

MARC 21 Specifications for Record Structure, Character Sets, and Exchange Media

EXCHANGE MEDIA: Part 3

Tape Transfer (Current)

January 2000

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INTRODUCTION

The specifications for the formatting and labeling of magnetic tape currently used in the distribution of MARC 21 authority, bibliographic, classification, community information, and holdings records are described below. These specifications have been used since the end of 1977 and are based on the standards noted below. They supersede the pre-1977 tape specifications.

STANDARDS

- *Magnetic Tape Labels and File Structure for Information Interchange* (ANSI X3.27-1978)
- *Recorded Magnetic Tape for Information Interchange (1600 CPI)* (ANSI X3.39)
- *Recorded Magnetic Tape for Information Interchange (6250 CPI, Group-Coded Recording)* (ANSI X.3.54)

TAPE FORMAT

MARC 21 magnetic tape reels and tape cartridges are nine channel tapes (odd parity) written at 1600, 6250, or 38,000 characters per inch. MARC 21 tapes contain internal labels written in ASCII. Each label is an 80-byte record, the byte positions of which are numbered, starting with the leftmost byte position, 0 to 79. Each label occupies a separate 2048-character file segment (1968 characters of which are padding blanks), without any Segment Control Word. (Refer to the section on record segmentation for more information on the use of the Segment Control Word in segments containing

MARC 21 records.) Each file of records is terminated by a tape mark.

TAPE FILE ORGANIZATION

Files may be organized on tape in volumes in one of four ways: 1) single volume, single file; 2) single volume, multiple files; 3) multiple volumes, single file; and 4) multiple volumes, multiple files. Examples of the sequence of labels, tape marks and files for each configuration is given below.

Single volume, Single file

Volume Header Label (VOL1)
File Header Label (HDR1)
File Header Label (HDR2)
Tape Mark
File of data records
Tape Mark
End of File Label (EOF1)
End of File Label (EOF2)
Tape Mark
Tape Mark

Single volume, Multiple files

Volume Header Label (VOL1)
File Header Label (HDR1)
File Header Label (HDR2)
Tape Mark
File A of data records
Tape Mark
End of File Label (EOF1)
End of File Label (EOF2)
Tape Mark
File Header Label (HDR1)
File Header Label (HDR2)
Tape Mark
File B of data records
Tape Mark
End of File Label (EOF1)
End of File Label (EOF2)
Tape Mark
Tape Mark

Multiple volumes, Single file

Volume A

Volume Header Label (VOL1)
File Header Label (HDR1)
File Header Label (HDR2)
Tape Mark

Volume B

Volume Header Label (VOL1)
File Header Label (HDR1)
File Header Label (HDR2)
Tape Mark

File of data record-Part 1	File of data records-Part 2
Tape Mark	Tape Mark
End of Volume Label (EOV1)	End of File Label (EOF1)
End of Volume Label (EOV2)	End of File Label (EOF2)
Tape Mark	Tape Mark
Tape Mark	Tape Mark

Multiple volumes, Multiple files

Volume A	Volume B	Volume C
Volume Header Label (VOL1)	Volume Header Label (VOL1)	Volume Header Label (VOL1)
File Header Label (HDR1)	File Header Label (HDR1)	File Header Label (HDR1)
File Header Label (HDR2)	File Header Label (HDR2)	File Header Label (HDR2)
Tape Mark	Tape Mark	Tape Mark
File A of data records	File B of data rec.-Pt.2	File B of data rec.-Pt.3
Tape Mark	Tape Mark	Tape Mark
End of File Label (EOF1)	End of Volume Label (EOV1)	End of File Label (EOF1)
End of File Label (EOF2)	End of Volume Label (EOV2)	End of File Label (EOF2)
Tape Mark	Tape Mark	Tape Mark
File Header Label (HDR1)	Tape Mark	File Header Label (HDR1)
File Header Label (HDR2)		File Header Label (HDR2)
Tape Mark		Tape Mark
File B of data rec.-Pt.1		File C of data records
Tape Mark		Tape Mark
End of Volume Label (EOV1)		End of File Label (EOF1)
End of Volume Label (EOV2)		End of File Label (EOF2)
Tape Mark		Tape Mark
Tape Mark		Tape Mark

TAPE LABELS

MARC 21 tapes contain internal labels that identify and characterize the volume and file section. They occur at the beginning of a volume and at the beginning and end of each file section. Each label is recorded in a separate block. Tapes should be identified on an external eye-readable label by volume and number.

The internal labels appearing on MARC 21 tapes are described below. The labels may contain ASCII numeric characters

0-9, ASCII uppercase alphabetic characters A-Z, and characters from the following group of ASCII graphic symbols:

SP ! " % & ' () * + , - . / : ; < = > ? _

In the following tables, "numeric" refers to ASCII numerics 0-9, and "alphanumeric" refers to all the allowable characters as specified above. Where numeric characters are indicated in *Content*, if the numeric value is shorter than the length allotted for the element, then the value is right justified and unused positions filled with zeros. Where alphanumeric characters are indicated in *Content*, if the alphanumeric value is shorter than the length allotted for the element, then the value is left justified and unused positions filled with blanks. The ASCII blank character is code 20(hex).

Volume Header Label (VOL1):

<i>Element Name</i>	<i>Bytes</i>	<i>Length</i>	<i>Content (Description)</i>
Label Identifier	0-2	3	VOL
Label Number	3	1	1
Volume Identifier	4-9	6	(numeric characters)
Accessibility	10	1	(blank)
Unused	11-36	26	(blanks)
Owner Identifier	37-50	14	(alphanumeric characters)
Unused	51-78	28	(blanks)
Label Standard Ver.	79	1	1

Example: Library of Congress Volume Header Label (VOL1)

VOL 1 <nnnnnn> # <26 #> LIBROFCONGRESS <28 #> 1

Notes: # = blank (ASCII 20(hex)). Library of Congress MARC Distribution Service tapes use unique serial numbers as Volume Identifiers. Tapes are also identified in an external label by volume and number as issues in the MARC Distribution Service.

File Header Label (HDR1):

<i>Element Name</i>	<i>Bytes</i>	<i>Length</i>	<i>Content (Description)</i>
Label Identifier	0-2	3	HDR
Label Number	3	1	1
File Identifier	4-20	17	(alphanumeric characters)
File Set Identifier	21-26	6	(numeric characters)

File Section Number	27-30	4	(numeric characters)
File Sequence Number	31-34	4	(numeric characters)
Unused	35-40	6	(blanks)
Creation Date	41-46	6	(blank and 5 numeric characters)*
Expiration Date	47-52	6	(blanks)
Accessibility	53	1	(blank)
Block Count	54-59	6	000000
System Code	60-72	13	(alphanumeric characters)
Unused	73-79	7	(blanks)

*The date is formatted yyddd, where yy = last 2 digits of the year and ddd = Julian day.

Example: Library of Congress File Header Label (HDR1)

```
HDR 1 MARC.BOOKS##### <nnnnnn> 0001 0001 <6 #> #yyddd
      <6 #> # 000000 OS370##### <7 #>
```

Notes: # = blank (ASCII 20(hex)).

The File Identifier is different for each Library of Congress MARC Distribution Service. The File Set Identifier will be the same as the Volume Identifier in VOL1. The System Code may vary. The following are representative of those used:

- Books (All) = MARC.BOOKS
- Books (English) = MARC.BOOKS.ENG
- Books CJK (Chinese, Japanese, Korean) = MARC.BOOKS.CJK
- Visual Materials = MARC.VISMAT
- Serials = MARC.SERIALS
- Music = MARC.MUSIC
- Name Authorities = MARC.NAMES
- Subject Authorities = MARC.SUBJECTS
- Books (All) [UNIMARC] = UNIMARC.BOOKS

Example:

National Library of Canada File Header Label (HDR1)

```
HDR 1 marc.canmon.##### <nnnnnn> 0001 0001 <6 #> #yyddd
      <6 #> # 000000 UNIX##### <7 #>
```

Notes: # = blank (ASCII 20(hex)). The File Identifier is different for each file distributed through the National Library of Canada's MARC Records Distribution Service as follows:

- Canadiana Monographs = marc.canmon.
- Canadiana Music and Sound Recordings = marc.canmsr.
- CONSER = marc.conser.
- Canadiana Authorities = marc.authrs.

File Header Label (HDR2):

<i>Element Name</i>	<i>Bytes</i>	<i>Length</i>	<i>Content (Description)</i>
Label Identifier	0-2	3	HDR
Label Number	3	1	2
Record Format	4	1	U
Block Length	5-9	5	02048
Record Length	10-14	5	00000
Unused	15-49	35	(blanks)
Buffer Offset	50-51	2	00
Unused	52-79	28	(blanks)

Example: Library of Congress File Header Label (HDR2)

```
HDR 2 U 02048 00000 <35 #> 00 <28 #>
```

Note: # = blank (ASCII 20(hex)).

End-of-Volume Label (EOV1):

<i>Element Name</i>	<i>Bytes</i>	<i>Length</i>	<i>Content (Description)</i>
Label Identifier	0-2	3	EOV
Label Number	3	1	1
Same as HDR1	4-53	50	(same as HDR1)
Physical Block Count	54-59	6	(numeric characters)
Same as HDR1	60-79	20	(same as HDR1)

Example: Library of Congress End of Volume Label (EOV1)

EOV 1 <same as HDR1> <nnnnnn> <same as HDR1>

End-of-Volume Label (EOV2):

<i>Element Name</i>	<i>Bytes</i>	<i>Length</i>	<i>Content (Description)</i>
Label Identifier	0-2	3	EOV
Label Number	3	1	2
Same as HDR2	4-79	76	(same as HDR2)

Example: Library of Congress End of Volume Label (EOV2)

EOV 2 <same as HDR2>

End-of-File Label (EOF1):

<i>Element Name</i>	<i>Bytes</i>	<i>Length</i>	<i>Content (Description)</i>
Label Identifier	0-2	3	EOF
Label Number	3	1	1
Same as HDR1	4-53	50	(same as HDR1)
Block Count	54-59	6	(numeric characters)
Same as HDR1	60-79	20	(same as HDR1)

Example: Library of Congress End of File Label (EOF1)

EOF 1 <same as HDR1> <nnnnnn> <same as HDR1>

End-of-File Label (EOF2):

<i>Element Name</i>	<i>Bytes</i>	<i>Length</i>	<i>Content (Description)</i>
Label Identifier	0-2	3	EOF
Label Number	3	1	2
Same as HDR2	4-79	76	(same as HDR2)

Example: Library of Congress End of File Label (EOF2)

EOF 2 <same as HDR2>

TAPE RECORD SEGMENTATION

MARC 21 records, are written to tape using a segmented record technique based on ANSI X3.27. This technique utilizes physical blocks fixed in length at 2048 characters, with records or record segments filling the entire block. Each record, or record segment, is preceded by a five-character Segment Control Word (SCW). The first character position of the SCW is called the Segment Indicator (see below) and contains a value that indicates the content of the segment. The last four character positions of the SCW contain the Segment Length. The Segment Length consists of four ASCII numerics, expressed as a decimal number, giving the length, in bytes, of the record segment plus the length of the SCW. The number is right justified with zero fill.

Segment Indicator (character position 1, ASCII numeric)

- 0 - Record begins and ends in this segment
- 1 - Record begins but does not end in this segment
- 2 - Record neither begins nor ends in this segment
- 3 - Record ends but does not begin in this segment

Segment Length (character positions 2-5, ASCII numerics). Segment Length includes the 5 characters of the SCW.

Record segments may thus span blocks or volumes. However, there may be only one segment of the same record in a block. The segments of a record are written in consecutive order; the segments of other records are not interspersed.

A segment may contain no fewer than six characters; such a segment consists of the SCW and one data character. If at the end of a logical record, less than six positions remain in a block, the block is padded with ASCII blanks and the next logical record begins in the next block. If the last physical block in a file is not completely filled, it is padded to its full length with ASCII blanks following the last data character. For example, if the only segment in the last block in a file is the minimum length of 6 characters, then that block is padded with 2042 ASCII blanks.

While there is no limit to the number of segments comprising one record, MARC 21 records have a maximum length of 99999 characters. This is the largest number that can be entered in the MARC 21 Logical Record Length field (Leader, character positions 00-04). Thus, the largest possible MARC 21 record could be contained in 49 blocks.

Example: Record 1 has logical length of 4231 characters; Record 2 has logical length of 1890 characters; Record 3 has logical length of 1845 characters. Record 3 is the last record.

Block 1:

SCW--> DATA----->
1 2048 2043 char. of Rec.1

Block 2:

SCW--> DATA----->
2 2048 2043 char. of Rec.1

Block 3:

SCW--> DATA-----> SCW--> DATA-----> PADDING
3 0150 145 char. of Rec.1 0 1895 1890 char. of Rec.2 3 blanks

Block 4:

SCW--> DATA-----> PADDING
0 1850 1845 char. of Rec.3 198 blank char.

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