

# BIBCON--A General Purpose Software System for MARC-Based Book Catalog Production

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*The BIBCON file management system, designed for use on IBM 360 system equipment, performs two basic functions: (1) it creates MARC structured, bibliographic records from untagged input data; (2) from these records it produces page image output for book catalogs. The system accepts data from several different input devices and can produce a variety of output formats by line printer, photocomposition, or computer output microform (COM).*

## INTRODUCTION

BIBCON is a general purpose data management system for *BIB*liographic records *CON*trol (i.e., for creating, manipulating, formatting and outputting of MARC structured bibliographic records from catalog card input data). The system, shown in Figure 1, consists of seven basic programs which functionally divide into two parts: (a) four programs for creation and correction of MARC-like records; and (b) three programs and an IBM utility sort for formation of book catalog entries from these records. Obviously, a detailed description of such a large and complicated system is impossible in one journal article. A detailed description of the system specifications and user instructions has been prepared and published by the California State Library.<sup>1</sup>

The BIBCON system was cooperatively developed by the Institute of Library Research, Berkeley; the Library Systems Development Project, Santa Barbara; and the Library Systems Offices at the Santa Cruz and Berkeley campuses of the University of California. The system was developed in response to the needs of the University of California (UC) and of the California State Library (CSL) for efficient production of author, title, and added entry listings of their monographic holdings for distribution to their respective clientele groups.

The general system requirements for both libraries were the same:

- (a) With a minimum of expensive manual keying, bibliographic data

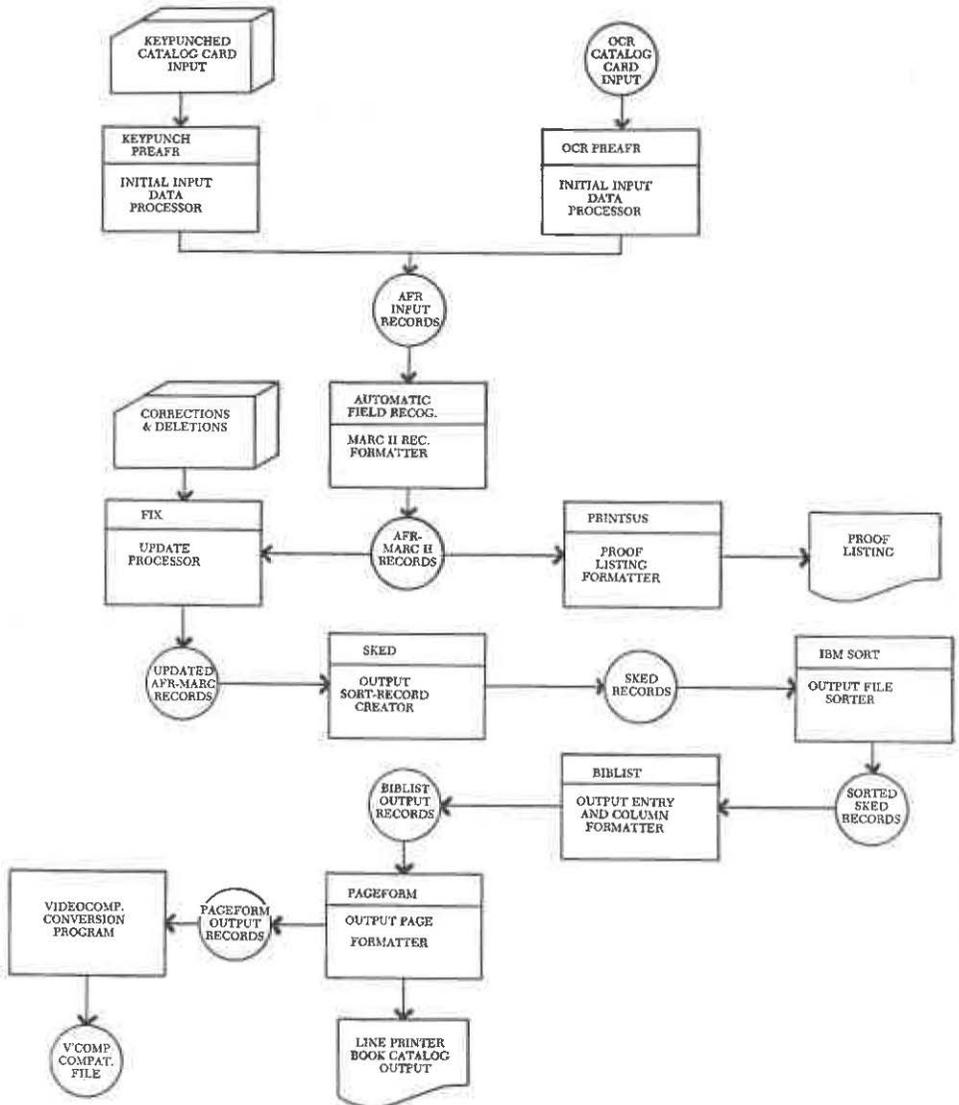


Fig. 1. BIBCON: Basic System Schematic

must be prepared for book catalog production, with any of the standard catalog entries as keys.

- (b) Provision must be made for the widest feasible variety of columnar output formats.
- (c) The format for any machine-readable records must be compatible with the MARC standard.

The system has been installed with revisions and modifications on an IBM 360 Model 50 computer used by the California State Library. All pro-

<i>Knowledge Numbers</i>	<i>Bibliographic Notes</i>
090 Call Number	500 Notes
<i>Main Entry</i>	<i>LC Subject Headings</i>
100 Main Entry	650 Subject Added Entry
<i>Supplied Titles</i>	<i>Other Added Entries</i>
240 Uniform	700 Author Added Entry
<i>Title Paragraph</i>	740 Title Added Entry (Traced Differently)
245 Title	<i>Series Added Entry</i>
<i>Collation</i>	810 Series Added Entry (Traced Differently)
300 Collation	<i>Remaining Unspecified Data</i>
	099 Remaining Unspecified Data
<i>Series Notes</i>	
400 Series, Traced (Personal)	
410 Series, Traced (Corporate)	
440 Series, Traced (Title)	
490 Series, Untraced or Traced Differently	

Fig. 2. Variable Field Tags—AFR-MARC II

grams in this version are written in the IBM Basic Assembler Language (BAL) instead of the original combination of BAL and COBOL.

In its first version, BIBCON processed monographic records exclusively. Various programs have now been modified so that the system will also process serial records in a simplified MARC serials format. This article, however, will describe only the system for processing monographic records.

The system has been used to produce catalogs of monographs for UC Santa Cruz, UC San Diego, and the one million record supplement to the UC catalog of books.<sup>2-4</sup> Portions of the system were used to produce the initial copies of the *University of California Union List of Serials*.

The California State Library Automation Project is using this basic file management system to process both monographic and serial records for the production of several book catalogs. These will include, principally, the *California Union List of Periodicals*, reflecting the periodical holdings of libraries throughout California, the *California State Library List of Periodicals*, and the *Catalog of Books in the California State Library*.

#### AUTOMATIC FIELD RECOGNITION (AFR)

At the heart of the system is the program which creates MARC-like records from unedited input data. This program, called Automatic Field Recognition or AFR, identifies control and variable fields and creates a leader and record directory for each record submitted to it. In order to accomplish this, when a record is submitted to the program, it first sets aside areas into which data for each of the four parts can be placed. The field

<i>Control Numbers</i>	250	Edition Statement
010 LC Card Number	260	Imprint
011 Linking LC Card Number	<i>Collation</i>	
015 National Bibliography Number	300	Collation
016 Linking NBN	350	Bibliographic Price
020 Standard Book Number	360	Converted Price
021 Linking SBN	<i>Series Notes</i>	
025 Overseas Acquisitions Number (PL 480, LACAP, etc.)	400	Personal Name-Title (Traced Same)
026 Linking OAN Number	410	Corporate Name-Title (Traced Same)
035 Local System Number	411	Conference-Title (Traced Same)
036 Linking Local Number	440	Title (Traced Same)
040 Cataloging Source	490	Series Untraced or Traced Differently
041 Languages	<i>Bibliographic Notes</i>	
042 Search Code	500	General Notes
<i>Knowledge Numbers</i>	501	"Bound With" Note
050 LC Call Number	502	Dissertation Note
051 Copy Statement	503	Bibliographic History Note
060 NLM Call Number	504	Bibliography Note
070 NAL Call Number	505	Contents Note (Formatted)
071 NAL Subject Category Number	506	"Limited Use" Note
080 UDC Number	520	Abstract or Annotation
081 BNB Classification Number	<i>Subject Added Entries</i>	
082 Dewey Decimal Classifica- tion Number	600	Personal Name
086 Supt. of Documents Classi- fication	610	Corporate Name (exclud- ing political jurisdiction alone)
090 Local Call Number	611	Conference or Meeting
<i>Main Entry</i>	630	Uniform Title Heading <i>LC Subject Headings</i>
100 Personal Name	650	Topical
110 Corporate Name	651	Geographic Names
111 Conference or Meeting	652	Political Jurisdictions Alone or with Subject Subdivisions
130 Uniform Title Heading	<i>Other Subject Headings</i>	
<i>Supplied Titles</i>	660	NLM Subject Headings (MESH)
240 Uniform Title	670	NAL Subject Headings
241 Romanized Title		
242 Translated Title		
<i>Title Paragraph</i>		
245 Title		

Fig. 3. Variable Field Tags—LC-MARC II

690 Local Subject Heading Systems	750 Name Not Capable of Authorship
<i>Other Added Entries</i>	<i>Series Added Entries</i>
700 Personal Name	800 Personal Name-Title
710 Corporate Name	810 Corporate Name-Title
711 Conference or Meeting	811 Conference or Meeting- Title
730 Uniform Title Heading	840 Title
740 Title Traced Differently	

Fig. 3 (continued)

identification progresses on the basis of two signal symbols which are inserted between fields during input and on the basis of the order and content of the fields. When a control or variable field is identified, a standard MARC record directory entry is created, containing the AFR-MARC II field tag, the length of the field, and the starting character position of the field (Figure 2). Necessary indicators and subfield delimiters are also created and placed in their proper positions in the field's data stream, and the field, along with its field terminator, is placed into the area set aside for data fields.

#### *AFR-MARC II Records*

It is important to emphasize that the system produces *MARC-like* records rather than full MARC records. While the basic record structure is exactly like that of standard Library of Congress MARC, distinctions such as personal versus corporate main entry are not shown by the field tagging and the degree of subfield delimiting is extremely restricted.<sup>5</sup> Compare the list of variable field tags for AFR-MARC II (Automatic Field Recognition MARC II) records to that for LC-MARC II (Library of Congress MARC II) records (Figures 2 and 3). At present, AFR-MARC II provides detailed subfield tagging for only two fields, call number (090) and title (245). This lack of detailed discrimination causes no problem, however, for output of book catalog entries. It can affect filing sequence, since ALA filing rules depend on such distinctions as personal versus corporate author to determine proper sorting.

The decision to omit detailed subfield discrimination is a concession to cost. The two principal developers (UC and CSL) decided that, for book catalog production, detailed subfield delimiting would be of little value and that the benefits of such detail (i.e., ability to sort according to LC filing rules) would not justify the added costs in editing, input, programming, and processing which would be required to provide this detail.

A sample of an AFR-MARC II record created by the Automatic Field Recognition program is shown in Figures 4 and 6. It can be contrasted with the LC-MARC II record for the same title (Figures 5 and 7). Both a machine-based representation (Figures 4 and 5) and a formatted output example (Figures 6 and 7) of the record are shown.

Leader										Record Directory									
00689	n	a	m	00145	0000001	008004100000	090002500041	099007700066	100009700143										
245014900240	300001800389	410004500407	650002500452	650002100477	700004600498														
Fixed Length Data Elements										Local Call Number									
71032	s	1954								\$arZ7164S66U5\$	cRef.								
Unspecified Data																			
\$aLB5.U37no.77016.370193/55-373/Z7164.S66U5/LibraryofCongress\$																			
Main Entry																			
10 \$aUnited Nations Educational, Scientific and Cultural Organization. Education Clearing House.																			
										Title									
										\$aEducation for community development; a selected bibliography, prepared by UNESCO and United Nations (Division of Social Affairs. Paris, 1954)									
										Collation					Series				
										\$a49p. 28cm.					\$aIts Educational studies and documents, 7				
										Subject Heading					Subject Heading				
										\$aSocial policy--Bibl.					\$aEducation--Bibl.				
Name Added Entry																			
10 \$aUnited Nations. Dept. of Social Affairs.																			

␣ = blank    ␣ = field terminator    ␣ = end of record

00001																								
rZ	United Nations Educational, Scientific and Cultural Organization. <i>Education Clearing House.</i>																							
7164																								
S66	Education for community development; a selected bibliography, prepared by UNESCO and United Nations (Division of Social Affairs. Paris, 1954)																							
U5																								
49 p. 28 cm. (Its Educational studies and documents, 7)																								
										1. Social policy--Bibl.					2. Education--Bibl.					I. United Nations.				
										Dept. of Social Affairs.					II. Title.					(Series)				
										m, 1, 2, 1, 11,					s					in, i, s				
										LB5.U37 no. 7					016.370193					r, 1, 2 <sup>55-373</sup>				
										Copy 2.					Z7164.S66U5									
										Library of Congress					51									

Fig. 4. Sample Library of Congress Card in AFR-MARC II Format



ERRORS	TAG <sup>1</sup>	IND <sup>2</sup>	SUB <sup>3</sup>	DATA
	RECORD NO.			0000001
	LEADER			00689nam 00145
	DIRECTORY			008004100000090002500041099007700066100009700143245014900240 300001800389410004500407650002500452650002100477700004600498
	008			710324s1954 00000 eng
	090		\$a	Z 7165 S66 U5
			\$c	Ref.
	100	10	\$a	United Nations Educational, Scientific and Cultural Organization. Education Clearing House.
	245	1	\$a	Education for community development;
			\$b	a selected bibliography,
			\$c	prepared by UNESCO and United Nations [Division of Social Affairs. Paris, 1954]
	300		\$a	49 p. 28cm.
	410	21	\$a	Its Educational studies and documents, 7
	650	0	\$a	Social policy--Bibl.
	650	0	\$a	Education--Bibl.
	700	10	\$a	United Nations. Dept. of Social Affairs.
	099		\$a	LB5.U37 no.7 /016.370193 /55-373 /Z7164.S66U5 /Library of Congress\$

1. TAG = Field tag. 2. IND = Indicator. 3. SUB = Subfield code.

*Fig. 6. AFR-MARC II PRINTSUS Output Format*

#### 4. End each input record with an end-of-record symbol.

Variations on these four basic rules may be required because of restrictions of the input device used, because of variations in content or form of the input data, or because output specifications require nonstandard treatment by the programs. The task of manipulating the varying input into a form which is acceptable to AFR is performed by a program called PREAMFR.

#### PRE AUTOMATIC FIELD RECOGNITION (PREAMFR)

This program provides the interface between any one of the different input methods and the AFR program. Basically, PREAMFR accepts data from keypunched cards, and OCR PREAMFR accepts it from tape records. Both forms of the preprocessing program combine input data segments until an end-of-record symbol is reached, indicating that all the data for one bibliographic record have been assembled. A character by character search is made, and special characters and diacriticals which were input as special codes are translated into the values necessary for output processing.

ERRORS	TAG	IND	SUB	DATA
RECORD NO.				
	LEADER			00804nam 2200181
	DIRECTORY			001001300000008004100013050003100054051002700085082001500112 110009700127245013500224260001800359300001800377410013600395 650002500531650002100556710004600577
	001			55-373
	008			710324s1954 fre 00000 eng
	050	0	\$a	LB5
			\$b	U37 no. 7
			\$a	27164.S66U5
	051	0	\$a	LB5
			\$b	U37 no. 7
			\$c	Copy 2
	082		\$a	0164.370193
	110	20	\$a	United Nations Educational, Scientific and Cultural Organization.
			\$b	Education Clearing House.
	245	1	\$a	Education for community development;
			\$b	a selected bibliography,
			\$c	prepared by UNESCO and United Nations [Division of Social Affairs.
	260	1	\$a	Paris,
			\$c	1954]
	300		\$a	49 p.
			\$c	28 cm.
	410	21	\$a	United Nations Educational, Scientific and Cultural Organization.
			\$b	Education Clearing House.
			\$t	Educational studies and documents,
			\$v	7
	650	0	\$a	Social policy
			\$b	Bibl.
	650	0	\$a	Education
			\$b	Bibl.
	710	20	\$a	United Nations.
			\$b	Dept. of Social Affairs.

Fig. 7. LC-MARC II PRINTSUS Output Format

In addition the program can perform several editing and checking functions. These functions are optional and are dependent upon the input equipment and upon the wishes of the user. Options such as deletion of data on the basis of special input symbols, checking to determine that the record control number is valid, and production of a file of control numbers for records in which data could not be interpreted by the input device are standard.

Because this program provides the interface between different, nonstandard input methods and one standard record formatting program, it is very user-dependent. The basic logic will remain the same, but individual options will have to be added or subtracted by each separate user.

0000001 R=Z 7164 =S66 =U5 Y=REFY=UNITED =NATIONS =EDUCATIONAL, =S  
 CIENTIFIC AND =CULTURAL =ORGANIZATION. =EDUCATION =CLEARING =HO  
 USE./=EDUCATION FOR COMMUNITY DEVELOPMENT; A SELECTED BIBLIOGRAP  
 HY, PREPARED BY =U=N=E=S=C=O AND =UNITED =NATIONS {=DIVISION O  
 F =SOCIAL =AFFAIRS. =PARIS, 1954}}/49 P. 28 CM. {=ITS =EDUCAT  
 IONAL S#TUDIES AND DOCUMENTS, 7}/1. =SOCIAL POLICY--=BIBL. 2. =E  
 DUCATION--=BIBL. =I. =UNITED =NATIONS. =DEPT. OF =SOCIAL =AFFA  
 IRS. =I=I. =TITLE. {=SERIES}/=L=B5.=U37 NO. 7/016.370193/55-  
 373/=Z7164.=S66=U5/=LIBRARY OF =CONGRESS#+

NOTE: Data are from the catalog card shown in Figure 5.

Fig. 8. Sample OCR Input

```

S      O 0 0 0 1 0 0 9   8 4 1 . 8   B A U D E L A I R E   W           B
583702290000F0F0F0F0F1F0F0F0E920F8F4F14BF840C2C1E4C4C5D3C1C9D9C5404062E6889640A681A240C281A48485938189

C      G      P
99856F40403EC399E9A389R3819340E5A2A281A84082A840C78596998785A240D796A49385A35E4082899687998197888983

R      K      T      R
819340839694948595A381938985A24082A840D997828599A340D2969797484040E3998195A29381A385844082A840D99682

A      J      E      G      S      D
8599A340C193538554C81958440D1819485A240C594949695A24B4040C7859585A5816840E2928998135EFC489A2A39989

U . S .      W      P      C      C      I 9
82A4A3858440899540A3888540E448E24R4082A840E69699938440D7A4824840C396486840C39385A585938195846840F1F9

6 9      1 8 8      (      )
F6F93F404062F1F8F840574R4040899393A4A24B4040978199A340839693485D6840868183A28994A2486840979699A3A248

? 4      ( T      A      )      O      B
4040F2F4839484DE3888540C195A389A2A340819584408889A240A69699938430404062D69540A2978995857A4040C281A4

B48593818999855E4CA388E5408199A389A2A340819584408889A240A6969993844R404062C9958393A48485A24082898293

I
89968799819788A848404062E14840C281A4848593818999856840C38881999385A240D78985999856840F1F8F2F160F1F8

l . B      C      P      I 8 2 1 - 1 8
6 7      I . P      T      G      I I      K      R      I I I
F6F7484040C94840D756A45385A36840C78596998785A24B4040C9C94840D29697976840D99682899A3484050C9C94840

T      B      ( S
E389A393857A4040C281A4848593818999855E40A38885408199A389A2A340819584408889A240A696999384484040E28599

) U . 0 0 0 1 0 1 0 .   Z 6 0 3 3   P 2   C 2 6      C      C
8985A25D3701E40000F0F0F0E1E0F1F00099E940F6F0E3F340D7E240C3F2F64079998586794040C38194976840C3888199
    
```

Fig. 9. PREAMFR Output Data—Printed From Tape Record

PREAMFR produces a file of variable length, machine-readable records (Figure 9) which are passed to AFR for formatting into a MARC structure with limited MARC II tagging as described in the section on AFR.

RECORD PROOFING AND CORRECTING  
 PRINTSUS

PRINTSUS is an output program which provides formatted AFR-MARC II records, showing field tag, subfield delimiters, indicators, etc. This printout is designed for proofing of the MARC records created by AFR. Samples of this type output appear in Figures 6 and 7.

## FIX

By processing data according to "FIX commands" this program corrects records in MARC format, operating as a context editor. Corrections can be made to content or structure. Entire records can be deleted and new records can be created using FIX "correction" statements. When any change is made, FIX automatically updates the record's leader and directory to reflect the record as changed.

There are two input files: bibliographic records, in MARC format, and the FIX correction data. The input records file must be in MARC format and must be in the same order (by record I.D. numbers) as the FIX correction data file in order to successfully update the records.

The FIX program method of making corrections is based on the FIX expression, which can be considered as a "language," with rules of grammar governing the structure of expressions (sentences), the order of elements within the expressions and the possible contents of each element (see Figure 10).

### *Output Processor*

The output processor consists of three programs and an IBM utility sort program. These general-purpose programs, which are designed to create book catalog page output, allow a variety of options for sorting as well as formatting.

### **SORT KEY EDIT (SKED)**

This program performs two major functions (Figure 11) as follows: (a) from a single MARC record it creates a record for each point of access to that record as specified by the program user; and (b) it establishes a 256 character sort key at the head of each record extracted. The file is then passed to an IBM sort package for sequencing.

### *Record Extraction*

SKED does not actually extract data from the original MARC record. Instead, it replicates the full record for each access point specified. It is left to the BIBLIST program to extract the required data from these records. Thus, if a particular bibliographic record should have five access points (one for main entry, one for title, two for subjects, and one for some other added entry), SKED would output five full MARC records. Essentially the only differences in the output SKED records would be in the data found in the sort keys prefixed to each record. The record for main entry access would contain main entry data as its first element; the title entry access record would contain title data first, etc.

### *Sort Key Creation*

Data for the sort key are selected on the basis of user-specified tables.

RECORD 0200380			
01 FIX EXPRESSION 3 1 s '650 1 1 '			
INPUT	<u>300</u>	a	1. Loans, Personal - San Francisco.
OUTPUT	<u>650 1</u>	a	1. Loans, Personal - San Francisco.
02 FIX EXPRESSION 2 1 ' c' d			
INPUT	245 0	a	San Francisco. v. <u>c24cm.</u>
OUTPUT	245 0	a	San Francisco. v.24cm.
03 FIX EXPRESSION 2 1 'v.24cm.' i '300 1 '			
INPUT	245 0	a	San Francisco. <u>v.24cm.</u>
OUTPUT	<u>300</u>	a	v.24cm.
	245 0	a	San Francisco.
04 FIX EXPRESSION 2 1 ' a' cd 1 1 'Report.'			
INPUT	245 0	<u>a</u>	San Francisco.
	100 10	a	San Francisco Remedial Loan Association. <u>Report.</u>
OUTPUT	245 0	a	<u>Report.</u> San Francisco.
	100 10	a	San Francisco Remedial Loan Association.
05 FIX EXPRESSION 2 1 'port.' c ' '			
INPUT	245 0	a	<u>Report.</u> San Francisco.
OUTPUT	245 0	a	Report. <u>San</u> Francisco.

FIX COMMANDS IN THIS SAMPLE		
EXPRESSION	CODE	MEANING
01	s	<u>Set</u> field tag
02	c	<u>Copy</u> data
03	i	<u>Identify</u> field
04	cd	<u>Copy &amp; Delete</u> data
05	c	<u>Copy</u> data

Fig. 10. Sample FIX Data, Illustrating FIX Operations

GENERAL DESCRIPTION OF SKED SUBSYSTEM

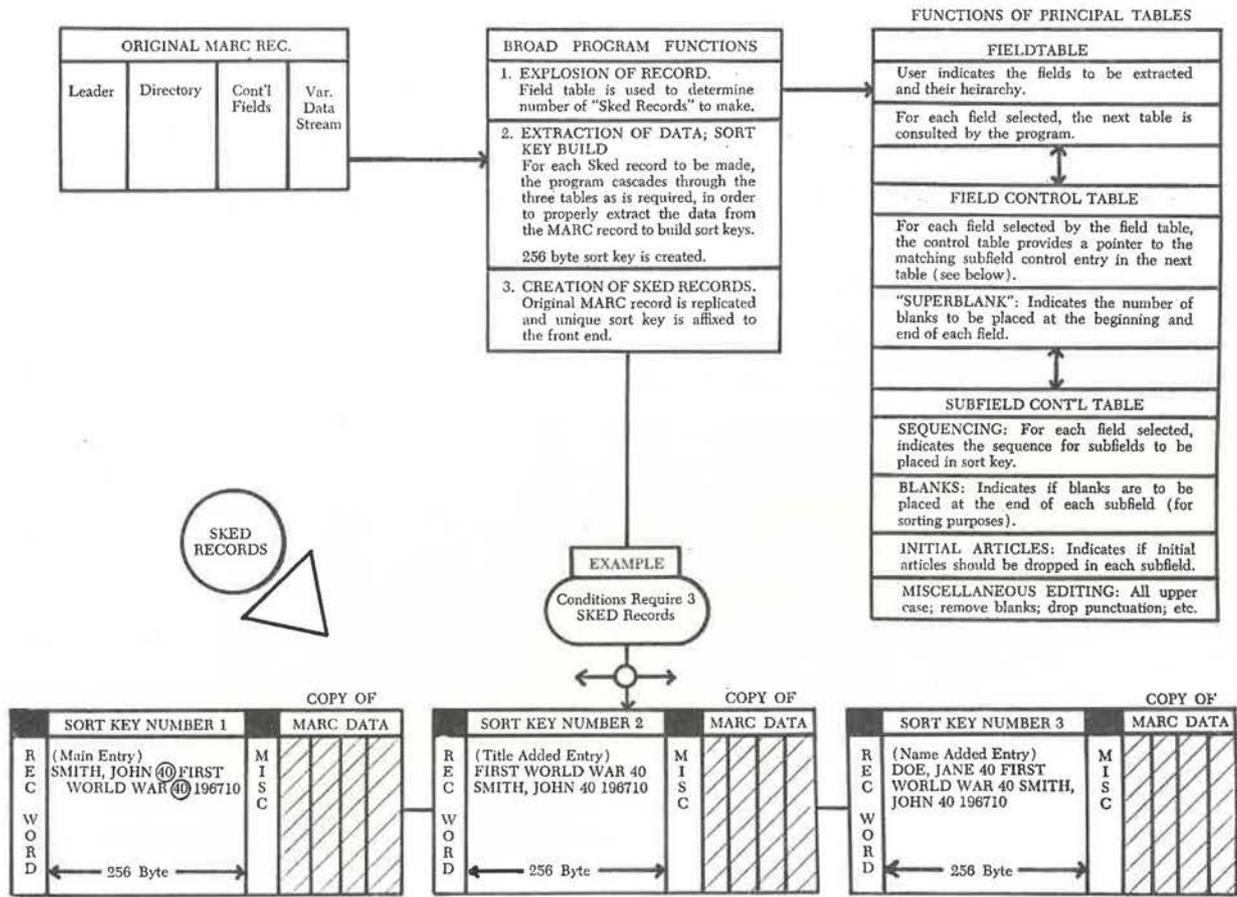


Fig. 11. General Description of SKED Subsystem

SAMPLE SKED TABLES - AUTHOR/TITLE LIST

LOC	OBJECT CODE	AUDR1	AGRP2	STMT	SOURCE STATEMENT	F150CT70	2/03/72
				84 *			00000960
				87 *	F F F F F F F F F F F U		00000970
				90 *	L L L L L L L L L L L N		00000980
				91 *	D D D D D D D D D D D U		00000990
				92 *	T T T C L L D 9 2 F I I S		00001000
				93 *	A A Y N G E U 9 4 0 N N E		00001010
				94 *	G C P T T V P 9 5 U D D D		00001020
				95 *	S C R H E N 1 2		00001030
				96 *	L D		00001040
				97 *			00001050
				98 *			00001060
				99 *	BYTE 0 J 6 7 8 1 1 1 1 1 1 1		00001070
				100 *		0 1 2 3 4 ... 7 8 9	00001080
				101 *			00001090
				102 *			00001100
000310	F4F0F0000J00E505			103	DC C'400',X'000000E5050000F1FFFFF2000000000000'	SERIES-IAM	00001110
000330	F2F4F5000000F505			104	DC C'245',X'000000E5050000F200000000000000000'	(TME)	00001120
000344	F0F1F0C000007C3C1			105	DC C'008',X'0000007C3C10004F300000000000000000'		00001130
				106 *			00001140
000358	F4F1F0C00000F505			107	DC C'410',X'000000F5050000F1FFFFF2000000000000'	SERIES-COR	00001150
000360	F2F4F5000000F505			108	DC C'245',X'000000E5050000F200000000000000000'	(TME)	00001160
000370	F0F0F0000007C3C1			109	DC C'003',X'0000007C3C10004F300000000000000000'		00001170
				110 *			00001180
000374	F4F4F0C00000F505			111	DC C'440',X'000000E5050000F1FFFFF3000000000000'	SERIES-TTL	00001190
000388	F2F4F5000000F505			112	DC C'245',X'000000E5050000F200000000000000000'	(TME)	00001200
000380	F1F7F7000000F505			113	DC C'1XX',X'000000E5050000F300000000000000000'		00001210
000310	F0F0F0000007C3C1			114	DC C'008',X'0000007C3C10004F300000000000000000'		00001220
				115 *			00001230
0003F4	F4F4F0C00000F505			114	DC C'440',X'000000F5050000F1FFFFF2000000000000'	SERIES-TTL	00001240
0003F8	F2F4F5000000F505			117	DC C'245',X'000000E5050000F200000000000000000'	(TME)	00001250
000400	F0F0F0000007C3C1			118	DC C'008',X'0000007C3C10004F300000000000000000'		00001260
				119 *			00001270
000470	F0F1F0C00000F505			120	DC C'810',X'000000E5050000F1FFFFF3000000000000'	SERIES AE	00001280
000434	F2F4F5000000F505			121	DC C'245',X'000000E5050000F200000000000000000'	(TME)	00001290
000444	F1F7F7000000F505			122	DC C'1XX',X'000000E5050000F300000000000000000'		00001300
000450	F0F0F0000007C3C1			123	DC C'008',X'0000007C3C10004F300000000000000000'		00001310
				124 *			00001320
000470	F8F1F0C00000F505			125	DC C'810',X'000000F5050000F1FFFFF2000000000000'	SERIES AE	00001330
000484	F2F4F5000000F505			126	DC C'245',X'000000E5050000F200000000000000000'	(TME)	00001340
000498	F0E0F0000007C3C1			127	DC C'008',X'0000007C3C10004F400000000000000000'		00001350
000440	C50504C00000C000			128	DC C'END',17X'00'		00001360
				129 *			00001370

Fig. 12. Sample SKED Table

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The user is allowed almost unlimited freedom in determining what fields are placed in this sort key and the order of their placement.

Field and subfield selection and sequencing are performed on the basis of information contained in the three basic tables set up by the user. The program contains both table-driven and automatic editing routines. The three principal tables are called: (a) **FIELDTABLE (FLDTABLE)**; (b) **FIELD CONTROL TABLE (FLDCNTL)**; and (c) **SUBFIELD CONTROL TABLE**. A portion of one **SKED** table appears in Figure 12.

When the data are placed into the sort key, various editing functions are performed; some are required and others are performed only at the user's request. This editing includes translation of all alphabetic to upper case so that they will all have the same sort value, deletion of initial articles in several languages, and insertion of blanks in certain locations in order to provide for a proper sort.

Another option allows the user to specially prepare the data to be placed in the sort key. Thus, if the title of a book, for example, contained numeric data or abbreviations, this option would allow the user to prepare data in a specified field by translating the numerics or abbreviations to their alphabetic equivalents so that the title would sort according to standard library filing rules. This specially prepared field would then be placed in the sort key for title added entry, instead of the actual title as found in the title field.

#### BIBLIOGRAPHIC RECORDS LISTING (BIBLIST)

**BIBLIST** is the program which formats individual entries for output. **BIBLIST**, like **SKED**, is a table driven program, and on the basis of user-specified options it extracts the fields needed for each type of book catalog entry. The program adds necessary spaces, numerals, words, phrases, and symbols as requested. The column width is specified by the user, and **BIBLIST** formats the entries according to this specification. The data stream is broken only at a blank, so no words are split between lines. A list and a description of some of the standard **BIBLIST** options are included in Figure 13.

**BIBLIST** creates a file of records, which are also, incidentally, **MARC** structured and which contain all of the instructions necessary for the final program (**PAGEFORM**) to array full pages of the book catalog.

#### PAGE FORMATTING (PAGEFORM)

**PAGEFORM** relies on user specified options in table format to establish: the number of columns per catalog page; the length of these columns; the width of the left, right, top, and bottom margins; and the width of the gutters between columns. **PAGEFORM** numbers the pages at center bottom, establishes entry headings, and combines two or more entries under identical headings.

Finally, if the user wishes, **PAGEFORM** provides that individual entries

## Output Options Currently Provided by BIBLIST

FUNCTION	OPTIONS AVAILABLE WITH ONE SET OF BIBTABLES	PROVIDED BY	DOCUMENTED IN
1. Records Processed	Any number of records, in a sequence, from any portion of the input file may be specified for processing.	File Control Card	BIBLIST APPENDIX II
2. Column Width	From 1 to 132 characters.	Program Parameter Card, Columns 13-15	BIBLIST APPENDIX III
3. Output Character Set	Provision is made for specification of 100 different character sets. Each set must be specified by the user. The IBM TN print train set and the standard all upper case set are currently specified by CSL. (The TN train contains lower case and more special characters than the standard set.)	Program Parameter Card, Columns 17-18	BIBLIST APPENDIX III
4. Print Diacriticals	Diacriticals may be printed or suppressed. (Not implemented as of 4/1/72.)	Program Parameter Card, Column 20	BIBLIST APPENDIX III
5. Print BIBLIST Records	The file of entries created by BIBLIST may be printed in list form before the file is passed to PAGEFORM.	Program Parameter Card, Column 22	BIBLIST APPENDIX III
6. Catalog Entries Selected	Any MARC field may be selected as the first (or heading) field in a catalog entry.	Field Format Table, Bytes 0-9	BIBLIST APPENDIX IV
7. Selection of Succeeding Fields in an Entry	Any MARC field may be selected to follow the first field in a catalog entry. These succeeding fields may appear in any sequence, regardless of their order in the AFR-MARC record.	Field Format Table, Bytes 0-9	BIBLIST APPENDIX IV
8. Bold Face Type	Bold face type may be specified for heading field print lines.	Field Format Table, Byte 10	BIBLIST APPENDIX IV
9. Missing Field	When a field which has been specified by the user is missing from a record, the record may be rejected and processing continued with the next record; or from 1 to 255 Field Format Table entries may be skipped, with processing of the record continuing from the next entry.	Field Format Table, Byte 11	BIBLIST APPENDIX IV

Fig. 13. Sample List of BIBLIST Options

are not split between columns or pages and for the repetition of entry headings on succeeding columns or pages.

The various users of the BIBCON software have produced both print files for line printer and driver tapes for photocomposition of book catalogs.

### *Book Catalog Samples*

Figures 14 and 15 show samples of catalogs produced with the BIBCON system.<sup>6,7</sup> For these catalogs the page masters were formatted by BIBCON and printed on a line printer. These page masters were then photo-reduced and the resultant paper masters were duplicated by usual offset methods.

### *Processing Costs*

#### OCR Keying:

400 character record @ 3,000 strokes/hr  
8-10 min/record @ \$.06/min = \$ .48

#### OCR Scanning:

15 records/min @ \$.45/min = \$ .03

#### Program Processing:

All programs: Est. 5 sec @ \$.10/sec = \$ .50

TOTAL \$1.01/output record

More detailed costs will be prepared by the California State Library and will be reported as they are available.

### *Evaluation*

The BIBCON system accepts unedited data, formats it into a MARC-like record, and produces book catalog output with a variety of options. The system is particularly useful for "listing" projects that require a range of output products and formats.

The advantages and disadvantages are summarized as follows:

#### Advantages:

##### 1. *Tagged Input Unnecessary:*

Because of the formatting and tagging abilities of the Automatic Field Recognition program, BIBCON can produce MARC records from input which has not been manually supplied with any of the MARC field tags.

##### 2. *Versatility:*

The output processing programs provide for a wide variety of output formats. With the addition of programs to produce files for photocomposition, the output options will be even more varied.

##### 3. *National Standard:*

BIBCON produces and processes records in the Library of Congress MARC format which has been established as the international standard for computer-based bibliographic records.

- DIFFE-DIGIT**
- DIFFERENTIAL EQUATIONS, PARTIAL.**  
 Gilbert, Robert P., 1932-  
 Function theoretic methods in partial differential equations by Robert P. Gilbert. New York, Academic Press, 1969. xviii, 311 p. illus. 24 cm. (Mathematics in science and engineering, v. 54) Includes bibliographical references.  
 QA 377 G5 Gen
- Horsander, Lars.**  
 Linear partial differential operators. 3d rev. printing. Berlin, Heidelberg, New York, Springer, 1969. vii, 285 p. 24 cm. (Die Grundlehren der mathematischen Wissenschaften in Einzeldarstellungen, Bd. 116) Bibliography: p. [280]-285.  
 QA 377 H58 1969 Gen
- Petrovskii, Ivan Georgievich**  
 Lectures on partial differential equations. Translated from the Russian by A. Shenitzer. [1st English ed.] New York, Interscience [1954] x, 245 p. illus. 24 cm. Translation of Lektsii ob uravneniakh s chastnymi proizvodnymi.  
 QA 377 P433 Gen
- DIFFERENTIAL EQUATIONS, PARTIAL-NUMERICAL SOLUTIONS.**  
 Walz, Alfred, 1907-  
 Boundary layers of flow and temperature. Edited and translated from the German by Hans Joerg Oser. Cambridge, Mass., M.I.T. Press [1969] xv, 297 p. illus. 24 cm. Translation of Stromungs- und Temperaturgrenzschichten. Includes bibliographical references.  
 QA 913 W3413 Gen
- DIFFERENTIAL OPERATORS.**  
**Horsander, Lars.**  
 Linear partial differential operators. 3d rev. printing. Berlin, Heidelberg, New York, Springer, 1969. vii, 285 p. 24 cm. (Die Grundlehren der mathematischen Wissenschaften in Einzeldarstellungen, Bd. 116) Bibliography: p. [280]-285.  
 QA 377 H58 1969 Gen
- DIFFRACTION GRATINGS.**  
 Davis, Sumner P.  
 Diffraction grating spectrographs [by] Sumner P. Davis. New York, Holt, Rinehart, and Winston [1970] viii, 73 p. illus. 24 cm. Bibliography: p. 57-69.  
 QC 415 D38 Gen
- DIFFUSION.**  
 Frank-Kamenetskii, David Albertovich.  
 Diffusion and heat transfer in chemical kinetics [by] David A. Frank-Kamenetskii. 2d ed. and rev. ed. Translation editor: John P. Appleton. New York, Plenum Press, 1969. xxvi, 574 p. illus. 24 cm. First ed. published in 1955 under title: Diffusion and heat exchange in chemical kinetics. Translation of [rosanized: Diffuziia i teploperedacha v khimicheskoi kinetike] Includes bibliographies.  
 QD 583 F6413 1969 Gen
- DIGITAL COMPUTER SIMULATION.**  
 Auburn University.  
 Simulation of a production control system. Detroit, Management Information Services [1970?] vi, 261 p. illus. 28 cm. "Information processing: the first annual report on Project THERIS Research at Auburn University." Bibliography: p. 241-242.  
 TS 157 A92 Gen
- Chemical plant simulation; an introduction to computersided, steady-state process analysis, [by] C. M. Crowe [and others] Englewood Cliffs, N. J., Prentice-Hall [1971] xiv, 368 p. illus. 24 cm. Bibliography: p. 343-354.  
 TP 155 C423 1971 Gen
- DIGITAL COMPUTER SIMULATION.**  
 Chu, Yaohan, 1920-  
 Digital simulation of continuous systems [by] Yaohan Chu, with the collaboration of Frederick J. Sisson and Harry E. Petersen. New York, McGraw-Hill [1969] xvii, 423 p. illus. 23 cm. Includes bibliographies.  
 QA 76.5 C49 Gen
- Gordon, Geoffrey.**  
 System simulation. Englewood Cliffs, N. J., Prentice-Hall [1969] xvi, 303 p. illus. 25 cm. (Prentice-Hall series in automatic computation) Includes bibliographies.  
 QA 76.5 G63 Gen
- Harbaugh, John Warvelle, 1926-**  
 Computer simulation in geology, by John W. Harbaugh and Graese Bonham-Carter. New York, Wiley-Interscience [1970] xiv, 575 p. illus. 23 cm. Includes bibliographies.  
 QE 48.8 H37 Gen
- Hize, Joe H.**  
 PROSIM V administrator's manual: production system simulator, [by] Joe H. Hize, with Bruce E. Herring [and others] Englewood Cliffs, New Jersey, Prentice-Hall [1971] 225p. 26 cm.  
 TS 155.8 H59 Gen
- Pritsker, Alan B. 1933-**  
 Simulation with GASP II: a FORTRAN bases simulation language, [by] Alan B. Pritsker [and] Philip J. Kiviat. Englewood Cliffs, N. J., Prentice-Hall [1969] xii, 332 p. illus. 26 cm. (Prentice-Hall series in automatic computation) Bibliography: p. 320-324.  
 QA 76.5 P73 Gen
- Schmidt, Joseph William.**  
 Simulation and analysis of industrial systems, by J. W. Schmidt and R. E. Taylor. Homewood, Ill., R. D. Irwin, 1970. xiii, 644 p. illus. 24 cm. (Irwin series in quantitative analysis for 4 cm.) Includes bibliographies.  
 T 57.62 S3 Gen
- Siegel, Arthur I.**  
 Man-machine simulation models: psychosocial and performance interaction, [by] Arthur I. Siegel and J. Jay Wolf. New York, Wiley-Interscience [1969] xiv, 177 p. illus. 23 cm. (Wiley series in human factors) Bibliography: p. 145-146.  
 TA 167 S53 Gen
- Wyman, Forrest Paul.**  
 Simulation modeling: a guide to using SIMSCRIPT., New York, Wiley [1970] xvi, 211 p. illus. 24 cm. (The Wiley series in management and administration) QA 76.5 W94 Gen
- DIGITAL COUNTERS.**  
 Lancaster, Donald E.  
 BTL cookbook, by Donald E. Lancaster. Indianapolis, H. W. Sams [1969] 240p. illus. 22 cm.  
 TK 7872 C7 L3 Gen
- Malvestad, Howard V., 1922-**  
 Digital electronics for scientists [by] H. V. Malvestad and C. G. Enke. New York, H. A. Benjamin, 1969. xviii, 545 p. illus. 24 cm.  
 TK 7872 C7 M3 Gen
- Morris, Noel Malcolm.**  
 Logic circuits [by] W. H. Morris. London, New York, McGraw-Hill [c1969] x, 189 p. illus. 28 cm. (European electrical and electronic engineering series) Bibliography: p. 182.  
 TK 7868 S9 M6 Gen
- DIGITAL ELECTRONICS.**  
 Corbin, Alfred.  
 Computer data handling circuits. Indianapolis, H. W. Sams [1971] 176p. illus. 22 cm.  
 TK 7868 D5 C6 Gen

### Fig. 14. Sample BIBCON Output; CSL Science and Technology Catalog

#### 4. System Is Operational:

The BIBCON system has been installed and is operational at the University of California and in Sacramento for the California State Library. It has already been used to produce catalogs of all sorts, from small, topical catalogs to large union lists of monographs and of se-

BROGAN-CALIFO

AUTHOR/TITLE SECTION

BROGAN-CALIFO

BROGAN, PEGGY, 1916-  
 --Helping children read [by] Peggy Brogan and Lorene K. Fox. [New York] Holt, Rinehart and Winston [1961] 330p. illus. 22 cm.  
 1. Reading (Elementary)  
 LB 1573 B73 Gen

Brottsan, Marvin L., ed.  
 See under: Language remediation for the disadvantaged preschool child. Edited.  
 LC 4085 L3 Gen

BROWN, ELEANOR FRANCES, 1908-  
 --Library service to the disadvantaged. Metuchen, N.J., Scarecrow Press, 1971. x, 560 p. illus. 22 cm. Bibliography: p. 532-538.  
 1. Libraries and the handicapped.  
 Z 711.92 H3 B7 Gen

Bruener, Jerome Seymour.  
 See under: Education of the infant and young child.  
 LB 1140 E27 Gen

BURGER, HENRY G., 1925-  
 --"Ethno-pedagogy": a manual in cultural sensitivity, with techniques for improving cross-cultural teaching by fitting ethnic patterns. 2d ed. Albuquerque, N.M., Southwestern Cooperative Educational Laboratory, 1968. xvii, 193 p. illus. 28 cm. Bibliography: p. [167]-193.  
 1. Socially handicapped children--Education.  
 2. Educational anthropology.  
 LC 4091 B8 Gen

BURMETT, DOROTHY KIRK.  
 --Your preschool child: making the most of the years from two to seven. Foreword by Katharine Whiteside Taylor. New York, Holt, Rinehart and Winston [1961] 272p. illus. 22 cm. Includes Bibliography.  
 1. Children--Management.  
 HQ 769 B795 Gen

Burns, Paul Clay, 1923- comp.  
 --Remedial reading: an anthology of sources. See under: Schell, Leo H. comp.  
 LB 1050.5 S28 Gen

BUTTE CO., CALIF. OFFICE OF THE SUPERINTENDENT OF SCHOOLS.  
 --Rini-Corpsven. [Chico, 1964] 50p. illus. Sponsored by the California Dept. of Education, Division of Compensatory Education, Bureau of Community Services and Migrant Education, Feb.-Aug. 1968.  
 1. Children of migrant laborers--Education.  
 2. Teachers--Butte Co., Calif. 3. Elementary and secondary education act. 4. Education--California--Butte Co. 5. Socially handicapped children--Education.  
 CGPS GPS

CALIFORNIA. ADVISORY COMMISSION ON WOMEN.  
 --Day care. Transcript of the public hearing held jointly with Senate and Assembly Social Welfare Committees, San Francisco, October 17, 18, 1969. 229p.  
 1. Day nurseries.  
 WB55 D3 GPS

CALIFORNIA. ADVISORY COMMITTEE ON COMPENSATORY EDUCATION.  
 --Recommendations for expansion by the California State Legislature of the State Compensatory Education program based on the McAteer act. [1965?] 46p. Paul F. Lawrence, Chairman.  
 1. California. Advisory Committee on Compensatory Education. 2. Exceptional children--Education. 3. Socially handicapped children--Education.  
 C770 R3 GPS

CALIFORNIA. BUREAU OF ELEMENTARY EDUCATION.  
 --California program for the care of children of working parents. Sacramento, California state Dept. of education [1963] ix, 125 p. incl. illus. (plans) tables, forms. 23 cm. (California. Dept. of education. Bulletin of the California state Department of education, vol. XII, no. 6) "Prepared by the Division of elementary education."-- Foreword. Bibliography: p. 79-101.  
 1. Day nurseries. 2. Children--Charities, protection, etc.--California. 3. World war, 1939--Children.  
 E200 B8 v.12 no.6 GPS

The California children's centers and preschool educational progress.  
 See under: California. Legislative Analyst.  
 L425 C41 GPS

CALIFORNIA. COMMISSION FOR SPECIAL EDUCATION.  
 --The education of physically handicapped children. Prepared by the Commission for special education of the California state Department of education. Sacramento, California state Dept. of education [1961] viii, 121, [1] p. 23 cm. (California. Dept. of education. Bulletin of the California state Department of education, vol. x, no. 12) At head of title: ... December, 1961. Contains bibliographies.  
 1. Defective and delinquent classes--Education.  
 2. Children, Abnormal and backward. 1. Education and children. 4. Education--California.  
 E200 B8 v.10 no.12 GPS

CALIFORNIA. COORDINATING COUNCIL FOR HIGHER EDUCATION.  
 --California higher education and the disadvantaged: a status report. 1968. 67p. On cover: Number 1032.  
 1. Education, Higher. 2. Universities and colleges--California. 3. Student aid--California. 4. Socially handicapped children--Education.  
 E190 D5 GPS

--California higher education and the disadvantaged: a status report 68-2 for presentation to the Council, February 19, 1968. 86p. [Publication] 68-2  
 1. Education, Higher. 2. Scholarships--California. 3. Students--California. 4. Student aid--California. 5. Socially handicapped children--California. 6. Universities and colleges--California. 7. Personnel service in education--California. 8. Universities and colleges--California--Entrance requirements.  
 F140 D6 GPS

--Use of exceptions to admissions standards for admission of disadvantaged students: University of California and California State Colleges. 1968. 7p.  
 1. Universities and colleges--Entrance requirements. 2. Universities and colleges--California. 3. Compensatory education.  
 E190 A3 GPS

Fig. 15. Sample BIBCON Output: CSL Education Catalog

rials. Additionally, portions of the software have been transferred successfully to the Hennepin County Library, Minnesota.

## Disadvantages:

### 1. Personnel Dependency:

BAL: The system is written in Basic Assembler Language, thus necessitating the services of an experienced programmer.

MARC: Because the system operates upon MARC structured record format, the average programmer may well have a difficult time in dealing with the added complexities introduced by this aspect.

OPTIONS: The wide range of options provided by the system necessitates highly complex programs which may be difficult for the average programmer to grasp readily.

2. *Equipment Dependency:*

IBM: Because the programs are written in IBM Basic Assembler Language, the system is presently usable on IBM equipment only.

*Conclusion*

The BIBCON-360 system is a versatile and inexpensive method for producing book catalogs, when a wide range of format options are required and when the catalogs must contain bibliographic information with more than one entry or access point per bibliographic record. If a simple, main entry catalog is needed, microfilm reproduction of the catalog cards may still be much cheaper.

BIBCON-360 is most useful for producing large scale catalogs (e.g., union catalogs) to be distributed widely to assist in the effort to provide the widest possible dissemination of library information at the least possible cost.

REFERENCES

1. California. State Library, Sacramento. Automation Project, *A Users' Manual for BIBCON 360; A File Management System for Bibliographic Records Control* (Sacramento: California State Library, 1972), 274p. (This manual, produced in limited quantities, is now available only on interlibrary loan.)
2. University of California, Santa Cruz, *Author-Title Catalog of the University Library* (Santa Cruz: University of California, 1970), 32 v.
3. University of California, San Diego, *Author-Title Catalog; Subject Catalog* (San Diego: San Diego Medical Society-University Library, 1969), 350p.
4. California. University. Institute of Library Research, *University of California Union Catalog of Monographs Cataloged by the Nine Campuses From 1963 Through 1967; A Supplement to the Catalogs of the University Libraries at Berkeley and Los Angeles Published in 1963* (Berkeley: University of California, 1972), 47 v.
5. U.S. Library of Congress. Information Systems Office, *MARC Manuals Used by the Library of Congress* (Chicago: ALA, 1970), p.42.
6. California. State Library, Sacramento, *Recent Works in the California State Library in Science and Technology* (Sacramento: California State Library, 1972), p.426.
7. California. State Library, Sacramento, *Special Education Problems; A Catalog of Materials in the California State Library* (Unpublished). (This topical catalog was output only to test refinements to the BIBCON-360 programs. It was not published, but the sample pages produced illustrate further refinements in formatting and sorting routines.)