The Lehigh On-Line Cataloging System.

Preston F. Marshall

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The Lehigh On-Line Cataloging System

by

Preston F. Marshall, Jr.

A Thesis
Presented to the Graduate Committee
of Lehigh University
in Candidacy for the Degree of
Master of Science
in
Information Science

Lehigh University
1975
This thesis is accepted and approved in partial fulfillment of the requirements for the degree of Master of Science.

October 29, 1975
(date)

Professor Donald J. Hillman
Professor in Charge

Professor Robert F. Barnes
Chairman of the Division of Information Science
ACKNOWLEDGMENTS

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ABSTRACT

This paper describes the data base construction and on-line operation of the Lehigh MARC cataloging system, LEMARC. This system performs automated cataloging of MARC like records including data base access, record modification, and communications to a holdings control system. In addition each system user can maintain a private data base of either selected data base records or user generated records. The paper includes the design, internal and user specifications.
I. INTRODUCTION

Lehigh University became involved in automated cataloging as the result of two ongoing university activities. The first of these was a program for library mechanization which had already succeeded in automating the circulation control system and acquisitions process. The second was the continuing study into the theoretical framework of information retrieval begun in 1962 by Donald J. Hillman in the Center for Information Science, and which currently involved implementing the LEADER retrieval system within the MART Science and Technology library.

A prototype system was developed in February 1972 to experiment with different ways of using MARC records in both library technical processing and information retrieval systems. For a period of a year this prototype was used, not only by Lehigh, but also by Bucknell University Library, and the staffs of both government and corporate libraries. Based on observations of the usage of the prototype system, a second cataloging system, LEMARC, was developed.
II. SYSTEM REQUIREMENTS

Experimentation with the prototype system showed that a MARC based system could provide significantly more than technical processing service to the library. Typical activities that the prototype system was used for included pre-order searching, inter-library loan verification, and a current awareness service based on titles and authors; the only content indicating fields available in the prototype. A system designed solely for technical processing could not support these requirements; technical processing systems quite often assume that the system user has the work immediately available and can supply the exact form of the search information, for example the title. Thus there exists a single retrieval key for each searchable attribute, and the user can reasonably be expected to supply it.

In many of the applications mentioned this is not a reasonable assumption, as users often have words misplaced or dropped within a title or main entry when they approach a librarian. If a system is to be useful as a verification tool has to be tolerant of this sort of request fault. A second reason for expanding the retrieval capacity to the extent we did was that Lehigh planned to eventually produce a patron access capacity as part of the automation program. It was desired to minimize the degree of system proliferation, and produce a cataloging system whose data base and operations
would be as compatible with the later stages as possible. While text element retrieval is very desirable for the technical processing requirements already mentioned, it is essential to the later development of the patron access system. Therefore data elements that are likely to be permuted or have words dropped are searched in "text" mode, in which the only retrieval requirement is that words that are present in the search also be present in the data field, with no consideration of order. Thus incomplete or out of order title or corporate main entry searches can still be performed successfully. For example any of the following would retrieve "Compiler Construction for Digital Computers":

"Digital Computer Compiler Construction",
"Compiler Construction",
"Digital Compiler Construction".

This approach has certain drawbacks, primarily that there can exist multiple, and undesired, records for even a search key that corresponds exactly to the data field.

To allow a more specific search query, both author and title searches can be combined, retrieving only records that satisfy both criteria. Results of actual operation have shown that the combined author-title search is successful, in almost all cases, in reducing retrieved record lists to a reasonable length.

Author name keys can also be partially specified, and all records that satisfy the partial specification can be retrieved.
For example, if JONES is used as a retrieval key, then all Jones records will be retrieved, JONES, A will retrieve those with A Jones as a name, and JONES, AS only AS Jones records. Up to three initials are allowed. This flexibility comes at a certain cost to the user, for it requires additional input and occasionally results in an extra user interaction to screen output. The added user effort has been found to be minor compared to the flexibility obtained.
III. SYSTEM LAYOUT

A. General Layout

The LEMARC system is shown in Fig. 1. Input records arrive from two sources, either Library of Congress MARC tapes, or original cataloging performed on the system. No on-line update is performed. The UPMARC system verifies the validity of each input record, and does an immediate update of all key files, after performing the editing operations described in Appendix E. Record text is placed in the text file system. Access from key files to record text is via a document number that is not directly related to physical location. This was added to provide more efficient disk storage control during weekly MARC update cycles, in which 50% of the records are often replacement or deletion transactions.

B. Data Base Structure

The LEMARC data base structure consists of four sets of data files, controlled through entries in the system control file, MARCSKL. This file includes both the physical and logical attributes of the files in the data base, plus the system definition of each file as a File Definition Block (FDB). This control file describes a logical combination of files, and their relationships. All attach and access information is contained in MARCSKL so no data base characteristics need be included in the access programs.
INFORMATION FLOW IN LEMARC
Fig. 1

MARC TAPE

ORIG. CAT.

UPMARC

SEARCH ACCESS

MARCDOC

LC NUMBER

ISBN

PERS. MAIN ENTRY

CORP MAIN ENT. TITLES

CRT/TELEPRINT

KEYBOARD

ONLINE LEMARC

ONLINE LEMARC

CATALOG FILE

TEXT FILE 1

TEXT FILE 8

USER SAVE FILE

BACKUP
1. Text File System

The text file system contains from two to nine files. The first, MARCD0C, is a word addressable files. Entries in this file are 1 word long and point to the text file and word location of each record in the system. By restricting access to the text system to logical record number only it is possible to reorganize or restructure the text system without updating the key files. The text files, MRCTXT1 - MRCTXT8 are also word addressable files. The records are stored in LEMARC internal format.

2. Key System

The key system contains three files for three different entry types. The block and record size for each key type is contained in MARCSKL. Access to the key files is by a common randomizing algorithm. The output range is controlled by the MARCSKL file. For each file there is allocated within it prime storage area and an overflow area. The prime area is equal to the number of buckets times the length of prime buckets. The overflow area can be established with a different record length depending on the expected statistical characteristics of the randomizer output. For unique keys it is reasonable to assume that any entry can be found in one read 95% of the time with a file configured to fill 90% of the prime storage area.
3. Update Control Files

The update control requires two files. The first, MARGAR holds location-length pairs for free space in the text files. Typically this space is made available when a record is deleted. This file is kept in core during the update process. The second file is MARCMEI. This file contains entries destined for the MARCME file. Since access to these keys is not required during the update process, it is more efficient in large volume updates to handle these keys in a sequential manner. Direct sequential update is a update run option.

4. On-Line Control Files

These files interface between the various on-line activities and the off-line processes. MARCUSERFLxx holds user stored records that may or may not be complete MARC records. This file is initialized batch and utilized by the on-line system only. It may be reorganized in batch mode. The other communication file is MARCSAVEFLx, which holds cataloging output from on-line activities. It is read and reset by the batch card production system.
IV. ON-LINE PROGRAM ORGANIZATION

A. Requirements

The on-line component of LEMARC was written to meet the following objectives:

1. Minimize Memory Requirements. Since the Lehigh computing environment is centered around a single CDC 6400, minimal memory requirements are essential to receiving reasonable service from the time sharing system. This requirement was felt to be more important to system performance than the amount of central processor or channel time required.

2. Operate on TTY compatible terminals. Although cataloging operations must be performed on a full ASCII terminal (ex. A Beehive Super Bee) inquiry and verification should be performable on any TTY like device. This precluded micro-programmed or intelligent terminals.

3. Potential for Reentrant Operation. This first version of LEMARC was not reentrant, since our performance studies showed that at least four active terminals were required to make reentrant operation break even. However, later plans, such as patron access would easily meet this level, so the programming developed for LEMARC was set up to allow relatively simple conversion to multi-user use.

4. Operate with Different Mass Storage Configurations. One of the major costs of running an on-line system is the cost of disk mass storage. It is also true that very little of
this resource is actually used at any one time. In a library system, the major storage requirement is for record text. Therefore we set LEMARC up so that the system could operate with different sets of records available. Currently this division is by receiving date, but subject area is an equally reasonable division criteria. The key files contain keys to all active records so a user can be informed when a record that is not available is retrieved. Different sets of records can be scheduled depending on the needs of the user group. For an inconvenience in accessing 5% or so of the search requests, up to 50% of the storage costs of the system can be eliminated. This is by no means a very desirable solution, but it does allow a greater degree of control over the system configuration and fixed costs.

B. Implementation

The implementation of LEMARC is very modular, not only for the obvious programming advantages modularity yields, but also to simplify the use of LEMARC routines in other systems. All input is channeled through a single routine, COMMAND. Each command type is handled by a separate command processing routine. Since all input processing is contained in COMMAND, various terminal characteristics can all be dealt with in one location. COMMAND, after verifying the command, then transfers control to the appropriate service routine. No user dependent storage is contained within each service routine, so as long as two users
are not scheduled into the same command the system can easily be made reentrant.

The command service routines, and the routines they require, all reside on a single library. To configure a LEMARC system, a set of macro calls cause the loading and linking of the desired service routines. LEMARC generation MACROS include:

1. COMMAND text, routine

   This allows version of LEMARC to be assembled to support different activities. Some systems may not include features like cataloging or private store area. Since each user on LEMARC has his own copy, the more compact each version is the better the entire system will perform. Also this allows multiple input commands to be made synonymous, which is convenient if users are used to different systems. It also allows single keys, such as the program function keys to be made equivalent to text commands such as LCNUMBER or TITLE.

2. TERMINAL type

   Certain versions of LEMARC are generated to assume, and require, that the terminal they are active at is a full ASCII terminal, and transmit both upper and lower case characters. Others display only a restricted character set and either display the shift characters, or ignore them.
3. MAXDOCL number

Different usages of LEMARC have differing requirements in terms of maximum number of documents that can be displayed as the result of a single search. For cataloging versions up to 512 documents can be displayed; for inquiry versions only 128 documents are displayable in each search pass.
LEMARC PROGRAM ORGANIZATION

Fig. 2

- KEYBOARD
- INPUT TERMINAL CONTROL
- COMMAND
- DISPLAY
- OUTPUT TERMINAL CONTROL
- USER AREA
- COMMAND SERVICE ROUTINES
- DATA MANAGER
- LEMARC DATA BASE
V. ADDED FEATURES

Although the basic functions of a cataloging system have been covered, there are a number of additional features that can add to the utility and ease of use of a system, although they are not essential.

A. Private Store Area

In our initial study of library requirements, a need for user oriented, temporary storage capacity was significant. This resulted for several reasons. The first was a desire on the part of the library cataloging supervisor to be able to verify the validity of cataloged records, on a complete, or partial basis. There was also a desire to put a record aside for later use, or pass a record to another user.

This need was met through the provision of a private store area for each cataloging user. This file stores up to one hundred records that may or may not be complete (i.e. main entry, title, call number, etc.) and so are only accessible through a number assigned to each record. The user can either request to store the current record in number nn, or store the current record in the next available location.

In the latter case the system would inform the user of the location that was used. Users can move records in and out
of the private store from the current record area.

Most importantly, users can access other users private store if it is not being used, and if they know the password. In that way a supervisor can examine the completed cataloging output, or a record that has caused a problem and leave comments or solutions in the private store.

There is one more advantage to the private store, particularly for installations that have a reasonably small usage rate. Since the private store area can exist on a separate device from the main data base, private store operations, including cataloging, can be performed even if the data base itself is unavailable. This technique can reduce the total resources required to maintain a cataloging system if it is acceptable to the user group, and the unused resources can be used by another system.

B. Message Switching

Experience with operating the LEADERMART system showed users (or the system itself) sometimes required the ability to communicate directly with a human. In the LEADERMART system a COMMENT command would display the user's comment on a Teletype at the Center for Information Science, to be noted or acted on by a staff member. The LEMARC system displays a message on a specified terminal (if available) in the following situations:

1. Every time a user enters or leaves the system,
2. Every time a system problem develops, ex. a file is found to be missing or out of space,

3. At a user request.

A staff member can then respond by sending a message to the terminal or rectifying the problem situation. Users can also communicate directly with other system users. Since we have very little operational experience with this feature it is not possible to determine its values to the user community.
VI. CONCLUSION

Since we have had very little operational experience with the system it is not possible to determine the acceptance of the system at this point. The system has several advantages:

1. It can be configured to fit a wide variety of requirements and resource availabilities.
2. It includes many capabilities beyond those required for technical processing, and so can be used to discover reaction to features such as message switching, information retrieval and patron access.
3. It is compatible with the requirements for bibliographic information retrieval systems.
4. It is easily extendable to additional requirements with a minimum of additional programming and data base changes.
REFERENCES


APPENDIX A
LEMARC USERS MANUAL

This appendix is a reproduction of the current LEMARC USERS manual. It consists of chapter I-VIII.

I. Initiating LEMARC
II. Initial Messages
III. Record Display
IV. Record Retrieval
V. Cataloging and Record Modification
VI. Private Store Area
VII. Miscellaneous Commands
VIII. Errors and Problems

In addition five Exhibits are included

A. Error Messages
B. User Definition Form
C. Save Parameters and Library Description
D. User Definition Values
E. Command List
Introduction

The Lehigh MARC System (LEMARC) is designed to aid library technical staff members working with the Library of Congress MARC II data base. The objective of the system is to aid the user in obtaining a machine readable cataloging record either from the data base or by original entry. Once the suitable record has been found the system provides the user with the capability to retrieve, modify and store the record for off-line catalog card production.

This document describes the basic characteristics of the system with both narrative and examples. Additional exhibits are included to provide background information for system users.
I. Initiating LEMARC

The LEMARC system is entered by first logging into the Lehigh computer with a valid user name and password and valid user description

Type

MARC.
II. Initial Messages

When LEMARC is first initiated it will inform you of several important facts about the data base, including the date of the last update and the last MARC issue.

Normally LEMARC will display READY.

when it is ready for your first command. It is possible that it may have trouble collecting the MARC data base. Discussion of this is in Chapter VIII.

LEMARC is now ready. The LEMARC system has the capacity to perform many different operations on the MARC data base and on particular MARC records. The next chapters describe the various operations that can be performed and discuss how to combine them to perform various purposes.
Command Entry

This section will discuss the entry of commands into the LEMARC system. The particular commands will be described later.

The LEMARC system performs particular functions for the user. It is the responsibility of the user to combine these functions together. All commands entered are of this form:

Command, parameter 1, parameter 2, 111

Command is a string of characters (described later) that refer particular functions such as DISPLAY, G0 or LCNUMBER. The parameters that follow depend on the particular function, they may consist of an LC number, text or a line number.

Each line begins in column 1. Parameters are separated from each other and the command by commas. The last parameter (or the command itself if there are none) can be terminated by a blank. When a line is ready for transmission, type carriage return, send or enter depending on your terminal.

LEMARÇ requires that only enough of the command be typed to make it unique from any other possible commands. It is acceptable to type more than this; for example:

LC, 68-4648
LCN, 68-4648 and
LCNUMBER, 68-4648

will all be recognized. Generally the first two characters are sufficient to guarantee uniqueness. The command may contain characters in both upper and lower case.
General Flow

There are some important concepts that make LEMARC usage more easily understood. Essentially the LEMARC user performs three major procedures

1) Request Entry
2) Inspection and Selection
3) Modification and Storage

Request entry (described in Chap. IV) yields a list of documents from 0 on up. This is the current document list. If it contains no items, it means that either the MARC II database does not contain what you are looking for, or your key was not formed properly (see Exhibit B). There are tools in LEMARC for easily dealing with this list by reducing its content.

The next phase is selection of the desired record. The PAGE and DOCUMENT commands aid in selecting records from the current list. Any LC or ISBN search, or a DOCUMENT command yield a single current record.

This current record can then be modified and saved.
III. Record Display

1. DISPLAY, line 1, line 2

This command displays the current document, from line number 1 to line number 2. If the parameters are missing, the entire record is displayed. If no record has been retrieved, the display will be aborted.

2. PAGE, docnum

This command starts the page display beginning with document < docnum >. This command is appropriate after a main entry search. The page display shows only the first line of the title and main entry, and a single page is displayed. For a 25 line terminal, 11 documents will be summarized. If docnum is not specified, the display will be continued from where it was left off, or at the beginning, document 1, following a search.

3. DOCUMENT, docnum

This command displays a particular document from the list resulting from a main entry or title search. Typically it is used to examine a particular document viewed in the page display. If docnum is not specified, the next document in line, or the first following a search will be displayed. This document then becomes the current document, and can be modified, saved or stored (described later).
4. G0

If the display for a LEMARC record will continue beyond the bottom of the current display screen, the LEMARC will request that the user enter a G0 to continue the display. This process will continue until the record has been completely displayed (or until the last line has been displayed if a limit was set in a DISPLAY command), when a READY will be displayed. Even though the system is requesting a G0, any valid LEMARC command may be entered at any point and the display continued with a G0 at a later point.
IV. Record Retrieval

1. **LCNUMBER, lcno**

   This command retrieves and displays the record for lcno. The hyphen can be included, and zero's following the first two digits are not required.

   *LC, 68-4648*
   *LC, 68-04648*
   *LC, 68-004648*

   are all equivalent.

2. **ISBN, isbn**

   This command retrieves and displays the record for isbn. The hyphen's can be included. An SBN can be converted to an ISBN by adding the country code (a zero for the U.S.) onto the left end of the SBN. The resulting number is nine digits plus a tenth which serves as a check digit and can be left off.

3. **PENTRY, name**

   This command retrieves the record based on the author's name. The name consists of the author's last name, plus any desired initials. It is desirable to specify as many initials as possible, as this will minimize the number of records retrieved. However if the MARC record does not contain the initials you have specified it will not be found, and it will be necessary to try the search with one less initial. The following search requests will all return the desired document,
although, the first requests will yield fewer undesired documents

PM, JONES AS
PM, JONES A
PM, JONES

4. CENTRY, corporate main entry

This searches for records based on the corporate main entry. The text of the main entry should be entered in full, except all punctuation should be left out. In order for a record to be retrieved, its main entry must contain all the words in the request, although order or any other words that may be present are not considered.

5. TITLE, title

This functions in the same manner as the CENTRY search except that the title is examined.

6. ANDD0CS

Often both the title and main entry searches will yield too many documents to easily inspect. To minimize the number of records that must be inspected, it is possible to specify both the title and main entry. The procedure is to logically 'and' the results of two searches together, yielding only records present in both lists.

After one search has been completed, and before the second search enter:

ANDD0CS
For example, to search U S CONGRESS; NOMINATION HEARINGS, enter
CM, U-S CONGRESS
AND
T1, NOMINATION HEARINGS

7. NSETM

On some searches, the internal record list of LEMARC may be exceeded. LEMARC will return as many records as it can, and will indicate that there is another set of documents. The retrieved list can be dealt with as with any document list. When it is exhausted, enter; NSETM to get the next set. It is even possible that no documents were retrieved, although there may be documents in a subsequent set. If one of these sets is 'AND'ed, the original request, followed by an immediate NSET should be entered. The 'AND' can then be performed against this set. It is important to realize that 'AND' operates on the current list, so it must be performed on each set individually. It is therefore important to do the search which is likely to result in the smallest list first.
V. CATALOGING + RECORD MODIFICATION

1. WSPACE

This command sets up a blank workspace for original cataloging. Data can be entered as alter statements (shown below).

2. ALTER

This command alters, deletes, or adds data to the current MARC record. The form is:

-, line no, tag, data

line no. This specifies the data element being referenced, and is of the form n.m.
Initially line numbers are assigned to the data elements in the record, incrementing n by 1 and with m=0, i.e. 1.0, 2.0, 3.0.
To insert a new item between element 2 and 3, line no should be 2.5. If the line number is the same as an existing one, it replaces the existing one. If the line number is blank, the entry will be added to the end of the record.

tag - This specifies the tag to be stored for the new field. If it is a new entry, it must be present. If the entry replaces or adds to an existing entry, the tag field can be left out, and the old tag value will be used.
data - This is the text of the data to be stored.
All data from the first non-blank character following the comma after tag through the last non-blank character of the line are stored.
No leading or trailing blanks can be stored.
If the first two characters of the data field are $$, the data in the line is entered as a continuation. If blanks follow the $$, they are included in the record.

For example:
To make an original cataloging entry:
-1,82, $a 301.6
-2,100, $a Horowitz, David
-3,245, $a Countr Culture and Revolution

To correct line 3
-3,, $a Counterculture and Revolution

3. SAVE

This command uses the current MARC record to make a permanent cataloging entry. The exact actions taken will depend on the user's Library Description File (see Exhibit C). The standard library values can be overridden by parameters following the SAVE. For example if a user normally has CAT=1, PRINT=0 (card production), the user can cause the document to be printed only by SAVE, CAT=0, PRINT=1
If the user's VERI flag (see Exhibit C) is 1, then save will be rejected. The user can perform a SAVE only by adding

VERI=0

to the parameter list.
VI. PRIVATE STORE AREA

Each cataloging user has 100 positions to temporarily store MARC records. These records are not part of the MARC data base and are retrievable only through the private store area commands.

1. GETREC,n

This command makes the record stored in position n the current document. If n is not specified the next record in sequence is returned, any unused records being skipped. The document list is not affected.

2. ST0REC,n

This command stores the current record in position n. If n is not specified, the next unused position is utilized, and the user is informed of the number. The document list is not affected. This command will be aborted if no open spots can be found if n is not specified. If n is specified any document in that position is overwritten. It is possible that the store will be aborted even if a position is open if no space is available. It may be necessary to purge a record to have two contiguous positions open.

3. PURGER, n

This purges record n from the private store. If n=ALL, the entire private store is cleared.

4. USE, ID, PASSW

This command allows one user to examine another user's private store area. It is necessary to specify both the ID
(2 characters) plus a password (PASSW) associated with that user. The original user cataloging description still applies, but the new users private store area is now accessible. If the USE attempt fails, the user will have no private store area. To regain the proper store area enter:

USE, HERE
VII. Miscellaneous Commands

1. DONE

This ends the session with LEMARC. The user can select another LEADERMART option.

2. MESSAGE, ID, message

This sends 'message' to terminal ID. This allows users to communicate among themselves. If ID is absent, the message is sent to the C.I.S. LEADERMART monitor terminal. When using this feature it is helpful if you identify yourself in the message, for ex.

M,, WHEN WILL MARC LC BE UP...SHARON

3. SETP, type, val

This command allows the user to override normal defaults during a LEMARC session. Type specifies the default value to be overridden, and val specifies the new value.

<table>
<thead>
<tr>
<th>type</th>
<th>default (see Exhibit C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NLINES</td>
</tr>
<tr>
<td>2</td>
<td>NCHARS</td>
</tr>
</tbody>
</table>

for example, if

SE,1,19

is entered, the terminal display will be adjusted to a 19 line terminal.
VIII. ERRORS AND PROBLEMS

A. Initiation

During program initiation (i.e. before the first READY- appears) several problems can be detected by the system. Both you and the Center for Information Science command terminal will be informed of any of these problems.

The LEMARC system consists of a set of data files. It is possible that for one reason or another one or more of these files may not be available to the LEMARC program. In that case one of the three messages below will be displayed.

1. MARCTXT file missing, some documents may not be retrievable

For any MARCTXT file that is missing, approximately 1/8 of the MARC records will not be available. References to them will be retrieved but at the point of display a message will indicate that the document is unavailable.

2. ___________ command not available

In this case the data file needed for the command is not available. That command will not be recognized if it is entered. For example

LNUMBER command not available

If these restrictions are not tolerable for your activity do an immediate DONE after LEMARC displays READY-.

3. MARC data base is not available

The MARC data base is not available so LEMARC will do a DONE itself. The next question you will get will be a chance to select a LEADERMART option.
B. During normal activity

Occasionally errors in MARC usage will occur. Most of these errors are user induced, but a few are errors detected by the system. An example of this later type would be error 1, which alerts you to a problem in the system. Most of the error messages are self explanatory and require only that you examine the last line entered and correct the mistake, for example mistyping a command. Others, indicating a record is unavailable, are not user errors but indicate an error condition in the MARC data base. The only action the user can perform is to skip over the document.
Exhibit A

ERROR MESSAGES

1. DOCUMENT FILE MISSING, RECORD UNRETRIEVABLE.

When LEMARC was initiated, one or more MARCTXT files was missing.

2. COMMAND NOT RECOGNIZED.

User entry was not a valid in EMARC entry. This could be because the command was mistyped, or not enough characters were entered. It is also possible that a file being missing caused a normally valid command to be unavailable.

3. SYSTEM DOCUMENT NUMBER INVALID.

If following a SYSDOC command, the document number was too large. If it occurs at any other point, it is an internal error to LEMARC, please notify C.I.S. of the situation.

4. DOCUMENT HAS BEEN DELETED.

This MARC record has been deleted by the Library of Congress. This will occur infrequently. Ignore it and keep going.

5. YOU HAVE NO CATALOGING CAPACITY.

You are not authorized to catalog, or else system was unable to find space to catalog your records.

6. YOU HAVE NO PRIVATE STORE CAPACITY.

You do not have a private store area.

7. YOUR PRIVATE STORE IS FILLED.

There is no more space in your private store area, purge some or all records.

8. NO RECORD STORED IN THAT POSITION.

No record has been stored in that position of your private store area.
9. SETP - VALUE NOT RECOGNIZED.

The set parameter value in a SETP command is out of range.

10. ILLEGAL LC KEY.

The LC number specified is illegal. Most likely it is greater than eight characters (not counting hyphen); is less than three; or contains alpabetic characters, in other than trailing position.

11. ILLEGAL ISBN KEY.

The ISBN Key is illegal, typically for reasons similar to (10) above.

12. MARC RECORD BAD.

The LC MARC record is unusable, skip it.

13. LEMARC INTERNAL ERROR.

The LEMARC program has detected an internal error. You will lose your current search, although anything you saved will not be lost. C.I.S. will automatically be informed of the situation. If this problem persists, do a DONE.

14. PASSWORD INVALID.

The password specified in the USE command is not correct, try again with the correct password or return to your own user area.

15. SPECIAL INSTRUCTIONS INVALID.

User options in SAVE command are not correct, see Exhibit C for description.

16. ACCOUNTING FILE ERROR.

Accounting for this usage may be inexact, please notify C.I.S. to insure an exact record.

17. NO MARC RECORD HAS BEEN RETRIEVED.

An attempt has been made to STORE, DISPLAY or ALTER when there is no current record.
18. NEXT/PAGE BEYOND DOCUMENT LIST.

A NEXT or PAGE request has been issued that would exceed the number of records retrieved.

19. BAD NUMERIC PARAMETER.

A parameter that should contain only digits contains other characters.

20. LINE NUMBER BAD.

ALTER request would require existence of a line number that does not exist.

21. ILLEGAL USER ID.

User ID is not a valid user ID for the LEMARC system.

22. COMMAND NOT YET IMPLEMENTED.

This feature of LEMARC has not yet been completed. Please be patient.

23. USER FILE UNAVAILABLE.

The user file requested in an USE command is in use by another user.

24. USER NOT KNOWN TO LEMARC SYSTEM.

The user ID specified in a USE command is not known to the LEMARC system.

25. ERROR in ALTER STATEMENT.

ALTER statement is improperly composed. Look for missing or extra commas.

26. NO ROOM TO STORE SAVED RECORD.

All LEMARC cataloging save files are filled. Notify C.I.S.
Exhibit C

Save Parameters and Library Description

In order to execute any SAVE functions under LEMARC it is necessary that for each cataloging user, a User definition be completed. The parameter values, and a sample form are in this exhibit.

Part of the User description is the specification of the standard catalogs which entries from that user will be sent to. For each catalog listed, a Catalog Description Form should also be completed. (In most cases one Catalog Description Form will serve multiple users). These define the existing card catalogs in the library system. They may also define archiving files. A special Catalog, PRINT, is defined for all users (if desired). Records sent here will be printed and mailed to the "SHIP TO" address in the User's Definition Form.
Exhibit D

USER Definition Values

PASSW  Password required to access private store are. If 0, is no access is possible.

VERI   I = SAVE allowed
        0 = SAVE not allowed. SAVE request will be rejected unless VERI=1 is listed as a special parameter.

HOLD   Holding library number. If no record is to be kept, this should be 0. (This value is originally assigned by C.I.S.

HOLDT  Holding library text. This text will appear in holding library area of card.

NCAT   Number of catalogs. Normally this will be the number of catalogs defined under LCAT. It is possible to define more LCAT entries than are reflected in the NCAT value. The extra catalogs will only have an effect if the NCAT value is set at SAVE issuance.

NLINES Number of lines displayed on terminal screen.

NCHARS Number of characters across one line.
**Exhibit D (cont.)**

**Catalog Description**

<table>
<thead>
<tr>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LABEL</td>
<td>Catalog Label 10 chars</td>
</tr>
<tr>
<td>DISP</td>
<td>Disposition code</td>
</tr>
<tr>
<td>CTYPE</td>
<td>Catalog type 0-7</td>
</tr>
<tr>
<td>CONTS</td>
<td>Continuation, default=1 0-7</td>
</tr>
<tr>
<td>CALLT</td>
<td>Call no. type, data element</td>
</tr>
<tr>
<td>CALLF</td>
<td>Call Format</td>
</tr>
<tr>
<td>LINEPC</td>
<td>Line position; primary call, d=3</td>
</tr>
<tr>
<td>ØVS1</td>
<td>Starting size, oversize 1 (in cm)</td>
</tr>
<tr>
<td>ØVS2</td>
<td>Starting size, oversize 2</td>
</tr>
<tr>
<td>ØVS3</td>
<td>Starting size, oversize 3</td>
</tr>
<tr>
<td>ØVL1</td>
<td>Oversize 1 symbol</td>
</tr>
<tr>
<td>ØVL2</td>
<td>Oversize 2 symbol</td>
</tr>
<tr>
<td>ØVL3</td>
<td>Oversize 3 symbol</td>
</tr>
<tr>
<td>ØVP</td>
<td>Position of oversize label</td>
</tr>
<tr>
<td>MHL</td>
<td>Maximum Headings Line d=3</td>
</tr>
<tr>
<td>CPH1</td>
<td>Ident position, heading line 1</td>
</tr>
<tr>
<td>CPI2</td>
<td>Ident position, heading line 2 - or</td>
</tr>
<tr>
<td>CSH</td>
<td>Char. set headings 1=full, 2=caps, d=1</td>
</tr>
<tr>
<td>TRC</td>
<td>Tracings present</td>
</tr>
<tr>
<td>SKLHM</td>
<td>Skip line between Heading+M.E. 0=no,1=yes,d=0</td>
</tr>
<tr>
<td>SKLMT</td>
<td>Skip line between M.E.+Title</td>
</tr>
<tr>
<td>SKLTC</td>
<td>Skip line between Title+coll.</td>
</tr>
<tr>
<td>SKLCN</td>
<td>Skip line between coll.+notes</td>
</tr>
<tr>
<td>PHOLD</td>
<td>Position of holdings data on card</td>
</tr>
<tr>
<td>SETI1</td>
<td>Set character position of Identure 1</td>
</tr>
<tr>
<td>SETI2</td>
<td>Set character position of Identure 2</td>
</tr>
<tr>
<td>SETI3</td>
<td>Set character position of Identure 3</td>
</tr>
<tr>
<td>SETI4</td>
<td>Set character position of Identure 4</td>
</tr>
</tbody>
</table>
Exhibit D (cont.)

Catalog Codes

1. Disposition code would indicate physical location of catalog data, i.e.
   1= Cards
   2-50 tape set n=1
   51-99 disk set n=50, etc.

2. 1= ATS  4=5  7=AS
    2= A  5=AT
    3= T  6=ST  0= no cards

3. Codes same as (2). Lists card types to be given continuations, i.e. C\_\_\_\_\_\_\_\_\_\_=1 will cause all cards to be continued.

4. Meaning depends on C\_\_\_\_\_\_\_\_\_\_. Refers to column of p16

5. 1= on right of call
    2= below call
    3= on left of call

6. Same code as (2). Only specified sets will have tracings present.

7. Position of holdings.
Command List

This is a list of all the commands available in LEMARC. The minimum characters to represent the command is capitalized, the rest is optional. For each command the chapter describing it is listed.

<table>
<thead>
<tr>
<th>Command</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lcnumber</td>
<td>4</td>
</tr>
<tr>
<td>Isbook</td>
<td>4</td>
</tr>
<tr>
<td>PMentry</td>
<td>4</td>
</tr>
<tr>
<td>Cmentry</td>
<td>4</td>
</tr>
<tr>
<td>Title</td>
<td>4</td>
</tr>
<tr>
<td>Nset</td>
<td>4</td>
</tr>
<tr>
<td>And list</td>
<td>4</td>
</tr>
<tr>
<td>Display</td>
<td>3</td>
</tr>
<tr>
<td>Go</td>
<td>3</td>
</tr>
<tr>
<td>PAGE</td>
<td>3</td>
</tr>
<tr>
<td>SDoc</td>
<td>3</td>
</tr>
<tr>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>Workspace</td>
<td>5</td>
</tr>
<tr>
<td>SAvE</td>
<td>5</td>
</tr>
<tr>
<td>SEQuence</td>
<td>5</td>
</tr>
<tr>
<td>D0Cument</td>
<td>3</td>
</tr>
<tr>
<td>Purger</td>
<td>6</td>
</tr>
<tr>
<td>STorec</td>
<td>6</td>
</tr>
<tr>
<td>Use</td>
<td>6</td>
</tr>
<tr>
<td>GEtrec</td>
<td>6</td>
</tr>
<tr>
<td>Message</td>
<td>7</td>
</tr>
<tr>
<td>SET p</td>
<td>7</td>
</tr>
<tr>
<td>D0ne</td>
<td>7</td>
</tr>
<tr>
<td>ECHO</td>
<td>7</td>
</tr>
</tbody>
</table>

This appendix includes the editing criteria for data stored in retrieval keys and the '008' field in the MARC record. The purpose of this editing is two fold.

(1) Normalization of data to simplify retrieval. An example of this would be the LC Number supplement, which we desired to place separately from the LC number text.

(2) Minimize Storage Requirements. An example would be the removal of very frequent (and non-sorting) words from the retrieval files.
1. LC Number 8 digits in R8 format
2. Supplement number (if present)
   Prefix
   Suffix format
   Revision date

   These fields are not separated by slashes as in a MARC record

3. Document number

<table>
<thead>
<tr>
<th>CARD</th>
<th>MARC</th>
<th>LEMARC</th>
</tr>
</thead>
<tbody>
<tr>
<td>78-657093</td>
<td>^78657093</td>
<td>78657093</td>
</tr>
<tr>
<td>78-657093 rev2</td>
<td>^78657093//r702</td>
<td>78657093//r702'</td>
</tr>
<tr>
<td>(revision date</td>
<td></td>
<td></td>
</tr>
<tr>
<td>470)</td>
<td>^78657093</td>
<td>78657093/AC</td>
</tr>
<tr>
<td>78-657093</td>
<td>^78657093/AC</td>
<td>78657093/AC</td>
</tr>
<tr>
<td>AC</td>
<td>^78657093/A</td>
<td></td>
</tr>
<tr>
<td>(revision date</td>
<td>^78657093/A</td>
<td></td>
</tr>
<tr>
<td>r70)</td>
<td>^78657093/AC/r70</td>
<td>78657093/AC/r70</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MARCLC first word</th>
<th>MARCLC second word</th>
</tr>
</thead>
<tbody>
<tr>
<td>--78657093</td>
<td></td>
</tr>
<tr>
<td>--78657093 r702</td>
<td></td>
</tr>
<tr>
<td>--78657093 AC</td>
<td></td>
</tr>
<tr>
<td>--78657093 AC r70</td>
<td></td>
</tr>
</tbody>
</table>
"Fixed" length data elements

"Type of Publication Date Code" (char. pos. 6) determines if the DATE1 (7-10) and DATE2 (11-14) are stored. If one of these fields is suppressed, all of the fields following it are shifted left 4 characters.

<table>
<thead>
<tr>
<th>Code</th>
<th>Date 1</th>
<th>Date 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>-</td>
<td>suppressed</td>
</tr>
<tr>
<td>C</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>n</td>
<td>suppressed</td>
<td>suppressed</td>
</tr>
<tr>
<td>r</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>m</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>q</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
100    Personal Main Entry

1. Up to 10 characters of last name (L format)
2. Remaining character of last name (if any)
   00 byte                                           (L format)
   Initials
3. Document number

Last Name - All characters up to the first comma in a MARC record except diacritical marks (shift 2) and any shift 1 characters

MARC       Word 1       Word 2
LA\$OR,\$ WILLIAM\$ALBERTLA\$OR---- -WA-------
RIMSKY- K\$RSAK\$V,\$ ILLYCH
         RIMSKY-K\$RSAK\$V-I---
The "STEM" is a maximum of 10 characters in length. It does not include shift 1 characters or any diacritical marks. Apostrophies and the characters that follow it are included in a stem.

A stem is delimited in a MARC record by:

1. beginning or end of a subfield  
2. period, comma, hyphen, or blank  
3. any numeric character not in a date.

A date is any string of four and only four numeric characters in which the first character is not zero. A date is considered to be a stem.

Some stems receive special treatment. "United States" and "U.S." are translated into the single stem "U-S"; "Great Britain" into "GRTBR". The position of the composite stem is that of the first stem that produced it, but all stems preserve their original position in the phrase. For example, for the phrase:

UNITED STATES CONGRESS

We generate the stems:

<table>
<thead>
<tr>
<th>Stem</th>
<th>Position</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>U-S</td>
<td>position = 1</td>
<td>length = 3</td>
</tr>
<tr>
<td>CONGRESS</td>
<td>position = 3</td>
<td>length = 3</td>
</tr>
</tbody>
</table>

A stoplist is used to keep "insignificant" stems out of the MARCCM file. This stoplist is generated by truncating all the
words in CISC\$FILE24STOPLIST to 10 characters and combining any duplicates that are produced. In addition to this stoplist, any stems of less than three characters are not considered significant (note that "U.""S." are exceptions). An insignificant stem does not change the position of stems that follow it in the phrase (a situation similar to "STATES" in the example above).

"Phrase" has the following meanings

a) 110 field - $A subfield
   $B subfields (as many as there are)
   $K subfields only if it immediately follows the $A subfield

b) 111 field - $A subfield only

c) 130 field - $A subfield

d) 245 field - $A subfield
VITA


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