```
======================================================================
    Microsoft Product Support Services Application Note (Text File)
           GC0165: RICH-TEXT FORMAT (RTF) SPECIFICATION
======================================================================
                                          Revision Date: 6/92
                                            No Disk Included
```

The following information applies to using RTF version 1.0 with
Microsoft MS-DOS(R), Windows(TM), OS/2(R), and Apple(R) Macintosh(R)
Applications.

```
| document was created using Microsoft Word for Windows.          |
 ------------------------------------------------------------------
```

OVERVIEW
========

The rich-text format (RTF) standard is a method of encoding formatted
text and graphics for easy transfer between MS-DOS, Windows, OS/2, and
Apple Macintosh applications.

The RTF standard 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 standard, you can transfer documents created under different
operating systems and with different software applications among 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 applicationís 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. However, Word for Windows uses
8-bit characters in the RTF stream given to converter DLLs.

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>[<NumericParameter>]<delimiter>
```

For example:

```
A    B    C
|    |    |
| ----- |
\ r t f 1
```

    A   A backslash begins each control word
    B   Letter sequence
    C   Numeric parameter

The "Letter Sequence" is made up of uppercase or lowercase alphabetic characters between A and Z inclusive.

The "Numeric Parameter" begins with a digit or a minus sign (-). The range of the values for the numeric parameter is -32,767 through 32,767. However, Microsoft Word for Windows, Word for OS/2, and Word for the Macintosh restrict the range to -31,680 through 31,680. If a numeric parameter immediately follows the control word, this parameter becomes part of the control word and the delimiter follows the parameter.

The "delimiter" marks the end of an RTF control word or symbol. A delimiter can be one of the following:

 - A space. If a space delimits a control word, the space does not appear in the document. Any characters following the delimiter, including spaces, do 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 backslash (\), opening brace ({), or closing brace (}). These characters are used to mark the beginning of a new control word or symbol, the beginning of a group, and end of a group, respectively. More information about control symbols and groups is provided later in this document.

- Any character other than a letter or a digit. In this case, the
  character terminates the control word but is not actually part of
  the control word. The character is considered part of the document
  text.

Some control words govern properties that have only two states (for
example, bold, which is either turned on or turned off). 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.

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, style, screen color, 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.

Certain groups, 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 can also be text that
is used but should not appear within the document at all. Destinations
are sometimes distinguished from other groups by a * control symbol
immediately following the opening brace of the group. The * is

followed by a control word that defines the type of the destination. 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 control words.) Destinations whose related text should be inserted into the document even if the RTF reader does not recognize the destination should not use *. An example of a destination is the \footnote group, where the footnote text follows 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, header and footer, and annotation groups (described later in this document) 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. The following is an example of plain text that does not exist within a group:

```
    ...
    \linex0endnhere \pard\plain \fs20 This is plain text.
    ...
```

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 follows:

```
    \\
    \{
    \}
```

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 state of the current group

The process of acting on control information is designed to be
relatively simple. Some control information only contributes special
characters to the plain text stream. Other information changes the
"program state," which includes properties of the document as a whole,
or changes a collection of "group states," which applies 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

An RTF reader performs the following procedure:

   1. The reader reads the next character.

   2. If the next character is:

        - An opening brace, the reader stores the current state of the
          document on the stack.

        - A closing brace, the reader retrieves the current state of
          the document from the stack.

- A backslash, the reader marks the beginning of an RTF
  control. The reader collects the control word or control
  symbol and its parameter, if any, and carries out the action
  prescribed for that control. The meaning of each of the
  controls is discussed in the section "Contents of an RTF
  File" in this document. The read pointer is left on the next
  nonspace delimiter following the control.

- 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.

3. The reader then reads the next character.

If the RTF reader does not recognize a particular control word or
control symbol, the reader ignores it. When the reader encounters a
control word or control symbol preceded by an opening brace, the
reader recognizes the control as part of a group. The reader saves the
current state on the stack but does not change the state. When the
reader encounters a closing brace, the reader retrieves the current
state from the stack, thereby resetting the current state. If the *
control symbol precedes the unknown control word, * defines a
destination group and is preceded by an opening brace. The RTF reader
will discard all text and subgroups up to and including the brace that
closes this group.

For control words or control symbols recognized by the RTF reader, 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 the destination are
\footnote, \header, \footer, \pict, \info,
\fonttbl, \stylesheet, and \colortbl.

Change formatting property	The RTF reader changes the property as described in the table entry. The entry specifies whether a parameter is required.
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, Word inserts a paragraph mark in the document, along with the paragraph properties belonging to that paragraph mark.

CONTENTS OF AN RTF FILE
========================

An RTF file can contain combinations of the following elements:

THE 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 version of the RTF standard used.
The RTF standard described in this document is version 1.0.

```
THE CHARACTER SET
=================

After specifying the RTF version, you must declare the character set.
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(R) PC Code Page 437

    \pca            IBM PC Code Page 850, used by IBM Personal
                    System/2(R) (not implemented in version 1.0 of
                    Microsoft Word for OS/2)

The Font Table
--------------

This group begins with the control word \fonttbl and contains
descriptions of fonts. All fonts available to the RTF writer can be
included in the font table, even if the document doesnít use all the
fonts.

A font is defined by a font number, a font family, and a font name as
shown in the following example:

        A       B       C       D
        |       |       |       |
    -------- | ------- ---------
    {\fonttbl\f0\froman Tms Rmn;}...
```

```
A   Control word
B   Font number
C   Font family
D   Font name
```

Semicolons separate one font from the next. The font numbers represent
the full font definitions in the group and vary with each document.
The font families are listed below:

```
Control Word    Font Family
------------    -----------

\fnil           Unknown or default fonts (the default)

\fRoman         Roman, proportionally spaced serif fonts (for
                example, Times Roman(R) and Palatino(R))

\fswiss         Swiss(TM), proportionally spaced sans serif fonts
                (for example, Swiss Helvetica(R))

\fmodern        Fixed-pitch serif and sans serif fonts (for
                example, Courier and Pica)

\fscript        Script fonts (for example, Cursive)

\fdecor         Decorative fonts (for example, Old English and
                ITC Zapf Chancery(R))

\ftech          Technical, symbol, and mathematical fonts (for
                example, Symbol)
```

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 readerís system.

```
THE STYLE SHEET
===============

The style sheet group begins with the control word \stylesheet. This
group contains definitions and descriptions of the various styles used
in the document. The style sheet is declared only once, before any
document text. All styles in the documentís style sheet can be
included, even if not all the styles are used.

    Control Word    Meaning
    ------------    -------

    \sbasedon<N>    Defines the number of the style on which the
                    current style is based. Word for Windows defaults
                    to the Normal style--style number 222--if
                    \sbasedon is omitted.

    \snext<N>       For paragraph styles, \snext defines the style
                    automatically assigned to a paragraph created
                    following the paragraph with the current style.
                    If \snext omitted, the next paragraph is given
                    the same style as the current paragraph.

    \keycode        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 Normal style may be defined {\s0
                    {\*\keycode \shift\ctrl n}Normal;} within the RTF
                    style sheet. See the "Special Characters" control
                    words for the characters outside of the
                    alphanumeric range that can be used.

An example of an RTF style sheet and styles follows:

            ...
        --
        |    {\stylesheet{\fs20 \sbasedon222\snext10{keycode \shift...}
  A---|    {\s1 \ar \fs20 \sbasedon0\snext1 FLUSHRIGHT}{\s2\fi...}
```

```
        |    \sbasedon0snext2 IND:}}
        --
          ...
      --
      |   \widowctrl\ftnbj\ftnrestart \sectd \linex0\endnhere
      |   \pard\plain \fs20 This is Normal style.
  B---|   \par \pard\plain \s1
      |   This is right justified. I call this style FLUSHRIGHT.
      |   \par \pard\plain \s2
      |   This is an indented paragraph. I call this style IND...
      --
          \par}
          ...

  A   Style sheet
  B   Styles applied to text

  This is Normal Style.
                This is right justified. I call this style FLUSHRIGHT.
  This is an indented paragraph. I call this style IND. It produces
        a hanging indent.
```

In this example, PostScript(R) is declared but not used. Some of the control words in this example are discussed in the following sections.

THE COLOR TABLE
===============

Screen colors, character colors, and other color information are contained in the color table group. The control word \colortbl begins this group. Additional control words for red, green, and blue and the foreground and background colors then use parameter values (0-255) corresponding to the color indexes used by Microsoft Windows to define the amount of red, green, and blue that makes up a color. For more information on color setup, see your Windows documentation.

The following are valid control words for this group:

```
   Control Word      Meaning
   ------------      -------

   \red<N>           Red index
   \green<N>         Green index
   \blue<N>          Blue index
   \cf<N>            Foreground color (the default is 0)
   \cb<N>            Background color (the default is 0)
```

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 that follows, 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 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.

PICTURES
========

An RTF file can include picture files created with other applications.
These files are in hexadecimal (the default) or binary format. The
control word \pict begins this group. Control words that define and

describe the picture parameters follow the \pict control word. These
control words are listed in the following table (some measurements in
this table are in twips; a twip is one-twentieth of a point):

  General

   Control Word   Meaning
   ------------   -------

   \macpict   The source file of the picture is QuickDraw(TM).

   \pmmetafile<N>   The source file of the picture is an OS/2
                     metafile; the <N> argument identifies the
                     metafile type.

   \wmetafile<N>   The source file of the picture is a Windows
                     metafile; the <N> argument identifies the
                     metafile type (the default is 1, meaning the
                     metafile type is MM_TEXT).

   \dibitmap<N>   The source file of the picture is a device
                     independent bitmap; the <N> argument identifies
                     the bitmap type (the default is 0).

   \wbitmap<N>   The source file of the picture is a bitmap; the
                     <N> argument identifies the bitmap type (the
                     default is 0, meaning that the bitmap is a
                     logical bitmap).

  Bitmap Information

   Control Word   Meaning
   ------------   -------

   \wbmbitspixel<N>   The number of bitmap bits per pixel (the default
                         is 1).
   \wbmplanes<N>   The number of bitmap planes (the default is 1).

```
 \wbmwidthbytes<N>        The bitmap width in bytes.

Picture Size, Scaling, and Cropping
------------------------------------------------------------------

 Control Word      Meaning
 ------------      -------

 \picw<N>          The <xExt> field if the picture is a metafile;
                   the picture width in pixels if the picture is a
                   bitmap or is from QuickDraw.

 \pich<N>          The <yExt> field if the picture is a metafile;
                   the picture height in pixels if the picture is a
                   bitmap or from QuickDraw.

 \picwgoal<N>      The desired width of the picture in twips.

 \pichgoal<N>      The desired height of the picture in twips.

 \picscalex<N>     The horizontal scaling value; the <N> argument is
                   a value representing a percentage (the default is
                   100).

 \picscaley<N>     The 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>      The 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 the picture (the default is
                   0).

 \piccropb<N>      The 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 the picture (the default is
0).

\piccropl<N>   The 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 the picture (the default is
                  0).

\piccropr<N>   The 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 the picture (the default is
                  0).

Picture Border

 Control Word   Meaning
 ------------   -------

 \brdrs   A single picture border.
 \brdrdb   A double picture border.
 \brdrth   A thick picture border.
 \brdrsh   A shadow picture border.
 \brdrdot   A dotted picture border.
 \brdrhair   A hairline picture border.

 \brdrw<N>   <N> is the width in twips of the picture border
                  line. This control should follow the picture
                  border controls \brdrt, \brdrr, \brdrb, and
                  \brdrl.

 \brdrcf<N>   <N> is the color of the picture border from the
                  color table in the RTF header. This control
                  should follow the picture border controls \brdrt,
                  \brdrr, \brdrb, and \brdrl.

```
Picture Background Shading
----------------------------------------------------------------

 Control Word    Meaning
 ------------    -------

 \shading<N>     <N> is the shading of the picture in hundredths
                 of a percent.

 \bghoriz        Specifies a horizontal background pattern for the
                 picture.

 \bgvert         Specifies a vertical background pattern for the
                 picture.

 \bgfdiag        Specifies a forward diagonal background pattern
                 for the picture (\\\\).

 \bgbdiag        Specifies a backward diagonal background pattern
                 for the picture (////).

 \bgcross        Specifies a cross-hatched background pattern for
                 the picture.

 \bgdcross       Specifies a diagonal cross-hatched background
                 pattern for the picture.

 \bgdkhoriz      Specifies a dark horizontal background pattern
                 for the picture.

 \bgdkvert       Specifies a dark vertical background pattern for
                 the picture.

 \bgdkfdiag      Specifies a dark forward diagonal background
                 pattern for the picture (\\\\).

 \bgdkbdiag      Specifies a dark backward diagonal background
                 pattern for the picture (////).
```

```
\bgdkcross          Specifies a dark cross-hatched background pattern
                    for the picture.

\bgdkdcross         Specifies a dark diagonal cross-hatched
                    background pattern for the picture.

\cfpat<N>           <N> is the line color of the background pattern.

\cbpat<N>           <N> is the background color of the background
                    pattern.
```

  Picture Data

```
  Control Word      Meaning
  ------------      -------

  \bin<N>           The picture is in binary format; the numeric
                    parameter <N> is the number of bytes that follow.
```

The \wbitmap control word is optional; if neither \wmetafile nor
\macpict 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
```

If \pmmetafile is specified, the <N> argument can be one of the
following types:

```
Type                 <N> Argument
----                 -------------

PU_ARBITRARY    4
PU_PELS         8
PU_LOMETRIC     12
PU_HIMETRIC     16
PU_LOENGLISH    20
PU_HIENGLISH    24
PU_TWIPS        28
```

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 (CRLF)
combination to break up pictures in binary format. If they do, the
CRLF is treated as literal text and considered part of the picture
data.

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

```
                A        B       C            D              E
                |        |       |            |              |
          -------- ------- ------ ------------- ----------
      {\pict\wbitmap0\picw170\pich77\wbmbitspixel1\wbmplanes1


              F                G
              |                |
      --------------- -----------
      \wmbwidthbytes22\picwgoal505

  H--- \pichgoal221
  I--- \picscalex172
  J--- \picscaley172
```

```
      -  49f2000000000273023d1101a030
      |  3901000a000000000273023d98
      |  0048000200000275
      |  020400002000010275023e000000000
K--|  273023d000002b90002b90002
      |  b90002b90002b9
      |  0002b90002b90002b90002b90002b90002
      |  b92222b90002b90002b90
      |  002b90002b9
      -  0002b90002b90002b90002b9000
         ...
A   Source
B   Width
C   Height
D   Bits per pixel
E   Bitmap planes
F   Width of picture in bytes
G   Desired picture width
H   Desired picture height
I   Horizontal scaling value
J   Vertical scaling value
K   Hexadecimal data
```

> NOTE: The controls \pichgoal, \picscalex, and \picscaley in
> this example are on separate lines for the purpose of
> illustration only. In actual RTF code, they can be included on
> the same line.

FOOTNOTES
=========

The group containing footnote text begins with the control word
*\footnote. Footnotes are anchored to the character that immediately
precedes the footnote group. If automatic footnoting is defined, the
group can be preceded by a footnote reference character, identified by
the control word \chftn.

The following is an example of a group containing footnotes:

```
        ...
        \ftnbj\ftnrestart \sectd \\linemod0\linex0\endnhere
        \pard\plain \ri1170 \fs20 {pu6 Mead's landmark study has been
        amply annotated.\chftn
A--| {\*\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
A--| {\*\footnote \pard\plain \s246 \fs20 {\up6\chftn}
   | A complete bibliography will be found at the end of the
   | chapter.}
        this period was a turning point for Margaret Mead.}
        \par
        ...


        Mead's landmark study has been amply annotated.1 It was her
        work in America during the Second World War, however, that
        forms the basis for this paper. As others have noted,2 this
        period was a turning point for Margaret Mead.

        1 See Sahlins, Bateson, and Geertz for a complete
        bibliography.

        2 A complete bibliography will be found at the end of the
        chapter.

   A: Footnotes
```

For other control words relating to footnotes, see the sections titled
"Document Formatting Properties," "Section Formatting Properties," and
"Special Characters" later in this document.

ANNOTATIONS

===========

The group containing annotation text begins with the control word
*\annotation. Annotations are anchored to the character that
immediately precedes the annotation group. The group must be preceded
by an annotation reference character identified by the control word
\chatn. The annotation reference character must in turn be preceded by
a group that begins with the control word *\atnid and that contains
the identification text for the author of the annotation. 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}}{\fs 16 \chatn }
   How about some examples that deal with social science?
   That's what this paper is about.}}
   ...
```


HEADERS AND FOOTERS
===================

Headers and footers are treated as separate groups in RTF. Different
headers and footers can be defined for different sections in the
document. If none is defined for a given section, the headers and
footers from the previous section (if any) are used. These groups must
precede the first plain-text character in the document section to
which they apply.

The control words \header and \footer begin these groups. These
control words can be replaced by the following control words, as
appropriate:

Control Word	Meaning
\headerl	The header is on left pages only.
\headerr	The header is on right pages only.

```
\headerf          The header is on the first page only.
\footerl          The footer is on left pages only.
\footerr          The footer is on right pages only.
\footerf          The footer is on the first page only.
```

The \headerl and \headerr and \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. For more information, see "Document Formatting
Properties" and "Section-Formatting Properties" in this document.

SUMMARY INFORMATION
===================

The RTF file can also contain a summary information group, which is
translated but not displayed with the text. This information 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 begins with the control word \info. 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 within braces ({ }).

```
   Control Word     Meaning
   ------------     -------


   \title           The title of the document
   \subject         The subject of the document
   \author          The author of the document
   \operator        The person who last made changes to the document
   \keywords        Selected keywords for the document
   \comment         Comments; text is ignored
```

```
  \version<N>      The version number of the document
  \doccomm         Comments displayed in Wordís Summary Info dialog
                   box
```

The RTF writer can automatically enter other control words, including
the following:

```
  Control Word     Meaning
  ------------     -------

  \vern<N>         The internal version number
  \creatim         The creation time
  \revtim          The revision time
  \printim         The last print time
  \buptim          The backup time
  \edmins<N>       The total editing time (in minutes)
  \yr<N>           The year
  \mo<N>           The month
  \dy<N>           The day
  \hr<N>           The hour
  \min<N>          The minute
  \nofpages<N>     The number of pages
  \nofwords<N>     The number of words
  \nofchars<N>     The number of characters
  \id<N>           The internal ID number
```

Entries without the <N> parameter have the \yr \mo \dy \hr \min
format. An example of a summary information group follows:

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


FIELDS
======

The field group contains the text of Word fields. For more detailed
information on fields, choose Help in Microsoft Word for Windows.

The field group begins with the control word \field. The following
control words can follow the \field control word:

```
Control Word       Meaning
------------       -------

\flddirty          A formatting change has been made to the field
                   result since the field was last updated.

\fldedit           The text has been added to, or removed from, the
                   field result since the field was last updated.

\fldlock           A field is locked and cannot be updated.

\fldpriv           A result is not in a form suitable for display
                   (for example, binary data used by fields whose
                   result is a picture).
```

Two subgroups are available within the \field group. They must be
enclosed within braces ({ }) and begin with the following control
words:

```
Control Word       Meaning
------------       -------

\*\fldinst         Field instructions
\fldrslt           The most recently calculated result of the field
```

The \fldrslt control word should be included even if no result has
been calculated because even readers that do not recognize fields can
generally include the value of the \fldrslt group in the document.

An example of field text follows:

```
      A                      B                    C
      |                      |                    |
    -----          --------------    -----------------
  {\field\fldedit{\fldinst author}{\fldrslt Joe Smith}}\par\pard
```

```
{\field{\fldinst time \\@ "h:mm AM/PM"}{\fldrslt 8:12 AM}}
  -----  ----------------------------  -----------------
    |                   |                       |
    A                   B                       C

  A  Begins field group
  B  Field instructions
  C  Field result
```

INDEX ENTRIES
=============

The index entry group begins with the control word \xe. Following this
control word is the text of the index entry and other optional control
words that further define the index entry.

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" in this document. Similarly, the text of the
\txe subgroup, described later in this section, becomes part of the
document if it is not formatted as hidden text.

The following control words can also be used:

  Control Word   Meaning
  ------------   -------

  \bxe   Formats the page number or cross-reference in bold
  \ixe   Formats the page number or cross-reference in
                    italic

The following control words are destinations within the \xe group and
are followed by text arguments. These control words and their
arguments must be enclosed within braces ({ })

  Control Word   Meaning
  ------------   -------

```
   \txe <Text>            The text argument is to be used instead of
                          a page number.

   \rxe <BookmarkName>    The text argument is a bookmark for the
                          range of page numbers.
```

An example of an index entry follows:

```
   A          B                   C                 D           E      F
   |          |                   |                 |           |      |
   --  -------------   ---------------   -------------   ---   ---
   {\xe{\v Index Entry}{\rxe Index Range}{\txe See Index}\bxe \ixe }
```

```
   A  Begins index-entry group
   B  Entry text
   C  Bookmark defining range of pages
   D  Replacement for page number
   E  Bold entry in index table
   F  Italic entry in index table
```


TABLE OF CONTENTS ENTRIES
=========================

The table of contents entry group begins with the control word \tc. It
is followed by the text of the table of contents entry and other
optional control words that further define the group.

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 group:

```
   Control Word    Meaning
   ------------    -------

   \tcf<N>         The 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 and is used for tables of contents).

  \tcl<N>   The level number (the default is 1).

OBJECTS
=======

Objects are structures in a document that contain a data portion and a
result portion. The data portion generally appears hidden to the
application that produced the document. A separate application uses
the data and supplies the result or appearance of the data. This
appearance is the result portion of the object. Some examples of
objects include object linking and embedding (OLE) objects and Edition
Manager Subscriber objects on the Macintosh platform.

In RTF, the results of objects are represented so that RTF readers
that donít understand objects or donít use a particular type of object
are able 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. For this reason, it is
important for RTF writers to supply the object result. The format of
the result should be standard RTF.

The data portion of an OLE object is the structure produced from the
OLE SaveToStream 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 obtained from the structure produced from the OLE SaveToStream
function.

An object group is defined by the control word \object. These objects
can be either embedded objects, OLE links, or subscriber objects on
the Macintosh platform. If the RTF readerís application does not use
the type of object represented, then all the object information and
data should be ignored and the object result should be inserted into
the document in place of the object.

Each object comes with optional information about the object, a
required data group that contains the object data, and an optional

result that contains the last display of the object. This result contains standard RTF. It is the responsibility of the RTF writer to provide the result so that existing RTF readers will be able to display the object without having full object support.

The syntax for this group is as follows:

{\object [\objemb|\objlink|\objautlink|\objsub|\objpub|\objicemb] [\linkself] [\objlock] [{*\objclass <Name>}] [{*\objname <Name>}] [\rsltmerge] [\rsltrtf|\rslttxt|\rsltpict|\rsltbmp] [\objsetsize] [\objalign<N>] [\objtransy<N>] [\objh<N> \objw<N>] [\objcropt<N>][\objcropb<N>][\objcropl<N>][\objcropr<N>] [\objscalex<N>][\objscaley<N>] {*\objdata[{*\objalias[\bin<N>] <Data>} {*\objsect[\bin<N>] <Data>}] [\bin<N>] <Data>}<Result>}

See the \result control word in the following table for a description of <Result>:

  Object Type

  Control Word   Meaning
  ------------   -------

  \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.

  \objicemb   An object type of MS Word for Macintosh Installable
                   Command (IC) Embedder.

  Object Information

```
------------------------------------------------------------------

Control Word     Meaning
------------     -------

\linkself        The object is a link to another part of the same
                 document.

\objlock         Locks the object from any updates.

\objclass        The syntax for the group is {\*\objclass <Name>}
                 where <Name> is the name of the object class. This
                 is optional in the \object group.

\objname         The syntax for group is {\*\objname <Name>} where
                 <Name> is the name of the specific object instance.
                 This is optional in the \object group.

Object Size, Position, Cropping, and Scaling
------------------------------------------------------------------

Control Word     Meaning
------------     -------

\objh<N>         <N> is the original object height in twips.

\objw<N>         <N> is the original object width in twips.

\objsetsize      Forces the object server to set the objectís
                 dimensions to those specified by the client.

\objtransy<N>    <N> is the distance in twips an object should be
                 moved vertically with respect to the baseline. This
                 control word is needed to place MathType(TM)
                 equation objects correctly in line. This is an
                 optional control of the \object group.

\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

```
Control Word      Meaning
------------      -------

\objdata          The \objdata subgroup is required to be in the
                  \object group. The syntax for this group is
                  {\*\objdata[{\*\objalias[\bin<N>]
                  <Data>}{\*\objsect[\bin<N>] <Data>}][\bin<N>]
                  <ObjectData>} where <ObjectData> represents the
                  complete data of the object. If the \bin<N> option
                  is used, then <N> represents the number of bytes of
                  binary data. Otherwise, the <ObjectData >is in
                  hexadecimal.

\objalias         This group contains the Alias Record for the
                  publisher object for the Macintosh Edition Manager.
                  If the \bin control is used, the data is in binary
                  numerical format. Otherwise, it is represented in
                  the RTF stream in hexadecimal.

\objsect          This group contains the Section Record for the
                  publisher object for the Macintosh Edition Manager.
                  If the \bin control is used, the data is in binary
                  numerical format. Otherwise, it is represented in
                  the RTF stream in hexadecimal.
```

Object Result

```
-----------------------------------------------------------------

Control Word    Meaning
------------    -------

\rsltrtf        Forces the result to be RTF, if possible.

\rsltpict       Forces the result to be a Windows metafile or
                MacPict image, 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 group is optional in the \object group.
                It contains the last update of the result of the
                object. The data of the result group should be
                standard RTF so that RTF readers that donít
                understand objects or the type of object
                represented can use the current result in the
                objectís place to maintain the object's appearance.
                The syntax for this group is {\result <ResultData>}
                where <ResultData> is standard RTF syntax.
```

BOOKMARKS
=========

This group contains two control words: *\bkmkstart, which indicates
the start of the specified bookmark, and *\bkmkend, which indicates
the end of the specified bookmark. 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}
   ...

If a bookmark covers a partial selection of columns of a table,
\bkmkcolf<N> is used to denote the first column of a table covered by
a bookmark and \bkmkcoll<N> is used to denote the last column. If
\bkmkcolf is not included, the first column of the table is used as
the first column for the bookmark. If \bkmkcoll is not included, the
last column of the table is used for the bookmark. These controls are
used within the *\bkmkstart group following the \bkmkstart control.
For example, {*\bkmkstart\bkmkcolf2\bkmkcoll5 Table1} places the
bookmark "Table1" on columns 2 through 5 of a table.

MACINTOSH EDITION MANAGER PUBLISHER OBJECTS
==

These controls define the RTF controls used to define publisher
objects for the Macintosh Edition Manager. The range of publisher
objects are marked as bookmarks; therefore, these controls are all
used within the \bkmkstart group. The RTF syntax for a publisher
object is:

   {*\bkmkstart\bkmkpub[\pubauto]{*\objalias[\bin]
   <Data>}{*\objsect[\bin] <Data>} <BookmarkName>}

   Control Word   Meaning
   ------------   -------

   \bkmkpub   The bookmark marks a Macintosh Edition Manager
                    publisher object.

   \pubauto   The publisher object will automatically update all
                    Macintosh Edition Manager subscribers of this
                    object whenever it is edited.

```
\objalias          This group contains the Alias Record for the
                   publisher object for the Macintosh Edition Manager.
                   If the \bin control is used, the data is in binary
                   format. Otherwise, it is in hexadecimal.

\objsect           This group contains the Section Record for the
                   publisher object for the Macintosh Edition Manager.
                   If the \bin control is used, the data is in binary
                   format. Otherwise, it is in hexadecimal.
```

DOCUMENT FORMATTING PROPERTIES
==============================

This section specifies 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 (the measurements are in twips).

The default values are used for omitted control words.

```
  Control Word     Meaning
  ------------     -------

  \deftab<N>       The default tab width (the default is 720).

  \hyphhotz        The hyphenation hot zone (the amount of space at
                   the right margin in which words are hyphenated--the
                   default for Word is 360 twips).

  \linestart<N>    The beginning line number (the default is 1).

  \fracwidth       Uses fractional character widths when printing
                   (QuickDraw only).

  \*\nextfile      The destination; the argument is the name of the
                   file to print or index next; must be enclosed with
```

braces.

*\template   The destination; the argument is the name of a
                  related template file; must be enclosed with
                  braces.

\makebackup   The 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.

\deflang<N>   Defines the default language used in the document
                  when character formatting is reset with the \plain
                  control word. See "Character Formatting Properties"
                  in this document for a list of possible values for
                  <N>.

Footnotes

Control Word   Meaning
------------   -------

\ftnsep   The text argument separates footnotes from the
                 document.

\ftnsepc   The text argument separates continued footnotes
                 from the document.

\ftncn   The text argument is a notice for continued
                 footnotes.

\endnotes   Print the footnotes at the end of the section (the
                 default).

\enddoc   Print the footnotes at the end of the document.

```
\ftntj          Print the footnotes beneath text.

\ftnbj          Print the footnotes at the bottom of the page.

\ftnstart<N>    The beginning footnote number (the default is 1).

\ftnrestart     The footnote numbers restart at each section.
```

Page Information

```
Control Word    Meaning
------------    -------

\paperw<N>      The paper width (the default is 12,240).

\paperh<N>      The paper height (the default is 15,840).

\margl<N>       The left margin (the default is 1,800).

\margr<N>       The right margin (the default is 1,800).

\margt<N>       The top margin (the default is 1,440).

\margb<N>       The bottom margin (the default is 1,440).

\facingp        Facing pages (activates odd/even headers and
                gutters).

\gutter<N>      The gutter width (the default is 0).

\margmirror     Switches margin definitions on left and right pages.

\landscape      Landscape format.

\pgnstart<N>    The beginning page number (the default is 1).

\widowctrl      Widow control.
```

```
   Revision Marks
   ------------------------------------------------------------------

   Control Word    Meaning
   ------------    -------

   \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 (left on left
                   pages, right on right pages; the default).
```

SECTION FORMATTING PROPERTIES
================================

This group specifies 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.

```
   Section Formatting Control Words
   ------------------------------------------------------------------

   Control Word    Meaning
   ------------    -------

   \sectd          Reset to the 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, 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.

Section Break

Control Word   Meaning
------------   -------

\sbknone   No section break.

\sbkcol   The section break starts a new column.

\sbkpage   The section break starts a new page (the default).

\sbkeven   The section break starts at an even page.

\sbkodd   The section break starts at an odd page.

Columns

Control Word   Meaning
------------   -------

\cols<N>   The number of columns for "snaking" (the default is
                  1).

\colsx<N>   The space between columns in twips (the default is
                  720).

\linebetcol   Insert a line between columns.

Line Numbering

```
Control Word       Meaning
------------       -------

\linemod<N>        The line number modulus amount to increase each line
                   number (the default is 1).

\linex<N>          The default value for <N> is 360 if \linex is
                   omitted. A value of 0 for <N> means the automatic
                   distance for the application reading the RTF file.

\linestarts<N>     The beginning line number (the default is 1).

\linerestart       The line numbers restart at the \linestarts value.

\lineppage         The line numbers restart on each page.

\linecont          The line numbers continue from the preceding
                   section.

Page Information
-----------------------------------------------------------------

Control Word       Meaning
------------       -------

\pgwsxn<N>         <N> is the page width in twips. A \sectd control
                   resets the value to that specified by \paperw<N> in
                   the document properties.

\pghsxn<N>         <N> is the page height in twips. A \sectd control
                   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 control 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 control resets the value to that specified by \margr<N> in the document properties.
\margtsxn<N>	<N> is the right margin of the page in twips. A \sectd control resets the value to that specified by \margr<N> in the document properties.
\margbsxn<N>	<N> is the top margin of the page in twips. A \sectd control resets the value to that specified by \margt<N> in the document properties.
\guttersxn<N>	<N> is the width of the gutter margin for the section in twips. A \sectd control resets the value to that specified by \gutter<N> in 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	The first page has a special format.
\headery<N>	The header is <N> twips from the top of the page (the default is 720).
\footery<N>	The footer is <N> twips from the bottom of the page (the default is 720).

Page Numbers

Control Word	Meaning

```
\pgnstarts<N>     The beginning page number (the default is 1).

\pgncont          The continuous page numbering (the default).

\pgnrestart       The page numbers restart at the \pgnstarts value.

\pgnx<N>          The page number is <N> twips from the right margin
                  (the default is 720).

\pgny<N>          The page number is <N> twips from the top margin
                  (the default is 720).

\pgndec           The page-number format is decimal.

\pgnucrm          The page-number format is uppercase Roman numerals.

\pgnlcrm          The page-number format is lowercase Roman numerals.

\pgnucltr         The page-number format is uppercase letters.

\pgnlcltr         The page-number format is lowercase letters.

Vertical Alignment
-----------------------------------------------------------------

Control Word      Meaning
------------      -------

\vertalt          The text is top aligned on the page (the default).
\vertal           The text is bottom aligned on the page.
\vertalc          The text is centered vertically on the page.
\vertalj          The text is justified vertically on the page.


PARAGRAPH FORMATTING PROPERTIES
===============================

This group specifies paragraph formatting properties. To ensure
```

compatibility with previous versions of RTF, if border properties are
specified, the border segment control word (\brdrt,\brdrb,\brdrl,
\brdrr, or \box) must precede the control word(s) that specify the
pattern for the border.

Paragraph Formatting Control Words

  Control Word   Meaning
  ------------   -------

  \pard   Resets to the default paragraph properties.

  \s<N>   Designates the reference number of the style in the
                    RTF document; if a style is referenced within the
                    document, style properties must be included along
                    with the style reference in the document text.

  \intbl   The paragraph is part of a table.

  \keep   Keep the paragraph intact.

  \keepn   Keep the paragraph with the next paragraph.

  \noline   No line numbering.

  \pagebb   Break the page before the paragraph.

  \sbys   Side-by-side paragraphs.

  Alignment

  Control Word   Meaning
  ------------   -------

  \ql   Left aligned (the default)
  \qr   Right aligned
  \qj   Justified

```
\qc             Centered

Indentation
--------------------------------------------------------------------

Control Word    Meaning
------------    -------

\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
--------------------------------------------------------------------

Control Word    Meaning
------------    -------

\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 \s1000 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 determines the
                size); if <N> is a negative value, the absolute
                value of <N> determines the size, even if it is
                shorter than the tallest character.

Tabs
--------------------------------------------------------------------

Control Word    Meaning
------------    -------

\tx<N>          The tab position in twips from the left margin.
```

```
\tqr             A flush-right tab.
\tqc             A centered tab.
\tqdec           A decimal tab.
\tb<N>           A bar tab position in twips from the left margin.
\tldot           Leader dots.
\tlhyph          Leader hyphens.
\tlul            A leader underline.
\tlth            A leader thick line.
\tleq            A leader equal sign.
```

Paragraph Borders

```
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   Box border outside (right side of odd-numbered
                 pages, left side of even-numbered pages).

\box   Border around the paragraph.

\brdrs   Single-thickness border.

\brdrth   Thick border.

```
\brdrsh          Shadowed border.

\brdrdb          Double border.

\brdrdot         Dotted border.

\brdrhair        Hairline border.

\brdrw<N>        <N> is the width in twips of the paragraph border
                 line. This control should follow the paragraph
                 border controls \brdrt, \brdrr, \brdrb, and \brdrl.

\brdrcf<N>       <N> is the color of the paragraph border from the
                 color table in the RTF header. This control should
                 follow the paragraph border controls \brdrt, \brdrr,
                 \brdrb, and \brdrl.

\brsp<N>         Space in twips between borders and the paragraph.

Paragraph Shading and Background Pattern
-----------------------------------------------------------------

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-hatched background pattern for the
                     paragraph.

   \bgdcross         Specifies a diagonal cross-hatched 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-hatched background pattern
                     for the paragraph.

   \bgdkdcross       Specifies a dark diagonal cross-hatched background
                     pattern for the paragraph.

   \cfpat<N>         <N> is the line color of the background pattern.

   \cbpat<N>         <N> is the background color of the background
                     pattern.
```

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.

```
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 0 indicates that the height of
                 the frame adjusts to the contents of the frame. Zero
                 is the default for frames where no height is given.
```

Horizontal Position

```
Control Word     Meaning
------------     -------

\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.

\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
----------------------------------------------------------------------

Control Word        Meaning
------------        -------

\pvmrg              Use the margin as the vertical reference frame.

\pvpg               Use the page as the vertical reference frame.

\pvpara             Positions the reference frame vertically relative to
                    the top of the top-left corner of the next unframed
                    paragraph in the RTF stream. This is the default if
                    no vertical frame positioning information is given.

\posy<N>            Positions the paragraph <N> twips from the top edge
                    of the reference frame.

\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
----------------------------------------------------------------------
```

```
   Control Word      Meaning
   ------------      -------


   \dxfrtext<N>      Distance in twips of a positioned paragraph from the
                     main text flow in all directions. In Word for
                     Windows 2.0, this control affects only the
                     horizontal distance from the text on each side of
                     the frame.

   \dyfrtext<N>      <N> is the vertical distance in twips from the text
                     above and below the frame.
```

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

```
                                                        A
                                                        |
...                                               -------------
\par \pard \pvpg\phpg\posxc\posyt\absw5040\dxfrtest173 abs pos para1
\par \pard \phmrg\posxo\posyc\dxfrtext1152 abs pos para2
                                                  -------------
                                                        |
                                                        A

     A: Text to be positioned
```


TABLES
======

There is no RTF table group. 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. This control is inherited between
paragraphs that do not have paragraph properties reset with a \pard.
The last paragraph of a cell is terminated by a cell mark (the \cell
control word), and the row is terminated by a row mark (the \row
control word). The following control words further define the table:

```
Control Word      Meaning
------------      -------

\trowd            Sets the table row defaults.

\trgaph<N>        Half the space between the cells of a table row in
                  twips.

\cellx<N>         Moves 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            The contents of the table cell are merged with those
                  of the preceding cell.
```

Cell Borders and Shading

```
Control Word      Meaning
------------      -------

\clbrdrb          The bottom table cell border.
\clbrdrt          The top table cell border.
\clbrdrl          The left table cell border.
\clbrdrr          The right table cell border.
```

Row Formatting

```
Control Word      Meaning
------------      -------

\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>       The position of the leftmost edge of the table with
                 respect to the left edge of its column.

\trrh<N>         The height of a table row in twips; when 0, 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.
```

Cell Shading and Background Pattern

```
Control Word     Meaning
------------     -------

\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-hatched background pattern for the
                 cell.
```

```
\clbgdcross       Specifies a diagonal cross-hatched 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-hatched background pattern
                  for the cell.

\clbgdkdcross     Specifies a dark diagonal cross-hatched 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 example shows some table text:

```
  ...
  \par \trowd \trqc\trgaph108\trrh280\trleft36
  \clbrdrt\brdrth \clbrdrl\brdrth \clbrdrb\brdrdb
  \clbrdrr\brdrdb \cellx3636\clbrdrt\brdrth
  ...
```

CHARACTER FORMATTING PROPERTIES
===============================

The last group controls 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, whereas \b0 turns off bold.

The character formatting control words are listed in the following table:

Control Word	Meaning
\plain	Resets applicationís default character formatting properties.
\b	Turns on bold.*
\caps	Turns on all uppercase.*
\deleted	Marks the text as deletion revision marked.*
\dn<N>	Sets the subscript position in half-points (the default is 6).
\expnd<N>	Sets the expansion or compression of the space between characters in quarter-points; a negative value compresses the space (the default is 0).
\f<N>	Identifies the font number.
\fs<N>	Sets the font size in half-points (the default is 24).
\i	Turns on italic.*
\outl	Turns on outline.*
\revised	Indicates that text has been added since revision marking was turned on.

```
\scaps          Turns on small capitals.*

\shad           Turns on shadow.*

\strike         Turns on strikethrough.

\ul             Turns on continuous underline. \ul0 turns off all
                underlining.

\uld            Turns on dotted underline.

\uldb           Turns on double underline.

\ulnone         Turns off all underlining.

\ulw            Turns on word underline.

\up<N>          Sets the superscript position in half-points (the
                default is 6).

\v              Turns on hidden text.*

\lang<N>        Applies a language to a character. <N> is a number
                corresponding to a language. The following table
                defines the standard languages used by Microsoft.
                This table was generated by the Unicode group for
                use with TrueType(R) and Unicode. A \plain control
                resets the language property to the language defined
                by \deflang<N> in the document properties.

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 (Aus.)	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).

SPECIAL CHARACTERS
==================

The RTF standard includes control words for special characters. If a
special character control word is not recognized by the RTF reader,
the control word 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           The current date (as in headers).

  \chdpl            The current date in long format; for example,
                    Tuesday, June 28, 1992.

  \chdpa            The current date in abbreviated format; for example,
                    Tue, Jun 28, 1992.

  \chtime           The current time (as in headers).

  \chpgn            The current page number (as in headers).

  \chftn            An automatic footnote reference (the footnotes
                    follow in a group).
```

Command	Description
\chatn	An annotation reference (the annotation text follows in a group).
\chftnsep	An anchoring character for the footnote separator.
\chftnsepc	An anchoring character for the footnote continuation.
\cell	The end of a table cell.
\row	The end of a table row.
\par	The end of a paragraph.
\sect	The end of a section and a paragraph.
\page	A required page break.
\column	A required column break.
\line	A required line break (no paragraph break).
\tab	A tab character; the same as ASCII 9.
\emdash	An em (--) dash. This is character 151 in the ANSI character set and character 208 in the Macintosh character set.
\endash	An en (-) dash. This is character 150 in the ANSI character set and character 209 in the Macintosh character set.
\bullet	A bullet character. This is character 149 in the ANSI character set and character 165 in the Macintosh character set.
\lquote	An opening single quotation mark. This is character 145 in the ANSI character set and character 212 in the Macintosh character set.

\rquote	A closing single quotation mark. This is character 146 in the ANSI character set and character 213 in the Macintosh character set.
\ldblquote	An opening double quotation mark. This is character 147 in the ANSI character set and character 210 in the Macintosh character set.
\rdblquote	A closing double quotation mark. This is character 148 in the ANSI character set and character 211 in the Macintosh character set.
|	A formula character.
\~	A nonbreaking space.
\-	An optional hyphen.
_	A 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).
\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.

Specifies a function key where <N> is the function key number. Used to describe shortcut-key codes for styles.

NOTE: An ASCII 9 is accepted as a tab character. A carriage return (character value 13) or linefeed character (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.)