Microsoft® MS-DOS®, Windows™, OS/2®, and Apple® Macintosh® Applications

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Product Support Services

Subject: **Rich Text Format (RTF) Specification**

Application Note

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INTRODUCTION

The Rich Text Format (RTF) Specification is a method of encoding formatted text and graphics for easy transfer between applications. Currently, users depend on special translation software to move word-processing documents between different MS-DOS, Windows, OS/2, and Apple Macintosh applications.

The RTF Specification provides a format for text and graphics interchange that can be used with different output devices, operating environments, and operating systems. RTF uses the ANSI, PC-8, Macintosh, or IBM® PC character set to control the representation and formatting of a document, both on the screen and in print. With the RTF Specification, documents created under different operating systems and with different software applications can be transferred between those operating systems and applications.

Software that takes a formatted file and turns it into an RTF file is called a *writer*. An RTF writer separates the application's control information from the actual text and writes a new file containing the text and the RTF groups associated with that text. Software that translates an RTF file into a formatted file is called a *reader*.

RTF SYNTAX

An RTF file consists of unformatted text, control words, control symbols, and groups. For ease of transport, a standard RTF file can consist of only 7-bit ASCII characters. (Converters that communicate with Microsoft Word for Windows or Microsoft Word for the Macintosh should expect 8-bit characters.)

A *control word* is a specially formatted command that RTF uses to mark printer control codes and information that applications use to manage documents. A control word takes the following form:

```
\ LetterSequence<Delimiter>
```

Note that a backslash begins each control word.

The LetterSequence is made up of lowercase alphabetic characters between "a" and "z" inclusive. RTF is case sensitive, and all RTF control words must be in lowercase.

The Delimiter marks the end of an RTF control word, and can be one of the following:

- A space. In this case, the space is part of the control word.
- A digit or a hyphen (-), which indicates that a numeric parameter follows. The subsequent digital sequence is then delimited by a space or any character other than a letter or a digit. The parameter can be a positive or a negative number. The range of the values for the number is –32767 through 32767. However, Microsoft Word for Windows, Word for OS/2, and Word for the Macintosh restrict the range to –31680 through 31680. If a numeric parameter immediately follows the control word, this parameter becomes part of the control word. The control word is then delimited by a space or a nonalphabetic or nonnumeric character in the same manner as any other control word.
- Any character other than a letter or a digit. In this case, the delimiting character terminates the control word but is not actually part of the control word.

If a space delimits the control word, the space does not appear in the document. Any characters following the delimiter, including spaces, will appear in the document. For this reason, you should use spaces only where necessary; do not use spaces merely to break up RTF code.

A *control symbol* consists of a backslash followed by a single, nonalphabetic character. For example, \~ represents a nonbreaking space. Control symbols take no delimiters.

A *group* consists of text and control words or control symbols enclosed in braces ({ }). The opening brace ({) indicates the start of the group and the closing brace (}) indicates the end of the group. Each group specifies the text affected by the group and the different attributes of that text. The RTF file can also include groups for fonts, styles, screen color, pictures, footnotes, annotations, headers and footers, summary information, fields, and bookmarks, as well as document-, section-, paragraph-, and character-formatting properties. If the font, file, style, screen-color, revision mark, and summary-information groups and document-formatting properties are included, they must precede the first plain-text character in the document. These groups form the RTF file header. If the group for fonts is included, it should precede the group for styles. If any group is not used, it can be omitted. The groups are discussed in the following sections.

The control properties of certain control words (such as bold, italic, keep together, and so forth) have only two states. When such a control word has no parameter or has a nonzero parameter, it is assumed that the control word turns on the property. When such a control word has a parameter of 0 (zero), it is assumed that the control word turns off the property. For example, **b** turns on bold, whereas **b0** turns off bold.

Certain control words, referred to as *destinations*, mark the beginning of a collection of related text that could appear at another position, or destination, within the document. Destinations may also be text that is used but should not appear within the document at all. An example of a destination is the **footnote** group, where the footnote text follows the control word. Destination control words and their following text must be enclosed in braces. Destinations added after the RTF Specification published in the March 1987 *Microsoft Systems Journal* may be preceded by the control symbol *. This control symbol identifies destinations whose related text should be ignored if the RTF reader does not recognize the destination. (RTF writers should follow the convention of using this control symbol when adding new destinations or groups.) Destinations whose related text should be inserted into the document even if the RTF reader does not recognize the destination should not use *. All destinations that were not included in the March 1987 revision of the RTF Specification are shown with * as part of the control word.

Formatting specified within a group affects only the text within that group. Generally, text within a group inherits the formatting of the text in the preceding group. However, Microsoft implementations of RTF assume that the footnote, annotation, header, and footer groups (described later in this chapter) do not inherit the formatting of the preceding text. Therefore, to ensure that these groups are always formatted correctly, you should set the formatting within these groups to the default with the **sectd**, **pard**, and **plain** control words, and then add any desired formatting.

The control words, control symbols, and braces constitute control information. All other characters in the file are plain text. Here is an example of plain text that does not exist within a group:

```
{\rtf\ansi\deff0{\fonttbl{\f0\froman Tms Rmn;}{\f1\fdecor
Symbol;}{\f2\fswiss Helv;}}{\colortbl;\red0\green0\blue0;
\red0\green0\blue255;\red0\green255\blue255;\red0\green255\
blue0;\red255\green0\blue255;\red255\green0\blue0;\red255\
green255\blue0;\red255\green255\blue255;}{\stylesheet{\fs20 \snext0Normal;}}{\info{\author John
Doe}
{\creatim\yr1990\mo7\dy30\hr10\min48}{\version1}{\edmins0}
{\nofpages1}{\nofwords0}{\nofchars0}{\vern8351}}\widoctrl\ftnbj \sectd\linex0\endnhere
\pard\plain \fs20 This is plain text.\par}
```

The phrase “This is plain text” is not part of a group and is treated as document text.

As previously mentioned, the backslash (\) and braces ({ }) have special meaning in RTF. To use these characters as text, precede them with a backslash, as in \\, \{, and \}.

CONVENTIONS OF AN RTF READER

The reader of an RTF stream is concerned with the following:

- Separating control information from plain text.
- Acting on control information.
- Collecting and properly inserting text into the document, as directed by the current group state.

Acting on control information is designed to be a relatively simple process. Some control information simply contributes special characters to the plain text stream. Other information serves to change the *program state*, which includes properties of the document as a whole, or to change any of a collection of *group states*, which apply to parts of the document.

As previously mentioned, a group state can specify the following:

- The *destination*, or part of the document that the plain text is constructing.
- Character-formatting properties, such as bold or italic.
- Paragraph-formatting properties, such as justified or centered.
- Section-formatting properties, such as the number of columns.
- Table-formatting properties, which define the number of cells and dimensions of a table row.

In practice, an RTF reader will evaluate each character it reads in sequence as follows:

- If the character is an opening brace ({), the reader stores its current state on the stack. If the character is a closing brace (}), the reader retrieves the current state from the stack.
- If the character is a backslash (\), the reader collects the control word or control symbol and its parameter, if any, and looks up the control word or control symbol in a table that maps control words to actions. It then carries out the action prescribed in the table. (The possible actions are discussed below.) The read pointer is left before or after a control-word delimiter, as appropriate.
- If the character is anything other than an opening brace ({), closing brace (}), or backslash (\), the reader assumes that the character is plain text and writes the character to the current destination using the current formatting properties.

If the RTF reader cannot find a particular control word or control symbol in the look-up table described above, the control word or control symbol should be ignored. If a control word or control symbol is preceded by an opening brace ({), it is part of a group. The current state should be saved on the stack, but no state change should occur. When a closing brace (}) is encountered, the current state should be retrieved from the stack, thereby resetting the current state. If the * control symbol precedes a control word, then it defines a destination group and was itself preceded by an opening brace ({). The RTF reader should discard all text up to and including the closing brace (}) that closes this group. All RTF readers must recognize all destinations defined in the March 1987 RTF Specification. The reader may skip past the group, but it is not allowed to simply discard the control word. Destinations defined since March 1987 are marked with the * control symbol.

> ***Note:*** *All RTF readers must implement the * control symbol so that they can read RTF files written by newer RTF writers.*

For control words or control symbols that the RTF reader can find in the look-up table, the possible actions are as follows.

Action	**Description**
Change Destination	The RTF reader changes the destination to the destination described in the table entry. Destination changes are legal only immediately after an opening brace ({). (Other restrictions may also apply; for example, footnotes cannot be nested.) Many destination changes imply that the current property settings will be reset to their default settings. Examples of control words that change destination are **footnote**, **header**, **footer**, **pict**, **info**, **fonttbl**, **stylesheet**, and **colortbl**. This Application Note identifies all destination control words where they appear in control-word tables.
Change Formatting Property	The RTF reader changes the property as described in the table entry. The entry will specify whether a parameter is required. The “Index of RTF Control ” section at the end of this Application Note also specifies which control words require parameters. If a parameter is needed and not specified, then a default value will be used. The default value used depends on the control word. If the control word does not specify a default, then all RTF readers should assume a default of 0.
Insert Special Character	The reader inserts into the document the character code or codes described in the table entry.
Insert Special Character and Perform Action	The reader inserts into the document the character code or codes described in the table entry and performs whatever other action the entry specifies. For example, when Microsoft Word interprets **par**, a paragraph mark is inserted in the document and special code is run to record the paragraph properties belonging to that paragraph mark.

FORMAL SYNTAX

This Application Note describes RTF using the following syntax, based on Backus-Naur Form.

Syntax **Meaning**

#PCDATA	Text (without control words).
#SDATA	Hexadecimal data.
#BDATA	Binary data.
'c'	A literal.
<text>	A nonterminal.
a	The (terminal) control word a, without a parameter.
a or **a*N***	The (terminal) control word a, with a parameter.
a?	Item a is optional.
a+	One or more repetitions of item a.
a*	Zero or more repetitions of item a.
a b	Item a followed by item b.
a | b	Item a or item b.
a & b	Item a and/or item b, in any order.

CONTENTS OF AN RTF FILE

An RTF file has the following syntax:

<File>	'{' <header> <document>'}'

This syntax is the standard RTF syntax; any RTF reader must be able to correctly interpret RTF written to this syntax. It is worth mentioning again that RTF readers do not have to use all control words, but they must be able to harmlessly ignore unknown (or unused) control words, and they must correctly skip over destinations marked with the * control symbol. There may, however, be RTF writers that generate RTF that does not conform to this syntax, and as such, RTF readers should be robust enough to handle some minor variations. Nonetheless, if an RTF writer generates RTF conforming to this specification, then any correct RTF reader should be able to interpret it.

Header

The header has the following syntax:

<header>	***rtf*** <charset> ***deff***? <fonttbl> <filetbl>? <colortbl>? <stylesheet>? <revtbl>?

RTF Version

An entire RTF file is considered a group and must be enclosed in braces. The control word **rtf*N*** must follow the opening brace. The numeric parameter ***N*** identifies the major version of the RTF Specification used. The RTF standard described in this Application Note, although titled as version 1.2, continues to correspond syntactically to RTF Specification Version 1. Therefore, the numeric parameter ***N*** for the **rtf** control word should still be emitted as 1.

Character Set

After specifying the RTF version, you must declare the character set used in this document. The control word for the character set must precede any plain text or any table control words. The RTF Specification currently supports the following character sets.

Control word	**Character set**

\ansi	ANSI (the default)
\mac	Apple Macintosh
\pc	IBM PC code page 437
\pca	IBM PC code page 850, used by IBM Personal System/2® (not implemented in version 1 of Microsoft Word for OS/2)

Font Table

The **fonttbl** control word introduces the font table group. Unique **\f*N*** control words define each font available in the document, and are used to reference that font throughout the document. This group has the following syntax:

<fonttbl>	'{' **fonttbl** (<fontinfo> | ('{' <fontinfo> '}'))+ '}'
<fontinfo>	<fontnum><fontfamily><fcharset>?<fprq>?<fontemb>?<codepage>? <fontname><fontaltname>? ';'
<fontnum>	***\f***
<fontfamily>	**\fnil** | **\froman** | **\fswiss** | **\fmodern** | **\fscript** | **\fdecor** | **\ftech** | **\fbidi**
<fcharset>	***\fcharset***
<fprq>	***\fprq***
<fontname>	#PCDATA
<fontaltname>	'{*' **falt** #PCDATA '}'
<fontemb>	'{*' **fontemb** <fonttype> <fontfname>? <data>? '}'
<fonttype>	**\ftnil** | **\fttruetype**
<fontfname>	'{*' **fontfile** <codepage>? #PCDATA '}'
<codepage>	***\cpg***

Note for <fontemb> that either <fontfname> or <data> must be present, although both may be present.

All fonts available to the RTF writer can be included in the font table, even if the document doesn't use all the fonts.

RTF also supports font families, so that applications can attempt to intelligently choose fonts if the exact font is not present on the reading system. RTF uses the following control words to describe the various font families.

Control word	Font family	Examples
\fnil	Unknown or default fonts (the default)	
\froman	Roman, proportionally spaced serif fonts	Times New Roman®, Palatino®
\fswiss	Swiss, proportionally spaced sans serif fonts	Arial®
\fmodern	Fixed-pitch serif and sans serif fonts	Courier New®, Pica
\fscript	Script fonts	Cursive
\fdecor	Decorative fonts	Old English, ITC Zapf Chancery®
\ftech	Technical, symbol, and mathematical fonts	Symbol
\fbidi	Arabic, Hebrew, or other bidirectional font	Miriam

If an RTF file uses a default font, the default font number is specified with the **deff*N*** control word, which must precede the font-table group. The RTF writer supplies the default font number used in the creation of the document as the numeric argument ***N***. The RTF reader then translates this number through the font table into the most similar font available on the reader's system.

The following control words specify the character set, alternative font name and pitch of a font in the font table.

Control word	Definition
\fcharset*N*	Specifies the character set of a font in the font table.
\falt	Indicates alternate font name to use if the specified font in the font table is not available. '{*' **\falt** <Alternate Font Name>'}'
\fprq*N*	Specifies the pitch of a font in the font table.

If **\fcharset** is specified, the ***N*** argument can be one of the following types.

Character set	*N* Value
ANSI_CHARSET	0
SYMBOL_CHARSET	2
SHIFTJIS_CHARSET	128
GREEK_CHARSET	161
TURKISH_CHARSET	162
HEBREW_CHARSET	177
ARABICSIMPLIFIED_CHARSET	178
ARABICTRADITIONAL_CHARSET	179
ARABICUSER_CHARSET	180
HEBREWUSER_CHARSET	181
CYRILLIC_CHARSET	204
EASTERNEUROPE_CHARSET	238
PC437_CHARSET	254
OEM_CHARSET	255

If **\fprq** is specified, the ***N*** argument can be one of the following values.

Pitch	Value
Default pitch	0
Fixed pitch	1
Variable pitch	2

Font Embedding

RTF supports embedded fonts with the **\fontemb** group located inside a font definition. An embedded font can be specified by a filename, or the actual font data may be located inside the group. If a filename is specified, it is contained in the **\fontfile** group. The **\cpg** control word can be used to specify the character set for the filename.

RTF supports TrueType and other embedded fonts. The type of the embedded font is described by the following control words.

Control word	Embedded font type
\ftnil	Unknown or default font type (the default)
\fttruetype	TrueType font

Code Page Support

A font may have a different character set from the character set of the document. For example, the Symbol font has the same characters in the same positions both on the Macintosh and in Windows. RTF describes this with the **cpg** control word, which names the character set used by the font. In addition, filenames (used in field instructions and in embedded fonts) may not necessarily be the same as the character set of the document; the **cpg** control word can change the character set for these filenames as well. However, all RTF documents must still declare a character set (that is, **\ansi, \mac, \pc,** or **pca**) to maintain backwards compatibility with earlier RTF readers.

The table below describes valid values for **cpg**.

Value	Description
437	United States IBM
708	Arabic (ASMO 708)
709	Arabic (ASMO 449+, BCON V4)
710	Arabic (transparent Arabic)
711	Arabic (Nafitha Enhanced)
720	Arabic (transparent ASMO)
819	Windows 3.1 (United States and Western Europe)
850	IBM multilingual
852	Eastern European
860	Portuguese
862	Hebrew
863	French Canadian
864	Arabic
865	Norwegian
866	Soviet Union
932	Japanese
1250	Windows 3.1 (Eastern European)
1251	Windows 3.1 (Cyrillic)

File Table

The **filetbl** control word introduces the file table destination. This group defines the files referenced in the document and has the following syntax:

<filetbl>	'{*' **filetbl** ('{' <fileinfo> '}')+ '}'
<fileinfo>	**file** <filenum><relpath>?<osnum>? <filesource>+ <filename>
<filenum>	***\fid***
<relpath>	***\frelative***
<osnum>	***\fosnum***
<filesource>	**\fvalidmac** | **\fvaliddos** | **\fvalidntfs** | **\fvalidhpfs** | **\fnetwork**
<filename>	#PCDATA

Note that the filename can be any valid alphanumeric string for the named file system, indicating the complete path and filename.

Control word	Definition
filetbl	A list of documents referenced by the current document. The file table has a structure analogous to the style or font table. This is a destination control word output as part of the document header.
file	Marks the beginning of a file group, which lists relevant information about the referenced file. This is a destination control word.
fid*N*	File ID number. Files are referenced later in the document using this number.
frelative*N*	The character position within the path (starting at 0 [zero]) where the referenced file's path starts to be relative to the path of the owning document. For example, a document is saved to the path C:\PRIVATE\RESUME\FILE1.DOC and its file table contains the path C:\PRIVATE\RESUME\EDU\FILE2.DOC, then that entry in the file table will be **frelative**18, to point at the character "e" in "edu". This allows preservation of relative paths.
fosnum*N*	Currently only filled in for paths from the Macintosh file system. It is an operating-system-specific number for identifying the file, which may be used to speed up access to the file, or find it if the file has been moved to another folder or disk. The Macintosh operating system name for this number is the "file id." Additional meanings of the **fosnum*N*** control word may be defined for other file systems in the future.
fvalidmac	Macintosh file system.
fvaliddos	MS-DOS file system.
fvalidntfs	NTFS file system.
fvalidhpfs	HPFS file system.
fnetwork	Network file system. This control word may be used in conjunction with any of the previous file source control words.

Color Table

The **colortbl** control word introduces the color table group, which defines screen colors, character colors, and other color information. This group has the following syntax:

<colortbl>	'{' **colortbl** <colordef>+ '}'
<colordef>	***\red*** ? & ***\green*** ? & ***\blue*** ? ';'

The following are valid control words for this group.

Control word	Meaning
red*N*	Red index
green*N*	Green index
blue*N*	Blue index

Each definition must be delimited by a semicolon, even if the definition is omitted. If a color definition is omitted, the RTF reader uses its default color. In the example below, three colors are defined. The first color is omitted, as shown by the semicolon following the **colortbl** control word.

```
{\colortbl;\red0\green0\blue0;\red0\green0\blue255;}
```

The foreground and background colors use indexes into the color table to define a color. For more information on color setup, see your Windows documentation.

The following example defines a block of text in color (where supported). Note that the **cf**/**cb** index is the index of an entry in the color table, which represents a red/green/blue color combination.

```
{\f1\cb1\cf2 This is colored text. The background is color
1 and the foreground is color 2.}
```

If the file is translated for software that does not display color, the reader ignores the color-table group.

Style Sheet

The **stylesheet** control word introduces the style sheet group, which contains definitions and descriptions of the various styles used in the document. All styles in the document's style sheet can be included, even if not all the styles are used. In RTF, a style is a form of shorthand used to specify a set of character, paragraph, or section formatting.

The style-sheet group has the following syntax:

<stylesheet>	'{' **stylesheet** <style>+ '}'
<style>	'{' <styledef>?<keycode>? <formatting> <additive>? <based>? <next>? <stylename>? ';' '}'
<styledef>	***s*** | ***cs*** | ***ds***
<keycode>	'{' **keycode** <keys> '}'
<additive>	**additive**
<based>	***sbasedon***
<next>	***snext***
<formatting>	(<brdrdef> | <parfmt> | <apoctl> | <tabdef> | <shading> | <chrfmt>)+
<stylename>	#PCDATA
<keys>	(**shift**? & **ctrl**? & **alt**?) <key>
<key>	***fn*** | #PCDATA

For <style>, both <styledef> and <stylename> are optional; the default is paragraph style 0. Note for <stylename> that Microsoft Word for the Macintosh interprets commas in #PCDATA as separating style synonyms. Also, for <key>, the data must be exactly one character.

Control word	Meaning
cs*N*	Designates character style.
s*N*	Designates paragraph style.
ds*N*	Designates section style.
additive	Used in a character style definition ('**{*'\cs**…'}'). Indicates that style attributes are to be applied in addition to current attributes, rather than setting the character attributes to only the style definition.
sbasedon*N*	Defines the number of the style on which the current style is based (the default is 222—no style).
snext*N*	Defines the next style associated with the current style; if omitted, the next style is the current style.
keycode	This group is specified within the description of a style in the style sheet in the RTF header. The syntax for this group is '**{*'\keycode** <keys>**}**' where *<keys>* are the characters used in the key code. For example, a style, Normal, may be defined {\s0 {*\keycode \shift\ctrl n}Normal;} within the RTF style sheet. See the Special Character control words for the characters outside the alphanumeric range that may be used.

\alt	The ALT modifier key. Used to describe shortcut-key codes for styles.
\shift	The SHIFT modifier key. Used to describe shortcut-key codes for styles.
\ctrl	The CTRL modifier key. Used to describe shortcut-key codes for styles.
\fn*N*	Specifies a function key where ***N*** is the function key number. Used to describe shortcut-key codes for styles.

The following is an example of an RTF style sheet

```
{\stylesheet{\fs20 \sbasedon222\snext0{\*\keycode \shift\ctrl n}
Normal;}{\s1\qr \fs20 \sbasedon0\snext1 FLUSHRIGHT;}{\s2\fi-
720\li720\fs20\ri2880\sbasedon0\snext2 IND;}}
```

and RTF paragraphs to which the styles are applied:

```
\widowctrl\ftnbj\ftnrestart \sectd \linex0\endnhere \pard\plain
\fs20 This is Normal style.
\par \pard\plain \s1\qr\fs20
This is right justified. I call this style FLUSHRIGHT.
\par \pard\plain \s2\fi-720\li720\fs20\ri2880
This is an indented paragraph. I call this style IND. It produces
a hanging indent.
\par}
```

Some of the control words in this example are discussed in later sections. In the example, note that the properties of the style were emitted following the application of the style. This was done for two reasons: 1) to allow RTF readers that don't support styles to still retain all formatting, and 2) to allow the additive model for styles, where additional property changes are “added” on top of the defined style. Some RTF readers may not “apply” a style upon only encountering the style number without the accompanying formatting information because of this.

Revision Marks

This table allows tracking of multiple authors and reviewers of a document, and is used in conjunction with the character properties for revision marks.

Control word	Definition
\revtbl	This group consists of subgroups that each identify the author of a revision in the document, as in `{Author1;}`. This is a destination control word. Revision conflicts, such as one author deleting another's additions, are stored as one group, in the following form: CurrentAuthor\'00\'<length of previous author's name>PreviousAuthor\'00 PreviousRevisionTime The 4 bytes of the Date/Time (DTTM) structure are emitted as ASCII characters, so values greater than 127 should be emitted as quoted hexadecimal values.

All time references for revision marks use the following bit field structure, DTTM.

Bit numbers	Information	Range
0–5	Minute	0–59
6–10	Hour	0–23
11–15	Day of month	1–31
16–19	Month	1–12
20–28	Year	= Year - 1900
29–31	Day of week	0 (Sun)–6 (Sat)

Document Area

Once the RTF header is defined, the RTF reader has enough information to correctly read the actual document text. The document area has the following syntax.

<document>	<info>? <docfmt>* <section>+

Information Group

The **\info** control word introduces the information group, which contains information about the document. This can include the title, author, keywords, comments, and other information specific to the file. This information is for use by a document-management utility, if available.

This group has the following syntax.

<info>	'{' <title>? & <subject>? & <author>? & <operator>? & <keywords>? & <comment>? & ***\version***? & <doccomm>? & ***\vern***? & <creatim>? & <revtim>? & <printim>? & <buptim>? & ***\edmins***? & ***\nofpages***? & ***\nofwords***? ***\nofchars***? & ***\id***? '}'
<title>	'{' **\title** #PCDATA '}'
<subject>	'{' **\subject** #PCDATA '}'
<author>	'{' **\author** #PCDATA '}'
<operator>	'{' **\operator** #PCDATA '}'
<keywords>	'{' **\keywords** #PCDATA '}'
<comment>	'{' **\comment** #PCDATA '}'
<doccomm>	'{' **\doccomm** #PCDATA '}'
<creatim>	'{' **\creatim** <time> '}'
<revtim>	'{' **\revtim** <time> '}'
<printim>	'{' **\printim** <time> '}'
<buptim>	'{' **\buptim** <time> '}'
<time>	***\yr***? ***\mo***? ***\dy***? ***\hr***? ***\min***? ***\sec***?

Some applications, such as Word, ask the user to type this information when saving the document in its native format. If the document is then saved as an RTF file or translated into RTF, the RTF writer specifies this information using the following control words. These control words are destinations and both the control words and the text should be enclosed in braces ({ }).

Control word	Meaning
\title	Title of the document. This is a destination control word.
\subject	Subject of the document. This is a destination control word.
\author	Author of the document. This is a destination control word.
\operator	Person who last made changes to the document. This is a destination control word.
\keywords	Selected keywords for the document. This is a destination control word.
\comment	Comments; text is ignored. This is a destination control word.
\version*N*	Version number of the document.
\doccomm	Comments displayed in Word's Edit Summary Info dialog box. This is a destination control word.

The RTF writer may automatically enter other control words, including the following.

Control word	Meaning
\vern*N*	Internal version number
\creatim	Creation time
\revtim	Revision time
\printim	Last print time
\buptim	Backup time
\edmins*N*	Total editing time (in minutes)
\yr*N*	Year
\mo*N*	Month
\dy*N*	Day
\hr*N*	Hour
\min*N*	Minute
\sec*N*	Seconds
\nofpages*N*	Number of pages
\nofwords*N*	Number of words
\nofchars*N*	Number of characters
\id*N*	Internal ID number

Any control word described in the previous table that does not have a numeric parameter specifies a date; all dates are specified with the **\yr \mo \dy \hr \min \sec** controls.

An example of an information group follows:

```
{\info{\title The Panda's Thumb}{\author Stephen J Gould}{\keywords
science natural history }}
```

Document Formatting Properties

After the information group (if any), there may be some document formatting control words (described as <docfmt> in the document area syntax description). These control words specify the attributes of the document, such as margins and footnote placement. These attributes must precede the first plain-text character in the document.

The control words that specify document formatting are listed in the following table (measurements are in twips; a twip is one-twentieth of a point). For omitted control words, RTF uses the default values.

Control word	Meaning
\deftab*N*	Default tab width in twips (the default is 720).
\hyphhotz*N*	Hyphenation hot zone in twips (the amount of space at the right margin in which words are hyphenated).
\hyphconsec*N*	***N*** is the maximum number of consecutive lines that will be allowed to end in a hyphen. 0 means no limit.
\hyphcaps	Toggles hyphenation of capitalized words (the default is on). Append 1 or leave control word by itself to toggle property on; append 0 (zero) to turn it off.
\hyphauto	Toggles automatic hyphenation (the default is off). Append 1 or leave control word by itself to toggle property on; append 0 (zero) to turn it off.

\linestart*N*	Beginning line number (the default is 1).
\fracwidth	Uses fractional character widths when printing (QuickDraw™ only).
***\nextfile**	Destination; the argument is the name of the file to print or index next; it must be enclosed in braces. This is a destination control word.
***\template**	Destination; the argument is the name of a related template file; it must be enclosed in braces. This is a destination control word.
\makebackup	Backup copy is made automatically when the document is saved.
\defformat	Tells the RTF reader that the document should be saved in RTF format.
\psover	Prints PostScript® over the text.
\doctemp	Document is a boilerplate document. For Word for Windows, this is a template; for Word for the Macintosh, this is a stationery file.
\deflang*N*	Defines the default language used in the document used with a **\plain** control word. See the section "Character-Formatting Properties" on page 32 of this Application Note for a list of possible values for ***N***.

Footnotes and Endnotes

\fet*N*	Footnote/endnote type. This indicates what type of notes are present in the document. 0 Footnotes only or nothing at all (the default). 1 Endnotes only. 2 Footnotes and endnotes both. For backward compatibility, if **\fet1** is emitted, **\endnotes** or **\enddoc** will be emitted along with **\aendnotes** or **\aenddoc. RTF r**eaders that understand **\fet** will need to ignore the footnote-positioning control words, and use the endnote control words instead.
\ftnsep	Text argument separates footnotes from the document. This is a destination control word.
\ftnsepc	Text argument separates continued footnotes from the document. This is a destination control word.
\ftncn	Text argument is a notice for continued footnotes. This is a destination control word.
\aftnsep	Text argument separates endnotes from the document. This is a destination control word.
\aftnsepc	Text argument separates continued endnotes from the document. This is a destination control word.
\aftncn	Text argument is a notice for continued endnotes. This is a destination control word.
\endnotes	Footnotes at the end of the section (the default).
\enddoc	Footnotes at the end of the document.
\ftntj	Footnotes beneath text (top justified).
\ftnbj	Footnotes at the bottom of the page (bottom justified).
\aendnotes	Endnotes at end of section (the default).
\aenddoc	Endnotes at end of document.
\aftnbj	Endnotes at bottom of page (bottom justified).
\aftntj	Endnotes beneath text (top justified).
\ftnstart*N*	Beginning footnote number (the default is 1).
\aftnstart*N*	Beginning endnote number (the default is 1).

\ftnrstpg	Restart footnote numbering each page.
\ftnrestart	Footnote numbers restart at each section. Microsoft Word for the Macintosh uses this control to restart footnote numbering at each page.
\ftnrstcont	Continuous footnote numbering (the default).
\aftnrestart	Restart endnote numbering each section.
\aftnrstcont	Continuous endnote numbering (the default).
\ftnnar	Footnote numbering—Arabic numbering (1, 2, 3, …)
\ftnnalc	Footnote numbering—Alphabetic lowercase (a, b, c, …)
\ftnnauc	Footnote numbering—Alphabetic uppercase (A, B, C, …)
\ftnnrlc	Footnote numbering—Roman lowercase (i, ii, iii, …)
\ftnnruc	Footnote numbering—Roman uppercase (I, II, III, …)
\ftnnchi	Footnote numbering—Chicago Manual of Style (*, †, ‡, §)
\aftnnar	Endnote numbering—Arabic numbering (1, 2, 3, …)
\aftnnalc	Endnote numbering—Alphabetic lowercase (a, b, c, …)
\aftnnauc	Endnote numbering—Alphabetic uppercase (A, B, C, …)
\aftnnrlc	Endnote numbering—Roman lowercase (i, ii, iii, …)
\aftnnruc	Endnote numbering—Roman uppercase (I, II, III, …)
\aftnnchi	Endnote numbering—Chicago Manual of Style (*, †, ‡ §)

Page Information

\paperw*N*	Paper width in twips (the default is 12,240).
\paperh*N*	Paper height in twips (the default is 15,840).
\psz*N*	Used to differentiate between paper sizes with identical dimensions under Windows NT™. Values 1–41 correspond to paper sizes defined in DRIVINI.H in the Windows 3.1 SDK (DMPAPER_ values). Values greater than or equal to 42 correspond to user-defined forms under Windows NT.
\margl*N*	Left margin in twips (the default is 1800).
\margr*N*	Right margin in twips (the default is 1800).
\margt*N*	Top margin in twips (the default is 1440).
\margb*N*	Bottom margin in twips (the default is 1440).
\facingp	Facing pages (activates odd/even headers and gutters).
\gutter*N*	Gutter width in twips (the default is 0).
\margmirror	Switches margin definitions on left and right pages. Used in conjunction with **\facingp.**
\landscape	Landscape format.
\pgnstart*N*	Beginning page number (the default is 1).
\widowctrl	Enable widow and orphan control.

Linked Styles

\linkstyles	Update document styles automatically based on template.

Compatibility Options

\notabind	Don't add automatic tab stop for hanging indent.
\wraptrsp	Wrap trailing spaces onto the next line.

\prcolbl	Print all colors as black.
\noextrasprl	Don't add extra space to line height for showing raised/lowered characters.
\nocolbal	Don't balance columns.
\cvmme	Treat old-style escaped quotation marks (\") as current style ("") in mail merge data documents.
\sprstsp	Suppress extra line spacing at top of page. Basically, this means to ignore any line spacing larger than Auto at the top of a page.
\sprsspbf	Suppress space before paragraph property after hard page or column break.
\otblrul	Combine table borders as done in Word 5.x for the Macintosh. Contradictory table border information is resolved in favor of the first cell.
\transmf	Metafiles are considered transparent; don't blank the area behind metafiles.
\swpbdr	If a paragraph has a left border (not a box) and the Different Odd And Even or Mirror Margins check box is selected, Word will print the border on the right for odd-numbered pages.
\brkfrm	Show hard (manual) page breaks and column breaks in frames.
Forms	
\formprot	This document is protected for forms.
\allprot	This document has no unprotected areas.
\formshade	This document has form field shading on.
\formdisp	This document currently has a forms drop down or check box selected.
\printdata	This document has print form data only on.
Revision Marks	
\revprot	This document is protected for revisions. The user can edit the document, but revision marking cannot be disabled.
\revisions	Turns on revision marking.
\revprop*N*	Argument indicates how revised text will be displayed: 0 for no properties shown; 1 for bold; 2 for italic; 3 for underline (the default); 4 for double underline.
\revbar*N*	Vertical lines mark altered text, based on the argument: 0 for no marking; 1 for left margin; 2 for right margin; 3 for outside (the default: left on left pages, right on right pages).
Annotations	
\annotprot	This document is protected for annotations. The user cannot edit the document but can insert annotations.
Bidirectional Controls	
\rtldoc	This document will be formatted to have Arabic-style pagination.
\ltrdoc	This document will have English-style pagination (the default).

Note that the three document-protection control words (**\formprot**, **\revprot**, and **\annotprot**) are mutually exclusive; only one of the three can apply to any given document. Also, there is currently no method for storing passwords in RTF, so any document that associates a password with a protection level will lose the password protection in RTF.

For more information about bidirectional controls, see “Bidirectional Language Support” on page 53 of this Application Note.

Section Text

Each section in the RTF file has the following syntax:

<section> <secfmt>* <hdrftr>? <para>+ (**sect** <section>)?

Section Formatting Properties

At the beginning of each section, there may be some section-formatting control words (described as <secfmt> in the section text syntax description). These control words specify section-formatting properties, which apply to the text *following* the control word, with the exception of the section-break control words (those beginning with **sbk**). Section-break control words describe the break *preceding* the text. These control words can appear anywhere in the section, not just at the start.

Note that if the **sectd** control word is not present, the current section inherits all section properties defined in the previous section.

The section-formatting control words are listed in the following table.

Control word	Meaning
sect	New section.
sectd	Reset to default section properties.
endnhere	Endnotes included in the section.
binfsxn*N*	***N*** is the printer bin used for the first page of the section. If this control is not defined then the first page uses the same printer bin as defined by the **binsxn*N*** control.
binsxn*N*	***N*** is the printer bin used for the pages of the section.
ds*N*	Designates section style; if a section style is specified, style properties must be specified with the section.
pnseclvl*N*	Used for multilevel lists. This property sets the default numbering style for each corresponding **pnlvl*N*** control word (bullets and numbering property for paragraphs) within that section. This is a destination control word.
sectunlocked	This section is unlocked for forms.
Section Break	
sbknone	No section break.
sbkcol	Section break starts a new column.
sbkpage	Section break starts a new page (the default).
sbkeven	Section break starts at an even page.
sbkodd	Section break starts at an odd page.
Columns	
cols*N*	Number of columns for "snaking" (the default is 1).
colsx*N*	Space between columns in twips (the default is 720).
colno*N*	Column number to be formatted; used to specify formatting for variable-width columns.
colsr*N*	Space to right of column in twips; used to specify formatting for variable-width columns.
colw*N*	Width of column in twips; used to override the default constant width setting for variable-width columns.
linebetcol	Line between columns.

Line Numbering	
\linemod*N*	Line-number modulus amount to increase each line number (the default is 1).
\linex*N*	Distance from the line number to the left text margin in twips (the default is 360). The automatic distance is 0.
\linestarts*N*	Beginning line number (the default is 1).
\linerestart	Line numbers restart at **\linestarts** value.
\lineppage	Line numbers restart on each page.
\linecont	Line numbers continue from the preceding section.

Page Information	
\pgwsxn*N*	***N*** is the page width in twips. A **\sectd** resets the value to that specified by **\paperw*N*** in the document properties.
\pghsxn*N*	***N*** is the page height in twips. A **\sectd** resets the value to that specified by **\paperh*N*** in the document properties.
\marglsxn*N*	***N*** is the left margin of the page in twips. A **\sectd** resets the value to that specified by **\margl*N*** in the document properties.
\margrsxn*N*	***N*** is the right margin of the page in twips. A **\sectd** resets the value to that specified by **\margr*N*** in the document properties.
\margtsxn*N*	***N*** is the top margin of the page in twips. A **\sectd** resets the value to that specified by **\margt*N*** in the document properties.
\margbsxn*N*	***N*** is the bottom margin of the page in twips. A **\sectd** resets the value to that specified by **\margb*N*** in the document properties.
\guttersxn*N*	***N*** is the width of the gutter margin for the section in twips. A **\sectd** resets the value to that specified by **\gutter*N*** from the document properties. If Facing Pages is turned off, the gutter will be added to the left margin of all pages. If Facing Pages is turned on, the gutter will be added to the left side of odd-numbered pages and the right side of even-numbered pages.
\lndscpsxn	Page orientation is in landscape format. To mix portrait and landscape sections within a document, the **\landscape** control should not be used so that the default for a section is portrait, which may be overridden by the **\lndscpsxn** control.
\titlepg	First page has a special format.
\headery*N*	Header is ***N*** twips from the top of the page (the default is 720).
\footery*N*	Footer is ***N*** twips from the bottom of the page (the default is 720).

Page Numbers	
\pgnstarts*N*	Beginning page number (the default is 1).
\pgncont	Continuous page numbering (the default).
\pgnrestart	Page numbers restart at **\pgnstarts** value.
\pgnx*N*	Page number is ***N*** twips from the right margin (the default is 720).
\pgny*N*	Page number is ***N*** twips from the top margin (the default is 720).
\pgndec	Page-number format is decimal.
\pgnucrm	Page-number format is uppercase roman numeral.
\pgnlcrm	Page-number format is lowercase roman numeral.
\pgnucltr	Page-number format is uppercase letter.
\pgnlcltr	Page-number format is lowercase letter.

\pgnhn*N*	Indicates which heading level is used to prefix a heading number to the page number. This control word can only be used in conjunction with numbered heading styles. 0 specifies to not show heading level (the default). Values 1-9 correspond to heading levels 1 through 9.
\pgnhnsh	Hyphen separator character. This separator and the successive ones appear between the heading level number and the page number.
\pgnhnsp	Period separator character.
\pgnhnsc	Colon separator character.
\pgnhnsm	Em-dash (—) separator character.
\pgnhnsn	En-dash (–) separator character.
Vertical Alignment	
\vertalt	Text is top-aligned (the default).
\vertalb	Text is bottom-aligned.
\vertalc	Text is centered vertically.
\vertalj	Text is justified vertically.
Bidirectional Controls	
\rtlsect	This section will snake (newspaper style) columns from right to left.
\ltrsect	This section will snake (newspaper style) columns from left to right (the default).

Headers and Footers

Headers and footers are RTF destinations. Each section in the document can have its own set of headers and footers. If no headers or footers are defined for a given section, the headers and footers from the previous section (if any) are used. Headers and footers have the following syntax:

<hdrftr>	'{' <hdrctl> <para>+ '}' <hdrftr>?
<hdrctl>	**\header** | **\footer** | **\headerl** | **\headerr** | **\headerf** | **\footerl** | **\footerr** | **\footerf**

Note that each separate <hdrftr> group must have a distinct <hdrctl> introducing it.

Control word	Meaning
\header	Header on all pages. This is a destination control word.
\footer	Footer on all pages. This is a destination control word.
\headerl	Header on left pages only. This is a destination control word.
\headerr	Header on right pages only. This is a destination control word.
\headerf	Header on first page only. This is a destination control word.
\footerl	Footer on left pages only. This is a destination control word.
\footerr	Footer on right pages only. This is a destination control word.
\footerf	Footer on first page only. This is a destination control word.

The **\headerl**, **\headerr**, **\footerl,** and **\footerr** control words are used in conjunction with the **\facingp** control word, and the **\headerf** and **\footerf** control words are used in conjunction with the **\titlepg** control word. Many RTF readers will not function correctly if the appropriate document properties are not set. In particular, if **\facingp** is not set, then only **\header** and **\footer** should be used; if **\facingp** is set, then only **\headerl**, **\headerr**, **\footerl**, and **\footerr** should be used. Combining both **\facingp** and **\titlepg** is allowed. You should not use **header** to set the headers for both pages when **facingp** is set. You can use **headerf** if **titlepg** is not set, but no header will appear. For more information, see "Document Formatting Properties" on page 15 and "Section Formatting Properties" on page 19 of this Application Note.

If the previous section had a first page header or footer and had **titlepg** set, and the current section does not, then the previous section's first page header or footer is disabled. However, it is not destroyed; if subsequent sections have **titlepg** set, then the first page header or footer is restored.

Paragraph Text

There are two kinds of paragraphs: plain and table. A table is a collection of paragraphs, and a table row is a continuous sequence of paragraphs partitioned into cells. The **intbl** paragraph-formatting control word identifies the paragraph as part of a table. For more information, see "Table Definitions" on page 30 of this Application Note. This control is inherited between paragraphs that do not have paragraph properties reset with **pard**.

<para>	<textpar> | <row>
<textpar>	<pn>? <brdrdef>? <parfmt>* <apoctl>* <tabdef>? <shading>? (***subdocument*** | <char>+) (**par** <para>)?
<row>	<tbldef> <cell>+ **row**
<cell>	<textpar>+ **cell**

Paragraph Formatting Properties

These control words (described as <parfmt> in the paragraph-text syntax description) specify generic paragraph formatting properties. These control words can appear anywhere in the body of the paragraph, not just at the beginning.

Note that if the **pard** control word is not present, the current paragraph inherits all paragraph properties defined in the previous paragraph.

The paragraph-formatting control words are listed in the following table.

Control word	Meaning
\par	New paragraph.
\pard	Resets to default paragraph properties.
\s*N*	Designates paragraph style; if a paragraph style is specified, style properties must be specified with the paragraph. ***N*** references an entry in the stylesheet.
\hyphpar	Toggles automatic hyphenation for the paragraph. Append 1 or nothing to toggle property on; append 0 (zero) to turn it off.
\intbl	Paragraph is part of a table.
\keep	Keep paragraph intact.
\nowidctlpar	No widow/orphan control. This is a paragraph-level property and is used to override the document-level **\widowctrl**.
\keepn	Keep paragraph with the next paragraph.
\level*N*	***N*** is the outline level of the paragraph.
\noline	No line numbering.
\pagebb	Break page before the paragraph.
\sbys	Side-by-side paragraphs.
Alignment	
\ql	Left-aligned (the default).
\qr	Right-aligned.
\qj	Justified.
\qc	Centered.
Indentation	
\fi*N*	First-line indent (the default is 0).
\li*N*	Left indent (the default is 0).
\ri*N*	Right indent (the default is 0).
Spacing	
\sb*N*	Space before (the default is 0).
\sa*N*	Space after (the default is 0).
\sl*N*	Space between lines: if this control word is missing or if **\sl1000** is used, the line spacing is automatically determined by the tallest character in the line; if ***N*** is a positive value, this size is used only if it is taller than the tallest character (otherwise the tallest character is used); if ***N*** is a negative value, the absolute value of ***N*** is used, even if it is shorter than the tallest character.
\slmult*N*	Line spacing multiple; indicates that the current line spacing is a multiple of "Single" line spacing. This control word can follow only the **\sl** control word and works in conjunction with it. 0 "At Least" or "Exactly" line spacing. 1 Multiple line spacing, relative to "Single."

Subdocuments	
\subdocument ***N***	This indicates that a subdocument in a master document/subdocument relationship should occur here. ***N*** represents an index into the file table. This control word must be the only item in a paragraph.
Bidirectional Controls	
\rtlpar	Text in this paragraph will be displayed with right-to-left precedence.
\ltrpar	Text in this paragraph will be displayed with left-to-right precedence (the default).

Tabs

Any paragraph may have its own set of tabs. Tabs must follow this syntax:

<tabdef>	(<tab> | <bartab>) +
<tab>	<tabkind>? <tablead>? ***tx***
<bartab>	<tablead>? ***tb***
<tabkind>	**\tqr** | **\tqc** | **\tqdec**
<tablead>	**\tldot** | **\tlhyph** | **\tlul** | **\tlth** | **\tleq**

Control word	**Meaning**
\tx*N*	Tab position in twips from the left margin.
\tqr	Flush-right tab.
\tqc	Centered tab.
\tqdec	Decimal tab.
\tb*N*	Bar tab position in twips from the left margin.
\tldot	Leader dots.
\tlhyph	Leader hyphens.
\tlul	Leader underline.
\tlth	Leader thick line.
\tleq	Leader equal sign.

Bullets and Numbering

To provide compatibility with existing RTF readers, all applications that can automatically bullet or number paragraphs will also emit the generated text as plain text in the **pntext** group. This will allow existing RTF readers to capture the plain text and safely ignore the autonumber instructions. This group precedes all bulleted or numbered paragraphs, and will contain all the text and formatting that would be auto-generated. It should precede the '**{**'***\pn** … '**}**' destination, and it is the responsibility of RTF readers that understand the '**{**'***\pn** … '**}**' destination to ignore the **pntext** group.

<pn>	<pnseclvl> | <pnpara>
<pnseclvl>	'{*' ***pnseclvl*** <pndesc>'}'
<pnpara>	<pntext> <pnprops>
<pntext>	'{' **pntext** <char> '}'
<pnprops>	'{*' **pn** <pnlevel> <pndesc>'}'

<pnlevel> ***\pnlvl*** | **\pnlvlblt** | **\pnlvlbody** | **\pnlvlcont**

<pndesc> <pnnstyle> & <pnchrfmt> & <pntxtb> & <pntxta> & <pnfmt>

<pnnstyle> **\pncard** | **\pndec** | **\pnucltr** | **\pnucrm** | **\pnlcltr** | **\pnlcrm** | **\pnord** | **\pnordt**

<pnchrfmt> ***\pnf***? & ***\pnfs***? & **\pnb**? & **\pni**? & **\pncaps**? & **\pnscaps**? & <pnul>? & **\pnstrike**? & ***\pncf***?

<pnul> **\pnul** | **\pnuld** | **\pnuldb** | **\pnulnone** | **\pnulw**

<pnfmt> **\pnnumonce**? & **\pnacross**? & ***\pnindent***? & ***\pnsp***? & **\pnprev**? & <pnjust>? & ***\pnstart***? & **\pnhang**? & **\pnrestart**?

<pnjust> **\pnqc** | **\pnql** | **\pnqr**

<pntxtb> '{' **\pntxtb** #PCDATA'}'

<pntxta> '{' **\pntxta** #PCDATA'}'

Settings below marked with an asterisk can be turned off by appending 0 (zero) to the control word.

Control word	Definition
\pntext	This group precedes all numbered/bulleted paragraphs, and contains all auto-generated text and formatting. It should precede the **'{*'\pn** … **'}'** destination, and it is the responsibility of RTF readers that understand the **'{*'\pn** … **'}'** destination to ignore this preceding group. This is a destination control word.
\pn	Turns on paragraph numbering. This is a destination control word.
\pnlvl*N*	Paragraph level, where ***N*** is a level from 1 to 9. Default set by **\pnseclvl*N*** section formatting property.
\pnlvlblt	Bulleted paragraph (corresponds to level 11). The actual character used for the bullet is stored in the **\pntxtb** group.
\pnlvlbody	Simple paragraph numbering (corresponds to level 10).
\pnlvlcont	Continue numbering but do not display number (“skip numbering”).
\pnnumonce	Number each cell only once in a table (the default is to number each paragraph in a table).
\pnacross	Number across rows (the default is to number down columns).
\pnhang	Paragraph uses a hanging indent.
\pnrestart	Restart numbering after each section break. Note that this control word is used only in conjunction with the Heading Numbering feature (applying multilevel numbering to Heading style definitions).
\pncard	Cardinal numbering (One, Two, Three).
\pndec	Decimal numbering (1, 2, 3).
\pnucltr	Uppercase alphabetic numbering (A, B, C).
\pnucrm	Uppercase roman numbering (I, II, III).
\pnlcltr	Lowercase alphabetic numbering (a, b, c).
\pnlcrm	Lowercase roman numbering. (i, ii, iii).
\pnord	Ordinal numbering (1st, 2nd, 3rd).
\pnordt	Ordinal text numbering (First, Second, Third).
\pnb	Bold numbering.*
\pni	Italic numbering.*
\pncaps	All Caps numbering.*

\pnscaps	Small Caps numbering.*
\pnul	Continuous underline.*
\pnuld	Dotted underline.
\pnuldb	Double underline.
\pnulnone	Turns off underlining.
\pnulw	Word underline.
\pnstrike	Strikethrough numbering.*
\pncf*N*	Foreground color—index into color table (the default is 0).
\pnf*N*	Font number.
\pnfs*N*	Font size (in half-points).
\pnindent*N*	Minimum distance from margin to body text.
\pnsp*N*	Distance from number text to body text.
\pnprev	Used for multilevel lists. Include information from previous level in this level; for example, 1, 1.1, 1.1.1, 1.1.1.1
\pnqc	Centered numbering.
\pnql	Left-justified numbering.
\pnqr	Right-justified numbering.
\pnstart*N*	Start At number.
\pntxta	Text after. This group contains the text that succeeds the number. This is a destination control word.
\pntxtb	Text before. This group contains the text that precedes the number. This is a destination control word.

Note that there is a limit of 32 characters total for the sum of text before and text after for simple numbering. Multilevel numbering has a limit of 64 characters total for the sum of all levels.

Paragraph Borders

Paragraph borders have the following syntax:

<brdrdef>	(<brdrseg> <brdr>)+
<brdrseg>	**\brdrt** | **\brdrb** | **\brdrl** | **\brdrr** | **\brdrbtw** | **\brdrbar** | **\box**
<brdr>	<brdrk> ***\brdrw***? ***\brsp***? ***\brdrcf***?
<brdrk>	**\brdrs** | **\brdrth** | **\brdrsh** | **\brdrdb** | **\brdrdot** | **\brdrdash** | **\brdrhair**

Control word	**Meaning**
\brdrt	Border top.
\brdrb	Border bottom.
\brdrl	Border left.
\brdrr	Border right.
\brdrbtw	Consecutive paragraphs with identical border formatting are considered part of a single group with the border information applying to the entire group. To have borders around individual paragraphs within the group, the **\brdrbtw** control must be specified for that paragraph.

\brdrbar	Border outside (right side of odd-numbered pages, left side of even-numbered pages).
\box	Border around the paragraph (box paragraph).
\brdrs	Single-thickness border.
\brdrth	Double-thickness border.
\brdrsh	Shadowed border.
\brdrdb	Double border.
\brdrdot	Dotted border.
\brdrdash	Dashed border.
\brdrhair	Hairline border.
\brdrw*N*	***N*** is the width in twips of the pen used to draw the paragraph border line.
\brdrcf*N*	***N*** is the color of the paragraph border; specified as an index into the color table in the RTF header.
\brsp*N*	Space in twips between borders and the paragraph.

Paragraph Shading

Paragraph shading has the following syntax:

<shading>   (***shading*** | <pat>) ***cfpat***? ***cbpat***?

<pat>   **\bghoriz** | **\bgvert** | **\bgfdiag** | **\bgbdiag** | **\bgcross** | **\bgdcross** | **\bgdkhoriz** | **\bgdkvert** | **\bgdkfdiag** | **\bgdkbdiag** | **\bgdkcross** | **\bgdkdcross**

Control word	Meaning
\shading*N*	***N*** is the shading of the paragraph in hundredths of a percent.
\bghoriz	Specifies a horizontal background pattern for the paragraph.
\bgvert	Specifies a vertical background pattern for the paragraph.
\bgfdiag	Specifies a forward diagonal background pattern for the paragraph (\\\\).
\bgbdiag	Specifies a backward diagonal background pattern for the paragraph (////).
\bgcross	Specifies a cross background pattern for the paragraph.
\bgdcross	Specifies a diagonal cross background pattern for the paragraph.
\bgdkhoriz	Specifies a dark horizontal background pattern for the paragraph.
\bgdkvert	Specifies a dark vertical background pattern for the paragraph.
\bgdkfdiag	Specifies a dark forward diagonal background pattern for the paragraph (\\\\).
\bgdkbdiag	Specifies a dark backward diagonal background pattern for the paragraph (////).
\bgdkcross	Specifies a dark cross background pattern for the paragraph.
\bgdkdcross	Specifies a dark diagonal cross background pattern for the paragraph.
\cfpat*N*	***N*** is the line color of the background pattern, specified as an index into the document's color table.
\cbpat*N*	***N*** is the background color of the background pattern, specified as an index into the document's color table.

Positioned Objects and Frames

The following paragraph-formatting control words specify the location of a paragraph on the page. Consecutive paragraphs with the same frame formatting are considered to be part of the same frame. For two framed paragraphs to appear at the same position on a page, they must be separated by a paragraph with different or no frame information.

Note that if any paragraph in a table row has any of these control words specified, then all paragraphs in the table row must have the same control words specified, either by inheriting the properties from the previous paragraph or by respecifying the controls.

Paragraph positioning has the following syntax:

<apoctl>	<framesize> & <horzpos> & <vertpos> & <txtwrap> & <dropcap>
<framesize>	***\absw***? & ***\absh***?
<horzpos>	<hframe> & <hdist>
<vertpos>	<vframe> & <vdist>
<txtwrap>	**\nowrap**? & ***\dxfrtext***? & ***\dfrmtxtx***? &***\dfrmtxty***?
<dropcap>	***\dropcapli***? & ***\dropcapt***?
<hframe>	**\phmrg**? | **\phpg**? | **\phcol**?
<hdist>	***\posx***? | ***\posnegx***? | **\posxc**? | **\posxi**? | **\posxo**? | **\posxl**? | **\posxr**?
<vframe>	**\pvmrg**? | **\pvpg**? | **\pvpara**?
<vdist>	***\posy***? | ***\posnegy***? | **\posyt**? | **\posyil**? | **\posyb**? | **\posyc**?

Control word	**Meaning**
\absw*N*	***N*** is the width of the frame in twips.
\absh*N*	***N*** is the height of the frame in twips. A positive number indicates the minimum height of the frame and a negative number indicates the exact height of the frame. A value of zero indicates that the height of the frame adjusts to the contents of the frame. This is the default for frames where no height is given.
Horizontal Position	
\phmrg	Use the margin as the horizontal reference frame.
\phpg	Use the page as the horizontal reference frame.
\phcol	Use the column as the horizontal reference frame. This is the default if no horizontal reference frame is given.
\posx*N*	Positions the frame ***N*** twips from the left edge of the reference frame.
\posnegx*N*	Same as **\posx** but allows arbitrary negative values.
\posxc	Centers the frame horizontally within the reference frame.
\posxi	Positions the paragraph horizontally inside the reference frame.
\posxo	Positions the paragraph horizontally outside the reference frame.
\posxr	Positions the paragraph to the right within the reference frame.
\posxl	Positions the paragraph to the left within the reference frame. This is the default if no horizontal positioning information is given.
Vertical Position	
\pvmrg	Positions the reference frame vertically relative to the margin. This is the default if no vertical frame positioning information is given.

\pvpg	Positions the reference frame vertically relative to the page.
\pvpara	Positions the reference frame vertically relative to the top of the top left corner of the next unframed paragraph in the RTF stream.
\posy*N*	Positions the paragraph ***N*** twips from the top edge of the reference frame.
\posnegy*N*	Same as **posy** but allows arbitrary negative values.
\posyil	Positions the paragraph vertically to be in-line.
\posyt	Positions the paragraph at the top of the reference frame.
\posyc	Centers the paragraph vertically within the reference frame.
\posyb	Positions the paragraph at the bottom of the reference frame.
Text Wrapping	
\nowrap	Prevents text from flowing around the positioned object.
\dxfrtext*N*	Distance in twips of a positioned paragraph from text in the main text flow in all directions.
\dfrmtxtx*N*	***N*** is the horizontal distance in twips from text on both sides of the frame.
\dfrmtxty*N*	***N*** is the vertical distance in twips from text on both sides of the frame.
Drop Caps	
\dropcapli*N*	Number of lines drop cap is to occupy. The range is 1 through 10.
\dropcapt*N*	Type of drop cap: 1 In-text drop cap 2 Margin drop cap

The following is an example of absolute-positioned text in a document:

```
\par \pard \pvpg\phpg\posxc\posyt\absw5040\dxfrtest173 First APO para
\par \pard \phmrg\posxo\posyc\dxfrtext1152 Second APO para
```

Table Definitions

There is no RTF table group; instead, tables are specified as paragraph properties. A table is represented as a sequence of table rows. A table row is a continuous sequence of paragraphs partitioned into cells. The table row begins with the **trowd** control word and ends with the **row** control word. Every paragraph that is contained in a table row must have the **intbl** control word specified or inherited from the previous paragraph. A cell may have more than one paragraph in it; the cell is terminated by a cell mark (the **cell** control word), and the row is terminated by a row mark (the **row** control word). Table rows can also be positioned. In this case, every paragraph in a table row must have the same positioning controls (see the <apoctl> controls on page 28 of this Application Note). Table properties may be inherited from the previous row; therefore, a series of table rows may be introduced by a single <tbldef>.

An RTF table row has the following syntax, as shown in the general paragraph-text syntax shown on page 22 of this Application Note.

<row>	<tbldef> <cell>+ **row**
<cell>	<textpar>+ **cell**

A table definition has the following syntax:

<tbldef>	**trowd** ***trgaph*** <rowjust>? & <rowwrite>? <rowtop>? & <rowbot>? & <rowleft>? & <rowright>? & <rowhor>? & <rowvert>? & ***trleft***? & ***trrh***? **trhdr**? & **trkeep**? <celldef>+
<rowjust>	**trql** | **trqr** | **trqc**

<rowwrite>	**\ltrrow** | **\rtlrow**
<rowtop>	**\trbrdrt** <brdr>
<rowbot>	**\trbrdrl** <brdr>
<rowleft>	**\trbrdrb** <brdr>
<rowright>	**\trbrdrr** <brdr>
<rowhor>	**\trbrdrh** <brdr>
<rowvert>	**\trbrdrv** <brdr>
<celldef>	(**\clmgf**? & **\clmrg**? <celltop>? & <cellleft>? & <cellbot>? & <cellright>? & <cellshad>?) ***\cellx***
<celltop>	**\clbrdrt** <brdr>
<cellleft>	**\clbrdrl** <brdr>
<cellbot>	**\clbrdrb** <brdr>
<cellright>	**\clbrdrr** <brdr>
<cellshad>	<cellpat>? ***\clcfpat***? & ***\clcbpat***? & ***\clshdng***
<cellpat>	**\clbghoriz** | **\clbgvert** | **\clbgfdiag** | **\clbgbdiag** | **\clbgcross** | **\clbgdcross** | **\clbgdkhor** | **\clbgdkvert** | **\clbgdkfdiag** | **\clbgdkbdiag** | **\clbgdkcross** | **\clbgdkdcross**

Note for <tbldef> that the number of **cellx**s must match the number of **cell**s in the **row**.

The following control words further define options for each row of the table.

Control word	Meaning
\trowd	Sets table row defaults.
\trgaph*N*	Half the space between the cells of a table row in twips.
\cellx*N*	Defines the right boundary of a table cell, including its half of the space between cells.
\clmgf	The first cell in a range of table cells to be merged.
\clmrg	Contents of the table cell are merged with those of the preceding cell.
Row Formatting	
\trql	Left-justifies a table row with respect to its containing column.
\trqr	Right-justifies a table row with respect to its containing column.
\trqc	Centers a table row with respect to its containing column.
\trleft*N*	Position of the leftmost edge of the table with respect to the left edge of its column.
\trrh*N*	Height of a table row in twips; when 0 (zero), the height is sufficient for all the text in the line; when positive, the height is guaranteed to be at least the specified height; when negative, the absolute value of the height is used, regardless of the height of the text in the line.
\trhdr	Table row header; this row should appear at the top of every page the current table appears on.
\trkeep	Table row keep together; this row cannot be split by a page break. This property is assumed off unless the control word is present.
Bidirectional Controls	
\rtlrow	Cells in this table row will have right-to-left precedence.

\ltrrow	Cells in this table row will have left-to-right precedence (the default).
Row Borders	
\trbrdrt	Table row border top.
\trbrdrl	Table row border left.
\trbrdrb	Table row border bottom.
\trbrdrr	Table row border right.
\trbrdrh	Table row border horizontal (inside).
\trbrdrv	Table row border vertical (inside).
Cell Borders	
\clbrdrb	Bottom table cell border.
\clbrdrt	Top table cell border.
\clbrdrl	Left table cell border.
\clbrdrr	Right table cell border.
Cell Shading and Background Pattern	
\clshdng*N*	***N*** is the shading of a table cell in hundredths of a percent. This control should be included in RTF along with cell border information.
\clbghoriz	Specifies a horizontal background pattern for the cell.
\clbgvert	Specifies a vertical background pattern for the cell.
\clbgfdiag	Specifies a forward diagonal background pattern for the cell (\\\\).
\clbgbdiag	Specifies a backward diagonal background pattern for the cell (////).
\clbgcross	Specifies a cross background pattern for the cell.
\clbgdcross	Specifies a diagonal cross background pattern for the cell.
\clbgdkhor	Specifies a dark horizontal background pattern for the cell.
\clbgdkvert	Specifies a dark vertical background pattern for the cell.
\clbgdkfdiag	Specifies a dark forward diagonal background pattern for the cell (\\\\).
\clbgdkbdiag	Specifies a dark backward diagonal background pattern for the cell (////).
\clbgdkcross	Specifies a dark cross background pattern for the cell.
\clbgdkdcross	Specifies a dark diagonal cross background pattern for the cell.
\clcfpat*N*	***N*** is the line color of the background pattern.
\clcbpat*N*	***N*** is the background color of the background pattern.

The following is an example of table text:

```
\par \trowd \trqc\trgaph108\trrh280\trleft36
\clbrdrt\brdrth \clbrdrl\brdrth \clbrdrb\brdrdb
\clbrdrr\brdrdb \cellx3636\clbrdrt\brdrth
\clbrdrl\brdrdb \clbrdrb\brdrdb \clbrdrr\brdrdb
\cellx7236\clbrdrt\brdrth \clbrdrl\brdrdb
\clbrdrb\brdrdb \clbrdrr\brdrdb \cellx10836\pard \intbl
\cell \pard \intbl \cell \pard \intbl \cell \pard \intbl \row
\trowd \trqc\trgaph108\trrh280\trleft36 \clbrdrt\brdrdb
\clbrdrl\brdrth \clbrdrb \brdrsh\brdrs \clbrdrr\brdrdb
\cellx3636\clbrdrt\brdrdb \clbrdr \brdrdb
\clbrdrb\brdrsh\brdrs \clbrdrr\brdrdb
\cellx7236\clbrdrt\brdrdb \clbrdr \brdrdb
\clbrdrb\brdrsh\brdrs \clbrdrr\brdrdb \cellx10836\pard
\intbl \cell \pard \intbl \cell \pard \intbl \cell \pard
\intbl \row \pard
```

Character Text

Character text has the following syntax:

<char>	<ptext> | <atext> | '{' <char> '}'
<ptext>	(<chrfmt>* <data>+)+
<data>	#PCDATA | <spec> | <pict> | <obj> | <do> | <foot> | <annot> | <field> | <idx> | <toc> | <book>

Character Formatting Properties

These control words (described as <chrfmt> in the syntax description) change character formatting properties. A control word preceding plain text turns on the specified attribute. Some control words (indicated in the following table by an asterisk following the description) can be turned off by the control word followed by 0 (zero). For example**,** **b** turns on bold, while **b0** turns off bold.

The character-formatting control words are listed in the following table.

Control word	**Meaning**
plain	Reset character formatting properties to a default value defined by the application. The associated character formatting properties (described in the section "Associated Character Properties" on page 35 of this Application Note) are also reset.
b	Bold.*
caps	All capitals.*
deleted	Marks the text as deletion revision marked.*
dn*N*	Subscript position in half-points (the default is 6).
sub	Subscripts text and shrinks point size according to font information.
nosupersub	Turns off superscripting or subscripting.
expnd*N*	Expansion or compression of the space between characters in quarter-points; a negative value compresses (the default is 0).
expndtw*N*	Expansion or compression of the space between characters in twips; a negative value compresses. For backward compatibility, both **expndtw** and **expnd** should be emitted.
kerning*N*	Point size (in half-points) above which to kern character pairs. **kerning0** turns off kerning.
f*N*	Font number. ***N*** refers to an entry in the font table.
fs*N*	Font size in half-points (the default is 24).
i	Italic.*
outl	Outline.*
revised	Text has been added since revision marking was turned on.
revauth*N*	Index into the revision table. The content of the ***N***th group in the revision table is considered to be the author of that revision.
revdttm*N*	Time of the revision. The 32-bit DTTM structure is emitted as a long integer.
scaps	Small capitals.*
shad	Shadow.*

\strike	Strikethrough.*
\ul	Continuous underline. **\ul0** turns off all underlining.
\uld	Dotted underline.
\uldb	Double underline.
\ulnone	Stops all underlining.
\ulw	Word underline.
\up*N*	Superscript position in half-points (the default is 6).
\super	Superscripts text and shrinks point size according to font information.
\v	Hidden text.*
\cf*N*	Foreground color (the default is 0).
\cb*N*	Background color (the default is 0).
\rtlch	The character data following this control word will be treated as a right-to-left run.
\ltrch	The character data following this control word will be treated as a left-to-right run (the default).
\cs*N*	Designates character style; if a character style is specified, style properties must be specified with the character run. ***N*** refers to an entry in the style table.
\cchs*N*	Indicates any characters not belonging to the default document character set and tells which character set they do belong to. Macintosh character sets are represented by values greater than 255. The values for ***N*** correspond to the values for the **\fcharset** control word.
\lang*N*	Applies a language to a character. ***N*** is a number corresponding to a language. The **\plain** control word resets the language property to the language defined by **\deflang*N*** in the document properties.

The following table defines the standard languages used by Microsoft. This table was generated by the Unicode™ group for use with TrueType and Unicode.

Language name	**Language ID**
No language	0x0400
Albanian	0x041c
Arabic	0x0401
Bahasa	0x0421
Belgian Dutch	0x0813
Belgian French	0x080c
Brazilian Portuguese	0x0416
Bulgarian	0x0402
Catalan	0x0403
Croato-Serbian (Latin)	0x041a
Czech	0x0405
Danish	0x0406
Dutch	0x0413
English (Australian)	0x0c09

English (U.K.)	0x0809
English (U.S.)	0x0409
Finnish	0x040b
French	0x040c
French (Canadian)	0x0c0c
German	0x0407
Greek	0x0408
Hebrew	0x040d
Hungarian	0x040e
Icelandic	0x040f
Italian	0x0410
Japanese	0x0411
Korean	0x0412
Norwegian (Bokmal)	0x0414
Norwegian (Nynorsk)	0x0814
Polish	0x0415
Portuguese	0x0816
Rhaeto-Romanic	0x0417
Romanian	0x0418
Russian	0x0419
Serbo-Croatian (Cyrillic)	0x081a
Simplified Chinese	0x0804
Slovak	0x041b
Spanish (Castilian)	0x040a
Spanish (Mexican)	0x080a
Swedish	0x041d
Swiss French	0x100c
Swiss German	0x0807
Swiss Italian	0x0810
Thai	0x041e
Traditional Chinese	0x0404
Turkish	0x041f
Urdu	0x0420

To read negative **expnd** values from Word for the Macintosh, an RTF reader should use only the low-order 6 bits of the value read. Word for the Macintosh does not emit negative values for **expnd**. Instead, it treats values from 57 through 63 as –7 through –1, respectively (the low-order 6 bits of 57 through 63 are the same as –7 through –1).

Associated Character Properties

Bidirectional-aware text processors often need to associate a Latin (or other left-to-right) font with an Arabic or Hebrew (or other right-to-left) font. The association is needed to match commonly used pairs of fonts in name, size, and other attributes. While RTF defines a broad variety of associated character properties, any implementation may choose to not implement a particular associated character property and share the property between the Latin and Arabic fonts.

Property association uses the following syntax:

<atext>	<ltrrun> | <rtlrun>
<ltrrun>	**rtlch** ***af*** & <aprops>* **ltrch** <ptext>
<rtlrun>	**ltrch** ***af*** & <aprops>* **rtlch** <ptext>

Here are some examples of property association:

```
\ ltrch\ af2\ ab\ au\ rtlch\ u Sample Text
```

This is a right-to-left run. Text will use the default bidirectional font, and will be underlined. The left-to-right font associated with this run is font 2 (in the font table) with bolding and underlining.

```
\ plain\ rtlch\ ltrch Sample Text
```

This is a left-to-right run. The right-to-left font and the left-to-right font use the default font (specified by **deff**).

```
\ rtlch\ af5\ ab\ ai\ ltrch\ u Sample Text
```

This is a left-to-right run. The right-to-left font is font 5, bold and italicized. The left-to-right font is the default font, underlined. If the reader does not support underlining in the associated font, both fonts will be underlined.

The property association control words (described as <aprops> in the syntax description) are listed in the following table. Some control words (indicated in the following table by an asterisk following the description) can be turned off by the control word followed by 0 (zero).

Control word	Meaning
ab	Associated font is bold.*
acaps	Associated font is all capitals.*
acf*N*	Associated foreground color (the default is 0).
adn*N*	Associated font is subscript position in half-points (the default is 6).
aexpnd*N*	Expansion or compression of the space between characters in quarter-points; a negative value compresses (the default is 0).
af*N*	Associated font number (the default is 0).
afs*N*	Associated font size in half-points (the default is 24).
ai	Associated font is italic.*
alang*N*	Language ID for the associated font. (This uses the same language ID codes describedon page 34 of this Application Note.)
aoutl	Associated font is outline.*
ascaps	Associated font is small capitals.*
ashad	Associated font is shadow.*
astrike	Associated font is strikethrough.*
aul	Associated font is continuous underline. **aul0** turns off all underlining for the alternate font.
auld	Associated font is dotted underline.

\auldb	Associated font is double underline.
\aulnone	Associated font is no longer underlined.
\aulw	Associated font is word underline.
\aup*N*	Superscript position in half-points (the default is 6).

Special Characters

The RTF Specification includes control words for special characters (described as <spec> in the character-text syntax description). If a special-character control word is not recognized by the RTF reader, it is ignored, and the text following it is considered plain text. The RTF Specification is flexible enough to allow new special characters to be added for interchange with other software.

The special RTF characters are listed in the following table.

Control word	Meaning
\chdate	Current date (as in headers).
\chdpl	Current date in long format (for example, Thursday, October 28, 1993).
\chdpa	Current date in abbreviated format (for example, Thu, Oct 28, 1993).
\chtime	Current time (as in headers).
\chpgn	Current page number (as in headers).
\sectnum	Current section number (as in headers).
\chftn	Automatic footnote reference (footnotes follow in a group).
\chatn	Annotation reference (annotation text follows in a group).
\chftnsep	Anchoring character for footnote separator.
\chftnsepc	Anchoring character for footnote continuation.
\cell	End of table cell.
\row	End of table row.
\par	End of paragraph.
\sect	End of section and paragraph.
\page	Required page break.
\column	Required column break.
\line	Required line break (no paragraph break).
\softpage	Nonrequired page break. Emitted as it appears in galley view.
\softcol	Nonrequired column break. Emitted as it appears in galley view.
\softline	Nonrequired line break. Emitted as it appears in galley view.
\softlheight*N*	Nonrequired line height. This is emitted as a prefix to each line.
\tab	Tab character; same as ASCII 9.
\emdash	Em-dash (—).
\endash	En-dash (–).
\emspace	Nonbreaking space equal to width of character "m" in current font.
\enspace	Nonbreaking space equal to width of character "n" in current font.
\bullet	Bullet character.

\lquote Left single quotation mark.

\rquote Right single quotation mark.

\ldblquote Left double quotation mark.

\rdblquote Right double quotation mark.

\| Formula character.

\~ Nonbreaking space.

\- Optional hyphen.

_ Nonbreaking hyphen.

\: Specifies a subentry in an index entry.

* Marks a destination whose text should be ignored if not understood by the RTF reader.

\'*hh* A hexadecimal value, based on the specified character set (may be used to identify 8-bit values).

\ltrmark The following characters should be displayed from left to right; usually found at the start of **\ltrch** runs.

\rtlmark The following characters should be displayed from right to left; usually found at the start of **\rtlch** runs.

\zwj Zero-width joiner. This is used to ligate (join) characters.

\zwnj Zero-width nonjoiner. This is used for unligating a characters.

Note that an ASCII 9 is accepted as a tab character. A carriage return (character value 13) or linefeed (character value 10) will be treated as a **\par** control if the character is preceded by a backslash. You must include the backslash, or RTF ignores the control word. (You may also want to insert a carriage-return/linefeed pair without backslashes at least every 255 characters for better text transmission over communication lines.)

The following are the code values for the special characters listed.

Control word	Word for Windows and OS/2	Apple Macintosh
\bullet	149	0xA5
\endash	150	0xD1
\emdash	151	0xD0
\lquote	145	0xD4
\rquote	146	0xD5
\ldblquote	147	0xD2
\rdblquote	148	0xD3

Bookmarks

This destination may specify one of two control words: ***\bkmkstart**, which indicates the start of the specified bookmark, and ***\bkmkend**, which indicates the end of the specified bookmark.

Bookmarks have the following syntax:

<book> <bookstart> | <bookend>

<bookstart> '{*' **bkmkstart** (***bkmkcolf***? & ***bkmkcoll***?) #PCDATA '}'

<bookend> '{*' **bkmkend** #PCDATA '}'

A bookmark is shown in the following example:

```
\pard\plain \fs20 Kuhn believes that science, rather than
discovering in experience certain structured
relationships, actually creates (or already participates in)
a presupposed structure to which it fits the data.
{\bkmkstart paradigm} Kuhn calls such a presupposed
structure a paradigm.{\bkmkend paradigm}
```

The bookmark start and the bookmark end are matched with the bookmark tag. In the example, the bookmark tag was "paradigm." Each bookmark start should have a matching bookmark end; however, the bookmark start and the bookmark end may be in any order.

\bkmkcolf*N* is used to denote the first column of a table covered by a bookmark. If it is not included, the first column is assumed. **\bkmkcoll*N*** is used to denote the last column. If it is not used, the last column is assumed. These controls are used within the ***\bkmkstart** destination following the **\bkmkstart** control. For example, `{\ *\ bkmkstart\ bkmkcolf2\ bkmkcoll5 Table1}` places the bookmark "Table1" on columns 2 through 5 of a table.

Pictures

An RTF file can include pictures created with other applications. These pictures can be in hexadecimal (the default) or binary format. Pictures are destinations, and begin with the **\pict** control word. A picture destination has the following syntax:

<pict>	'{' **\pict** (<brdr>? & <shading>? & <picttype> & <pictsize> & <metafileinfo>?) <data> '}'
<picttype>	**\macpict** | ***\pmmetafile*** | ***\wmetafile*** | ***\dibitmap*** <bitmapinfo> | ***\wbitmap*** <bitmapinfo>
<bitmapinfo>	***\wbmbitspixel*** & ***\wbmplanes*** & ***\wbmwidthbytes***
<pictsize>	(***\picw*** & ***\pich***) *\picwgoal*? & *\pichgoal*? ***\picscalex***? & ***\picscaley***? & **\picscaled**? & ***\piccropt***? & ***\piccropb***? & ***\piccropr***? & ***\piccropl***?
<metafileinfo>	**\picbmp** & ***\picbpp***
<data>	(***\bin*** #BDATA) | #SDATA

These control words are described in the following table (some measurements in this table are in twips; a twip is one-twentieth of a point).

Control word	Meaning
\macpict	Source of the picture is QuickDraw.
\pmmetafile*N*	Source of the picture is an OS/2 metafile; the ***N*** argument identifies the metafile type. The ***N*** values are descibed on page 41 of this Application Note.
\wmetafile*N*	Source of the picture is a Windows metafile; the ***N*** argument identifies the metafile type (the default is 1).
\dibitmap*N*	Source of the picture is a Windows device-independent bitmap; the ***N*** argument identifies the bitmap type (must equal 0).
	The information to be included in RTF from a Windows device-independent bitmap is the concatenation of the BITMAPINFO structure followed by the actual pixel data.
\wbitmap*N*	Source of the picture is a Windows device-dependent bitmap; the ***N*** argument identifies the bitmap type (must equal 0).
	The information to be included in RTF from a Windows device-dependent bitmap is the result of the GetBitmapBits function.

For more information on the GetDIBits and GetBitmapBits functions and the structure of Windows device-independent and device-dependent bitmaps, see *Volume 1* and *Volume 2* of the *Programmer's Reference* in the Microsoft Windows 3.1 Software Development Kit. For best device-independence and interoperability with

Microsoft products, however, use of the **wbitmap** and **dibitmap** control words is discouraged. Rather, bitmaps should be embedded within Windows metafiles and the **wmetafile** control word used. For more information on embedding bitmaps within metafiles, see *Volume 1* and *Volume 2* of the *Programmer's Reference* in the Microsoft Windows 3.1 Software Development Kit.

Bitmap Information	
wbmbitspixel*N*	Number of adjacent color bits on each plane needed to define a pixel (the default is 1). Possible values are 1 (monochrome), 4 (16 colors), 8 (256 colors) and 24 (RGB).
wbmplanes*N*	Number of bitmap color planes (must equal 1).
wbmwidthbytes *N*	Specifies the number of bytes in each raster line. This value must be an even number since the Windows graphics device interface (GDI) assumes that the bit values of a bitmap form an array of integer (two-byte) values. In other words, **wbmwidthbytes** times 8 must be the next multiple of 16 greater than or equal to the **picw** (bitmap width in pixels) value.
Picture Size, Scaling, and Cropping	
picw*N*	*xExt* field if the picture is a Windows metafile; picture width in pixels if the picture is a bitmap or from QuickDraw.
pich*N*	*yExt* field if the picture is a Windows metafile; picture height in pixels if the picture is a bitmap or from QuickDraw.
picwgoal*N*	Desired width of the picture in twips.
pichgoal*N*	Desired height of the picture in twips.
picscalex*N*	Horizontal scaling value; the ***N*** argument is a value representing a percentage (the default is 100).
picscaley*N*	Vertical scaling value; the ***N*** argument is a value representing a percentage (the default is 100).
picscaled	Scales the picture to fit within the specified frame; used only with **macpict** pictures.
piccropt*N*	Top cropping value in twips; a positive value crops toward the center of the picture; a negative value crops away from the center, adding a space border around picture (the default is 0).
piccropb*N*	Bottom cropping value in twips; a positive value crops toward the center of the picture; a negative value crops away from the center, adding a space border around picture (the default is 0).
piccropl*N*	Left cropping value in twips; a positive value crops toward the center of the picture; a negative value crops away from the center, adding a space border around picture (the default is 0).
piccropr*N*	Right cropping value in twips; a positive value crops toward the center of the picture; a negative value crops away from the center, adding a space border around picture (the default is 0).
Metafile Information	
picbmp	Specifies whether a metafile contains a bitmap.
picbpp*N*	Specifies the bits per pixel in a metafile bitmap. The valid range is 1–32, with 1, 4, 8, and 24 being recognized.
Picture Data	
bin*N*	The picture is in binary format; the numeric parameter ***N*** is the number of bytes that follow. Unlike all other controls, this control word takes a 32-bit parameter.

The **wbitmap** control word is optional; if no other picture type is specified, the picture is assumed to be a Windows bitmap. If **wmetafile** is specified, the ***N*** argument can be one of the following types.

Type	***N* argument**
MM_TEXT	1
MM_LOMETRIC	2
MM_HIMETRIC	3
MM_LOENGLISH	4
MM_HIENGLISH	5
MM_TWIPS	6
MM_ISOTROPIC	7
MM_ANISOTROPIC	8

For more information about these types, see volume 1 of the *Programmer's Reference* in the Microsoft Windows 3.1 Software Development Kit.

If **pmmetafile** is specified, the ***N*** argument can be one of the following types.

Type	***N* argument**
PU_ARBITRARY	0x0004
PU_PELS	0x0008
PU_LOMETRIC	0x000C
PU_HIMETRIC	0x0010
PU_LOENGLISH	0x0014
PU_HIENGLISH	0x0018
PU_TWIPS	0x001C

For more information about these types, see volume 2 of the *OS/2 Programmer's Reference*.

Be careful with spaces following control words when dealing with pictures in binary format. When reading files, RTF considers the first space after a control word the delimiter and subsequent spaces part of the document text. Therefore, any extra spaces are attached to the picture, with unpredictable results.

RTF writers should not use the carriage-return/linefeed (CR/LF) combination to break up pictures in binary format. If they do, the CR/LF combination is treated as literal text and considered part of the picture data.

The picture in hexadecimal or binary format follows the picture-destination control words. The following example illustrates the destination format:

```
{\pict\wbitmap0\picw170\pich77\wbmbitspixel1\wbmplanes1\wbmwidthbytes22
\picwgoal505
\pichgoal221
\picscalex172
\picscaley172
49f2000000000273023d1101a030
3901000a000000000273023d98
0048000200000275
02040000200010275023e000000000
273023d000002b90002b90002
b90002b90002b9
0002b90002b90002b90002b90002b90002
b92222b90002b90002b90
002b90002b9
0002b90002b90002b90002b9000
```

Objects

Microsoft OLE links, Microsoft OLE embedded objects, and Macintosh Edition Manager subscriber objects are represented in RTF as objects. Objects are destinations that contain a data part and a result part. The data part is generally hidden to the application that produced the document. A separate application uses the data and supplies the appearance of the data. This appearance is the result part of the object.

The representation of objects in RTF is designed to allow RTF readers that don't understand objects or don't use a particular type of object to use the current result in place of the object. This allows the appearance of the object to be maintained through the conversion even though the object functionality is lost. Each object comes with optional information about the object, a required destination that contains the object data, and an optional result that contains the current appearance of the object. This result contains standard RTF. It is an important responsibility of the RTF writer to provide the result so that existing RTF readers that either do not support objects or that do not support the particular type of object will be able to display the object.

When the object is an OLE embedded or linked object, the data part of the object is the structure produced by the OLESaveToStream function. Some OLE clients rely on the OLE system to render the object and a copy of the result is not available to the RTF writer for that application. For these cases, the object result can be extracted from the structure produced by the OLESaveToStream function. For information about the OLESaveToStream function, see the Microsoft Object Linking and Embedding Software Development Kit.

The syntax for this destination is:

<obj>	('{' **object** (<objtype> & <objmod>? & <objclass>? & <objname>? & <objtime>? & <objsize>? & <rsltmod>?) <objdata> <result> '}') | <pubobject>
<objtype>	**objemb** | **objlink** | **objautlink** | **objsub** | **objpub** | **objicemb**
<objmod>	**linkself**? & **objlock**? | **objupdate**?
<objclass>	'{*' **objclass** #PCDATA '}'
<objname>	'{*' **objname** #PCDATA '}'
<objtime>	'{*' **objtime** <time> '}'
<rsltmod>	**rsltmerge**? & <rslttype>?
<rslttype>	**rsltrtf** | **rslttxt** | **rsltpict** | **rsltbmp**
<objsize>	**objsetsize**? & ***\objalign***? & ***\objtransy***? & <objhw>? & ***\objcropt***? & ***\objcropb***? & ***\objcropl***? & ***\objcropr***? & ***\objscalex***? & ***\objscaley***?
<objhw>	***\objh*** & ***\objw***
<objdata>	'{*' **objdata** (<objalias>? & <objsect>?) <data> '}'
<objalias>	'{*' **objalias** <data> '}'
<objsect>	'{*' **objsect** <data> '}'
<result>	'{' **result** <para>+ '}'

Control word	Meaning
Object Type	
\objemb	An object type of OLE embedded object. If no type is given for the object, the object is assumed to be of type **objemb**.
\objlink	An object type of OLE link.
\objautlink	An object type of OLE autolink.
\objsub	An object type of Macintosh Edition Manager subscriber.
\objpub	An object type of Macintosh Edition Manager publisher.
\objicemb	An object type of MS® Word for the Macintosh Installable Command (IC) Embedder.

Object Information	
\linkself	The object is a link to another part of the same document.
\objlock	Locks the object from any updates.
\objupdate	Forces an update to the object before displaying it. Note that this will override any values in the <objsize> control words, but reasonable values should always be provided for these to maintain backwards compatibility.
\objclass	The text argument is the object class to use for this object; ignore the class specified in the object data. This is a destination control word.
\objname	The text argument is the name of this object. This is a destination control word.
\objtime	Describes the time that the object was last updated.

Object Size, Position, Cropping, and Scaling	
\objh*N*	***N*** is the original object height in twips, assuming the object has a graphical representation.
\objw*N*	***N*** is the original object width in twips, assuming the object has a graphical representation.
\objsetsize	Forces the object server to set the object's dimensions to that specified by the client.
\objalign*N*	***N*** is the distance in twips from the left edge of the objects that should be aligned on a tab stop. This is needed to place Equation Editor equations correctly in line.
\objtransy*N*	***N*** is the distance in twips the objects should be moved vertically with respect to the baseline. This is needed to place Math Type equations correctly in line.
\objcropt*N*	***N*** is the top cropping distance in twips.
\objcropb*N*	***N*** is the bottom cropping distance in twips.
\objcropl*N*	***N*** is the left cropping distance in twips.
\objcropr*N*	***N*** is the right cropping distance in twips.
\objscalex*N*	***N*** is the horizontal scaling percentage.
\objscaley*N*	***N*** is the vertical scaling percentage.

Object Data	
\objdata	This subdestination contains the data for the object in the appropriate format; OLE objects are in OLESaveToStream format. This is a destination control word.
\objalias	This subdestination contains the Alias Record for the publisher object for the Macintosh Edition Manager. This is a destination control word.
\objsect	This subdestination contains the Section Record for the publisher object for the Macintosh Edition Manager. This is a destination control word.

Object Result	
\rsltrtf	Forces the result to be rich-text format, if possible.
\rsltpict	Forces the result to be a Windows metafile or MacPict image format, if possible.
\rsltbmp	Forces the result to be a bitmap, if possible.
\rslttxt	Forces the result to be plain text, if possible.
\rsltmerge	Uses the formatting of the current result whenever a new result is obtained.
\result	The result destination is optional in the **\object** destination. It contains the last update of the result of the object. The data of the result destination should be standard RTF so that RTF readers that don't understand objects or the type of object represented can use the current result in the object's place to maintain appearance. This is a destination control word.

Macintosh Edition Manager Publisher Objects

Word for the Macintosh writes publisher objects for the Macintosh Edition Manager in terms of bookmarks (see "Bookmarks" on page 38 of this Application Note). The range of publisher objects are marked as bookmarks, so these controls are all used within the **\bkmkstart** destination. The RTF syntax for a publisher object is:

<pubobject>	'{*' **\bkmkstart \bkmkpub \pubauto**? (<objalias>? & <objsect>) #PCDATA '}'

Control word	Meaning
\bkmkpub	The bookmark marks a Macintosh Edition Manager publisher object.
\pubauto	The publisher object updates all Macintosh Edition Manager subscribers of this object automatically whenever it is edited.

Drawing Objects

Drawing objects and the drawing primitives enumerated within drawing object groups use the syntax described by the following tables.

<do>	'{*' **\do** <dohead> <dpinfo>'}'
<dohead>	<dobx> <doby> <dodhgt> <dolock>?
<dobx>	**\dobxpage** | **\dobxcolumn** | **\dobxmargin**
<doby>	**\dobypage** | **\dobypara** | **\dobymargin**
<dodhgt>	***\dodhgt***
<dolock>	**\dolock**
<dpinfo>	<dpgroup> | <dpcallout> | <dpsimple>
<dpgroup>	**\dpgroup** ***\dpcount*** <dphead> <dpinfo>+ **\dpendgroup** <dphead>
<dpcallout>	**\dpcallout** <cotype> <coangle>? <coaccent>? <cosmartattach>? <cobestfit>? <cominusx>? <cominusy>? <coborder>? <codescent>? ***\dpcooffset*** ***\dpcolength*** <dphead> <dppolyline> <dphead> <dpprops> <dptextbox> <dphead> <dpprops>
<dpsimple>	<dpsimpledpk> <dphead> <dpprops>
<dpsimpledpk>	<dpline> | <dprect> | <dptextbox> | <dpellipse> | <dppolyline> | <dparc>
<dpline>	**\dpline** <dppt> <dppt>
<dprect>	**\dprect** (**\dproundr**)?
<dptextbox>	**\dptxbx** ***\dptxbxmar*** '{' **\dptxbxtext** <para>+'}'
<dpellipse>	**\dpellipse**
<dparc>	**\dparc** **\dparcflipx**? **\dparcflipy**?
<dppolyline>	**\dppolyline** (**\dppolygon**)? ***\dppolycount*** <dppt>+
<dppt>	***\dpptx*** ***\dppty***
<dphead>	***\dpx*** ***\dpy*** ***\dpxsize*** ***\dpysize***

Note that in <dpgroup> the number of <dpinfo>s is equal to the argument of **\dpcount**, while in <dppolyline> the number of <dppt>s is equal to the argument of **\dppolycount.**

The following elements of the drawing-object syntax pertain specifically to callout objects:

<cotype>	**\dpcotright** | **\dpcotsingle** | **\dpcotdouble** | **\dpcottriple**
<coangle>	***\dpcoa***
<coaccent>	**\dpcoaccent**
<cosmartattach>	**\dpcosmarta**
<cobestfit>	**\dpcobestfit**
<cominusx>	**\dpcominusx**
<cominusy>	**\dpcominusy**
<coborder>	**\dpcoborder**
<codescent>	**\dpcodtop** | **\dpcodcenter** | **\dpcodbottom** | ***\dpcodabs***

The remaining elements of the drawing object syntax are properties applied to individual drawn primitives:

<dpprops>	<lineprops>? <fillprops>? <endstylestart>? <endstyleend>? <shadow>?
<lineprops>	<linestyle> <linecolor> ***\dplinew***
<linestyle>	**\dplinesolid** | **\dplinehollow** | **\dplinedash** | **\dplinedot** | **\dplinedado** | **\dplinedadodo**
<linecolor>	<linegray> | <linergb>
<linegray>	***\dplinegray***
<linergb>	***\dplinecor*** ***\dplinecog*** ***\dplinecob***<linepal>?
<linepal>	**\dplinepal**
<fillprops>	<fillcolorfg> <fillcolorbg> ***\dpfillpat***
<fillcolorfg>	<fillfggray> | <fillfgrgb>
<fillfggray>	***\dpfillfggray***
<fillfgrgb>	***\dpfillfgcr*** ***\dpfillfgcg*** ***\dpfillfgcb***<fillfgpal>?
<fillfgpal>	**\dpfillfgpal**
<fillcolorbg>	<fillbggray> | <fillbgrgb>
<fillbggray>	***\dpfillbggray***
<fillbgrgb>	***\dpfillbgcr*** ***\dpfillbgcg*** ***\dpfillbgcb***<fillbgpal>?
<fillbgpal>	**\dpfillbgpal**
<endstylestart>	<arrowstartfill> ***\dpastartl*** ***\dpastartw***
<arrowstartfill>	**\dpastartsol** | **\dpastarthol**
<endstyleend>	<arrowendfill> ***\dpaendl*** ***\dpaendw***
<arrowendfill>	**\dpaendsol** | **\dpaendhol**
<shadow>	**\dpshadow** ***\dpshadx*** ***\dpshady***

The following table describes the control words for the drawing object group in detail. All color values are RGB values between 0-255. All distances are in twips. All other values are as indicated.

Control word	**Definition**
\do	Indicates a drawing object is to be inserted at this point in the character stream. This is a destination control word.

\dolock	The drawing object's anchor is locked and cannot be moved.
\dobxpage	The drawing object is page relative in the x-direction.
\dobxcolumn	The drawing object is column relative in the x-direction.
\dobxmargin	The drawing object is margin relative in the x-direction.
\dobypage	The drawing object is page relative in the y-direction.
\dobypara	The drawing object is paragraph relative in the y-direction.
\dobymargin	The drawing object is margin relative in the y-direction.
\dodhgt*N*	The drawing object is positioned at the following numeric address in the z-ordering.
Drawing Primitives	
\dpgroup	Begin group of drawing primitives.
\dpcount*N*	Number of drawing primitives in the current group.
\dpendgroup	End group of drawing primitives.
\dparc	Arc drawing primitive.
\dpcallout	Callout drawing primitive, which consists of both a polyline and a text box.
\dpellipse	Ellipse drawing primitive.
\dpline	Line drawing primitive.
\dppolygon	Polygon drawing primitive (closed polyline).
\dppolyline	Polyline drawing primitive.
\dprect	Rectangle drawing primitive.
\dptxbx	Text box drawing primitive.
Position and Size	
\dpx*N*	X-offset of the drawing primitive from its anchor.
\dpxsize*N*	X-size of the drawing primitive.
\dpy*N*	Y-offset of the drawing primitive from its anchor.
\dpysize*N*	Y-size of the drawing primitive.
Callouts	
\dpcoa*N*	Angle of callout's diagonal line is restricted to one of the following: 0, 30, 45, 60, or 90. If this control word is absent, the callout has an arbitrary angle, indicated by the coordinates of its primitives.
\dpcoaccent	Accent bar on callout (vertical bar between polyline and text box).
\dpcobestfit	Best fit callout (x-length of each line in callout is similar).
\dpcoborder	Visible border on callout text box.
\dpcodabs*N*	Absolute distance-attached polyline. ***N*** is the offset in twips from the corner that an auto-attached callout would attach to.
\dpcodbottom	Bottom-attached polyline.
\dpcodcenter	Center-attached polyline.
\dpcodtop	Top-attached callout.
\dpcolength*N*	Length of callout.
\dpcominusx	Text box falls in quadrants II or III relative to polyline origin.

\dpcominusy	Text box falls in quadrants III or IV relative to polyline origin.
\dpcooffset*N*	Offset of callout. This is the distance between the end of the polyline and the edge of the text box.
\dpcosmarta	Auto-attached callout. Polyline will attach to either the top or bottom of the text box depending on the relative quadrant.
\dpcotdouble	Double line callout.
\dpcotright	Right angle callout.
\dpcotsingle	Single line callout.
\dpcottriple	Triple line callout.
Text Boxes and Rectangles	
\dptxbxmar*N*	Internal margin of the text box.
\dptxbxtext	Group that contains the text of the text box.
\dproundr	Rectangle is a round rectangle.
Lines and Polylines	
\dpptx*N*	X-coordinate of the current vertex (only for lines and polylines). The coordinate order for a point must be x, y.
\dppty*N*	Y-coordinate of the current vertex (only for lines and polylines). The coordinate order for a point must be x, y.
\dppolycount*N*	Number of vertices in polyline drawing primitive.
Arcs	
\dparcflipx	This indicates that the end point of the arc is to the right of the start point. Arcs are drawn counter-clockwise.
\dparcflipy	This indicates that the end point of the arc is below the start point. Arcs are drawn counter-clockwise.
Line Style	
\dplinecob*N*	Blue value for line color.
\dplinecog*N*	Green value for line color.
\dplinecor*N*	Red value for line color.
\dplinepal	Render line color using the PALETTERGB macro instead of the RGB macro in Windows.
\dplinedado	Dashed-dotted line style.
\dplinedadodo	Dashed-dotted-dotted line style.
\dplinedash	Dashed line style.
\dplinedot	Dotted line style.
\dplinegray*N*	Grayscale value for line color (in half-percentages).
\dplinehollow	Hollow line style (no line color).
\dplinesolid	Solid line style.
\dplinew*N*	Thickness of line (in twips).
Arrow Style	
\dpaendhol	Hollow end arrow (lines only).

\dpaendl*N* Length of end arrow, relative to pen width:

1 Small

2 Medium

3 Large

\dpaendsol Solid end arrow (lines only).

\dpaendw*N* Width of end arrow, relative to pen width:

1 Small

2 Medium

3 Large

\dpastarthol Hollow start arrow (lines only).

\dpastartl*N* Length of start arrow, relative to pen width:

1 Small

2 Medium

3 Large

\dpastartsol Solid start arrow (lines only).

\dpastartw*N* Width of start arrow, relative to pen width:

1 Small

2 Medium

3 Large

Fill Pattern

\dpfillbgcb*N* Blue value for background fill color.

\dpfillbgcg*N* Green value for background fill color.

\dpfillbgcr*N* Red value for background fill color.

\dpfillbgpal Render fill background color using the PALETTERGB macro instead of the RGB macro in Windows.

\dpfillbggray*N* Grayscale value for background fill (in half-percentages).

\dpfillfgcb*N* Blue value for foreground fill color.

\dpfillfgcg*N* Green value for foreground fill color.

\dpfillfgcr*N* Red value for foreground fill color.

\dpfillfgpal Render fill foreground color using the PALETTERGB macro instead of the RGB macro in Windows.

\dpfillfggray*N* Grayscale value for foreground fill (in half-percentages).

\dpfillpat*N* Index into a list of fill patterns. See below for list.

Shadow

\dpshadow Current drawing primitive has a shadow.

\dpshadx*N* X-offset of the shadow.

\dpshady*N* Y-offset of the shadow.

The following values are available for specifying fill patterns in drawing objects with the **\dpfillpat** control word.

Value	**Fill pattern**
0 (zero)	Clear (no pattern)
1	Solid (100%)
2	5%
3	10%
4	20%
5	25%
6	30%
7	40%
8	50%
9	60%
10	70%
11	75%
12	80%
13	90%
14	Dark horizontal lines
15	Dark vertical lines
16	Dark left-diagonal lines (\\\)
17	Dark right-diagonal lines (///)
18	Dark grid lines
19	Dark trellis lines
20	Light horizontal lines
21	Light vertical lines
22	Light left-diagonal lines (\\\)
23	Light right-diagonal lines (///)
24	Light grid lines
25	Light trellis lines

Footnotes

The **footnote** control word introduces a footnote. Footnotes are destinations in RTF. A footnote is anchored to the character that immediately precedes the footnote destination (that is, the footnote moves with the character to which it is anchored). If automatic footnote numbering is defined, the destination can be preceded by a footnote reference character, identified by the control word **chftn**. No Microsoft product supports footnotes within headers, footers, or annotations. Placing a footnote within headers, footers, or annotations will often result in a corrupt document.

Footnotes have the following syntax.

<foot> '{*' **footnote** <para>+ '}'

Here is an example of a destination containing footnotes:

```
\ftnbj\ftnrestart \sectd \linemod0\linex0\endnhere \pard\plain
\ri1170 \fs20 {\pu6 Mead's landmark study has been amply annotated.\chftn
{\*\footnote \pard\plain \s246 \fs20 {\up6\chftn }See Sahlins, Bateson, and
Geertz for a complete bibliography.}
It was her work in America during the Second World War, however, that forms
the basis for the paper. As others have noted, \chftn
{\*\footnote \pard\plain \s246 \fs20 {\up6\chftn}
A complete bibliography will be found at the end of this chapter.}
this period was a turning point for Margaret Mead.}
\par
```

To indicate endnotes, the following combination is emitted: **footnote****ftnalt.** Existing readers will ignore the **ftnalt** control word and treat everything as a footnote.

For other control words relating to footnotes, see the sections titled "Document Formatting Properties" (page 15), "Section Formatting Properties" (page 19), and "Special Characters" (page 37) in this Application Note.

Annotations

RTF annotations have two parts; the author ID (introduced by the control word **atnid**) and the annotation text (introduced by the control word **annotation**); there is no group enclosing both parts. No Microsoft product supports annotations within headers, footers, or footnotes. Placing an annotation within headers, footers, or footnotes will often result in a corrupt document. Each part of the annotation is an RTF destination. Annotations are anchored to the character that immediately precedes the annotation.

If an annotation is associated with an annotation bookmark, the following two destination control words precede and follow the bookmark. The alphanumeric string ***N***, such as a long integer, represents the bookmark name.

<atrfstart>	'{*' **atrfstart** ***N*** '}'
<atrfend>	'{*' **atrfend** ***N*** '}'

Annotations have the following syntax:

<annot>	<annotid> <atnauthor> <atntime>? **chatn** <atnicn>? <annotdef>
<annotid>	'{*' **atnid** #PCDATA '}'
<atnauthor>	'{*' **atnauthor** #PCDATA '}'
<annotdef>	'{*' **annotation** <atnref> <para>+ '}'
<atnref>	'{*' **atnref** ***N*** '}'
<atntime>	'{*' **atntime** <time> '}'
<atnicn>	'{*' **atnicn** <pict> '}'

An example of annotation text follows:

```
An example of a paradigm might be Newtonian physics or
Darwinian biology.{\v\fs16 {\atnid bz}\chatn{\*\annotation
\pard\plain \s224 \fs20 {\field{\fldinst page \\#'"Page:
'#'\line'"}{\fldrslt}}{\fs16 \chatn }
How about some examples that deal with social science?
That's what this paper is about.}}
```

Annotations may have optional time stamps (contained in the **atntime** destination) or icons (contained in the **atnicn** destination).

Fields

The **field** control word introduces a field destination, which contains the text of Word for Windows fields.

Fields have the following syntax:

<field>	'{' **field** <fieldmod>? <fieldinst> <fieldrslt> '}'

<fieldmod>	**flddirty**? & **fldedit**? & **fldlock**? & **fldpriv**?
<fieldinst>	'{*' **fldinst** <char>+ <fldalt>? '}'
<fldalt>	**fldalt**
<fieldrslt>	'{*' **fldrslt** <para>+ '}'

There are several control words that alter the interpretation of the field. These control words are listed in the following table.

Control word	Meaning
flddirty	A formatting change has been made to the field result since the field was last updated.
fldedit	Text has been added to, or removed from, the field result since the field was last updated.
fldlock	Field is locked and cannot be updated.
fldpriv	Result is not in a form suitable for display (for example, binary data used by fields whose result is a picture).

Two subdestinations are required within the **field** destination. They must be enclosed in braces ({ }) and begin with the following control words.

Control word	Meaning
fldinst	Field instructions. This is a destination control word.
fldrslt	Most recent calculated result of the field. This is a destination control word.

If the instruction for a field contains a filename, then the **cpg** control can be used to define the character set of the filename. See “Code Page Support” on page 9 of this Application Note for details.

The **fldrslt** control word should be included even if no result has been calculated because most readers (even those readers that do not recognize fields) can generally include the value of the **fldrslt** destination in the document.

An example of some field text follows:

```
{\field\fldedit{\fldinst author}{\fldrslt Joe Smith}}\par\pard
{\field{\fldinst time \\@ "h:mm AM/PM"}{\fldrslt 8:12 AM}}
```

You can use the **fldalt** control word to specify that the given field reference is to an endnote. For example, the following field in RTF is a reference to a footnote:

```
{\ field{\ *\ fldinst NOTEREF _RefNumber } {\ fldrslt 1}}
```

The following is an example of a reference to an endnote:

```
{\ field{\ *\ fldinst NOTEREF _RefNumber \ fldalt } {\ fldrslt I}}
```

If the specified field is a form field, the ***\datafield** destination appears as a part of <char> and contains the binary data of a form field instruction. For example:

```
{\ field{\*\fldinst {\*\bkmkstart Text1} FORMTEXT {{\*\datafield
00000000000000000554657874310008476565207768697a0000000000000000000000}}}{\fldrslt Default
Result}}{\*\bkmkend Text1}
```

Note that the **datafield** destination requires the * prefix.

Index Entries

The **xe** control word introduces an index entry. Index entries in RTF are destinations. An index entry has the following syntax:

<idx>	'{' **xe** (***xef**? & **bxe**? & **ixe**?) <char>+ (<txe> | <rxe>)? '}'

<txe>	'{' **txe** <char>+ '}'
<rxe>	'{' **rxe** #PCDATA '}'

If the text of the index entry is not formatted as hidden text with the **v** control word, the text is put into the document as well as into the index. For more information on the **v** control word, see "Character Formatting Properties" on page 32 of this Application Note. Similarly, the text of the **txe** subdestination, described later in this section, becomes part of the document if it is not formatted as hidden text.

The following control words may also be used.

Control word	Meaning
xef*N*	Allows multiple indexes within the same document. ***N*** is an integer that corresponds to the ASCII value of a letter between A and Z.
bxe	Formats the page number or cross-reference in bold.
ixe	Formats the page number or cross-reference in italic.
txe *Text*	Text argument to be used instead of a page number. This is a destination control word.
rxe *BookmarkName*	Text argument is a bookmark for the range of page numbers. This is a destination control word.

Table of Contents Entries

The **tc** control word introduces a table of contents entry, which can be used to build the actual table of contents. The **tcn** control word marks a table of contents entry that will not have a page number associated with it; this is used in place of **tc** for such entries. Table of contents entries are destinations, and they have the following syntax:

<toc>	'{' **tc** **|** **tcn** (***tcf***? & ***tcl***?) <char>+ '}'

As with index entries, text that is not formatted as hidden with the **v** character-formatting control word is put into the document. The following control words can also be used in this destination.

Control word	Meaning
tcf*N*	Type of table being compiled; ***N*** is mapped by existing Microsoft software to a letter between A and Z (the default is 67, which maps to C, used for tables of contents).
tcl*N*	Level number (the default is 1).

Bidirectional Language Support

RTF supports bidirectional writing orders for languages such as Arabic. The controls are described below (as well as in the appropriate sections throughout this Application Note). Also refer to the associated character properties defined in “Associated Character Properties” on page 35 of this Application Note.

All the control words relating to bidirectional language support are repeated here for convenience.

Control word	Meaning
rtlch	The character data following this control word will be treated as a right-to-left run.
ltrch	The character data following this control word will be treated as a left-to-right run (the default).
rtlmark	The following characters should be displayed from right to left.
ltrmark	The following characters should be displayed from left to right.

\rtlpar	Text in this paragraph will be displayed with right-to-left precedence
\ltrpar	Text in this paragraph will be displayed with left-to-right precedence. This is the default.
\rtlrow	Cells in this table row will have right-to-left precedence.
\ltrrow	Cells in this table row will have left-to-right precedence. This is the default.
\rtlsect	This section will thread columns from right to left.
\ltrsect	This section will thread columns from left to right. This is the default.
\rtldoc	Text in this document will be displayed from right to left unless overridden by a more specific control.
\ltrdoc	Text in this document will be displayed from left to right unless overridden by a more specific control. This is the default.
\zwj	Zero-width joiner. This is used for ligating characters.
\zwnj	Zero-width nonjoiner. This is used for unligating characters.

INDEX OF RTF CONTROL WORDS

The following table contains a list of all RTF control words, the name of the section where it may be found, and a brief description of the type of control word. The types are described in the following table.

Type	Description
Flag	The control word ignores any parameter.
Destination	This control word starts a group or destination. It ignores any parameter.
Symbol	This control word represents a special character.
Toggle	This control word distinguishes between the ON and OFF states for the given property. The control word with no parameter or a non-zero parameter is used to turn on the property, while the control word with a zero parameter is used to turn it off.
Value	This control word requires a parameter.

***Note:** In the following comprehensive table, the names of all control words that are new to Microsoft Word version 6.0 are followed by an asterisk (*).*

Control word	Described in Section	Type
\'	Special Characters	Symbol
*	Special Characters	Symbol
\-	Special Characters	Symbol
\:	Special Characters	Symbol
\\	Special Characters	Symbol
_	Special Characters	Symbol
\{	Special Characters	Symbol
|	Special Characters	Symbol
\}	Special Characters	Symbol
\~	Special Characters	Symbol
\ab	Associated Character Properties	Toggle
\absh	Positioned Objects and Frames	Value
\absw	Positioned Objects and Frames	Value
\acaps	Associated Character Properties	Toggle
\acf	Associated Character Properties	Value
\additive *	Style Sheet	Flag
\adn	Associated Character Properties	Value
\aenddoc *	Document Formatting Properties	Flag
\aendnotes *	Document Formatting Properties	Flag
\aexpnd	Associated Character Properties	Value
\af	Associated Character Properties	Value
\afs	Associated Character Properties	Value
\aftnbj *	Document Formatting Properties	Flag
\aftncn *	Document Formatting Properties	Destination
\aftnnalc *	Document Formatting Properties	Flag
\aftnnar *	Document Formatting Properties	Flag
\aftnnauc *	Document Formatting Properties	Flag
\aftnnchi *	Document Formatting Properties	Flag
\aftnnrlc *	Document Formatting Properties	Flag
\aftnnruc *	Document Formatting Properties	Flag
\aftnrestart *	Document Formatting Properties	Flag
\aftnrstcont *	Document Formatting Properties	Flag
\aftnsep *	Document Formatting Properties	Destination

\aftnsepc *	Document Formatting Properties	Destination
\aftnstart *	Document Formatting Properties	Value
\aftntj *	Document Formatting Properties	Flag
\ai	Associated Character Properties	Toggle
\alang	Associated Character Properties	Value
\allprot *	Document Formatting Properties	Flag
\alt	Style Sheet	Flag
\annotation	Annotations	Destination
\annotprot *	Document Formatting Properties	Flag
\ansi	Character Set	Flag
\aoutl	Associated Character Properties	Toggle
\ascaps	Associated Character Properties	Toggle
\ashad	Associated Character Properties	Toggle
\astrike	Associated Character Properties	Toggle
\atnauthor *	Annotations	Destination
\atnicn	Annotations	Destination
\atnid	Annotations	Destination
\atnref *	Annotations	Destination
\atntime	Annotations	Destination
\atrfend *	Annotations	Destination
\atrfstart *	Annotations	Destination
\aul	Associated Character Properties	Toggle
\auld	Associated Character Properties	Toggle
\auldb	Associated Character Properties	Toggle
\aulnone	Associated Character Properties	Toggle
\aulw	Associated Character Properties	Toggle
\aup	Associated Character Properties	Value
\author	Information Group	Destination
\b	Character Formatting Properties	Toggle
\bgbdiag	Paragraph Shading	Flag
\bgcross	Paragraph Shading	Flag
\bgdcross	Paragraph Shading	Flag
\bgdkbdiag	Paragraph Shading	Flag
\bgdkcross	Paragraph Shading	Flag
\bgdkdcross	Paragraph Shading	Flag
\bgdkfdiag	Paragraph Shading	Flag
\bgdkhoriz	Paragraph Shading	Flag
\bgdkvert	Paragraph Shading	Flag
\bgfdiag	Paragraph Shading	Flag
\bghoriz	Paragraph Shading	Flag
\bgvert	Paragraph Shading	Flag
\bin	Pictures	Value
\binfsxn	Section Formatting Properties	Value
\binsxn	Section Formatting Properties	Value
\bkmkcolf	Bookmarks	Value
\bkmkcoll	Bookmarks	Value
\bkmkend	Bookmarks	Destination
\bkmkpub	Macintosh Edition Manager Publisher Objects	Flag
\bkmkstart	Bookmarks	Destination
\blue	Color Table	Value
\box	Paragraph Borders	Flag
\brdrb	Paragraph Borders	Flag
\brdrbar	Paragraph Borders	Flag
\brdrbtw	Paragraph Borders	Flag

\brdrcf	Paragraph Borders	Value
\brdrdash *	Paragraph Borders	Flag
\brdrdb	Paragraph Borders	Flag
\brdrdot	Paragraph Borders	Flag
\brdrhair	Paragraph Borders	Flag
\brdrl	Paragraph Borders	Flag
\brdrr	Paragraph Borders	Flag
\brdrs	Paragraph Borders	Flag
\brdrsh	Paragraph Borders	Flag
\brdrt	Paragraph Borders	Flag
\brdrth	Paragraph Borders	Flag
\brdrw	Paragraph Borders	Value
\brkfrm *	Document Formatting Properties	Flag
\brsp	Paragraph Borders	Value
\bullet	Special Characters	Symbol
\buptim	Information Group	Destination
\bxe	Index Entries	Flag
\caps	Character Formatting Properties	Toggle
\cb	Character Formatting Properties	Value
\cbpat	Paragraph Shading	Value
\cchs *	Character Formatting Properties	Value
\cell	Special Characters	Symbol
\cellx	Table Definitions	Value
\cf	Character Formatting Properties	Value
\cfpat	Paragraph Shading	Value
\chatn	Special Characters	Symbol
\chdate	Special Characters	Symbol
\chdpa	Special Characters	Symbol
\chdpl	Special Characters	Symbol
\chftn	Special Characters	Symbol
\chftnsep	Special Characters	Symbol
\chftnsepc	Special Characters	Symbol
\chpgn	Special Characters	Symbol
\chtime	Special Characters	Symbol
\clbgbdiag	Table Definitions	Flag
\clbgcross	Table Definitions	Flag
\clbgdcross	Table Definitions	Flag
\clbgdkbdiag	Table Definitions	Flag
\clbgdkcross	Table Definitions	Flag
\clbgdkdcross	Table Definitions	Flag
\clbgdkfdiag	Table Definitions	Flag
\clbgdkhor	Table Definitions	Flag
\clbgdkvert	Table Definitions	Flag
\clbgfdiag	Table Definitions	Flag
\clbghoriz	Table Definitions	Flag
\clbgvert	Table Definitions	Flag
\clbrdrb	Table Definitions	Flag
\clbrdrl	Table Definitions	Flag
\clbrdrr	Table Definitions	Flag
\clbrdrt	Table Definitions	Flag
\clcbpat	Table Definitions	Value
\clcfpat	Table Definitions	Value
\clmgf	Table Definitions	Flag
\clmrg	Table Definitions	Flag
\clshdng	Table Definitions	Value

\colno *	Section Formatting Properties	Value
\colortbl	Color Table	Destination
\cols	Section Formatting Properties	Value
\colsr *	Section Formatting Properties	Value
\colsx	Section Formatting Properties	Value
\column	Special Characters	Symbol
\colw *	Section Formatting Properties	Value
\comment	Information Group	Destination
\cpg	Code Page Support	Value
\creatim	Information Group	Destination
\cs	Character Formatting Properties	Value
\ctrl	Style Sheet	Flag
\cvmme *	Document Formatting Properties	Flag
\datafield *	Fields	Destination
\deff	Font Table	Value
\defformat	Document Formatting Properties	Flag
\deflang	Document Formatting Properties	Value
\deftab	Document Formatting Properties	Value
\deleted	Character Formatting Properties	Toggle
\dfrmtxtx	Positioned Objects and Frames	Value
\dfrmtxty	Positioned Objects and Frames	Value
\dibitmap	Pictures	Value
\dn	Character Formatting Properties	Value
\do *	Drawing Objects	Destination
\dobxcolumn *	Drawing Objects	Flag
\dobxmargin *	Drawing Objects	Flag
\dobxpage *	Drawing Objects	Flag
\dobymargin *	Drawing Objects	Flag
\dobypage *	Drawing Objects	Flag
\dobypara *	Drawing Objects	Flag
\doccomm	Information Group	Destination
\doctemp	Document Formatting Properties	Flag
\dodhgt *	Drawing Objects	Value
\dolock *	Drawing Objects	Flag
\dpaendhol *	Drawing Objects	Flag
\dpaendl *	Drawing Objects	Value
\dpaendsol *	Drawing Objects	Flag
\dpaendw *	Drawing Objects	Value
\dparc *	Drawing Objects	Flag
\dparcflipx *	Drawing Objects	Flag
\dparcflipy *	Drawing Objects	Flag
\dpastarthol *	Drawing Objects	Flag
\dpastartl *	Drawing Objects	Value
\dpastartsol *	Drawing Objects	Flag
\dpastartw *	Drawing Objects	Value
\dpcallout *	Drawing Objects	Flag
\dpcoa *	Drawing Objects	Value
\dpcoaccent *	Drawing Objects	Flag
\dpcobestfit *	Drawing Objects	Flag
\dpcoborder *	Drawing Objects	Flag
\dpcodabs *	Drawing Objects	Value
\dpcodbottom *	Drawing Objects	Flag
\dpcodcenter *	Drawing Objects	Flag
\dpcodtop *	Drawing Objects	Flag
\dpcolength *	Drawing Objects	Value

\dpcominusx *	Drawing Objects	Flag
\dpcominusy *	Drawing Objects	Flag
\dpcooffset *	Drawing Objects	Value
\dpcosmarta *	Drawing Objects	Flag
\dpcotdouble *	Drawing Objects	Flag
\dpcotright *	Drawing Objects	Flag
\dpcotsingle *	Drawing Objects	Flag
\dpcottriple *	Drawing Objects	Flag
\dpcount *	Drawing Objects	Value
\dpellipse *	Drawing Objects	Flag
\dpendgroup *	Drawing Objects	Flag
\dpfillbgcb *	Drawing Objects	Value
\dpfillbgcg *	Drawing Objects	Value
\dpfillbgcr *	Drawing Objects	Value
\dpfillbggray *	Drawing Objects	Value
\dpfillbgpal *	Drawing Objects	Flag
\dpfillfgcb *	Drawing Objects	Value
\dpfillfgcg *	Drawing Objects	Value
\dpfillfgcr *	Drawing Objects	Value
\dpfillfggray *	Drawing Objects	Value
\dpfillfgpal *	Drawing Objects	Flag
\dpfillpat *	Drawing Objects	Value
\dpgroup *	Drawing Objects	Flag
\dpline *	Drawing Objects	Flag
\dplinecob *	Drawing Objects	Value
\dplinecog *	Drawing Objects	Value
\dplinecor *	Drawing Objects	Value
\dplinedado *	Drawing Objects	Flag
\dplinedadodo *	Drawing Objects	Flag
\dplinedash *	Drawing Objects	Flag
\dplinedot *	Drawing Objects	Flag
\dplinegray *	Drawing Objects	Value
\dplinehollow *	Drawing Objects	Flag
\dplinepal *	Drawing Objects	Flag
\dplinesolid *	Drawing Objects	Flag
\dplinew *	Drawing Objects	Value
\dppolycount *	Drawing Objects	Value
\dppolygon *	Drawing Objects	Flag
\dppolyline *	Drawing Objects	Flag
\dpptx *	Drawing Objects	Value
\dppty *	Drawing Objects	Value
\dprect *	Drawing Objects	Flag
\dproundr *	Drawing Objects	Flag
\dpshadow *	Drawing Objects	Flag
\dpshadx *	Drawing Objects	Value
\dpshady *	Drawing Objects	Value
\dptxbx *	Drawing Objects	Flag
\dptxbxmar *	Drawing Objects	Value
\dptxbxtext *	Drawing Objects	Destination
\dpx *	Drawing Objects	Value
\dpxsize *	Drawing Objects	Value
\dpy *	Drawing Objects	Value
\dpysize *	Drawing Objects	Value
\dropcapli *	Positioned Objects and Frames	Value
\dropcapt *	Positioned Objects and Frames	Value

\ds	Section Formatting Properties	Value
\dxfrtext	Positioned Objects and Frames	Value
\dy	Information Group	Value
\edmins	Information Group	Value
\emdash	Special Characters	Symbol
\emspace *	Special Characters	Symbol
\endash	Special Characters	Symbol
\enddoc	Document Formatting Properties	Flag
\endnhere	Section Formatting Properties	Flag
\endnotes	Document Formatting Properties	Flag
\enspace *	Special Characters	Symbol
\expnd	Character Formatting Properties	Value
\expndtw *	Character Formatting Properties	Value
\f	Character Formatting Properties	Value
\facingp	Document Formatting Properties	Flag
\falt *	Font Table	Destination
\fbidi	Font Table	Flag
\fcharset *	Font Table	Value
\fdecor	Font Table	Flag
\fet *	Document Formatting Properties	Value
\fi	Paragraph Formatting Properties	Value
\fid *	File Table	Value
\field	Fields	Destination
\file *	File Table	Destination
\filetbl *	File Table	Destination
\fldalt *	Document Formatting Properties	Flag
\flddirty	Fields	Flag
\fldedit	Fields	Flag
\fldinst	Fields	Destination
\fldlock	Fields	Flag
\fldpriv	Fields	Flag
\fldrslt	Fields	Destination
\fmodern	Font Table	Flag
\fn	Style Sheet	Value
\fnetwork *	File Table	Flag
\fnil	Font Table	Flag
\fontemb	Font Table	Destination
\fontfile	Font Table	Destination
\fonttbl	Font Table	Destination
\footer	Headers and Footers	Destination
\footerf	Headers and Footers	Destination
\footerl	Headers and Footers	Destination
\footerr	Headers and Footers	Destination
\footery	Section Formatting Properties	Value
\footnote	Footnotes	Destination
\formdisp *	Document Formatting Properties	Flag
\formprot *	Document Formatting Properties	Flag
\formshade *	Document Formatting Properties	Flag
\fosnum *	File Table	Value
\fprq *	Font Table	Value
\fracwidth	Document Formatting Properties	Flag
\frelative *	File Table	Value
\froman	Font Table	Flag
\fs	Character Formatting Properties	Value
\fscript	Font Table	Flag

\fswiss	Font Table	Flag
\ftech	Font Table	Flag
\ftnalt *	Document Formatting Properties	Flag
\ftnbj	Document Formatting Properties	Flag
\ftncn	Document Formatting Properties	Destination
\ftnil	Font Table	Flag
\ftnnalc *	Document Formatting Properties	Flag
\ftnnar *	Document Formatting Properties	Flag
\ftnnauc *	Document Formatting Properties	Flag
\ftnnchi *	Document Formatting Properties	Flag
\ftnnrlc *	Document Formatting Properties	Flag
\ftnnruc *	Document Formatting Properties	Flag
\ftnrestart	Document Formatting Properties	Flag
\ftnrstcont *	Document Formatting Properties	Flag
\ftnrstpg *	Document Formatting Properties	Flag
\ftnsep	Document Formatting Properties	Destination
\ftnsepc	Document Formatting Properties	Destination
\ftnstart	Document Formatting Properties	Value
\ftntj	Document Formatting Properties	Flag
\fttruetype	Font Table	Flag
\fvaliddos *	File Table	Flag
\fvalidhpfs *	File Table	Flag
\fvalidmac *	File Table	Flag
\fvalidntfs *	File Table	Flag
\green	Color Table	Value
\gutter	Document Formatting Properties	Value
\guttersxn	Section Formatting Properties	Value
\header	Headers and Footers	Destination
\headerf	Headers and Footers	Destination
\headerl	Headers and Footers	Destination
\headerr	Headers and Footers	Destination
\headery	Section Formatting Properties	Value
\hr	Information Group	Value
\hyphauto *	Document Formatting Properties	Toggle
\hyphcaps *	Document Formatting Properties	Toggle
\hyphconsec *	Document Formatting Properties	Value
\hyphhotz	Document Formatting Properties	Value
\hyphpar *	Paragraph Formatting Properties	Toggle
\i	Character Formatting Properties	Toggle
\id	Information Group	Value
\info	Information Group	Destination
\intbl	Paragraph Formatting Properties	Flag
\ixe	Index Entries	Flag
\keep	Paragraph Formatting Properties	Flag
\keepn	Paragraph Formatting Properties	Flag
\kerning *	Character Formatting Properties	Value
\keycode	Style Sheet	Destination
\keywords	Information Group	Destination
\landscape	Document Formatting Properties	Flag
\lang	Character Formatting Properties	Value
\ldblquote	Special Characters	Symbol
\level	Paragraph Formatting Properties	Value
\li	Paragraph Formatting Properties	Value
\line	Special Characters	Symbol
\linebetcol	Section Formatting Properties	Flag

\linecont	Section Formatting Properties	Flag
\linemod	Section Formatting Properties	Value
\lineppage	Section Formatting Properties	Flag
\linerestart	Section Formatting Properties	Flag
\linestart	Document Formatting Properties	Value
\linestarts	Section Formatting Properties	Value
\linex	Section Formatting Properties	Value
\linkself	Objects	Flag
\linkstyles *	Document Formatting Properties	Flag
\lndscpsxn	Section Formatting Properties	Flag
\lquote	Special Characters	Symbol
\ltrch	Character Formatting Properties	Flag
\ltrdoc	Document Formatting Properties	Flag
\ltrmark	Special Characters	Symbol
\ltrpar	Paragraph Formatting Properties	Flag
\ltrrow	Table Definitions	Flag
\ltrsect	Section Formatting Properties	Flag
\mac	Character Set	Flag
\macpict	Pictures	Flag
\makebackup	Document Formatting Properties	Flag
\margb	Document Formatting Properties	Value
\margbsxn	Section Formatting Properties	Value
\margl	Document Formatting Properties	Value
\marglsxn	Section Formatting Properties	Value
\margmirror	Document Formatting Properties	Flag
\margr	Document Formatting Properties	Value
\margrsxn	Section Formatting Properties	Value
\margt	Document Formatting Properties	Value
\margtsxn	Section Formatting Properties	Value
\min	Information Group	Value
\mo	Information Group	Value
\nextfile	Document Formatting Properties	Destination
\nocolbal *	Document Formatting Properties	Flag
\noextrasprl *	Document Formatting Properties	Flag
\nofchars	Information Group	Value
\nofpages	Information Group	Value
\nofwords	Information Group	Value
\noline	Paragraph Formatting Properties	Flag
\nosupersub *	Character Formatting Properties	Flag
\notabind *	Document Formatting Properties	Flag
\nowidctlpar *	Paragraph Formatting Properties	Flag
\nowrap	Positioned Objects and Frames	Flag
\objalias	Objects	Destination
\objalign	Objects	Value
\objautlink	Objects	Flag
\objclass	Objects	Destination
\objcropb	Objects	Value
\objcropl	Objects	Value
\objcropr	Objects	Value
\objcropt	Objects	Value
\objdata	Objects	Destination
\object	Objects	Destination
\objemb	Objects	Flag
\objh	Objects	Value
\objicemb	Objects	Flag

\objlink	Objects	Flag
\objlock	Objects	Flag
\objname	Objects	Destination
\objpub	Objects	Flag
\objscalex	Objects	Value
\objscaley	Objects	Value
\objsect	Objects	Destination
\objsetsize	Objects	Flag
\objsub	Objects	Flag
\objtime	Objects	Destination
\objtransy	Objects	Value
\objupdate *	Objects	Flag
\objw	Objects	Value
\operator	Information Group	Destination
\otblrul *	Document Formatting Properties	Flag
\outl	Character Formatting Properties	Toggle
\page	Special Characters	Symbol
\pagebb	Paragraph Formatting Properties	Flag
\paperh	Document Formatting Properties	Value
\paperw	Document Formatting Properties	Value
\par	Special Characters	Symbol
\pard	Paragraph Formatting Properties	Flag
\pc	Character Set	Flag
\pca	Character Set	Flag
\pghsxn	Section Formatting Properties	Value
\pgncont	Section Formatting Properties	Flag
\pgndec	Section Formatting Properties	Flag
\pgnhn *	Section Formatting Properties	Value
\pgnhnsc *	Section Formatting Properties	Flag
\pgnhnsh *	Section Formatting Properties	Flag
\pgnhnsm *	Section Formatting Properties	Flag
\pgnhnsn *	Section Formatting Properties	Flag
\pgnhnsp *	Section Formatting Properties	Flag
\pgnlcltr	Section Formatting Properties	Flag
\pgnlcrm	Section Formatting Properties	Flag
\pgnrestart	Section Formatting Properties	Flag
\pgnstart	Document Formatting Properties	Value
\pgnstarts	Section Formatting Properties	Value
\pgnucltr	Section Formatting Properties	Flag
\pgnucrm	Section Formatting Properties	Flag
\pgnx	Section Formatting Properties	Value
\pgny	Section Formatting Properties	Value
\pgwsxn	Section Formatting Properties	Value
\phcol	Positioned Objects and Frames	Flag
\phmrg	Positioned Objects and Frames	Flag
\phpg	Positioned Objects and Frames	Flag
\picbmp *	Pictures	Flag
\picbpp *	Pictures	Value
\piccropb	Pictures	Value
\piccropl	Pictures	Value
\piccropr	Pictures	Value
\piccropt	Pictures	Value
\pich	Pictures	Value
\pichgoal	Pictures	Value
\picscaled	Pictures	Flag

\picscalex	Pictures	Value
\picscaley	Pictures	Value
\pict	Pictures	Destination
\picw	Pictures	Value
\picwgoal	Pictures	Value
\plain	Character Formatting Properties	Flag
\pmmetafile	Pictures	Value
\pn *	Bullets and Numbering	Destination
\pnacross *	Bullets and Numbering	Flag
\pnb *	Bullets and Numbering	Toggle
\pncaps *	Bullets and Numbering	Toggle
\pncard *	Bullets and Numbering	Flag
\pncf *	Bullets and Numbering	Value
\pndec *	Bullets and Numbering	Flag
\pnf *	Bullets and Numbering	Value
\pnfs *	Bullets and Numbering	Value
\pnhang *	Bullets and Numbering	Flag
\pni *	Bullets and Numbering	Toggle
\pnindent *	Bullets and Numbering	Value
\pnlcltr *	Bullets and Numbering	Flag
\pnlcrm *	Bullets and Numbering	Flag
\pnlvl *	Bullets and Numbering	Value
\pnlvlblt *	Bullets and Numbering	Flag
\pnlvlbody *	Bullets and Numbering	Flag
\pnlvlcont *	Bullets and Numbering	Flag
\pnnumonce *	Bullets and Numbering	Flag
\pnord *	Bullets and Numbering	Flag
\pnordt *	Bullets and Numbering	Flag
\pnprev *	Bullets and Numbering	Flag
\pnqc *	Bullets and Numbering	Flag
\pnql *	Bullets and Numbering	Flag
\pnqr *	Bullets and Numbering	Flag
\pnrestart *	Bullets and Numbering	Flag
\pnscaps *	Bullets and Numbering	Toggle
\pnseclvl *	Bullets and Numbering	Destination
\pnsp *	Bullets and Numbering	Value
\pnstart *	Bullets and Numbering	Value
\pnstrike *	Bullets and Numbering	Toggle
\pntext *	Bullets and Numbering	Destination
\pntxta *	Bullets and Numbering	Destination
\pntxtb *	Bullets and Numbering	Destination
\pnucltr *	Bullets and Numbering	Flag
\pnucrm *	Bullets and Numbering	Flag
\pnul *	Bullets and Numbering	Toggle
\pnuld *	Bullets and Numbering	Flag
\pnuldb *	Bullets and Numbering	Flag
\pnulnone *	Bullets and Numbering	Flag
\pnulw *	Bullets and Numbering	Flag
\posnegx *	Positioned Objects and Frames	Value
\posnegy *	Positioned Objects and Frames	Value
\posx	Positioned Objects and Frames	Value
\posxc	Positioned Objects and Frames	Flag
\posxi	Positioned Objects and Frames	Flag
\posxl	Positioned Objects and Frames	Flag
\posxo	Positioned Objects and Frames	Flag

\posxr	Positioned Objects and Frames	Flag
\posy	Positioned Objects and Frames	Value
\posyb	Positioned Objects and Frames	Flag
\posyc	Positioned Objects and Frames	Flag
\posyil	Positioned Objects and Frames	Flag
\posyt	Positioned Objects and Frames	Flag
\prcolbl *	Document Formatting Properties	Flag
\printdata *	Document Formatting Properties	Flag
\printim	Information Group	Destination
\psover	Document Formatting Properties	Flag
\psz *	Document Formatting Properties	Value
\pubauto	Macintosh Edition Manager Publisher Objects	Flag
\pvmrg	Positioned Objects and Frames	Flag
\pvpara	Positioned Objects and Frames	Flag
\pvpg	Positioned Objects and Frames	Flag
\qc	Paragraph Formatting Properties	Flag
\qj	Paragraph Formatting Properties	Flag
\ql	Paragraph Formatting Properties	Flag
\qr	Paragraph Formatting Properties	Flag
\rdblquote	Special Characters	Symbol
\red	Color Table	Value
\result	Objects	Destination
\revauth *	Character Formatting Properties	Value
\revbar	Document Formatting Properties	Value
\revdttm *	Character Formatting Properties	Value
\revised	Character Formatting Properties	Toggle
\revisions	Document Formatting Properties	Flag
\revprop	Document Formatting Properties	Value
\revprot *	Document Formatting Properties	Flag
\revtbl *	Revision Marks	Destination
\revtim	Information Group	Destination
\ri	Paragraph Formatting Properties	Value
\row	Special Characters	Symbol
\rquote	Special Characters	Symbol
\rsltbmp	Objects	Flag
\rsltmerge	Objects	Flag
\rsltpict	Objects	Flag
\rsltrtf	Objects	Flag
\rslttxt	Objects	Flag
\rtf	RTF Version	Destination
\rtlch	Character Formatting Properties	Flag
\rtldoc	Document Formatting Properties	Flag
\rtlmark	Bidirectional Language Support and Special Characters	Symbol
\rtlpar	Paragraph Formatting Properties	Flag
\rtlrow	Table Definitions	Flag
\rtlsect	Section Formatting Properties	Flag
\rxe	Index Entries	Destination
\s	Paragraph Formatting Properties	Value
\sa	Paragraph Formatting Properties	Value
\sb	Paragraph Formatting Properties	Value
\sbasedon	Style Sheet	Value
\sbkcol	Section Formatting Properties	Flag
\sbkeven	Section Formatting Properties	Flag

\sbknone	Section Formatting Properties	Flag
\sbkodd	Section Formatting Properties	Flag
\sbkpage	Section Formatting Properties	Flag
\sbys	Paragraph Formatting Properties	Flag
\scaps	Character Formatting Properties	Toggle
\sec	Information Group	Value
\sect	Special Characters	Symbol
\sectd	Section Formatting Properties	Flag
\sectnum	Special Characters	Symbol
\sectunlocked *	Section Formatting Properties	Flag
\shad	Character Formatting Properties	Toggle
\shading	Paragraph Shading	Value
\shift	Style Sheet	Flag
\sl	Paragraph Formatting Properties	Value
\slmult *	Paragraph Formatting Properties	Value
\snext	Style Sheet	Value
\softcol *	Special Characters	Flag
\softlheight *	Special Characters	Value
\softline *	Special Characters	Flag
\softpage *	Special Characters	Flag
\sprsspbf *	Document Formatting Properties	Flag
\sprstsp *	Document Formatting Properties	Flag
\strike	Character Formatting Properties	Toggle
\stylesheet	Style Sheet	Destination
\sub *	Character Formatting Properties	Flag
\subdocument *	Paragraph Formatting Properties	Value
\subject	Information Group	Destination
\super *	Character Formatting Properties	Flag
\swpbdr *	Document Formatting Properties	Flag
\tab	Special Characters	Symbol
\tb	Tabs	Value
\tc	Table of Contents Entries	Destination
\tcf	Table of Contents Entries	Value
\tcl	Table of Contents Entries	Value
\tcn *	Table of Contents Entries	Flag
\template	Document Formatting Properties	Destination
\title	Information Group	Destination
\titlepg	Section Formatting Properties	Flag
\tldot	Tabs	Flag
\tleq	Tabs	Flag
\tlhyph	Tabs	Flag
\tlth	Tabs	Flag
\tlul	Tabs	Flag
\tqc	Tabs	Flag
\tqdec	Tabs	Flag
\tqr	Tabs	Flag
\transmf *	Document Formatting Properties	Flag
\trbrdrb *	Table Definitions	Flag
\trbrdrh *	Table Definitions	Flag
\trbrdrl *	Table Definitions	Flag
\trbrdrr *	Table Definitions	Flag
\trbrdrt *	Table Definitions	Flag
\trbrdrv *	Table Definitions	Flag
\trgaph	Table Definitions	Value
\trhdr *	Table Definitions	Flag

\trkeep *	Table Definitions	Flag
\trleft	Table Definitions	Value
\trowd	Table Definitions	Flag
\trqc	Table Definitions	Flag
\trql	Table Definitions	Flag
\trqr	Table Definitions	Flag
\trrh	Table Definitions	Value
\tx	Tabs	Value
\txe	Index Entries	Destination
\ul	Character Formatting Properties	Toggle
\uld	Character Formatting Properties	Flag
\uldb	Character Formatting Properties	Flag
\ulnone	Character Formatting Properties	Flag
\ulw	Character Formatting Properties	Flag
\up	Character Formatting Properties	Value
\v	Character Formatting Properties	Toggle
\vern	Information Group	Value
\version	Information Group	Value
\vertalb	Section Formatting Properties	Flag
\vertalc	Section Formatting Properties	Flag
\vertalj	Section Formatting Properties	Flag
\vertalt	Section Formatting Properties	Flag
\wbitmap	Pictures	Value
\wbmbitspixel	Pictures	Value
\wbmplanes	Pictures	Value
\wbmwidthbytes	Pictures	Value
\widowctrl	Document Formatting Properties	Flag
\wmetafile	Pictures	Value
\wraptrsp *	Document Formatting Properties	Flag
\xe	Index Entries	Destination
\xef *	Index Entries	Value
\yr	Information Group	Value
\zwj	Special Characters	Symbol
\zwnj	Special Characters	Symbol