next #INSERT generates all the "After Lookups" class formulas, then comes a #EMBED to allow the programmer to embed code after the lookups. The DISPLAY statement puts any changed values on screen, and ForceRefresh = False turns off the procedure's screen refresh flag.

The SyncWindow ROUTINE is also a standard routine in all of Clarion's shipping Templates. It performs the same lookups as the RefreshWindow ROUTINE, with similar embed points, but does not refresh the screen. Instead, it ensures all record buffers contain correct data. This ROUTINE is usually called before executing some action that may require the currently highlighted record in a LIST.

The last #EMBED statement allows the programmer to embed any ROUTINES they have called from their code within other embed points.

## %StandardWindowHandling #GROUP

---

This #GROUP generates all the code to handle field-independent events for the procedure. It generates its code inside the Window template's CASE EVENT() structure.

```
#GROUP(%StandardWindowHandling)
#FOR(%WindowEvent)
#SUSPEND
#?OF EVENT:%WindowEvent
#EMBED(%WindowEventHandling,'Window Event Handling'),%WindowEvent
#CASE(%WindowEvent)
#OF('OpenWindow')
IF NOT WindowInitialized
DO InitializeWindow
END
#IF(%FirstField)
SELECT(%FirstField)
#ENDIF
#OF('GainFocus')
ForceRefresh = True
IF NOT WindowInitialized
DO InitializeWindow
WindowInitialized = True
ELSE
DO RefreshWindow
END
#ENDCASE
#RESUME
#ENDFOR
#SUSPEND
#?ELSE
#EMBED(%WindowOtherEventHandling,'Other Window Event Handling')
#RESUME
```

This #GROUP starts with #FOR(%WindowEvent). This means it will loop through every instance of the %WindowEvent symbol, generating code (if required) for each field-independent event in the procedure.

The #SUSPEND statement begins the section of code that will only conditionally generate code if an explicit code statement (without #?) generates, or if the programmer has placed some embedded source or used a Code or Extension template to generate code into an embed point.

The #?OF EVENT:%WindowEvent statement conditionally generates an OF clause to the CASE EVENT() structure for the currently processing instance of %WindowEvent. This line of code, since it is prefaced with #?, will only generate if there is some other code generated within it, eliminating an empty OF clause.

The #EMBED statement is the key to the source generation process, and to the Procedure template's interaction with Code, Control, and Extension templates. Because it has the “,%WindowEvent” appended to the end, the programmer will have a separate embed point available for every instance of the %WindowEvent symbol. This means programmers can write their own

code for any field-independent event . It also means any Code, Ccontrol, or Extension templates the programmer places in the procedure can generate code into these embed points, as needed, to produce the code necessary to support their functionality. These embed points are the targets of the #AT statements used in the Code, Control, and Extension templates.

The #CASE(%WindowEvent) structure generates explicit source code for the field-independent events in its structure. The #OF('OpenWindow') checks for EVENT:OpenWindow and generates the check on the WindowInitialized variable to conditionally initialize the window. This code executes if no EVENT:GainFocus has already occurred (such as opening a second window on the same execution thread that currently has focus).

The SELECT(%FirstField) statement is generated only if there are any controls that can receive focus in the window.

The #OF('GainFocus') statement checks for EVENT:GainFocus and generates the ForceRefresh = True, then checks to see if the window has already been initialized (if the user is switching between active threads it would have been). If not, it initializes the window, otherwise it simply refreshes it.

The #ENDCASE statement terminates the #CASE structure. The #RESUME statement terminates the #SUSPEND section. If no source code has actually been generated, no conditional source statements (prefaced by #?) between the #SUSPEND and the #RESUME are generated.

#ENDFOR terminates the #FOR loop, then #SUSPEND statement begins another conditional generation section. This means the #?ELSE statement only generates an ELSE if source code is generated by the #EMBED statement. #RESUME terminates this #SUSPEND section.

## %StandardAcceptedHandling #GROUP

---

This #GROUP generates all the code to handle field-specific events for the procedure. It generates its code inside the Window Template's CASE FIELD() structure.

```
#GROUP(%StandardAcceptedHandling)
#FOR(%Control),WHERE(%ControlMenu)
  #FIX(%ControlEvent,'Accepted')
  #MESSAGE('Control Handling: ' & %Control,3)
  #SUSPEND
#?OF %Control
  #EMBED(%ControlPreEventHandling,'Control Event Handling, before generated code') %|
  ,%Control,%ControlEvent
  #INSERT(%FieldTemplateStandardHandling)
  #EMBED(%ControlEventHandling,'Internal Control Event Handling') %|
  ,%Control,%ControlEvent,HIDE
  #EMBED(%ControlPostEventHandling,'Control Event Handling, after generated code') %|
  ,%Control,%ControlEvent
#RESUME
#ENDFOR
```

This code starts with the #FOR(%Control),WHERE(%ControlMenu) statement. The WHERE attribute limits this #FOR loop to only those instances of %Control that contain menu items. The #FIX statement ensure that this code only deals with Accepted events.

The #MESSAGE statement displays its message during source generation. #SUSPEND begins a conditional source generation section.

The #?OF %Control statement conditionally generates an OF clause to the CASE ACCEPTED() structure for the currently processing instance of %Control. This line of code, since it is prefaced with #?, will only generate if there is some other code generated within it, eliminating an empty OF clause.

All three #EMBED statements have “,%Control,%ControlEvent” appended to the end, so the programmer will have a separate embed point available for every instance of the %ControlEvent symbol within every instance of the %Control symbol. For this group, this only means the Accepted event.

The #INSERT(%FieldTemplateStandardHandling) statement generates code to handle all the Actions dialog selections the programmer has made for the menu item. The next two #EMBED statements also have “,%Control,%ControlEvent” appended to the end. The first has the HIDE attribute, so it is available only for Code, Control, and Extension template use. These three #EMBEDs give the programmer an embed point both before and after any code automatically generated for them by the Actions tab prompts.

#RESUME terminates this #SUSPEND section. #ENDFOR terminates the %Control loop.

## %StandardControlHandling #GROUP

---

This #GROUP generates all the code to handle field-specific events for the procedure. It generates its code inside the Window template's CASE FIELD() structure.

```
#GROUP(%StandardControlHandling)
#FOR(%Control),WHERE(%Control)
  #MESSAGE('Control Handling: ' & %Control,3)
  #SUSPEND
#?OF %Control
  #EMBED(%ControlPreEventCaseHandling,'Control Handling, before event handling') %|
                                     ,%Control
  #?CASE EVENT()
    #IF(NOT %ControlMenu)
      #FOR(%ControlEvent)
        #SUSPEND
    #?OF EVENT:%ControlEvent
      #EMBED(%ControlPreEventHandling,'Control Event Handling, Before Generated %|
                                     Code'),%Control,%ControlEvent
      #INSERT(%FieldTemplateStandardHandling)
      #EMBED(%ControlEventHandling,'Internal Control Event Handling') %|
                                     ,%Control,%ControlEvent,HIDE
      #EMBED(%ControlPostEventHandling,'Control Event Handling, After Generated %|
                                     Code'),%Control,%ControlEvent
      #RESUME
    #ENDIF
  #ELSE
    #?OF EVENT:Accepted
      #ENDIF
      #SUSPEND
  #?ELSE
    #EMBED(%ControlOtherEventHandling,'Other Control Event Handling'),%Control
  #RESUME
#?END
#EMBED(%ControlPostEventCaseHandling,'Control Handling, after event handling') %|
                                     ,%Control
#RESUME
#ENDFOR
```

This code starts with the #FOR(%Control),WHERE(%Control) statement. The WHERE clause may at first seem redundant, since #FOR will only loop through existing instances of %Control. However, since some controls do not need (and so do not have) field equate labels, there are valid instances of %Control that do not contain a value for %Control itself. Therefore, the WHERE attribute limits this #FOR loop to those instances of %Control that do contain a field equate label for the control.

The #MESSAGE statement displays its message during source generation. #SUSPEND begins a conditional source generation section.

The #?OF %Control statement conditionally generates an OF clause to the CASE FIELD() structure for the currently processing instance of %Control. This line of code, since it is prefaced with #?, will only generate if there is some other code generated within it, eliminating an empty OF clause.

The first #EMBED allows the programmer to handle any situation that needs to be handled before any generated code for the control. The #?CASE EVENT() conditionally generates a CASE EVENT() structure for the control. The #IF(NOT %ControlMenu) statement filters out all the menu items, since they are handled by the %StandardAcceptedHandling #GROUP. #FOR(%ControlEvent) loops through all the possible events that the control being processed can generate.

#SUSPEND begins another conditional source generation section, nested within the previous one. This allows multiple levels of conditional source code generation. The outer section is automatically generated if any code is generated from the inner section.

The #?OF EVENT:%ControlEvent statement conditionally generates an OF clause to the CASE EVENT() structure for the currently processing instance of %Control. This line of code, since it is prefaced with #?, will only generate if there is some other code generated within it, eliminating an empty OF clause.

This next #EMBED statement has “,%Control,%ControlEvent” appended to the end, so the programmer will have a separate embed point available for every instance of the %ControlEvent symbol within every instance of the %Control symbol. This means programmers can write their own code for any field-specific event, for any control. It also means any Code templates, Control templates, or Extension templates the programmer places in the procedure can generate code into these embed points, as needed, to produce the code necessary to support their functionality. These embed points are the targets of the #AT statements used in the Code, Control, and Extension templates.

The #INSERT(%FieldTemplateStandardHandling) statement generates code to handle all the Actions tab selections the programmer has made for the control. The prompts on the Actions tab come from the #FIELD structures that were #INSERTed at the beginning of the Window template.

The next two #EMBED statements also have “,%Control,%ControlEvent” appended to the end, so the programmer will have a separate embed point available for every instance of the %ControlEvent symbol within every instance of the %Control symbol. The first has the HIDE attribute, so it is available only for Code, Control, and Extension template use. These three #EMBEDs give the programmer an embed point both before and after any code automatically generated for them by the Actions tab prompts.

#RESUME terminates the inner conditional source generation section, then #ENDFOR terminates the %ControlEvent loop. The #ELSE refers back to the #IF(NOT %ControlMenu) and will generate an empty OF EVENT:Accepted followed by an ELSE statement for a Menu item if the programmer has entered code into the Other Control Event Handling embed point. This eliminates any duplication between EVENT:Accepted code for a

menu item while still allowing the programmer to process any user-defined events for them.

The `#SUSPEND` statement begins another nested conditional generation section. This means the `#?ELSE` statement only generates an `ELSE` if source code is generated by the `#EMBED` statement. `#RESUME` terminates this `#SUSPEND` section.

The `#?END` generates the `END` statement for the `CASE FIELD()` structure, if any code has been generated, then the `#RESUME` statement terminates the outer `#SUSPEND` section. `#ENDFOR` terminates the `%Control` loop.

## Code Template: ControlValueValidation

The *ControlValueValidation* Code template performs data entry validation for an entry-type control (ENTRY, SPIN, or COMBO) by looking up the value entered by the user in another data file. If the lookup is successful, the entered value is valid. If not, it calls another procedure to allow the user to select a valid value from the lookup file.

This Code template is designed to generate code only into EVENT:Selected or EVENT:Accepted embed points of an ENTRY, SPIN, or COMBO control. These are the controls into which a user can directly type in data.

```
#CODE(ControlValueValidation,'Control Value Validation')
  #RESTRICT
    #CASE(%ControlType)
      #OF('ENTRY')
      #OROF('SPIN')
      #OROF('COMBO')
        #CASE(%ControlEvent)
          #OF('Accepted')
          #OROF('Selected')
            #ACCEPT
        #ELSE
          #REJECT
        #ENDCASE
    #ELSE
      #REJECT
    #ENDCASE
  #ENDRESTRICT
#DISPLAY('This Code Template is used to perform a control value')
#DISPLAY('validation. This Code Template only works for')
#DISPLAY('the Selected or Accepted Events for an Entry Control.')
#DISPLAY('')
#PROMPT('Lookup Key',KEY),%LookupKey,REQ
#PROMPT('Lookup Field',COMPONENT),%LookupField,REQ
#PROMPT('Lookup Procedure',PROCEDURE),%LookupProcedure
#DISPLAY('')
#DISPLAY('The Lookup Key is the key used to perform the value validation.')
#DISPLAY('If the Lookup Key is a multi-component key, you must insure that')
#DISPLAY('other key elements are primed BEFORE this Code Template is used.')
#DISPLAY('')
#DISPLAY('The Lookup field must be a component of the Lookup Key. Before')
#DISPLAY('execution of the lookup code, this field will be assigned the value of')
#DISPLAY('the control being validated, and the control will be assigned the value')
#DISPLAY('of the lookup field if the Lookup procedure is successful.')
#DISPLAY('')
#DISPLAY('The Lookup Procedure is called to let the user to select a value. ')
#DISPLAY('Request upon entrance to the Lookup will be set to SelectRecord, and ')
#DISPLAY('successful completion is signalled when Response = RequestCompleted.')
#IF(%ControlEvent='Accepted')
  IF %Control{PROP:Req} = False AND NOT %ControlUse #<! If not required and empty
ELSE
  #INSERT(%CodeTPLValidationCode)
END
#ELSIF(%ControlEvent='Selected')
  #INSERT(%CodeTPLValidationCode)
#ELSE
  #ERROR('This Code Template must be used for Accepted or Selected Events!')
#ENDIF
```

A Code template always starts with the #CODE statement, which identifies it within the template set and defines the description which appears in the list of available Code templates for a given embed point.

The #RESTRICT structure defines the embed points where the code template will appear as a choice. The #CASE(%ControlType) structure limits the embed points to the ENTRY, SPIN, and COMBO controls, and the #CASE(%ControlEvent) structure limits the embed points to EVENT:Accepted and EVENT:Selected.

The #ACCEPT statement indicates these are appropriate embed points, while the #REJECT indicates all other control type and event embed points are not valid for the Code template to appear in as a choice.

All the #DISPLAY statements display their text to the programmer on the code template's prompt dialog. These describe the information the programmer needs to supply in the prompts.

The first #PROMPT asks for the name of the key to use in the file that will be used to validate the user's input. The REQ attribute indicates the programmer must supply this information.

The second #PROMPT asks for the name of the field in the key that contains the same information the user should enter into the control. Again, the REQ attribute indicates the programmer must supply this information.

The third #PROMPT asks for the name of the procedure to call if the lookup is unsuccessful. This would usually be a Browse procedure for the lookup file with a Select button to allow the user to choose the record containing the value they want for the control.

Again, the #DISPLAY statements display text to the programmer on the prompt dialog to describe the information the programmer needs to supply in the prompts.

The #IF(%ControlEvent='Accepted') structure generates an IF structure for EVENT:Accepted that detects when the control has the REQ attribute or the user has entered a value and #INSERTs the %CodeTPLValidationCode #GROUP to generate the source code for the data validation. The #ELSIF just unconditionally #INSERTs the %CodeTPLValidationCode #GROUP to generate the source code for the data validation.

If the event is anything other than EVENT:Accepted or EVENT:Selected, an error message is the only output generated.

## %CodeTPLValidationCode #GROUP

---

This #GROUP is the “workhorse” of the Code template. It generates the actual file lookup code to validate the data entry. It takes the information provided in the prompts and combines it with the %ControlUse symbol to generate a GET statement into the lookup file. If the GET is successful, the data is valid. If not, it calls the lookup procedure.

```
#GROUP(%CodeTPLValidationCode)
  %LookupField = %ControlUse
#FIND(%Field,%LookupField)
  GET(%File,%LookupKey)
  IF ERRORCODE()
    GlobalRequest = SelectRecord
    %LookupProcedure
    LocalResponse = GlobalResponse
    GlobalResponse = RequestCancelled
    IF LocalResponse = RequestCompleted
      %ControlUse = %LookupField
#IF(%ControlEvent='Accepted')
  ELSE
    SELECT(%Control)
    CYCLE
#ENDIF
  END
#IF(%ControlEvent='Selected')
  SELECT(%Control)
#ENDIF
  END
```

```
#<! Move value for lookup
#! FIX field for lookup
#!< Get value from file
#!< IF record not found
#!< Set Action for Lookup
#!< Call Lookup Procedure
#!< Save Returned Action
#!< Clear the Action Value
#!< IF Lookup successful
#!< Move value to control field
#! IF a Post-Edit Validation
#!< ELSE (IF Lookup NOT...)
#!< Select the control
#!< Go back to ACCEPT
#! END (IF a Pre-Edit...)
#!< END (IF Lookup successful)
#! IF a Pre-Edit Validation
#!< Select the control
#! END (IF a Pre-Edit...)
#!< END (IF record not found)
```

This #GROUP starts by generating the %LookupField = %ControlUse assignment. This assigns the control’s USE variable to the field named in the second prompt; the key field that should contain the correct value.

The #FIND(%Field,%LookupField) statement looks through all the fields in the data dictionary, looking for a matching field to the one contained in %LookupField. This fixes %Field and %File to the correct values to generate the GET(%File,%LookupKey) statement. This becomes a GET(file,key) form of the GET statement to get a single record from the lookup file with matching key field values.

The IF ERRORCODE() structure checks for a successful GET operation. If an error occurred, the GET was unsuccessful and the GlobalRequest = SelectRecord statement sets up the call to the lookup procedure, generated by the %LookupProcedure statement.

After return from the lookup procedure, LocalResponse = GlobalResponse saves the lookup procedure’s response code. Then the GlobalResponse = RequestCancelled statement cleans up so any other execution thread does not get an incorrect response. This must be done immediately, before the user has a chance to change execution threads.

The IF LocalResponse = RequestCompleted structure detects a user choice

from the lookup procedure and the `%ControlUse = %LookupField` statement assigns the choice to the control's USE variable.

The `#IF(%ControlEvent='Accepted')` detects when the Code template is generating for `EVENT:Accepted` and adds the ELSE clause to SELECT the control and CYCLE back to the top of the ACCEPT loop.

The END statement terminates the `IF LocalResponse = RequestCompleted` structure. The `#IF(%ControlEvent='Selected')` structure generates the SELECT statement for the control when generating for `EVENT:Selected`.

The END statement terminates the `IF ERRORCODE()` structure. Obviously, if there was no error on the GET statement, the data is valid and no further code is necessary.

## Control Template: *DOSFileLookup*

The *DOSFileLookup* Control template adds an ellipsis (...) button which leads the end user to a standard **Open File** dialog. You can specify a file mask, and a return variable to hold the end user's choice.

```
#CONTROL(DOSFileLookup,'Lookup a DOS file name'),WINDOW
CONTROLS
    BUTTON('...'),AT(,,12,12),USE(?LookupFile)
END
#BOXED('DOS File Lookup Prompts')
#PROMPT('File Dialog Header:',@S60),%DOSFileDialogHeader,REQ,DEFAULT('Choose a File')
#PROMPT('DOS FileName Variable:',FIELD),%DOSFileField,REQ
#PROMPT('Default Directory:',@S80),%DOSInitialDirectory
#PROMPT('Variable File Mask',CHECK),%DOSVariableMask
#ENABLE(%DOSVariableMask)
    #PROMPT('Variable Mask Value:',FIELD),%DOSVariableMaskValue
#ENDENABLE
#ENABLE(NOT %DOSVariableMask)
    #PROMPT('File Mask Description:',@S40),%DOSMaskDesc,REQ,DEFAULT('All Files')
    #PROMPT('File Mask',@S50),%DOSMask,REQ,DEFAULT('*.*')
    #BUTTON('More File Masks'),MULTI(%DOSMoreMasks,%DOSMoreMaskDesc & ' - ' & %|
                                     %DOSMoreMask)
        #PROMPT('File Mask Description:',@S40),%DOSMoreMaskDesc,REQ
        #PROMPT('File Mask',@S50),%DOSMoreMask,REQ
    #ENDBUTTON
#ENDENABLE
#ENDBOXED
#LOCALDATA
DOSDialogHeader      CSTRING(40)
DOSExtParameter      CSTRING(250)
DOSTargetVariable    CSTRING(80)
#ENDLOCALDATA
#ATSTART
#DECLARE(%DOSExtensionParameter)
#DECLARE(%DOSLookupControl)
#FOR(%Control),WHERE(%ControlInstance = %ActiveTemplateInstance)
    #SET(%DOSLookupControl,%Control)
#ENDFOR
#IF(%DOSVariableMask)
    #SET(%DOSExtensionParameter,%DOSVariableMask)
#ELSE
    #SET(%DOSExtensionParameter,%DOSMaskDesc & '|' & %DOSMask)
    #FOR(%DOSMoreMasks)
        #SET(%DOSExtensionParameter,%DOSExtensionParameter & '|' & %DOSMoreMaskDesc %|
            & '|' & %DOSMoreMask)
    #ENDFOR
#END
#ENDAT
#AT(%ControlEventHandler,%DOSLookupControl,'Accepted')
IF NOT %DOSFileField
    #INSERT(%StandardValueAssignment,'DOSTargetVariable',%DOSInitialDirectory)
ELSE
    DOSTargetVariable = %DOSFileField
END
#INSERT(%StandardValueAssignment,'DOSDialogHeader',%DOSFileDialogHeader)
#INSERT(%StandardValueAssignment,'DOSExtParameter',%DOSExtensionParameter)
IF FILEDIALOG(DOSDialogHeader,DOSTargetVariable,DOSExtParameter,0)
    %DOSFileField = DOSTargetVariable
    DO RefreshWindow
END
#ENDAT
```

This starts, as all Control templates must, with a `#CONTROL` statement. The `WINDOW` attribute allows you to populate it onto a window, but not onto a report. The `CONTROLS` section pre-defines the `BUTTON` control for the window.

The `#BOXED` structure places a box around all the prompts that display on the Actions tab for this Control template. The first `#PROMPT` asks for the text for the caption of the **Open File** dialog, and the next asks for the name of a variable to receive the end user's choice. The third allows you to explicitly set the directory in which the **Open File** dialog starts.

The fourth `#PROMPT` is a check box asking whether the programmer will explicitly set the file mask(s) for the **Open File** dialog, or use a variable to determine them at run time. When checked, the first `#ENABLE` activates the Variable Mask Value `#PROMPT` to get the name of the variable to use at run time. If not checked, the second `#ENABLE` activates its set of prompts to get each explicit file mask to pass to the **Open File** dialog.

The `#LOCALDATA` section defines three local variables that generate automatically as part of the procedure. These local variables are only used in the code generated by this Control template as the actual variables passed as parameters to the `FILEDIALOG` function.

The `#ATSTART` statement begins a section of template code that executes before any source code generates for the procedure. This means it is only appropriate to initialize user-defined template symbols and perform any necessary set up to generate correct source for the control template into the procedure. This section does not generate source code. The `#DECLARE` statements declare two symbols used only during source generation for this Control template.

`#FOR(%Control),WHERE(%ControlInstance=%ActiveTemplateInstance)` executes the enclosed `#SET` statement only for the single control populated by this Control template. The `#SET` statement then places the field equate label of the control into `%DOSLookupControl`.

The `#IF` structure checks whether the programmer checked the **Variable File Mask** box and either sets up the variable, or the explicit file masks to pass to the `FILEDIALOG` function. The `#ENDAT` statement terminates the `#ATSTART` section.

The next `#AT` generates Clarion code into the embed point for the Accepted event for the control populated by this Control template to perform the file lookup. The `IF NOT %DOSFileField` structure detects whether the user has performed the lookup. If they haven't the initial directory is assigned to the `DOSTargetVariable`. If the user has performed the lookup, the `ELSE` clause assigns the result of the previous lookup as the starting point for the next.

The two `#INSERT` statements create assignment statements to initialize the **File Open** dialog's title and file masks. Next, the `IF FILEDIALOG` structure

performs the actual lookup for the file. If the user selects a file from the **File Open** dialog, the selected filename is assigned to variable the user selected in the **DOS FileName Variable** prompt, then he DO RefreshWindow statement ensures that all data on the window is current. The #ENDAT statement terminates the #AT section.

## Extension Template: *DateTimeDisplay*

The *DateTimeDisplay* Extension template displays the date and/or time in either a display-only STRING control or a section of the status bar. Of course, the status bar should be declared on the window.

```
#EXTENSION(DateTimeDisplay,'Display the date and/or time in the current window') %|
    ,HLP('~TPLExtensionDateTimeDisplay'),PROCEDURE
#BUTTON('Date and Time Display'),AT(10,,180)
  #BOXED('Date Display...')
    #PROMPT('Display the current day/date in the window',CHECK) %|
        ,%DisplayDate,DEFAULT(0),AT(10,,150)
    #ENABLE(%DisplayDate)
      #PROMPT('Date Picture:',DROP('October 31, 1959|OCT 31,1959|10/31/59| %|
          10/31/1959|31 OCT 59|31 OCT 1959|31/10/59| %|
          31/10/1959|Other')),%DatePicture %|
          ,DEFAULT('October 31, 1959')
    #ENABLE(%DatePicture = 'Other')
      #PROMPT('Other Date Picture:',@S20),%OtherDatePicture,REQ
    #ENDENABLE
    #PROMPT('Show the day of the week before the date',CHECK),%ShowDayOfWeek %|
        ,DEFAULT(1),AT(10,,150)
    #PROMPT('&Location of Date Display:',DROP('Control|Status Bar')) %|
        ,%DateDisplayLocation
    #ENABLE(%DateDisplayLocation='Status Bar')
      #PROMPT('Status Bar Section:',@n1),%DateStatusSection,REQ,DEFAULT(1)
    #ENDENABLE
    #ENABLE(%DateDisplayLocation='Control')
      #PROMPT('Date Display Control:',CONTROL),%DateControl,REQ
    #ENDENABLE
  #ENDENABLE
#ENDBOXED
#BOXED('Time Display...')
  #PROMPT('Display the current time in the window',CHECK),%DisplayTime %|
      ,DEFAULT(0),AT(10,,150)
  #ENABLE(%DisplayTime)
    #PROMPT('Time Picture:',DROP('5:30PM|5:30:00PM|17:30|17:30:00| %|
        1730|173000|Other')),%TimePicture %|
        ,DEFAULT('5:30PM')
    #ENABLE(%TimePicture = 'Other')
      #PROMPT('Other Time Picture:',@S20),%OtherTimePicture,REQ
    #ENDENABLE
    #PROMPT('&Location of Time Display:',DROP('Control|Status Bar')) %|
        ,%TimeDisplayLocation
    #ENABLE(%TimeDisplayLocation='Status Bar')
      #PROMPT('Status Bar Section:',@n1),%TimeStatusSection,REQ,DEFAULT(2)
    #ENDENABLE
    #ENABLE(%TimeDisplayLocation='Control')
      #PROMPT('Time Display Control:',CONTROL),%TimeControl,REQ
    #ENDENABLE
  #ENDENABLE
#ENDBOXED
#ENDBUTTON
#ATSTART
  #DECLARE(%TimerEventGenerated)
  #IF(%DisplayDate)
    #DECLARE(%DateUsePicture)
    #CASE(%DatePicture)
      #OF('10/31/59')
        #SET(%DateUsePicture,'@D1')
      #OF('10/31/1959')
```

```

    #SET(%DateUsePicture,'@D2')
#OF('OCT 31,1959')
    #SET(%DateUsePicture,'@D3')
#OF('October 31, 1959')
    #SET(%DateUsePicture,'@D4')
#OF('31/10/59')
    #SET(%DateUsePicture,'@D5')
#OF('31/10/1959')
    #SET(%DateUsePicture,'@D6')
#OF('31 OCT 59')
    #SET(%DateUsePicture,'@D7')
#OF('31 OCT 1959')
    #SET(%DateUsePicture,'@D8')
#OF('Other')
    #SET(%DateUsePicture,%OtherDatePicture)
#ENDCASE
#ENDIF
#IF(%DisplayTime)
#DECLARE(%TimeUsePicture)
#CASE(%TimePicture)
#OF('17:30')
    #SET(%TimeUsePicture,'@T1')
#OF('1730')
    #SET(%TimeUsePicture,'@T2')
#OF('5:30PM')
    #SET(%TimeUsePicture,'@T3')
#OF('17:30:00')
    #SET(%TimeUsePicture,'@T4')
#OF('173000')
    #SET(%TimeUsePicture,'@T5')
#OF('5:30:00PM')
    #SET(%TimeUsePicture,'@T6')
#OF('Other')
    #SET(%TimeUsePicture,%OtherTimePicture)
#ENDCASE
#ENDIF
#ENDAT
#AT(%DataSectionBeforeWindow)
    #IF(%DisplayDate AND %ShowDayOfWeek)
DisplayDayString STRING('Sunday Monday Tuesday WednesdayThursday %|
                        Friday Saturday ')
DisplayDayText   STRING(9),DIM(7),OVER(DisplayDayString)
    #ENDIF
#ENDAT
#AT(%BeforeAccept)
    #IF(%DisplayTime OR %DisplayDate)
IF NOT INRANGE(%Window{Prop:Timer},1,100)
    %Window{Prop:Timer} = 100
END
#INSERT(%DateTimeDisplayCode)
    #ENDIF
#ENDAT
#AT(%WindowEventHandling,'Timer')
    #SET(%TimerEventGenerated,%True)
    #IF(%DisplayDate OR %DisplayTime)
#INSERT(%DateTimeDisplayCode)
    #ENDIF
#ENDAT
#AT(%WindowOtherEventHandling)
    #IF(%DisplayDate OR %DisplayTime)
        #IF(NOT %TimerEventGenerated)
IF EVENT() = EVENT:Timer

```

```
#INSERT(%DateTimeDisplayCode)
END
    #ENDIF
#ENDIF
#ENDAT
```

An Extension template starts with the `#EXTENSION` statement. The `PROCEDURE` attribute specifies the Extension template is available only at the procedure level, not the global level of the application.

The `#BUTTON` structure creates a separate page for all the prompts for this Extension template. These prompts ask the programmer for the format of the date and/or time to display, and whether to display them in a control or the status bar.

The `#ATSTART` statement begins a section of template code that executes before any source code generates for the procedure. This means it is only appropriate to initialize user-defined template symbols and perform any necessary set up to generate correct source for the control template into the procedure. This section does not generate source code.

The `#DECLARE(%TimerEventGenerated)` statement declares a symbol used only in this Extension template. It is used to flag whether an `OF EVENT:Timer` clause has been generated for the procedure.

The `#IF(%DisplayDate)` structure sets up to display the date by declaring a symbol to contain the programmer's choice of date formats. The `#CASE` structure assigns that choice to the `%DateUsePicture` symbol. The `#IF(%DisplayTime)` structure sets up to display the time by declaring a symbol to contain the programmer's choice of date formats. The `#CASE` structure assigns that choice to the `%TimeUsePicture` symbol. The `#ENDAT` statement terminates the `#ATSTART` section.

The next `#AT` generates code into the embed point that appears immediately before the window data structure. The `#IF(%DisplayDate AND %ShowDayOfWeek)` structure generates two local variable declarations for the procedure if the programmer is displaying the date with the day of week.

The next `#AT` generates code into the embed point that appears immediately before the `ACCEPT` loop. The `#IF(%DisplayTime OR %DisplayDate)` structure generates code that ensures the window has its `TIMER` attribute set. The `IF NOT INRANGE(%Window{Prop:Timer},1,100)` detects the lack of the attribute, then `%Window{Prop:Timer} = 100` sets it to one second. The `#INSERT(%DateTimeDisplayCode)` adds the code that updates the display.

The next `#AT` generates code into the embed point for `EVENT:Timer`. This embed point only appears if the programmer has placed a `TIMER` attribute on the window. Therefore, the `#SET(%TimerEventGenerated,% True)` statement signals that code was generated in this embed point. The

#IF(%DisplayTime OR %DisplayDate) structure ensures the #INSERT(%DateTimeDisplayCode) statement generates the code that updates the display every time EVENT:Timer is processed.

The next #AT generates code into the “Other Window Event Handling” embed point. This is the ELSE clause of the CASE EVENT() structure to handle field-independent events. #IF(NOT %TimerEventGenerated) detects that the previous #AT did not generate code because the programmer did not place the TIMER attribute on the window. Therefore, the IF EVENT() = EVENT:Timer structure is necessary for the code that updates the display whenever EVENT:Timer occurs.

## %DateTimeDisplayCode #GROUP

---

This #GROUP generates the code to actually display the Date and/or Time.

```
#GROUP(%DateTimeDisplayCode)
  #IF(%DisplayDate)
    #IF(%ShowDayOfWeek)
      #CASE(%DateDisplayLocation)
        #OF('Control')
          %DateControl{Prop:Text} = CLIP(DisplayDayText[(TODAY())%7)+1]) & ', ' & %|
                                FORMAT(TODAY(),%DateUsePicture)
          DISPLAY(%DateControl)
        #ELSE
          %Window{Prop:StatusText,%DateStatusSection} = CLIP(DisplayDayText[( %|
                                TODAY())%7)+1]) & ', ' & FORMAT(TODAY(),%DateUsePicture)
        #ENDCASE
      #ELSE
        #CASE(%DateDisplayLocation)
          #OF('Control')
            %DateControl{Prop:Text} = FORMAT(TODAY(),%DateUsePicture)
            DISPLAY(%DateControl)
          #ELSE
            %Window{Prop:StatusText,%DateStatusSection} = FORMAT(TODAY(),%DateUsePicture)
          #ENDCASE
        #ENDIF
      #ENDIF
    #IF(%DisplayTime)
      #CASE(%TimeDisplayLocation)
        #OF('Control')
          %TimeControl{Prop:Text} = FORMAT(CLOCK(),%TimeUsePicture)
          DISPLAY(%DateControl)
        #ELSE
          %Window{Prop:StatusText,%TimeStatusSection} = FORMAT(CLOCK(),%TimeUsePicture)
        #ENDCASE
      #ENDIF
    #ENDIF
```

The #IF(%DisplayDate) structure generates the code to display the date. The #IF(%ShowDayOfWeek) structure detects the programmer’s choice to display the day along with the date, then #CASE(%DateDisplayLocation) generates the code to display into a STRING display-only control for the #OF('Control') clause.

The assignment statement concatenates the day of the week (from the `DisplayDayText[(TODAY() %% 7)+1]` expression) with the formatted date (from the `FORMAT(TODAY(),%DateUsePicture)` expression) into the `STRING(text)` property (the `%DateControl{Prop:Text}` property). The `%%` generates as a single `%` (modulus operator) for the `TODAY() % 7 + 1` expression to get the correct day of the week text from the `DisplayDayText` array. The `#ELSE` clause of the `#CASE(%DateDisplayLocation)` assigns the same expression to the status bar section the programmer chose for the date display.

The `#ELSE` clause of the `#IF(%ShowDayOfWeek)` structure performs the same assignments, without the day of the week. The `#IF(%DisplayTime)` structure performs the same type of assignments of the formatted time to either a `STRING` display-only control or the status bar.

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