

SYSTEMS ENGINEERING LABORATORIES PROGRAM LIBRARY

PROGRAM DESCRIPTION

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Catalog Number 370005B

IDENTIFICATION: SEL 810A Cross Reference Program

AUTHOR: Systems Engineering Laboratories

ACCEPTED: January 22, 1969

PURPOSE: To provide a cross reference for assembly language programs on the SEL 810A.

COMPUTER CONFIGURATION: SEL 810A with a Card Reader, Line Printer, and ASR-33, with the standard interrupt for the card reader.

SUBROUTINES REQUIRED: None

STORAGE: 1504g + remainder of core for tables to process above program.

TIMING: N/A

LOADING PROCEDURE: Standard SEL 810A/B relocatable loader, Catalog Number 300001. Program must be loaded above '1016.

USE: Start the program at the relocation base with the desired sense switch settings.

If any sense switch is set, there will not be a card listing on the line printer, just the cross reference.

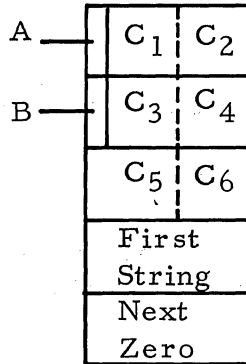
If the sense switches are not set there will be a card listing and a card number printed out.

The sense switch option may be set or reset at any time.

METHOD:

The following figures show how the tables are set up in memory and a core diagram as to how the tables expand through core.

External Name Block



A = Sign bit is reset until the name is output.

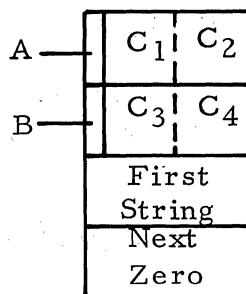
B = Sign bit is set to flag an external.

C₁₋₆ = Characters one to six of the external name. Blank if name is shorter than six characters.

First String = Address of the beginning of the number string.

Next Zero = Address of the end of the string for that name.

4 Character Name Block



METHOD: (Cont'd)

A = Sign bit reset until output.

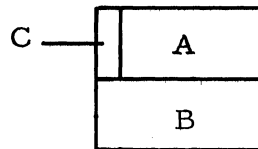
B = Sign bit reset to flag non-external.

C₁₋₄ = Characters one to four of the non-external name. Blank if name is less than four characters.

First String = Address of the beginning of the number string.

Next Zero = Address of the end of the string for that name.

String Words Block

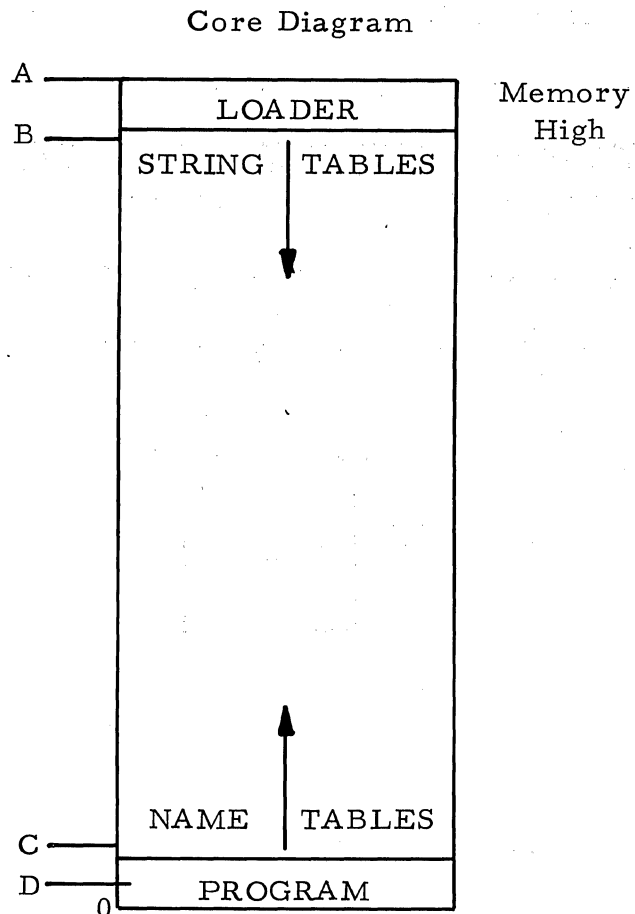


A = Card Number.

B = Zero if A is the last time that name has been referenced, or B is the address of the next string block if A is not the last time that name has been referenced. The address in B points to the next card number (in A).

C = Sign bit of the card number is reset (0) if name was in the variable field. Sign bit is set (1) if the name is located at that card number. Name occurred in columns 1 to 4.

METHOD: (Cont'd)



A = Top of Core

B = Start of the string table. '2000 was subtracted from the top of core so that the loader would not be destroyed.

C = Low core where the name table begins. Low core is one location after the program.

D = Map zero and the program, which in this case was loaded at '1017.

Note the directions of the arrows. The name table builds up and the string table builds down through core. When these tables meet, the cross reference at this point is output and the program resets the table and string pointers and finishes processing the remainder of the cards. An END card signals the end of the program and the cross reference is output.

METHOD: (Cont'd)

Batch processing is available. A dollar (\$) sign in column one and a blank in column two cause the program to halt; pressing start reinitializes the program.

The sorting method is a minimum value search on two characters at a time, and the name with the smallest numerical alphabetical value is output first. The sorting takes place while the previous name is being printed.

NOTE

Macro names with an "EN" in columns six and seven are processed as an END card.

Macro names with a "CA" or "NA" in columns six and seven are processed as Externals.

If the word "ERROR" is printed out with the card listing, a name used was more than four characters and not an external; the card is not processed from that name on.

The variable field must start in column eleven. A blank in column eleven will terminate the variable field.

Interrupts

This program uses the standard interrupt on the card reader to read each character and convert it to full ASCII code and store it in the input-output buffer.

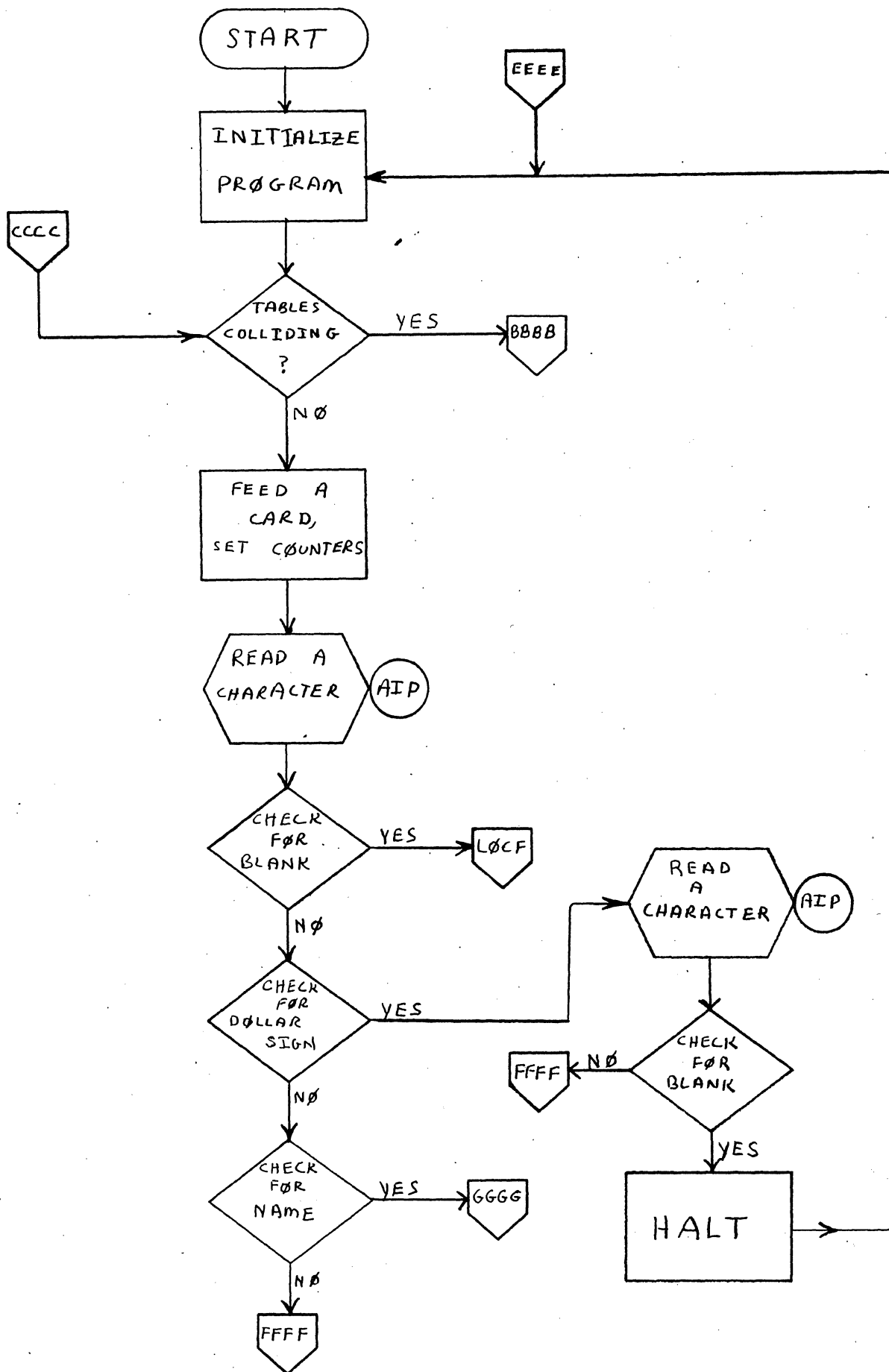
The program uses another input routine to read the characters from the buffer. If the character needed has not been read, the program stays in a compare loop until the character has been read by the interrupt routine.

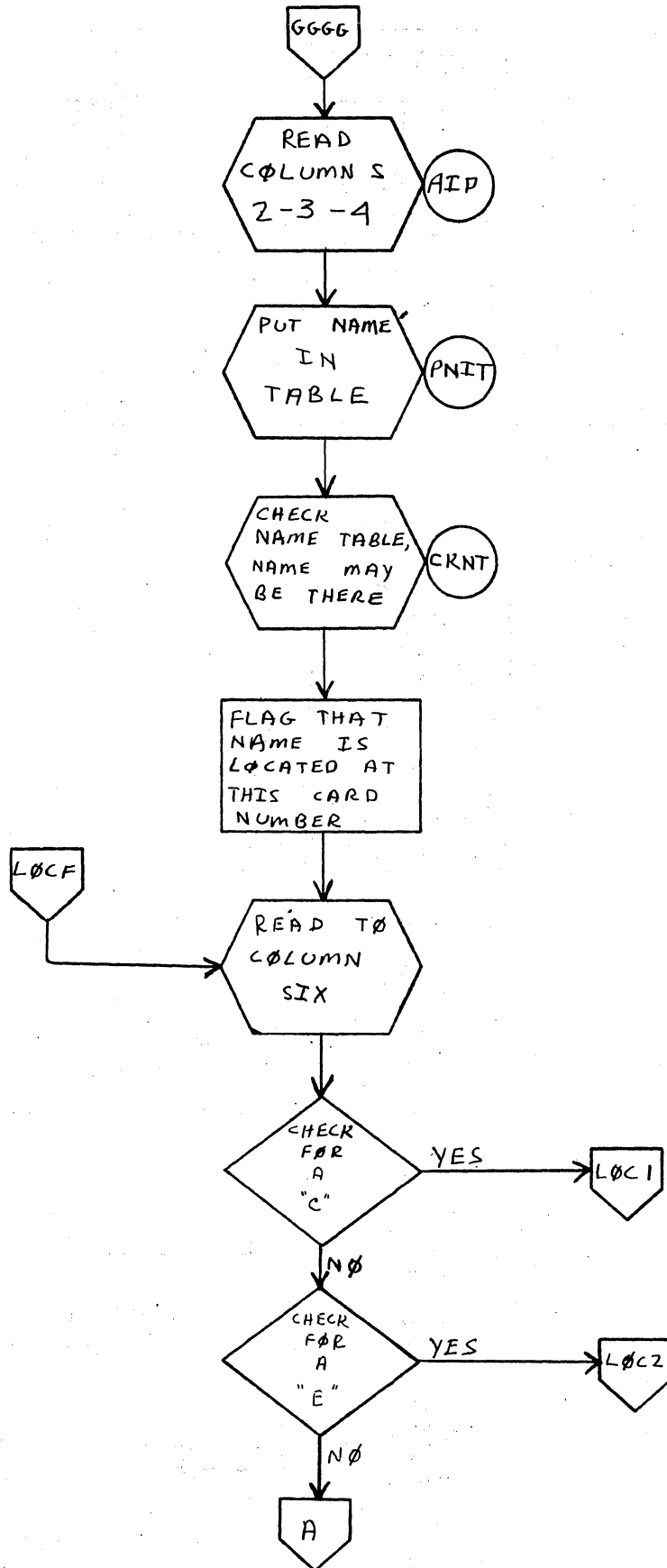
METHOD: (Cont'd)

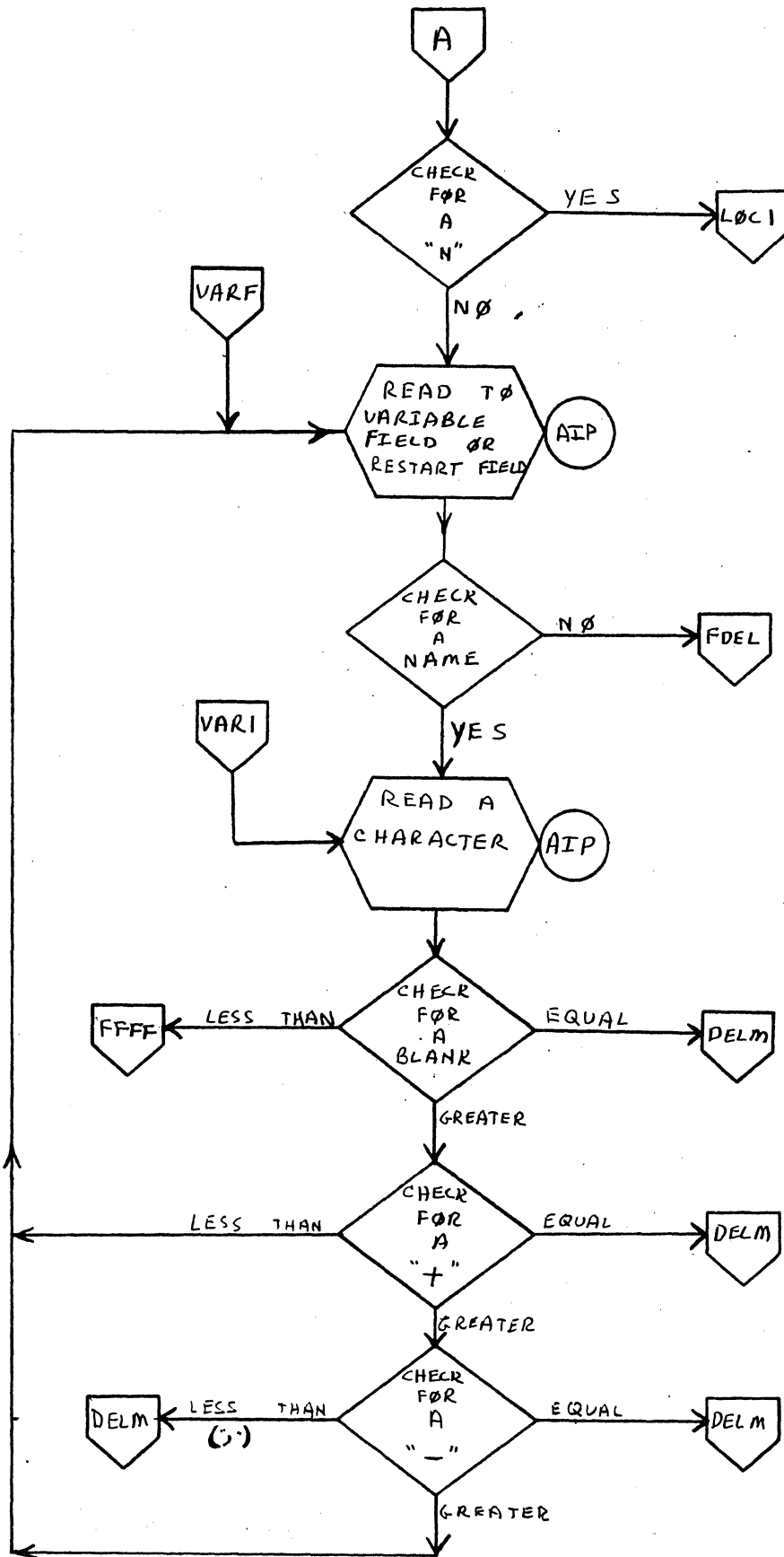
The time between reading characters is used to process the names read in and set up the strings in core. Therefore, the program may be processing columns one to four and may be reading in column six.

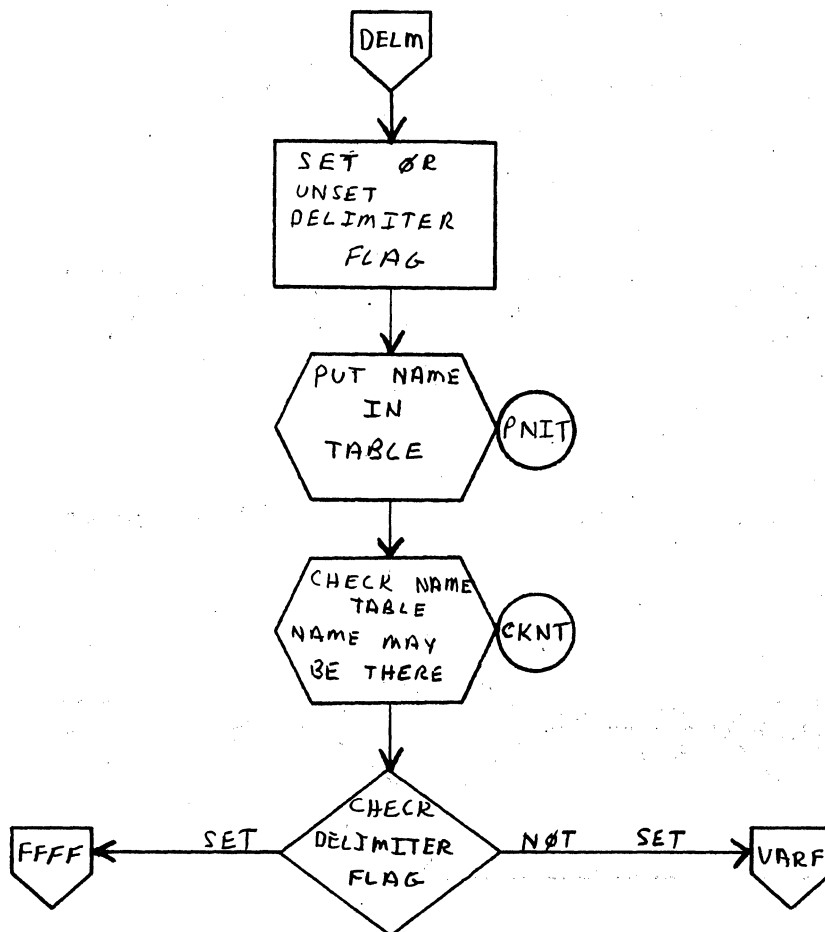
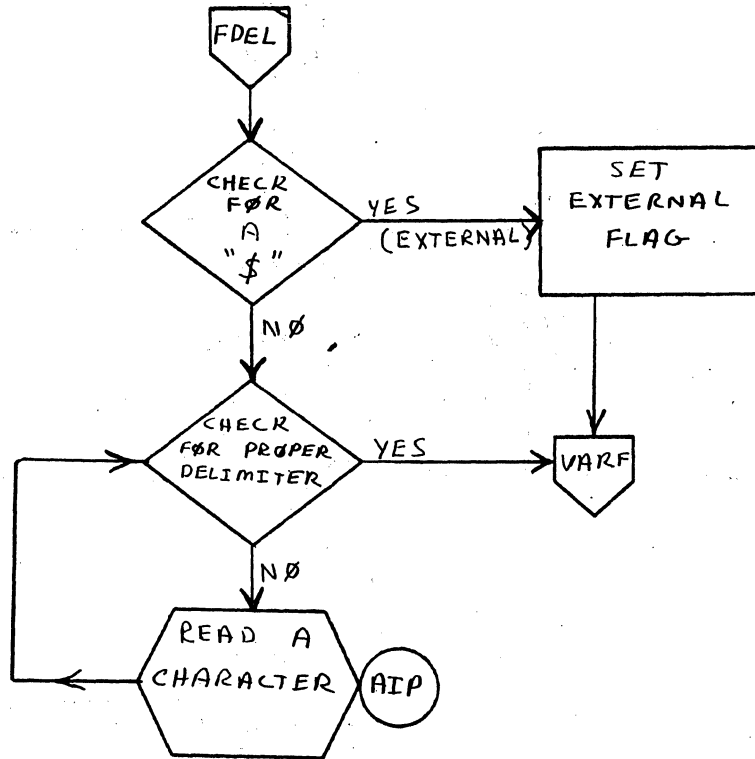
When the interrupt routine reaches the end of a card, the card output option is checked. If the cards are to be listed the program will run at the speed of the slowest peripheral.

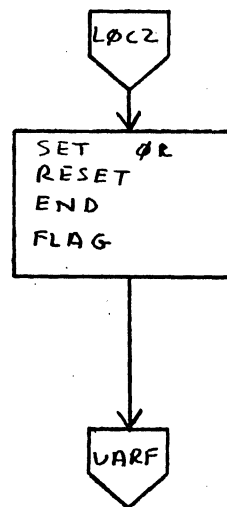
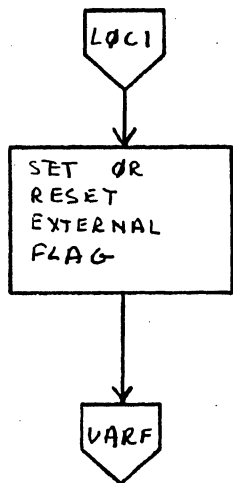
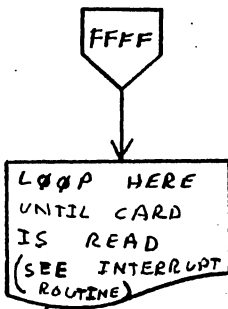
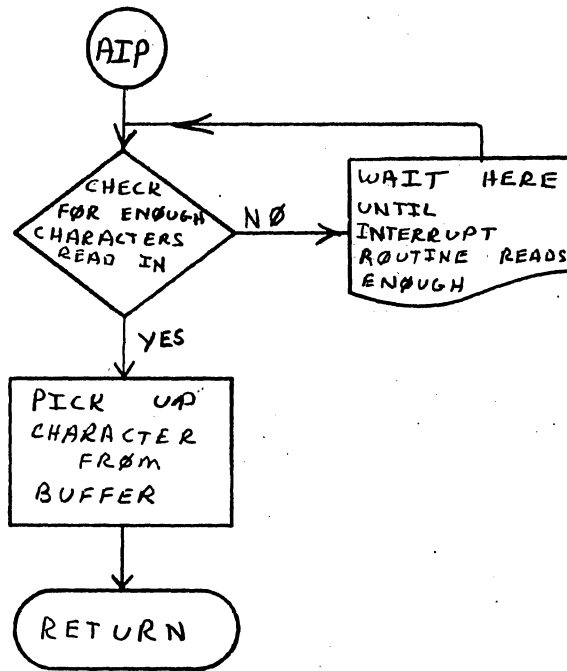
While a card is being printed the next card is being read and processed.

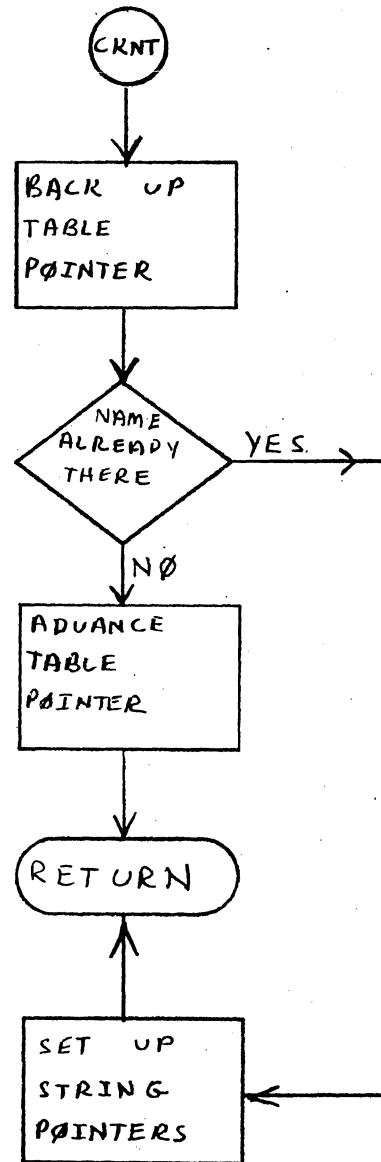
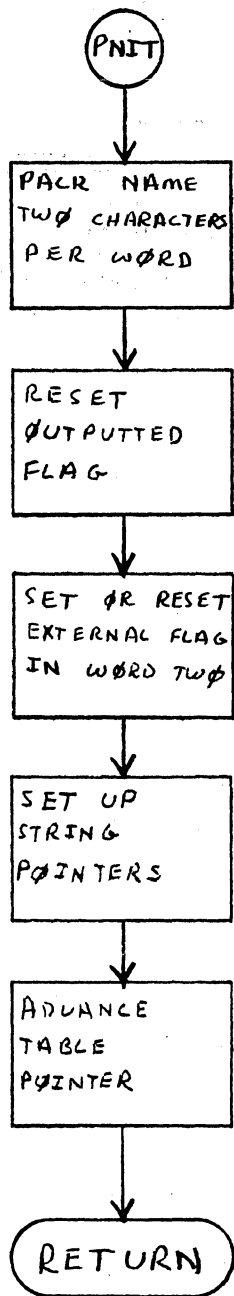


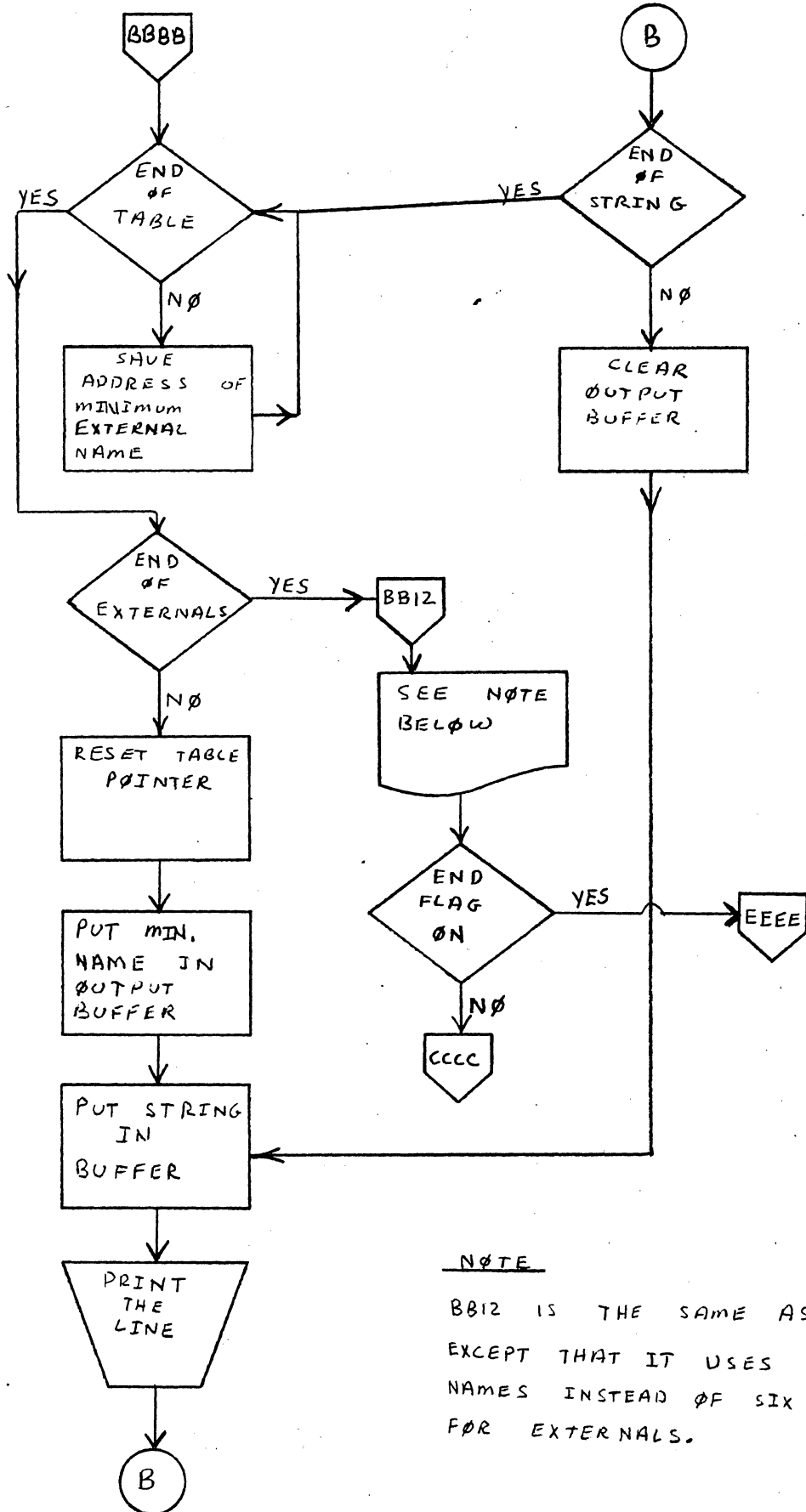






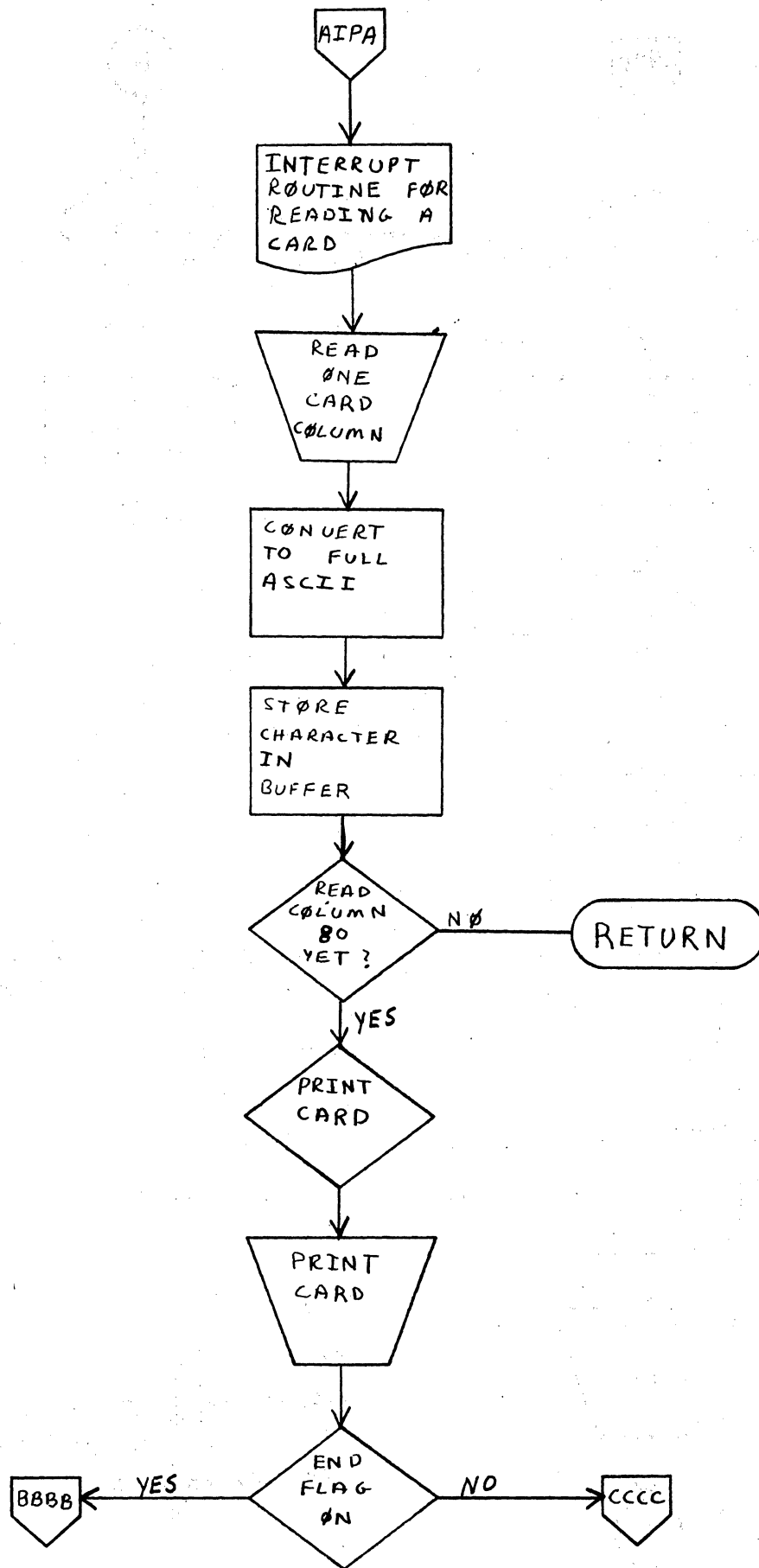






NOTE

BB12 IS THE SAME AS BBBB EXCEPT THAT IT USES FOUR CHARACTER NAMES INSTEAD OF SIX CHARACTERS FOR EXTERNALS.



1 PAGE 0001
 0002 00000 00000000 *
 0003 00000 00000000 *
 0004 00000 00000000 *
 0005 00000 00000000 *
 0006 00000 00000000 *
 0007 00000 00130601 EEEE
 0008 00001 00010001 DATA
 0009 00002 00130104 CEU
 0010 00003 00020000 DATA
 0011 00004 00000003 CLA
 0012 00005 00130104 CEU
 0013 00006 00060000 DATA
 0014 00007 00130600 PIE
 0015 00010 00010001 DATA
 0016 00011 05010000 EEE1 AMA
 0017 00012 00000005 TAB
 0018 00013 03400000 STA
 0019 00014 01400000 LAA
 0020 00015 00000022 SAZ
 0021 00016 11100011 BRU
 0022 00017 16076000 AMB
 0023 00020 04100763 STB
 0024 00021 04100771 STB
 0025 00022 04100765 STB
 0026 00023 04100772 STB
 0027 00024 03100764 STA
 0028 00025 01101503 LAA
 0029 00026 03100766 STA
 0030 00027 01001016 LAA
 0031 00030 03100777 STA
 0032 00031 01100775 LAA
 0033 00032 03001016 STA
 0034 00033 00130105 CCCS CEU
 0035 00034 00001000 DATA
 0036 00035 00000000 *
 0037 00035 00000000 *
 0038 00035 00000000 *

810A CROSS REFERENCE PROGRAM
 JANUARY 22, 1969

CAT. 3700058

SYSTEMS ENGINEERING LABORATORIES

INITIALIZE PROGRAM

DISABLE INTERRUPT MDL: 1/22/69 *B
 DISABLE INTERRUPT MDL: 1/22/69 *B
 DISABLE INTERRUPT MDL: 1/22/69 *B
 DISABLE INTERRUPT MDL: 1/22/69 *B

ENABLE INTERRUPT

ENABLE INTERRUPT
 4K+1
 FIND MEMORY HIGH
 MINUS '2000

XREF HIGHEST LOCATION

EXTERNAL FLAG
 STRING POINTER
 END CARD FLAG
 CARD COUNT
 LOW CORE
 TABLE POINTER

SET UP INTERRUPT LOCATION

TOP OF FORM

START XREF

0039	00035	01100765	CCCC	LAA	STRN	
0040	00036	06000015		SMA	= '15	CHECK FOR TABLES
0041	00037	15100766		CMA	TABP	COLLIDING
0042	00040	11101152		BRU	BBBB	YES
0043	00041	11101152		BRU	BBBB	YES
0044	00042	00130104	CCC1	CEU	4,W	NO
0045	00043	00004000		DATA	'4000	FEED A CARD
0046	00044	14100764		IMS	CCNT	INCREMENT CARD COUNT
0047	00045	02077752		LBA	= -22	
0048	00046	01000240		LAA	= '240	
0049	00047	03500641		STA	CARD.1	
0050	00050	00000026		IBS		
0051	00051	11100047		BRU	*-2	
0052	00052	01077660		LAA	= -80	
0053	00053	03100774		STA	C0LC	SET COLUMN POINTER
0054	00054	03100776		STA	C0LL	
0055	00055	12100311		SPB	AIP	INPUT A CHARACTER
0056	00056	15000240		CMA	= '240	
0057	00057	11100163		BRU	FFFF	80 - 80 PRINT OUT ONLY
0058	00060	11100106		BRU	L0CF-1	LOCATION FIELD
0059	00061	15000244		CMA	= '244	\$
0060	00062	11100163		BRU	FFFF	
0061	00063	11100177		BRU	CCC2	
0062	00064	15000333		CMA	= '333	CHECK FOR A NAME
0063	00065	15000277		CMA	= '277	
0064	00066	11100163		BRU	FFFF	NO NAME
0065	00067	11100163		BRU	FFFF	NO NAME
0066	00070	01000005		LAA	= 5	READ 4 CHARACTER NAME
0067	00071	03100770		STA	CHAR	
0068	00072	02077774	GGGG	LBA	= -4	
0069	00073	12100311		SPB	AIP	
0070	00074	00000026		IBS		
0071	00075	11100073		BRU	GGGG+1	
0072	00076	12100324		SPB	PNIT	PUT NAME IN TABLE
0073	00077	12101003		SPB	CKNT	CHECK NAME TABLE
0074	00100	02100765		LBA	STRN	
0075	00101	01400002		LAA	2,1	
0076	00102	00000020		ASC		FLAG THAT NAME IS LOCATED

1	PAGE	0003		
0077	00103	03400002	STA	2,1
0078	00104	02077777	LBA	=-1
0079	00105	11100107	BRU	LØCF
0080	00106	02077773	LBA	=-5
0081	00107	12100311	LØCF SPB	AIP
0082	00110	00000026	IBS	
0083	00111	11100107	BRU	LØCF
0084	00112	15000303	CMA	= '303
0085	00113	11100134	BRU	VARF
0086	00114	11100124	BRU	LØC1
0087	00115	15000305	CMA	= '305
0088	00116	11100134	BRU	VARF
0089	00117	11100130	BRU	LØC2
0090	00120	15000316	CMA	= '316
0091	00121	11100134	BRU	VARF
0092	00122	11100124	BRU	LØC1
0093	00123	11100134	BRU	VARF
0094	00124	12100311	LØC1 SPB	AIP
0095	00125	06000301	SMA	= '301
0096	00126	03100771	STA	EXTF
0097	00127	11100133	BRU	LØC3
0098	00130	12100311	LØC2 SPB	AIP
0099	00131	06000316	SMA	= '316
0100	00132	03100772	STA	ENDF
0101	00133	16000001	LØC3 AMB	=1
0102	00134	16077773	VARF AMB	=-5
0103	00135	12100311	SPB	AIP
0104	00136	00000026	IBS	
0105	00137	11100135	BRU	VARF+1
0106	00140	02000001	VAR7 LBA	=1
0107	00141	04100770	STB	CHAR
0108	00142	15000333	CMA	= '333
0109	00143	15000277	CMA	= '277
0110	00144	11100162	BRU	FDEL
0111	00145	11100162	BRU	FDEL
0112	00146	12100311	VAR1 SPB	AIP
0113	00147	14100770	IMS	CHAR
0114	00150	15000240	CMA	= '240

810A CROSS REFERENCE PROGRAM CAT. 370005B
AT THIS CARD NUMBER

CHECK FOR AN EXTERNAL OR.
END CARD AND SET FLAGS

C
VARIABLE FIELD
CHECK FOR AN A
E

GO CHECK FOR AN N
N

CHECK FOR AN A

A
ON IF ZERO
EXTERNAL FLAG

N
ON IF ZERO
END FLAG

START VARIABLE FIELD NAME
CHECK

CHECK FOR A NAME

CHECK DELIMITER

1

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B10A CROSS REFERENCE PROGRAM

DAT. 370005B

0115	00151	11100163	BRU	FFFF				
0116	00152	11100265	BRU	DELM		SET DELIMITER FLAG		
0117	00153	15000253	CMA	= '253		+		
0118	00154	11100146	BRU	VAR1				
0119	00155	11100265	BRU	DELM				
0120	00156	15000255	CMA	= '255		-		
0121	00157	11100265	BRU	DELM		.		
0122	00160	11100265	BRU	DELM		-		
0123	00161	11100146	BRU	VAR1				
0124	00162	15000240	FDEL CMA	= '240				
0125	00163	12100311	FFFF SPB	AIP		LOOP HERE TILL CARD IS		
0126	00164	11100163	BRU	FFFF		COMPLETELY READ		
0127	00165	15000244	CMA	= '244		\$		
0128	00166	11100236	BRU	VAR4				
0129	00167	11100214	BRU	VAR2		EXTERNAL		
0130	00170	15000247	CMA	= '247		CHECK FOR '		
0131	00171	11100236	BRU	VAR4				
0132	00172	11100246	BRU	VAR8				
0133	00173	15000252	CMA	= '252		*		
0134	00174	11100236	BRU	VAR4				
0135	00175	11100217	BRU	VAR3				
0136	00176	11100236	BRU	VAR4				
0137	00177	12100311	CCC2 SPB	AIP		CHECK FOR NON \$ CARD		
0138	00200	15000240	CMA	= '240				
0139	00201	11100163	BRU	FFFF		SPID CARD		
0140	00202	11100204	BRU	*+2				
0141	00203	11100163	BRU	FFFF				
0142	00204	01100777	LAA	SAVE		RESTORE INTERRUPT LOCATION		
0143	00205	03001016	STA	'1016				
0144	00206	00130601	PIU			DISABLE INTERRUPT	MDL 1/22/69	*B
0145	00207	00010001	DATA	'10001		DISABLE INTERRUPT	MDL 1/22/69	*B
0146	00210	00130104	CEU	4,W		DISABLE INTERRUPT	MDL 1/22/69	*B
0147	00211	00020000	DATA	'20000		DISABLE INTERRUPT	MDL 1/22/69	*B
0148	00212	00000000	HLT					
0149	00213	11100000	BRU	EEEE		START		
0150	00214	00000003	VAR2 CLA					
0151	00215	03100771	STA	EXTF		SET EXTERNAL FLAG ON		
0152	00216	11100135	BRU	VARF+1				

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0153	00217	12100311	VAR3	SPB	AIP	
0154	00220	15000333		CMA	= '333	
0155	00221	15000277		CMA	= '277	
0156	00222	11100225		BRU	VAR5	
0157	00223	11100225		BRU	VAR5	
0158	00224	11100146		BRU	VAR1	
0159	00225	15000240	VAR5	CMA	= '240	SPACE CHECK
0160	00226	11100163		BRU	FFFF	
0161	00227	11100163		BRU	FFFF	
0162	00230	15000254		CMA	= '254	COMMA CHECK
0163	00231	11100217		BRU	VAR3	NO READ CHAR.
0164	00232	11100234		BRU	*+2	YES
0165	00233	11100217		BRU	VAR3	
0166	00234	02077777	VAR6	LBA	= -1	
0167	00235	11100135		BRU	VARF+1	
0168	00236	12100311	VAR4	SPB	AIP	
0169	00237	15000240		CMA	= '240	
0170	00240	11100163		BRU	FFFF	
0171	00241	11100163		BRU	FFFF	
0172	00242	15000254		CMA	= '254	
0173	00243	11100236		BRU	VAR4	
0174	00244	11100234		BRU	VAR6	
0175	00245	11100236		BRU	VAR4	
0176	00246	12100311	VAR8	SPB	AIP	
0177	00247	15000247		CMA	= '247	
0178	00250	11100236		BRU	VAR4	
0179	00251	11100253		BRU	*+2	
0180	00252	11100236		BRU	VAR4	
0181	00253	12100311	VAR9	SPB	AIP	
0182	00254	15000247		CMA	= '247	
0183	00255	11100253		BRU	VAR9	
0184	00256	11100260		BRU	*+2	
0185	00257	11100253		BRU	VAR9	
0186	00260	12100311		SPB	AIP	
0187	00261	15000247		CMA	= '247	
0188	00262	11100253		BRU	VAR9	
0189	00263	11100236		BRU	VAR4	
0190	00264	11100253		BRU	VAR9	

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0225	00333	01500761		LAA	CARD+80,1	
0226	00334	14100770		IMS	CHAR	CHARACTER NO. 1
0227	00335	11100373		BRU	PN12	
0228	00336	00001016		LSL	8	ONE CHAR. ADD IN SPACES
0229	00337	05000240		AMA	= '240	
0230	00340	00000020	PN13	ASC		RESET OUTPUTTED FLAG
0231	00341	02100766		LBA	TABP	
0232	00342	03400000		STA	0,1	
0233	00343	01020240		LAA	= '20240	
0234	00344	03400001	PN15	STA	1,1	
0235	00345	01100771		LAA	EXTF	CHECK EXTERNAL FLAG
0236	00346	00000022		SAZ		
0237	00347	11100356		BRU	PN11	
0238	00350	01400001		LAA	1,1	
0239	00351	00000020		ASC		SET EXTERNAL FLAG IN
0240	00352	03400001		STA	1,1	WORD TWO OF NAME WORD
0241	00353	01020240		LAA	= '120240	
0242	00354	03400002		STA	2,1	
0243	00355	16000001		AMB	=1	
0244	00356	01100765	PN11	LAA	STRN	
0245	00357	03400002		STA	2,1	FIRST STRING
0246	00360	06000001		SMA	=1	
0247	00361	03400003		STA	3,1	NEXT ZERO
0248	00362	06000001		SMA	=1	
0249	00363	03100765		STA	STRN	
0250	00364	01100764		LAA	CCNT	SET UP STRING
0251	00365	03600002		STA*	2,1	
0252	00366	00000003		CLA		
0253	00367	03600003		STA*	3,1	
0254	00370	16000004		AMB	=4	
0255	00371	04100766		STB	TABP	MOVE TABLE POINTER
0256	00372	11300324		BRU*	PN1T	AHEAD.
0257	00373	00001016	PN12	LSL	8	
0258	00374	05500762		AMA	CARD+81,1	
0259	00375	14100770		IMS	CHAR	CHARACTER NO. 2
0260	00376	11100400		BRU	PN14	
0261	00377	11100340		BRU	PN13	
0262	00400	04100767	PN14	STB	GGG1	CHARACTER INDEX

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0263	00401	02100766	LBA	TABP		TABLE POINTER	
0264	00402	00000020	ASC				
0265	00403	03400000	STA	0,1			
0266	00404	02100767	LBA	GGG1			
0267	00405	01500763	LAA	CARD+82,1			
0268	00406	14100770	IMS	CHAR		CHARACTER NO. 3	
0269	00407	11100415	BRU	PN16			
0270	00410	00001016	LSL	8			
0271	00411	05000240	AMA	= '240			
0272	00412	00000020	PN17	ASC		TURN SIGN BIT OFF-NAME	
0273	00413	02100766	LBA	TABP			
0274	00414	11100344	BRU	PN15			
0275	00415	00001016	PN16	LSL	8		
0276	00416	05500764	AMA	CARD+83,1			
0277	00417	14100770	IMS	CHAR		CHARACTER NO. 4	
0278	00420	11100422	BRU	PN18			
0279	00421	11100412	BRU	PN17			
0280	00422	04100767	PN18	STB	GGG1		
0281	00423	02100766	LBA	TABP			
0282	00424	03400001	STA	1,1		LEAVE SIGN BIT SET - EXTERNAL	
0283	00425	02100767	LBA	GGG1			
0284	00426	01100771	LAA	EXTF		CHECK EXTERNAL FLAG	
0285	00427	00000022	SAZ				
0286	00430	11100276	BRU	FFF1		NOT SET-ERROR-NAME TO LONG	
0287	00431	01500765	LAA	CARD+84,1		NO ERROR	
0288	00432	14100770	IMS	CHAR		CHARACTER NO. 5	
0289	00433	11100441	BRU	PN19			
0290	00434	00001016	LSL	8			
0291	00435	05000240	AMA	= '240			
0292	00436	00000020	ASC				
0293	00437	02100766	LBA	TABP			
0294	00440	11100354	BRU	PN11-2			
0295	00441	00001016	PN19	LSL	8		
0296	00442	05500766	AMA	CARD+85,1		CHARACTER NO. 6	
0297	00443	11100436	BRU	PN19-3			
0298	00444	00000000	****				
0299	00444	00000000	****				
0300	00444	00000000	AIPA	HIT		INTERRUPT ROUTINE FOR CHARACTERS	

1	PAGE	0009	810A	CROSS REFERENCE PROGRAM	CAT. 3700058
0301	00445	03101000	STA	HX7	SAVE A-REG
0302	00446	04101001	STB	HX8	SAVE B-REG
0303	00447	00170304	AIP	4,W	INPUT A CHARACTER AND CONVERT
0304	00450	15100610	CMA	CD28	0-2-8 TO FULL ASCII
0305	00451	11100454	BRU	*+3	
0306	00452	01100606	LAA	P60P	'6000
0307	00453	15100611	CMA	CO1	0-1
0308	00454	11100457	BRU	*+3	
0309	00455	01100607	LAA	P70P	'7000
0310	00456	15100612	CMA	CC28	12-2-8
0311	00457	11100461	BRU	*+2	
0312	00460	01100605	LAA	P50P	'5000
0313	00461	02000000	LBA	=0	
0314	00462	04101002	STB	TS2	
0315	00463	00000714	FRL	7	
0316	00464	00000022	SAZ		
0317	00465	11100543	BRU	HX2	
0318	00466	01101002	HX1	LAA	TS2
0319	00467	00000216	LSL	2	
0320	00470	00000030	ØBA		
0321	00471	02000000	LBA	=0	
0322	00472	00000112	FRA	1	
0323	00473	00000006	IAB		
0324	00474	02500567	LBA	HSAT,1	
0325	00475	00000022	SAZ		
0326	00476	00001013	FLL	8	
0327	00477	00000003	CLA		
0328	00500	00001013	FLL	8	
0329	00501	02100774	HX5	LBA	CØLC BUFFER COLUMN POINTER
0330	00502	03500761	STA	CARD+80,1	STORE CHARACTER IN BUFFER
0331	00503	14100774	IMS	CØLC	
0332	00504	11100537	BRU	HX9	NOT ZERO EXIT
0333	00505	00000031	LCS		LOAD CONTROL SWITCHES
0334	00506	00000022	SAZ		FOR PRINT OPTION
0335	00507	11100527	BRU	HX6	DO NOT PRINT CARD
0336	00510	00130105	CEU	5,W	PRINT CARD
0337	00511	00000200	DATA	'200	CLEAR
0338	00512	00130105	CEU	5,W	

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0339	00513	00002100		DATA	12100	
0340	00514	01100764		LAA	CCNT	
0341	00515	12101066		SPB	C0NV	DECIMAL CONVERTER NO. IN
0342	00516	35600613		DAC	CNVT,1	WHERE TO PUT NUMBERS (NOTE INDEX BIT SET)
0343	00517	02077632		LBA	*-102	
0344	00520	01500761		LAA	CNVT+102,1	
0345	00521	00001016		LSL	8	
0346	00522	00170105		A0P	5,W	OUTPUT CARD
0347	00523	00000026		IBS		
0348	00524	11100520		BRU	*-4	
0349	00525	00130105		CEU	5,W	PRINT COMMAND
0350	00526	00000400		DATA	1400	
0351	00527	01100772	Hx6	LAA	ENDF	END CARD FLAG CHECK
0352	00530	00000035		T0I		TURN OFF INTERRUPT
0353	00531	00000022		SAZ		
0354	00532	11100535		BRU	*+3	END FLAG NOT ON
0355	00533	00000036		L0B		END FLAG IS ON
0356	00534	35401152		DAC	8898	
0357	00535	00000036		L0B		
0358	00536	35400035		DAC	CCCC	READ ANOTHER CARD
0359	00537	01101000	Hx9	LAA	Hx7	RESTORE A-REG
0360	00540	02101001		LBA	Hx8	RESTORE B-REG
0361	00541	00000035		T0I		TURN OFF INTERRUPT
0362	00542	11300444		BRU	AIPA	
0363	00543	00000024	Hx2	SAP		
0364	00544	11100550		BRU	Hx3	
0365	00545	00000116		LSL	1	
0366	00546	14101002		IMS	TS2	
0367	00547	11100543		BRU	Hx2	
0368	00550	00000006	Hx3	IAB		
0369	00551	15000004		CMA	*4	
0370	00552	11100554		BRU	*+2	
0371	00553	01000003		LAA	*3	
0372	00554	00000006		IAB		
0373	00555	00000116		LSL	1	
0374	00556	00000022		SAZ		
0375	00557	11100466		BRU	Hx1	
0376	00560	05101002		AMA	TS2	

1		PAGE 0011	B10A CROSS REFERENCE PROGRAM		CAT. 370005B
0377	00561	05500563	AMA	HX4,1	
0378	00562	11100501	BRU	HX5	
0379	00563	00000261	HX4	DATA '261,'322,'312,'301	
0379	00564	00000322			
0379	00565	00000312			
0379	00566	00000301			
0380	00567	00120260	H&AT	DATA '120260,'126641,'125677,'157257,'136654	
0380	00570	00126641			
0380	00571	00125677			
0380	00572	00157257			
0380	00573	00136654			
0381	00574	00122256	DATA	'122256,'123650,'125251,'135243,'156733	
0381	00575	00123650			
0381	00576	00125251			
0381	00577	00135243			
0381	00600	00156733			
0382	00601	00137334	DATA	'137334,'135674,'140242,'140337	MDL 1/22/69 *8
0382	00602	00135674			
0382	00603	00140242			
0382	00604	00140337			
0383	00605	00005000	P50P	DATA '5000	
0384	00606	00006000	P60P	DATA '6000	
0385	00607	00007000	P70P	DATA '7000	
0386	00610	00001202	C02B	DATA '1202	
0387	00611	00001400	C01	DATA '1400	
0388	00612	00004202	CC2B	DATA '4202	
0389	00613	00000014	CNVT	BSS 12	NAME AND CARD COUNT
0390	00627	00000012	NMBR	BSS 10	XREF NUMBERS START HERE THROUGH CARD
0391	00641	00000122	CARD	BSS 82	CARD CHARACTER BUFFER
0392	00763	00000000	*****		
0393	00763	00000000	HIGH	HLT	XREF HIGHEST LOCATION
0394	00764	00000000	CCNT	HLT	CARD COUNT
0395	00765	00000000	STRN	HLT	STRING POINTER
0396	00766	00000000	TABP	HLT	TABLE POINTER
0397	00767	00000000	GGG1	HLT	STORAGE
0398	00770	00000000	CHAR	HLT	CHARACTER COUNT (NAMES)
0399	00771	00000000	EXTF	HLT	EXTERNAL FLAG OR STORAGE
0400	00772	00000000	ENDF	HLT	END FLAG

1	PAGE	0012			810A	CROSS REFERENCE PROGRAM	CAT. 3700058
0401	00773	00000000	DELF	HLT		DELIMITER FLAG	
0402	00774	00000000	C0LC	HLT		C0LUME C0UNT 0N CARDS	
0403	00775	35400444	DAC3	DAC	AIPA	INTERRUPT ADDRESS	
0404	00776	00000000	C0LL	HLT			
0405	00777	00000000	SAVE	HLT			
0406	01000	00000000	HX7	HLT			
0407	01001	00000000	HX8	HLT			
0408	01002	00000000	TS2	HLT		STORAGE	
0409	01003	00000000	CKNT	HLT		A =0, B= NEXT TABLE ENTRY	
0410	01004	01100771	LAA	EXTF			
0411	01005	00000022	SAZ				
0412	01006	16000001	AMB	=1		NAME	
0413	01007	16077773	AMB	=-5		EXTERNAL NAME	
0414	01010	04100766	STB	TABP		BACK UP TABLE POINTER	
0415	01011	01400000	LAA	0,1		CHARACTERS 1 AND 2	
0416	01012	03101145	STA	CKN1			
0417	01013	01400001	LAA	1,1			
0418	01014	03101146	STA	CKN2		CHARACTERS 3 AND 4	
0419	01015	01400002	LAA	2,1			
0420	01016	03101147	STA	CKN3		CHARACTERS 5 AND 6 IF EXTERNAL	
0421	01017	02101503	LBA	L0W		L0W CORE	
0422	01020	11101031	BRU	CK11			
0423	01021	01400000	CKN6	LAA	0,1		
0424	01022	15101145	CMA	CKN1		CHECK FIRST TWO CHAR.	
0425	01023	11101025	BRU	CKN4		NOT EQUAL - CHECK NEXT NAME	
0426	01024	11101042	BRU	CKN5		EQUAL	
0427	01025	01400001	CKN4	LAA	1,1		
0428	01026	00000024	SAP			NAME OR EXTERNAL CHECK	
0429	01027	16000001	AMB	=1		EXTERNAL	
0430	01030	16000004	AMB	=4		NAME	
0431	01031	00000004	CK11	TBA		CHECK FOR END OF TABLE	
0432	01032	15100766	CMA	TABP			
0433	01033	11101021	BRU	CKN6		NOT END - MORE NAMES	
0434	01034	01100771	LAA	EXTF		END	
0435	01035	00000022	SAZ				
0436	01036	16077777	AMB	=-1			
0437	01037	16000005	AMB	=5			
0438	01040	04100766	STB	TABP		ENTER NEW NAME	

0439	01041	11301003	BRU*	CKNT	
0440	01042	01400001	CKN5	LAA	1,1
0441	01043	15101146		CMA	CKN2
0442	01044	11101026		BRU	CKN4+1
0443	01045	11101047		BRU	CKN7
0444	01046	11101026		BRU	CKN4+1
0445	01047	00000024	CKN7	SAP	
0446	01050	11101057		BRU	CKN8
0447	01051	01100765	CK10	LAA	STRN
0448	01052	05000002		AMA	=2
0449	01053	03600003		STA*	3,1
0450	01054	06000001		SMA	=1
0451	01055	03400003		STA	3,1
0452	01056	11301003		BRU*	CKNT
0453	01057	01400002	CKN8	LAA	2,1
0454	01060	15101147		CMA	CKN3
0455	01061	11101025		BRU	CKN4
0456	01062	11101064		BRU	CKN9
0457	01063	11101025		BRU	CKN4
0458	01064	16000001	CKN9	AMB	=1
0459	01065	11101051		BRU	CK10
0460	01066	00000000	C0NV	HLT	
0461	01067	03101142		STA	TS1
0462	01070	04101432		STB	SYMB
0463	01071	02000005		LBA	=5
0464	01072	04101143		STB	TS3
0465	01073	01101066		LAA	C0NV
0466	01074	05040000		AMA	= '40000
0467	01075	03101066		STA	C0NV
0468	01076	01101142		LAA	TS1
0469	01077	00000023		SAN	
0470	01100	11101105		BRU	C0N1
0471	01101	00000020		ASC	
0472	01102	03101142		STA	TS1
0473	01103	01000252		LAA	= '252
0474	01104	11101106		BRU	*+2
0475	01105	01000240	C0N1	LAA	= '240
0476	01106	02000000		LBA	=0

CHECK SECOND TWO CHAR.

EQUAL

EXTERNAL CHECK

NOT EXTERNAL

SET UP STRING FOR

CARD NUMBER AND

NEXT ZERO

CHECK THIRD TWO CHAR.

NOT EQUAL

EQUAL

ADVANCE B-POINTER TO HANDLE

EXTERNAL AS A NAME FOR STRING

CONVERT NUMBER IN A-REG

SAVE B-REG INDEX

SET ENTERANCE FOR TWO LEVEL

INDIRECT AND INDEX ON LAST LINK

CHECK FOR LOCATION FLAG

TURN OFF LOCATION FLAG

AND CONVERT

1	PAGE	0014		810A	CROSS REFERENCE PROGRAM	CAT. 3700058
0477	01107	03301066		STA*	C0NV	STORE LOCATION FLAG (* OR BLANK)
0478	01110	02101142	C0N4	LBA	TS1	CONVERT BINARY NUMBER
0479	01111	00000003		CLA		TO 5 ASCII CHARACTERS
0480	01112	10000012		DIV	=10	
0481	01113	03101142		STA	TS1	
0482	01114	00000022		SAZ		
0483	01115	11101137		BRU	C0N2	
0484	01116	00000004		TBA		
0485	01117	00000022		SAZ		
0486	01120	11101140		BRU	C0N2+1	
0487	01121	01000240		LAA	=1240	
0488	01122	02101143	C0N3	LBA	TS3	STORING INDEX
0489	01123	03301066		STA*	C0NV	STORE CONVERTED NUMBER
0490	01124	00000004		TBA		
0491	01125	06000001		SMA	=1	DECREMENT INDEX
0492	01126	03101143		STA	TS3	
0493	01127	00000022		SAZ		
0494	01130	11101110		BRU	C0N4	NOT DONE
0495	01131	02101432		LBA	SYMB	RESTORE B-REG
0496	01132	01101066		LAA	C0NV	
0497	01133	05040000		AMA	=140000	RESTORE EXIT
0498	01134	03101066		STA	C0NV	
0499	01135	14101066		IMS	C0NV	ADVANCE OVER STORING ADDRESS
0500	01136	11301066		BRU*	C0NV	BYE
0501	01137	00000004	C0N2	TBA		
0502	01140	05000260		AMA	=1260	
0503	01141	11101122		BRU	C0N3	
0504	01142	00000000	TS1	HLT		STORAGE
0505	01143	00000000	TS3	HLT		STORAGE
0506	01144	00000000	STNF	HLT		STRING FLAG
0507	01145	00000000	CKN1	HLT		CHARACTERS 1 AND 2
0508	01146	00000000	CKN2	HLT		CHARACTERS 3 AND 4
0509	01147	00000000	CKN3	HLT		CHARACTERS 5 AND 6 (EXTERNALS ONLY)
0510	01150	00000000	MIN	HLT		MINIMUM VALUE TABLE POINTER
0511	01151	35600627	DAC1	DAC	NMBR,1	NUMBER STRING OUTPUT START
0512	01152	02077632	BBBB	LBA	=-102	
0513	01153	01000240		LAA	=1240	
0514	01154	03500761		STA	CNVT+102,1	CLEAR OUTPUT BUFFER

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0515	01155	00000026		IBS			
0516	01156	11101154		BRU	*-2		
0517	01157	12101453		SPB	EXTR		TYPE OUT EXTERNAL HEADING
0518	01160	01077777	BBB0	LAA	= '77777		MAX PDS. NUMBER TO START
0519	01161	03101145		STA	CKN1		MIN SEARCH OF EXTERNAL TABLE
0520	01162	02101503		LBA	L0W		L0W CORE
0521	01163	01400001	BBB1	LAA	1,1		
0522	01164	00000024		SAP			CHECK FOR EXTERNALS ONLY
0523	01165	11101174		BRU	BBBx		EXTERNAL
0524	01166	16000004		AMB	=4		NAME
0525	01167	00000004	BBB5	TBA			
0526	01170	15100766		CMA	TABP		CHECK FOR END OF TABLE
0527	01171	11101163		BRU	BBB1		NOT END CONTINUE
0528	01172	11101230		BRU	BBB2		END
0529	01173	11101230		BRU	BBB2		
0530	01174	01400000	BBBx	LAA	0,1		
0531	01175	00000023		SAN			BEEN OUTPUTTED YET
0532	01176	11101201		BRU	BBB4		NO
0533	01177	16000005	BBB7	AMB	=5		YES
0534	01200	11101167		BRU	BBB3		
0535	01201	15101145	BBB4	CMA	CKN1		
0536	01202	11101220		BRU	BBB5		SET POINTER
0537	01203	11101205		BRU	BBB6		CHECK NEXT LETTERS
0538	01204	11101177		BRU	BBB7		
0539	01205	01400001	BBB6	LAA	1,1		
0540	01206	00000020		ASC			
0541	01207	15101146		CMA	CKN2		
0542	01210	11101223		BRU	BBB9		
0543	01211	11101213		BRU	BBB8		
0544	01212	11101177		BRU	BBB7		
0545	01213	01400002	BBB8	LAA	2,1		
0546	01214	15101147		CMA	CKN3		
0547	01215	11101225		BRU	BB10		
0548	01216	11101177		BRU	BBB7		
0549	01217	11101177		BRU	BBB7		
0550	01220	03101145	BBB5	STA	CKN1		CHAR. 1 AND 2 LESS THAN
0551	01221	01400001		LAA	1,1		PREVIOUS CHAR. 1 AND 2
0552	01222	00000020		ASC			

1	PAGE	0016	810A	CROSS REFERENCE PROGRAM	CAT. 370005B
0553	01223	03101146	BBB9	STA CKN2	CHAR 3 AND 4 LESS THAN
0554	01224	01400002		LAA 2,1	PREVIOUS CHAR 3 AND 4
0555	01225	03101147	BB10	STA CKN3	
0556	01226	04101150		STB MIN	MIN CHAR'S TABLE POINTER
0557	01227	11101177		BRU BBB7	CONTINUE SEARCH
0558	01230	01101145	BBB2	LAA CKN1	
0559	01231	15077777		CMA ='77777	ANY EXTERNALS LEFT
0560	01232	11101234		BRU BB11	YES
0561	01233	11101255		BRU BB12	NO - DO NAMES (SYMBOLICS)
0562	01234	02101150	BB11	LBA MIN	MINIMUM TABLE NAME
0563	01235	01400000		LAA 0,1	
0564	01236	00000020		ASC	SET NAME TO OUTPUTTED
0565	01237	03400000		STA 0,1	MODE
0566	01240	03100614		STA CNVT+1	
0567	01241	00001015		RSL 8	STORE NAME IN BUFFER
0568	01242	03100613		STA CNVT	
0569	01243	01400001		LAA 1,1	
0570	01244	03100616		STA CNVT+3	
0571	01245	00001015		RSL 8	
0572	01246	03100615		STA CNVT+2	
0573	01247	01400002		LAA 2,1	
0574	01250	03100620		STA CNVT+5	
0575	01251	00001015		RSL 8	
0576	01252	03100617		STA CNVT+4	
0577	01253	12101351		SPB SING	STRING OUTPUT LOCATIONS
0578	01254	11101160		BRU BB80	
0579	01255	12101432	BB12	SPB SYMB	TYPE OUT SYMBOLIC HEADING
0580	01256	01077777	XXX0	LAA ='77777	
0581	01257	03101145		STA CKN1	SET TO MAX. POS. NUMBER
0582	01260	02101503		LBA LOW	LOW CORE
0583	01261	01400000	XXX1	LAA 0,1	
0584	01262	00000023		SAN	BEEN OUTPUTTED YET
0585	01263	11101275		BRU XXX2	NO
0586	01264	01400001		LAA 1,1	YES
0587	01265	00000023		SAN	NAME OR EXTERNAL
0588	01266	16077777	XXX5	AMB =-1	SYMBOLIC
0589	01267	16000005		AMB =5	EXTERNAL
0590	01270	00000004		TBA	

1	PAGE	0017		810A	CROSS REFERENCE PROGRAM	CAT. 3700058
0591	01271	15100766		CMA	TABP	CHECK FOR END OF TABLE
0592	01272	11101261		BRU	XXX1	NOT END
0593	01273	11101313		BRU	XXXX	END
0594	01274	11101313		BRU	XXXX	
0595	01275	15101145	XXX2	CMA	CKN1	CHAR 1 AND 2 CHECK
0596	01276	11101306		BRU	XXX3	LESS
0597	01277	11101301		BRU	XXX4	EQUAL
0598	01300	11101266		BRU	XXX5	GREATER
0599	01301	01400001	XXX4	LAA	1,1	
0600	01302	15101146		CMA	CKN2	CHECK CHAR. 3 AND 4
0601	01303	11101310		BRU	XXX6	LESS
0602	01304	11101266		BRU	XXX5	EQUAL
0603	01305	11101266		BRU	XXX5	GREATER
0604	01306	03101145	XXX3	STA	CKN1	CHAR. 1 AND 2 LESS THAN
0605	01307	01400001		LAA	1,1	PREVIOUS CHAR 1 AND 2
0606	01310	03101146	XXX6	STA	CKN2	CHAR. 3 AND 4 LESS THAN
0607	01311	04101150		STB	MIN	PREVIOUS CHAR 3 AND 4
0608	01312	11101266		BRU	XXX5	SET TABLE POINTER TO MIN AND CONTINUE
0609	01313	01101145	XXXX	LAA	CKN1	CHECK FOR END OF TABLE
0610	01314	15077777		CMA	= '77777	
0611	01315	11101334		BRU	XXX7	NOT END
0612	01316	01100772		LAA	ENDF	END - LOAD END CARD FLAG
0613	01317	00000022		SAZ		
0614	01320	11101324		BRU	*+4	NOT SET
0615	01321	01100777		LAA	SAVE	SET - RESTORE INTERRUPT LOCATION
0616	01322	03001016		STA	'1016	
0617	01323	11100000		BRU	EEEE	
0618	01324	01100763		LAA	HIGH	RESET STRING POINTER
0619	01325	03100765		STA	STRN	
0620	01326	01101503		LAA	LOW	RESET TABLE POINTER
0621	01327	03100766		STA	TABP	
0622	01330	00000031		LCS		CHECK FOR PRINTOUT OF
0623	01331	00000022		SAZ		CARDS
0624	01332	11100042		BRU	CCC1	NO - NO TOP OF FORM
0625	01333	11100033		BRU	CCC3	YES - DO TOP OF FORM
0626	01334	02101150	XXX7	LBA	MIN	MINIMUM TABLE NAME
0627	01335	01400000		LAA	0,1	
0628	01336	00000020		ASC		

1	PAGE	0018		810A	CROSS REFERENCE PROGRAM	CAT. 370005B
0629	01337	03400000	STA	0,1	STORE NAME IN BUFFER.	
0630	01340	03100614	STA	CNVT+1		
0631	01341	00001015	RSL	8		
0632	01342	03100613	STA	CNVT		
0633	01343	01400001	LAA	1,1		
0634	01344	03100616	STA	CNVT+3		
0635	01345	00001015	RSL	8		
0636	01346	03100615	STA	CNVT+2		
0637	01347	12101351	SPB	STNG	OUTPUT CARD NUMBER STRING	
0638	01350	11101256	BRU	XXXO		
0639	01351	00000000	STNG	HLT	STRING OUTPUT ROUTINE	
0640	01352	02101150	LBA	MIN	MIN TABLE NAME	
0641	01353	01400001	LAA	1,1		
0642	01354	00000024	SAP			
0643	01355	16000001	AMB	=1	EXTERNAL	
0644	01356	02400002	LBA	2,1	NAME-GET FIRST STRING LOCATION	
0645	01357	01077767	STN2	LAA	=-9	
0646	01360	03101453	STA	EXTR	OUTPUT COLUMN COUNTER	
0647	01361	01101151	LAA	DAC1		
0648	01362	03101365	STA	DAC2	RESET WHERE FIRST NUMBER GOES	
0649	01363	01400000	STN3	LAA	0,1	LOAD FIRST NUMBER
0650	01364	12101066	SPB	C0NV		
0651	01365	35400627	DAC2	UAC	NMBR	WHERE NUMBER GOES
0652	01366	16077777	AMB	=-1		
0653	01367	01400000	LAA	0,1	PICK UP NEXT STRING LOCATION	
0654	01370	00000022	SAZ		CHECK FOR END OF STRING	
0655	01371	11101421	BRU	STN1	NOT END OF STRING	
0656	01372	03101144	STA	STNF	SET STRING FLAG	
0657	01373	00130105	STN4	CEU	5,W	
0658	01374	00000200	DATA	'200	CLEAR PRINTER BUFFER	
0659	01375	00130105	CEU	5,W		
0660	01376	00002100	DATA	'2100	UP ONE LINE-FILL BUFFER	
0661	01377	02077632	LBA	=-102		
0662	01400	01500761	FILL	LAA	CNVT+102,1	OUTPUT BUFFER
0663	01401	00001016	LSL	8		
0664	01402	00170105	A0P	5,W		
0665	01403	00000026	IBS			
0666	01404	11101400	BRU	FILL		

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0667	01405	00130105	CEU	5,W	PRINT
0668	01406	00000400	DATA	'400	
0669	01407	02077632	LBA	=-102	
0670	01410	01000240	LAA	'240	
0671	01411	03500761	STA	CNVT*102,1	CLEAR BUFFER
0672	01412	00000026	IBS		
0673	01413	11101411	BRU	*-2	
0674	01414	01101144	LAA	STNF	CHECK STRING FLAG
0675	01415	00000005	TAB		
0676	01416	00000022	SAZ		
0677	01417	11101357	BRU	STN2	NOT END OF STRING
0678	01420	11301351	BRU*	STNG	END - GO BACK
0679	01421	00000005	STN1 TAB		
0680	01422	14101453	IMS	EXTR	CHECK PRINT COLUMN COUNT
0681	01423	11101426	BRU	STN5	NOT = 0
0682	01424	03101144	STA	STNF	COUNT=0 STORE NEXT STRING
0683	01425	11101373	BRU	STN4	ADDRESS IN STNF AND PRINT
0684	01426	01101365	STN5 LAA	DAC2	
0685	01427	05000012	AMA	=10	INCREMENT COLUMN POINTER
0686	01430	03101365	STA	DAC2	FOR NUMBERS
0687	01431	11101363	BRU	STN3	
0688	01432	00000000	SYMB HLT		EXIT FOR SYMB AND EXTR
0689	01433	01101461	LAA	SYM4	SET UP ROUTINE FOR SYMB
0690	01434	03101442	STA	SYM2	
0691	01435	00130105	SYMS CEU	5,W	
0692	01436	00000200	DATA	'200	CLEAR PRINT BUFFER
0693	01437	00130105	CEU	5,W	
0694	01440	00001100	DATA	'1100	TOP OF FORM AND FILLI BUFFER
0695	01441	02077770	LBA	=-8	
0696	01442	01501473	SYM2 LAA	SYM1+8,1	
0697	01443	00170105	AOP	5,W	PRINT OUT ...SYMBOLICS...
0698	01444	00001016	LSL	8	OR
0699	01445	00170105	AOP	5,W	PRINT OUT ...EXTERNALS...
0700	01446	00000026	IBS		
0701	01447	11101442	BRU	SYM2	
0702	01450	00130105	CEU	5,W	
0703	01451	00000400	DATA	'400	PRINT
0704	01452	11301432	BRU*	SYMB	RETURN

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0705	01453	00000000	EXTR	HLT		
0706	01454	01101462		LAA	EXT1	SET UP TO PRINT OUT ...EXTERNAL...
0707	01455	03101442		STA	SYM2	
0708	01456	01101453		LAA	EXTR	SET UP EXIT FOR EXTR.
0709	01457	03101432		STA	SYMB	
0710	01460	11101435		BRU	SYM3	BRANCH TO SYMB ROUTINE
0711	01461	01501473	SYM4	LAA	SYM1+8,1	
0712	01462	01501503	EXT1	LAA	EXT2+8,1	
0713	01463	00127256	SYM1	DATA	'...SYMBOLICS...'	
0713	01464	00127323				
0713	01465	00154715				
0713	01466	00141317				
0713	01467	00146311				
0713	01470	00141723				
0713	01471	00127256				
0713	01472	00127240				
0714	01473	00127256	EXT2	DATA	'...EXTERNALS...'	
0714	01474	00127305				
0714	01475	00154324				
0714	01476	00142722				
0714	01477	00147301				
0714	01500	00146323				
0714	01501	00127256				
0714	01502	00127240				
0715	01503	35401504	LOW	DAC	++1	LOW CORE
0716	01504	70400000		END		
ERRORS	0000	00000				

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