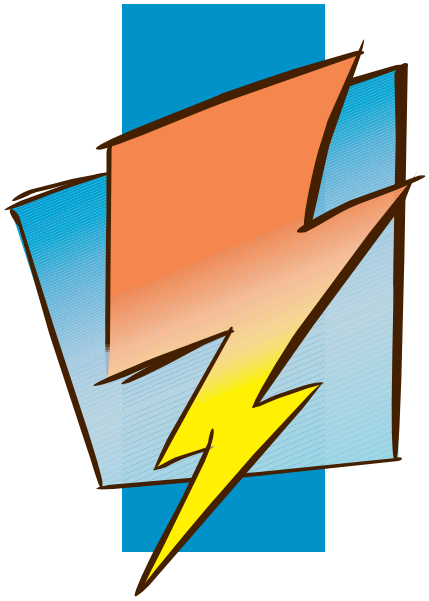
Open Watcom OS/2 Help Compiler

User's Guide



Version 2.0

Open Watcom

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For more information please visit https://github.com/open-watcom/open-watcom-v2 .

Preface

The *Open Watcom OS/2 Help Compiler User's Guide* describes how to use the Open Watcom OS/2 Help Compiler to compile tagged text files (*.ipf) into OS/2 help files (*.inf or *.hlp) for use with the OS/2 Information Presentation facility. The Open Watcom OS/2 Help Compiler runs under DOS/4G, OS/2, Windows 9x, Windows NT, and Linux.

Acknowledgments

This book was produced with the Open Watcom GML electronic publishing system, a software tool developed by WATCOM. In this system, writers use an ASCII text editor to create source files containing text annotated with tags. These tags label the structural elements of the document, such as chapters, sections, paragraphs, and lists. The Open Watcom GML software, which runs on a variety of operating systems, interprets the tags to format the text into a form such as you see here. Writers can produce output for a variety of printers, including laser printers, using separately specified layout directives for such things as font selection, column width and height, number of columns, etc. The result is type-set quality copy containing integrated text and graphics.

July, 1997.

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The Open Watcom OS/2 Help Compiler

1 Introduction

Documentation for programs in the form of help files can make the user's life much easier. The Open Watcom OS/2 Help Compiler produces such documentation for the OS/2 operating system's Information Presentation Facility (IPF). It consumes text documents containing special IPF tags, commands, and (optionally) bit-mapped graphics, and outputs help files in the .inf or .hlp formats.

The IPF tags are similar to other SGML tags, the most familiar of which is likely HTML. The IPF tags allow you, the documentation author, to:

- Specify the source (highlighted text or regions of an image) and destination of hyper-link jumps
- Set right and left text margins
- Create lists, footnotes, notes, and various other kinds of notices
- Create tables
- Add illustrations in the form of examples, text figures, and bit-mapped graphics
- Change the size, style, and color of displayed text
- Change whether text spacing and new lines in the source are significant or not
- Customize the behavior of windows in the help viewer
- Create communication links to other applications

This document provides a basic description of how tags are used ("Using IPF Tags" on page 7) as well as a complete reference for each tag ("IPF Tag Reference" on page 13). For more advanced topics, please refer to IBM's "IPF Programming Guide and Reference" (ipfref.inf) which is available on the internet.

2 Using the Open Watcom OS/2 Help Compiler

The Open Watcom OS/2 Help Compiler is a command line utility. It may be invoked as follows:

```
wipfc [options] input.ipf
```

2.1 Environment Variables

The Open Watcom OS/2 Help Compiler depends upon several environment variables that must be set correctly before wipfc is run.

WIPFC This must be set to %watcom%\wipfc, which is the location of the files defining the local language encoding.

IPFCARTWORK Must point to your source of bit-mapped graphic images if your source file uses any.

IPFCIMBED Must point to your source of input files if your main source file includes other source files.

TMP Must point to a directory where temporary files that are generated by Open Watcom OS/2 Help Compiler can be stored.

2.2 Command Line Flags

The behavior of the Open Watcom OS/2 Help Compiler can be altered using command line options. Each flag begins with a delimiter. Either '-' or '/' can be used. Each flag is given a longer descriptive name here, but only the first character after the delimiter is actually significant. Flag names are not case-sensitive.

2.2.1 Switches

The switches change the state of the Open Watcom OS/2 Help Compiler in a yes/no fashion.

Name	*Description*
inf	Generate an 'inf' file. Otherwise a 'hlp' file is created by default.
quiet	Operate quietly, suppressing the usual copyright information display.
suppress-search	Suppress the generation of the full-text search table in the output file. This makes the help file smaller, but the user can't search for individual words.
xref	Generate additional output information, including a cross-reference of identifiers. This is saved in a file 'output-name.log' where 'output-name' is the base name of the help file being created.

2.2.2 Options

The options give additional information to the Open Watcom OS/2 Help Compiler Each option is immediately followed by the information to be passed into wipfc.

2.2.2.1 localization

Help files can be created for different locales. This is done by using the **localization** option in the form of

```
-l xx_YY
```

where xx_YY is the name of the locale (for example, en_US). The localization information is store in a text file (en_US.nls in this case). You can create your own locales from the sample file xx_YY.nls, but you may also need to create a corresponding entity file containing the definitions of "IPF Symbols" on page 45.

2.2.2.2 output-name

You can specify the name of the help file that wipfc generates by using the **output-name** option. For example,

```
-o MyHelp
```

will cause wipfc to generate an output file (either inf or hlp depending on the -inf switch) with a base name of 'MyHelp'

2.2.2.3 warning-level

The Open Watcom OS/2 Help Compiler generates three different levels of warnings (1, 2, and 3). By default, all levels of warnings are displayed. You can suppress the display of warnings higher than level **n** by using the **warning-level** option. For example,

```
-w1
```

suppresses all warnings higher than level 1.

3 Using IPF Tags

Source files for the Open Watcom OS/2 Help Compiler consist of text (words, whitespace, punctuation, and entity references), markup tags, and commands. Each markup tags is described in detail elsewhere ("IPF Tag Reference" on page 13), as are the commands ("Using IPF Commands" on page 11).

Tags come in four flavors:

1. Tags that appear in the document header and control how the document behaves.
2. Tags that establish blocks. These tags can contain other tags as well as text.
3. Tags that are in-line and contain text or other in-line tags.
4. Formatting tags that can appear anywhere, but are usually in-line.

3.1 Text

Text consists of words, whitespace, punctuation, and entity references (symbols).

3.1.1 Words

Words consist of letters and/or numbers (ABC123 is a single word, for example). Which letters are valid depends upon the current locale. For the default locale (en_US, code page 850), the upper and lower case ASCII letters are allowed (A-Z, a-z). Other letters can be included via entity references.

3.1.2 Whitespace

Whitespace consists of spaces, tabs, and new-line characters. Usually, single whitespace characters are not significant, but multiple whitespace characters are. Tab characters are not expanded, so count as a single whitespace character. New-lines are generally ignored.

Some tags create blocks where some or all forms of whitespace become significant. In these cases, new-line characters will cause line breaks and the text will be shown as you have formatted it. If the block is monospaced, spaces as well as new-lines will be significant.

3.1.3 Punctuation

Punctuation is not part of a word. 'ABC123' is a single word, but 'ABC-123' is actually two words ('ABC' and '123') and a punctuation ('-').

Some forms of punctuation are used to delimit tags or entity references. When a colon (':') or ampersand ('&') begin a word, that word is treated as a tag or entity reference, respectively. Likewise, a period ('.') ends both tags and entity references. If you need to use such constructs, replace the punctuation character with an entity reference ('&colon.', '&amp.', and '&per.').

3.1.4 Entity References (Symbols)

Entities are symbolic references to single characters. During processing of the source file, valid entity references are removed and the matching single character is substituted. This allows you to include special characters that are outside the normal character set (for example, characters with diacriticals) in words.

Unless the entity reference is a punctuation symbol, a string of ...-word-entity-word-... (in any order) is considered to be a single word.

Unrecognized entity references will cause wipfc to generate a warning. Note that all entity references are case sensitive: &Alpha. and &alpha. are two different things.

3.2 Tag Syntax

All tags begin with a colon (':') and end with a period ('.'). In addition, many tags have flags or attribute=value pairs that appear inside the tag between the tag name and the end-of-tag delimiter ('.'). If you forget the end-of-tag delimiter, the numerous warnings that wipfc generates will be sure to let you know.

3.3 Tag Attributes

A tag may have one or more **attributes.** An attribute contains additional information that a tag needs. The attribute has a name, and may also have a value or keyword assigned to it.

For example, heading tags have a 'res' attribute that specifies a window identifier (a target for hyper-linked jumps).

```
:h1 res=001.How to make Popcorn
```

In this case, res is assigned the value 001.

Notice that attributes are part of the tag, and the end-of-tag delimiter always follows the last attribute.

Many tags have multiple attributes. If you like, you can place them on different lines or all on a single line. If you place them on different lines, however, the attribute and its assigned value must be on the same line. Spaces are allowed between the attribute, '=', and the value. If spaces are required within the value, the value must be enclosed in matching quotation marks ('', or "", but not '" or "').

Optional attributes all have default values and do not need to be specified unless you need to change the default. Other attributes are required, and wipfc will issue a warning if they are not specified.

Attributes may be specified in any order within a tag.

Some attributes may not have a value, in which case the presence of the attribute simply acts as a boolean flag. For those attributes that do have values, values can be numeric, text strings (with spaces, if quoted), or keywords. For example, the color tag specifies the foreground and/or background color for text. Only certain colors are supported, and each has a keyword:

default
blue
red

pink
green
cyan
yellow
neutral
brown
darkgray
darkblue
darkred
darkpink
darkgreen
darkcyan
black
palegray

3.4 End Tags

Some tags require matching end tags to form an enclosing block of code. The end tag has the same name as the tag prefixed with the letter 'e'. For example, if "tag" had an end tag, it would be "etag".

3.5 Nesting Tags

Most tags can be arbitrarily nested within other tags. However, some tags can *only* be nested inside other tags. For example, the list-item tag (li) can only appear between opening and closing list tags.

In addition, there are a few tags that restrict the kinds of elements that they can contain. If you try to include a tag where it doesn't belong, wipfc will issue a warning, the tag will be ignored, and the result will not be what you hoped for!

3.6 Tags Requiring Text

Some tags (for example, heading tags) have text associated with them. This text can appear either immediately after the end-of-tag delimiter ('.') or on the next line. Note, however, that in this case the end-of-tag delimiter must be immediately followed by a new-line character. No other form of whitespace is allowed.

3.7 Units of Measure

Several tags have attributes that are measurements of one sort or another (window origin and extent, for example). Dimensional measurements can be one of three types: **absolute, relative,** or **dynamic.**

Absolute measurements consist of a number followed by a letter that indicates the unit of measurement. The units are:

- c: the average character width of the default system font.
- x: pixels.
- p: typographical points (about 1/72 inch).

Relative measurements consists of a number followed by the percent sign (%). The values is a percentage of the parent window width or height.

Dynamic measurements consist of a keyword. The actual value is computed at run-time based on the current size and position of the parent window. The keywords for x-axis values are:

- left: flush left in the parent window
- center: centered in the parent window
- right: flush right in the parent window

The keywords for y-axis values are:

- top: at the top of the parent window
- center: centered in the parent window
- bottom: at the bottom of the parent window

Note that the coordinate system for all window measurements has its origin at the lower left corner. Increasingly positive values represent movement upward and rightward.

4 Using IPF Commands

In addition to tags, the Open Watcom OS/2 Help Compiler recognizes 5 commands (control words) that invoke special processing procedures. Each command must start with a period '.' in the first column of a line, followed by the name of the command. Commands that start anywhere except the first column of a line will be treated as regular text.

The Open Watcom OS/2 Help Compiler recognizes these commands:

Command	*Description*
.*	Begin a comment.
.br	Add a line break (start a new line).
.ce	Center a single line of text.
.im filename	Imbed (include) **filename** as if it were text in the current file.
.nameit	Define a macro for text substitution.

4.1 Line comment

Comments are always useful. They allow you to document your documentation! Any text on a line beginning with the '.*' command is passed over without further processing.

Don't put a comment within a tag, or between a tag and text that must immediately follow it.

4.2 Line break

There are times when you want to interrupt the normal flow of text and begin a new line. The '.br' command does just that. It must be the only thing on the line.

Any text following this command on the same line will be ignored.

4.3 Line center

The '.ce' command centers the line of text that follows it.

The single line of text may not contain any other tags, but may contain nameit (macro) and entity references.

4.4 Include file

The Open Watcom OS/2 Help Compiler allows source files to be embedded in other source files. The top-most file is the master file.

The imbed command '.im' is followed by the name of the file to include. This file is then processed as if it were in-line with the document including it.

The ability to include other files makes it possible to break large documents into smaller, more manageable logical chunks.

Note: The embedded files cannot contain the userdoc and euserdoc tags (see "userdoc" on page 36). Only the master document may contain these tags.

The embedded files must be in the current directory or in a directory listed in the IPFCIMBED environment variable (see "Environment Variables" on page 5). Otherwise, a full path name must be used.

4.5 Macro

The '.nameit' command creates a text-substitution macro. This command takes two parameters (**symbol** =name and **text** ='string') that can appear in any order.

The **symbol** parameter is the name of the macro. Symbol names were limited to 10 characters (0-9A-Za-z) for the original OS/2 help compiler, but Open Watcom OS/2 Help Compiler does not have this restriction. Note that the '&' character is not part of the symbol name, but is used when referencing the symbol.

The **text** parameter defines 'string' as the text to be substituted on each occurrence of &name. in the text.

A '.nameit' symbol is used in the same way as an entity reference.

5 IPF Tag Reference

This section acts as a reference, describing how wipfc implements each tag.

5.1 Overview

Tags are the heart of IPF markup and come in four flavors:

1. Tags that appear in the document header. These tags control how the document behaves.
2. Tags that establish blocks. These tags can contain other tags as well as text. List-blocks and tables are special cases in that they can only contain other tags and cannot directly contain text.
3. Tags that are in-line. These tags can contain text or other in-line tags.
4. Formatting tags that can appear anywhere, but are usually in-line.

This diagram classifies each tag and shows which tags can contain which other tags. Tags that are marked as containing 'in-line' can also contain formatting and text.

```
Tag Name             Classification
userdoc
  title              (doc header)
  docprof            (doc header)
  ctrldef            (doc header)
    pbutton          (doc header)
    ctrl             (doc header)
  ectrldef           (doc header)
  fn                 (block)
    block
    in-line
  efn
  h1                 (block)
    h2
      h3
        h4
          h5
            h6
    acviewport       (block)
    artlink          (in-line)
      link
    eartlink
    artwork          (in-line)
    caution          (block)
      in-line
    ecaution
    cgraphic         (block)
      in-line
    ecgraphic
    color            (format)
    ddf              (block)
    dl               (list-block)
      dthd           (block)
        in-line
      ddhd           (block)
        in-line
      dt             (block)
        in-line
      dd             (block)
        in-line
        block
        list-block
    edl
    fig              (block)
      in-line
      figcap         (block)
        text
    efig
    font             (format)
    hdref            (in-line)
    hide             (format)
      block
      in-line
    ehide
    hp1 - hp9        (format)
      block
      in-line
    ehp1 - ehp9
```

```
i1                (block)
  text
i2                (block)
  text
icmd              (block)
  text
isyn              (block)
  text
lines             (block)
  in-line
elines
link              (in-line)
  in-line
elink
lm                (format)
note              (block)
  in-line
nt                (block)
  in-line
  block
ent
ol                (list-block)
  li              (block)
    in-line
  lp              (block)
    in-line
  list-block
eol
p                 (block)
  in-line
parml             (list-block)
  pt              (block)
    in-line
  pd              (block)
    in-line
  list-block
eparml
rm                (format)
sl                (list-block)
  li              (block)
    in-line
  lp              (block)
    in-line
  list-block
esl
table             (block)
  row             (block)
    c             (block)
      lines       (block)
        text
      elines
      in-line
etable
ul                (list-block)
  li              (block)
    in-line
  lp              (block)
    in-line
  list-block
```

```
      eul
      warning          (block)
        in-line
      ewarning
      xmp              (block)
        in-line
      exmp
    euserdoc
```

5.2 Reference

The Open Watcom OS/2 Help Compiler follows the behavior of the IBM OS/2 Help Compiler as documented in the "ipfref.inf" help file. This means that the behavior of the two compilers is very similar but not identical, since the IBM compiler allows certain things that the documentation says it should not. The entry for each tag that follows describes how the Open Watcom OS/2 Help Compiler treats each tag.

5.2.1 acviewport

Description: This tag creates a child window within the current window (page). The contents of this child window is controlled by an application via a dynamic link library.

Attributes:

dll='text' The name of the dynamic link library containing the code that controls the current viewer window.

objectname='text'
The entry point (function name) in the dll to be called. Case sensitive.

objectinfo='text'
Parameters to be passed to the dll function.

objectid='text' An identifier to associate the window with the object.

vpx=measurement
The x origin of the child window. May be absolute, relative, or dynamic. See "Units of Measure" on page 9.

vpy=measurement
The y origin of the child window. May be absolute, relative, or dynamic. See "Units of Measure" on page 9.

vpcx=measurement
The width of the child window. May be absolute, relative, or dynamic. See "Units of Measure" on page 9.

vpcy=measurement
The height of the child window. May be absolute, relative, or dynamic. See "Units of Measure" on page 9.

Classification: Block

May contain: None

See also: "ddf" on page 19

5.2.2 artlink

Description: The artlink tag is used in conjunction with the artwork tag to define rectangular regions of a bitmap that each act as a hypergraphic link.

Note The artlink tag must immediately follow the artwork tag that declares the bit-mapped image, or be included in a file referenced from the artwork tag.

Classification: In-line

May contain: link

Closing tag: The closing eartlink is required.

See also: "artwork"

5.2.3 artwork

Description: The artwork tag declares a bit-mapped image to be included in the help file. Windows and OS/2 BMP files are supported. wipfc looks for images in the directories pointed to by the IPFCARTWORK environment variable (see "Environment Variables" on page 5).

Attributes:

name='filename.ext'
The name of the bitmap image file. This attribute is required.

align=left | center | right
Specifies how the image is to be aligned in the current window. Can be one of left, center, or right.

linkfile='filename.ext'
A direct reference to a file containing artlink/eartlink tags and its associated link tags. This allows the image to act as a hyper-graphic link.

runin This flag places the image within the line of text surrounding it. Otherwise, it acts as a block with the text appearing above and below.

fit This flag causes the image to be scaled to fill the window. Note that this may distort the image if the aspect ratio of the window and image differ.

Classification: In-line

May contain: None

See also: "artlink"

5.2.4 caution

Description: Displays a locale-specific cautionary message ("Caution: " in the en_US locale) followed on the next line by the contents enclosed by the caution tag block.

Closing tag: The closing ecaution is required.

Attributes:

text='message' Use 'message' instead of 'CAUTION: ' as the introductory text.

Classification: Block

May contain: Text, Formatting, In-line, Block (except acviewport, fn, h1-h6), List-block

See also: "note" on page 31, "nt" on page 31, "warning" on page 36

5.2.5 cgraphic

Description: Creates a "text graphic." Any text in the cgraphic block will be rendered mono-spaced, and spaces and new-lines will be honored. If the text does not fit within the window, it will be clipped. Although in-line formatting is allowed, mixing bold and normal fonts will throw the spacing off.

Closing tag: The closing ecgraphic is required.

Classification: Block

May contain: Text, Formatting, In-line

See also: "artwork" on page 17, "fig" on page 22, "lines" on page 28

5.2.6 color

Description: Changes the fore- and background color of the text. The color change remains in effect until another color is specified or the next heading tag (h1 - h6) is reached.

Attributes:

fc=default | black | blue | red | pink | green | cyan | yellow | neutral | brown (a synonym for neutral) | darkgray | darkblue | darkred | darkpink | darkgreen | darkcyan | palegray
This sets the foreground color of the text.

bc=default | black | blue | red | pink | green | cyan | yellow | neutral | brown (a synonym for neutral) | darkgray | darkblue | darkred | darkpink | darkgreen | darkcyan | palegray
This sets the background color of the text.

Classification: Formatting

May contain: Text, Formatting, In-line, Block, List-block

5.2.7 ctrl

Description: Defines which push-buttons are displayed in the control area, and where. For on-line documents, the default push-buttons are: Previous, Search, Print, Index, Contents, Back, Forward, Tutorial (if a tutorial is present). These are displayed in the control area of the cover window. For help windows, the default buttons are: Previous, Search, Print, Index, Tutorial (if a tutorial is present).

Attributes:

ctrlid=text Specifies the id by which this control group can be referenced. Alphanumeric. Duplicate ids are not allowed.

controls='search print index contents esc back forward custom-id'
A space-separated list of the ids of the buttons you want to display, in the order to be displayed. If you define your own button (using the pbutton tag), use the id from that tag as the custom-id.

page Put the buttons in the control area of a page.

coverpage Put the buttons in the control area of the cover (main) page.

Conditions The ctrl tag must be enclosed in a ctrldef block, and must follow all pbutton tags

Classification: Document Header

May contain: None

See also: "ctrldef", "pbutton" on page 33

5.2.8 ctrldef

Description: Defines a control area and its contents. It must follow the docprof tag and precede the first h1 tag.

Closing tag: The closing ectrldef is required.

Classification: Document Header

May contain: pbutton, ctrl

See also: "docprof" on page 21, "ctrl", "pbutton" on page 33

5.2.9 ddf

Description: Display dynamically formatted text in an application-controlled window.

Attributes:

res=number The resource id number. Must be between 1 and 64000.

Classification: Block

May contain: None

See also: "acviewport" on page 16

5.2.10 dl

Description: Begin a definition list (a sequence of terms and their definitions).

Closing tag: The closing edl is required.

Attributes:

compact Omit inserting a blank line between each term-description pair.

tsize=number Sets the width of the "term " column (the default is 10).

break=none | fit | all
Controls how a description follows a term. If break is set to "none", descriptions are on the same line as the term, even if the length of the term exceeds "tsize" characters. If break is set to "fit", descriptions are placed on the next line only if the length of the term exceeds "tsize" characters. If break is set to "all" descriptions are always placed on the next line.

Conditions: The dthd and ddhd tags must occur before any dt and dd tags. Multiple consecutive dt tags are allowed (synonyms), but only one dd tag is allowed for each set of dt tags.

Classification: List-block

May contain: "dthd", "ddhd" on page 21, "dt" on page 21, "dd" on page 21, Block, List-block

See also: "ol" on page 32, "parml" on page 32, "ul" on page 35, "sl" on page 34

5.2.10.1 dthd

Description: The term header for a definition list. It acts as a column title for all term elements.

Conditions: Must appear before the first ddhd, dt, or dd tag.

Classification: Block

May contain: Text, Formatting, In-line

See also: "ddhd" on page 21

5.2.10.2 ddhd

Description: The definition header for a definition list. It acts as a column title for all definition elements.

Conditions: Must appear after a dthd tag and before the first dt or dd tag.

Classification: Block

May contain: Text, Formatting, In-line

See also: "dthd" on page 20

5.2.10.3 dt

Description: A term to be defined.

Classification: Block

May contain: Text, Formatting, In-line

See also: "dd"

5.2.10.4 dd

Description: A definition of a term.

Classification: Block

May contain: Text, Formatting, In-line

See also: "dt"

5.2.11 docprof

Description: Describes the document profile, which includes which (if any) dynamic link librarys to load, what level headers trigger new pages, where controls are displayed. The tag must follow the userdoc tag and (if present) the title tag.

Attributes:

toc=numbers Controls which heading levels are included in the table of contents. For example, ’123’ (the default) places headings defined by the h1, h2, and h3 tags in the table of contents. The numbers must be consecutive, beginning with 1.

dll=’text’ Specifies a dll to load. This dll can act as a communication object and alter the behavior of the viewer.

objectname=’text’
The dll entry point.

objectinfo='text'
Parameters to pass to the dll.

ctrlarea=none | coverpage | page | both
Specifies where the control area that contains push buttons is located. If 'page' is specified, place the control area on the text window. If 'coverpage' is specified, place the control area on the cover page. If 'both' is specified, place the control are in both locations. If 'none' is specified, suppress the control area.

Classification: Document Header

May contain: None

5.2.12 fig

Description: A block of text representing a figure. A proportional font is used, but spaces and line breaks are honored so that the text is layed out as entered. If the text exceeds the current window dimensions, it will be clipped.

Closing tag: The closing efig is required.

Classification: Block

May contain: Text, Formatting, In-line, figcap

See also: "cgraphic" on page 18, "figcap", "lines" on page 28

5.2.13 figcap

Description: Specifies the title for a figure. This tag must occur in a fig/efig block, either at the beginning or end of the figure. The caption text must be on the same line as the tag, or on the next line.

Classification: Block

May contain: Text

See also: "fig"

5.2.14 font

Description: Change the font face, size, or encoding for the text in the page (fonts reset at the next header defining a new page).

Attributes:

facename='text'
Sets the name of the font to use. If set to 'default', resets the font to the default face and size. This attribute is required.

size=HxW Sets the height and width of the font. If either value is 0, resets the font to the default face and size. This attribute is required. The 'x' separating the numbers is required.

codepage=number
Sets the encoding of the displayed text. The value is a 3 digit number.

Classification: Formatting

May contain: Text, Formatting, In-line, Block, List-block

5.2.15 fn

Description: Defines a pop-up window that acts as a footnote. The window is activated when the user clicks a link.

Closing tag: The closing efn is required.

Attributes:

id=text Specifies a unique alphanumeric identifier used as the target of a link tag. This attribute is required.

Conditions: The index tags (i1, i2, icmd, isyn) are not allowed. Footnotes cannot be nested within other footnotes, nor can they contain headings (h1 - h6). The link to a footnote cannot appear in a child window. The text of footnotes is not searchable.

Classification: Block

May contain: Text, Formatting, Block (except fn, h1 - h6), List-block

See also: "link" on page 28

5.2.16 h1 - h6

Description: A heading tag defines a new page (window), provided the heading level is less than the maximum value set using the docprof tag. The text of the header immediately follows the close of the tag, either on the same or the next line. The attributes of the heading tag can be used to set the properties of the window that displays the page of information. Heading tags must appear in consecutive ascending (but not descending) order. That is, you cannot go from h1 to h3 without an intervening h2, but you can go from h3 to h1.

Attributes:

res=number Specify the resource id of the header. It must be in the range of 1 to 64000. This attribute is required for HLP files.

id=text The id of the header. Alphanumeric.

name=text The name of the header. Alphanumeric.

global If set, this page can be linked to by an external HLP or INF file.

tutorial=text Specifies the file name of the tutorial, and adds the tutorial button to the control area.

x=measurement
The x origin of the window in the parent window. See "Units of Measure" on page 9.

y=measurement
The y origin of the window in the parent window. See "Units of Measure" on page 9.

width=measurement
The width of the window in the parent window. See "Units of Measure" on page 9.

height=measurement
The height of the window in the parent window. See "Units of Measure" on page 9.

group=number
The group number of the window (1 to 64000). All pages in the same group are displayed in the same window, one replacing the other.

viewport Force the opening of a new window for this page.

clear Close any open windows before opening a new one to display this page.

titlebar=yes | sysmenu | minmax | both | none
Set what contents appear in the title bar. The default is 'both'. Useful for secondary windows.

scroll=horizontal | vertical | both | none (default: both)
Set which scroll bars appear. The default is 'both'. Useful for secondary windows.

rules=border | sizeborder | none
Set the type of border on the window. The default is 'sizeborder'. Useful for secondary windows.

nosearch When searching, do not jump to this secondary window. Instead, jump to the parent window that contains it.

noprint Do not print the contents of a secondary window separately. Print it as part of the parent window contents.

hide Do not include this header in the table of contents.

toc=numbers Controls which heading levels are included in the table of contents. For example, '123' (the default) places headings defined by the h1, h2, and h3 tags in the table of contents. The numbers must be consecutive, beginning with 1. Valid until the end of the file or until the next header with a toc attribute.

ctrlarea=page|none
Specifies where the control area that contains push buttons is located. If 'page' is specified, place the control area on the text window. If 'none' is specified, suppress the control area on this page. This overrides the value set in the docprof tag.

ctrlrefid=text An alphanumeric identifier of the set of controls you wish to display.

Note: You cannot mix absolute units with dynamic or relative units when specifying x and width, or y and height.

Classification: Block

May contain: Text, Formatting, In-line, Block, List-block

See also: "fn" on page 23

5.2.17 hdref

Description: Link to a heading. The text of the link is "Reference".

Attributes:

res=number The resource id of the header tag.

refid=text The id of the header tag. Alphanumeric.

Classification: In-line

May contain: None

See also: "link" on page 28

5.2.18 hide

Description: Hide a section of information unless the IPF_KEYS environment variable contains the correct key.

Closing tag: The closing ehide is required.

Attributes:

key='text' The key that will unhide the enclosed information. Multiple keys can be specified by enclosing each key in single quotes then concatenating them with the plus sign. So, 'key1'+'key2'+... wipfc will also accept 'key1+key2+...'

Conditions: You cannot nest hide tags within each other. You cannot include a header tag with the 'res' attribute set (in other words, you cannot jump to hidden material). Note that the Open Watcom OS/2 Help Compiler does not check for this error.

Classification: Formatting

May contain: Text, Formatting, In-line, Block, List-block

5.2.19 hp1 - hp9

Description: Change the style of the text. The style can be a combination of bold, italic, or underlined, or a color change. hp1 is italic. hp2 is bold. hp3 is bold italic. hp4 is blue. hp5 is underlined. hp6 is underlined italic. hp7 is underlined bold. hp8 is red. hp9 is pink.

Closing tag: The closing matching tag is required.

Conditions Highlighting tags cannot nest. Note that the Open Watcom OS/2 Help Compiler allows this as an extension, but still issues a warning. In this case the opening and closing tags must match at each nesting level. Also note that nested highlighting tags are not additive: an hp1 (italic) inside hp2 (bold) does not make an hp3 (bold italic).

Classification: Formatting

May contain: Text, Formatting, In-line, Block, List-block

5.2.20 i1

Description: Add a primary entry to the index. The text for the entry must be on the same line as the tag and cannot contain other tags.

Attributes:

id=text A cross-reference for use by a secondary index (i2) tag.

global For HLP files, allows this entry to also appear in the global index.

roots='text' Specifies a space separated list of root words (as defined by isyn) that act as index entries to specific topics.

sortkey='key-text'.index-text
Specify a string used to sort this entry in the index, and a string to use in its place. In other words, place index-text where key-text would sort in index.

Conditions Cannot appear in a footnote (fn/efn block).

Classification: Block

May contain: Text

See also: "i2", "icmd", "isyn"

5.2.21 i2

Description: Add a secondary entry to the index. The text for the entry must be on the same line as the tag and cannot contain other tags.

Attributes:

refid=text The id of the primary index entry to which this belongs.

global For HLP files, allows this entry to also appear in the global index.

sortkey='key-text'.index-text
Specify a string used to sort this entry in the index, and a string to use in its place. In other words, place index-text where key-text would sort in index.

Conditions Cannot appear in a fn/efn footnote. If the global flag is set for the i1 tag, it must be set for the i2 tag.

Classification: Block

May contain: Text

See also: "i1" on page 26

5.2.22 icmd

Description: Show that this page describes a command. The text for the command must be on the same line as the tag and cannot contain other tags. If the page contains information on more than one command, there should be one icmd tag for each documented command.

Conditions The icmd tag must directly follow a heading tag, or other index tags (i1, i2 or isyn).

Classification: Block

May contain: Text

See also: "i1" on page 26, "i2"

5.2.23 isyn

Description: Create a list of synonyms or variations of a word in a primary index tag (i1). If the user enters one of the words in the isyn list, the corresponding i1 index referencing the root word is returned. The synonyms themselves do not appear in the index. The isyn tag can be placed on any page that contains related i1 tags. The list of synonyms must be on the same line as the tag and cannot contain other tags.

Attributes:

root=text The root word for which the synonyms apply. This word will also appear in the 'roots' attribute of the i1 tag.

Classification: Block

May contain: Text

See also: "i1" on page 26

5.2.24 li

Description: Begins a list item. This tag is only valid inside a simple, ordered, or unordered lists.

Classification: Block

May contain: Text, Formatting, In-line, Block, List-block

See also: "ol" on page 32, "sl" on page 34, "ul" on page 35

5.2.25 lines

Description: Renders the enclosed block in a proportional font, but honoring white space and line breaks to preserve the formatting of the text as it was entered. The text can be left or right aligned, or centered.

Closing tag: The closing elines is required.

Attributes:

align=left | center | right
Left, center, or right align the block of text in the window.

Classification: Block

May contain: Text, Formatting, In-line

See also: "Line center" on page 11, "fig" on page 22, "xmp" on page 36

5.2.26 link

Description: A link to additional information. Activating the link may jump to a different location in the same or a different document, open a footnote, launch an application, or send a notification to another running process.

Closing tag: The closing elink is required. Unless the link is contained in an artlink tag, or if reftype is 'inform'.

Attributes:

reftype=hd | fn | launch | inform
If reftype is 'hd', then it links to a heading and the refid attribute must be specified. If the heading is in an external file, the database must also be set and the heading must have its 'global' attribute set. If reftype is 'fn', the link is to a footnote and the 'refid' attribute must be set. Note that a split window cannot contain a link to a footnote. If reftype is 'launch', the link starts the external program specified by the 'object' attribute with parameters specified in the 'data' attribute. If reftype is 'inform', the value of the 'res' attribute is sent to the application.

res=number The resource id of the header tag.

refid=text The id of the header. Alphanumeric.

database='text'
The name of the external INF or HLP file.

object='text' The name of a program to execute.

data='text' The parameters to pass to program being started.

auto Automatically trigger this link when the page that contains it is displayed. Footnotes cannot be opened automatically. The link tag must follow a heading tag before other tags and text.

viewport Open a secondary window when the link that refers to it is opened.

dependent Make the automatically opened window close when the secondary window that opened it is closed.

split Open a secondary window when the link is activated. Note that the primary window can only contain links to secondary windows. Each of the secondary windows must have a different group number if they are to be displayed at the same time.

child Open the page being linked to as a child of the current page, clipped to fit within the current page. The child is always on top, is closed when the parent is closed, resized when the parent's size is changed. If only the child is minimized, its icon appears within the parent's border.

group=number
The group number of the window (1 to 64000). All pages in the same group are displayed in the same window, one replacing the other.

vpx=measurement
The x origin of the window. See "Units of Measure" on page 9. Not valid for footnotes.

vpy=measurement
The y origin of the window. See "Units of Measure" on page 9. Not valid for footnotes.

vpcx=measurement
The width of the window. Absolute or dynamic units only. See "Units of Measure" on page 9. Not valid for footnotes.

vpcy=measurement
The height of the window. Absolute or dynamic units only. See "Units of Measure" on page 9. Not valid for footnotes.

titlebar=yes|sysmenu|minmax|both|none
Set what contents appear in the title bar. The default is 'both'. Useful for secondary windows.

scroll=horizontal|vertical|both|none
Set which scroll bars appear. The default is 'both'. Useful for secondary windows.

rules=border|sizeborder|none
Set the type of border on the window. The default is 'sizeborder'. Useful for secondary windows.

x=number The x origin of the active area of the graphic. Valid only if the link is in an artlink.

y=number The y origin of the active area of the graphic. Valid only if the link is in an artlink.

cx=number The width of the active area of the graphic. Valid only if the link is in an artlink.

cy=number The height of the active area of the graphic. Valid only if the link is in an artlink.

Note: If the link is to contain an image, the link must be enclosed in an artlink tag block.

Classification: In-line

May contain: Text, Formatting, In-line

See also: "artlink" on page 17, "hdref" on page 25

5.2.27 lm

Description: Sets the left margin. The margin remains in effect until it is reset or until the end of the current page.

Attributes:

margin=number
The number of character spaces. If the tag appears more than 'margin' character spaces into a line of text, the margin becomes effective on the next line.

Classification: Formatting

May contain: Text, Formatting, In-line, Block, List-block

See also: "rm" on page 33

5.2.28 lp

Description: Add a paragraph to a list. The resulting block of text is indented to the same level as the list text, but is not numbered or bulleted.

Classification: Block

May contain: Text, Formatting, In-line, Block, List-block

See also: "p" on page 32

5.2.29 note

Description: Begins a note. The text that follows the tag (up to the next block-class tag) is used as the text of the note. This text appears after the local-specific phrase ("Note: " in the en_US locale) and on the same line.

Attributes:

text='text' Substitute 'text' for the default "Note: " phrase.

Classification: Block

May contain: Text, Formatting, In-line

See also: "caution" on page 18, "nt", "warning" on page 36

5.2.30 nt

Description: Begins a multi-paragraph note. All of the text in the note left aligns with the first word after the message text. The text begins with a local-specific phrase ("Note: " in the en_US locale).

Closing tag: The closing ent is required.

Attributes:

text='text' Substitute 'text' for the default "Note: " phrase.

Classification: Block

May contain: Text, Formatting, In-line, Block, List-block

See also: "caution" on page 18, "note", "warning" on page 36

5.2.31 ol

Description: An ordered list (numbers precede each list item). List items begin with the li tag and can be continued in another paragraph (without numbering) by using the lp tag.

Closing tag: The closing eol is required.

Attributes:

compact Do not put blank lines between each list item.

verycompact Do not put blank lines between each list item, and do not put blank lines before or after the list. An Open Watcom OS/2 Help Compiler extension.

Classification: List-block

May contain: Text, Formatting, In-line, Block, List-block

See also: "li" on page 28, "lp" on page 31, "sl" on page 34, "ul" on page 35

5.2.32 p

Description: A paragraph. Each paragraph is preceded by a blank line, and is terminated by the next block-level tag. Text doesn't have to be in a paragraph, but it helps.

Classification: Block

May contain: Text, Formatting, In-line

5.2.33 parml

Description: A two-column list of parameters and their definitions, similar to a definition list (dl tag). A pt tag defines the term, and a pd tag defines a definition of the term. Each pt tag must have a pd tag. Multiple consecutive pt tags are allowed (synonyms), but only one pd tag is allowed for each set of pt tags. Other lists and blocks may be nested in a parameter table.

Attributes:

tsize=number The width of the term column. The default is 10.

break=all | fit | none
If break is 'all' then each description is on a line below the term. This is the default. If break is 'fit' then the description is on the same line as the term provided that the width of the term is less than tsize characters. If break is 'none' then the description is on the same line as the term.

compact Do not add blank lines between each term/description pair.

Classification: List-block

May contain: "pt" on page 33, "pd" on page 33

See also: "dl" on page 20

5.2.33.1 pt

Description: The parameter to be described. Multiple pt tags (synonyms) may described by a single pd tag.

Classification: List-block

May contain: Text, Formatting, In-line, "pd", pt

5.2.33.2 pd

Description: The description of the parameter.

Classification: List-block

May contain: Text, Formatting, In-line

See also: "pt"

5.2.34 pbutton

Description: Defines a custom (author-defined) push button.

Attributes:

id=text	An alphanumeric identifier that will be referenced by the ctrl tag when using the button.
res=number	The resource identifier for the button (returned by window messages). Must be greater 256; values of 256 or less are reserved.
text='text'	The button text. May include spaces. May not include entity references. Must not conflict with any pre-defined buttons.

Note: All pbutton tags must appear inside a ctrldef block and before any ctrl tags.

Classification: Document Header

May contain: None

See also: "ctrl" on page 19, "ctrldef" on page 19

5.2.35 rm

Description: Sets the right margin. The margin remains in effect until it is reset or until the end of the current page.

Attributes:

margin=number
The number of character spaces. If the tag appears more than 'margin' character spaces into a line of text, the margin becomes effective on the next line.

Classification: Formatting

May contain: Text, Formatting, In-line, Block, List-block

See also: "lm" on page 30

5.2.36 sl

Description: A simple list (neither numbered, nor bulleted). List items begin with the li tag and can be continued in another paragraph (without numbering) by using the lp tag.

Closing tag: The closing esl is required.

Attributes:

compact Do not put blank lines between each list item.

verycompact Do not put blank lines between each list item, and do not put blank lines before or after the list. An Open Watcom OS/2 Help Compiler extension.

Classification: List-block

May contain: Text, Formatting, In-line, Block, List-block

See also: "li" on page 28, "lp" on page 31, "ol" on page 32, "ul" on page 35

5.2.37 table

Description: Begins a table. Tables use a mono-spaced font to ensure that the column width are respected. If you change the font (using the font tag) or change make the font bold, the spacing will be thrown off.

Attributes:

cols='number number...'
Specifies both the width of each column ('number') and the number of columns (the number of 'number's).

rules=both | horiz | vert | none
Specify whether the table will have horizontal or vertical rules. If the rule is not drawn, blank space appears in it place. The default is 'both'.

frame=rule|box|none
Specifies the frame around the table. If no frame is drawn, blank space appears in its place. The default is 'box'.

Classification: Block

May contain: "row"

5.2.37.1 row

Description: A table row. If the number of cells supplied for a row is greater or less than the number specified in the table tag, a warning is generated.

Classification: Block

May contain: "c"

5.2.37.2 c

Description: A table cell. If the width of the text exceeds the width of the cell, the text is wrapped. If the length of a single word exceeds the width of the cell, that word will be truncated to the width of the cell.

Classification: Block

May contain: Text, "color" on page 18, "font" on page 22, "hp1 - hp9" on page 26, "lines" on page 28, "link" on page 28

Note: Using the lines tag does not change the font to a proportional spaced font. It simply makes the whitespace and new lines significant so that the cell is formatted as entered. All attributes for the lines tag are ignored.

5.2.38 title

Description: Sets the title of the help document. The maximum length of the title is 47 characters (including spaces and blanks) and is displayed in a single line. Other than text, the title may contain entity references and nameit expansions.

Note: The title tag may only appear in the document header. It cannot appear on individual pages because it applies to the document as a whole.

Classification: Document Header

May contain: Text

5.2.39 ul

Description: An unordered list (bullets precede each list item). List items begin with the li tag and can be continued in another paragraph (without numbering) by using the lp tag.

Closing tag: The closing eul is required.

Attributes:

compact Do not put blank lines between each list item.

verycompact Do not put blank lines between each list item, and do not put blank lines before or after the list. An Open Watcom OS/2 Help Compiler extension.

Classification: List-block

May contain: Text, Formatting, In-line, Block, List-block

See also: "li" on page 28, "lp" on page 31, "ol" on page 32, "sl" on page 34

5.2.40 userdoc

Description: Delimit the compilable source text. userdoc must be the first tag in the file. Only comments may precede the userdoc tag. Only comments may follow the terminating euserdoc tag.

Closing tag: The closing euserdoc is required.

Classification: Block

May contain: Everything

5.2.41 warning

Description: Displays a locale-specific warning message ("Warning: " in the en_US locale) followed immediately by the contents enclosed by the warning tag block.

Closing tag: The closing ewarning is required.

Attributes:

text='message' Use 'message' instead of 'Warning: ' as the introductory text.

Classification: Block

May contain: Text, Formatting, In-line, Block (except acviewport, fn, h1-h6), List-block

See also: "caution" on page 18, "note" on page 31, "nt" on page 31

5.2.42 xmp

Description: Renders the enclosed text in a monospaced font, honoring whitespace and line breaks. In other words, exactly as it is entered. If the width of the text exceeds the width of the window, the text is clipped, not wrapped.

Closing tag: The closing exmp is required.

Classification: Block

May contain: Text, Formatting, In-line

See also: "cgraphic" on page 18, "lines" on page 28

6 Error Messages

The Open Watcom OS/2 Help Compiler generates four kinds of diagnostic messages: Errors and three levels of warnings. Despite their name, warnings are really errors and indicate that wipfc has produced a file that is probably not exactly the way you wanted.

6.1 Errors

Errors are always fatal and cause Open Watcom OS/2 Help Compiler to stop immediately.

"The length of the file path is too long"
The maximum length of the file path depends on the operating system. You may need to re-arrange the project's layout on disk.

"Cannot open file"
A source file cannot be opened, usually because it doesn't exist. Check the spelling of the file name.

"Cannot open image file"
A image file cannot be opened, usually because it doesn't exist. Check the spelling of the file name.

"Cannot read from file"
For some reason, reading the file has failed.

"Cannot write to file"
For some reason, writing to the file has failed. The disk might be full.

"Unexpected end of file"
The source file has unexpectedly ended. This can occur if you have forgotten the euserdoc tag.

"Text conversion error"
wipfc uses wide characters internally. All text is converted from multi-byte characters to wide characters when read, and back to multi-byte characters when written. If a character cannot be converted successfully, this error is generated.

"Syntax error"
A syntax error has occurred. Usually, this is because an end-of-tag delimiter is missing.

"Invalid country code or codepage"
The appropriate file of entity references cannot be found or cannot be read. Usually, this is because the WIPFC environment variable is not setup or is pointing to the wrong place.

"Invalid language code"
The appropriate nls file cannot be found or cannot be read. Usually, this is because the WIPFC environment variable is not setup or is pointing to the wrong place.

"Missing :userdoc or :euserdoc"
The document is not correctly formed. The userdoc and euserdoc tags are required.

"Too many unique words--the document is too big"
A document can contain a maximum of 64000 unique words.

"The document has no words"
A document cannot be empty. Add some text.

"The document has too many pages"
A document cannot have more than 65535 pages.

"The document has too many index or icmd entries"
The document cannot have more than 65535 index entries.

"The document has no visible table of contents entries"
At least one of the pages must be visible. Don't hide them all.

"Cannot open nls configuration file"
A NLS configuration file cannot be opened. Usually, this is because the WIPFC environment variable is not setup or is pointing to the wrong place.

6.2 Level 1 Warnings

Level 1 warnings are the most serious. Unless they are corrected, your help file is not likely to contain information presented as you intended.

"This command is not defined"
Commands begin with a '.' in the first column of a row of text. You probably have a line beginning with a period.

"This tag is not defined"
You are trying to use a tag that wipfc does not recognize. Try replacing the ':' character with an entity reference.

"This attribute is not defined for this tag"
Check the spelling of the attribute, or delete it.

"Attributes are not allowed for this tag--probably missing . to end the tag"
This tag has no attributes.

"The tag, word, or command is not allowed in this context"
This is usually because the enclosing tag can only contain specific tags or no tags at all.

"Syntax error in tag"
There is something wrong within the tag.

"Ignoring text before the h1 tag"
Text and most tags cannot appear before the first heading tag.

"Ignoring text after the euserdoc tag"
Text and tags cannot appear after the terminating document tag.

"Heading levels are not in consecutive order"
The offending heading tag is more than one level greater than the heading that contains it.

"The required refid attribute is missing"
A refid or res attribute is required to specify the target of a link or secondary index, but not present.

"Unable to find the resource identifier for this reference"
A non-existent resource id is being referenced.

"The required resource identifier is missing"
A ddf tag is missing a valid resource identifier.

"Unable to find the id or name for this reference"
The referenced id or name does not exist.

"The required id for this footnote is missing"
A footnote tag is missing a required id.

"Ignoring a list item tag that is not part of a list"
List elements can only appear within a list.

"The required end the list is missing"
The list has not been closed.

"A ddhd tag must be preceded by a dthd tag"
Definition list header tags must appear in the correct order.

"A dd tag must be preceded by a dt tag"
Definition list elements must appear in the correct order.

"Too many external files have been linked to"
A maximum of 256 external files can be linked.

"The required graphics file name is not present"
You have to specify the name of the bit-mapped graphics file if you expect wipfc to find it.

"wipfc does not support this graphics file format"
Only Windows and OS/2 bmp files are supported by wipfc.

"Cannot hide a header with the res attribute set"
Either don't hide the header, or remove the res attribute so it can't be a link target.

"No valid cols have been specified"
A table needs its column widths specified in advance.

"The total width of the table is >250 characters"
The total width of a table (including borders) cannot exceed 250 characters.

"Ignoring text before c tag"
Text in a table must be inside of a cell. Put it after the c tag.

"Ignoring invalid tag in table cell"
Table cells cannot contain other block-level tags.

"Text in this table column is too long, truncating"
If a single word is longer than the table cell is wide, it is truncated.

"Ignoring extra table columns in this row"
You have more c tags in the row than you have columns specified in the table tag.

"Not enough columns have been specified for this row"
You have fewer c tags in the row than you have columns specified in the table tag.

"The required elink tag is missing, but has been appended to this column"
You forgot to close the link, so wipfc has added an elink tag at the end of the cell.

"This page has too many elements (words, punctuation, etc.)"
The maximum number of text elements in a single page is 64000.

6.3 Level 2 Warnings

Level 2 warnings are less serious.

"Invalid or missing attribute value"
A required attribute is either missing, or has an invalid value.

"Invalid symbol (entity reference or .nameit expansion)"
The entity reference or nameit macro is not defined. Check the spelling.

"Invalid tag nesting"
Text hiding tags and highlighting tags cannot nest with themselves.

"Footnote cannot be indexed"
Footnotes cannot have in1, in2, or icmd tags.

"Too many (> 14) fonts have been used"
You need to user fewer fonts.

"Title or index text is too long"
The length of title text is limited to 47 characters; index text, to 255 characters.

"Subindexes of a global index must be global, too"
If an index is global, all of its subindexes must be global, too. Set the 'global' flag.

"An index entry requires text"
Text must follow an in1, in2, or icmd tag.

6.4 Level 3 Warnings

Level 3 warnings are less serious still.

"This id or name is already in use"
If the id or name is the target of a link tag, you're not likely to get to the right place.

"This res number is already in use"
If the resource id is the target of a link tag, you're not likely to get to the right place.

"Redefinition of .nameit symbol"
A nameit symbol can only be defined once. It cannot be redefined.

"This synonym set is already defined"
A synonym set can only be defined once.

"This synonym set is not defined"
A synonym set must be defined before it can be used.

"Control group references an undefined button"
A push button definition is missing.

"Cannot mix dynamic and absolute units"
Absolute and relative units cannot be used at the same time.

"Footnotes cannot be opened automatically"
Footnotes are special.

"Footnote cannot be opened from a split window"
Footnotes are special.

"Missing res number in a .HLP file"
HLP files headers are required have res numbers. INF files are not unless they are being concatenated. HLP files appear to work fine without them as long as they aren't concatenated and don't use global links.

7 IPF Symbols

Special symbols can be incorporated into OS/2 help file by using entity references in the form of &symbol-name. Each entity reference begins with the '&' character and ends with the '.' character. New symbols can be created by using the nameit command (see "Macro" on page 12), but each language encoding has a pre-defined set of symbols associated with it. For the en_US locale (and other locales using the IBM 850 code page), the predefined symbols are as follows (symbols that cannot appear in this document are left blank):

Char	Hex value	Unicode code point	Entity name	Description
	0x10	\u25BA	rarrow	Black right-pointing pointer
	0x10	\u25BA	rahead	Black right-pointing pointer
	0x11	\u25C4	lahead	Black left-pointing pointer
	0x11	\u25C4	larrow	Black left-pointing pointer
	0x18	\u25B2	uarrow	Black up-pointing triangle
	0x19	\u25BC	darrow	Black down-pointing triangle
	0x20	\u0020	rbl	Required blank
!	0x21	\u0021	xclm	Exclamation mark
!	0x21	\u0021	xclam	Exclamation mark
"	0x22	\u201D	odq	Left double quotation mark
"	0x22	\u201C	cdq	Right double quotation mark
#	0x23	\u0023	numsign	Number sign
$	0x24	\u0024	dollar	Dollar sign
%	0x25	\u0025	percent	Percent sign
&	0x26	\u0026	amp	Ampersand
’	0x27	\u0027	apos	Apostrophe
‘	0x60	\u2018	osq	Left single quotation mark
’	0x27	\u2019	csq	right single quotation mark
`	0x60	\u0060	grave	Grave accent
(	0x28	\u0028	lpar	Left parenthesis
(	0x28	\u0028	lparen	Left parenthesis
)	0x29	\u0029	rpar	Right parenthesis
)	0x29	\u0029	rparen	right parenthesis
*	0x2A	\u002A	asterisk	Asterisk
+	0x2B	\u002B	plus	Plus sign
,	0x2C	\u002C	comma	Comma
-	0x2D	\u002D	dash	Hyphen-minus
-	0x2D	\u002D	emdash	Hyphen-minus
-	0x2D	\u002D	mdash	Hyphen-minus
-	0x2D	\u002D	endash	Hyphen-minus
-	0x2D	\u002D	ndash	Hyphen-minus
-	0x2D	\u002D	hyphen	Hyphen-minus
-	0x2D	\u002D	minus	Hyphen-minus
.	0x2E	\u002E	period	Full stop
.	0x2E	\u002E	per	Full stop
/	0x2F	\u002F	slash	Solidus
/	0x2F	\u002F	slr	Solidus
:	0x3A	\u003A	colon	Colon
;	0x3B	\u003B	semi	Semicolon
<	0x3C	\u003C	lt	Less-than sign
<	0x3C	\u003C	ltsym	Less-than sign
=	0x3D	\u003D	eq	Equals sign
=	0x3D	\u003D	equals	Equals sign
=	0x3D	\u003D	eqsym	Equals sign
>	0x3E	\u003E	gt	Greater-than sign
>	0x3E	\u003E	gtsym	Greater-than sign
@	0x40	\u0040	atsign	Commercial at
[	0x5B	\u005B	lbracket	Left square bracket
[	0x5B	\u005B	lbrk	Left square bracket
\	0x5C	\u005C	bslash	Reverse solidus
\	0x5C	\u005C	bsl	Reverse solidus
]	0x5D	\u005D	rbracket	Right square bracket
]	0x5D	\u005D	rbrk	Right square bracket
^	0x5E	\u005E	caret	Circumflex accent

```
 ^      0x5E    \u005E      and         Circumflex accent
 _      0x5F    \u005F      us          Low line
 {      0x7B    \u007B      lbrace      Left curly bracket
 {      0x7B    \u007B      lbrc        Left curly bracket
 |      0x7C    \u00A6      splitvbar   Split vertical bar
 |      0x7C    \u007C      vbar        Vertical bar
 |      0x7C    \u007C      lor         Vertical bar
 }      0x7D    \u007D      rbrace      Right curly bracket
 }      0x7D    \u007D      rbrc        Right curly bracket
 ~      0x7E    \u007E      tilde       Tilde
 ~      0x7E    \u007E      similar     Tilde
        0x7F    \u2302      house       House
        0x80    \u00C7      Cc          Latin capital letter C with
cedilla
        0x81    \u00FC      ue          Latin small letter U with
diaeresis
        0x82    \u00E9      ea          Latin small letter E with
acute
        0x83    \u00E2      ac          Latin small letter A with
circumflex
        0x84    \u00E4      ae          Latin small letter A with
diaeresis
        0x85    \u00E0      ag          Latin small letter A with
grave
        0x86    \u00E5      ao          Latin small letter A with
ring above
        0x87    \u00E7      cc          Latin small letter C with
cedilla
        0x88    \u00EA      ec          Latin small letter E with
circumflex
        0x89    \u00EB      ee          Latin small letter E with
diaeresis
        0x8A    \u00E8      eg          Latin small letter E with
grave
        0x8B    \u00EF      ie          Latin small letter I with
diaeresis
        0x8C    \u00EE      ic          Latin small letter I with
circumflex
        0x8D    \u00EC      ig          Latin small letter I with
grave
        0x8E    \u00C4      Ae          Latin capital letter A with
diaeresis
        0x8F    \u00C5      Ao          Latin capital letter A with
ring above
        0x8F    \u00C5      angstrom    Latin capital letter A with
ring above
        0x90    \u00C9      Ea          Latin capital letter E with
acute
        0x91    \u00E6      aelig       Latin small letter Ae
        0x92    \u00C6      AElig       Latin capital letter Ae
        0x93    \u00F4      oc          Latin small letter O with
circumflex
        0x94    \u00F6      oe          Latin small letter O with
diaeresis
        0x95    \u00F2      og          Latin small letter O with
grave
        0x96    \u00FB      uc          Latin small letter U with
circumflex
        0x97    \u00F9      ug          Latin small letter U with
```

```
grave
        0x98    \u00FF      ye          Latin small letter Y with
diaeresis
        0x99    \u00D6      Oe          Latin capital letter O with
diaeresis
        0x9A    \u00DC      Ue          Latin capital letter U with
diaeresis
        0x9B    \u00A2      cent        Cent sign
        0x9C    \u00A3      Lsterling   Pound sign
        0x9D    \u00A5      yen         Yen sign
        0x9F    \u0192      fnof        Latin small letter F with
hook
        0xA0    \u00E1      aa          Latin small letter A with
acute
 ¡      0xA1    \u00ED      ia          Latin small letter I with
acute
 ¢      0xA2    \u00F3      oa          Latin small letter O with
acute
 £      0xA3    \u00FA      ua          Latin small letter U with
acute
 ⁄      0xA4    \u00F1      nt          Latin small letter N with
tilde
 ¥      0xA5    \u00D1      Nt          Latin capital letter N with
tilde
 ƒ      0xA6    \u00AA      aus         Feminine ordinal indicator
 §      0xA7    \u00BA      ous         Masculine ordinal indicator
 ¤      0xA8    \u00BF      invq        Inverted question mark
 '      0xA9    \u2310      lnotrev     Reversed not sign
 "      0xAA    \u00AC      lnot        Not sign
 "      0xAA    \u00AC      notsym      Not sign
 «      0xAB    \u00BD      frac12      Vulgar fraction one half
 ‹      0xAC    \u00BC      frac14      Vulgar fraction one quarter
 ›      0xAD    \u00A1      inve        Inverted exclamation mark
 fi     0xAE    \u00AB      odqf        Left-pointing double angle
quotation mark
 •      0xAF    \u00BB      cdqf        Right-pointing double angle
quotation mark
        0xB0    \u2591      box14       Light shade
 –      0xB1    \u2592      box12       Medium shade
 †      0xB2    \u2593      box34       Dark shade
 ‡      0xB3    \u2502      bxv         Box drawings light vertical
 ·      0xB4    \u2524      bxri        Box drawings light vertical
and left
 ·      0xB4    \u2524      bxrj        Box drawings light vertical
and left
        0xB5    \u2561      bx1012      Box drawings vertical single
and left double
 ¶      0xB6    \u2562      bx2021      Box drawings vertical double
and left single
 •      0xB7    \u2556      bx0021      Box drawings down double and
left single
 ,      0xB8    \u2555      bx0012      Box drawings down single and
left double
        0xB9    \u2563      bx2022      Box drawings double vertical
and left
 ”      0xBA    \u2551      bx2020      Box drawings double vertical
 »      0xBB    \u2557      bx0022      Box drawings double down and
left
 …      0xBC    \u255D      bx2002      Box drawings double up and
```

```
left
 ¾      0xBD    \u255C      bx2001      Box drawings up double and
left single
        0xBE    \u255B      bx1002      Box drawings up single and
left double
 ¿      0xBF    \u2510      bxur        Box drawings light down and
left
        0xC0    \u2514      bxll        Box drawings light up and
right
 À      0xC1    \u2534      bxas        Box drawings light up and
horizontal
 À      0xC1    \u2534      bxbj        Box drawings light up and
horizontal
 Á      0xC2    \u252C      bxde        Box drawings light down and
horizontal
 Á      0xC2    \u252C      bxtj        Box drawings light down and
horizontal
 Â      0xC3    \u251C      bxle        Box drawings light vertical
and right
 Â      0xC3    \u251C      bxlj        Box drawings light vertical
and right
 Ã      0xC4    \u2500      bxh          Box drawings light
horizontal
 Ã      0xC5    \u253C      bxcr        Box drawings light vertical
and horizontal
 Ã      0xC5    \u253C      bxcj        Box drawings light vertical
and horizontal
 Ä      0xC6    \u255E      bx1210      Box drawings vertical single
and right double
 Å      0xC7    \u255F      bx2120      Box drawings vertical double
and right single
 Æ      0xC8    \u255A      bx2200      Box drawings double up and
right
        0xC9    \u2554      bx0220      Box drawings double down and
right
 Ç      0xCA    \u2569      bx2202      Box drawings double up and
horizontal
 È      0xCB    \u2566      bx0222      Box drawings double down and
horizontal
        0xCC    \u2560      bx2220      Box drawings double vertical
and right
 É      0xCD    \u2550      bx0202      Box drawings double
horizontal
 Ê      0xCE    \u256C      bx2222      Box drawings double vertical
and horizontal
 Ë      0xCF    \u2567      bx1202      Box drawings up single and
horizontal double
 Ì      0xD0    \u2568      bx1201      Box drawings up double and
horizontal single
        0xD1    \u2564      bx0212      Box drawings down single and
horizontal double
        0xD2    \u2565      bx0121      Box drawings down double and
horizontal single
        0xD3    \u2559      bx2100      Box drawings up double and
right single
        0xD4    \u2558      bx1200      Box drawings up single and
right double
        0xD5    \u2552      bx0210      Box drawings down single and
right double
```

	0xD6	\u2553	bx0120	Box drawings down double and right single
	0xD7	\u256B	bx2121	Box drawings vertical double and horizontal single
	0xD8	\u256A	bx1212	Box drawings vertical single and horizontal double
	0xD9	\u2518	bxlr	Box drawings light up and left
	0xDA	\u250C	bxul	Box drawings light down and right
	0xDB	\u2588	BOX	Box drawings Full block
	0xDC	\u2584	BOXBOT	Box drawings Lower half block
	0xDD	\u258C	BOXLEFT	Box drawings Left half block
	0xDE	\u2590	BOXRIGHT	Box drawings Right half block
	0xDF	\u2580	BOXTOP	Box drawings Upper half block
	0xE0	\u03B1	alpha	Greek small letter alpha
A	0x41	\u0391	Alpha	Greek capital letter alpha
Æ	0xE1	\u00DF	Beta	Latin small letter sharp s
	0xE2	\u0393	Gamma	Greek capital letter gamma
ª	0xE3	\u03C0	pi	Greek small letter pi
	0xE4	\u03A3	Sigma	Greek capital letter sigma
	0xE5	\u03C3	sigma	Greek small letter sigma
	0xE6	\u00B4	mu	Micro sign
	0xE7	\u03C4	tau	Greek small letter tau
	0xE8	\u03A6	Phi	Greek capital letter phi
Ø	0xE9	\u0398	Theta	Greek capital letter theta
	0xEA	\u03A9	Omega	Greek capital letter omega
º	0xEB	\u03B4	delta	Greek small letter delta
	0xEC	\u221E	infinity	Infinity
	0xED	\u03C6	phi	Greek small letter phi
	0xEE	\u03B5	epsilon	Greek small letter epsilon
	0xEF	\u2229	intersect	Intersection
	0xF0	\u2261	identical	Identical to
æ	0xF1	\u00B1	plusmin	Plus-minus sign
æ	0xF1	\u00B1	pm	Plus-minus sign
	0xF2	\u2265	ge	Greater-than or equal to
	0xF2	\u2265	gesym	Greater-than or equal to
	0xF3	\u2264	le	Less-than or equal to
	0xF3	\u2264	lesym	Less-than or equal to
	0xF4	\u2320	inttop	Top half integral
ı	0xF5	\u2321	intbot	Bottom half integral
	0xF6	\u00F7	divide	Division sign
	0xF7	\u2248	nearly	Almost equal to
ł	0xF8	\u00B0	degree	Degree sign
ł	0xF8	\u00B0	deg	Degree sign
ø	0xF9	\u2219	bullet	Bullet operator
œ	0xFA	\u00B7	dot	Middle dot
ß	0xFB	\u221A	sqrt	Square root
	0xFC	\u207F	supn	Superscript Latin small letter n
	0xFD	\u00B2	sup2	Superscript 2
	0xFE	\u25A0	sqbul	Black square

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