

# [MS-EMFSPPOOL]: Enhanced Metafile Spool Format

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# 1 Introduction

This document is a specification of the Enhanced Metafile Spool Format (EMFSPPOOL) structure. The **EMFSPPOOL** structure specifies a **metafile** format that can store a **print job** in portable form. The stored print job contains information for printing a document outside the control of the original application, either on the same computer or on another computer.

An EMFSPPOOL metafile is a series of variable-length records, called EMFSPPOOL records, that contain the page content, font definitions, and device settings. The metafile begins with a header record, which includes the metafile version, its size, the name of the document, and identification of an output device. An EMFSPPOOL metafile is "played back" when its records are parsed and processed and the print job is sent to its destination.

## 1.1 Glossary

The following terms are defined in [\[MS-GLOS\]](#):

**American National Standards Institute (ANSI) character set**

**ASCII**

**attribute**

**big-endian**

**device**

**enhanced metafile format (EMF)**

**enhanced metafile spool format (EMFSPPOOL)**

**Graphics Device Interface (GDI)**

**Image Color Management (ICM)**

**little-endian**

**page description language (PDL)**

**PostScript**

**print job**

**print server**

**printer driver**

**spool file**

**Unicode**

**universal serial bus (USB)**

**UTF-16LE (Unicode Transformation Format, 16-bits, little-endian)**

**Windows metafile format (WMF)**

The following terms are specific to this document:

**bitmap:** A collection of structures that contain a device-independent representation of a graphical image, a logical palette, dimensions, and other information.

**color matching:** The conversion of a color, sent from its original color space, to its visually closest color in the destination color space. See also: **Image Color Management**.

**delta font:** Partial **TrueType** and **OpenType** font that contains new **glyphs** to be merged with data from a previous **subset font** definition.

**design vector:** A set of specific values for the **font axes** of a **multiple master** font.

**dithering:** A form of digital **halftoning**.

**embedded font:** A font that is attached to a document so that the font may be used wherever the document is used, regardless of whether the font is installed on the system.

**encapsulated PostScript (EPS):** A file of PostScript-language raw data that describes the appearance of a single page. **EPS** data can describe text, graphics, and images, but the primary purpose of an **EPS** file is to be encapsulated within another PostScript-language page definition.

**font association:** The automatic pairing of a font that contains ideographs with a font that does not contain ideographs. Font association is used to maintain font **attributes** across changes in locale. For example, it allows the user to enter ideographic characters regardless of which font is selected.

**font axis:** A property of font design that can assume a linear range of values. In general, a font has multiple axes. For example, a font may define an axis for **weight**, along which range the possible values for that property.

**font mapper:** An operating system component that maps specified font **attributes** to available, installed fonts on the system.

**glyph:** A graphical representation of a character, a part of a character, or a sequence of characters, in a font used for graphical output.

**grayscale:** A continuum of shades of gray used to represent an image. Continuous-tone images, such as black-and-white photographs, use an almost unlimited number of shades of gray. Conventional computer hardware and software, however, can only represent a limited number of gray shades, typically 16 or 256. **Grayscale** is the process of converting a continuous-tone image to an image that a computer can manipulate.

Note that **grayscale** is different from **dithering**. **Dithering** simulates shades of gray by altering the density and pattern of black and white dots. In **grayscale**, each individual dot can have a different shade of gray.

**halftoning:** The process of converting **grayscale**, or continuous-tone graphics or images, to a representation with a discrete number of gray (or tone) levels.

**inclusive-exclusive:** When referring to the bounds of a rectangle that consist of two coordinates—one coordinate for one corner and the other coordinate for the opposite corner—**inclusive-exclusive** means that the coordinates are part of the rectangle. If not **inclusive-exclusive**, the coordinates are not part of the rectangle and instead are one logical unit outside the bounds of the rectangle along both coordinate axes.

**metafile:** A sequence of record structures that store an image in an application-independent format. Metafile records contain drawing commands, object definitions, and configuration settings. When a metafile is processed, the stored image can be rendered on a display, output to a printer or plotter, stored in memory, or saved to a file or stream.

**multiple master:** A font technology that is a variation of Adobe's **PostScript Type 1 font** format. Multiple master fonts support the creation of an unlimited number of custom variations, called instances, as well as the emulation of typefaces. Multiple master fonts are scalable, so changing their size does not affect the quality of their output.

**OpenGL:** A software API for graphics hardware, which supports the rendering of multidimensional graphical objects. The Microsoft implementation of **OpenGL** for the Windows operating system is industry-standard graphics software with which implementers can create high-quality still and animated three-dimensional color images. See [\[OPENGL\]](#) for further information.

**OpenType:** A **Unicode**-based font technology developed by Microsoft and Adobe. It is an extension to **TrueType** and **Type 1 font** technologies; **OpenType** allows both **PostScript glyph** definitions and **TrueType glyph** definitions to reside in a common container format.

**port:** A logical name representing a connection to a **device**. A **port** can represent a network address (for example, a TCP/IP address) or a local connection (for example, a **USB port**).

**region:** A graphics object that is nonrectilinear in shape and is defined by an array of scanlines.

**stock object:** A predefined graphics object. Stock objects are standard, commonly used objects, such as a black brush and pen. The set of predefined stock objects is specified in the **StockObject** enumeration in [\[MS-EMF\]](#) section 2.1.31.

**subset font:** A subset of **TrueType** and **OpenType** fonts, which can be merged to form more complete fonts. Subset fonts are embedded in **metafiles** in order to save space. Information is present only for the characters that are actually used in a document.

**TrueType:** A scalable font technology that renders fonts for both the printer and the screen. Originally developed by Apple, it was enhanced jointly by Apple and Microsoft. Each **TrueType** font contains its own algorithms for converting printer outlines into screen **bitmaps**, which means that both the outline and **bitmap** information is rasterized from the same font data. The lower-level language embedded within the **TrueType** font allows great flexibility in its design. Both **TrueType** and **Type 1 font** technologies are part of the **OpenType** format.

**Type 1 font:** A public, standard type format originally developed by Adobe for use with **PostScript** printers. **Type 1 fonts** contain two components—the outline font, used for printing; and the **bitmap** font set, used for screen display.

**typeface:** The terms **typeface** and font are used interchangeably. However, a **typeface** is the primary design of a set of printed characters such as Courier, Helvetica, and Times Roman. A font is the particular implementation and variation of the **typeface** such as roman, bold, or italic. The distinguishing characteristic of a **typeface** is often the presence or absence of serifs.

**weight:** A property or **font axis** of a font that specifies the degree of emphasis or boldness of the characters.

**MAY, SHOULD, MUST, SHOULD NOT, MUST NOT:** These terms (in all caps) are used as described in [\[RFC2119\]](#). All statements of optional behavior use either MAY, SHOULD, or SHOULD NOT.

## 1.2 References

References to Microsoft Open Specification documents do not include a publishing year because links are to the latest version of the documents, which are updated frequently. References to other documents include a publishing year when one is available.

### 1.2.1 Normative References

We conduct frequent surveys of the normative references to assure their continued availability. If you have any issue with finding a normative reference, please contact [dochelp@microsoft.com](mailto:dochelp@microsoft.com). We will assist you in finding the relevant information. Please check the archive site, <http://msdn2.microsoft.com/en-us/library/E4BD6494-06AD-4aed-9823-445E921C9624>, as an additional source.

[ISO/IEC-8859-1] International Organization for Standardization, "Information Technology -- 8-Bit Single-Byte Coded Graphic Character Sets -- Part 1: Latin Alphabet No. 1", ISO/IEC 8859-1, 1998, <http://www.iso.org/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=28245&ICS1=35&ICS2=40&ICS3=>

**Note** There is a charge to download the specification.

[MS-DTYP] Microsoft Corporation, "[Windows Data Types](#)".

[MS-EMF] Microsoft Corporation, "[Enhanced Metafile Format](#)".

[MS-RPRN] Microsoft Corporation, "[Print System Remote Protocol Specification](#)".

[MS-WMF] Microsoft Corporation, "[Windows Metafile Format](#)".

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997, <http://www.rfc-editor.org/rfc/rfc2119.txt>

[UNICODE] The Unicode Consortium, "Unicode Home Page", 2006, <http://www.unicode.org/>

## 1.2.2 Informative References

[MS-PAR] Microsoft Corporation, "[Print System Asynchronous Remote Protocol Specification](#)".

[MS-GLOS] Microsoft Corporation, "[Windows Protocols Master Glossary](#)".

[OPENG] Segal, M. and Akeley, K., "The OpenGL Graphics System: A Specification, Version 2.1", December 2006, <http://www.opengl.org/registry/doc/glspec21.20061201.pdf>

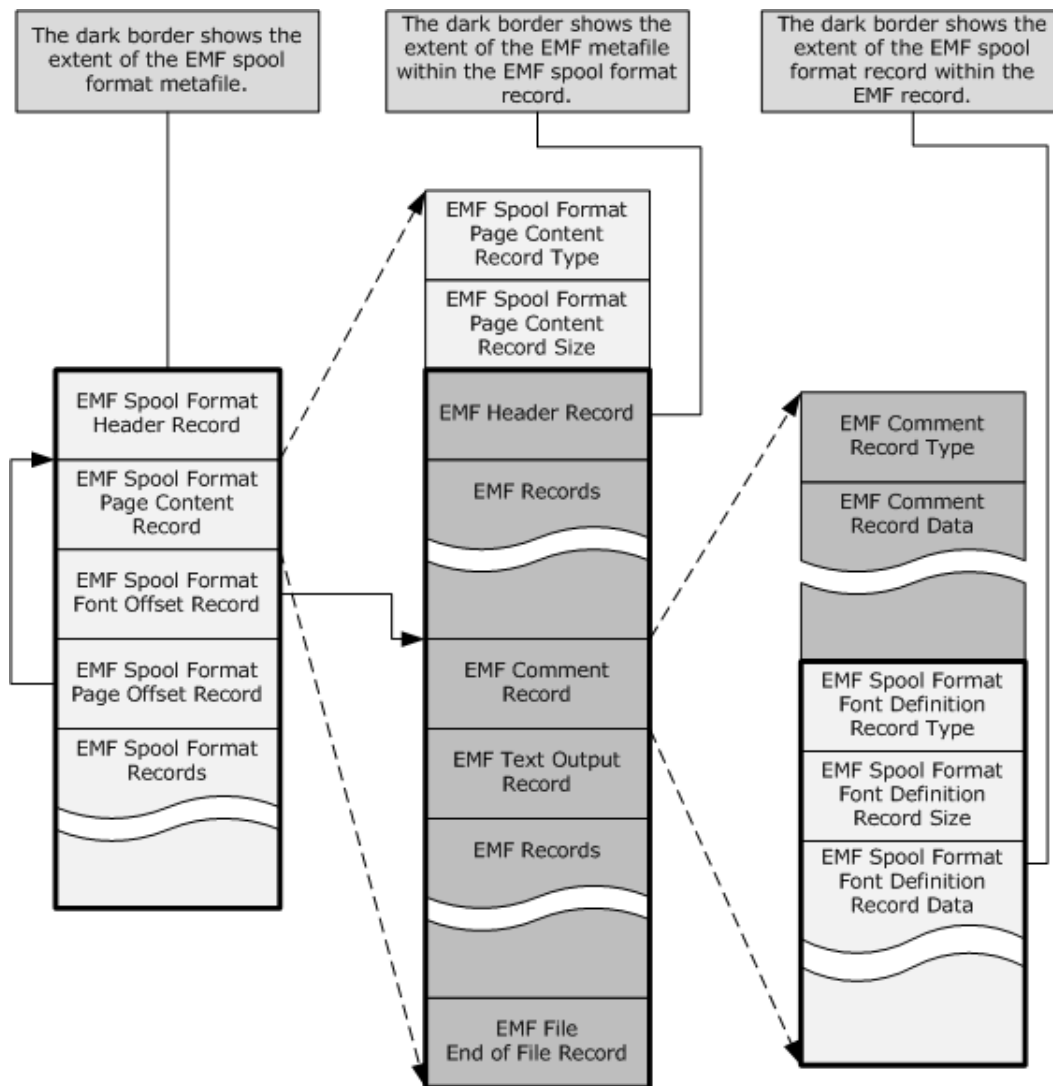
## 1.3 Overview

### 1.3.1 Metafile Structure

The enhanced metafile spool format (EMFSPPOOL) is a metafile structure that defines a graphical image that can be recreated outside the control of the application that created it, either on the same computer or on a network. Metafile records specify general information about the image and the **device** on which it was created, and the graphics functions and objects that are needed to draw the picture. [<1>](#)

EMFSPPOOL records contain graphics commands, which specify drawing operations, graphics objects, and properties that define how to render the document, including:

- The overall structure of the document.
- The format and content of individual pages.
- Print device settings, such as paper size.
- **Embedded fonts.**
- Image **bitmaps.**
- Injected **PostScript** commands.



**Figure 1: High-level structure of an EMF spool file**

This figure shows the following about EMFSPOOL files:

- A header record is always present, specified in section [2.2.2](#).
- A page content record actually contains an entire **EMF** metafile, as specified in [\[MS-EMF\]](#).
- A font definition can be embedded in an EMF [EMR\\_COMMENT\\_EMFSPOOL](#) record, which is embedded in an EMF metafile, which is embedded in a page content record. For more information, see [\[MS-EMF\]](#) section 2.3.3.3.
- No end-of-file record is defined.

### 1.3.2 Byte Ordering

Data in metafile records are stored in **little-endian** format.

Some computer architectures number bytes in a binary word from left to right, which is referred to as **big-endian**. The byte numbering used for bitfields in this specification is big-endian. Other architectures number the bytes in a binary word from right to left, which is referred to as little-endian. The byte numbering used for enumerations, objects, and records in this specification is little-endian.

Using the big-endian and little-endian methods, the number 0x12345678 would be stored as shown in the following table.

Byte order	Byte 0	Byte 1	Byte 2	Byte 3
big-endian	0x12	0x34	0x56	0x78
little-endian	0x78	0x56	0x34	0x12

## 1.4 Relationship to Protocols and Other Structures

Enhanced Metafile Spool Format (EMFSPPOOL) **spool files** can contain entire EMF metafiles, which are specified in [\[MS-EMF\].<2>](#)

The data format defined in this specification may be used by print jobs sent from a client to a server using the [Print System Remote Protocol](#) [MS-RPRN] or [Print System Asynchronous Remote Protocol](#) [MS-PAR].

## 1.5 Applicability Statement

The Enhanced Metafile Spool Format (EMFSPPOOL) was defined and intended for use as a device-independent spool file format. It can be used as a portable, system-independent container for documents. The graphics supported in EMF spool format are applicable to document content representation, including printing and plotting.[<3>](#)

## 1.6 Versioning and Localization

This specification covers versioning issues in the following areas:

**Structure Versions:** There is only one version of the Enhanced Metafile Spool Format (EMFSPPOOL) structure.

**Localization:** The EMF Spool Format structure defines no locale-specific processes or data.

## 1.7 Vendor-Extensible Fields

The EMF Spool Format (EMFSPPOOL), because it can contain EMF metafiles, supports a mechanism for the encapsulation of arbitrary, vendor-defined data. The EMF is as specified in [\[MS-EMF\]](#).

## 2 Structures

The following topics specify:

- Common enumerations.
- EMF spool format records, as they are marshaled on the wire.

This protocol references commonly used data types as defined in [\[MS-DTYP\]](#).

### 2.1 EMFSPOOL Enumerations

#### 2.1.1 RecordType Enumeration

The **RecordType** enumeration specifies the types of records allowed in an EMF spool format metafile.

```
typedef enum
{
    EMRI_METAFILE = 0x00000001,
    EMRI_ENGINE_FONT = 0x00000002,
    EMRI_DEVMODE = 0x00000003,
    EMRI_TYPE1_FONT = 0x00000004,
    EMRI_PRESTARTPAGE = 0x00000005,
    EMRI_DESIGNVECTOR = 0x00000006,
    EMRI_SUBSET_FONT = 0x00000007,
    EMRI_DELTA_FONT = 0x00000008,
    EMRI_FORM_METAFILE = 0x00000009,
    EMRI_BW_METAFILE = 0x0000000A,
    EMRI_BW_FORM_METAFILE = 0x0000000B,
    EMRI_METAFILE_DATA = 0x0000000C,
    EMRI_METAFILE_EXT = 0x0000000D,
    EMRI_BW_METAFILE_EXT = 0x0000000E,
    EMRI_ENGINE_FONT_EXT = 0x0000000F,
    EMRI_TYPE1_FONT_EXT = 0x00000010,
    EMRI_DESIGNVECTOR_EXT = 0x00000011,
    EMRI_SUBSET_FONT_EXT = 0x00000012,
    EMRI_DELTA_FONT_EXT = 0x00000013,
    EMRI_PS_JOB_DATA = 0x00000014,
    EMRI_EMBED_FONT_EXT = 0x00000015
} RecordType;
```

**EMRI\_METAFILE:** Document content in the form of an EMF metafile, as specified in section [2.2.3.1](#).

**EMRI\_ENGINE\_FONT:** A **TrueType** font definition, as specified in section [2.2.3.3.1](#).

**EMRI\_DEVMODE:** Device settings, as specified in section [2.2.3.5](#).

**EMRI\_TYPE1\_FONT:** A PostScript **Type 1 font** definition, as specified in section [2.2.3.3.2](#).

**EMRI\_PRESTARTPAGE:** The start page for **encapsulated PostScript (EPS)**, as specified in section [2.2.3.6](#).

**EMRI\_DESIGNVECTOR:** A font **design vector**, as specified in section [2.2.3.3.3](#).

**EMRI\_SUBSET\_FONT:** A **subset font** definition, as specified in section [2.2.3.3.4](#).

**EMRI\_DELTA\_FONT:** A **delta font** definition, as specified in section [2.2.3.3.5](#).

**EMRI\_FORM\_METAFILE:** Document content in the form of an EMF metafile, as specified in section [2.2.3.1](#).

**EMRI\_BW\_METAFILE:** Monochrome document content in the form of an EMF metafile, as specified in section [2.2.3.1](#).

**EMRI\_BW\_FORM\_METAFILE:** Monochrome document content in the form of an EMF metafile, as specified in section [2.2.3.1](#).

**EMRI\_METAFILE\_DATA:** Document content in the form of an EMF metafile, as specified in section [2.2.3.1](#).

**EMRI\_METAFILE\_EXT:** An offset to document content, as specified in section [2.2.3.2](#).

**EMRI\_BW\_METAFILE\_EXT:** An offset to monochrome document content, as specified in section [2.2.3.2](#).

**EMRI\_ENGINE\_FONT\_EXT:** An offset to a TrueType font definition, as specified in section [2.2.3.4](#).

**EMRI\_TYPE1\_FONT\_EXT:** An offset to a PostScript Type 1 font definition, as specified in section [2.2.3.4](#).

**EMRI\_DESIGNVECTOR\_EXT:** An offset to a font design vector, as specified in section [2.2.3.4](#).

**EMRI\_SUBSET\_FONT\_EXT:** An offset to a subset font definition, as specified in section [2.2.3.4](#).

**EMRI\_DELTA\_FONT\_EXT:** An offset to a delta font definition, as specified in section [2.2.3.4](#).

**EMRI\_PS\_JOB\_DATA:** Document-level PostScript data, as specified in section [2.2.3.7](#).

**EMRI\_EMBED\_FONT\_EXT:** An offset to embedded font identifiers, as specified in section [2.2.3.4](#).

## 2.1.2 SpecVersion Enumeration

The **SpecVersion** enumeration specifies Windows system versions, for comparison with **printer driver** versions.

```
typedef enum
{
    _WIN32_WINNT_NT4 = 0x0400,
    _WIN32_WINNT_WIN2K = 0x0500,
    _WIN32_WINNT_WINXP = 0x0501,
    _WIN32_WINNT_WS03 = 0x0502,
    _WIN32_WINNT_VISTA = 0x0600,
    _WIN32_WINNT_WIN7 = 0x0601
} SpecVersion;
```

**\_WIN32\_WINNT\_NT4:** Windows NT 4.0

- \_WIN32\_WINNT\_WIN2K:** Windows 2000
- \_WIN32\_WINNT\_WINXP:** Windows XP
- \_WIN32\_WINNT\_WS03:** Windows Server 2003
- \_WIN32\_WINNT\_VISTA:** Windows Vista and Windows Server 2008
- \_WIN32\_WINNT\_WIN7:** Windows 7 and Windows Server 2008 R2

## 2.2 EMFSPOOL Records

This section specifies Records, including syntax and record types. This information is organized as follows.

Name	Section	Description
Record syntax	<a href="#">2.2.1</a>	The structure and syntax of EMFSPOOL records.
Header record	<a href="#">2.2.2</a>	The EMFSPOOL header record, which specifies global properties, including the size of the spool file, the name of the document being spooled, and the name of the output device.
Data records	<a href="#">2.2.3</a>	EMFSPOOL data records, which specify page content, fonts, and output device information.

All string data in EMFSPOOL records MUST be encoded in **Unicode UTF-16LE** format, as specified in [\[UNICODE\]](#), unless stated otherwise.

### 2.2.1 Record Syntax

The Record Syntax is specified as follows.

```

<emf_spool_format> ::= <Header_record>
    [ <EMRI_PS_JOB_DATA_record> ]
    { <other_records> }
    <page_offset_records>

<other_records> ::= <page_content_records> |
    <font_definition_records> |
    <font_offset_records> |
    <EMRI_DEVMODE_record> |
    <EMRI_PRESTARTPAGE_record>

<page_content_records> ::= <EMRI_METAFILE_record> |
    <EMRI_FORM_METAFILE_record> |
    <EMRI_BW_METAFILE_record> |
    <EMRI_BW_FORM_METAFILE_record> |
    <EMRI_METAFILE_DATA_record>

<page_offset_records> ::= <EMRI_METAFILE_EXT_record> |
    <EMRI_BW_METAFILE_EXT_record>

```

```

<font_definition_records> ::= <EMRI_ENGINE_FONT_record> |
    <EMRI_TYPE1_FONT_record> |
    <EMRI_DESIGNVECTOR_record> |
    <EMRI_SUBSET_FONT_record> |
    <EMRI_DELTA_FONT_record>

<font_offset_records> ::= <EMRI_ENGINE_FONT_EXT_record> |
    <EMRI_TYPE1_FONT_EXT_record> |
    <EMRI_DESIGNVECTOR_EXT_record> |
    <EMRI_SUBSET_FONT_OFFSET_record> |
    <EMRI_DELTA_FONT_EXT_record> |
    <EMRI_EMBED_FONT_EXT_record>

```

These record types perform the following roles:

- An **<EMRI\_PS\_JOB\_DATA\_record>** stores injected PostScript code at the document level. If an **<EMRI\_PS\_JOB\_DATA\_record>** is present in the metafile, it **MUST** be the first EMF spool format record after the **<Header\_record>**.
- **<page\_content\_records>** store drawing commands for rendering and formatting individual pages of output. Within a **<page\_content\_record>**, a complete EMF metafile may be defined, as specified in [\[MS-EMF\]](#).
- **<page\_offset\_records>** point to **<page\_content\_records>**, which **MUST** precede the **<page\_offset\_records>** in the metafile. Two types of **<page\_offset\_records>** are provided, for color and monochrome pages.
- **<font\_definition\_records>** store font information within an EMF [EMR\\_COMMENT\\_EMFSPOOL](#) record that is identified with the signature "TONF", as specified in [\[MS-EMF\]](#) section 2.3.3.3. The **EMR\_COMMENT\_EMFSPOOL** record is part of an EMF metafile that is embedded in a **<page\_content\_record>**.
- **<font\_offset\_records>** point to the embedded font definitions within preceding **<page\_content\_records>**.
- An **<EMRI\_DEVMODE\_record>** stores device settings and information about device capabilities.
- An **<EMRI\_PRESTARTPAGE\_record>** stores encapsulated PostScript (EPS).

All record types are specified in section [2.2](#).

## 2.2.2 Header Record

The Header record is always the first record of an EMFSPOOL metafile.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
dwVersion																															
cjSize																															

dpszDocName
dpszOutput
extraDataDocName (variable)
...
extraDataOutputDevice (variable)
...

**dwVersion (4 bytes):** A 32-bit unsigned integer that specifies the version of EMFSPOOL. This value MUST be 0x00010000.

**cjSize (4 bytes):** A 32-bit unsigned integer that specifies the size, in bytes, of the header record, including extra data attached. The size of each record in EMFSPOOL MUST be rounded up to a multiple of 32 bits.

**dpszDocName (4 bytes):** A 32-bit unsigned integer that specifies the offset of the document name from the start of the record (**dwVersion** field). The document name is stored as a NULL-terminated Unicode string, as specified in [\[UNICODE\]](#), in the **extraDataDocName** field. If this value is 0x00000000, a document name string SHOULD NOT be present in the header record.

**dpszOutput (4 bytes):** A 32-bit unsigned integer that specifies the offset of the output device name from the start of the record (**dwVersion** field). The output device name is stored as a NULL-terminated Unicode string in the **extraDataOutputDevice** field. If this value is 0x00000000, an output device name string SHOULD NOT be present in the header record.

**extraDataDocName (variable):** Variable-size storage area for the document name string. This structure MUST be 32-bit aligned.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
PaddingDocName (variable)																															
...																															
DocName (variable)																															
...																															
AlignmentDocName (variable)																															
...																															

**PaddingDocName (variable):** An optional array of [WORD](#) structures as padding, because the **DocName** field is not required to immediately follow the **dpszOutput** field. The values of these structures are indeterminate and MUST be ignored.

**DocName (variable):** A null-terminated string that specifies the name of the output file, or the name of the printer port.

**AlignmentDocName (variable):** An optional array of **WORD** structures to ensure 32-bit alignment. The values of these structures are indeterminate and MUST be ignored.

**extraDataOutputDevice (variable):** Variable-size storage area for the output device name string. This structure MUST be 32-bit aligned.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
PaddingOutputDevice (variable)																															
...																															
OutputDevice (variable)																															
...																															
AlignmentOutputDevice (variable)																															
...																															

**PaddingOutputDevice (variable):** An optional array of **WORD** structures as padding, because the **OutputDevice** field is not required to immediately follow the **extraDataDocName** field. The values of these structures are indeterminate and MUST be ignored.

**OutputDevice (variable):** A null-terminated string that specifies the name of the output file, or the name of the printer port.

**AlignmentOutputDevice (variable):** An optional array of **WORD** structures to ensure 32-bit alignment. The values of these structures are indeterminate and MUST be ignored.

### 2.2.3 Data Records

This section specifies the Data records, which follow the EMF spool format [Header Record \(section 2.2.2\)](#). These records have been grouped into the following categories, as described in [Record Syntax \(section 2.2.1\)](#).

Name	Section	Description
Page Content records	<a href="#">2.2.3.1</a>	Page content records specify formatting and graphical content, in the form of embedded EMF metafiles.
Page Offset records	<a href="#">2.2.3.2</a>	Page offset records specify the location of page content records in the EMF spool format metafile.

Name	Section	Description
Font Definition records	<a href="#">2.2.3.3</a>	Font definition records specify partial fonts, complete fonts, and font properties.
Font Offset records	<a href="#">2.2.3.4</a>	Font offset records specify offsets to embedded font definition records.
EMRI_DEVMODE record	<a href="#">2.2.3.5</a>	EMRI_DEVMODE records store device settings and properties.
EMRI_PRESTARTPAGE record	<a href="#">2.2.3.6</a>	EMRI_PRESTARTPAGE records contain information used in encapsulated PostScript (EPS) printing.
EMRI_PS_JOB_DATA record	<a href="#">2.2.3.7</a>	EMRI_PS_JOB_DATA records store injected PostScript data at the job level.

All EMF spool format data records have the generic format specified as follows.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ulID																															
cjSize																															
data (variable)																															
...																															

**ulID (4 bytes):** A 32-bit unsigned identifier that specifies the type of record from the [RecordType Enumeration \(section 2.1.1\)](#).

**cjSize (4 bytes):** A 32-bit unsigned integer that specifies the size, in bytes, of the data attached to the record. The size of each record in an EMF spool format metafile **MUST** be rounded up to a multiple of 4 bytes.

**data (variable):** A variable-size array that stores the data information of the record, according to its record type. The data array **MUST** be 32-bit aligned.

### 2.2.3.1 Page Content Records

The Page Content records include five record types, and they all have the structure shown as follows. Page content records specify formatting and graphical content, in the form of embedded EMF metafiles, specified in [\[MS-EMF\]](#).

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ulID																															
cjSize																															

EmfMetafile (variable)
...

**ulID (4 bytes):** A 32-bit unsigned integer that identifies the type of record. This value MUST be in the **RecordType** (section 2.1.1) enumeration.

Value	Meaning
EMRI_METAFILE 0x00000001	This record defines the same function as the <b>EMRI_METAFILE_DATA</b> record. <a href="#">&lt;4&gt;</a>
EMRI_FORM_METAFILE 0x00000009	This record defines the same function as the <b>EMRI_METAFILE_DATA</b> record. <a href="#">&lt;5&gt;</a>
EMRI_BW_METAFILE 0x0000000A	This record defines the same function as the <b>EMRI_METAFILE_DATA</b> record, except that the content is monochrome. <a href="#">&lt;6&gt;</a>
EMRI_BW_FORM_METAFILE 0x0000000B	This record defines the same function as the <b>EMRI_METAFILE_DATA</b> record, except that the content is monochrome. <a href="#">&lt;7&gt;</a>
EMRI_METAFILE_DATA 0x0000000C	The record contains an EMF metafile, which specifies the content for a page of output. It can be followed by <b>font offset</b> records (section <a href="#">2.2.3.4</a> ).

**cjSize (4 bytes):** A 32-bit unsigned integer that specifies the size, in bytes, of the metafile data attached to the record. The size of each record in EMF spool format MUST be rounded up to a multiple of 4 bytes.

**EmfMetafile (variable):** A complete EMF metafile.

### 2.2.3.2 Page Offset Records

The Page Offset records include two record types, and they both have the structure shown as follows. Page offset records specify the location of [page content](#) records in the EMF spool format metafile. Page content records are specified in section [2.2.3.1](#).

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ulID																															
cjSize																															
offset																															
...																															

**ulID (4 bytes):** A 32-bit unsigned integer that identifies the type of record, from the **RecordType** (section 2.1.1) enumeration.

Value	Meaning
EMRI_METAFILE_EXT 0x0000000D	Offset to a page content record.
EMRI_BW_METAFILE_EXT 0x0000000E	Offset to a page content record that contains only monochrome data.

**cjSize (4 bytes):** A 32-bit unsigned integer that specifies the size, in bytes, of the data attached to the record. The size of each record in EMF spool format **MUST** be rounded up to a multiple of 4 bytes.

**offset (8 bytes):** A 64-bit unsigned integer that specifies the offset, in bytes, from the start of the page offset record to the start of a page content record. That page content record **MUST** be located ahead of the corresponding page offset record, which means that the offset is counted backward in the metafile.

### 2.2.3.3 Font Definition Records

The Font Definition records include five record types, listed in the following table. Font definition records specify partial fonts, complete fonts, and font properties.

Name	Section	Description
EMRI_ENGINE_FONT	<a href="#">2.2.3.3.1</a>	Defines a font in TrueType format.
EMRI_TYPE1_FONT	<a href="#">2.2.3.3.2</a>	Defines a font in PostScript Type 1 font format.
EMRI_DESIGNVECTOR	<a href="#">2.2.3.3.3</a>	Contains a font's design vector, which characterizes a font's appearance in 16 properties.
EMRI_SUBSET_FONT	<a href="#">2.2.3.3.4</a>	Contains a partial font in TrueType format, with enough <b>glyph</b> outlines for pages up to the current page.
EMRI_DELTA_FONT	<a href="#">2.2.3.3.5</a>	Contains new glyphs to be merged with data from a preceding <b>EMRI_SUBSET_FONT</b> record.

The **EMRI\_ENGINE\_FONT** and **EMRI\_TYPE1\_FONT** records have similar structures, and the **EMRI\_SUBSET\_FONT** and **EMRI\_DELTA\_FONT** records have similar structures.

In an EMF spool format metafile, a font definition record **MUST** be embedded in an EMF [EMR\\_COMMENT\\_EMFSPOOL](#) record that contains the "**TONF**" signature in **ASCII** (0x544F4E46), as specified in [\[MS-EMF\]](#) section 2.3.3.3.

The EMR\_COMMENT\_EMFSPOOL record itself is part of a complete EMF metafile that is embedded in an EMF spool format [page content \(section 2.2.3.1\)](#) record. This multiple embedding scheme is shown in the structure overview figure in section [1.3.1](#).

#### 2.2.3.3.1 EMRI\_ENGINE\_FONT Record

The EMRI\_ENGINE\_FONT record contains embedded TrueType fonts. This record and the [EMRI\\_TYPE1\\_FONT \(section 2.2.3.3.2\)](#) record have similar structures.

0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
ulID																															
cjSize																															
Type1ID																															
NumFiles																															
FileSizes (variable)																															
...																															
AlignBuffer (variable)																															
...																															
FileContent (variable)																															
...																															

**ulID (4 bytes):** A 32-bit unsigned integer that identifies the type of record. The value MUST be 0x00000002, which specifies the **EMRI\_ENGINE\_FONT** record type from the [RecordType Enumeration \(section 2.1.1\)](#).

**cjSize (4 bytes):** A 32-bit unsigned integer that specifies the size, in bytes, of the data attached to the record. The size of each record in an EMF spool format file MUST be rounded up to a multiple of 4 bytes.

**Type1ID (4 bytes):** A 32-bit unsigned integer. The value MUST be 0x00000000, to indicate a TrueType.

**NumFiles (4 bytes):** A 32-bit unsigned integer that specifies the number of files attached to this record.

**FileSizes (variable):** Variable number of 32-bit unsigned integers that define the sizes of the files attached to this record.

**AlignBuffer (variable):** Up to 7 bytes, to make the data that follows 64-bit aligned.

**FileContent (variable):** Variable-size, 32-bit aligned data that represents the definitions of glyphs in the font. The content is in TrueType format.

#### 2.2.3.3.2 EMRI\_TYPE1\_FONT Record

The EMRI\_TYPE1\_FONT record contains embedded PostScript Type 1 fonts. This record and the [EMRI\\_ENGINE\\_FONT \(section 2.2.3.3.1\)](#) record have similar structures.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ulID																															
cjSize																															
Type1ID																															
NumFiles																															
FileEndOffs (variable)																															
...																															
Padding (optional)																															
FileContent (variable)																															
...																															

**ulID (4 bytes):** A 32-bit unsigned integer that identifies the type of record. The value MUST be 0x00000004, which specifies the **EMRI\_TYPE1\_FONT** record type from the [RecordType \(section 2.1.1\)](#) enumeration.

**cjSize (4 bytes):** A 32-bit unsigned integer that specifies the size, in bytes, of this record, not including the **ulID** and **cjSize** fields. The size of each record in EMF spool format MUST be rounded up to a multiple of 4 bytes.

**Type1ID (4 bytes):** A 32-bit unsigned integer that SHOULD be 0x00000000 and MUST be ignored. [<8>](#)

**NumFiles (4 bytes):** A 32-bit unsigned integer that specifies the number of files included in this record. This value MUST NOT be zero.

**FileEndOffs (variable):** An array of 32-bit unsigned integers that specify the locations of the font files in this record. For each font file, this value is the byte offset of the end of that file, starting from the beginning of the first file. Thus, the first **FileEndOffs** value is the size, in bytes, of the first file; the second value is the sum of the sizes of the first and second files, and so on.

The **FileEndOffs** values are limited as follows:

```
FileEndOffs[0] < FileEndOffs[1] < ... < FileEndOffs[NumFiles - 1]
<= (cjSize - (8 + (nFiles * 4)))
```

Each offset value MUST be a multiple of 4 bytes, and each file MUST have a size greater than zero.

**Padding (4 bytes):** An optional 32-bit field, which is padding used to align the **FileContent** field on an 8-byte boundary. The contents of this field are indeterminate and MUST be ignored.

**FileContent (variable):** Variable-size, 32-bit aligned data, which represents the definitions of glyphs in the font. The content is in PostScript **Type 1** font format.

### 2.2.3.3.3 EMRI\_DESIGNVECTOR Record

The EMRI\_DESIGNVECTOR record specifies a design vector for a font, which characterizes the font's appearance in up to 16 dimensions. [<9>](#)

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ulID																															
cjSize																															
UniversalFontId																															
...																															
DesignVector (variable)																															
...																															

**ulID (4 bytes):** A 32-bit unsigned integer that identifies the type of record. The value MUST be 0x00000006, which specifies the **EMRI\_DESIGNVECTOR** record type from the [RecordType Enumeration \(section 2.1.1\)](#).

**cjSize (4 bytes):** A 32-bit unsigned integer that specifies the size, in bytes, of the data attached to the record. The size of each record in EMF spool format MUST be rounded up to a multiple of 4 bytes.

**UniversalFontId (8 bytes):** An EMF [UniversalFontId](#) object ([\[MS-EMF\]](#) section 2.2.27) that identifies the font.

**DesignVector (variable):** An EMF [DesignVector](#) object ([\[MS-EMF\]](#) section 2.2.3) that specifies the properties of the font.

The first **DWORD** MUST contain the design vector signature, which is the value given by the equation.

$$0x08000000 + 'd' + ('v' << 8)$$

Using 8-bit ASCII for the character code points, this value is 0x08007664.

#### 2.2.3.3.4 EMRI\_SUBSET\_FONT Record

The EMRI\_SUBSET\_FONT record contains a subset of TrueType and **OpenType** fonts, which can be merged to form more complete fonts. An EMRI\_SUBSET\_FONT record defines enough glyph outlines for pages up to the current one.

This record and the [EMRI\\_DELTA\\_FONT \(section 2.2.3.3.5\)](#) record have similar structures.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ulID																															
cjSize																															
UniversalFontId																															
...																															
FontData (variable)																															
...																															

**ulID (4 bytes):** A 32-bit unsigned integer that identifies the type of record. The value MUST be 0x00000007, which specifies the **EMRI\_SUBSET\_FONT** record type from the [RecordType Enumeration \(section 2.1.1\)](#).

**cjSize (4 bytes):** A 32-bit unsigned integer that specifies the size, in bytes, of the data attached to the record. The size of each record in EMF spool format MUST be rounded up to a multiple of 4 bytes.

**UniversalFontId (8 bytes):** An EMF [UniversalFontId](#) object ([\[MS-EMF\]](#) section 2.2.27) that identifies the font.

**FontData (variable):** The 32-bit-aligned data that contains the definitions of glyphs in the font.

#### 2.2.3.3.5 EMRI\_DELTA\_FONT Record

The EMRI\_DELTA\_FONT record contains partial TrueType and OpenType font data, which can be merged to form more complete fonts. An EMRI\_DELTA\_FONT record defines new glyphs to be merged with data from a preceding **EMRI\_SUBSET\_FONT** record.

This record and the [EMRI\\_SUBSET\\_FONT \(section 2.2.3.3.4\)](#) have similar structures.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ulID																															
cjSize																															

UniversalFontId
...
FontData (variable)
...

**ulID (4 bytes):** A 32-bit unsigned integer that identifies the type of record. The value MUST be 0x00000008, which specifies the **EMRI\_DELTA\_FONT** record type from the [RecordType Enumeration \(section 2.1.1\)](#).

**cjSize (4 bytes):** A 32-bit unsigned integer that specifies the size, in bytes, of the data attached to the record. The size of each record in EMF spool format MUST be rounded up to a multiple of 4 bytes.

**UniversalFontId (8 bytes):** An EMF [UniversalFontId](#) object ([\[MS-EMF\]](#) section 2.2.27) that identifies the font.

**FontData (variable):** The 32-bit-aligned data that contains the definitions of glyphs in the font.

#### 2.2.3.4 Font Offset Records

The Font Offset records include six record types, and they all have the structure shown as follows. Font offset records specify offsets to embedded font definition records in an EMF spool format metafile.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ulID																															
cjSize																															
OffsetLow																															
OffsetHigh																															

**ulID (4 bytes):** A 32-bit unsigned integer that identifies the type of record, from the **RecordType** (section 2.1.1) enumeration.

Value	Meaning
EMRI_ENGINE_FONT_EXT 0x0000000F	This type of record specifies an offset to a TrueType font within a page content record.
EMRI_TYPE1_FONT_EXT 0x00000010	This type of record specifies an offset to a PostScript Type 1 font within a page content record.
EMRI_DESIGNVECTOR_EXT 0x00000011	This type of record specifies an offset to a TrueType font design vector within a page content record.

Value	Meaning
EMRI_SUBSET_FONT_EXT 0x00000012	This type of record specifies an offset to embedded subset fonts within a page content record.
EMRI_DELTA_FONT_EXT 0x00000013	This type of record specifies an offset to embedded delta fonts within a page content record.
EMRI_EMBED_FONT_EXT 0x00000015	This type of record specifies an offset to embedded font identifiers within a page content record.

**cjSize (4 bytes):** A 32-bit unsigned integer that specifies the size, in bytes, of the data attached to the record. The size of each record in EMF spool format **MUST** be aligned to a multiple of 4 bytes.

**OffsetLow (4 bytes):** The lower 32 bits of a 64-bit unsigned integer that contains the font offset.

**OffsetHigh (4 bytes):** The upper 32 bits of a 64-bit unsigned integer that contains the font offset.

The offset is the number of bytes from the start of the offset record to the start of a [font definition \(section 2.2.3.3\)](#) record, which is embedded within a [page content](#) record. Font definition records are embedded in [EMR\\_COMMENT EMFSPOOL](#) records, as specified in [\[MS-EMF\]](#) section 2.3.3.3.

### 2.2.3.5 EMRI\_DEVMODE Record

The EMRI\_DEVMODE record specifies settings and capabilities for an output device.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ulID																															
cjSize																															
Devmode (variable)																															
...																															

**ulID (4 bytes):** A 32-bit unsigned integer that identifies the type of record. The value **MUST** be 0x00000003, from the **RecordType** (section 2.1.1) enumeration.

**cjSize (4 bytes):** A 32-bit unsigned integer that specifies the size, in bytes, of the data attached to the record. Each record size in EMF spool format **MUST** be aligned to a multiple of 32 bits.

**Devmode (variable):** A [\\_DEVMODE](#) structure ([\[MS-RPRN\]](#) section 2.2.2.1), containing configuration and capabilities information about a particular output device.

### 2.2.3.6 EMRI\_PRESTARTPAGE Record

The EMRI\_PRESTARTPAGE record specifies the start of encapsulated PostScript (EPS) data.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ulID																															
cjSize																															
ulUnused																															
bEPS																															

**ulID (4 bytes):** A 32-bit unsigned integer that identifies the type of record. The value MUST be 0x00000005, from the **RecordType** (section 2.1.1) enumeration.

**cjSize (4 bytes):** A 32-bit unsigned integer that specifies the size, in bytes, of the data attached to the record. Each record in EMF spool format MUST be aligned to a multiple of 4 bytes.

**ulUnused (4 bytes):** A 32-bit unsigned integer that is not used. Its value MUST be 0xFFFFFFFF.

**bEPS (4 bytes):** A 32-bit unsigned integer that specifies whether EPS printing is enabled. EPS printing is enabled if the value is nonzero. When EPS printing is enabled, the printer driver is only used to generate a minimum header, and the rest of the output is generated through PostScript pass-through.

#### 2.2.3.7 EMRI\_PS\_JOB\_DATA Record

The EMRI\_PS\_JOB\_DATA record stores encapsulated PostScript (EPS) data at the document level. If this record is present, it MUST appear immediately after an EMFSPOOL [Header Record \(section 2.2.2\)](#), as shown in the [Record Syntax \(section 2.2.1\)](#).

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ulID																															
cjSize																															
PostScriptDataRecords (variable)																															
...																															

**ulID (4 bytes):** A 32-bit unsigned integer that identifies the type of record. The value MUST be 0x00000014, from the [RecordType Enumeration \(section 2.1.1\)](#).

**cjSize (4 bytes):** A 32-bit unsigned integer that specifies the size, in bytes, of the data attached to the record. Each record in EMFSPOOL format MUST be aligned to a multiple of 4 bytes.

**PostScriptDataRecords (variable):** Data after the **ulID** and **cjSize** fields comes as multiple PostScript data records until all **cjSize** bytes are accounted for. Each variable-size record has the following structure.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
PostScriptDataRecordSize																															
nEscape																nIgnore															
PostScriptDataSize																															
PostScriptData (variable)																															
...																															
nAlignment (variable)																															
...																															

**PostScriptDataRecordSize (4 bytes):** A 32-bit unsigned integer that specifies the size, in bytes, of this PostScript data record. This value is based upon the value of **PostScriptDataSize** as follows:

Value of (PostScriptDataSize modulo 4)	Value of PostScriptDataRecordSize
0	PostScriptDataSize + 16
1	PostScriptDataSize + 15
2	PostScriptDataSize + 18
3	PostScriptDataSize + 17

**nEscape (2 bytes):** A 16-bit unsigned integer that specifies the escape code. It SHOULD be one of the following values ([\[MS-WMF\]](#) section 2.1.1.17); otherwise, the record SHOULD be ignored.

Value	Meaning
POSTSCRIPT_IDENTIFY 0x1005	Specify either PostScript-centric or <b>GDI</b> -centric mode to the printer driver.
POSTSCRIPT_INJECTION 0x1006	Insert a block of raw data into a PostScript stream.

**nIgnore (2 bytes):** A 16-bit unsigned integer that MUST be zero and ignored upon receipt.

**PostScriptDataSize (4 bytes):** A 32-bit signed integer that specifies the size, in bytes, of the **PostScriptData** field.

**PostScriptData (variable):** The PostScript data. The size of this field, in bytes, is **PostScriptDataSize**.

**nAlignment (variable):** A buffer that is included so that the record is 32-bit aligned. The contents of this field MUST be ignored. The size of this field is based upon the value of **PostScriptDataSize** as follows:

Value of (PostScriptDataSize modulo 4)	Size of nAlignment
0	4 bytes
1	3 bytes
2	6 bytes
3	5 bytes

## 3 Structure Examples

### 3.1 Byte Ordering Example

The following code snippet illustrates how the use of the big-endian and little-endian methods can affect the compatibility of applications.

```
#include <unistd.h>
#include <sys/stat.h>
#include <fcntl.h>
int main()
{
    int buf;
    int in;
    int nread;
    in = open("file.in", O_RDONLY);

    nread = read(in, (int *) &buf, sizeof(buf));
    printf("First Integer in file.in = %x\n", buf);
    exit(0);
}
```

In the preceding code, if the first integer word stored in the file.in file on a big-endian computer was the hexadecimal number 0x12345678, the resulting output on that computer would be as follows.

```
% ./test
First Integer in file.in = 12345678
%
```


If the file.in file were read by the same program running on a little-endian computer, the resulting output would be as follows.

```
% ./test
First Integer in file.in = 78563412
%
```

Because of the difference in output, one would need to implement metafile record processing so that it could read integers from a file based on the endian method that the computer uses.

### 3.2 EMFSPPOOL Metafile Example

This section provides an example of an EMFSPPOOL metafile, which when processed renders the following images.



This is page 1.  
Page 1 is letter.  
Page 1 orientation is portrait.

**Figure 2: EMFSPOOL Metafile Example, Page 1**

This is page 2.  
Page 2 is letter.  
Page 2 orientation is landscape.

**Figure 3: EMFSPOOL Metafile Example, Page 2**

The contents of this metafile example are shown as follows in hexadecimal bytes. The far-left column is the byte count; the far-right characters are the interpretation of the bytes in the Latin-1 **ANSI Character Set**, as specified in [\[ISO/IEC-8859-1\]](#). The sections that follow describe the metafile records that convey this series of bytes.

00000000:00 00 01 00 54 00 00 00 10 00 00 00 46 00 00 00	....T.....F...
00000010:4d 00 69 00 63 00 72 00 6f 00 73 00 6f 00 66 00	M.i.c.r.o.s.o.f.
00000020:74 00 20 00 57 00 6f 00 72 00 64 00 20 00 2d 00	t. .W.o.r.d. .-.
00000030:20 00 44 00 6f 00 63 00 75 00 6d 00 65 00 6e 00	.D.o.c.u.m.e.n.
00000040:74 00 31 00 00 00 4e 00 65 00 30 00 32 00 3a 00	t.l...N.e.0.2.:.
00000050:00 00 00 00 0c 00 00 00 58 46 06 00 01 00 00 00	.....XF.....
00000060:84 00 00 00 67 01 00 00 3d 01 00 00 3b 04 00 00	„...g...=...;...
00000070:4f 02 00 00 00 00 00 00 00 00 00 00 4c 4f 00 00	O.....LO..
00000080:14 69 00 00 20 45 4d 46 00 00 01 00 58 46 06 00	.i.. EMF....XF..
00000090:23 00 00 00 02 00 00 00 0c 00 00 00 6c 00 00 00	#.....l...
000000a0:00 00 00 00 3f 0b 00 00 e9 0e 00 00 cb 00 00 00	....?...é...Ě...
000000b0:0d 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000000c0:79 19 03 00 ff 1b 04 00 50 00 72 00 69 00 6e 00	y...ÿ...P.r.i.n.
000000d0:74 00 20 00 74 00 65 00 73 00 74 00 00 00 00 00	t. .t.e.s.t.....
000000e0:62 00 00 00 0c 00 00 00 02 00 00 00 25 00 00 00	b.....%...
000000f0:0c 00 00 00 07 00 00 80 25 00 00 00 0c 00 00 00	.....€%.....
00000100:00 00 80 25 00 00 00 0c 00 00 00 0e 00 00 80	...€%.....€
00000110:1b 00 00 00 10 00 00 00 00 00 00 00 00 00 00	.....
00000120:0d 00 00 00 10 00 00 00 00 00 00 00 00 00 00	.....

00000130:62 00 00 00 0c 00 00 00 02 00 00 00 64 00 00 00 b.....d...  
00000140:0c 00 00 00 14 00 00 80 16 00 00 00 0c 00 00 00 .....€.....  
00000150:18 00 00 00 25 00 00 0c 00 00 00 0e 00 00 80 ....%......€  
00000160:16 00 00 00 0c 00 00 00 18 00 00 00 12 00 00 00 .....  
00000170:0c 00 00 00 01 00 00 00 0c 00 00 00 10 00 00 00 .....  
00000180:00 00 00 00 00 00 00 12 00 00 00 0c 00 00 00 .....  
00000190:01 00 00 00 52 00 00 00 70 01 00 00 01 00 00 00 ....R...p.....  
000001a0:c4 ff ff ff 00 00 00 00 00 00 00 00 00 00 00 00 Äÿÿÿ.....  
000001b0:90 01 00 00 00 00 00 00 07 40 00 12 54 00 69 00 .....@..T.i.  
000001c0:6d 00 65 00 73 00 20 00 4e 00 65 00 77 00 20 00 m.e.s. .N.e.w. .  
000001d0:52 00 6f 00 6d 00 61 00 6e 00 00 00 00 00 00 00 R.o.m.a.n.....  
000001e0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
000001f0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 20 00 .....  
00000200:08 5a 18 00 24 a8 56 07 d0 ee 7d 07 c4 f0 7d 07 .Z..\$`V.Đi}.Äð}.  
00000210:37 a4 07 30 90 00 b7 00 b8 1a e2 01 00 00 00 00 00 7¤.0□.•. .â.....  
00000220:00 00 00 00 b8 1a e2 01 6f ec ee 94 d4 a5 07 30 .....â.oii"Ô¥.0  
00000230:48 f1 7d 07 40 f8 a9 30 84 f8 a9 30 78 a3 07 30 Hñ}.@ø0„ø0xf.0  
00000240:28 48 24 00 01 00 00 00 02 00 00 00 50 ee 7d 07 (H\$.Pi}.  
00000250:54 ee 7d 07 ac 1e 24 00 00 90 fd 7f 00 90 fd 7f Ti}.¬.\$...ý.ý  
00000260:00 00 b9 6e b8 00 b9 6e 18 ee 7d 07 00 00 b9 6e ..'n..'n.i}...'n  
00000270:50 ee 7d 07 14 00 00 00 01 00 00 00 00 00 00 00 Pi}.....  
00000280:00 00 00 00 00 00 00 00 47 16 90 01 00 00 00 00 .....G. ....  
00000290:00 00 00 00 00 00 00 00 87 3a 00 20 00 00 00 00 .....#: . ....  
000002a0:00 00 00 00 00 00 00 00 ff 01 00 00 00 00 00 00 .....ÿ.....  
000002b0:54 00 69 00 6d 00 65 00 73 00 20 00 00 00 65 00 T.i.m.e.s. ...e.  
000002c0:77 00 20 00 52 00 6f 00 6d 00 61 00 6e 00 00 00 w. .R.o.m.a.n...  
000002d0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....  
000002e0:00 00 00 00 00 00 00 00 f0 ee 7d 07 5a b0 02 30 .....ði}.Z°.0  
000002f0:f0 ee 7d 07 8c 63 ab 30 08 ef 7d 07 64 76 00 08 ði}.€c«0.i}.dv..  
00000300:00 00 00 00 25 00 00 0c 00 00 00 01 00 00 00 .....%.  
00000310:18 00 00 00 0c 00 00 00 00 00 00 02 6d 00 00 00 .....m...  
00000320:10 00 00 00 df a6 a0 78 01 00 00 00 46 00 00 00 ....ß| x....F...  
00000330:ec 3e 06 00 e0 3e 06 00 00 00 00 00 46 4e 4f 54 i>..â>.....FNOT  
00000340:02 00 00 00 d0 3e 06 00 00 00 00 00 01 00 00 00 ....Đ>.....  
00000350:c0 3e 06 00 00 00 00 00 .....À>.....

\*\*\*\*\* Embedded TrueType Font \*\*\*\*\*

00064210: 54 00 00 00 a8 00 00 00 T...`...  
00064220:67 01 00 00 3d 01 00 00 c4 02 00 00 80 01 00 00 g...=...Ä...€...  
00064230:01 00 00 00 47 a2 e1 40 76 84 e1 40 67 01 00 00 ....Gčá@v„á@g...  
00064240:73 01 00 00 0f 00 00 00 4c 00 00 00 04 10 00 00 s.....L.....  
00064250:00 00 00 00 00 00 00 00 f4 0b 00 00 78 0f 00 00 .....ô...x...  
00064260:6c 00 00 00 54 00 68 00 69 00 73 00 20 00 69 00 l...T.h.i.s. .i.  
00064270:73 00 20 00 70 00 61 00 67 00 65 00 20 00 31 00 s. .p.a.g.e. .l.  
00064280:2e 00 00 00 25 00 00 00 1e 00 00 00 11 00 00 00 .....%.  
00064290:17 00 00 00 0f 00 00 00 11 00 00 00 17 00 00 00 .....  
000642a0:0f 00 00 00 1e 00 00 00 1b 00 00 00 1d 00 00 00 .....  
000642b0:1b 00 00 00 0f 00 00 00 1e 00 00 00 0f 00 00 00 .....  
000642c0:54 00 00 00 54 00 00 00 c5 02 00 00 3d 01 00 00 T...T...Ä...=...  
000642d0:df 02 00 00 80 01 00 00 01 00 00 00 47 a2 e1 40 ß...€.....Gčá@  
000642e0:76 84 e1 40 c5 02 00 00 73 01 00 00 01 00 00 00 v„á@Ä...s.....  
000642f0:4c 00 00 00 04 10 00 00 00 00 00 00 00 00 00 00 L.....  
00064300:f4 0b 00 00 78 0f 00 00 50 00 00 00 20 00 00 00 ô...x...P. ....  
00064310:1b 00 00 00 12 00 00 00 0c 00 00 00 01 00 00 00 .....  
00064320:54 00 00 00 b4 00 00 00 67 01 00 00 82 01 00 00 T...´...g...  
00064330:d9 02 00 00 c5 01 00 00 01 00 00 00 47 a2 e1 40 Û...Ä...Gčá@  
00064340:76 84 e1 40 67 01 00 00 b8 01 00 00 11 00 00 00 v„á@g...  
00064350:4c 00 00 00 04 10 00 00 00 00 00 00 00 00 00 00 L.....

00064360:f4 0b 00 00 78 0f 00 00 70 00 00 00 50 00 61 00	ô...x...p...P.a.
00064370:67 00 65 00 20 00 31 00 20 00 69 00 73 00 20 00	g.e. .l. .i.s. .
00064380:6c 00 65 00 74 00 74 00 65 00 72 00 2e 00 00 00	l.e.t.t.e.r....
00064390:21 00 00 00 1b 00 00 00 1d 00 00 00 1b 00 00 00	!.....
000643a0:0f 00 00 00 1e 00 00 00 0f 00 00 00 11 00 00 00	.....
000643b0:17 00 00 00 0f 00 00 00 11 00 00 00 1b 00 00 00	.....
000643c0:11 00 00 00 11 00 00 00 1b 00 00 00 14 00 00 00	.....
000643d0:0f 00 00 00 54 00 00 00 54 00 00 00 da 02 00 00	....T...T...Ů...
000643e0:82 01 00 00 f3 02 00 00 c5 01 00 00 01 00 00 00	,...ô...Å.....
000643f0:47 a2 e1 40 76 84 e1 40 da 02 00 00 b8 01 00 00	Gčá@v,,á@Ů....
00064400:01 00 00 00 4c 00 00 00 04 10 00 00 00 00 00 00	....L.....
00064410:00 00 00 00 f4 0b 00 00 78 0f 00 00 50 00 00 00	....ô...x...P...
00064420:20 00 00 00 1a 00 00 00 12 00 00 00 0c 00 00 00	.....
00064430:01 00 00 00 54 00 00 00 d0 00 00 00 67 01 00 00	....T...Đ...g...
00064440:c7 01 00 00 61 03 00 00 0a 02 00 00 01 00 00 00	Ç...a.....
00064450:47 a2 e1 40 76 84 e1 40 67 01 00 00 fd 01 00 00	Gčá@v,,á@g...ý...
00064460:16 00 00 00 4c 00 00 00 04 10 00 00 00 00 00 00	....L.....
00064470:00 00 00 00 f4 0b 00 00 78 0f 00 00 78 00 00 00	....ô...x...x...
00064480:50 00 61 00 67 00 65 00 20 00 31 00 20 00 6f 00	P.a.g.e. .l. .o.
00064490:72 00 69 00 65 00 6e 00 74 00 61 00 74 00 69 00	r.i.e.n.t.a.t.i.
000644a0:6f 00 6e 00 20 00 69 00 73 00 20 00 21 00 00 00	o.n. .i.s. .!...
000644b0:1b 00 00 00 1d 00 00 00 1b 00 00 00 0f 00 00 00	.....
000644c0:1e 00 00 00 0f 00 00 00 1e 00 00 00 14 00 00 00	.....
000644d0:11 00 00 00 1b 00 00 00 1e 00 00 00 11 00 00 00	.....
000644e0:1b 00 00 00 11 00 00 00 11 00 00 00 1e 00 00 00	.....
000644f0:1e 00 00 00 0e 00 00 00 11 00 00 00 17 00 00 00	.....
00064500:0f 00 00 00 54 00 00 00 7c 00 00 00 62 03 00 00	....T... ...b...
00064510:c7 01 00 00 12 04 00 00 0a 02 00 00 01 00 00 00	Ç.....
00064520:47 a2 e1 40 76 84 e1 40 62 03 00 00 fd 01 00 00	Gčá@v,,á@b...ý...
00064530:08 00 00 00 4c 00 00 00 04 10 00 00 00 00 00 00	....L.....
00064540:00 00 00 00 f4 0b 00 00 78 0f 00 00 5c 00 00 00	....ô...x...\...
00064550:70 00 6f 00 72 00 74 00 72 00 61 00 69 00 74 00	p.o.r.t.r.a.i.t.
00064560:1e 00 00 00 1e 00 00 00 14 00 00 00 11 00 00 00	.....
00064570:14 00 00 00 1b 00 00 00 10 00 00 00 11 00 00 00	.....
00064580:54 00 00 00 54 00 00 00 13 04 00 00 c7 01 00 00	T...T.....Ç...
00064590:21 04 00 00 0a 02 00 00 01 00 00 00 47 a2 e1 40	!.....Gčá@
000645a0:76 84 e1 40 13 04 00 00 fd 01 00 00 01 00 00 00	v,,á@....ý.....
000645b0:4c 00 00 00 04 10 00 00 00 00 00 00 00 00 00 00	L.....
000645c0:f4 0b 00 00 78 0f 00 00 50 00 00 00 2e 00 00 00	ô...x...P.....
000645d0:0f 00 00 00 54 00 00 00 54 00 00 00 22 04 00 00	....T...T..."...
000645e0:c7 01 00 00 3b 04 00 00 0a 02 00 00 01 00 00 00	Ç...;.....
000645f0:47 a2 e1 40 76 84 e1 40 22 04 00 00 fd 01 00 00	Gčá@v,,á@"...ý...
00064600:01 00 00 00 4c 00 00 00 04 10 00 00 00 00 00 00	....L.....
00064610:00 00 00 00 f4 0b 00 00 78 0f 00 00 50 00 00 00	....ô...x...P...
00064620:20 00 00 00 1a 00 00 00 12 00 00 00 0c 00 00 00	.....
00064630:01 00 00 00 54 00 00 00 54 00 00 00 67 01 00 00	....T...T...g...
00064640:0c 02 00 00 81 01 00 00 4f 02 00 00 01 00 00 00	....•...O.....
00064650:47 a2 e1 40 76 84 e1 40 67 01 00 00 42 02 00 00	Gčá@v,,á@g...B...
00064660:01 00 00 00 4c 00 00 00 04 10 00 00 00 00 00 00	....L.....
00064670:00 00 00 00 f4 0b 00 00 78 0f 00 00 50 00 00 00	....ô...x...P...
00064680:20 00 00 00 1b 00 00 00 25 00 00 00 0c 00 00 00	.....%.....
00064690:0e 00 00 80 62 00 00 00 0c 00 00 00 01 00 00 00	...eb.....
000646a0:0e 00 00 00 14 00 00 00 00 00 00 00 10 00 00 00	.....
000646b0:14 00 00 00 0f 00 00 00 08 00 00 00 74 43 06 00	.....tC..
000646c0:00 00 00 00 03 00 00 00 40 04 00 00 5c 00 5c 00	.....@...\.\.
000646d0:70 00 72 00 69 00 6e 00 74 00 65 00 72 00 73 00	p.r.i.n.t.e.r.s.
000646e0:65 00 72 00 76 00 65 00 72 00 5c 00 43 00 61 00	e.r.v.e.r.\.C.a.
000646f0:6e 00 6f 00 6e 00 20 00 42 00 75 00 62 00 62 00	n.o.n. .B.u.b.b.
00064700:6c 00 65 00 2d 00 4a 00 00 00 00 00 01 04 00 06	l.e.-.J.....

00064710:dc 00 64 03 43 ef 80 07 01 00 01 00 ea 0a 6f 08	Ü.d.Ci€.....ê.o.
00064720:64 00 01 00 0f 00 fd ff 02 00 01 00 fd ff 02 00	d.....ýý....ýý..
00064730:01 00 4c 00 65 00 74 00 74 00 65 00 72 00 00 00	..L.e.t.t.e.r...
00064740:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064750:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064760:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064770:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064780:01 00 00 00 00 00 00 00 02 00 00 00 02 00 00 00	.....
00064790:01 00 00 00 01 01 00 00 00 00 00 00 00 00 00 00	.....
000647a0:00 00 00 00 00 00 00 00 44 49 4e 55 22 00 00 01	.....DINU"...
000647b0:44 02 18 00 59 d8 b0 99 00 00 00 00 00 00 00 00 00	D...YØ <sup>om</sup> .....
000647c0:00 00 00 00 01 00 00 00 00 00 00 00 00 00 00 00	.....
000647d0:00 00 00 00 08 00 00 00 01 00 00 00 03 00 01 00	.....
000647e0:01 00 02 00 02 00 00 00 00 00 00 00 00 00 00 00	.....
000647f0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064800:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064810:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064820:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064830:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064840:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064850:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064860:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064870:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064880:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064890:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000648a0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000648b0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000648c0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000648d0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000648e0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000648f0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064900:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064910:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064920:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064930:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064940:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064950:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064960:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064970:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064980:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064990:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000649a0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000649b0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000649c0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000649d0:00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00	.....
000649e0:00 00 00 00 00 01 00 00 53 4d 54 4a 18 00 00 00	.....SMTJ....
000649f0:4e 55 4a 42 00 00 01 00 34 00 00 00 00 00 00 00	NUJB....4.....
00064a00:00 00 00 08 01 00 00 53 4d 54 4a 00 00 00 00 00	.....SMTJ....
00064a10:14 00 00 00 00 00 f4 00 43 00 61 00 6e 00 6f 00	.....δ.C.a.n.o.
00064a20:6e 00 20 00 42 00 75 00 62 00 62 00 6c 00 65 00	n. .B.u.b.b.l.e.
00064a30:2d 00 4a 00 65 00 74 00 20 00 42 00 4a 00 43 00	-.J.e.t. .B.J.C.
00064a40:2d 00 35 00 30 00 00 00 49 6e 70 75 74 42 69 6e	-.5.0...InputBin
00064a50:00 4d 41 4e 55 41 4c 00 52 45 53 44 4c 4c 00 55	.MANUAL.RESDLL.U
00064a60:6e 69 72 65 73 44 4c 4c 00 50 61 70 65 72 53 69	niresDLL.PaperSi
00064a70:7a 65 00 4c 45 54 54 45 52 00 52 65 73 6f 6c 75	ze.LETTER.Resolu
00064a80:74 69 6f 6e 00 53 54 41 4e 44 41 52 44 00 4d 65	tion.STANDARD.Me
00064a90:64 69 61 54 79 70 65 00 53 54 41 4e 44 41 52 44	diaType.STANDARD
00064aa0:00 43 6f 6c 6f 72 4d 6f 64 65 00 43 4d 59 4b 32	.ColorMode.CMYK2
00064ab0:34 00 48 61 6c 66 74 6f 6e 65 00 48 54 5f 50 41	4.Halftone.HT_PA

00064ac0:54	53 49 5a 45 5f 41 55 54 4f 00 4f 72 69 65 6e	TSIZE_AUTO.Orien
00064ad0:74	61 74 69 6f 6e 00 50 4f 52 54 52 41 49 54 00	tation.PORTRAIT.
00064ae0:00	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064af0:00	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064b00:00	00 00 00 00 00 00 00 00 00 00 00 00 0e 00 00	.....
00064b10:08	00 00 00 b8 4a 06 00 00 00 00 00 0c 00 00 00	....J.....
00064b20:64	07 00 00 01 00 00 00 84 00 00 00 3d 01 00 00	d....."....=...
00064b30:68	01 00 00 4d 04 00 00 7a 02 00 00 00 00 00 00	h...M...z.....
00064b40:00	00 00 00 14 69 00 00 4c 4f 00 00 20 45 4d 46	....i..LO.. EMF
00064b50:00	00 01 00 64 07 00 00 21 00 00 00 02 00 00 00	....d...!.....
00064b60:0c	00 00 00 6c 00 00 00 00 00 00 00 00 e9 0e 00 00	....l.....é....
00064b70:3f	0b 00 00 0d 01 00 00 cb 00 00 00 00 00 00 00	?.....Ě.....
00064b80:00	00 00 00 00 00 00 00 ff 1b 04 00 79 19 03 00	.....ÿ...y...
00064b90:50	00 72 00 69 00 6e 00 74 00 20 00 74 00 65 00	P.r.i.n.t. .t.e.
00064ba0:73	00 74 00 00 00 00 00 62 00 00 00 0c 00 00 00	s.t....b.....
00064bb0:02	00 00 00 25 00 00 00 0c 00 00 00 07 00 00 80	....%......e
00064bc0:25	00 00 00 0c 00 00 00 00 00 00 00 80 25 00 00 00	%.....e%...
00064bd0:0c	00 00 00 0e 00 00 80 1b 00 00 00 10 00 00 00	.....e.....
00064be0:00	00 00 00 00 00 00 00 0d 00 00 00 10 00 00 00	.....
00064bf0:00	00 00 00 00 00 00 00 62 00 00 00 0c 00 00 00	.....b.....
00064c00:02	00 00 00 64 00 00 00 0c 00 00 00 14 00 00 80	....d.....e
00064c10:16	00 00 00 0c 00 00 00 18 00 00 00 25 00 00 00	.....%...
00064c20:0c	00 00 00 0e 00 00 80 16 00 00 00 0c 00 00 00	.....e.....
00064c30:18	00 00 00 12 00 00 00 0c 00 00 00 01 00 00 00	.....
00064c40:0c	00 00 00 10 00 00 00 00 00 00 00 00 00 00 00	.....
00064c50:12	00 00 00 0c 00 00 00 01 00 00 00 52 00 00 00	.....R...
00064c60:70	01 00 00 01 00 00 00 c4 ff ff ff 00 00 00 00	p.....Äÿÿÿ....
00064c70:00	00 00 00 00 00 00 00 90 01 00 00 00 00 00 00	.....•.....
00064c80:07	40 00 12 54 00 69 00 6d 00 65 00 73 00 20 00	.@..T.i.m.e.s. .
00064c90:4e	00 65 00 77 00 20 00 52 00 6f 00 6d 00 61 00	N.e.w. .R.o.m.a.
00064ca0:6e	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	n.....
00064cb0:00	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064cc0:00	00 00 00 00 00 00 20 00 08 5a 18 00 24 a8 56 07	.....Z..\$"V.
00064cd0:24	a8 56 07 c4 f0 7d 07 c9 a4 07 30 90 00 b7 00	\$"V.Äð}.Éð.0□.•.
00064ce0:b8	1a e2 01 43 00 00 00 00 00 00 00 b8 1a e2 01	..â.C.....,â.
00064cf0:6f	ec ee 94 d4 a5 07 30 48 f1 7d 07 40 f8 a9 30	oiî"Ôÿ.0Hñ}.@ø0
00064d00:84	f8 a9 30 78 a3 07 30 2f 00 00 00 7b 7c 03 30	„ø00xf.0/...{ .0
00064d10:31	90 18 00 00 00 00 00 f4 5e 9b 00 08 5a 18 00	1□.....ô^>..Z..
00064d20:04	00 00 00 08 00 00 00 04 00 00 00 68 5e 9b 00	.....h^>.
00064d30:78	ee 7d 07 31 90 18 00 00 00 00 00 04 00 00 00	xi}.1•.....
00064d40:7c	ee 7d 07 00 00 7d 07 00 00 00 00 00 00 00 00	î}...}.....
00064d50:47	16 90 01 00 00 00 00 00 00 00 00 00 00 00 00	G.♦.....
00064d60:87	3a 00 20 00 00 00 00 00 00 00 00 00 00 00 00	‡:.....
00064d70:ff	01 00 00 00 00 00 00 54 00 69 00 6d 00 65 00	ÿ.....T.i.m.e.
00064d80:73	00 20 00 00 00 65 00 77 00 20 00 52 00 6f 00	s. ...e.w. .R.o.
00064d90:6d	00 61 00 6e 00 00 00 00 00 00 00 00 00 00 00	m.a.n.....
00064da0:00	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00064db0:f0	ee 7d 07 5a b0 02 30 f0 ee 7d 07 8c 63 ab 30	ôî}.Z°.0ôî}.Éc«0
00064dc0:08	ef 7d 07 64 76 00 08 00 00 00 00 25 00 00 00	.î}.dv.....%...
00064dd0:0c	00 00 00 01 00 00 00 6d 00 00 00 10 00 00 00	.....m.....
00064de0:df	a6 a0 78 01 00 00 00 54 00 00 00 a8 00 00 00	ß! x....T...."
00064df0:3d	01 00 00 68 01 00 00 9a 02 00 00 ab 01 00 00	=...h...Š...«...
00064e00:01	00 00 00 76 84 e1 40 47 a2 e1 40 3d 01 00 00	....v„á@Gčá@=...
00064e10:9e	01 00 00 0f 00 00 00 4c 00 00 00 04 10 00 00	ž.....L.....
00064e20:00	00 00 00 00 00 00 00 78 0f 00 00 f4 0b 00 00	.....x...ô....
00064e30:6c	00 00 00 54 00 68 00 69 00 73 00 20 00 69 00	l...T.h.i.s. .i.
00064e40:73	00 20 00 70 00 61 00 67 00 65 00 20 00 32 00	s. .p.a.g.e. .2.
00064e50:2e	00 06 00 25 00 00 00 1e 00 00 00 11 00 00 00	....%.....
00064e60:17	00 00 00 0f 00 00 00 11 00 00 00 17 00 00 00	.....

00064e70:0f 00 00 00 1e 00 00 00 1b 00 00 00 1d 00 00 00 .....  
00064e80:1b 00 00 00 0f 00 00 00 1e 00 00 00 0f 00 00 00 .....  
00064e90:54 00 00 00 54 00 00 00 9b 02 00 00 68 01 00 00 T...T...>...h...  
00064ea0:b5 02 00 00 ab 01 00 00 01 00 00 00 76 84 e1 40 μ...«.....v,,á@  
00064eb0:47 a2 e1 40 9b 02 00 00 9e 01 00 00 01 00 00 00 Gçá@>...ž.....  
00064ec0:4c 00 00 00 04 10 00 00 00 00 00 00 00 00 00 00 L.....  
00064ed0:78 0f 00 00 f4 0b 00 00 50 00 00 00 20 00 00 56 x...ô...P... ..V  
00064ee0:1b 00 00 00 12 00 00 00 0c 00 00 00 01 00 00 00 .....  
00064ef0:54 00 00 00 88 00 00 00 3d 01 00 00 ad 01 00 00 T...^...=...-...  
00064f00:23 02 00 00 f0 01 00 00 01 00 00 00 76 84 e1 40 #...ð.....v,,á@  
00064f10:47 a2 e1 40 3d 01 00 00 e3 01 00 00 0a 00 00 00 Gçá@=...ã.....  
00064f20:4c 00 00 00 04 10 00 00 00 00 00 00 00 00 00 00 L.....  
00064f30:78 0f 00 00 f4 0b 00 00 60 00 00 00 50 00 61 00 x...ô...`...P.a.  
00064f40:67 00 65 00 20 00 32 00 20 00 69 00 73 00 20 00 g.e. .2. .i.s. .  
00064f50:21 00 00 00 1b 00 00 00 1d 00 00 00 1b 00 00 00 !.....  
00064f60:0f 00 00 00 1e 00 00 00 0f 00 00 00 11 00 00 00 .....  
00064f70:17 00 00 00 0f 00 00 00 54 00 00 00 70 00 00 00 .....T...p...  
00064f80:24 02 00 00 ad 01 00 00 a0 02 00 00 f0 01 00 00 \$...-... ..ð...  
00064f90:01 00 00 00 76 84 e1 40 47 a2 e1 40 24 02 00 00 ....v,,á@Gçá@\$...  
00064fa0:e3 01 00 00 06 00 00 00 4c 00 00 00 04 10 00 00 ã.....L.....  
00064fb0:00 00 00 00 00 00 00 00 78 0f 00 00 f4 0b 00 00 .....x...ô...  
00064fc0:58 00 00 00 6c 00 65 00 74 00 74 00 65 00 72 00 X...l.e.t.t.e.r.  
00064fd0:11 00 00 00 1b 00 00 00 11 00 00 00 11 00 00 00 .....  
00064fe0:1b 00 00 00 14 00 00 00 54 00 00 00 54 00 00 00 .....T...T...  
00064ff0:a1 02 00 00 ad 01 00 00 af 02 00 00 f0 01 00 00 j...-...-...ð...  
00065000:01 00 00 00 76 84 e1 40 47 a2 e1 40 a1 02 00 00 ....v,,á@Gçá@j...  
00065010:e3 01 00 00 01 00 00 00 4c 00 00 00 04 10 00 00 ã.....L.....  
00065020:00 00 00 00 00 00 00 00 78 0f 00 00 f4 0b 00 00 .....x...ô...  
00065030:50 00 00 00 2e 00 fe 26 0f 00 00 00 54 00 00 00 P....p&....T...  
00065040:54 00 00 00 b0 02 00 00 ad 01 00 00 c9 02 00 00 T...°....-...É...  
00065050:f0 01 00 00 01 00 00 00 76 84 e1 40 47 a2 e1 40 ð.....v,,á@Gçá@  
00065060:b0 02 00 00 e3 01 00 00 01 00 00 00 4c 00 00 00 °...ã.....L...  
00065070:04 10 00 00 00 00 00 00 00 00 00 00 78 0f 00 00 .....x...  
00065080:f4 0b 00 00 50 00 00 00 20 00 01 05 1a 00 00 00 ô...P... .....  
00065090:12 00 00 00 0c 00 00 00 01 00 00 00 54 00 00 00 .....T...  
000650a0:0c 01 00 00 3d 01 00 00 f2 01 00 00 33 04 00 00 ....=...ô...3...  
000650b0:35 02 00 00 01 00 00 00 76 84 e1 40 47 a2 e1 40 5.....v,,á@Gçá@  
000650c0:3d 01 00 00 28 02 00 00 20 00 00 00 4c 00 00 00 =...(... ..L...  
000650d0:04 10 00 00 00 00 00 00 00 00 00 00 78 0f 00 00 .....x...  
000650e0:f4 0b 00 00 8c 00 00 00 50 00 61 00 67 00 65 00 ô...E...P.a.g.e.  
000650f0:20 00 32 00 20 00 6f 00 72 00 69 00 65 00 6e 00 .2. .o.r.i.e.n.  
00065100:74 00 61 00 74 00 69 00 6f 00 6e 00 20 00 69 00 t.a.t.i.o.n. .i.  
00065110:73 00 20 00 6c 00 61 00 6e 00 64 00 73 00 63 00 s. .l.a.n.d.s.c.  
00065120:61 00 70 00 65 00 2e 00 21 00 00 00 1b 00 00 00 a.p.e...!.....  
00065130:1d 00 00 00 1b 00 00 00 0f 00 00 00 1e 00 00 00 .....  
00065140:0f 00 00 00 1e 00 00 00 14 00 00 00 11 00 00 00 .....  
00065150:1b 00 00 00 1e 00 00 00 11 00 00 00 1b 00 00 00 .....  
00065160:11 00 00 00 11 00 00 00 1e 00 00 00 1e 00 00 00 .....  
00065170:0e 00 00 00 11 00 00 00 17 00 00 00 0f 00 00 00 .....  
00065180:11 00 00 00 1b 00 00 00 1e 00 00 00 1e 00 00 00 .....  
00065190:17 00 00 00 1a 00 00 00 1b 00 00 00 1e 00 00 00 .....  
000651a0:1b 00 00 00 0f 00 00 00 54 00 00 00 54 00 00 00 .....T...T...  
000651b0:34 04 00 00 f2 01 00 00 4d 04 00 00 35 02 00 00 4...ò...M...5...  
000651c0:01 00 00 00 76 84 e1 40 47 a2 e1 40 34 04 00 00 ....v,,á@Gçá@4...  
000651d0:28 02 00 00 01 00 00 00 4c 00 00 00 04 10 00 00 (...L.....  
000651e0:00 00 00 00 00 00 00 00 78 0f 00 00 f4 0b 00 00 .....x...ô...  
000651f0:50 00 00 00 20 00 00 3c 1a 00 00 00 12 00 00 00 P... ..<.....  
00065200:0c 00 00 00 01 00 00 00 54 00 00 00 54 00 00 00 .....T...T...  
00065210:3d 01 00 00 37 02 00 00 57 01 00 00 7a 02 00 00 =...7...W...z...

00065220:01 00 00 00 76 84 e1 40 47 a2 e1 40 3d 01 00 00	....v,,á@Gçá@=...
00065230:6d 02 00 00 01 00 00 00 4c 00 00 00 04 10 00 00	m.....L.....
00065240:00 00 00 00 00 00 00 00 78 0f 00 00 f4 0b 00 00	.....x...ô...
00065250:50 00 00 00 20 00 00 4a 1b 00 00 00 25 00 00 00	P... ..J....%...
00065260:0c 00 00 00 0e 00 00 80 62 00 00 00 0c 00 00 00	.....Ěb.....
00065270:01 00 00 00 0e 00 00 00 14 00 00 00 00 00 00 00	.....
00065280:10 00 00 00 14 00 00 00 03 00 00 00 40 04 00 00	.....@...
00065290:5c 00 5c 00 70 00 72 00 69 00 6e 00 74 00 65 00	\\.\\.p.r.i.n.t.e.
000652a0:72 00 73 00 65 00 72 00 76 00 65 00 72 00 5c 00	r.s.e.r.v.e.r\\.
000652b0:43 00 61 00 6e 00 6f 00 6e 00 20 00 42 00 75 00	C.a.n.o.n. .B.u.
000652c0:62 00 62 00 6c 00 65 00 2d 00 4a 00 00 00 00 00	b.b.l.e.-.J.....
000652d0:01 04 00 06 dc 00 64 03 43 ef 80 07 02 00 01 00	....Ů.d.CiĚ.....
000652e0:ea 0a 6f 08 64 00 01 00 0f 00 fd ff 02 00 01 00	ê.o.d....ýÿ....
000652f0:fd ff 02 00 01 00 4c 00 65 00 74 00 74 00 65 00	ýÿ....L.e.t.t.e.
00065300:72 00 00 00 00 00 00 00 00 00 00 00 00 00 00	r.....
00065310:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065320:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065330:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065340:00 00 00 00 01 00 00 00 00 00 00 00 02 00 00 00	.....
00065350:02 00 00 00 01 00 00 00 01 01 00 00 00 00 00 00	.....
00065360:00 00 00 00 00 00 00 00 00 00 00 00 44 49 4e 55	.....DINU
00065370:22 00 00 01 44 02 18 00 59 d8 b0 99 00 00 00 00 00	"...D...YØ <sup>o</sup> ™....
00065380:00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00	.....
00065390:00 00 00 00 00 00 00 00 08 00 00 00 01 00 00 00	.....
000653a0:03 00 01 00 01 00 02 00 02 00 00 00 00 00 00 00	.....
000653b0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000653c0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000653d0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000653e0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000653f0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065400:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065410:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065420:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065430:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065440:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065450:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065460:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065470:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065480:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065490:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000654a0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000654b0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000654c0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000654d0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000654e0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
000654f0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065500:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065510:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065520:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065530:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065540:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065550:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065560:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065570:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065580:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00065590:00 00 00 00 00 00 00 00 00 00 00 01 00 00 00 00	.....
000655a0:00 00 00 00 00 00 00 00 01 00 00 53 4d 54 4a	.....SMTJ
000655b0:18 00 00 00 4e 55 4a 42 00 00 01 00 34 00 00 00	....NUJB....4...
000655c0:00 00 00 00 00 00 00 00 08 01 00 00 53 4d 54 4a	.....SMTJ

```

000655d0:00 00 00 00 14 00 00 00 00 00 f4 00 43 00 61 00 .....ô.C.a.
000655e0:6e 00 6f 00 6e 00 20 00 42 00 75 00 62 00 62 00 n.o.n. .B.u.b.b.
000655f0:6c 00 65 00 2d 00 4a 00 65 00 74 00 20 00 42 00 l.e.-.J.e.t. .B.
00065600:4a 00 43 00 2d 00 35 00 30 00 00 00 49 6e 70 75 J.C.-.5.0...Inpu
00065610:74 42 69 6e 00 4d 41 4e 55 41 4c 00 52 45 53 44 tBin.MANUAL.RESD
00065620:4c 4c 00 55 6e 69 72 65 73 44 4c 4c 00 50 61 70 LL.UniresDLL.Pap
00065630:65 72 53 69 7a 65 00 4c 45 54 54 45 52 00 52 65 erSize.LETTER.Re
00065640:73 6f 6c 75 74 69 6f 6e 00 53 54 41 4e 44 41 52 solution.STANDAR
00065650:44 00 4d 65 64 69 61 54 79 70 65 00 53 54 41 4e D.MediaType.STAN
00065660:44 41 52 44 00 43 6f 6c 6f 72 4d 6f 64 65 00 43 DARD.ColorMode.C
00065670:4d 59 4b 32 34 00 48 61 6c 66 74 6f 6e 65 00 48 MYK24.Halftone.H
00065680:54 5f 50 41 54 53 49 5a 45 5f 41 55 54 4f 00 4f T_PATSIZE_AUTO.O
00065690:72 69 65 6e 74 61 74 69 6f 6e 00 50 4f 52 54 52 rientation.PORTR
000656a0:41 49 54 00 00 00 00 00 00 00 00 00 00 00 00 00 AIT.....
000656b0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
000656c0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
000656d0:0e 00 00 00 08 00 00 00 b4 0b 00 00 00 00 00 00 .....

```

### 3.2.1 EMFSPOOL Header Example

This section provides an example of a [Header](#) record, as specified in section [2.2.2](#).

```

00000000:00 00 01 00 54 00 00 00 10 00 00 00 46 00 00 00
00000010:4d 00 69 00 63 00 72 00 6f 00 73 00 6f 00 66 00
00000020:74 00 20 00 57 00 6f 00 72 00 64 00 20 00 2d 00
00000030:20 00 44 00 6f 00 63 00 75 00 6d 00 65 00 6e 00
00000040:74 00 31 00 00 00 4e 00 65 00 30 00 32 00 3a 00
00000050:00 00 00

```

0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9	2	1	2	3	4	5	6	7	8	9	3	1
dwVersion (0x00010000)																														
cjSize (0x00000054)																														
dpszDocName (0x00000010)																														
dpszOutput (0x00000046)																														
extraDataDocName ("Microsoft Work - Document 1")																														
extraDataOutputDevice ("net02:")																														

**Figure 4: EMFSPOOL Header Example**

**dwVersion:** 0x00010000 specifies the version of EMFSPOOL.

**cjSize:** 0x00000054 specifies the size, in bytes, of the header record, including any extra data attached.

**dpszDocName:** 0x00000010 specifies the offset of the document name from the start of the record (the **dwVersion** field). The document name is stored as a NULL-terminated Unicode string, as specified in [\[UNICODE\]](#), in the **extraData** area. If the value is 0x00000000, no document name is specified.

**extraData:** Variable-size storage area for document name and output device name, 4-byte aligned.

This section provides an example of the [EMRI METAFILE DATA](#) record, as specified in section [2.2.3.1](#).

```
00000050:      0c 00 00 00 58 46 06 00
```

**EmfMetafile:** A variable-size field that contains a complete EMF metafile. This embedded metafile itself contains an embedded [Font Definition Record \(section 2.2.3.3\)](#), the corresponding example of which is presented in section 3.2.2.20.1.

This section provides an example of the EMF [EMR\\_HEADER](#) record ([\[MS-EMF\]](#) section 2.3.4.2).

```

00000050:                                01 00 00 00
00000060:84 00 00 00 67 01 00 00 3D 01 00 00 3B 04 00 00
00000070:4F 02 00 00 00 00 00 00 00 00 00 00 4C 4F 00 00
00000080:14 69 00 00 20 45 4D 46 00 00 01 00 58 46 06 00
00000090:23 00 00 00 02 00 00 00 0C 00 00 00 6C 00 00 00
000000a0:00 00 00 00 3F 0b 00 00 E9 0E 00 00 CB 00 00 00
000000b0:0D 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000000c0:79 19 03 00 FF 1B 04 00 50 00 72 00 69 00 6E 00
000000d0:74 00 20 00 74 00 65 00 73 00 74 00 00 00 00 00

```



**Bytes:** 0x00064658 specifies the size of the metafile in bytes.

**Records:** 0x00000023 specifies the number of records in the metafile.

**Handles:** 0x0002 specifies the number of indexes that will need to be defined during the processing of the metafile. These indexes correspond to graphics objects that are used in drawing commands. Index 0 is reserved for references to the metafile itself.

**Reserved:** 0x0000 is not used.

**nDescription:** 0x0000000C specifies the number of characters in the array that contains the description of the EMF metafile's contents.

**offDescription:** 0x0000006C specifies the offset from the beginning of this record to the array that contains the description of the EMF metafile's contents.

**nPalEntries:** 0x00000000 specifies the number of entries in the metafile palette. The location of the palette is specified in the [EMR\\_EOF](#) record in [\[MS-EMF\]](#) section 2.3.4.1.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Device (0x00000B3F)																															
... (0x00000EE9)																															
Millimeters (0x000000CB)																															
... (0x0000010D)																															
cbPixelFormat (0x00000000)																															
offPixelFormat (0x00000000)																															
bOpenGL (0x00000000)																															
MicrometersX (0x00031797)																															
MicrometersY (0x00041BFF)																															
EmfDescription ("Print test")																															

**Figure 8: EMF EMR\_HEADER Record Example, Part 3**

**Device:** 0x00000B3F, 0x00000EE9 specifies the size of the reference device in pixels.

**Millimeters:** 0x000000CB, 0x0000010D specifies the size of the reference device in millimeters.

**cbPixelFormat:** 0x00000000 specifies the size of the [PixelFormatDescriptor](#) structure, as specified in [\[MS-EMF\]](#) section 2.2.22. This value indicates that no pixel format is defined.

**offPixelFormat:** 0x00000000 specifies the offset to the PixelFormatDescriptor in the metafile. In this case, no pixel format structure is present.

**bOpenGL:** 0x00000000 specifies that no **OpenGL** commands are present in the metafile.

**MicrometersX:** 0x00031797 specifies the horizontal size of the reference device in micrometers.

**MicrometersY:** 0x00041BFF specifies the vertical size of the reference device in micrometers.

**EmfDescription:** "Print test".

3.2.2.2 EMR\_SETICMMODE Example

This section provides an example of the [EMR\\_SETICMMODE](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.14.

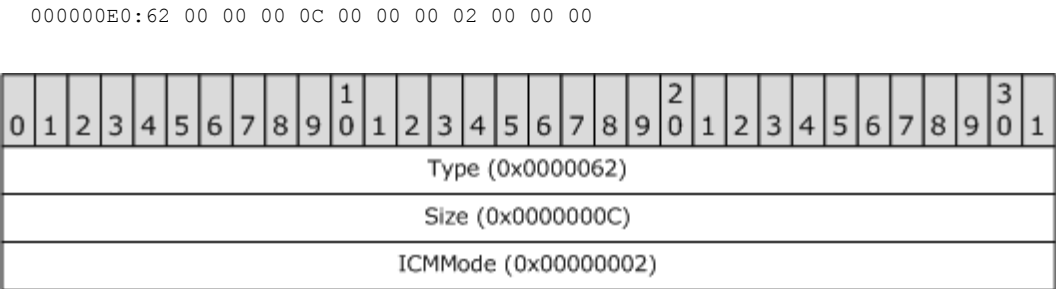


Figure 9: EMF EMR\_SETICMMODE Record Example

**Type:** 0x00000062 identifies this EMF record type as EMR\_SETICMMODE.

**Size:** 0x0000000C is the size of this record in bytes.

**ICMMode:** 0x00000002 is an **Image Color Management (ICM)** mode value from the [ICMMode](#) enumeration as specified in [\[MS-EMF\]](#) section 2.1.18.

3.2.2.3 EMR\_SELECTOBJECT Example

This section provides an example of the [EMR\\_SELECTOBJECT](#) record, as specified in [\[MS-EMF\]](#) section 2.3.8.5.

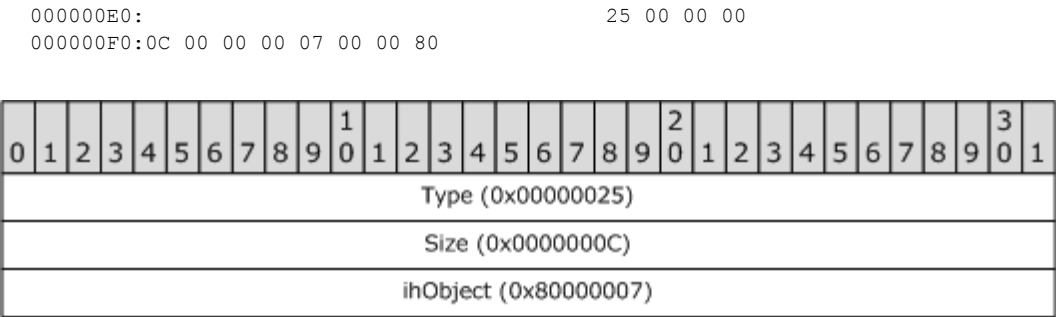


Figure 10: EMF EMR\_SELECTOBJECT Record Example

**Type:** 0x00000025 identifies this EMF record type as EMR\_SELECTOBJECT.

**Size:** 0x0000000C is the size of this record in bytes.

**ihObject:** 0x80000007 is the index of a **BLACK\_PEN stock object** from the EMF [StockObject](#) enumeration, specified in [\[MS-EMF\]](#) section 2.1.31.

### 3.2.2.4 EMR\_SELECTOBJECT Example

This section provides an example of the [EMR\\_SELECTOBJECT](#) record as specified in [\[MS-EMF\]](#) section 2.3.8.5.

```
000000F0:                                25 00 00 00 0C 00 00 00
00000100: 00 00 00 80
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000025)																															
Size (0x0000000C)																															
ihObject (0x80000000 = WHITE_BRUSH)																															

**Figure 11: MF EMR\_SELECTOBJECT Record Example**

**Type:** 0x00000025 identifies this EMF record type as EMR\_SELECTOBJECT.

**Size:** 0x0000000C is the size of this record in bytes.

**ihObject:** 0x80000000 specifies the index of an object in the object table or the stock object if it is negative.

### 3.2.2.5 EMR\_SELECTOBJECT Example

This section provides an example of the [EMR\\_SELECTOBJECT](#) record as specified in [\[MS-EMF\]](#) section 2.3.8.5.

```
00000100:                25 00 00 00 0C 00 00 00 0E 00 00 80
```

0	1	2	3	4	5	6	7	8	9	1	0	1	2	3	4	5	6	7	8	9	2	0	1	2	3	4	5	6	7	8	9	3	0	1
Type (0x00000025)																																		
Size (0x0000000C)																																		
ihObject (0x8000000E = DEVICE_DEFAULT_FONT)																																		

**Figure 12: MF EMR\_SELECTOBJECT Record Example**

**Type:** 0x00000025 identifies this EMF record type as EMR\_SELECTOBJECT.

**Size:** 0x0000000C is the size of this record in bytes.

**ihObject:** 0x8000000E specifies the index of an object in the object table or the stock object if it is negative.

### 3.2.2.6 EMR\_MOVETOEX Example

This section provides an example of the [EMR\\_MOVETOEX](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.4.

00000110:1B 00 00 00 10 00 00 00 00 00 00 00 00 00 00 00

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x000001B)																															
Size (0x00000010)																															
Offset (64-bits) (0x0000000000000000)																															

**Figure 13: EMF EMR\_MOVETOEX Record Example**

**Type:** 0x0000001B identifies this EMF record type as EMR\_MOVETOEX.

**Size:** 0x00000010 is the size of this record in bytes.

**Offset:** 0x0000000000000000 specifies the coordinates of the new current position in logical units.

### 3.2.2.7 EMR\_SETBRUSHORGEX Example

This section provides an example of the [EMR\\_SETBRUSHORGEX](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.12.

00000120:0D 00 00 00 10 00 00 00 00 00 00 00 00 00 00 00

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x0000000D)																															
Size (0x00000010)																															
Origin (64 bits) (0x00000000, 0x00000000)																															

**Figure 14: EMF EMR\_SETBRUSHORGEX Record Example**

**Type:** 0x0000000D identifies this EMF record type as EMR\_SETBRUSHORGEX.

**Size:** 0x00000010 is the size of this record in bytes.

**Origin:** 0x00000000, 0x00000000 defines the brush horizontal and vertical origin in device units.

### 3.2.2.8 EMR\_SETICMODE Example

This section provides an example of the [EMR\\_SETICMODE](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.14.

00000130:62 00 00 00 0C 00 00 00 02 00 00 00

0	1	2	3	4	5	6	7	8	9	1	0	1	2	3	4	5	6	7	8	9	2	0	1	2	3	4	5	6	7	8	9	3	0	1
Type (0x0000062)																																		
Size (0x0000000C)																																		
ICMMode (0x00000002)																																		

**Figure 15: EMF EMR\_SETICCMODE Record Example**

**Type:** 0x00000062 identifies this EMF record type as EMR\_SETICCMODE.

**Size:** 0x0000000C is the size of this record in bytes.

**ICMMode:** 0x00000002 is an Image Color Management (ICM) mode value from the [ICMMode](#) enumeration, as specified in [\[MS-EMF\]](#) section 2.1.18.

### 3.2.2.9 EMR\_SETCOLORSPACE Example

This section provides an example of the [EMR\\_SETCOLORSPACE](#) record as specified in [\[MS-EMF\]](#) section 2.3.8.7.

```
00000130:                                64 00 00 00
00000140:0C 00 00 00 14 00 00 80
```

0	1	2	3	4	5	6	7	8	9	1	0	1	2	3	4	5	6	7	8	9	2	0	1	2	3	4	5	6	7	8	9	3	0	1
Type (0x0000064)																																		
Size (0x0000000C)																																		
ihCS (0x80000014)																																		

**Figure 16: EMF EMR\_SETCOLORSPACE Record Example**

**Type:** 0x00000064 identifies this EMF record type as EMR\_SETCOLORSPACE.

**Size:** 0x0000000C is the size of this record in bytes.

**ihCS:** 0x80000014 specifies the **ColorSpace** by using the values in the **ColorSpace** enumeration specified in [\[MS-EMF\]](#) section 2.1.7.

### 3.2.2.10 EMR\_SETTEXTALIGN Example

This section provides an example of an EMF [EMR\\_SETTEXTALIGN](#) record ([\[MS-EMF\]](#) section 2.3.11.25).

```
00000140:                                16 00 00 00 0C 00 00 00
00000150:18 00 00 00
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000016)																															
Size (0x0000000C)																															
TextAlignmentMode (0x00000018)																															

**Figure 17: EMF EMR\_SETTEXTALIGN Record Example**

**Type:** 0x00000016 identifies the record type as EMR\_SETTEXTALIGN.

**Size:** 0x0000000C is the size of this record in bytes.

**TextAlignmentMode:** 0x00000018 specifies the text alignment mode by using **WMF TextAlignmentMode Flags** ([MS-WMF] section 2.1.2.3).

### 3.2.2.11 EMR\_SELECTOBJECT Example

This section provides an example of the [EMR\\_SELECTOBJECT](#) record as specified in [\[MS-EMF\]](#) section 2.3.8.5.

```
00000150:          25 00 00 00 0C 00 00 00 0E 00 00 80
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000025)																															
Size (0x0000000C)																															
ihObject (0x8000000E=DEVICE_DEFAULT_FONT)																															

**Figure 18: MF EMR\_SELECTOBJECT Record Example**

**Type:** 0x00000025 identifies this EMF record type as EMR\_SELECTOBJECT.

**Size:** 0x0000000C is the size of this record in bytes.

**ihObject:** 0x8000000E specifies the index of an object in the object table or stock object to be selected.

### 3.2.2.12 EMR\_SETTEXTALIGN Example

This section provides an example of the EMF [EMR\\_SETTEXTALIGN](#) record ([MS-EMF] section 2.3.11.25).

```
00000160:16 00 00 00 0C 00 00 00 18 00 00 00
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000016)																															
Size (0x0000000C)																															
TextAlignmentMode (0x00000018)																															

**Figure 19: EMF EMR\_SETTEXTALIGN Record Example**

**Type:** 0x00000016 identifies the record type as EMR\_SETTEXTALIGN.

**Size:** 0x0000000C is the size of this record in bytes.

**TextAlignmentMode:** 0x00000018 specifies the text alignment mode by using WMF [TextAlignmentMode Flags](#) ([MS-WMF] section 2.1.2.3).

### 3.2.2.13 EMR\_SETBKMODE Example

This section provides an example of the [EMR\\_SETBKMODE](#) record as specified in [MS-EMF] section 2.3.11.11.

```
00000160:                                12 00 00 00
00000170:0C 00 00 00 01 00 00 00
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000012)																															
Size (0x0000000C)																															
BackgroundMode (0x00000001)																															

**Figure 20: EMF EMR\_SETBKMODE Record Example**

**Type:** 0x00000012 identifies this EMF record type as EMR\_SETBKMODE.

**Size:** 0x0000000C is the size of this record in bytes.

**BackgroundMode:** 0x00000001 specifies background mode.

### 3.2.2.14 EMR\_SETVIEWPORTORGEX Example

This section provides an example of the [EMR\\_SETVIEWPORTORGEX](#) record as specified in [MS-EMF] section 2.3.11.29.

```
00000170:                                0C 00 00 00 10 00 00 00
00000180:00 00 00 00 00 00 00 00
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x0000000C)																															
Size (0x00000010)																															
Origin (0x00000000)																															
... (0x00000000)																															

**Figure 21: EMF EMR\_SETVIEWPORTORGEX Record Example**

**Type:** 0x0000000C identifies this EMF record type as EMR\_SETVIEWPORTORGEX.

**Size:** 0x00000010 is the size of this record in bytes.

**Origin:** 0x00000000, 0x00000000 specifies the viewport horizontal and vertical origin in device units.

### 3.2.2.15 EMR\_SETBKMODE Example

This section provides an example of the [EMR\\_SETBKMODE](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.11.

```
00000180:                12 00 00 00 0C 00 00 00
00000190:01 00 00 00
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000012)																															
Size (0x0000000C)																															
BackgroundMode (0x00000001)																															

**Figure 22: EMF EMR\_SETBKMODE Record Example**

**Type:** 0x00000012 identifies this EMF record type as EMR\_SETBKMODE.

**Size:** 0x0000000C is the size of this record in bytes.

**BackgroundMode:** 0x00000001 specifies background mode.

### 3.2.2.16 EMR\_EXTCREATEFONTINDIRECTW Example

This section provides an example of an EMF [EMR\\_EXTCREATEFONTINDIRECTW](#) record ([\[MS-EMF\]](#) section 2.3.7.8).

```
00000190:                52 00 00 00 70 01 00 00 01 00 00 00
000001A0:C4 FF FF FF 00 00 00 00 00 00 00 00 00 00 00 00
000001B0:90 01 00 00 00 00 00 00 07 40 00 12 54 00 69 00
000001C0:6D 00 65 00 73 00 20 00 4E 00 65 00 77 00 20 00
000001D0:52 00 6F 00 6D 00 61 00 6E 00 00 00 00 00 00 00
000001E0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000001F0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 20 00
```

```

00000200:08 5A 18 00 24 A8 56 07 D0 EE 7D 07 C4 F0 7D 07
00000210:37 A4 07 30 90 00 B7 00 B8 1A E2 01 00 00 00 00
00000220:00 00 00 00 B8 1A E2 01 6F EC EE 94 D4 A5 07 30
00000230:48 F1 7D 07 40 F8 A9 30 84 F8 A9 30 78 A3 07 30
00000240:28 48 24 00 01 00 00 00 02 00 00 00 50 EE 7D 07
00000250:54 EE 7D 07 AC 1E 24 00 00 90 FD 7F 00 90 FD 7F
00000260:00 00 B9 6E B8 00 B9 6E 18 EE 7D 07 00 00 B9 6E
00000270:50 EE 7D 07 14 00 00 00 01 00 00 00 00 00 00 00
00000280:00 00 00 00 00 00 00 00 47 16 90 01 00 00 00 00
00000290:00 00 00 00 00 00 00 00 87 3A 00 20 00 00 00 00
000002A0:00 00 00 00 00 00 00 00 FF 01 00 00 00 00 00 00
000002B0:54 00 69 00 6D 00 65 00 73 00 20 00 00 00 65 00
000002C0:77 00 20 00 52 00 6F 00 6D 00 61 00 6E 00 00 00
000002D0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000002E0:00 00 00 00 00 00 00 00 F0 EE 7D 07 5A B0 02 30
000002F0:F0 EE 7D 07 8C 63 AB 30 08 EF 7D 07 64 76 00 08
00000300:00 00 00 00

```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000052)																															
Size (0x00000170)																															
lhFonts (0x00000001)																															
elw (variable)																															
...																															
(elw cont. for 87 rows)																															

**Figure 23: EMF EMR\_EXTCREATEFONTINDIRECTW Record Example**

**Type:** 0x00000052 identifies the record type as EMR\_EXTCREATEFONTINDIRECTW.

**Size:** 0x00000170 specifies the size of this record in bytes.

**lhFonts:** 0x00000001 specifies the object index in the [EMF Object Table](#) ([MS-EMF] section 3.1.1) to assign to the font.

**elw:** To determine the type of logical font object in this field, an algorithm ([MS-EMF] section 2.3.7.8) is applied, which indicates that this is a variable-length EMF [LogFontExDv](#) object ([MS-EMF] section 2.2.15).

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Height (0xFFFFFC4)																															
Width (0x00000000)																															
Escapement (0x00000000)																															
Orientation (0x00000000)																															
Weight (0x00000190)																															
Italic (0x00)								Underline (0x00)								StrikeOut (0x00)								CharSet (0x00)							
OutPrecision (0x07)								ClipPrecision (0x40)								Quality (0x00)								PitchAndFamily (0x12)							
Facename ("Times New Roman")																															
...																															
(Facename cont. for 14 rows)																															

**Figure 24: EMF LogFontExDv Object, Part 1**

**Height:** 0xFFFFFC4 has an absolute value of 60, which specifies the character height for this font in logical units.

**Width:** 0x00000000 specifies a computed font width. The aspect ratio of the device is matched against the digitization aspect ratio of the font to find the closest match, determined by the absolute value of the difference.

**Escapement:** 0x00000000 specifies an angle of 0 degrees between the baseline of a row of text and the x-axis of the device.

**Orientation:** 0x00000000 specifies an angle of 0 degrees between each character's baseline and the x-axis of the device.

**Weight:** 0x000000190 specifies that the **weight** of the font is 400, in the range 0 through 1000, from lightest to darkest, with 400 (0x00000190) considered normal.

**Italic:** 0x00 specifies that the font is not italic.

**Underline:** 0x00 specifies that the font is not underlined.

**Strikeout:** 0x00 specifies that the font characters do not have a strike-out graphic.

**CharSet:** 0x00 specifies the **ANSI\_CHARSET**, as defined in the WMF [CharacterSet](#) enumeration ([\[MS-WMF\]](#) section 2.1.1.5).

**OutPrecision:** 0x07 specifies the output precision, which is how closely the output must match the requested font properties, from the WMF [OutPrecision](#) enumeration ([\[MS-WMF\]](#) section 2.1.1.21). The value 0x07 specifies that the **font mapper** should choose a TrueType font.

**ClipPrecision:** 0x40 specifies the clipping precision, which is how to clip characters that are partially outside the clipping **region**, from the WMF [ClipPrecision Flags](#) ([\[MS-WMF\]](#) section 2.1.2.1). The value 0x40 specifies that **font association** be turned off.

**Quality:** 0x00 specifies default output quality, from the WMF [FontQuality](#) enumeration ([\[MS-WMF\]](#) section 2.1.1.10).

**PitchAndFamily:** 0x12 specifies a variable-pitch font with serifs, from the WMF [FamilyFont](#) and [PitchFont](#) enumerations ([MS-WMF] sections [2.1.1.8](#) and [2.1.1.24](#), respectively).

**Facename:** "Times New Roman" specifies the **typeface** name of the font in Unicode characters.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
FullName (")																															
...																															
(FullName cont. for 30 rows)																															
Style (")																															
...																															
(Style cont. for 14 rows)																															
Script (")																															
...																															
(Script cont. for 14 rows)																															
Signature (0x80007664)																															
NumAxes (0x00000000)																															

**Figure 25: EMF LogFontExDv Object, Part 2**

**FullName:** An empty string specifies the font's full name.

**Style:** An empty string describes the font's style.

**Script:** An empty string describes the font's character set.

**Signature:** 0x80007664 specifies the signature of an EMF [DesignVector](#) object ([MS-EMF] section 2.2.3).

**NumAxes:** 0x00000000 specifies the number of **font axes** described in the DesignVector object.

**3.2.2.17 EMR\_SELECTOBJECT Example**

This section provides an example of the [EMR\\_SELECTOBJECT](#) record as specified in [\[MS-EMF\]](#) section 2.3.8.5.

00000300:                    25 00 00 00 0C 00 00 00 01 00 00 00

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000025)																															
Size (0x0000000C)																															
ihObject (0x00000001)																															

**Figure 26: EMF EMR\_SELECTOBJECT Record Example**

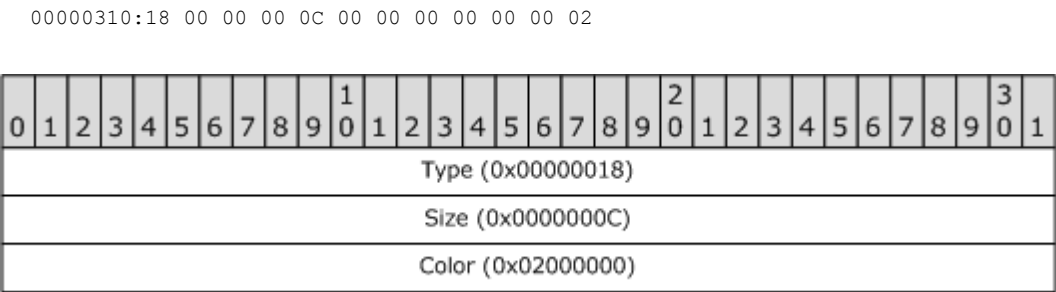
**Type:** 0x00000025 identifies this EMF record type as EMR\_SELECTOBJECT.

**Size:** 0x0000000C is the size of this record in bytes.

**ihObject:** 0x00000001 specifies the index of an object in the object table or stock object to be selected.

**3.2.2.18 EMR\_SETTEXTCOLOR Example**

This section provides an example of the [EMR\\_SETTEXTCOLOR](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.26.



**Figure 27: EMF EMR\_SETTEXTCOLOR Record Example**

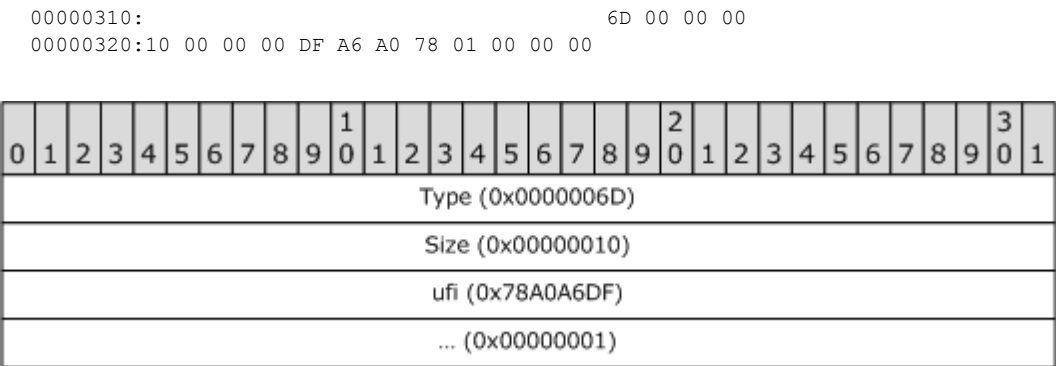
**Type:** 0x00000018 identifies this EMF record type as EMR\_SETTEXTCOLOR.

**Size:** 0x0000000C is the size of this record in bytes.

**Color:** 0x02000000 specifies the text color value.

**3.2.2.19 EMR\_FORCEUFIMAPPING Example**

This section provides an example of the [EMR\\_FORCEUFIMAPPING](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.2.



**Figure 28: EMF EMR\_FORCEUFIMAPPING Record Example**

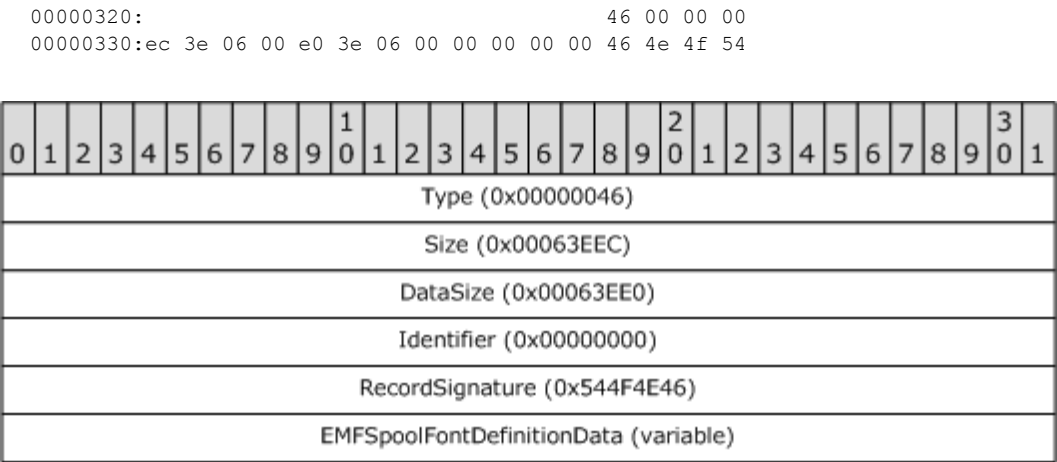
**Type:** 0x0000006D identifies this EMF record type as EMR\_FORCEUFIMAPPING.

**Size:** 0x00000010 is the size of this record in bytes.

**ufi:** 0x78A0A6DF,0x00000001 specifies the font ID to use. This consists of a 32-bit checksum (0x78A0A6DF) followed by a 32-bit index (0x00000001).

**3.2.2.20 EMR\_COMMENT\_EMFSPOOL Example**

This section provides an example of the [EMR\\_COMMENT\\_EMFSPOOL](#) record, as specified in [\[MS-EMF\]](#) section 2.3.3.



**Figure 29: EMF EMR\_COMMENT\_EMFSPOOL Record Example**

**Type:** 0x00000046 identifies this EMF record type as an [EMR\\_COMMENT](#) record, specified in [\[MS-EMF\]](#) section 2.3.3.

**Size:** 0x00063EEC is the size in bytes of this entire EMF record.

**DataSize:** 0x00063EE0 specifies the size in bytes of the data that follows, including the embedded EMF spool format [EMRI\\_ENGINE\\_FONT \(section 2.2.3.3.1\)](#) record.

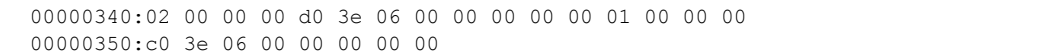
**Identifier:** 0x00000000 identifies this EMR\_COMMENT record type as EMR\_COMMENT\_EMFSPOOL.

**RecordSignature:** 0x544F4E46 ("TONF") identifies this EMR\_COMMENT\_EMFSPOOL record as one that contains embedded EMF spool format font definition data.

**EMFSpoolFontDefinitionData:** A **DataSize** length array of bytes that contains the data.

**3.2.2.20.1 EMRI\_ENGINE\_FONT Example**

This section provides an example of an [EMRI\\_ENGINE\\_FONT](#) font definition record, as specified in section [2.2.3.3.1](#).



0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
uIID (0x00000002)																															
cjSize (0x00063ED0)																															
Type1ID (0x00000000)																															
NumFiles (0x00000001)																															
FileSizes (0x00063EC0)																															
AlignBuffer (0x00000000)																															
FileContent (variable)																															

**Figure 30: EMRI\_ENGINE\_FONT Record Example**

**uIID:** 0x00000002 identifies the type of record as an EMFSPOOL **EMRI\_ENGINE\_FONT** font definition record.

**cjSize:** 00063ED0 specifies the size, in bytes, of the data attached to the record, rounded up to a multiple of 4 bytes.

**Type1ID:** 0x00000000 identifies the font format as TrueType.

**NumFiles:** 0x00000001 specifies the number of font files embedded within this record.

**FileSizes:** 0x00063EC0 specifies the sizes of the files attached within this record.

**AlignBuffer:** 0x00000000 specifies the number of bytes to skip to make the data that follows 64-bit aligned.

**FileContent:** The actual bits of the fonts, each 32-bit aligned, in TrueType format.

### 3.2.2.21 EMR\_EXTTEXTOUTW Example

This section provides an example of an EMF [EMR\\_EXTTEXTOUTW](#) record ([\[MS-EMF\]](#) section 2.3.5.8).

```

00064210:          54 00 00 00 A8 00 00 00
00064220:67 01 00 00 3d 01 00 00 C4 02 00 00 80 01 00 00
00064230:01 00 00 00 47 A2 E1 40 76 84 E1 40 67 01 00 00
00064240:73 01 00 00 0F 00 00 00 4C 00 00 00 04 10 00 00
00064250:00 00 00 00 00 00 00 00 F4 0b 00 00 78 0F 00 00
00064260:6C 00 00 00 54 00 68 00 69 00 73 00 20 00 69 00
00064270:73 00 20 00 70 00 61 00 67 00 65 00 20 00 31 00
00064280:2E 00 00 00 25 00 00 00 1E 00 00 00 11 00 00 00
00064290:17 00 00 00 0F 00 00 00 11 00 00 00 17 00 00 00
000642a0:0F 00 00 00 1E 00 00 00 1B 00 00 00 1D 00 00 00
000642b0:1B 00 00 00 0F 00 00 00 1E 00 00 00 0F 00 00 00

```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000054)																															
Size (0x000000A8)																															
Bounds (0x00000167)																															
... (0x0000013D)																															
... (0x000002C4)																															
... (0x00000180)																															
iGraphicsMode (0x00000001)																															
exScale (0x40E1A247)																															
eyScale (0x40E18476)																															
EmrText (variable)																															
...																															

**Figure 31: EMF EMR\_EXTTEXTOUTW Record Example**

**Type:** 0x00000054 identifies the record type as EMR\_EXTTEXTOUTW.

**Size:** 0x000000A8 is the size of this record in bytes.

**Bounds:** 0x00000167, 0x0000013D, 0x000002C4, 0x00000180 values are not used.

**iGraphicsMode:** 0x00000001 specifies the **GM\_COMPATIBLE** graphics mode from the EMF [GraphicsMode](#) enumeration ([\[MS-EMF\]](#) section 2.1.16).

**exScale:** 0x40E1A247 specifies the X scale from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**eyScale:** 0x40E18476 specifies the Y scales from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**EmrText:** An EMF [EmrText](#) object ([\[MS-EMF\]](#) section 2.2.5). This is followed by strings and spacing arrays.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Reference (0x00000167)																															
... (0x00000173)																															
Char (0x0000000F)																															
offString (0x0000004C)																															
Options (0x00001004)																															
Rectangle (0x00000000)																															
... (0x00000000)																															
... (0x00000BF4)																															
... (0x00000F78)																															
offDx (0x0000006C)																															
text ("This is page 1.")																															

**Figure 32: EMF EmrText Object Example**

**Reference:** 0x00000167, 0x00000173 specifies the coordinates of the reference point used to position the string.

**Chars:** 0x0000000F specifies the number of characters in the string.

**offString:** 0x0000004C specifies the offset to the string.

**Options:** 0x00001004 indicates that the rectangle defined in the **Rectangle** field is used for clipping, as specified in the EMF [ExtTextOutOptions](#) enumeration ([\[MS-EMF\]](#) section 2.1.11).

**Rectangle:** 0x00000000, 0x00000000, 0x00000BF4, 0x00000F78 defines the clipping rectangle in logical units.

**offDx:** 0x0000006C specifies the offset to the intercharacter spacing array.

**text:** "This is page 1."

### 3.2.2.22 EMR\_EXTTEXTOUTW Example

This section provides an example of an EMF [EMR\\_EXTTEXTOUTW](#) record ([\[MS-EMF\]](#) section 2.3.5.8).

```
000642C0:54 00 00 00 54 00 00 00 C5 02 00 00 3D 01 00 00
000642D0:DF 02 00 00 80 01 00 00 01 00 00 00 47 A2 E1 40
000642E0:76 84 E1 40 C5 02 00 00 73 01 00 00 01 00 00 00
000642F0:4C 00 00 00 04 10 00 00 00 00 00 00 00 00 00 00
00064300:F4 0B 00 00 78 0F 00 00 50 00 00 00 20 00 00 00
00064310:1B 00 00 00
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000054)																															
Size (0x00000005)																															
Bounds (0x000002C5)																															
... (0x0000013D)																															
... (0x000002DF)																															
... (0x00000180)																															
iGraphicsMode (0x00000001)																															
exScale (0x40E1A247)																															
eyScale (0x40E18476)																															
EmrText (variable)																															
...																															

**Figure 33: EMF EMR\_EXTTEXTOUTW Record Example**

**Type:** 0x00000054 identifies the record type as EMR\_EXTTEXTOUTW.

**Size:** 0x00000005 is the size of this record in bytes.

**Bounds:** 0x000002C5, 0x0000013D, 0x000002DF, 0x00000180 values are not used.

**iGraphicsMode:** 0x00000001 specifies the **GM\_COMPATIBLE** graphics mode from the EMF [GraphicsMode](#) enumeration ([\[MS-EMF\]](#) section 2.1.16).

**exScale:** 0x40E1A247 specifies the X scale from page units to .01 mm units if the graphics mode is **GM\_COMPATIBLE**.

**eyScale:** 0x40E18476 specifies the Y scale from Page units to .01 mm units if the graphics mode is **GM\_COMPATIBLE**.

**EmrText:** An EMF [EmrText](#) object ([\[MS-EMF\]](#) section 2.2.5). This is followed by strings and spacing arrays.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Reference (64-bits) (0x000002C5)																															
... (0x00000173)																															
Class (0x00000001)																															
offString (0x0000004C)																															
Options (0x00001004)																															
Rectangle (0x00000000)																															
... (0x00000000)																															
... (0x00000BF4)																															
... (0x00000F78)																															
offDx (0x00000050)																															
text (" ")																															

**Figure 34: EMF EmrText Object Example**

**Reference:** 0x000002C5, 0x00000173 specifies the coordinates of the reference point used to position the string.

**Chars:** 0x00000001 specifies the number of characters in the string.

**offString:** 0x0000004C specifies the offset to the string.

**Options:** 0x00001004 indicates that the rectangle defined in the **Rectangle** field is used for clipping, as specified in the EMF [ExtTextOutOptions](#) enumeration ([\[MS-EMF\]](#) section 2.1.11).

**Rectangle:** 0x00000000, 0x00000000, 0x00000BF4, 0x00000F78 defines the clipping rectangle in logical units.

**offDx:** 0x00000050 specifies the offset to the intercharacter spacing array.

**text:** " ".

### 3.2.2.23 EMR\_SETBKMODE Example

This section provides an example of the [EMR\\_SETBKMODE](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.11.

00064310: 12 00 00 00 0C 00 00 00 01 00 00 00

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x0000012)																															
Size (0x0000000C)																															
Mode (0x00000001)																															

**Figure 35: EMF EMR\_SETBKMODE Record Example**

**Type:** 0x00000012 identifies this EMF record type as EMR\_SETBKMODE.

**Size:** 0x0000000C is the size of this record in bytes.

**Mode:** 0x00000001 specifies the background color value.

**3.2.2.24 EMR\_EXTTEXTOUTW Example**

This section provides an example of an EMF [EMR\\_EXTTEXTOUTW](#) record ([\[MS-EMF\]](#) section 2.3.5.8).

```
00064320:54 00 00 00 B4 00 00 00 67 01 00 00 82 01 00 00
00064330:D9 02 00 00 C5 01 00 00 01 00 00 00 47 A2 E1 40
00064340:76 84 E1 40 67 01 00 00 B8 01 00 00 11 00 00 00
00064350:4C 00 00 00 04 10 00 00 00 00 00 00 00 00 00 00
00064360:F4 0B 00 00 78 0F 00 00 70 00 00 00 50 00 61 00
00064370:67 00 65 00 20 00 31 00 20 00 69 00 73 00 20 00
00064380:6C 00 65 00 74 00 74 00 65 00 72 00 2E 00 00 00
00064390:21 00 00 00 1B 00 00 00 1D 00 00 00 1B 00 00 00
000643a0:0F 00 00 00 1E 00 00 00 0F 00 00 00 11 00 00 00
000643b0:17 00 00 00 0F 00 00 00 11 00 00 00 1B 00 00 00
000643c0:11 00 00 00 11 00 00 00 1B 00 00 00 14 00 00 00
000643d0:0F 00 00 00
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000054)																															
Size (0x000000B4)																															
Bounds (0x000000167)																															
... (0x000000182)																															
... (0x0000002D9)																															
... (0x0000001C5)																															
iGraphicsMode (0x00000001)																															
exScale (0x40E1A247)																															
eyScale (0x40E18476)																															
EmrText (variable)																															
...																															

**Figure 36: EMF EMR\_EXTTEXTOUTW Record Example**

**Type:** 0x00000054 identifies the record type as EMR\_EXTTEXTOUTW.

**Size:** 0x000000B4 is the size of this record in bytes.

**Bounds:** 0x000000167, 0x000000182, 0x0000002D9, 0x0000001C5 values are not used.

**iGraphicsMode:** 0x00000001 specifies the **GM\_COMPATIBLE** graphics mode from the EMF [GraphicsMode](#) enumeration ([\[MS-EMF\]](#) section 2.1.16).

**exScale:** 0x40E1A247 specifies the X scale from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**eyScale:** 0x40E18476 specifies the Y scales from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**EmrText:** An EMF [EmrText](#) object ([\[MS-EMF\]](#) section 2.2.5). This is followed by strings and spacing arrays.

0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
Reference (0x00000167)																															
(0x000001B8)																															
Class (0x00000001)																															
offString (0x0000004C)																															
Options (0x00001004)																															
Rectangle (0x00000000)																															
... (0x00000000)																															
... (0x00000BF4)																															
... (0x00000F78)																															
offDx (0x00000070)																															
text ("Page 1 is letter.")																															

**Figure 37: EMF EmrText Object Example**

**Reference:** 0x00000167, 0x000001B8 specifies the coordinates of the reference point used to position the string.

**Chars:** 0x00000011 specifies the number of characters in the string.

**offString:** 0x0000004C specifies the offset to the string.

**Options:** 0x00001004 indicates that the rectangle defined in the **Rectangle** field is used for clipping, as specified in the EMF [ExtTextOutOptions](#) enumeration ([\[MS-EMF\]](#) section 2.1.11).

**Rectangle:** 0x00000000, 0x00000000, 0x00000BF4, 0x00000F78 defines the clipping rectangle in logical units.

**offDx:** 0x00000070 specifies the offset to intercharacter spacing array.

**text:** "Page 1 is letter."

### 3.2.2.25 EMR\_EXTTEXTOUTW Example

This section provides an example of an EMF [EMR\\_EXTTEXTOUTW](#) record ([\[MS-EMF\]](#) section 2.3.5.8).

```

000643D0:          54 00 00 00 54 00 00 00 DA 02 00 00
000643E0:82 01 00 00 F3 02 00 00 C5 01 00 00 01 00 00 00
000643F0:47 A2 E1 40 76 84 E1 40 DA 02 00 00 B8 01 00 00
00064400:01 00 00 00 4C 00 00 00 04 10 00 00 00 00 00 00
00064410:00 00 00 00 F4 0b 00 00 78 0F 00 00 50 00 00 00
00064420:20 00 00 00 1A 00 00 00

```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000054)																															
Size (0x00000054)																															
Bounds (0x000002DA)																															
... (0x00000182)																															
... (0x000002F3)																															
... (0x000001C5)																															
iGraphicsMode (0x00000001)																															
exScale (0x40E1A247)																															
eyScale (0x40E18476)																															
EmrText (variable)																															
...																															

**Figure 38: EMF EMR\_EXTTEXTOUTW Record Example**

**Type:** 0x00000054 identifies the record type as EMR\_EXTTEXTOUTW.

**Size:** 0x00000054 is the size of this record in bytes.

**Bounds:** 0x000002DA, 0x00000182, 0x000002F3, 0x000001C5 values are not used.

**iGraphicsMode:** 0x00000001 specifies the **GM\_COMPATIBLE** graphics mode from the EMF [GraphicsMode](#) enumeration ([\[MS-EMF\]](#) section 2.1.16).

**exScale:** 0x40E1A247 specifies the X scale from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**eyScale:** 0x40E18476 specifies the Y scales from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**EmrText:** An EMF [EmrText](#) object ([\[MS-EMF\]](#) section 2.2.5). This is followed by strings and spacing arrays.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Reference (0x000002DA)																															
... (0x000001B8)																															
Class (0x00000001)																															
offString (0x0000004C)																															
Options (0x00001004)																															
Rectangle (0x00000000)																															
... (0x00000000)																															
... (0x00000BF4)																															
... (0x00000F78)																															
offDx (0x00000050)																															
text (" ")																															

**Figure 39: EMF EmrText Object Example**

**Reference:** 0x000002DA, 0x000001B8 specifies the coordinates of the reference point used to position the string.

**Chars:** 0x00000001 specifies the number of characters in the string.

**offString:** 0x0000004C specifies the offset to the string.

**Options:** 0x00001004 indicates that the rectangle defined in the **Rectangle** field is used for clipping, as specified in the EMF [ExtTextOutOptions](#) enumeration ([\[MS-EMF\]](#) section 2.1.11).

**Rectangle:** 0x00000000, 0x00000000, 0x00000BF4, 0x00000F78 defines the clipping rectangle in logical units.

**offDx:** 0x00000050 specifies the offset to the intercharacter spacing array.

**text:** " ".

### 3.2.2.26 EMR\_SETBKMODE Example

This section provides an example of the [EMR\\_SETBKMODE](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.11.

```
00064420:                12 00 00 00 0C 00 00 00
00064430:01 00 00 00
```

0	1	2	3	4	5	6	7	8	9	1	0	1	2	3	4	5	6	7	8	9	2	0	1	2	3	4	5	6	7	8	9	3	0	1
Type (0x00000012)																																		
Size (0x0000000C)																																		
BackgroundMode (0x00000001)																																		

**Figure 40: EMF EMR\_SETBKMODE Record Example**

**Type:** 0x00000012 identifies this EMF record type as EMR\_SETBKMODE.

**Size:** 0x0000000C is the size of this record in bytes.

**BackgroundMode:** 0x00000001 specifies background mode.

### 3.2.2.27 EMR\_EXTTEXTOUTW Example

This section provides an example of an EMF [EMR\\_EXTTEXTOUTW](#) record ([\[MS-EMF\]](#) section 2.3.5.8).

```

00064430:          54 00 00 00 d0 00 00 00 67 01 00 00
00064440:C7 01 00 00 61 03 00 00 0A 02 00 00 01 00 00 00
00064450:47 A2 E1 40 76 84 E1 40 67 01 00 00 FD 01 00 00
00064460:16 00 00 00 4C 00 00 00 04 10 00 00 00 00 00 00
00064470:00 00 00 00 F4 0b 00 00 78 0F 00 00 78 00 00 00
00064480:50 00 61 00 67 00 65 00 20 00 31 00 20 00 6F 00
00064490:72 00 69 00 65 00 6e 00 74 00 61 00 74 00 69 00
000644A0:6F 00 6E 00 20 00 69 00 73 00 20 00 21 00 00 00
000644B0:1B 00 00 00 1D 00 00 00 1B 00 00 00 0F 00 00 00
000644C0:1E 00 00 00 0F 00 00 00 1E 00 00 00 14 00 00 00
000644D0:11 00 00 00 1B 00 00 00 1E 00 00 00 11 00 00 00
000644E0:1B 00 00 00 11 00 00 00 11 00 00 00 1E 00 00 00
000644F0:1E 00 00 00 0E 00 00 00 11 00 00 00 17 00 00 00
00064500:0F 00 00 00

```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000054)																															
Size (0x000000D0)																															
Bounds (0x00000167)																															
... (0x000001C7)																															
... (0xF0000361)																															
... (0x0000020A)																															
iGraphicsMode (0x00000001)																															
exScale (0x40E1A247)																															
eyScale (0x40E18476)																															
EmrText (variable)																															
...																															

**Figure 41: EMF EMR\_EXTTEXTOUTW Record Example**

**Type:** 0x00000054 identifies the record type as EMR\_EXTTEXTOUTW.

**Size:** 0x000000D0 is the size of this record in bytes.

**Bounds:** 0x00000167, 0x000001C7, 0xF0000361, 0x0000020A values are not used.

**iGraphicsMode:** 0x00000001 specifies the **GM\_COMPATIBLE** graphics mode from the EMF [GraphicsMode](#) enumeration ([\[MS-EMF\]](#) section 2.1.16).

**exScale:** 0x40E1A247 specifies the X scale from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**eyScale:** 0x40E18476 specifies the Y scales from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**EmrText:** An EMF [EmrText](#) object ([\[MS-EMF\]](#) section 2.2.5). This is followed by strings and spacing arrays.

0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
Reference (64-bits) (0x00000167)																																									
... (0x000001FD)																																									
Class (0x00000016)																																									
offString (0x0000004C)																																									
Options (0x00001004)																																									
Rectangle (0x00000000)																																									
... (0x00000000)																																									
... (0x00000BF4)																																									
... (0x00000F78)																																									
offDx (0x00000078)																																									
text ("Page 1 orientation is !")																																									

**Figure 42: EMF EmrText Object Example**

**Reference:** 0x00000167, 0x000001FD specifies the coordinates of the reference point used to position the string.

**Chars:** 0x00000016 specifies the number of characters in the string.

**offString:** 0x0000004C specifies the offset to the string.

**Options:** 0x00001004 indicates that the rectangle defined in the **Rectangle** field is used for clipping, as specified in the EMF [ExtTextOutOptions](#) enumeration ([\[MS-EMF\]](#) section 2.1.11).

**Rectangle:** 0x00000000, 0x00000000, 0x00000BF4, 0x00000F78 defines the clipping rectangle in logical units.

**offDx:** 0x00000078 specifies the offset to the intercharacter spacing array.

**text:** "Page 1 orientation is !".

### 3.2.2.28 EMR\_EXTTEXTOUTW Example

This section provides an example of an EMF [EMR\\_EXTTEXTOUTW](#) record ([\[MS-EMF\]](#) section 2.3.5.8).

```

00064500:          54 00 00 00 7C 00 00 00 62 03 00 00
00064510:C7 01 00 00 12 04 00 00 0A 02 00 00 01 00 00 00
00064520:47 A2 E1 40 76 84 E1 40 62 03 00 00 FD 01 00 00
00064530:08 00 00 00 4C 00 00 00 04 10 00 00 00 00 00 00
00064540:00 00 00 00 F4 0B 00 00 78 0F 00 00 5C 00 00 00
00064550:70 00 6F 00 72 00 74 00 72 00 61 00 69 00 74 00
00064560:1E 00 00 00 1E 00 00 00 14 00 00 00 11 00 00 00
00064570:14 00 00 00 1B 00 00 00 10 00 00 00 11 00 00 00

```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000054)																															
Size (0x0000007C)																															
Bounds (0x00000362)																															
... (0x000001C7)																															
... (0x00000412)																															
... (0x0000020A)																															
iGraphicsMode (0x00000001)																															
exScale (0x40E1A247)																															
eyScale (0x40E18476)																															
EmrText (variable)																															
...																															

**Figure 43: EMF EMR\_EXTTEXTOUTW Record Example**

**Type:** 0x00000054 identifies the record type as EMR\_EXTTEXTOUTW.

**Size:** 0x0000007C is the size of this record in bytes.

**Bounds:** 0x00000362, 0x000001C7, 0x00000412, 0x0000020A values are not used.

**iGraphicsMode:** 0x00000001 specifies the **GM\_COMPATIBLE** graphics mode from the EMF [GraphicsMode](#) enumeration ([\[MS-EMF\]](#) section 2.1.16).

**exScale:** 35.260418 specifies the X scale from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**eyScale:** 35.250000 specifies the Y scales from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**EmrText:** An EMF [EmrText](#) object ([\[MS-EMF\]](#) section 2.2.5). This is followed by strings and spacing arrays.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Reference (0x00000362)																															
(0x000001FD)																															
Class (0x00000008)																															
offString (0x0000004C)																															
Options (0x00001004)																															
Rectangle (0x00000000)																															
... (0x00000000)																															
... (0x00000BF4)																															
... (0x00000F78)																															
offDx (0x0000005C)																															
text ("portrait")																															

**Figure 44: EMF EmrText Object Example**

**Reference:** 0x00000362, 0x000001FD specifies the coordinates of the reference point used to position the string.

**Chars:** 0x00000008 specifies the number of characters in the string.

**offString:** 0x0000004C specifies the offset to the string.

**Options:** 0x00001004 indicates that the rectangle defined in the **Rectangle** field is used for clipping, as specified in the EMF [ExtTextOutOptions](#) enumeration ([\[MS-EMF\]](#) section 2.1.11).

**Rectangle:** 0x00000000, 0x00000000, 0x00000BF4, 0x00000F78 defines the clipping rectangle in logical units.

**offDx:** 0x0000005C specifies the offset to the intercharacter spacing array.

**text:** "portrait".

### 3.2.2.29 EMR\_EXTTEXTOUTW Example

This section provides an example of an EMF [EMR\\_EXTTEXTOUTW](#) record ([\[MS-EMF\]](#) section 2.3.5.8).

```

00064580:54 00 00 00 54 00 00 00 13 04 00 00 C7 01 00 00
00064590:21 04 00 00 0A 02 00 00 01 00 00 00 47 A2 E1 40
000645A0:76 84 E1 40 13 04 00 00 FD 01 00 00 01 00 00 00
000645B0:4C 00 00 00 04 10 00 00 00 00 00 00 00 00 00 00
000645C0:F4 0B 00 00 78 0F 00 00 50 00 00 00 2E 00 00 00
000645D0:0F 00 00 00

```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000054)																															
Size (0x00000054)																															
Bounds (0x00000413)																															
... (0x000001C7)																															
... (0x00000421)																															
... (0x0000020A)																															
iGraphicsMode (0x00000001)																															
exScale (0x40E1A247)																															
eyScale (0x40E18476)																															
EmrText (variable)																															
...																															

**Figure 45: EMF EMR\_EXTTEXTOUTW Record Example**

**Type:** 0x00000054 identifies the record type as EMR\_EXTTEXTOUTW.

**Size:** 0x00000054 is the size of this record in bytes.

**Bounds:** 0x00000413, 0x000001C7, 0x00000421, 0x0000020A values are not used.

**iGraphicsMode:** 0x00000001 specifies the **GM\_COMPATIBLE** graphics mode from the EMF [GraphicsMode](#) enumeration ([\[MS-EMF\]](#) section 2.1.16).

**exScale:** 0x40E1A247 specifies the X scale from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**eyScale:** 0x40E18476 specifies the Y scales from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**EmrText:** An EMF [EmrText](#) object ([\[MS-EMF\]](#) section 2.2.5). This is followed by strings and spacing arrays.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Reference (0x00000413)																															
(0x000001FD)																															
Class (0x00000001)																															
offString (0x0000004C)																															
Options (0x00001004)																															
Rectangle (0x00000000)																															
... (0x00000000)																															
... (0x0000BF4F)																															
... (0x00000F78)																															
offDx (0x00000050)																															
text (".")																															

**Figure 46: EMF EmrText Object Example**

**Reference:** (0x00000413, 0x000001FD) specifies the coordinates of the reference point used to position the string.

**Chars:** 0x00000001 specifies the number of characters in the string.

**offString:** 0x0000004C specifies the offset to the string.

**Options:** 0x00001004 indicates that the rectangle defined in the **Rectangle** field is used for clipping, as specified in the EMF [ExtTextOutOptions](#) enumeration ([\[MS-EMF\]](#) section 2.1.11).

**Rectangle:** (0x00000000, 0x00000000, 0x00000BF4F, 0x00000F78) defines the clipping rectangle in logical units.

**offDx:** 0x00000050 specifies the offset to the intercharacter spacing array.

**text:** ".".

### 3.2.2.30 EMR\_EXTTEXTOUTW Example

This section provides an example of an EMF [EMR\\_EXTTEXTOUTW](#) record ([\[MS-EMF\]](#) section 2.3.5.8).

```

000645d0:          54 00 00 00 54 00 00 00 22 04 00 00
000645E0:C7 01 00 00 3B 04 00 00 0A 02 00 00 01 00 00 00
000645F0:47 A2 E1 40 76 84 E1 40 22 04 00 00 FD 01 00 00
00064600:01 00 00 00 4C 00 00 00 04 10 00 00 00 00 00 00
00064610:00 00 00 00 F4 0b 00 00 78 0F 00 00 50 00 00 00
00064620:20 00 00 00 1A 00 00 00

```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000054)																															
Size (0x00000054)																															
Bounds (0x00000422)																															
... (0x000001C7)																															
... (0x0000043B)																															
... (0x0000020A)																															
iGraphicsMode (0x00000001)																															
exScale (0x40E1A247)																															
eyScale (0x40E18476)																															
EmrText (variable)																															
...																															

**Figure 47: EMF EMR\_EXTTEXTOUTW Record Example**

**Type:** 0x00000054 identifies the record type as EMR\_EXTTEXTOUTW.

**Size:** 0x00000054 is the size of this record in bytes.

**Bounds:** 0x00000422, 0x000001C7, 0x0000043B, 0x0000020A values are not used.

**iGraphicsMode:** 0x00000001 specifies the **GM\_COMPATIBLE** graphics mode from the EMF [GraphicsMode](#) enumeration ([\[MS-EMF\]](#) section 2.1.16).

**exScale:** 0x40E1A247 0x00000001 specifies the X scale from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**eyScale:** 0x40E18476 0x00000001 specifies the Y scales from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**EmrText:** An EMF [EmrText](#) object ([\[MS-EMF\]](#) section 2.2.5). This is followed by strings and spacing arrays.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Reference (0x00000413)																															
... (0x000001FD)																															
Class (0x00000001)																															
offString (0x0000004C)																															
Options (0x00001004)																															
Rectangle (0x00000000)																															
... (0x00000000)																															
... (0x0000BF4F)																															
... (0x00000F78)																															
offDx (0x00000050)																															
text (" ")																															

**Figure 48: EMF EmrText Object Example**

**Reference:** 0x00000413, 0x000001FD specifies the coordinates of the reference point used to position the string.

**Chars:** 0x00000001 specifies the number of characters in the string.

**offString:** 0x0000004C specifies the offset to the string.

**Options:** 0x00001004 indicates that the rectangle defined in the **Rectangle** field is used for clipping, as specified in the EMF [ExtTextOutOptions](#) enumeration ([\[MS-EMF\]](#) section 2.1.11).

**Rectangle:** 0x00000000, 0x00000000, 0x00000BF4F, 0x00000F78 defines the clipping rectangle in logical units.

**offDx:** 0x00000050 specifies the offset to the intercharacter spacing array.

**text:** " ".

### 3.2.2.31 EMR\_SETBKMODE Example

This section provides an example of the [EMR\\_SETBKMODE](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.11.

```
00064620:                12 00 00 00 0C 00 00 00
00064630:01 00 00 00
```



**Bounds:** 0x00000167, 0x0000020C, 0x00000181, 0x0000024F values are not used.

**iGraphicsMode:** 0x00000001 specifies the **GM\_COMPATIBLE** graphics mode from the EMF [GraphicsMode](#) enumeration ([\[MS-EMF\]](#) section 2.1.16).

**exScale:** 0x40E1A247 specifies the X scale from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**eyScale:** 0x40E18476 specifies the Y scales from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**EmrText:** An EMF [EmrText](#) object ([\[MS-EMF\]](#) section 2.2.5). This is followed by strings and spacing arrays.

0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1		
Reference (0x00000167)																																											
... (0x00000242)																																											
Class (0x00000001)																																											
offString (0x0000004C)																																											
Options (0x00001004)																																											
Rectangle (0x00000000)																																											
... (0x00000000)																																											
... (0x00000BF4)																																											
... (0x00000F78)																																											
offDx (0x00000050)																																											
text (" ")																																											

**Figure 51: EMF EmrText Object Example**

**Reference:** 0x00000167, 0x00000242 specifies the coordinates of the reference point used to position the string.

**Chars:** 0x00000001 specifies the number of characters in the string.

**offString:** 0x0000004C specifies the offset to the string.

**Options:** 0x00001004 indicates that the rectangle defined in the **Rectangle** field is used for clipping, as specified in the EMF [ExtTextOutOptions](#) enumeration ([\[MS-EMF\]](#) section 2.1.11).

**Rectangle:** 0x00000000, 0x00000000, 0x00000BF4F, 0x00000F78 defines the clipping rectangle in logical units.

**offDx:** 0x00000050 specifies the offset to the intercharacter spacing array.

**text:** " ".

### 3.2.2.33 EMR\_SELECTOBJECT Example

This section provides an example of the [EMR\\_SELECTOBJECT](#) record as specified in [\[MS-EMF\]](#) section 2.3.8.5.

```
00064680:                25 00 00 00 0C 00 00 00
00064690:0E 00 00 80
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000025)																															
Size (0x0000000C)																															
ihObject (0x8000000E=DEVICE_DEFAULT_FONT)																															

**Figure 52: EMF EMR\_SELECTOBJECT Record Example**

**Type:** 0x00000025 identifies this EMF record type as EMR\_SELECTOBJECT.

**Size:** 0x0000000C is the size of this record in bytes.

**ihObject:** 0x8000000E specifies the index of an object in the object table or the stock object if it is negative.

### 3.2.2.34 EMR\_SETICMMODE Example

This section provides an example of the [EMR\\_SETICMMODE](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.14.

```
00064690:                62 00 00 00 0C 00 00 00 01 00 00 00
```

0	1	2	3	4	5	6	7	8	9	1	0	1	2	3	4	5	6	7	8	9	2	0	1	2	3	4	5	6	7	8	9	3	0	1
Type (0x0000062)																																		
Size (0x0000000C)																																		
ICMMode (0x00000001)																																		

**Figure 53: EMF EMR\_SETICMMODE Record Example**

**Type:** 0x00000062 identifies this EMF record type as EMR\_SETICMMODE.

**Size:** 0x0000000C is the size of this record in bytes.

**ICMMode:** 0x00000001 is an Image Color Management (ICM) mode value from the [ICMMode](#) enumeration as specified in [\[MS-EMF\]](#) section 2.1.18.

### 3.2.2.35 EMR\_EOF Example

This section provides an example of an [EMR\\_EOF](#) record, as specified in [\[MS-EMF\]](#) section 2.3.4.1.

```

000646A0:0E 00 00 00 14 00 00 00 00 00 00 00 10 00 00 00
000646B0:14 00 00 00

```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x0000000E)																															
Size (0x00000014)																															
nPalEntries (0x00000000)																															
offPalEntries (0x00000010)																															
SizeLast (0x00000014)																															

**Figure 54: EMF EMR\_EOF Record Example**

**Type:** 0x0000000E identifies the type of record as an EMF **EMR\_EOF** record.

**Size:** 0x00000014 is the size of this record in bytes.

**nPalEntries:** 0x00000000 specifies the number of palette entries.

**offPalEntries:** 0x00000010 specifies the offset to the palette entries.

**SizeLast:** 0x00000014 is the same as **Size**.

### 3.2.3 EMRI\_ENGINE\_FONT\_EXT Example

This section provides an example of the [EMRI\\_ENGINE\\_FONT\\_EXT](#) record specified in section [2.2.3.4](#).

```

000646B0:          0F 00 00 00 08 00 00 00 74 43 06 00
000646C0:00 00 00 00

```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x0000000F)																															
Size (0x00000008)																															
OffsetLow (0x00064374)																															
OffsetHigh (0x00000000)																															

**Figure 55: EMRI\_ENGINE\_FONT\_EXT Record Example**

**Type:** 0x0000000F specifies this record type as **EMRI\_ENGINE\_FONT\_EXT**, which is a font offset record.

**Size:** 0x00000008 is the size in bytes of the data in this EMF spool record.

**OffsetLow:** 0x00064374 is the lower (least-significant) 32 bits of the offset, which is the location of the embedded font in a previous **EMRI\_METAFILE\_DATA** record, relative to the start of this record.

**OffsetHigh:** 0x00000000 is the upper (most-significant) 32 bits of the offset.

### 3.2.4 EMRI\_DEVMODE Example

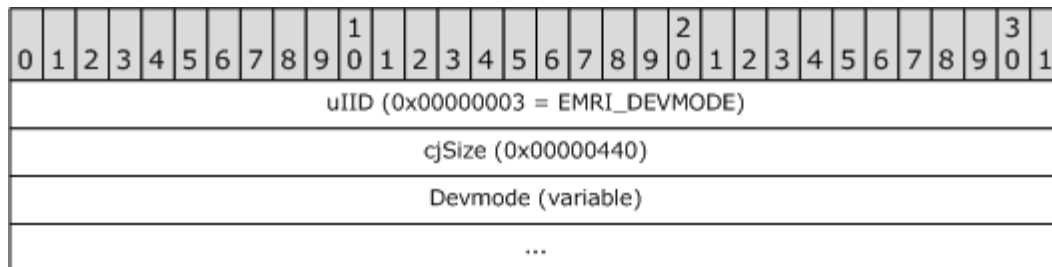
This section provides an example of the [EMRI DEVMODE record \(section 2.2.3.5\)](#).

```
000646C0:          03 00 00 00 40 04 00 00 5C 00 5C 00
000646D0:70 00 72 00 69 00 6E 00 74 00 65 00 72 00 73 00
000646E0:65 00 72 00 76 00 65 00 72 00 5C 00 43 00 61 00
000646F0:6E 00 6F 00 6E 00 20 00 42 00 75 00 62 00 62 00
00064700:6C 00 65 00 2D 00 4A 00 00 00 00 00 01 04 00 06
00064710:DC 00 64 03 43 EF 80 07 01 00 01 00 EA 0A 6F 08
00064720:64 00 01 00 0F 00 FD FF 02 00 01 00 FD FF 02 00
00064730:01 00 4C 00 65 00 74 00 74 00 65 00 72 00 00 00
00064740:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064750:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064760:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064770:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064780:01 00 00 00 00 00 00 00 02 00 00 00 02 00 00
00064790:01 00 00 00 01 01 00 00 00 00 00 00 00 00 00
000647A0:00 00 00 00 00 00 00 00 44 49 4E 55 22 00 00 01
000647B0:44 02 18 00 59 D8 B0 99 00 00 00 00 00 00 00
000647C0:00 00 00 00 01 00 00 00 00 00 00 00 00 00 00
000647D0:00 00 00 00 08 00 00 00 01 00 00 00 03 00 01 00
000647E0:01 00 02 00 02 00 00 00 00 00 00 00 00 00 00
000647F0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064800:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064810:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064820:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064830:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064840:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064850:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064860:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064870:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064880:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064890:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000648A0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000648B0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000648C0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000648D0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000648E0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000648F0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064900:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064910:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064920:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064930:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064940:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064950:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064960:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064970:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064980:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064990:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000649A0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000649B0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000649C0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000649D0:00 00 00 00 00 00 00 00 01 00 00 00 00 00 00
000649E0:00 00 00 00 00 01 00 00 53 4D 54 4A 18 00 00
000649F0:4E 55 4A 42 00 00 01 00 34 00 00 00 00 00 00
```

```

00064A00:00 00 00 00 08 01 00 00 53 4D 54 4A 00 00 00 00
00064A10:14 00 00 00 00 00 F4 00 43 00 61 00 6E 00 6F 00
00064A20:6E 00 20 00 42 00 75 00 62 00 62 00 6C 00 65 00
00064A30:2D 00 4A 00 65 00 74 00 20 00 42 00 4A 00 43 00
00064A40:2D 00 35 00 30 00 00 00 49 6E 70 75 74 42 69 6E
00064A50:00 4D 41 4E 55 41 4C 00 52 45 53 44 4C 4C 00 55
00064A60:6E 69 72 65 73 44 4C 4C 00 50 61 70 65 72 53 69
00064A70:7A 65 00 4C 45 54 54 45 52 00 52 65 73 6F 6C 75
00064A80:74 69 6F 6E 00 53 54 41 4E 44 41 52 44 00 4D 65
00064A90:64 69 61 54 79 70 65 00 53 54 41 4E 44 41 52 44
00064AA0:00 43 6F 6C 6F 72 4D 6F 64 65 00 43 4D 59 4B 32
00064AB0:34 00 48 61 6C 66 74 6F 6E 65 00 48 54 5F 50 41
00064AC0:54 53 49 5A 45 5F 41 55 54 4F 00 4F 72 69 65 6E
00064AD0:74 61 74 69 6F 6E 00 50 4F 52 54 52 41 49 54 00
00064AE0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064AF0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064B00:00 00 00 00 00 00 00 00 00 00 00 00 00 00

```



**Figure 56: EMRI\_DEVMODE Record Example**

**uIID:** 0x00000003 specifies the type of the record, **EMRI\_DEVMODE**, from the **RecordType enumeration** (section 2.1.1).

**cjSize:** 0x00000440 is the size, in bytes, of all the data in the record, including private driver-specific data. Each EMFSPOOL record is aligned to a multiple of 4 bytes.

**Devmode:** A complete, variable-length **\_DEVMODE** structure ([\[MS-RPRN\]](#) section 2.2.2.1).

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
dmDeviceName ("\\printerserver\\Canon Bubble-J")																															
...																															
(dmDeviceName cont. for 14 rows)																															
dmSpecVersion (0x0401)																dmDriverVersion (0x0600)															
dmSize (0x00DC)																dmDriverExtra (0x0364)															
dmFields (0x0780EF43)																															
dmOrientation (0x0001)																dmPaperSize (0x0001)															
dmPaperLength (0x0AEA)																dmPaperWidth (0x086F)															
dmScale (0x0064)																dmCopies (0x0001)															
dmDefaultSource (0x000F)																dmPrintQuality (0xFFFFD)															
dmColor (0x0002)																dmDuplex (0x0001)															

**Figure 57: Print System \_DEVMODE Structure, Part 1**

**dmDeviceName:** "\\printerserver\\Canon Bubble-J" specifies the text name of the printer, truncated to fit into a 32-character Unicode string with null terminator.

**dmSpecVersion:** 0x0401 specifies the version of the initialization data specification on which the structure is based.

**dmDriverVersion:** 0x0600 specifies the version assigned by the implementer of the printer driver.

**dmSize:** 0x00DC specifies the size, in bytes, of the fixed-length portion of the **\_DEVMODE** structure, which does not include the private driver-specific data that follows.

**dmDriverExtra:** 0x0364 specifies size, in bytes, of the variable-length driver-specific data that follows the fixed-length portion of the **\_DEVMODE** structure.

**dmFields:** 0x0780EF43 specifies whether certain fields of the **\_DEVMODE** structure are initialized. If a field is initialized, its corresponding bit is set; otherwise the bit is clear.

**dmOrientation:** 0x0001 specifies **Portrait** page orientation.

**dmPaperSize:** 0x0001 specifies **Letter** size paper, 8 1/2 x 11 inches.

**dmPaperLength:** 0x0AEA specifies the length of the printable area, in tenths of a millimeter.

**dmPaperWidth:** 0x086F specifies the width of the printable area, in tenths of a millimeter.

**dmScale:** 0x0064 specifies the factor by which the printed output is meant to be scaled, in percent.

**dmCopies:** 0x0001 specifies the number of copies to be printed.

**dmDefaultSource:** 0x000F specifies a device-specific value for the paper source, from which the output bin can be determined.

**dmPrintQuality:** 0xFFFFD specifies medium-resolution printing quality with a predefined value. If this field contained a positive value, it would specify the dots per inch resolution of the device.

**dmColor:** 0x0002 specifies color printing.

**dmDuplex:** 0x0001 specifies single-sided printing.

0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
dmYResolution (0xFFFD)																dmTTOption (0x0002)															
dmCollate (0x0001)																dmFormName ("Letter")															
...																															
(dmFormName cont. for 14 rows)																															
(dmFormName cont.)																reserved0 (0x0000)															
reserved1 (0x00000000)																															
reserved2 (0x00000000)																															
reserved3 (0x00000000)																															
dmNup (0x00000001)																															
reserved4 (0x00000000)																															

**Figure 58: Print System \_DEVMODE Structure, Part 2**

**dmYResolution:** 0xFFFD specifies the vertical resolution of the printer, in dots per inch.

**dmTTOption:** 0x0002 specifies that TrueType fonts should be downloaded as "software fonts."

**dmCollate:** 0x0001 specifies that collation should be used when printing multiple copies.

**dmFormName:** "Letter" specifies the name of the printer form, padded with nulls to fit into a 32-character Unicode string with null terminator.

**reserved0:** 0x0000 is not used.

**reserved1:** 0x00000000 is not used.

**reserved2:** 0x00000000 is not used.

**reserved3:** 0x00000000 is not used.

**dmNup:** 0x00000001 specifies that the **print server** handles the layout of multiple logical pages on one physical page.

**reserved4:** 0x00000000 is not used.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
dmICMMethod (0x00000002)																															
dmICMIntent (0x00000002)																															
dmMediaType (0x00000001)																															
dmDitherType (0x00000101)																															
reserved5 (0x00000000)																															
reserved6 (0x00000000)																															
reserved7 (0x00000000)																															
reserved8 (0x00000000)																															
dmDriverExtraData (variable)																															
...																															
(dmDriverExtraData cont. for 26 rows)																															

**Figure 59: Print System \_DEVMODE Structure, Part 3**

**dmICMMethod:** 0x00000002 specifies that Image Color Management (ICM) should be handled by the system on which the **Page Description Language (PDL)** data is generated.

**dmICMIntent:** 0x00000002 specifies that **color matching** is optimized for contrast.

**dmMediaType:** 0x00000001 specifies that plain-paper media type is used.

**dmDitherType:** 0x00000101 specifies a printer driver-specific value for the type of **dithering**.

**reserved5:** 0x00000000 is not used.

**reserved6:** 0x00000000 is not used.

**reserved7:** 0x00000000 is not used.

**reserved8:** 0x00000000 is not used.

**dmDriverExtraData:** A block of private data, of a size specified by the **dmDriverExtra** field, which is understandable only by the printer driver.

### 3.2.5 EMRI\_BW\_METAFILE\_EXT Example

This section provides an example of the [EMRI\\_BW\\_METAFILE\\_EXT](#) record, specified in section [2.2.3.2](#).

```
00064B00:                                0E 00 00 00
00064B10:08 00 00 00 B8 4A 06 00 00 00 00 00
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
uIID (0x0000000E)																															
cjSize (0x00000008)																															
Offset (0x00000000000064AB8)																															
...																															

**Figure 60: EMRI\_BW\_METAFILE\_EXT Record Example**

**uIID:** 0x0000000E identifies this record type as **EMRI\_BW\_METAFILE\_EXT**, which is a page offset record.

**cjSize:** 0x00000008 is the size in bytes of the data in this record.

**offset:** 0x00000000000064AB8 specifies the offset backwards in the metafile to the preceding [page content record \(section 2.2.3.1\)](#), the corresponding example of which is presented in section [3.2.2](#).

This record signals the end of the page.

### 3.2.6 EMRI\_METAFILE\_DATA Example

This section provides an example of the [EMRI\\_METAFILE\\_DATA](#) record, as specified in section [2.2.3.1](#).

```
00064B10:                                0C 00 00 00
00064B20:64 07 00 00
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
uIID (0x0000000C)																															
cjSize (0x00000764)																															
EmfMetafile (variable)																															
...																															

**Figure 61: EMRI\_METAFILE\_DATA Record Example**

**uIID:** 0x0000000C identifies the type of record as **EMRI\_METAFILE\_DATA**, which is a [page content record](#).

**cjSize:** 0x00000764 specifies the 4-byte-aligned size in bytes of the data in this record.

**EmfMetafile:** A variable-size field that contains a complete EMF metafile. This embedded metafile does not contain an embedded [font definition record \(section 2.2.3.3\)](#).

#### 3.2.6.1 EMR\_HEADER Example

This section provides an example of the EMF [EMR\\_HEADER](#) record ([\[MS-EMF\] section 2.3.4.2](#)).

```
00064B20:          01 00 00 00 84 00 00 00 3D 01 00 00
```

```

00064B30:68 01 00 00 4D 04 00 00 7A 02 00 00 00 00 00 00
00064B40:00 00 00 00 14 69 00 00 4C 4F 00 00 20 45 4D 46
00064B50:00 00 01 00 64 07 00 00 21 00 00 00 02 00 00 00
00064B60:0C 00 00 00 6C 00 00 00 00 00 00 00 00 E9 0E 00 00
00064B70:3F 0B 00 00 0D 01 00 00 CB 00 00 00 00 00 00 00 00
00064B80:00 00 00 00 00 00 00 00 FF 1B 04 00 79 19 03 00
00064B90:50 00 72 00 69 00 6E 00 74 00 20 00 74 00 65 00
00064BA0:73 00 74 00 00 00 00 00

```

0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
Type (0x00000001)																															
Size (0x00000084)																															
Bounds (0x0000013D)																															
... (0x00000168)																															
... (0x0000044D)																															
... (0x0000027A)																															
Frame (0x00000000)																															
... (0x00000000)																															
... (0x00006914)																															
... (0x00004F4C)																															

**Figure 62: EMF EMR\_HEADER Record Example, Part 1**

**Type:** 0x00000001 identifies this EMF record type as EMR\_HEADER.

**Size:** 0x00000084 is the record size in bytes.

**Bounds:** 0x0000013D, 0x00000168, 0x0000044D, 0x0000027A specifies the rectangular inclusive-inclusive bounds in device units of the smallest rectangle that can be drawn around the image stored in the metafile.

**Frame:** 0x00000000, 0x00000000, 0x00006914, 0x00004F4C specifies the rectangular inclusive-inclusive dimensions, in .01 millimeter units, of a rectangle that surrounds the image stored in the metafile.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Signature (0x464D4520)																															
Version (0x00010000)																															
Bytes (0x00000764)																															
Records (0x00000021)																															
Handles (0x0002)																Reserved (0x0000)															
nDescription (0x0000000C)																															
offDescription (0x0000006C)																															
nPalEntries (0x00000000)																															

**Figure 63: EMF EMR\_HEADER Record Example, Part 2**

**Signature:** 0x464D4520 specifies the record signature, which consists of the ASCII string "EMF".

**Version:** 0x00010000 specifies EMF metafile interoperability.

**Bytes:** 0x00000764 specifies the size of the metafile in bytes.

**Records:** 0x00000021 specifies the number of records in the metafile.

**Handles:** 0x0002 specifies the number of indexes that will need to be defined during the processing of the metafile. These indexes correspond to graphics objects that are used in drawing commands. Index 0 is reserved for references to the metafile itself.

**Reserved:** 0x0000 is not used.

**nDescription:** 0x0000000C specifies the number of characters in the array that contains the description of the EMF metafile's contents.

**offDescription:** 0x0000006C specifies the offset from the beginning of this record to the array that contains the description of the EMF metafile's contents.

**nPalEntries:** 0x00000000 specifies the number of entries in the metafile palette. The location of the palette is specified in the EMF end-of-file record.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Device (0x00000B3F)																															
... (0x00000EE9)																															
Millimeters (0x0000010D)																															
... (0x000000CB)																															
cbPixelFormat (0x00000000)																															
offPixelFormat (0x00000000)																															
bOpenGL (0x00000000)																															
MicrometersX (0x00031979)																															
MicrometersY (0x00041BFF)																															
EmfDescription ("Print test")																															

**Figure 64: EMF EMR\_HEADER Record Example, Part 3**

**Device:** 0x00000B3F, 0x00000EE9 specifies the size of the reference device in pixels.

**Millimeters:** 0x0000010D, 0x000000CB specifies the size of the reference device in millimeters.

**cbPixelFormat:** 0x00000000 specifies the size of the [PixelFormatDescriptor](#) structure, as specified in [\[MS-EMF\]](#) section 2.2.22. This value indicates that no pixel format is defined.

**offPixelFormat:** 0x00000000 specifies the offset to the PixelFormatDescriptor in the metafile. In this case, no pixel format structure is present.

**bOpenGL:** 0x00000000 specifies that no OpenGL commands are present in the metafile.

**MicrometersX:** 0x00031979 specifies the horizontal size of the reference device in micrometers.

**MicrometersY:** 0x00041BFF specifies the vertical size of the reference device in micrometers.

**EmfDescription:** "Print test".

### 3.2.6.2 EMR\_SETICMMODE Example

This section provides an example of the [EMR\\_SETICMMODE](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.14.

```
00064BA0:                                62 00 00 00 0C 00 00 00
00064BB0:02 00 00 00
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000062)																															
Size (0x0000000C)																															
ICMMode (0x00000002)																															

**Figure 65: EMF EMR\_SETICMMODE Record Example**

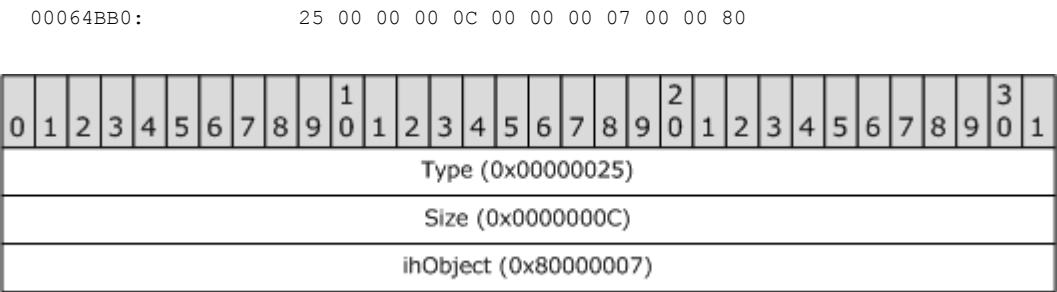
**Type:** 0x00000062 identifies this EMF record type as EMR\_SETICMMODE.

**Size:** 0x0000000C is the size of this record in bytes.

**ICMMode:** 0x00000002 is an Image Color Management (ICM) mode value from the EMF [ICMMode](#) enumeration, specified in [\[MS-EMF\]](#) section 2.1.18.

**3.2.6.3 EMR\_SELECTOBJECT Example**

This section provides an example of the [EMR\\_SELECTOBJECT](#) record as specified in [\[MS-EMF\]](#) section 2.3.8.5.



**Figure 66: EMF EMR\_SELECTOBJECT Record Example**

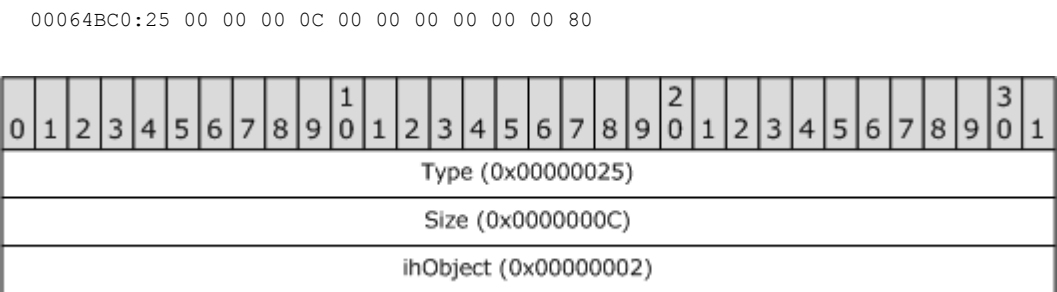
**Type:** 0x00000025 identifies this EMF record type as EMR\_SELECTOBJECT.

**Size:** 0x0000000C is the size of this record in bytes.

**ihObject:** 0x80000007 specifies the index of an object in the object table or the stock object if it is negative.

**3.2.6.4 EMR\_SELECTOBJECT Example**

This section provides an example of the [EMR\\_SELECTOBJECT](#) record as specified in [\[MS-EMF\]](#) section 2.3.8.5.



**Figure 67: EMF EMR\_SELECTOBJECT Record Example**

**Type:** 0x00000025 identifies this EMF record type as EMR\_SELECTOBJECT.

**Size:** 0x0000000C is the size of this record in bytes.

**ihObject:** 0x00000002 specifies the index of an object in the object table or the stock object if it is negative.

3.2.6.5 EMR\_SELECTOBJECT Example

This section provides an example of the [EMR\\_SELECTOBJECT](#) record as specified in [\[MS-EMF\]](#) section 2.3.8.5.

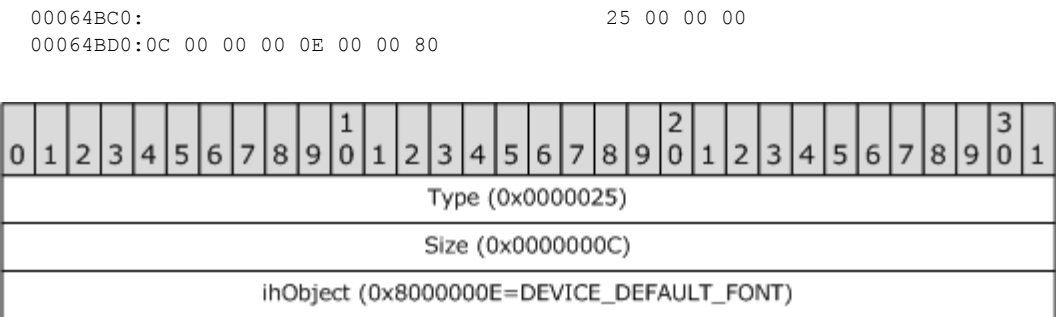


Figure 68: EMF EMR\_SELECTOBJECT Record Example

**Type:** 0x00000025 identifies this EMF record type as EMR\_SELECTOBJECT.

**Size:** 0x0000000C is the size of this record in bytes.

**ihObject:** 0x8000000E specifies the index of an object in the object table or the stock object if it is negative.

3.2.6.6 EMR\_MOVETOEX Example

This section provides an example of the [EMR\\_MOVETOEX](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.4.

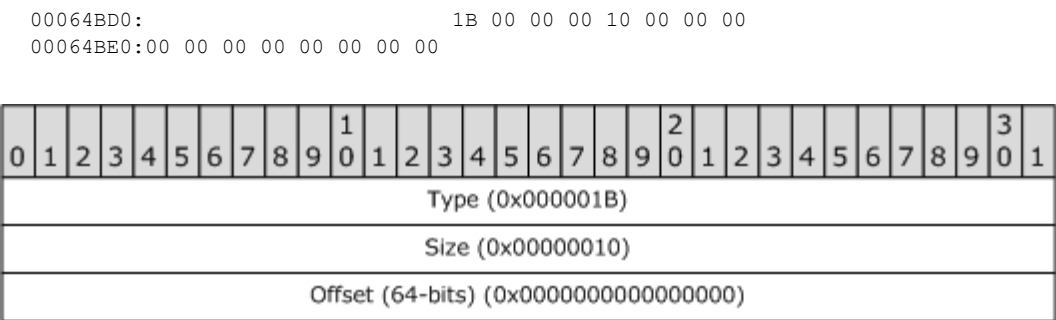


Figure 69: EMF EMR\_MOVETOEX Record Example

**Type:** 0x0000001B identifies this EMF record type as EMR\_MOVETOEX.

**Size:** 0x00000010 is the size of this record in bytes.

**Offset:** 0x0000000000000000 specifies coordinates of the new current position in logical units.

### 3.2.6.7 EMR\_SETBRUSHORGEX Example

This section provides an example of the [EMR\\_SETBRUSHORGEX](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.12.

```
00064BE0:                                0d 00 00 00 10 00 00 00
00064BF0:00 00 00 00 00 00 00 00
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x0000000D)																															
Size (0x00000010)																															
Origin (64 bits) (0x00000000, 0x00000000)																															

**Figure 70: EMF EMR\_SETBRUSHORGEX Record Example**

**Type:** 0x0000000D identifies this EMF record type as EMR\_SETBRUSHORGEX.

**Size:** 0x00000010 is the size of this record in bytes.

**Origin:** 0x00000000, 0x00000000 specifies the brush horizontal and vertical origin in device units.

### 3.2.6.8 EMR\_SETICCMODE Example

This section provides an example of the [EMR\\_SETICCMODE](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.14.

```
00064BF0:                                62 00 00 00 0C 00 00 00
00064C00:02 00 00 00
```

0	1	2	3	4	5	6	7	8	9	1	0	1	2	3	4	5	6	7	8	9	2	0	1	2	3	4	5	6	7	8	9	3	0	1
Type (0x00000062)																																		
Size (0x0000000C)																																		
ICMMode (0x00000002)																																		

**Figure 71: EMF EMR\_SETICCMODE Record Example**

**Type:** 0x00000062 identifies this EMF record type as EMR\_SETICCMODE.

**Size:** 0x0000000C is the size of this EMF record in bytes.

**ICMMode:** 0x00000002 is an Image Color Management (ICM) mode value from the [ICMMode](#) enumeration, specified in [\[MS-EMF\]](#) section 2.1.18.

### 3.2.6.9 EMR\_SETCOLORSPACE Example

This section provides an example of the [EMR\\_SETCOLORSPACE](#) record as specified in [\[MS-EMF\]](#) section 2.3.8.7.

```
00064C00:          64 00 00 00 0C 00 00 00 14 00 00 80
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000064)																															
Size (0x0000000C)																															
ihCS (0x80000014)																															

**Figure 72: EMF EMR\_SETCOLORSPACE Record Example**

**Type:** 0x00000064 identifies this EMF record type as EMR\_SETCOLORSPACE.

**Size:** 0x0000000C is the size of this record in bytes.

**ihCS:** 0x80000014 specifies the ColorSpace, as specified in the [ColorSpace](#) enumeration in [\[MS-EMF\]](#) section 2.1.7.

### 3.2.6.10 EMR\_SETTEXTALIGN Example

This section provides an example of an EMF [EMR\\_SETTEXTALIGN](#) record ([\[MS-EMF\]](#) section 2.3.11.25).

```
00064C10:16 00 00 00 0C 00 00 00 18 00 00 00
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000016)																															
Size (0x0000000C)																															
TextAlignmentMode (0x00000018)																															

**Figure 73: EMF EMR\_SETTEXTALIGN Record Example**

**Type:** 0x00000016 identifies the record type as EMR\_SETTEXTALIGN.

**Size:** 0x0000000C is the size of this record in bytes.

**TextAlignmentMode:** 0x00000018 specifies the text alignment mode by using WMF [TextAlignmentMode Flags](#) ([\[MS-WMF\]](#) section 2.1.2.3).

### 3.2.6.11 EMR\_SELECTOBJECT Example

This section provides an example of the [EMR\\_SELECTOBJECT](#) record as specified in [\[MS-EMF\]](#) section 2.3.8.5.

```
00064C10:          25 00 00 00
00064C20:0c 00 00 00 0e 00 00 80
```

0	1	2	3	4	5	6	7	8	9	1	0	1	2	3	4	5	6	7	8	9	2	0	1	2	3	4	5	6	7	8	9	3	0	1
Type (0x00000025)																																		
Size (0x0000000C)																																		
ihObject (0x8000000E=DEVICE_DEFAULT_FONT)																																		

**Figure 74: EMF EMR\_SELECTOBJECT Record Example**

**Type:** 0x00000025 identifies this EMF record type as EMR\_SELECTOBJECT.

**Size:** 0x0000000C is the size of this record in bytes.

**ihObject:** 0x8000000E specifies the index of an object in the object table or the stock object if it is negative.

### 3.2.6.12 EMR\_SETTEXTALIGN Example

This section provides an example of an EMF [EMR\\_SETTEXTALIGN](#) record ([\[MS-EMF\]](#) section 2.3.11.25).

```
00064C20                                16 00 00 00 0C 00 00 00
00064C30:18 00 00 00
```

0	1	2	3	4	5	6	7	8	9	1	0	1	2	3	4	5	6	7	8	9	2	0	1	2	3	4	5	6	7	8	9	3	0	1
Type (0x00000016)																																		
Size (0x0000000C)																																		
TextAlignmentMode (0x00000018)																																		

**Figure 75: EMF EMR\_SETTEXTALIGN Record Example**

**Type:** 0x00000016 identifies the record type as EMR\_SETTEXTALIGN.

**Size:** 0x0000000C is the size of this record in bytes.

**TextAlignmentMode:** 0x00000018 specifies the text alignment mode by using WMF [TextAlignmentMode Flags](#) ([\[MS-WMF\]](#) section 2.1.2.3).

### 3.2.6.13 EMR\_SETBKMODE Example

This section provides an example of the [EMR\\_SETBKMODE](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.11.

```
00064C30:          12 00 00 00 0C 00 00 00 01 00 00 00
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000012)																															
Size (0x0000000C)																															
Mode (0x00000001)																															

**Figure 76: EMF EMR\_SETBKMODE Record Example**

**Type:** 0x00000018 identifies this EMF record type as EMR\_SETBKMODE.

**Size:** 0x0000000C is the size of this record in bytes.

**Mode:** 0x00000001 specifies the background mode as **TRANSPARENT**.

### 3.2.6.14 EMR\_SETVIEWPORTORGEX Example

This section provides an example of the [EMR\\_SETVIEWPORTORGEX](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.29.

```
00064C40:0C 00 00 00 10 00 00 00 00 00 00 00 00 00 00 00 00
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x0000000C)																															
Size (0x00000010)																															
Origin (0x00000000)																															
... (0x00000000)																															

**Figure 77: EMF EMR\_SETVIEWPORTORGEX Record Example**

**Type:** 0x0000000C identifies this EMF record type as EMR\_SETVIEWPORTORGEX.

**Size:** 0x00000010 is the size of this record in bytes.

**Origin:** 0x00000000, 0x00000000 specifies the viewport horizontal and vertical origin in device units.

### 3.2.6.15 EMR\_SETBKMODE Example

This section provides an example of the [EMR\\_SETBKMODE](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.11.

```
00064C50:12 00 00 00 0C 00 00 00 01 00 00 00
```

0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1		
Type (0x0000012)																																	
Size (0x0000000C)																																	
Mode (0x00000001)																																	

**Figure 78: EMF EMR\_SETBKMODE Record Example**

**Type:** 0x00000012 identifies this EMF record type as EMR\_SETBKMODE.

**Size:** 0x0000000C is the size of this record in bytes.

**Mode:** 0x00000001 specifies the background mode, as specified in the [BackgroundMode](#) enumeration in [\[MS-EMF\]](#) section 2.1.4.

### 3.2.6.16 EMR\_EXTCREATEFONTINDIRECTW Example

This section provides an example of an EMF [EMR\\_EXTCREATEFONTINDIRECTW](#) record ([\[MS-EMF\]](#) section 2.3.7.8).

```

00064C50:                                     52 00 00 00
00064C60:70 01 00 00 01 00 00 00 C4 FF FF FF 00 00 00 00
00064C70:00 00 00 00 00 00 00 00 90 01 00 00 00 00 00 00
00064C80:07 40 00 12 54 00 69 00 6D 00 65 00 73 00 20 00
00064C90:4E 00 65 00 77 00 20 00 52 00 6F 00 6D 00 61 00
00064CA0:6E 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064CB0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064CC0:00 00 00 00 00 00 20 00 08 5A 18 00 24 A8 56 07
00064CD0:24 A8 56 07 C4 F0 7D 07 C9 A4 07 30 90 00 B7 00
00064CE0:B8 1A E2 01 43 00 00 00 00 00 00 00 B8 1A E2 01
00064CF0:6F EC EE 94 D4 A5 07 30 48 F1 7D 07 40 F8 A9 30
00064D00:84 F8 A9 30 78 A3 07 30 2F 00 00 00 7B 7C 03 30
00064D10:31 90 18 00 00 00 00 00 F4 5E 9B 00 08 5A 18 00
00064D20:04 00 00 00 08 00 00 00 04 00 00 00 68 5E 9B 00
00064D30:78 EE 7D 07 31 90 18 00 00 00 00 00 04 00 00 00
00064D40:7C EE 7D 07 00 00 7D 07 00 00 00 00 00 00 00 00
00064D50:47 16 90 01 00 00 00 00 00 00 00 00 00 00 00 00
00064D60:87 3A 00 20 00 00 00 00 00 00 00 00 00 00 00 00
00064D70:FF 01 00 00 00 00 00 00 54 00 69 00 6D 00 65 00
00064D80:73 00 20 00 00 00 65 00 77 00 20 00 52 00 6F 00
00064D90:6D 00 61 00 6E 00 00 00 00 00 00 00 00 00 00 00
00064DA0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00064DB0:F0 EE 7D 07 5A B0 02 30 F0 EE 7D 07 8C 63 AB 30
00064DC0:08 EF 7D 07 64 76 00 08 00 00 00 00 00 00 00

```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000052)																															
Size (0x00000170)																															
ihFonts (0x00000001)																															
elw (variable)																															
...																															
(elw cont. for 87 rows)																															

**Figure 79: EMF EMR\_EXTCREATEFONTINDIRECTW Record Example**

**Type:** 0x00000052 identifies the record type as EMR\_EXTCREATEFONTINDIRECTW.

**Size:** 0x00000170 specifies the size of this record in bytes.

**ihFonts:** 0x00000001 specifies the object index in the [EMF Object Table](#) ([\[MS-EMF\]](#) section 3.1.1) to assign to the font.

**elw:** To determine the type of logical font object in this field, an algorithm ([\[MS-EMF\]](#) section 2.3.7.8) is applied, which indicates that this is a variable-length EMF [LogFontExDv](#) object ([\[MS-EMF\]](#) section 2.2.15).

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
Height (0xFFFFF4C)																															
Width (0x00000000)																															
Escapement (0x00000000)																															
Orientation (0x00000000)																															
Weight (0x00000190)																															
Italic (0x00)								Underline (0x00)								StrikeOut (0x00)								CharSet (0x00)							
OutPrecision (0x07)								ClipPrecision (0x40)								Quality (0x00)								PitchAndFamily (0x12)							
Facename ("Times New Roman")																															
...																															
(Facename cont. for 14 rows)																															

**Figure 80: EMF LogFontExDv Object, Part 1**

**Height:** 0xFFFFF4C has an absolute value of 60, which specifies the character height for this font in logical units.

**Width:** 0x00000000 specifies a computed font width. The aspect ratio of the device is matched against the digitization aspect ratio of the font to find the closest match, determined by the absolute value of the difference.

**Escapement:** 0x00000000 specifies an angle of 0 degrees between the baseline of a row of text and the x-axis of the device.

**Orientation:** 0x00000000 specifies an angle of 0 degrees between each character's baseline and the x-axis of the device.

**Weight:** 0x000000190 specifies that the weight of the font is 400, in the range 0 through 1000, from lightest to darkest, with 400 (0x00000190) considered normal.

**Italic:** 0x00 specifies that the font is not italic.

**Underline:** 0x00 specifies that the font is not underlined.

**Strikeout:** 0x00 specifies that the font characters do not have a strike-out graphic.

**CharSet:** 0x00 specifies the **ANSI\_CHARSET** as defined in the WMF [CharacterSet](#) enumeration ([\[MS-WMF\]](#) section 2.1.1.5).

**OutPrecision:** 0x07 specifies the output precision, which is how closely the output must match the requested font properties, from the WMF [OutPrecision](#) enumeration ([\[MS-WMF\]](#) section 2.1.1.21). The value 0x07 specifies that the font mapper should choose a TrueType font.

**ClipPrecision:** 0x40 specifies the clipping precision, which is how to clip characters that are partially outside the clipping region, from the WMF [ClipPrecision Flags](#) ([\[MS-WMF\]](#) section 2.1.2.1). The value 0x40 specifies that font association be turned off.

**Quality:** 0x00 specifies default output quality, from the WMF [FontQuality](#) enumeration ([\[MS-WMF\]](#) section 2.1.1.10).

**PitchAndFamily:** 0x12 specifies a variable-pitch font with serifs, from the WMF [FamilyFont](#) and [PitchFont](#) enumerations ([\[MS-WMF\]](#) sections [2.1.1.8](#) and [2.1.1.24](#), respectively).

**Facename:** "Times New Roman" specifies the typeface name of the font in Unicode characters.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
FullName ("")																															
...																															
(FullName cont. for 30 rows)																															
Style ("")																															
...																															
(Style cont. for 14 rows)																															
Script ("")																															
...																															
(Script cont. for 14 rows)																															
Signature (0x80007664)																															
NumAxes (0x00000000)																															

**Figure 81: EMF LogFontExDv Object, Part 2**

**FullName:** An empty string specifies the font's full name.

**Style:** An empty string describes the font's style.

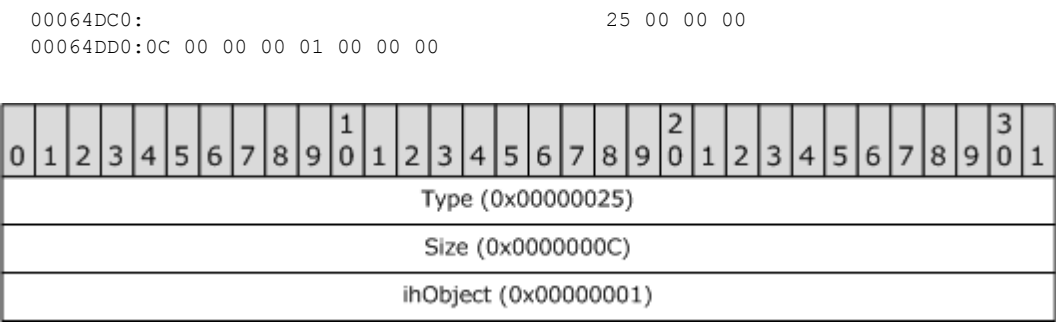
**Script:** An empty string describes the font's character set.

**Signature:** 0x80007664 specifies the signature of an EMF [DesignVector](#) object ([MS-EMF] section 2.2.3).

**NumAxes:** 0x00000000 specifies the number of font axes described in the DesignVector object.

### 3.2.6.17 EMR\_SELECTOBJECT Example

This section provides an example of the [EMR\\_SELECTOBJECT](#) record as specified in [\[MS-EMF\]](#) section 2.3.8.5.



**Figure 82: EMF EMR\_SELECTOBJECT Record Example**

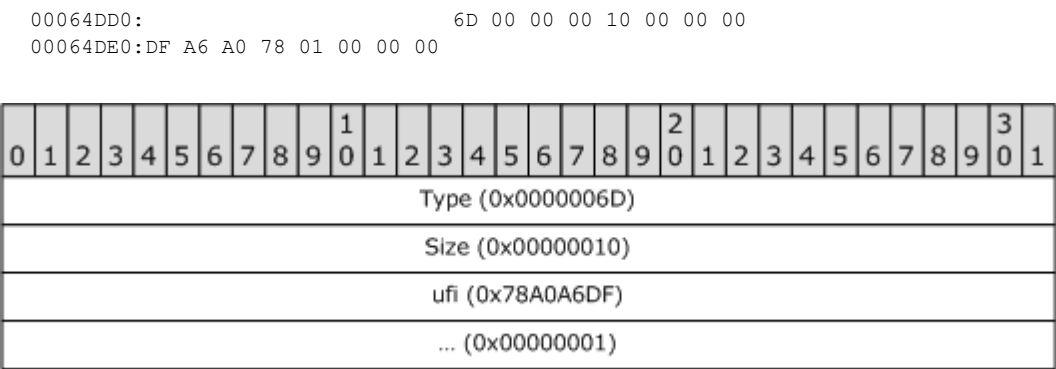
**Type:** 0x00000025 identifies this EMF record type as EMR\_SELECTOBJECT.

**Size:** 0x0000000C is the size of this record in bytes.

**ihObject:** 0x00000001 specifies the index of an object in the object table or the stock object if it is negative.

### 3.2.6.18 EMR\_FORCEUFIMAPPING Example

This section provides an example of the [EMR\\_FORCEUFIMAPPING](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.2.



**Figure 83: EMF EMR\_FORCEUFIMAPPING Record Example**

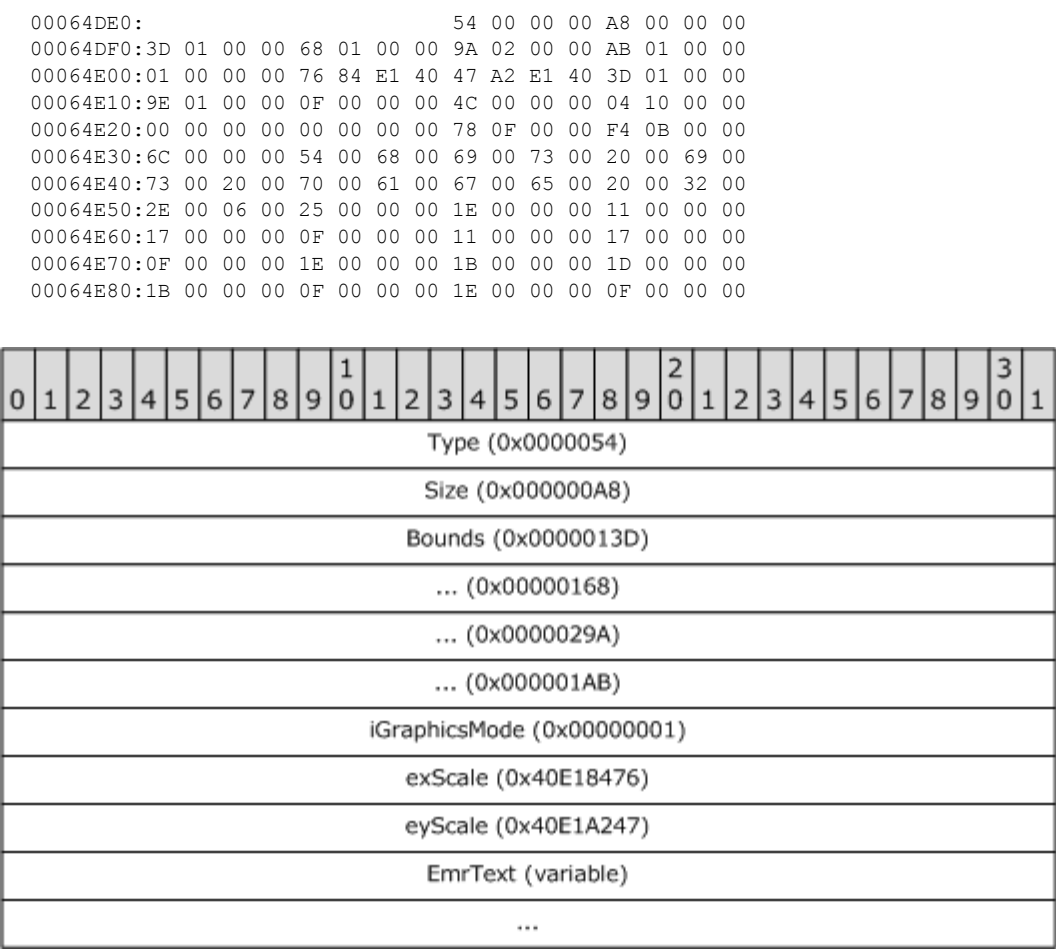
**Type:** 0x0000006D identifies this EMF record type as EMR\_FORCEUFIMAPPING.

**Size:** 0x00000010 specifies the size of this record in bytes.

**ufi:** 0x78A0A6DF, 0x00000001 specifies the universal font ID to use. This consists of a 32-bit checksum (0x78A0A6DF) followed by a 32-bit index (0x00000001).

**3.2.6.19 EMR\_EXTTEXTOUTW Example**

This section provides an example of an EMF [EMR\\_EXTTEXTOUTW](#) record ([\[MS-EMF\]](#) section 2.3.5.8).



**Figure 84: EMF EMR\_EXTTEXTOUTW Record Example**

**Type:** 0x00000054 identifies the record type as EMR\_EXTTEXTOUTW.

**Size:** 0x000000A8 specifies the size of this record in bytes.

**Bounds:** 0x0000013D, 0x00000168, 0x0000029A, 0x000001AB values are not used.

**iGraphicsMode:** 0x00000001 specifies the **GM\_COMPATIBLE** graphics mode from the EMF [GraphicsMode](#) enumeration ([\[MS-EMF\]](#) section 2.1.16).

**exScale:** 0x40E18476 specifies the X scale from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**eyScale:** 0x40E1A247 specifies the Y scales from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**EmrText:** An EMF [EmrText](#) object ([\[MS-EMF\]](#) section 2.2.5). This is followed by strings and spacing arrays.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Reference (64-bits) (0x0000013D)																															
... (0x0000019E)																															
Chars (0x0000000F)																															
offString (0x0000004C)																															
Options (0x00001004)																															
Rectangle (0x00000000)																															
... (0x00000000)																															
... (0x00000F78)																															
... (0x00000BF4)																															
offDx (0x0000006C)																															
text ("This is page 2.")																															

**Figure 85: EMF EmrText Object Example**

**Reference:** 0x0000013D, 0x0000019E specifies the coordinates of the reference point used to position the string.

**Chars:** 0x0000000F specifies the number of characters in the string.

**offString:** 0x0000004C specifies the offset to the string.

**Options:** 0x00001004 indicates that the rectangle defined in the **Rectangle** field is used for clipping, as specified in the EMF [ExtTextOutOptions](#) enumeration ([\[MS-EMF\]](#) section 2.1.11).

**Rectangle:** 0x00000000, 0x00000000, 0x00000F78, 0x00000BF4 defines the clipping rectangle in logical units.

**offDx:** 0x0000006C specifies the offset to the intercharacter spacing array.

**text:** "This is page 2."

### 3.2.6.20 EMR\_EXTTEXTOUTW Example

This section provides an example of an EMF [EMR\\_EXTTEXTOUTW](#) record ([\[MS-EMF\]](#) section 2.3.5.8).

```

00064E90:54 00 00 00 54 00 00 00 9B 02 00 00 68 01 00 00
00064EA0:B5 02 00 00 AB 01 00 00 01 00 00 00 76 84 E1 40
00064EB0:47 A2 E1 40 9B 02 00 00 9E 01 00 00 01 00 00 00
00064EC0:4C 00 00 00 04 10 00 00 00 00 00 00 00 00 00 00
00064ED0:78 0F 00 00 F4 0B 00 00 50 00 00 00 20 00 00 56
00064EE0:1B 00 00 00

```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000054)																															
Size (0x00000054)																															
Bounds (0x0000029B)																															
... (0x00000168)																															
... (0x000002B5)																															
... (0x000001AB)																															
iGraphicsMode (0x00000001)																															
exScale (0x40E18476)																															
eyScale (0x40E1A247)																															
EmrText (variable)																															
...																															

**Figure 86: EMF EMR\_EXTTEXTOUTW Record Example**

**Type:** 0x00000054 identifies the record type as EMR\_EXTTEXTOUTW.

**Size:** 0x00000054 specifies the size of this record in bytes.

**Bounds:** 0x0000029B, 0x00000168, 0x000002B5, 0x000001AB values are not used.

**iGraphicsMode:** 0x00000001 specifies the **GM\_COMPATIBLE** graphics mode from the EMF [GraphicsMode](#) enumeration ([MS-EMF] section 2.1.16).

**exScale:** 0x40E18476 specifies the X scale from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**eyScale:** 0x40E1A247 specifies the Y scales from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**EmrText:** An EMF [EmrText](#) object ([MS-EMF] section 2.2.5). This is followed by strings and spacing arrays.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Reference (0x0000029B)																															
... (0x0000019E)																															
Chars (0x00000001)																															
offString (0x0000004C)																															
Options (0x00001004)																															
Rectangle (0x00000000)																															
... (0x00000000)																															
... (0x00000F78)																															
... (0x00000BF4)																															
offDx (0x00000050)																															
text (" ")																															

**Figure 87: EMF EmrText Object Example**

**Reference:** 0x0000029B, 0x0000019E specifies the coordinates of the reference point used to position the string.

**Chars:** 0x00000001 specifies the number of characters in the string.

**offString:** 0x0000004C specifies the offset to the string.

**Options:** 0x00001004 indicates that the rectangle defined in the **Rectangle** field is used for clipping, as specified in the EMF [ExtTextOutOptions](#) enumeration ([\[MS-EMF\]](#) section 2.1.11).

**Rectangle:** 0x00000000, 0x00000000, 0x00000F78, 0x00000BF4 defines the clipping rectangle in logical units.

**offDx:** 0x00000050 specifies the offset to the intercharacter spacing array.

**text:** " ".

### 3.2.6.21 EMR\_SETBKMODE Example

This section provides an example of the [EMR\\_SETBKMODE](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.11.

00064EE0: 12 00 00 00 0C 00 00 00 01 00 00 00

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000012)																															
Size (0x0000000C)																															
BackgroundMode (0x00000001)																															

**Figure 88: EMF EMR\_SETBKMODE Record Example**

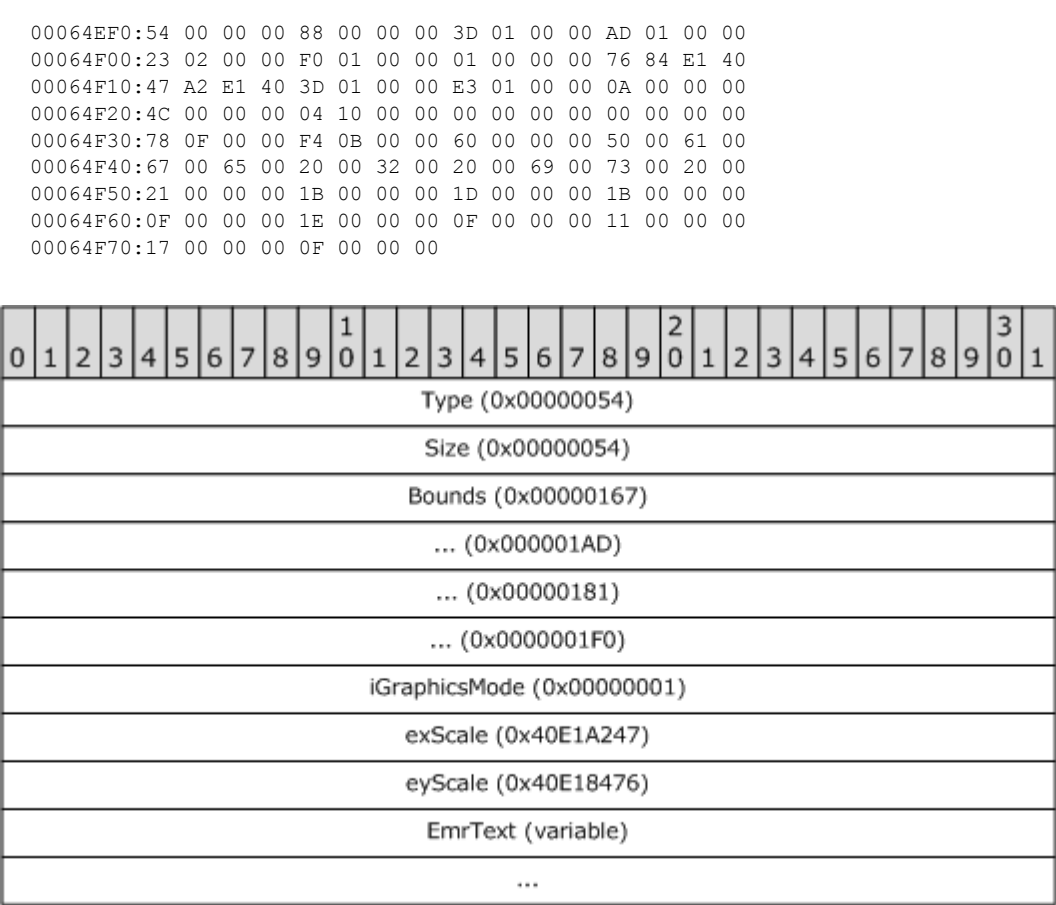
**Type:** 0x00000012 identifies this EMF record type as EMR\_SETBKMODE.

**Size:** 0x0000000C specifies the size of this record in bytes.

**BackgroundMode:** 0x00000001 specifies background mode.

**3.2.6.22 EMR\_EXTTEXTOUTW Example**

This section provides an example of an EMF [EMR\\_EXTTEXTOUTW](#) record ([\[MS-EMF\]](#) section 2.3.5.8).



**Figure 89: EMF EMR\_EXTTEXTOUTW Record Example**

**Type:** 0x00000054 identifies the record type as EMR\_EXTTEXTOUTW.

**Size:** 0x00000088 specifies the size of this record in bytes.

**Bounds:** 0x0000013D, 0x000001AD, 0x00000223, 0x00001F0 values are not used.

**iGraphicsMode:** 0x00000001 specifies the **GM\_COMPATIBLE** graphics mode from the EMF [GraphicsMode](#) enumeration ([\[MS-EMF\]](#) section 2.1.16).

**exScale:** 0x40E18476 specifies the X scale from Page units to .01 mm units if the graphics mode is **GM\_COMPATIBLE**.

**eyScale:** 0x40E1A247 specifies the Y scales from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**EmrText:** An EMF [EmrText](#) object ([\[MS-EMF\]](#) section 2.2.5). This is followed by strings and spacing arrays.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Reference (64-bits) (0x0000013D)																															
... (0x000001E3)																															
Chars (0x0000000A)																															
offString (0x0000004C)																															
Options (0x00001004)																															
Rectangle (0x00000000)																															
... (0x00000000)																															
... (0x00000F78)																															
... (0x00000BF4)																															
offDx (0x00000060)																															
text ("Page 2 is !")																															

**Figure 90: EMF EmrText Object Example**

**Reference:** 0x0000013D, 0x000001E3 specifies the coordinates of the reference point used to position the string.

**Chars:** 0x0000000A specifies the number of characters in the string.

**offString:** 0x0000004C specifies the offset to the string.

**Options:** 0x00001004 indicates that the rectangle defined in the **Rectangle** field is used for clipping, as specified in the EMF [ExtTextOutOptions](#) enumeration ([\[MS-EMF\]](#) section 2.1.11).

**Rectangle:** 0x00000000, 0x00000000, 0x00000F78, 0x00000BF4 defines the clipping rectangle in logical units.

**offDx:** 0x00000060 specifies the offset to the intercharacter spacing array.

**text:** "Page 2 is !".

**3.2.6.23 EMR\_EXTTEXTOUTW Example**

This section provides an example of an EMF [EMR\\_EXTTEXTOUTW](#) record ([\[MS-EMF\]](#) section 2.3.5.8).

```
00064F70:                54 00 00 00 70 00 00 00
00064F80:24 02 00 00 AD 01 00 00 A0 02 00 00 F0 01 00 00
00064F90:01 00 00 00 76 84 E1 40 47 A2 E1 40 24 02 00 00
```

```

00064FA0:E3 01 00 00 06 00 00 00 4C 00 00 00 04 10 00 00
00064FB0:00 00 00 00 00 00 00 00 78 0F 00 00 F4 0B 00 00
00064FC0:58 00 00 00 6C 00 65 00 74 00 74 00 65 00 72 00
00064FD0:11 00 00 00 1B 00 00 00 11 00 00 00 11 00 00 00
00064FE0:1B 00 00 00 14 00 00 00

```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000054)																															
Size (0x00000070)																															
Bounds (0x00000224)																															
... (0x000001AD)																															
... (0x000002A0)																															
... (0x000001F0)																															
iGraphicsMode (0x00000001)																															
exScale (0x40E18476)																															
eyScale (0x40E1A247)																															
EmrText (variable)																															
...																															

**Figure 91: EMF EMR\_EXTTEXTOUTW Record Example**

**Type:** 0x00000054 identifies the record type as EMR\_EXTTEXTOUTW.

**Size:** 0x00000070 specifies the size of this record in bytes.

**Bounds:** 0x00000224, 0x000001AD, 0x000002A0, 0x000001F0 values are not used.

**iGraphicsMode:** 0x00000001 specifies the **GM\_COMPATIBLE** graphics mode from the EMF [GraphicsMode](#) enumeration ([\[MS-EMF\]](#) section 2.1.16).

**exScale:** 0x40E18476 specifies the X scale from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**eyScale:** 0x40E1A247 specifies the Y scales from Page units to .01mm units if the graphics mode is **GM\_COMPATIBLE**.

**EmrText:** An EMF [EmrText](#) object ([\[MS-EMF\]](#) section 2.2.5). This is followed by strings and spacing arrays.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Reference (0x00000224)																															
... (0x000001E3)																															
Chars (0x00000006)																															
offString (0x0000004C)																															
Options (0x00001004)																															
Rectangle (0x00000000)																															
... (0x00000000)																															
... (0x00000F78)																															
... (0x00000BF4)																															
offDx (0x00000058)																															
text ("letter")																															

**Figure 92: EMF EmrText Object Example**

**Reference:** 0x00000224, 0x000001E3 specifies the coordinates of the reference point used to position the string.

**Chars:** 0x00000006 specifies the number of characters in the string.

**offString:** 0x0000004C specifies the offset to the string.

**Options:** 0x00001004 indicates that the rectangle defined in the **Rectangle** field is used for clipping, as specified in the EMF [ExtTextOutOptions](#) enumeration ([\[MS-EMF\]](#) section 2.1.11).

**Rectangle:** 0x00000000, 0x00000000, 0x00000F78, 0x0000BF4 defines the clipping rectangle in logical units.

**offDx:** 0x00000058 specifies the offset to the intercharacter spacing array.

**text:** "letter".

### 3.2.6.24 EMR\_EXTTEXTOUTW Example

This section provides an example of an EMF [EMR\\_EXTTEXTOUTW](#) record ([\[MS-EMF\]](#) section 2.3.5.8).

```

00064FE0:                54 00 00 00 54 00 00 00
00064FF0:A1 02 00 00 AD 01 00 00 AF 02 00 00 F0 01 00 00
00065000:01 00 00 00 76 84 E1 40 47 A2 E1 40 A1 02 00 00
00065010:E3 01 00 00 01 00 00 00 4C 00 00 00 04 10 00 00
00065020:00 00 00 00 00 00 00 00 78 0F 00 00 F4 0B 00 00
00065030:50 00 00 00 2E 00 FE 26 0F 00 00 00 00

```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000054)																															
Size (0x00000088)																															
Bounds (0x0000002A1)																															
... (0x0000001AD)																															
... (0x0000002AF)																															
... (0x0000001F0)																															
iGraphicsMode (0x00000001)																															
exScale (0x40E18476)																															
eyScale (0x40E1A247)																															
EmrText (variable)																															
...																															

**Figure 93: EMF EMR\_EXTTEXTOUTW Record Example**

**Type:** 0x00000054 identifies the record type as EMR\_EXTTEXTOUTW.

**Size:** 0x00000054 specifies the size of this record in bytes.

**Bounds:** 0x0000002A1, 0x0000001AD, 0x0000002AF, 0x0000001F0 values are not used.

**iGraphicsMode:** 0x00000001 specifies the **GM\_COMPATIBLE** graphics mode from the EMF [GraphicsMode](#) enumeration ([\[MS-EMF\]](#) section 2.1.16).

**exScale:** 0x40E18476 specifies the X scale from Page units to .01 mm units if the graphics mode is **GM\_COMPATIBLE**.

**eyScale:** 0x40E1A247 specifies the Y scales from Page units to .01 mm units if the graphics mode is **GM\_COMPATIBLE**.

**EmrText:** An EMF [EmrText](#) object ([\[MS-EMF\]](#) section 2.2.5). This is followed by strings and spacing arrays.

0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
Reference (64-bits) (0x000002A1)																															
... (0x000001E3)																															
Chars (0x00000001)																															
offString (0x0000004C)																															
Options (0x00001004)																															
Rectangle (0x00000000)																															
... (0x00000000)																															
... (0x00000F78)																															
... (0x00000BF4)																															
offDx (0x00000050)																															
text (" ")																															

**Figure 94: EMF EmrText Object Example**

**Reference:** 0x000002A1, 0x000001E3 specifies the coordinates of the reference point used to position the string.

**Chars:** 0x00000001 specifies the number of characters in the string.

**offString:** 0x0000004C specifies the offset to the string.

**Options:** 0x00001004 indicates that the rectangle defined in the **Rectangle** field is used for clipping, as specified in the EMF [ExtTextOutOptions](#) enumeration ([\[MS-EMF\]](#) section 2.1.11).

**Rectangle:** 0x00000000, 0x00000000, 0x00000F78, 0x0000BF4 defines the clipping rectangle in logical units.

**offDx:** 0x00000050 specifies the offset to the intercharacter spacing array.

**text:** " ".

### 3.2.6.25 EMR\_EXTTEXTOUTW Example

This section provides an example of an EMF [EMR\\_EXTTEXTOUTW](#) record ([\[MS-EMF\]](#) section 2.3.5.8).

```

00065030:                                54 00 00 00
00065040:54 00 00 00 B0 02 00 00 AD 01 00 00 C9 02 00 00
00065050:F0 01 00 00 01 00 00 00 76 84 E1 40 47 A2 E1 40
00065060:B0 02 00 00 E3 01 00 00 01 00 00 00 4C 00 00 00
00065070:04 10 00 00 00 00 00 00 00 00 00 00 78 0F 00 00
00065080:F4 0B 00 00 50 00 00 00 20 00 01 05 1A 00 00 00
00065090:12 00 00 00 0C 00 00 00 01 00 00 00

```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000054)																															
Size (0x00000054)																															
Bounds (0x000002B0)																															
... (0x000001AD)																															
... (0x000002C9)																															
... (0x000001F0)																															
iGraphicsMode (0x00000001)																															
exScale (0x40E18476)																															
eyScale (0x40E14740)																															
EmrText (variable)																															
...																															

**Figure 95: EMF EMR\_EXTTEXTOUTW Record Example**

**Type:** 0x00000054 identifies the record type as EMR\_EXTTEXTOUTW.

**Size:** 0x00000054 specifies the size of this record in bytes.

**Bounds:** 0x000002B0, 0x000001AD, 0x000002C9, 0x000001F0 values are not used.

**iGraphicsMode:** 0x00000001 specifies the **GM\_COMPATIBLE** graphics mode from the EMF [GraphicsMode](#) enumeration ([\[MS-EMF\]](#) section 2.1.16).

**exScale:** 0x40E18476 specifies the X scale from Page units to .01 mm units if the graphics mode is **GM\_COMPATIBLE**.

**eyScale:** 0x40E14740 specifies the Y scales from Page units to .01 mm units if the graphics mode is **GM\_COMPATIBLE**.

**EmrText:** An EMF [EmrText](#) object ([\[MS-EMF\]](#) section 2.2.5). This is followed by strings and spacing arrays.

0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
Reference (0x000002B0)																																									
... (0x000001E3)																																									
Chars (0x00000001)																																									
offString (0x0000004C)																																									
Options (0x00001004)																																									
Rectangle (0x00000000)																																									
(0x00000000)																																									
(0x00000F78)																																									
(0x00000BF4)																																									
offDx (0x00000050)																																									
text (" ")																																									

**Figure 96: EMF EmrText Object Example**

**Reference:** 0x000002B0, 0x000001E3 specifies the coordinates of the reference point used to position the string.

**Chars:** 0x00000001 specifies the number of characters in the string.

**offString:** 0x0000004C specifies the offset to the string.

**Options:** 0x00001004 indicates that the rectangle defined in the **Rectangle** field is used for clipping, as specified in the EMF [ExtTextOutOptions](#) enumeration ([\[MS-EMF\]](#) section 2.1.11).

**Rectangle:** (0x00000000, 0x00000000, 0x00000F78, 0x0000BF4) defines the clipping rectangle in logical units.

**offDx:** 0x00000050 specifies the offset to the intercharacter spacing array.

**text:** " ".

### 3.2.6.26 EMR\_EXTTEXTOUTW Example

This section provides an example of an EMF [EMR\\_EXTTEXTOUTW](#) record ([\[MS-EMF\]](#) section 2.3.5.8).

```

00065090:                                54 00 00 00
000650A0:0C 01 00 00 3D 01 00 00 F2 01 00 00 33 04 00 00
000650B0:35 02 00 00 01 00 00 00 76 84 E1 40 47 A2 E1 40
000650C0:3D 01 00 00 28 02 00 00 20 00 00 00 4C 00 00 00
000650D0:04 10 00 00 00 00 00 00 00 00 00 00 78 0F 00 00
000650E0:F4 0B 00 00 8C 00 00 00 50 00 61 00 67 00 65 00
000650F0:20 00 32 00 20 00 6F 00 72 00 69 00 65 00 6E 00
00065100:74 00 61 00 74 00 69 00 6F 00 6E 00 20 00 69 00
00065110:73 00 20 00 6C 00 61 00 6E 00 64 00 73 00 63 00
00065120:61 00 70 00 65 00 2E 00 21 00 00 00 1B 00 00 00
00065130:1D 00 00 00 1B 00 00 00 0F 00 00 00 1E 00 00 00
00065140:0F 00 00 00 1E 00 00 00 14 00 00 00 11 00 00 00

```

```

00065150:1B 00 00 00 1E 00 00 00 11 00 00 00 1B 00 00 00
00065160:11 00 00 00 11 00 00 00 1E 00 00 00 1E 00 00 00
00065170:0E 00 00 00 11 00 00 00 17 00 00 00 0F 00 00 00
00065180:11 00 00 00 1B 00 00 00 1E 00 00 00 1E 00 00 00
00065190:17 00 00 00 1A 00 00 00 1B 00 00 00 1E 00 00 00
000651A0:1B 00 00 00 0F 00 00 00

```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type (0x00000054)																															
Size (0x0000010C)																															
Bounds (0x0000013D)																															
... (0x000001F2)																															
... (0x00000433)																															
... (0x00000235)																															
iGraphicsMode (0x00000001)																															
exScale (0x40E18476)																															
eyScale (0x40E1A247)																															
EmrText (variable)																															
...																															

**Figure 97: EMF EMR\_EXTTEXTOUTW Record Example**

**Type:** 0x00000054 identifies the record type as EMR\_EXTTEXTOUTW.

**Size:** 0x0000010C specifies the size of this record in bytes.

**Bounds:** 0x0000013D, 0x000001F2, 0x00000433, 0x00000235 values are not used.

**iGraphicsMode:** 0x00000001 specifies the **GM\_COMPATIBLE** graphics mode from the EMF [GraphicsMode](#) enumeration ([\[MS-EMF\]](#) section 2.1.16).

**exScale:** 0x40E18476 specifies the X scale from Page units to .01 mm units if the graphics mode is **GM\_COMPATIBLE**.

**eyScale:** 0x40E1A247 specifies the Y scales from Page units to .01 mm units if the graphics mode is **GM\_COMPATIBLE**.

**EmrText:** An EMF [EmrText](#) object ([\[MS-EMF\]](#) section 2.2.5). This is followed by strings and spacing arrays.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Reference (0x0000013D)																															
... (0x00000228)																															
Chars (0x00000020)																															
offString (0x0000004C)																															
Options (0x00001004)																															
Rectangle (0x00000000)																															
... (0x00000000)																															
... (0x00000F78)																															
... (0x00000BF4)																															
offDx (0x0000008C)																															
text ("Page 2 orientation is landscape.")																															

**Figure 98: EMF EmrText Object Example**

**Reference:** 0x0000013D, 0x00000228 specifies the coordinates of the reference point used to position the string.

**Chars:** 0x00000020 specifies the number of characters in the string.

**offString:** 0x0000004C specifies the offset to the string.

**Options:** 0x00001004 indicates that the rectangle defined in the **Rectangle** field is used for clipping, as specified in the EMF [ExtTextOutOptions](#) enumeration ([\[MS-EMF\]](#) section 2.1.11).

**Rectangle:** 0x00000000, 0x00000000, 0x00000F78, 0x00000BF4 defines the clipping rectangle in logical units.

**offDx:** 0x0000008c specifies the offset to intercharacter spacing array.

**text:** "Page 2 orientation is landscape."

### 3.2.6.27 EMR\_EXTTEXTOUTW Example

This section provides an example of an EMF [EMR\\_EXTTEXTOUTW](#) record ([\[MS-EMF\]](#) section 2.3.5.8).

```

000651A0:                54 00 00 00 54 00 00 00
000651B0:34 04 00 00 F2 01 00 00 4D 04 00 00 35 02 00 00
000651C0:01 00 00 00 76 84 E1 40 47 A2 E1 40 34 04 00 00
000651D0:28 02 00 00 01 00 00 00 4C 00 00 00 04 10 00 00
000651E0:00 00 00 00 00 00 00 00 78 0F 00 00 F4 0B 00 00
000651F0:50 00 00 00 20 00 00 3C 1A 00 00 00

```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Text (0x00000054)																															
Size (0x00000054)																															
Bounds (0x000000434)																															
... (0x0000001F2)																															
... (0x00000044D)																															
... (0x000000235)																															
iGraphicsMode (0x00000001)																															
exScale (0x40E18576)																															
eyScale (0x40E1A247)																															
EmrText (variable)																															
...																															

**Figure 99: EMF EMR\_EXTTEXTOUTW Record Example**

**Type:** 0x00000054 identifies the record type as EMR\_EXTTEXTOUTW.

**Size:** 0x00000054 specifies the size of this record in bytes.

**Bounds:** 0x000000434, 0x0000001F2, 0x00000044D, 0x000000235 values are not used.

**iGraphicsMode:** 0x00000001 specifies the **GM\_COMPATIBLE** graphics mode from the EMF [GraphicsMode](#) enumeration ([\[MS-EMF\]](#) section 2.1.16).

**exScale:** 0x40E18576 specifies the X scale from Page units to .01 mm units if the graphics mode is **GM\_COMPATIBLE**.

**eyScale:** 0x40E1A247 specifies the Y scales from Page units to .01 mm units if the graphics mode is **GM\_COMPATIBLE**.

**EmrText:** An EMF [EmrText](#) object ([\[MS-EMF\]](#) section 2.2.5). This is followed by strings and spacing arrays.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Reference (0x0000013D)																															
... (0x0000026D)																															
Chars (0x00000001)																															
offString (0x0000004C)																															
Options (0x00001004)																															
Rectangle (0x00000000)																															
... (0x00000000)																															
... (0x00000F78)																															
... (0x00000BF4)																															
offDx (0x00000050)																															
text (" ")																															

**Figure 100: EMF EmrText Object Example**

**Reference:** 0x00000434, 0x00000282 specifies the coordinates of the reference point used to position the string.

**Chars:** 0x00000001 specifies the number of characters in the string.

**offString:** 0x0000004C specifies the offset to the string.

**Options:** 0x00001004 indicates that the rectangle defined in the **Rectangle** field is used for clipping, as specified in the EMF [ExtTextOutOptions](#) enumeration ([\[MS-EMF\]](#) section 2.1.11).

**Rectangle:** (0x00000000, 0x00000000, 0x00000F78, 0x00000BF4) defines the clipping rectangle in logical units.

**offDx:** 0x00000050 specifies the offset to the intercharacter spacing array.

**text:** " ".

### 3.2.6.28 EMR\_SETBKMODE Example

This section provides an example of the [EMR\\_SETBKMODE](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.11.

```
000651F0:                                12 00 00 00
00065200:0C 00 00 00 01 00 00 00
```



**Bounds:** 0x0000013D, 0x00000237, 0x00000157, 0x0000027A values are not used.

**iGraphicsMode:** 0x00000001 specifies the **GM\_COMPATIBLE** graphics mode from the EMF [GraphicsMode](#) enumeration ([\[MS-EMF\]](#) section 2.1.16).

**exScale:** 0x40E18576 specifies the X scale from page units to .01 mm units if the graphics mode is **GM\_COMPATIBLE**.

**eyScale:** 0x40E1A247 specifies the Y scales from page units to .01 mm units if the graphics mode is **GM\_COMPATIBLE**.

**EmrText:** An EMF [EmrText](#) object ([\[MS-EMF\]](#) section 2.2.5). This is followed by strings and spacing arrays.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Reference (0x0000013D)																															
... (0x0000026D)																															
Chars (0x00000001)																															
offString (0x0000004C)																															
Options (0x00001004)																															
Rectangle (0x00000000)																															
... (0x00000000)																															
... (0x00000F78)																															
... (0x00000BF4)																															
offDx (0x00000050)																															
text (" ")																															

**Figure 103: EMF EmrText Object Example**

**Reference:** 0x0000013D, 0x0000026D specifies the coordinates of the reference point used to position the string.

**Chars:** 0x00000001 specifies the number of characters in the string.

**offString:** 0x0000004C specifies the offset to the string.

**Options:** 0x00001004 indicates that the rectangle defined in the **Rectangle** field is used for clipping, as specified in the EMF [ExtTextOutOptions](#) enumeration ([\[MS-EMF\]](#) section 2.1.11).

**Rectangle:** (0x00000000, 0x00000000, 0x00000F78, 0x00000BF4) defines the clipping rectangle in logical units.

**offDx:** 0x00000050 specifies the offset to intercharacter spacing array.

**text:** " ".

### 3.2.6.30 EMR\_SELECTOBJECT Example

This section provides an example of the [EMR\\_SELECTOBJECT](#) record as specified in [\[MS-EMF\]](#) section 2.3.8.5.

```
00065250:                                25 00 00 00
00065260:0C 00 00 00 0E 00 00 80
```

0	1	2	3	4	5	6	7	8	9	1	0	1	2	3	4	5	6	7	8	9	2	0	1	2	3	4	5	6	7	8	9	3	0	1
Type (0x00000025)																																		
Size (0x0000000C)																																		
ihObject (0x8000000E=DEVICE_DEFAULT_FONT)																																		

**Figure 104: EMF EMR\_SELECTOBJECT Record Example**

**Type:** 0x00000025 identifies this EMF record type as EMR\_SELECTOBJECT.

**Size:** 0x0000000C specifies the size of this record in bytes.

**ihObject:** 0x8000000E specifies the index of an object in the object table or the stock object if it is negative.

### 3.2.6.31 EMR\_SETICMMODE Example

This section provides an example of the [EMR\\_SETICMMODE](#) record as specified in [\[MS-EMF\]](#) section 2.3.11.14.

```
00065260:                                62 00 00 00 0C 00 00 00
00065270:01 00 00 00
```

0	1	2	3	4	5	6	7	8	9	1	0	1	2	3	4	5	6	7	8	9	2	0	1	2	3	4	5	6	7	8	9	3	0	1
Type (0x00000062)																																		
Size (0x0000000C)																																		
ICMMode (0x00000001)																																		

**Figure 105: EMF EMR\_SETICMMODE Record Example**

**Type:** 0x00000062 identifies this EMF record type as EMR\_SETICMMODE.

**Size:** 0x0000000C is the size of this EMF record in bytes.

**ICMMode:** 0x00000001 is an Image Color Management (ICM) mode value from the [ICMMode](#) enumeration, specified in [\[MS-EMF\]](#) section 2.1.18.

### 3.2.6.32 EMR\_EOF Example

This section provides an example of an [EMR\\_EOF](#) record, as specified in [\[MS-EMF\]](#) section 2.3.4.1.

```
00065270:          0E 00 00 00 14 00 00 00 00 00 00 00
00065280:10 00 00 00 14 00 00 00
```

0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
Type (0x0000000E)																															
Size (0x00000014)																															
nPalEntries (0x00000000)																															
offPalEntries (0x00000010)																															
SizeLast (0x00000014)																															

**Figure 106: EMF EMR\_EOF Record Example**

**Type:** 0x0000000E identifies the type of record as an EMF **EMR\_EOF** record.

**Size:** A 0x00000014 specifies the size of this record in bytes.

**nPalEntries:** 0x00000000 specifies the number of palette entries.

**offPalEntries:** 0x00000010 specifies the offset to the palette entries.

**SizeLast:** 0x00000014 is the same as **Size**.

### 3.2.7 EMRI\_DEVMODE Example

This section provides an example of the [EMRI\\_DEVMODE record \(section 2.2.3.5\)](#).

```
00065280:          03 00 00 00 40 04 00 00
00065290:5C 00 5C 00 70 00 72 00 69 00 6E 00 74 00 65 00
000652A0:72 00 73 00 65 00 72 00 76 00 65 00 72 00 5C 00
000652B0:43 00 61 00 6E 00 6F 00 6E 00 20 00 42 00 75 00
000652C0:62 00 62 00 6C 00 65 00 2D 00 4A 00 00 00 00 00
000652D0:01 04 00 06 DC 00 64 03 43 EF 80 07 02 00 01 00
000652E0:EA 0A 6F 08 64 00 01 00 0F 00 FD FF 02 00 01 00
000652F0:FD FF 02 00 01 00 4C 00 65 00 74 00 74 00 65 00
00065300:72 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065310:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065320:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065330:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065340:00 00 00 00 01 00 00 00 00 00 00 00 02 00 00
00065350:02 00 00 00 01 00 00 00 01 01 00 00 00 00 00
00065360:00 00 00 00 00 00 00 00 00 00 00 00 44 49 4E 55
00065370:22 00 00 01 44 02 18 00 59 D8 B0 99 00 00 00 00
00065380:00 00 00 00 00 00 00 00 01 00 00 00 00 00 00
00065390:00 00 00 00 00 00 00 00 08 00 00 00 01 00 00
000653A0:03 00 01 00 01 00 02 00 02 00 00 00 00 00 00
000653B0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000653C0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000653D0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000653E0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000653F0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065400:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065410:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

```

00065420:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065430:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065440:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065450:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065460:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065470:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065480:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065490:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000654A0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000654B0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000654C0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000654D0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000654E0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000654F0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065500:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065510:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065520:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065530:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065540:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065550:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065560:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065570:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065580:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00065590:00 00 00 00 00 00 00 00 00 00 00 01 00 00 00
000655A0:00 00 00 00 00 00 00 00 01 00 00 53 4D 54 4A
000655B0:18 00 00 00 4E 55 4A 42 00 00 01 00 34 00 00 00
000655C0:00 00 00 00 00 00 00 00 08 01 00 00 53 4D 54 4A
000655D0:00 00 00 00 14 00 00 00 00 00 F4 00 43 00 61 00
000655E0:6E 00 6F 00 6E 00 20 00 42 00 75 00 62 00 62 00
000655F0:6C 00 65 00 2D 00 4A 00 65 00 74 00 20 00 42 00
00065600:4A 00 43 00 2D 00 35 00 30 00 00 00 49 6E 70 75
00065610:74 42 69 6E 00 4D 41 4E 55 41 4C 00 52 45 53 44
00065620:4C 4C 00 55 6E 69 72 65 73 44 4C 4C 00 50 61 70
00065630:65 72 53 69 7A 65 00 4C 45 54 54 45 52 00 52 65
00065640:73 6F 6C 75 74 69 6F 6E 00 53 54 41 4E 44 41 52
00065650:44 00 4D 65 64 69 61 54 79 70 65 00 53 54 41 4E
00065660:44 41 52 44 00 43 6F 6C 6F 72 4D 6F 64 65 00 43
00065670:4D 59 4B 32 34 00 48 61 6C 66 74 6F 6E 65 00 48
00065680:54 5F 50 41 54 53 49 5A 45 5F 41 55 54 4F 00 4F
00065690:72 69 65 6E 74 61 74 69 6F 6E 00 50 4F 52 54 52
000656A0:41 49 54 00 00 00 00 00 00 00 00 00 00 00 00
000656B0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
000656C0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

```

0	1	2	3	4	5	6	7	8	9	1	0	1	2	3	4	5	6	7	8	9	2	0	1	2	3	4	5	6	7	8	9	3	0	1
uIID (0x00000003 = EMRI_DEVMODE)																																		
cjSize (0x00000440)																																		
Devmode (variable)																																		
...																																		

**Figure 107: EMRI\_DEVMODE Record Example**

**ulID:** 0x00000003 specifies the type of the record, **EMRI\_DEVMODE**, from the **RecordType enumeration** (section 2.1.1).

**cjSize:** 0x00000440 is the size, in bytes, of all the data in the record, including private driver-specific data. Each EMFSPOOL record is aligned to a multiple of 4 bytes.

**Devmode:** A complete, variable-length **\_DEVMODE** structure ([\[MS-RPRN\]](#) section 2.2.2.1).

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
dmDeviceName ("\\printerserver\\Canon Bubble-J")																															
...																															
(dmDeviceName cont. for 14 rows)																															
dmSpecVersion (0x0401)																dmDriverVersion (0x0600)															
dmSize (0x00DC)																dmDriverExtra (0x0364)															
dmFields (0x0780EF43)																															
dmOrientation (0x0001)																dmPaperSize (0x0001)															
dmPaperLength (0x0AEA)																dmPaperWidth (0x086F)															
dmScale (0x0064)																dmCopies (0x0001)															
dmDefaultSource (0x000F)																dmPrintQuality (0xFFFD)															
dmColor (0x0002)																dmDuplex (0x0001)															

**Figure 108: Print System \_DEVMODE Structure, Part 1**

**dmDeviceName:** "\\printerserver\\Canon Bubble-J" specifies the text name of the printer, truncated to fit into a 32-character Unicode string with null terminator.

**dmSpecVersion:** 0x0401 specifies the version of the initialization data specification on which the structure is based.

**dmDriverVersion:** 0x0600 specifies the version assigned by the implementer of the printer driver.

**dmSize:** 0x00DC specifies the size, in bytes, of the fixed-length portion of the **\_DEVMODE** structure, which does not include the private driver-specific data that follows.

**dmDriverExtra:** 0x0364 specifies size, in bytes, of the variable-length driver-specific data that follows the fixed-length portion of the **\_DEVMODE** structure.

**dmFields:** 0x0780EF43 specifies whether certain fields of the **\_DEVMODE** structure are initialized. If a field is initialized, its corresponding bit is set; otherwise the bit is clear.

**dmOrientation:** 0x0001 specifies **Portrait** page orientation.

**dmPaperSize:** 0x0001 specifies **Letter** size paper, 8 1/2 x 11 inches.

**dmPaperLength:** 0x0AEA specifies the length of the printable area, in tenths of a millimeter.

**dmPaperWidth:** 0x086F specifies the width of the printable area, in tenths of a millimeter.

**dmScale:** 0x0064 specifies the factor by which the printed output is meant to be scaled, in percent.

**dmCopies:** 0x0001 specifies the number of copies to be printed.

**dmDefaultSource:** 0x000F specifies a device-specific value for the paper source, from which the output bin can be determined.

**dmPrintQuality:** 0xFFFFD specifies medium-resolution printing quality with a predefined value. If this field contained a positive value, it would specify the dots per inch resolution of the device.

**dmColor:** 0x0002 specifies color printing.

**dmDuplex:** 0x0001 specifies single-sided printing.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31																
dmYResolution (0xFFFFD)																dmTTOption (0x0002)																															
dmCollate (0x0001)																dmFormName ("Letter")																															
...																																															
(dmFormName cont. for 14 rows)																																															
(dmFormName cont.)																reserved0 (0x0000)																															
reserved1 (0x00000000)																																															
reserved2 (0x00000000)																																															
reserved3 (0x00000000)																																															
dmNup (0x00000001)																																															
reserved4 (0x00000000)																																															

**Figure 109: Print System \_DEVMODE Structure, Part 2**

**dmYResolution:** 0xFFFFD specifies the vertical resolution of the printer, in dots per inch.

**dmTTOption:** 0x0002 specifies that TrueType fonts should be downloaded as "software fonts."

**dmCollate:** 0x0001 specifies that collation should be used when printing multiple copies.

**dmFormName:** "Letter" specifies the name of the printer form, padded with nulls to fit into a 32-character Unicode string with null terminator.

**reserved0:** 0x0000 is not used.

**reserved1:** 0x00000000 is not used.

**reserved2:** 0x00000000 is not used.

**reserved3:** 0x00000000 is not used.

**dmNup:** 0x00000001 specifies that the print server handles the layout of multiple logical pages on one physical page.

**reserved4:** 0x00000000 is not used.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
dmICMMethod (0x00000002)																															
dmICMIntent (0x00000002)																															
dmMediaType (0x00000001)																															
dmDitherType (0x00000101)																															
reserved5 (0x00000000)																															
reserved6 (0x00000000)																															
reserved7 (0x00000000)																															
reserved8 (0x00000000)																															
dmDriverExtraData (variable)																															
...																															
(dmDriverExtraData cont. for 26 rows)																															

**Figure 110: Print System \_DEVMODE Structure, Part 3**

**dmICMMethod:** 0x00000002 specifies that Image Color Management should be handled by the system on which the Page Description Language (PDL) data is generated.

**dmICMIntent:** 0x00000002 specifies that color matching is optimized for contrast.

**dmMediaType:** 0x00000001 specifies that plain-paper media type is used.

**dmDitherType:** 0x00000101 specifies a printer driver-specific value for the type of dithering.

**reserved5:** 0x00000000 is not used.

**reserved6:** 0x00000000 is not used.

**reserved7:** 0x00000000 is not used.

**reserved8:** 0x00000000 is not used.

**dmDriverExtraData:** A block of private data, of a size specified by the **dmDriverExtra** field, which is understandable only by the printer driver.

### 3.2.8 EMRI\_BW\_METAFILE\_EXT Example

This section provides an example of the [EMRI\\_BW\\_METAFILE\\_EXT](#) record, specified in section [2.2.3.2](#).

```
000656D0:0E 00 00 00 08 00 00 00 B4 0B 00 00 00 00 00 00
```

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
u1ID(0x0000000E)																															
cjSize (0x00000008)																															
offset (0x0000000000000BB4)																															
...																															

**Figure 111: EMRI\_BW\_METAFILE\_EXT Record Example**

**u1ID:** 0x0000000E specifies this record type as **EMRI\_BW\_METAFILE\_EXT**, which is a page offset record.

**cjSize:** 0x00000008 is the size in bytes of the data in this record.

**offset:** 0x0000000000000BB4 specifies the offset backward in the metafile to the preceding [Page Content Record \(section 2.2.3.1\)](#), the corresponding example of which is presented in section [3.2.6](#).

This record signals the end of the page.

## 4 Security Considerations

This file format enables third parties to send payloads (such as PostScript) to pass through as executable code.

## 5 Appendix A: Product Behavior

The information in this specification is applicable to the following Microsoft products or supplemental software. References to product versions include released service packs:

- Microsoft Windows NT® 4.0 operating system Service Pack 2 (SP2)
- Microsoft Windows® 2000 operating system
- Windows® XP operating system
- Windows Server® 2003 operating system
- Windows Vista® operating system
- Windows Server® 2008 operating system
- Windows® 7 operating system
- Windows Server® 2008 R2 operating system

Exceptions, if any, are noted below. If a service pack or Quick Fix Engineering (QFE) number appears with the product version, behavior changed in that service pack or QFE. The new behavior also applies to subsequent service packs of the product unless otherwise specified. If a product edition appears with the product version, behavior is different in that product edition.

Unless otherwise specified, any statement of optional behavior in this specification that is prescribed using the terms SHOULD or SHOULD NOT implies product behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term MAY implies that the product does not follow the prescription.

[<1> Section 1.3.1:](#) When a Windows application needs to print, it performs the following operations:

1. First, the application creates a printer device context specifying the target printer.
2. The application then calls Windows graphics device interface (GDI) methods such as **DrawLine** to pass drawing instructions to the GDI graphics engine.
3. The GDI graphics engine accumulates the drawing instructions into an EMFSPOOL file.
4. The spool file is sent to the Windows print spooler. One of the spool file formats accepted by the Windows print spooler is the EMFSPOOL.
5. The Windows print spooler interprets the EMFSPOOL, possibly also inserting page layout information and job control instructions into the data stream.
6. The spooler then sends the data stream to the serial, parallel, or network **port** driver associated with the target printer's I/O port.

[<2> Section 1.4:](#) EMF evolved from Windows metafile format (WMF), as specified in [\[MS-WMF\]](#).

[<3> Section 1.5:](#) The EMF spool format was defined and intended for use as the spool file format for Windows operating systems.

[<4> Section 2.2.3.1:](#) This record is not written to metafiles by Windows 2000, Windows XP, Windows Server 2003, Windows Vista, Windows Server 2008, Windows 7, and Windows Server 2008 R2 implementations.

<5> [Section 2.2.3.1](#): This record is not written to metafiles by Windows implementations.

<6> [Section 2.2.3.1](#): This record is not written to metafiles by Windows implementations.

<7> [Section 2.2.3.1](#): This record is not written to metafiles by Windows implementations.

<8> [Section 2.2.3.3.2](#): Windows NT 4.0: This is set to a nonzero value.

<9> [Section 2.2.3.3.3](#): This record is written to metafiles by Windows 2000 implementations only.

## 5.1 Version-Specific Support

This section describes Microsoft Windows® version-specific support for EMFSPOOL [Records \(section 2.2\)](#) by type, as specified in the [RecordType enumeration \(section 2.1.1\)](#).

The following table shows support for EMFSPOOL records in Microsoft Windows NT® Workstation 4.0 operating system SP2, Microsoft Windows® 2000 operating system, Windows® XP operating system, Windows Server® 2003 operating system, Windows Vista® operating system, Windows Server® 2008 operating system, Windows® 7 operating system, and Windows Server® 2008 R2 operating system.

Record type	Windows NT Workstation 4.0 SP2	Windows 2000	Windows XP, Windows Server 2003, Windows Vista, Windows Server 2008, Windows 7, and Windows Server 2008 R2
EMRI_METAFILE	X	X <b>Note</b> This record type is parsed, but is not written to metafiles.	X <b>Note</b> This record type is parsed, but is not written to metafiles.
EMRI_ENGINE_FONT	X	X	X
EMRI_DEVMODE	X	X	X
EMRI_TYPE1_FONT	X	X	X
EMRI_PRESTARTPAGE	X	X	X
EMRI_DESIGNVECTOR		X	X <b>Note</b> This record type is parsed, but is not written to metafiles.
EMRI_SUBSET_FONT		X	X
EMRI_DELTA_FONT		X	X
EMRI_FORM_METAFILE		X <b>Note</b> This record type is parsed, but is not written to metafiles.	X <b>Note</b> This record type is parsed, but is not written to metafiles.
EMRI_BW_METAFILE		X	X

Record type	Windows NT Workstation 4.0 SP2	Windows 2000	Windows XP, Windows Server 2003, Windows Vista, Windows Server 2008, Windows 7, and Windows Server 2008 R2
		<b>Note</b> This record type is parsed, but is not written to metafiles.	<b>Note</b> This record type is parsed, but is not written to metafiles.
EMRI_BW_FORM_METAFILE		X <b>Note</b> This record type is parsed, but is not written to metafiles.	X <b>Note</b> This record type is parsed, but is not written to metafiles.
EMRI_METAFILE_DATA		X	X
EMRI_METAFILE_EXT		X	X
EMRI_BW_METAFILE_EXT		X	X
EMRI_ENGINE_FONT_EXT		X	X
EMRI_TYPE1_FONT_EXT		X	X
EMRI_DESIGNVECTOR_EXT		X	X
EMRI_SUBSET_FONT_EXT		X	X
EMRI_DELTA_FONT_EXT		X	X
EMRI_PS_JOB_DATA		X	X
EMRI_EMBED_FONT_EXT			X

## 6 Change Tracking

This section identifies changes that were made to the [MS-EMFSPOOL] protocol document between the May 2011 and June 2011 releases. Changes are classified as New, Major, Minor, Editorial, or No change.

The revision class **New** means that a new document is being released.

The revision class **Major** means that the technical content in the document was significantly revised. Major changes affect protocol interoperability or implementation. Examples of major changes are:

- A document revision that incorporates changes to interoperability requirements or functionality.
- An extensive rewrite, addition, or deletion of major portions of content.
- The removal of a document from the documentation set.
- Changes made for template compliance.

The revision class **Minor** means that the meaning of the technical content was clarified. Minor changes do not affect protocol interoperability or implementation. Examples of minor changes are updates to clarify ambiguity at the sentence, paragraph, or table level.

The revision class **Editorial** means that the language and formatting in the technical content was changed. Editorial changes apply to grammatical, formatting, and style issues.

The revision class **No change** means that no new technical or language changes were introduced. The technical content of the document is identical to the last released version, but minor editorial and formatting changes, as well as updates to the header and footer information, and to the revision summary, may have been made.

Major and minor changes can be described further using the following change types:

- New content added.
- Content updated.
- Content removed.
- New product behavior note added.
- Product behavior note updated.
- Product behavior note removed.
- New protocol syntax added.
- Protocol syntax updated.
- Protocol syntax removed.
- New content added due to protocol revision.
- Content updated due to protocol revision.
- Content removed due to protocol revision.

- New protocol syntax added due to protocol revision.
- Protocol syntax updated due to protocol revision.
- Protocol syntax removed due to protocol revision.
- New content added for template compliance.
- Content updated for template compliance.
- Content removed for template compliance.
- Obsolete document removed.

Editorial changes are always classified with the change type **Editorially updated**.

Some important terms used in the change type descriptions are defined as follows:

- **Protocol syntax** refers to data elements (such as packets, structures, enumerations, and methods) as well as interfaces.
- **Protocol revision** refers to changes made to a protocol that affect the bits that are sent over the wire.

The changes made to this document are listed in the following table. For more information, please contact [protocol@microsoft.com](mailto:protocol@microsoft.com).

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
<a href="#">1.2 References</a>	Added explanatory statement regarding the removal of the publishing year from Microsoft Open Specification document references.	N	Content updated.

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