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AEC RESEARCH AND DEVELOPMENT REPORT

COMPUTER PROGRAMS FOR ORDERING, LISTING, AND CIRCULATING LIBRARY BOOKS

N. A. BUHL
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Savannah River Laboratory
Aiken, South Carolina

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Mathematics and Computers
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**COMPUTER PROGRAMS FOR ORDERING,
LISTING, AND CIRCULATING LIBRARY BOOKS**

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**CONTRACT AT(07-2)-1 WITH THE
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ABSTRACT

The Technical Library of the Savannah River Laboratory uses COBOL programs to assist in purchasing and circulating books and to provide book lists and printed catalogs. The programs are written for the IBM System/360-65 with 524K storage and may be applied to a library of any size. Bibliographic and cataloging data for the library holdings are stored on magnetic tape from which data can be recalled in a number of print formats.

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INTRODUCTION

The Technical Library of the Savannah River Laboratory uses an IBM System/360-65 with 524K storage to control over 19,000 books and monographs. Many time-consuming and repetitive library operations have been automated to provide better and additional service to library users.

The library serves the Savannah River Laboratory, the Savannah River Plant, and the Savannah River Operations Office of the U. S. Atomic Energy Commission. The facilities for these organizations are located on a 315-square-mile site near Aiken, South Carolina. E. I. du Pont de Nemours and Company operates the laboratory and the plant for the Atomic Energy Commission. The library is primarily concerned with atomic energy and related technical subjects. Three librarians and four other staff members are employed.

To assist in the control of library materials, two COBOL programs have been developed for use with the Level E compiler. The Book Order Program prepares orders for the purchase of books. The Book Control Program stores bibliographic and cataloging data on a master tape that is updated periodically. Twenty-seven different options can be used to recall the data. These options provide catalog listings of all material in the library as well as listings of books on loan and those charged permanently to individuals. There is no limit on the number of books that can be processed by these programs.

Figure 1 (page 9) shows the library procedures for ordering, processing, circulating, recalling, and listing books.

The general procedure followed by library personnel is to assign an accession number to each book as it is ordered. This number becomes the unique identity of the book and is added to each of the punched cards necessary for a "book record". The order clerk keypunches three Book Cards when ordering a book. The Book Order Program prints purchase orders from these cards. Previously the order clerk typed multiple copies of book orders on 3" x 5" preprinted purchase order forms. Three of these slips were filed, one was sent to the book vendor, and two were used to order Library of Congress (LC) catalog cards. The computer-printed slips receive the same distribution except that three files maintained by the order clerk are replaced by printouts from the Book Control Program.

When a book is received, the book and the three cards punched by the order clerk are given to the technical processing personnel. The book is cataloged and additional cards are keypunched. The

additional data include all bibliographic and cataloging information. As few as 5 or as many as 15 punched cards may be needed. The Book Control Program stores the bibliographic and cataloging data on a master tape. The master tape is updated as new books are received or as the status of a book changes. Partial or complete printouts may be obtained on demand. These printouts replace six files previously maintained by library personnel. Output from the Book Control Program provides:

- Shelf list in book form
- Author, title, series, and subject catalogs in book form
- Subject bibliographies
- Purchase and accounting records
- Inventory control
- Accurate control over desk or departmental materials, surplus books, and lost books
- Listing of new acquisitions

The loan system previously required two charge-out card files, and recall notices were handwritten on preprinted forms. Now only one charge-out card file of punched cards is maintained. The Book Control Program produces two printouts of all books on loan: one arranged by author and the other by borrower. The same charge-out card is used to obtain recall notices.

The Book Order Program is explained in the first section of this report, and the Book Control Program is explained in the second section.

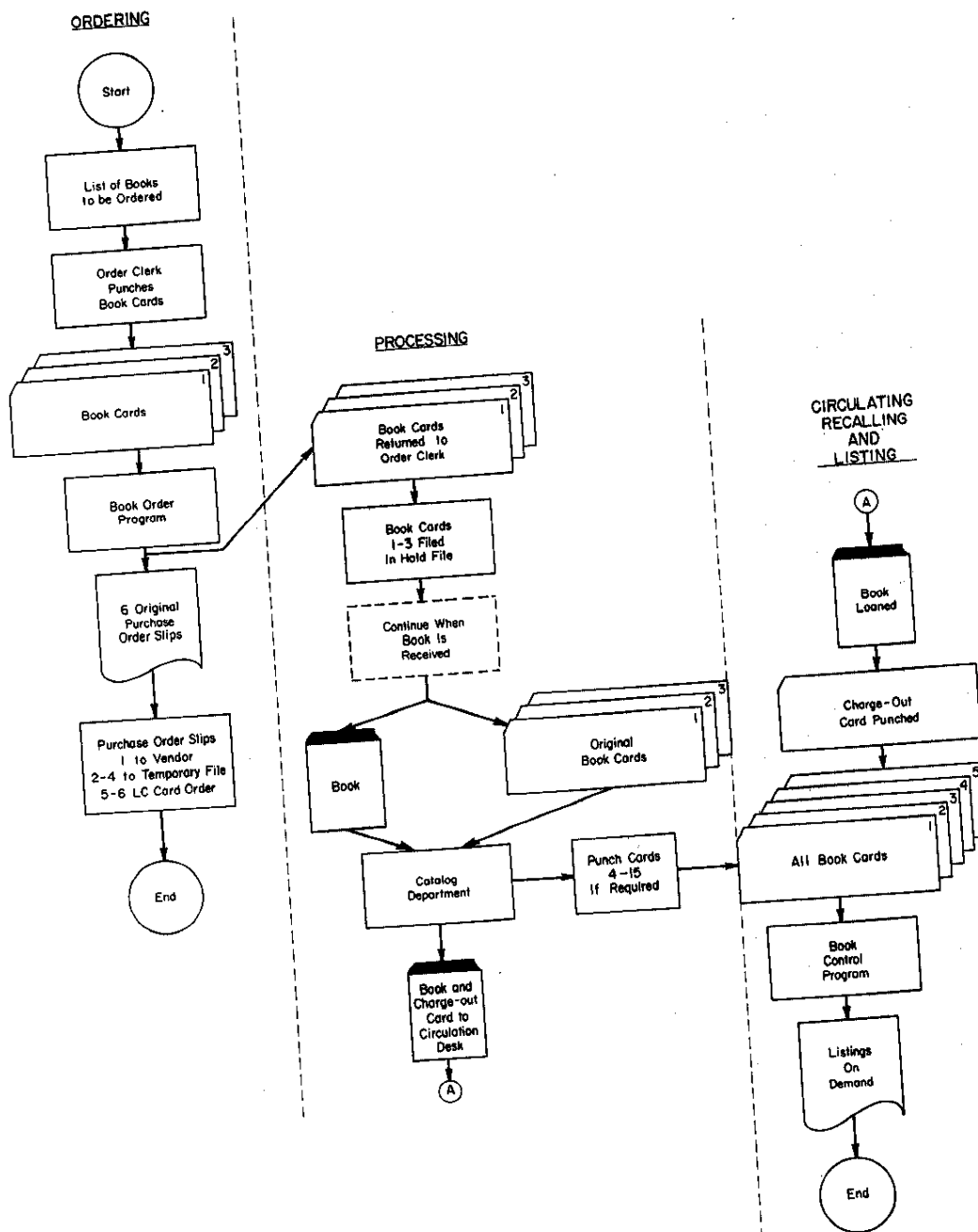


FIG. 1 LIBRARY PROCEDURE FLOWCHART

BOOK ORDER PROGRAM

PROGRAM DESCRIPTION FOR BOOK ORDER

To initiate a book order, the library order clerk keypunches three data cards per book from original order requests. These cards are submitted with the control deck. There is no upper limit on the number of books ordered at any one time. Since the source deck for the Book Order Program has already been compiled and link edited, only the cards in Figure 2 are necessary to execute the program.

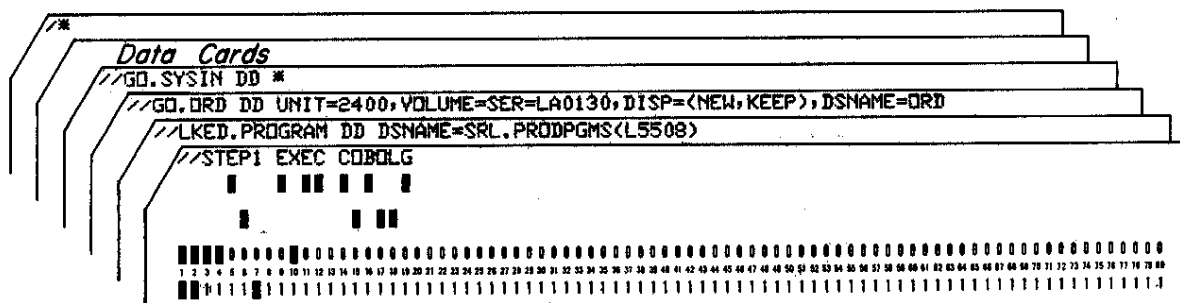


FIG. 2 BOOK ORDER CONTROL DECK

Output from the Book Order Program is written on magnetic tape as shown in Figure 3. This tape is then printed, eight lines per inch, on unlined, 10" x 14" paper. Listing of the magnetic tape gives six original purchase order forms for each book (Figure 4). The printout is cut en masse to provide the standard 3" x 5" order forms. Since headings are underlined, preprinted forms are not necessary.

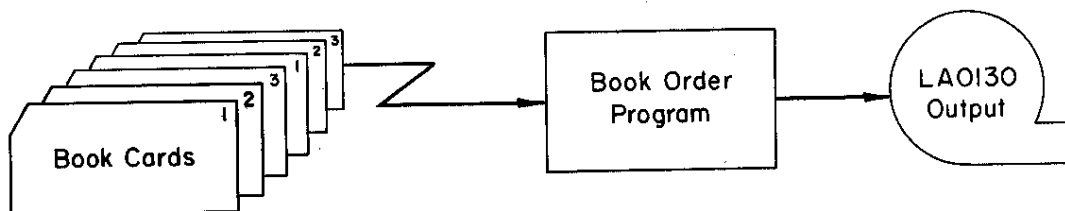


FIG. 3 BOOK ORDER FLOWCHART

25642 ITEM NO LC CARD NO 64-23889 AUTHOR WEERTMAN,J TITLE ELEMENTARY DISLOCATION THEORY (PAPER) PUBLISHER MACMILLAN YEAR 1964 ED 01 VOL COPY NO 01 ORD 06/12/67 LETTER REL 412 EST COST \$ 4.40 COST CODE 8071 QUANTITY 01 REQUESTER LIB (KRAPP) 1	25642 ITEM NO LC CARD NO 64-23889 AUTHOR WEERTMAN,J TITLE ELEMENTARY DISLOCATION THEORY (PAPER) PUBLISHER MACMILLAN YEAR 1964 ED 01 VOL COPY NO 01 ORD 06/12/67 LETTER REL 412 EST COST \$ 4.40 COST CODE 8071 QUANTITY 01 REQUESTER LIB (KRAPP) 2
25642 ITEM NO LC CARD NO 64-23889 AUTHOR WEERTMAN,J TITLE ELEMENTARY DISLOCATION THEORY (PAPER) PUBLISHER MACMILLAN YEAR 1964 ED 01 VOL COPY NO 01 ORD 06/12/67 LETTER REL 412 EST COST \$ 4.40 COST CODE 8071 QUANTITY 01 REQUESTER LIB (KRAPP) 3	25642 ITEM NO LC CARD NO 64-23889 AUTHOR WEERTMAN,J TITLE ELEMENTARY DISLOCATION THEORY (PAPER) PUBLISHER MACMILLAN YEAR 1964 ED 01 VOL COPY NO 01 ORD 06/12/67 LETTER REL 412 EST COST \$ 4.40 COST CODE 8071 QUANTITY 01 REQUESTER LIB (KRAPP) 4
25642 ITEM NO LC CARD NO 64-23889 AUTHOR WEERTMAN,J TITLE ELEMENTARY DISLOCATION THEORY (PAPER) PUBLISHER MACMILLAN YEAR 1964 ED 01 VOL COPY NO 01 ORD 06/12/67 LETTER REL 412 EST COST \$ 4.40 COST CODE 8071 QUANTITY 01 REQUESTER LIB (KRAPP) 5	25642 ITEM NO LC CARD NO 64-23889 AUTHOR WEERTMAN,J TITLE ELEMENTARY DISLOCATION THEORY (PAPER) PUBLISHER MACMILLAN YEAR 1964 ED 01 VOL COPY NO 01 ORD 06/12/67 LETTER REL 412 EST COST \$ 4.40 COST CODE 8071 QUANTITY 01 REQUESTER LIB (KRAPP) 6

FIG. 4 BOOK ORDER OUTPUT TAPE LISTING

Three data cards are punched as shown in Figures 5 through 7. These cards constitute the input to the Book Order Program, which prints six original purchase order forms. Data in all fields are left justified unless otherwise noted. Periods are not used after initials or abbreviations.

<u>Column</u>	<u>Content</u>
1 - 36	Main author
37 - 68	Title (if longer than 32 characters, continued on card 2)
69 - 72	Blank
73	Type of record (used in Book Control Program only)
74	Card number (in this case, 1)
75 - 80	Accession number (identity of book)

- 13 -

<u>Column</u>	<u>Content</u>
1 - 63	Continuation of title from card 1 (Card 2 must always be submitted even though the title on card 1 does not exceed 32 characters.)
64 - 65	Quantity of books ordered (used in Book Order Program; data not stored permanently; leading zeros)
66 - 67	Blank
68 - 72	Day and year (used in Book Control Program only; leading zeros)
73	Type of record (used in Book Control Program only)
74	Card number (in this case, 2)
75 - 80	Accession number

- 14 -

01	AWS		66071466013938071		LIBRARY		664964		3.00		884194	
Ed	Vol	Publisher	Yr	Date Ordered	Cy	LR	Cost Code	Requester	E	LC Cd No.	Est Cost	Access. No.
1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9	9
10	10	10	10	10	10	10	10	10	10	10	10	10
11	11	11	11	11	11	11	11	11	11	11	11	11
12	12	12	12	12	12	12	12	12	12	12	12	12
13	13	13	13	13	13	13	13	13	13	13	13	13
14	14	14	14	14	14	14	14	14	14	14	14	14
15	15	15	15	15	15	15	15	15	15	15	15	15
16	16	16	16	16	16	16	16	16	16	16	16	16
17	17	17	17	17	17	17	17	17	17	17	17	17
18	18	18	18	18	18	18	18	18	18	18	18	18
19	19	19	19	19	19	19	19	19	19	19	19	19
20	20	20	20	20	20	20	20	20	20	20	20	20
21	21	21	21	21	21	21	21	21	21	21	21	21
22	22	22	22	22	22	22	22	22	22	22	22	22
23	23	23	23	23	23	23	23	23	23	23	23	23
24	24	24	24	24	24	24	24	24	24	24	24	24
25	25	25	25	25	25	25	25	25	25	25	25	25
26	26	26	26	26	26	26	26	26	26	26	26	26
27	27	27	27	27	27	27	27	27	27	27	27	27
28	28	28	28	28	28	28	28	28	28	28	28	28
29	29	29	29	29	29	29	29	29	29	29	29	29
30	30	30	30	30	30	30	30	30	30	30	30	30
31	31	31	31	31	31	31	31	31	31	31	31	31
32	32	32	32	32	32	32	32	32	32	32	32	32
33	33	33	33	33	33	33	33	33	33	33	33	33
34	34	34	34	34	34	34	34	34	34	34	34	34
35	35	35	35	35	35	35	35	35	35	35	35	35
36	36	36	36	36	36	36	36	36	36	36	36	36
37	37	37	37	37	37	37	37	37	37	37	37	37
38	38	38	38	38	38	38	38	38	38	38	38	38
39	39	39	39	39	39	39	39	39	39	39	39	39
40	40	40	40	40	40	40	40	40	40	40	40	40
41	41	41	41	41	41	41	41	41	41	41	41	41
42	42	42	42	42	42	42	42	42	42	42	42	42
43	43	43	43	43	43	43	43	43	43	43	43	43
44	44	44	44	44	44	44	44	44	44	44	44	44
45	45	45	45	45	45	45	45	45	45	45	45	45
46	46	46	46	46	46	46	46	46	46	46	46	46
47	47	47	47	47	47	47	47	47	47	47	47	47
48	48	48	48	48	48	48	48	48	48	48	48	48
49	49	49	49	49	49	49	49	49	49	49	49	49
50	50	50	50	50	50	50	50	50	50	50	50	50
51	51	51	51	51	51	51	51	51	51	51	51	51
52	52	52	52	52	52	52	52	52	52	52	52	52
53	53	53	53	53	53	53	53	53	53	53	53	53
54	54	54	54	54	54	54	54	54	54	54	54	54
55	55	55	55	55	55	55	55	55	55	55	55	55
56	56	56	56	56	56	56	56	56	56	56	56	56
57	57	57	57	57	57	57	57	57	57	57	57	57
58	58	58	58	58	58	58	58	58	58	58	58	58
59	59	59	59	59	59	59	59	59	59	59	59	59
60	60	60	60	60	60	60	60	60	60	60	60	60
61	61	61	61	61	61	61	61	61	61	61	61	61
62	62	62	62	62	62	62	62	62	62	62	62	62
63	63	63	63	63	63	63	63	63	63	63	63	63
64	64	64	64	64	64	64	64	64	64	64	64	64

Column	Content
1 - 2	Edition
3 - 4	Volume
5 - 20	Publisher
21 - 22	Year of publication
23 - 28	Date book ordered (leading zeros)
29 - 30	Copy number (indicates number of copies in library's collection; leading zeros)
31 - 33	Letter release number
34 - 38	Cost code to which book charged
39 - 56	Requester (an individual's name if book is desk copy; "library" if book is cataloged for the library's collection; can be used later to indicate "lost" or "surplus" items)
57	Expendable (term used for accounting purposes)
58 - 64	Library of Congress card number (used to order printed catalog cards; data not stored permanently)

FIG. 7 BOOK CARD 3

(Continued on next page)

<u>Column</u>	<u>Content</u>
65 - 70	Estimated cost of book (data not stored permanently; right justified)
71 - 72	Blank
73	Type of record (used in Book Control Program only)
74	Card number (in this case, 3)
75 - 80	Accession number

FIG. 7 BOOK CARD 3 (Continued)

OUTPUT FROM BOOK ORDER PROGRAM

The Book Order Program produces six original purchase order forms. The disposition of each form is:

1. Vendor
2. On order file
3. Claim file
4. Accession number file
- 5-6. Library of Congress card order

An example of a purchase order form is shown in Figure 8.

```

25643  ITEM NO          LC CARD NO 64-21966
AUTHOR WAYMAN.C
TITLE  INTRODUCTION TO CRYSTALLOGRAPHY (PAPER)

PUBLISHER MACMILLAN      YEAR 1964  ED 01
VOL      COPY NO 01  QBD 06/12/67 LETTER REL 412
ESI  CDSI $ 4.40  CDSI CODE 8071  QUANTITY 01
REQUESTER LIB (KRAPP)

```

FIG. 8 PURCHASE ORDER FORM

BOOK CONTROL PROGRAM

PROGRAM DESCRIPTION FOR BOOK CONTROL

As shown in Figure 9, the Book Control Program has six major divisions that are executed as program steps. Each program step may, however, be executed as a separate program. All of the data, whether new information, additions, or corrections, is submitted in a single deck to the Card-to-Tape Program. The tape produced by this program is input to the Card Image Sort Program. The data are read from and written onto the same reel of tape. The sorted card image tape, the old master tape, and the series and subject deck (see Figure 24) are input to the Update Program, which produces a new master tape. The old master tape is retained as a backup tape. The new master tape and a request deck (see Table I for list of possible requests) are input to the Report Program, which produces another tape containing only pertinent information. This program may also produce a listing of books by accession number, if requested. Since the original data tape (LA0091) is no longer of any value (its data having already been processed), it is used as the output reel for the Report Program. After the report tape is sorted by the Report Sort Program, the Printout Program uses the sorted tape to produce the listings that have been requested.

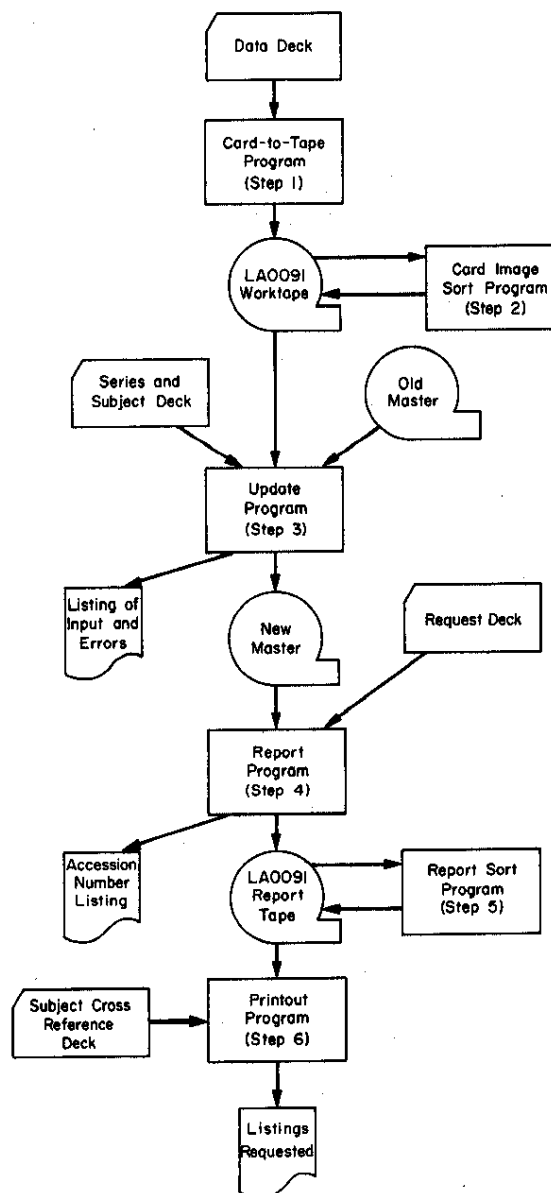


FIG. 9 BOOK CONTROL FLOWCHART

CARD-TO-TAPE PROGRAM (STEP 1)

The Card-to-Tape Program transfers data from punched cards to magnetic tape. The setup of the control deck (the source deck having previously been compiled and link edited) is shown in Figure 10, and the Card-to-Tape flowchart is shown in Figure 11.

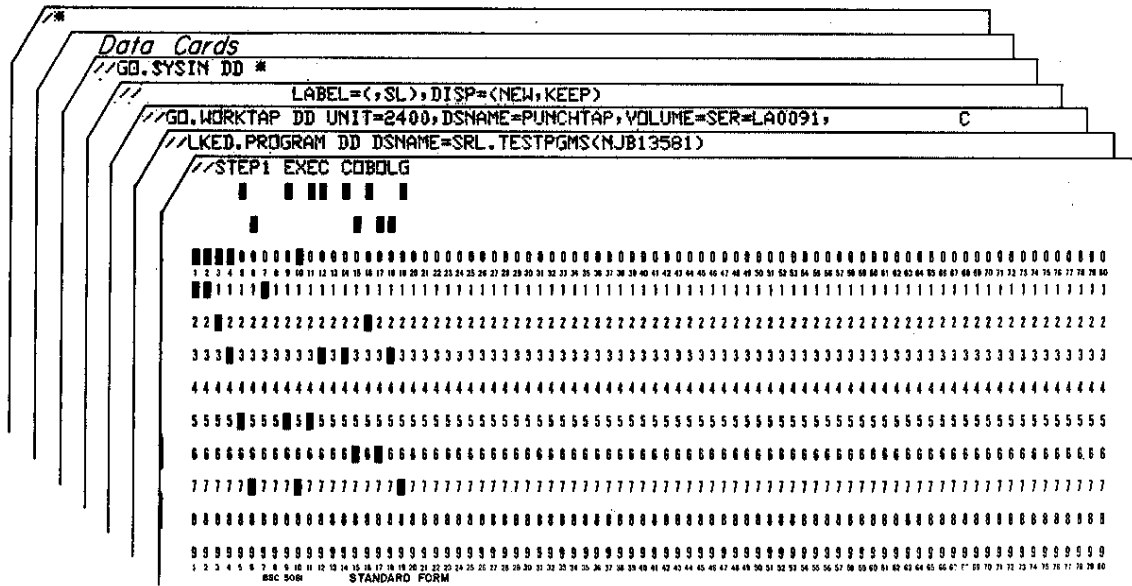


FIG. 10 CARD-TO-TAPE CONTROL DECK

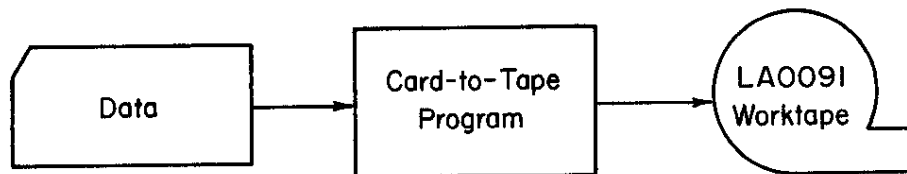


FIG. 11 CARD-TO-TAPE FLOWCHART

Input for Card-to-Tape

New Book Record

As many as nine different card formats may be used. Cards 1 through 5 contain the primary information and are always necessary (Figures 5-7, 12, and 13). Cards 6 through 8 contain secondary information such as alternate title or author (Figures 14-16). Card 9 contains information pertaining to the loan of the book (Figure 17). Cards 6 through 9 are optional. It is not necessary that the card input be in order except that a card 6 must come before its corresponding card 7. In other words, charge-out cards, deletion cards, update cards, and new book cards can be submitted simultaneously and in any order.

Cards 1 through 3 were originally punched to initiate the Purchase Order Forms. Upon receipt of a book the information below is added to card 2.*

<u>Column</u>	<u>Content</u>
68 - 70	Day of the year book record added to master tape (The days of the year are numbered from 1 through 366. This designation is used to control cumulative or selective printouts for a given year.)
71 - 72	Year the book record added to master tape
73	Type of record (blank indicates a new book record)

* Data are left justified unless otherwise noted.

[illegible]

FIG. 12 BOOK CARD 4

<u>Column</u>	<u>Content</u>
31 - 32	Numeric field (left justified, zeros to right)
33	Alphabetic field (author letter; will always appear)
34 - 36	Numeric field (Cutter number, left justified, zeros to right)
37 - 40	Alphabetic field (indicates form of material such as directory, bibliography, etc; left justified; remainder of field blank)
41 - 43	Alphabetic field (indicates reference material; will always be "ref" or blank)
44 - 49	Numeric series code indicating series* of which book is a part (leading zeros or blank if the book is not part of a series)
50 - 64	Series identity (such as Handbook 4 or Bulletin 304)
65 - 72	Blank
73	Type of record (blank)
74	Card number (in this case, 4)
75 - 80	Accession number

FIG. 12 BOOK CARD 4 (Continued)

As indicated above, the call number of a book is submitted in expanded form to facilitate sorting. On a final listing however, the call number will appear in its normal form.

* A series of publications issued with some regularity usually by the same publisher and with related subject matter, formats, etc.

<u>Column</u>	<u>Content</u>
1 - 36	Joint author or added author entries
37 - 68	Added title entry (may be continued on card 7)
69 - 72	Blank
73	Type of record (blank)
74	Card number (in this case, 6)
75 - 80	Accession number

FIG. 14 BOOK CARD 6

<u>Column</u>	<u>Content</u>
1 - 63	Added title entry (continued from card 6)
64 - 72	Blank
73	Type of record (blank)
74	Card number (in this case, 7)
75 - 80	Accession number

FIG. 15 BOOK CARD 7

Card 9 (Figure 17) is used as a charge-out card. As a matter of convenience to library personnel, the type of record code is always 1 and is prepunched into the card. Space is always reserved on the master tape for the data contained on card 9, even though this card may not have been submitted when the book was originally added to the master tape.

[illegible]

<u>Column</u>	<u>Content</u>
1 - 6	Added or second series code (leading zeros)
7 - 21	Added or second series identity
22 - 72	Blank
73	Type of record (blank)
74	Card number (in this case, 8)
75 - 80	Accession number

FIG. 16 BOOK CARD 8

SMITH, JA		773A	072167	1924194	
Retd	Borrower	Bldg	Date	Access. No.	

Charge-Out Card

TIS LIBRARY

Savannah River Laboratory

NAME & INITIALS
PLEASE PRINT → **Smith, J. A.**

BUILDING → **773A**

DATE → **7-21-67**

Column	Content
1	Blank if book presently loaned; "R" if book returned
2 - 6	Blank
7 - 24	Borrower's name
25 - 30	Borrower's address
31 - 36	Date borrowed
37 - 72	Blank
73	Type of record (always 1)
74	Card number (in this case, 9)
75 - 80	Accession number

FIG. 17 BOOK CARD 9

Changing an Existing Book Record

The formats of data cards that are input for changing an existing book record are exactly the same as those for input for a new book record. The type of record code for a change or update card is always 1. The card number is the same as for input for a new book record. If it is necessary to change data in an existing book record, only the card containing the field to be changed is submitted. For example, to correct the main author entry, the following card (Figure 18) must be submitted.

[illegible]

<u>Column</u>	<u>Content</u>
1 - 36	Main author
37 - 72	Blank
73	Type of record (1 indicates a change card)
74	Card number (indicates the change is to be made in a card 1 data field)
75 - 80	Accession number

FIG. 18 CHANGE CARD FORMAT

To blank out the call number, subject, series, or expendable data fields, an asterisk is punched in the first column of the field to be set to blanks. Thus, a change card deletes old, erroneous data and inserts new, correct, or updated information in the same field.

Deleting an Existing Book Record

To delete a complete book record, a punched card containing only the accession number and the type of record code is submitted (Figure 19).

[illegible]

<u>Column</u>	<u>Content</u>
1 - 72	Blank
73	Type of record (a 7,9 multiple punch indicates deletion of whole book record)
74	Card number (cards 1 through 9 could be used; for convenience, always use card 1)
75 - 80	Accession number

FIG. 19 DELETION CARD FORMAT

Output from Card-to Tape

The output from the Card-to-Tape Program (Step 1) is a magnetic tape file which later is the input to Card Image Sort Program (Step 2).

The Card Image Sort Program performs a major sort by accession number and a secondary sort by card number. Control information, herein referred to as the Card Image Sort Program, is supplied to the Operating System/360 Sort/Merge Program. The setup of the control deck and the flowchart are shown in Figures 20 and 21, respectively.

FIG. 20 CARD IMAGE SORT CONTROL DECK



Input for Card Image Sort

Input for the Card Image Sort Program is the tape produced in the Card-to-Tape Program.

Output from Card Image Sort

The sorted data are written on the original input reel (LA0091). This reel is one source of input for the Update Program (Step 3).

UPDATE PROGRAM (STEP 3)

The Update Program receives the output tape from Card Image Sort Program (Step 2) and may perform three main functions:

- Delete an existing book record
- Add a new book record
- Substitute or add data to an existing book record

The function to be performed is determined by the type of record code in each punched card (see input card formats for Card-to-Tape Program).

To delete an existing book record, the Update Program matches the accession number of the card image with the accession number of an existing book record. The matching book record remains on the old master tape and is not transferred to the new master tape.

To add a new book record, five or more punched cards are necessary (see card formats for a new book record, page 13 ff). The Update Program moves the data into a book record format. A main author entry is always created. If alternate authors, titles, or series exist, secondary or added entries for use in cross-referencing will be created. The Update Program ascertains that the correct number of cards has been submitted in the Card-to-Tape Program (Step 1) and that the accession number assigned to the new book has not previously been assigned to another book.

To substitute or add data to an existing book record, only those cards containing the fields which are to undergo change are submitted. The Update Program matches the accession number of the card image with the accession number of an existing book record. Each field of the card image is checked to see if it is blank. The contents of a nonblank field replace the contents of the corresponding field in the existing book record. The program

The following items cannot be corrected or updated:

- Second or third alternate authors
- Second or third alternate titles
- Second or third alternate series
- Accession numbers
- Date book added to tape

The setup of the control deck and the Update flowchart are shown in Figures 22 and 23, respectively.

[illegible]

FIG. 22 UPDATE CONTROL DECK

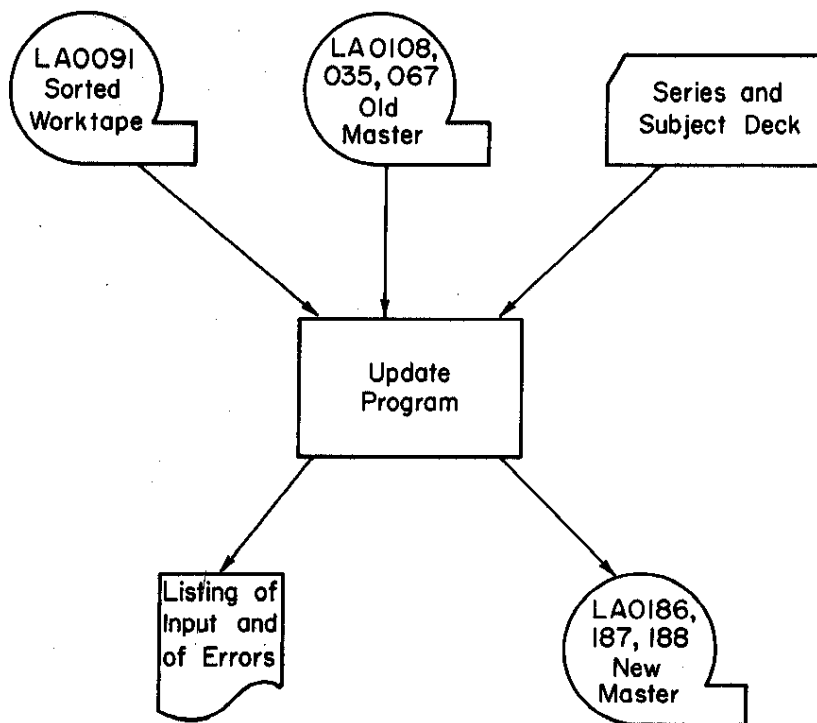


FIG. 23 UPDATE FLOWCHART

Input for Update

The three sources of input to the Update Program step are:

1. Output tape from Card Image Sort
2. Old master tape
3. Series and subject deck

The series and subject deck is held in an array in core, and from this array the series and subject headings are looked up to match the numeric code submitted on the original book cards.

Series and Subjects

A deck of series and subject cards is submitted as a separate data file. This deck has an upper limit of 1500 cards per run. Series are assigned an arbitrary 6-digit code. In Figure 24, 00632 is the code designation for U. S. National Bureau of Standards Handbook. Therefore, for this USNBS series publication, only the 6-digit code and the series identity, such as No. 59, need be punched (see Figure 12, Book Card 4). Subject cards have the same format and are contained in the same file.

REPORT PROGRAM (STEP 4)

The Report Program performs three main functions:

- Identification of master tape entries relevant to the requests received
- Storage of pertinent information in formats designed to facilitate sorting
- Printing of selected items of information arranged by the accession number of each book when requested

Reports or listings are requested by use of a report code (see Table I). Each book record is examined to see if it is relevant to the requested reports; if so, it is written on magnetic tape in a format which will facilitate sorting in the Report Sort Program (Step 5). For a cumulative printout, the Report Program first examines a record to see if the book was added within designated dates and then determines if the book record is pertinent to the report requested. For a master printout, the Report Program only determines if the book record is pertinent to the report requested. After a master printout has been obtained, library personnel may request cumulative printouts as supplements to the master. When the cumulative printout becomes too large and cumbersome, a new master may be requested. (The first item listed in Table I indicates a major sort, and other items are secondary sorts.)

TABLE I

Request Options and Uses by Report Code

<u>Report Code</u>		<u>Request Option</u>
01	(master)	All books by author, title, and accession number.
02	(cumulative)	Books added within designated dates by author, title, and accession number. Report codes 01 and 02 give complete listings of all books (library, departmental, surplus, lost) to replace master author file.
03	(master)	All books with call number by author and then title.
04	(cumulative)	Books added within designated dates with call number by author and then title. Report codes 03 and 04 give complete listings of all cataloged library material to replace author file in reading room and to be sent to plant areas remote from the library.

(Continued on next page)

TABLE I (Continued)

<u>Report Code</u>	<u>Request Option</u>
05	(master) All books with call number by call number.
06	(cumulative) Books with call number added within designated dates by call number.
Report codes 05 and 06 give complete listings of cataloged library material to replace shelf-list file, to provide subject bibliographies according to Library of Congress classification, and to facilitate shelf inventory.	
07	(master) All books by departmental cost code and date received.
Report code 07 gives complete listing of all books.	
08	(master) All books by accession number.
09	(cumulative) Books added within designated dates by accession number.
Report codes 08 and 09 give complete listings of all books to replace master accession number file and to provide accurate accounting for all library items.	
10	(master) All books with series by series.
11	(cumulative) Books with series added within designated dates by series.
Report codes 10 and 11 give complete listings of all books to provide a master series listing.	
12	(master) All books with call number and series by series.
13	(cumulative) Books with call number and series added within designated dates by series.
Report codes 12 and 13 give complete listings of all cataloged material to replace this portion of the card catalog.	
14	(master) All books with call number by subject and then author.
15	(cumulative) Books with call number added within designated dates by subject and then author.
Report codes 14 and 15 give complete listings of all cataloged material to replace this portion of the card catalog. A book may be listed under as many as 11 different subjects.	
16	(master) All books by title and then author.
17	(cumulative) Books added within designated dates by title and then author.
Report codes 16 and 17 give complete listings of all books and their present status, whether library or desk copies, surplus or lost books.	

TABLE I (Continued)

<u>Report Code</u>		<u>Request Option</u>
18	(master)	All books on loan by author and then title.
19	(master)	All books on loan by borrower, author, and title.
Report codes 18 and 19 give two printouts to control the circulation of library material.		
20	(master)	All books with call number by title and then author.
21	(cumulative)	Books with call number added within designated dates by title and then author.
Report codes 20 and 21 give complete listings of all cataloged material to replace this portion of the card catalog and to provide listing of new acquisitions. Several of the above listings could also be used for new acquisition lists depending upon styles desired.		
22	(master)	All books without call number by requester, author, and title.
23	(cumulative)	Books without call number added within designated dates by requester, author, and title.
Report codes 22 and 23 give complete listings of all departmental and desk copies, and surplus and lost books to eliminate a departmental book file.		
24	(master)	All books loaned to a particular individual by requester or borrower.
Report code 24 is used for accounting purposes for an individual being transferred or terminated; also eliminates typing a list of an individual's books and gives in one print format, library copies and desk copies charged to that individual. (Upper limit of 200 requests per run.)		
25	(master)	All books with call number loaned to a particular individual by borrower, author, and title.
Report code 25 is used for recall notices only. (Upper limit of 200 recall requests per run.)		
26	(master)	All books without call number by requester, author, and accession number.
Report code 26 is used for inventory of departmental or desk copies.		
27	(master)	All books cataloged under a particular subject.
Report code 27 is used for subject bibliographies. (Upper limit of 200 requests per run.)		

The setup of the control deck, the source deck having previously been compiled and link edited, is shown in Figure 26, and the Report flowchart is shown in Figure 27.

[illegible]

FIG. 26 REPORT CONTROL DECK

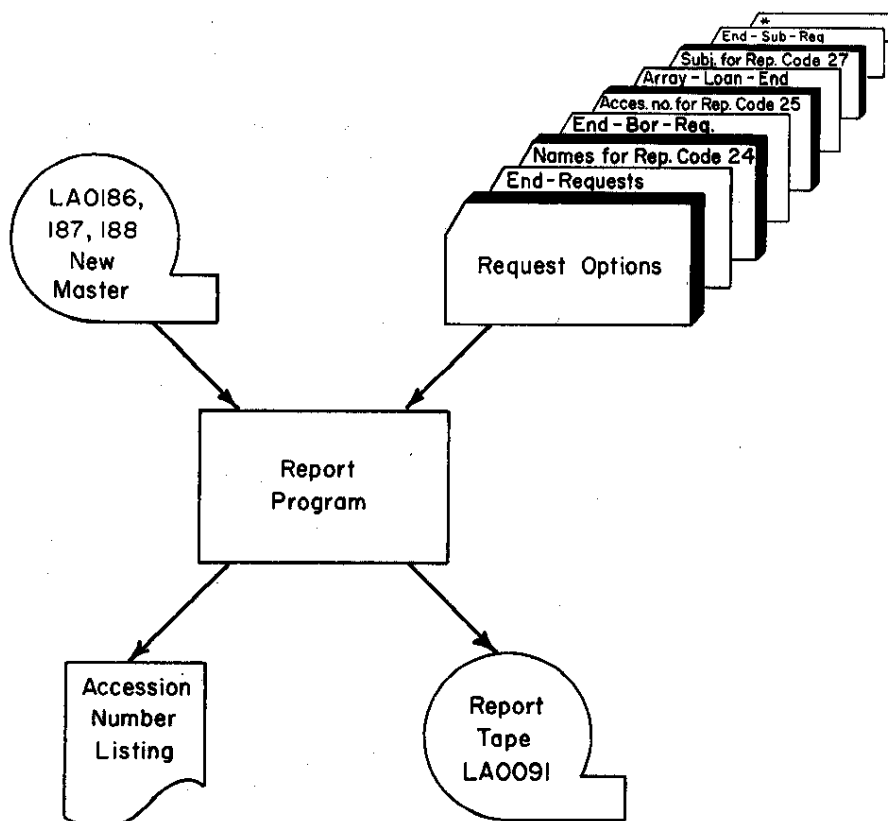


FIG. 27 REPORT FLOWCHART

The End-Requests card tells the program when all of the report codes have been read into an array (Figure 27). The End-Bor-Req card tells the program when all the names necessary for request option 24 have been read into an array. The Array-Loan-End card tells the program when all of the accession numbers for request option 25 have been read into an array. The End-Sub-Req card signals the program when all of the subject codes for request option 27 have been read into an array. Only the end cards relevant to the reports requested are used. The end cards have the words End-Requests, End-Bor-Req, Array-Loan-End, or End-Sub-Req keypunched beginning in Column 3.

Input for Report

Two sources of input to the Report Program are the new master tape and the request option deck. As shown in Figure 28, if only those entries that were added to the master tape between certain dates are of interest, the beginning and ending dates appear after the report codes. Whether a beginning or ending date is required is a function of the report code. One restriction is that dates given for a listing request must be within the same year.

Column	Content
1 - 2	Report code
3 - 5	Beginning day of report (Days of the year numbered from 1 through 366, leading zeros)
6 - 7	Beginning year of report
8 - 10	Ending day of report (leading zeros)
11 - 12	Ending year of report

FIG. 28 REQUEST OPTION CARD

[illegible]FIG. 29 NAME CARD FOR REPORT CODE 24

<u>Column</u>	<u>Content</u>
1 - 74	Information not used
75 - 80	Accession number of book

- 38 -

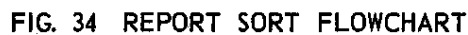
[illegible]FIG. 31 SUBJECT CARD FOR REPORT CODE 27

The Report Program has two forms of output: a magnetic tape file of pertinent information and a listing arranged by accession number. The magnetic tape file is arranged in such a manner as to enable all of the requested reports to be sorted with one sort program. The second form of output, upon request, is a cumulative or master listing, arranged by accession number. This listing may be printed on-line or may be written on a magnetic tape that is later listed. Figure 32 gives an example of an accession number listing.

FIG. 32 ACCESSION NUMBER ENTRY

The Report Sort Program is actually control information which is supplied to the Operating/360 Sort/Merge Program. The setup of the control deck is shown in Figure 33; and the flow-chart, in Figure 34. Figure 35 shows the fields by which the data pertinent to the requests are sorted.

FIG. 33 REPORT SORT CONTROL DECK



Report
Code

Rep Code (2)	Main Author (36)	Title (32) First Portion	Accession No. (6)	(12)
--------------------	---------------------	-----------------------------	----------------------	------

1, 2, 3, 4, 18

Rep Code (2)	Call Number (23)	(63)
--------------------	---------------------	------

5, 6

Rep Code (2)	Cost Code (5)	Date Recd (6)	(75)
--------------------	------------------	------------------	------

7

Rep Code (2)	Series (6)	Series Identity (15)	(63)
--------------------	---------------	-------------------------	------

10, 11, 12, 13

Rep Code (2)	Subject Heading (50) First Portion	Author (36)
--------------------	---------------------------------------	----------------

14, 15

Rep Code (2)	Title (32) First Portion	Author (36)	(16)
--------------------	-----------------------------	----------------	------

16, 17, 20, 21

Rep Code (2)	Borrower (18)	Author (36)	Title (32) First Portion
--------------------	------------------	----------------	-----------------------------

19, 25

Rep Code (2)	Requester (18)	Author (36)	Accession No. (6)	(26)
--------------------	-------------------	----------------	----------------------	------

22, 23

Rep Code (2)	Requester or Borrower (18)	Author (36)	Title (32) First Portion
--------------------	-------------------------------	----------------	-----------------------------

24, 26

FIG. 35 REPORT SORT FIELDS

Input for Report Sort

The input for the Report Sort Program is the magnetic tape file produced by the Report Program.

Output from Report Sort

The sorted output from the Report Sort Program is written on the original input reel (IA0091).

PRINTOUT PROGRAM (STEP 6)

The Printout Program arranges the information on the sorted report tape into formats according to report codes and then lists the information. The listing may be either on-line or onto magnetic tape.

The control deck (the source deck having previously been compiled and link edited) and the Printout flowchart are shown in Figures 36 and 37, respectively.

[illegible]

FIG. 36 PRINTOUT CONTROL DECK



One source of input for the Printout Program is the subject cross reference deck (Figures 38 and 39). The cards are used to provide "See" and "See also" references, when a master subject listing has been requested.

FIG. 38 SUBJECT CROSS REFERENCE CARD 1FIG. 39 SUBJECT CROSS REFERENCE CARD 2

The second source of input for the Printout Program is the output tape from Report Sort Program (Step 5).

Output from Printout

Examples of each type of listing obtainable from the Printout Program appear in Figures 40 through 56.

```

24963
GAMBELL,AW
CHEMICAL COMPOSITION OF RAINFALL EASTERN NORTH CAROLINA AND SOUTHEASTERN VIRGINIA
QC925N5G2 01 ED VOL GPO 1966 41P
24774 NO. 1535-K US GEOLOGICAL SURVEY WATER-SUPPLY PAPER

GLASSTONE,S
NUCLEAR REACTOR ENGINEERING 02 ED VOL VAN NOSTRAND 1963 830P
O NEILL,GF
25192

```

FIG. 40 ALL BOOKS BY AUTHOR, TITLE, AND ACCESSION NUMBER
(Report Codes 1 and 2)

```

EISENMAN,G
GLASS ELECTRODES FOR HYDROGEN AND OTHER CATIONS; PRINCIPLES AND PRACTICE
TK7729E4 01 ED VOL MARCEL DEKKER 1967 582P
25185

FERZIGER,JH
THEORY OF NEUTRON SLOWING DOWN IN NUCLEAR REACTORS 1966 310P
QC776F44 01 ED VOL PERGAMON
24534 VOL 101 INTERNATL SERIES OF MONOGRAPHS ON NUCLEAR ENERGY

```

FIG. 41 ALL BOOKS WITH CALL NUMBER BY AUTHOR AND TITLE
(Report Codes 3 and 4)

```

T043015
INTERNATL ATOMIC ENERGY AGENCY INTL PUB 1966 01 ED VOL
COSTING METHODS FOR NUCLEAR DESALINATION
NO. 69 INTERNATL ATOMIC ENERGY AGENCY TECHNICAL REPORT SERIES
24961 01. WATER---PURIFICATION
02. SALINE WATERS--DEMINERALIZATION
03. NUCLEAR REACTORS
04. ATOMIC POWER

```

FIG. 42 ALL BOOKS WITH CALL NUMBER BY CALL NUMBER
(Report Codes 5 and 6)

```

704A
MOTORS + GENERATORS - STANDARDS PUBLICATION FOR 1963
NATL ELECTRICAL MANUFACTURERS ASSOC NEMA VOL 5991
RECD 09/13/63 COST $10.40 DISCOUNT
GOODMAN,SF

```

FIG. 43 ALL BOOKS BY DEPARTMENTAL COST CODE AND DATE RECEIVED
(Report Code 7)

2344 HUTCHINSON,FW INDUSTRIAL PRESS 1952 ORD 05/05/52 RECD 05/23/52
 INDUSTRIAL HEAT TRANSFER 8005 COST \$ 6.00 DISCOUNT 10.0 COPY 02 01 ED VOL
 QC320H8

3121 INSTITUTE OF OCCUPATIONAL RESEARCH INST OCCUP RES 1961 ORD 08/13/62 RECD 03/18/62
 TWO HUNDRED TWENTY FIVE QUESTIONS & ANSWERS FROM 1961 SEMINAR ON RECRUITING COLLEGE GRADUATES
 HF5549.5R4I5 8170 COST \$ 2.00 DISCOUNT COPY 01

4374 KEINATH,G GPO 1958 ORD 07/14/59 RECD 07/28/59
 MEASUREMENT OF THICKNESS 505A COST \$.50 DISCOUNT COPY 03
 NO. 585 US NATL BUREAU OF STANDARDS CIRCULAR
 HD31D6

FIG. 44 ALL BOOKS BY ACCESSION NUMBER (Report Codes 8 and 9)

NO. 42C ASSOCIATION OF AMER RAILROADS
 ASSOCIATION OF AMERICAN RAILROADS
 CLOSED CARLOADING PAMPHLETS
 25140
 COLLINS,CN

NO. 66 CHEMICAL ENGINEERING PROGRESS SYMP SERIES
 LEONARD,EF
 CHEMICAL ENGINEERING IN MEDICINE
 20594
 R856L4

FIG. 45 ALL BOOKS WITH SERIES BY SERIES (Report Codes 10 and 11)

NO. 1535-K US GEOLOGICAL SURVEY WATER-SUPPLY PAPER
 GAMBELL,AW
 CHEMICAL COMPOSITION OF RAINFALL EASTERN NORTH CAROLINA AND SOUTHEASTERN VIRGINIA
 24774
 QC925N562

FIG. 46 ALL BOOKS WITH CALL NUMBER AND SERIES BY SERIES
 (Report Codes 12 and 13)

ATOMIC BOMB--HIST
 GROUEFF,S LITTLE,BROWN 1967
 MANHATTAN PROJECT: THE UNTOLD STORY OF THE MAKING OF THE ATOMIC BOMB
 QC773A1G6 01 ED VOL 372P
 25402

ATOMIC POWER
 INTERNATL ATOMIC ENERGY AGENCY INTL PUB 1966
 COSTING METHODS FOR NUCLEAR DESALINATION
 T0430I5 01 ED VOL 42P
 24961 NO. 69 INTERNATL ATOMIC ENERGY AGENCY TECHNICAL REPORT SERIES

FIG. 47 ALL BOOKS WITH CALL NUMBER BY SUBJECT AND AUTHOR
 (Report Codes 14 and 15)

CODE FOR PRESSURE PIPING WITH ADDENDA
 SEE - AMERICAN STANDARD CODE FOR PRESSURE PIPING WITH ADDENDA

COMPLEXES OF RARE EARTHS
 SINHA,SP PERGAMON 1966
 SIDDALL,TH
 25431 01 ED VOL 205P

COMPUTER NUMBERING SYSTEMS & BINARY ARITHMETIC; A PROGRAMMED TEXT
 TRAINING SYSTEMS,INC HAYDEN BOOK CO 1965
 MAUNEY,CF
 25330 01 ED VOL 220P

FIG. 48 ALL BOOKS BY TITLE AND AUTHOR (Report Codes 16 and 17)

BUTTS,A
 COPPER, THE SCIENCE + TECHNOLOGY OF THE METAL, ITS ALLOYS + COMPOUNDS
 DERRICK,RG 12783 TN780887 01 ED VOL 04/21/67

BYERLY,WE
 HARMONIC FUNCTIONS
 GOOSEY,MH 10917 QA405899 04 ED VOL 03/12/65

FIG. 49 ALL BOOKS ON LOAN BY AUTHOR AND TITLE (Report Code 18)

KELLEY,HM 24961 TD43015 01 ED VOL
 INTERNATL ATOMIC ENERGY AGENCY NO. 69 INTERNATL ATOMIC ENERGY AGENCY TECHNICAL REPORT
 COSTING METHODS FOR NUCLEAR DESALINATION

KELLEY,HM 24053 TD433151 01 ED VOL
 INTERNATL ATOMIC ENERGY AGENCY
 NUCLEAR ENERGY FOR WATER DESALINATION, REPORT OF A PANEL VIENNA 5-9 APRIL 1965

FIG. 50 ALL BOOKS ON LOAN BY BORROWER, AUTHOR, AND TITLE
 (Report Code 19)

PANEL ON BIOPHYSICAL ASPECTS OF RADIATION QUALITY,VIENNA,1965
 SEE - BIOPHYSICAL ASPECTS OF RADIATION QUALITY, REPORT OF PANEL, VIENNA 29 MARCH-2 APRIL 1965

QUALITY CONTROL OF RADIOACTIVITY-COUNTING SYSTEMS
 KOLDE,HE GPO 1965
 QC795K5 NO. 999-RH-15 US PUBLIC HEALTH SERVICE PUBLICATION
 24562 01 ED VOL 18P

FIG. 51 ALL BOOKS WITH CALL NUMBER BY TITLE AND AUTHOR
 (Report Codes 20 and 21)

MAUNEY,CF
 MC DONNELL,LP DELMAR 01 ED VOL 294P 19
 HAND WOODWORKING TOOLS - CARPENTRY SERIES (PAPER)
 26090 ORD 05/02/67 RECD 05/22/67 EXPENDABLE

MAUNEY,CF
 OLIVO,CT DELMAR RE ED VOL 408P 1963
 FUNDAMENTALS OF APPLIED PHYSICS (RELATED SCIENCE SERIES)
 26048 ORD 05/02/67 RECD 05/22/67

FIG. 52 ALL BOOKS WITHOUT CALL NUMBER BY REQUESTER, AUTHOR,
 AND TITLE (Report Codes 22 and 23)

FELDMAN,MS

THE FOLLOWING BOOKS ARE CHARGED TO YOU FROM TIS LIBRARY.
THOSE WITH CALL NUMBERS ARE FROM THE CIRCULATION DESK,
THOSE WITHOUT CALL NUMBERS ARE DESK COPIES.

Z695A52 AMER LIBRARY ASSOCIATION 9858
A.L.A. CATALOGING RULES FOR AUTHOR + TITLE ENTRIES
BRITISH STANDARDS INSTITUTION 18616
LETTER SYMBOLS, SIGNS + ABBREVIATIONS PT 2 CHEMICAL ENGINEERING, NUCLEAR SCIENCE..

FIG. 53 ALL BOOKS LOANED TO PARTICULAR INDIVIDUAL BY
REQUESTER OR BORROWER (Report Code 24)

TO HEINRICH,LA
BLDG. 706C

THE FOLLOWING BOOK(S) HAVE BEEN ON LOAN TO YOU FOR MORE THAN TWO
WEEKS AND HAVE BEEN REQUESTED BY OTHER PERSONNEL. PLEASE RETURN TO

TIS LIBRARY BLDG 773A

STRANATHAN,JD
PARTICLES OF MODERN PHYSICS

QC721S827

242

FIG. 54 ALL BOOKS WITH CALL NUMBER LOANED TO PARTICULAR INDIVIDUAL
BY BORROWER, AUTHOR, AND TITLE (Report Code 25)

TO BOWERS,BL

THE FOLLOWING BOOKS ARE CHARGED TO YOU AS DESK COPIES.
IF ANY OF THESE ARE LOST, DESTROYED, OR TRANSFERRED TO
OTHER PERSONNEL, PLEASE INDICATE ON THIS SLIP AND
RETURN TO TIS LIBRARY.

US DEPT OF DEFENSE
13 ITEM NO RE ED VOL

PRODUCTION EQUIPMENT DIRECTORY,

FIG. 55 ALL BOOKS WITHOUT CALL NUMBER BY REQUESTER, AUTHOR,
AND ACCESSION NUMBER (Report Code 26)

NON-WAGE PAYMENTS
AMER MANAGEMENT ASSOC AMA 1960
LOOKING AHEAD IN LABOR RELATIONS + OTHER CHALLENGES FOR PERSONNEL MANAGEMENT
HD8072A53 01 ED VOL P
16

US BUREAU OF LABOR STATISTICS GPO 1960
OCCUPATIONAL WAGE SURVEY, BIRMINGHAM, ALA. MARCH 1960
HD4973A4U5 01 EP VOL P
20

FIG. 56 ALL BOOKS CATALOGED UNDER A PARTICULAR SUBJECT
(Report Code 27)

APPENDIX A

Error List for Update Program

ADD-ALL	The information in the following card was added to the master tape.
DELETE	The following book record was deleted from the master tape.
ERROR-1	The following new book record card has the same accession number as an existing book record. This card has been discarded.
ERROR-4 ERROR-4A	More than one card 1 with the same accession number has been submitted for a new book record. This card has been discarded.
ERROR-5 ERROR-5A	More than one card 2 with the same accession number has been submitted for a new book record. This card has been discarded.
ERROR-6 ERROR-6A	More than one card 3 with the same accession number has been submitted for a new book record. This card has been discarded.
ERROR-7 ERROR-7A	More than one card 4 with the same accession number has been submitted for a new book record. This card has been discarded.
ERROR-8 ERROR-8A	More than three card 6's with the same accession number have been submitted for a new book record. This card has been discarded.
ERROR-9 ERROR-9A	More than three card 7's with the same accession number have been submitted for a new book record. This card has been discarded.
ERROR-10 ERROR-11	More than one card 5 with the same accession number has been submitted for a new book record. This card has been discarded.
ERROR-12 ERROR-13	More than one card 9 with the same accession number has been submitted for a new book record. This card has been discarded.
ERROR-14	No existing book record has the same accession number as this deletion card. This card has been discarded.
ERROR-15	No existing book record has the same accession number as this partial addition card. This card has been discarded.

ERROR-16	More than three card 8's with the same accession number have been submitted for a new book record. This card has been discarded.
ERROR-17	
ERROR-20	The series code in card 4 was not found in the master list of series codes. This code has been discarded.
ERROR-21	
ERR-20	The series code in card 8 was not found in the master list of series codes. This card has been discarded.
ERROR-22	
ERROR-23	
ERROR-24	
ERROR-30	An incomplete set of new book record cards has been submitted. This set has been discarded.
ERROR-31	
ERROR-32	The last set of cards submitted was for a new book record and was incomplete. This set was discarded.
ERROR-40	The subject code in card 5 was not found in the master list of subject codes. This code was discarded.
ERROR-41	
ERROR-60	The accession number on this correction card was found to exceed the accession number of any existing book record. This card was discarded.
ERROR-61	The accession number of this deletion card was found to exceed the accession number of any existing book record.
PART-CH	The items shown on the following card have replaced corresponding fields in an existing book record.