



PDP-12
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CONVERT

A PROGRAM TO TRANSLATE LAP6 or LAP6-3L SOURCE TO DIAL

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ABSTRACT

Program CONVERT will perform the major tasks in translating a LAP6 or LAP6-3L source stored on a LINC tape to a suitable source for utilization by the DIAL system on the PDP-12.

REQUIREMENTS

1. The minimum configuration is the PDP-12A.
2. A DIAL system tape containing CONVERT on Unit 0.
3. A LAP6 tape on Unit 1 containing the source program to be translated.

OPERATING PROCEDURE

1. Load a DIAL system tape containing the CONVERT program onto Unit 0.
2. Load the LAP6 tape on Unit 1.
3. Call in DIAL.
4. Clear the DIAL work area with the CL monitor command.
5. Call PROGRAM CONVERT by typing:
→ LO CONVERT,0)
6. Complete the questionnaire seen on the scope by inserting the starting Block Number of the program to be converted. Press the LINEFEED Key upon completion. (See QANDA documentation for more details.)
7. Upon completion of the program, CONVERT rewinds the LAP6 tape on Unit 1, types out a message warning the user to remove the LAP tape from Unit 1 and to type:
→AP 370,0)
8. The user now has two alternative procedures:
Choice 1 - if more than one program will be translated, leave the LAP tape on Unit 1, type:
→ SP name,0)
and file your source program ("name" is an eight-character name selected by the user). Then issue a:
→LO CONVERT,0)
to translate another source program.
Choice 2 - Replace the LAP tape on Unit 1 with a DIAL system tape, check and edit program, then type:
→LI) to assemble and obtain a listing
→AS) to assemble only
→PS) to obtain a quick source listing without assembling.

WARNING

If you issue a LI or AS command without removing your LAP tape, your assembled binary will overlay filed programs on the LAP tape.

PROGRAM RESULTS

1. Converts LAP6 packed LINC code source into packed ASCII source code. (See Table 1.)
2. Removes the LAP tag indicator and reverses the tag to that acceptable by DIAL (i.e., "#2C" becomes "C2,TAB") and follows the user tag with a comma and a TAB.
3. Initiates each line with a TAB unless the line begins with a tag or comment.
4. Inserts a space after all three letter combinations except those in a comment or text environment.
5. Changes each "i" to an "I _", each "u" to an "U _", and each "p" to a period, ".".
6. Reverses all number-letter combinations to letter-number combinations indicating valid references to tags.
7. Inserts an *20) into the new source along with a warning message.
8. Inserts equalities for old mnemonics that can be legally used on the 12. These will be at the start of the new program.
9. Changes ALT MODE/A to TEXT ← > and ALT MODE/B to >. (See restriction for this text system when used with the new QANDA.)
10. The LAP terminator code 77 changes to code 00 (\$) indicating a source terminator for DIAL source programs.
11. Ignores the first two words of a LAP6 source (2065, 5712).
12. Replaces the square left bracket with a slash to indicate comments in the DIAL system.
13. Replaces the vertical bar with a backslash to indicate the 1000_g x + y operator.

LIMITATIONS

The CONVERT program only accomplishes the major efforts involved in translation. The user must accept responsibility for solutions to overcome situations caused by a new monitor system (DIAL) and a new computer (PDP-12). These situations are outlined below:

1. KBD - DIAL will issue a US error and the user must insert the correct IOB's or a PDP-8 mode routine. (Also see Limitation 10.)
2. OPR.n - DIAL will issue a US error. The user must determine how the LINC-8 PROGOFOP was modified to handle particular OPR situations.
3. TAPE READ/WRITE - The DIAL index format file locations, QANDA size and location, working area, etc. differ from LAP6 and LAP6-3L.

4. EXC - Use of the EXC mnemonic will cause a US error. The user may desire to insert his PDP-8 mode program directly into the program at this point.
5. SAM n - The A-D sampling instruction utilizes one additional bit in the PDP-12.
6. PDP - DIAL will create an instruction (002) which changes the processor from LINC Mode to PDP-8 Mode. The LINC-8 PDP mnemonic (0513) also transferred to PDP-8 mode, but to the location in the LINC accumulator.
7. REARRANGED INSTRUCTION ELEMENTS - LAP6 allowed rearranged field elements (seldom used) which will confuse the translator and will not be accepted by DIAL. DIAL expects (if present) a tag, mnemonic, operand and comment:
Example: "i6LDA" becomes "TABI L6DA".
8. QANDA - Check all "JMP 1000", "RDC 2403", and "RDE 2403" instructions as these may indicate use of the LINC-8 Q+A Subroutine. The new QANDA Subroutine is contained in two tape blocks and its location may not be Block 403.
9. TEXT META - Check all data between brackets after translation. These indicate a text mode probably used with the LINC-8 Q+A buffer. The new QANDA has a separate text and answer string (see the QANDA documentation for more details).
10. TELETYPE INPUT - The old Q+A and KBD inputs were in LINC code. The new QANDA and most input routines utilize ASCII code. Thus, the routines following an input routine will require changing. (Example - a 1 is 01 in LINC code, 261 in ASCII, and 61 in packed ASCII.) The new QANDA left justifies packed ASCII in an answer buffer, while the Q+A right-justified packed LINC code in the text buffer.
11. ZTA - The retrieval of the Block Number from the Z register after a LAP LO command does not apply to the MQ register in the DIAL system.

Table 1
Character Changes

LAP		DIAL	
<u>Code</u>	<u>Character</u>	<u>Character</u>	<u>Code</u>
00	0	0	60
01	1	1	61
02	2	2	62
03	3	3	63
04	4	4	64
05	5	5	65
06	6	6	66
07	7	7	67
10	8	8	70
11	9	9	71
12	>	>	43
13	Rubout	Rubout	None
14	Space	Space	40
15	i	I	11

Table 1 (Cont)
Character Changes

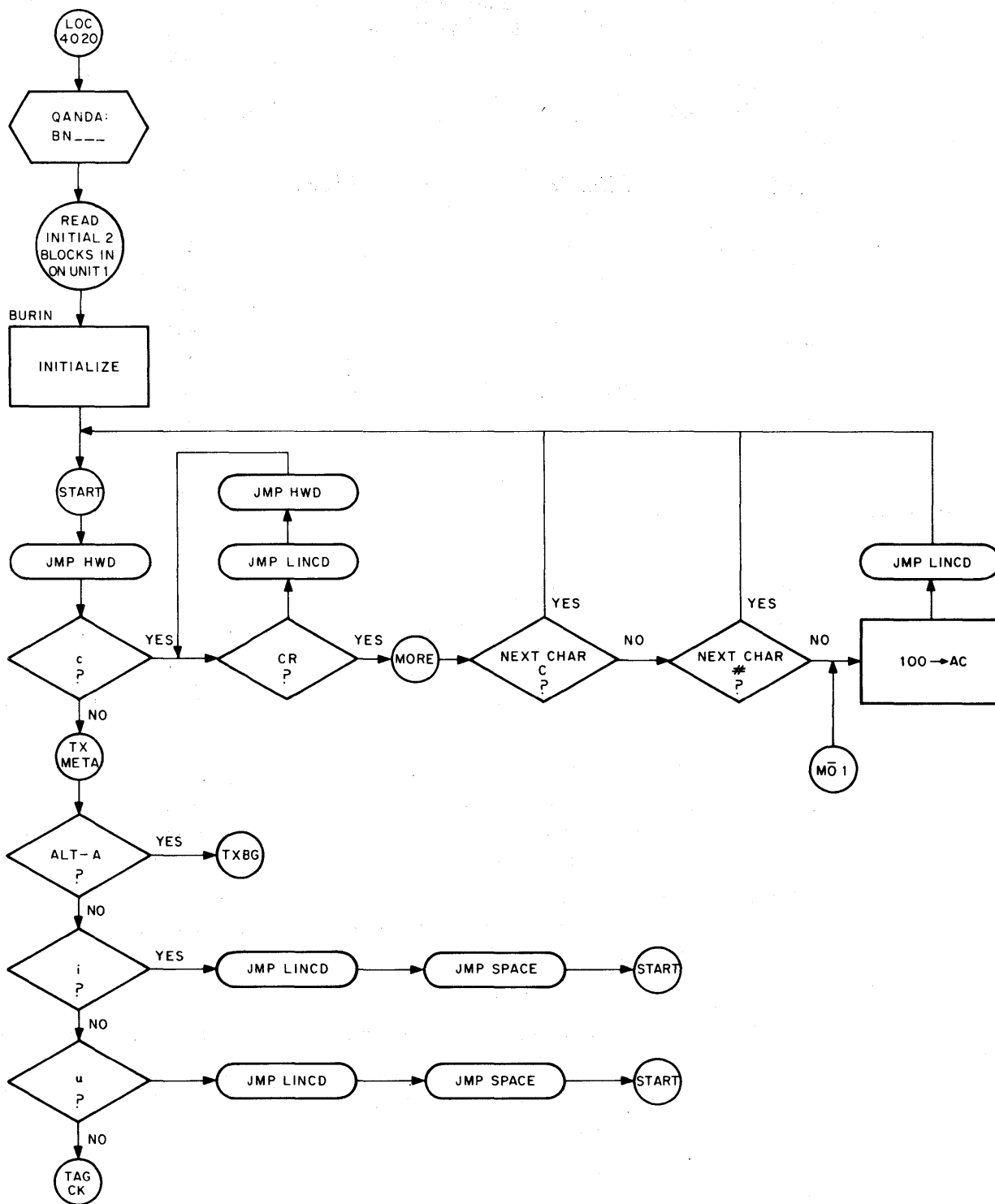
LAP		DIAL	
<u>Code</u>	<u>Character</u>	<u>Character</u>	<u>Code</u>
16	p	.	56
17	-	-	55
20	+	+	53
21	Vert Bar	\	34
22	#	Z	32
23	ALT	ALT	none
24	A	A	01
25	B	B	02
26	C	C	03
27	D	D	04
30	E	E	05
31	F	F	06
32	G	G	07
33	H	H	10
34	I	I	11
35	J	J	12
36	K	K	13
37	L	L	14
40	M	M	15
41	N	N	16
42	O	O	17
43	P	P	20
44	Q	Q	21
45	R	R	22
46	S	S	23
47	T	T	24
50	U	U	25
51	V	V	26
52	W	W	27
53	X	X	30
54	Y	Y	31
55	Z	Z	32
56	LINEFEED	LINEFEED	37
57	illegal	?	77
60	?	?	77
61	=	=	75
62	u	U	25
63	,	,	54
64	.	.	56
65	☐	*	52
66	[/	57
67	-	?	77
70	"	See Item 9 of Program Results	
71	"	>	76

Table 1 (Cont)
Character Changes

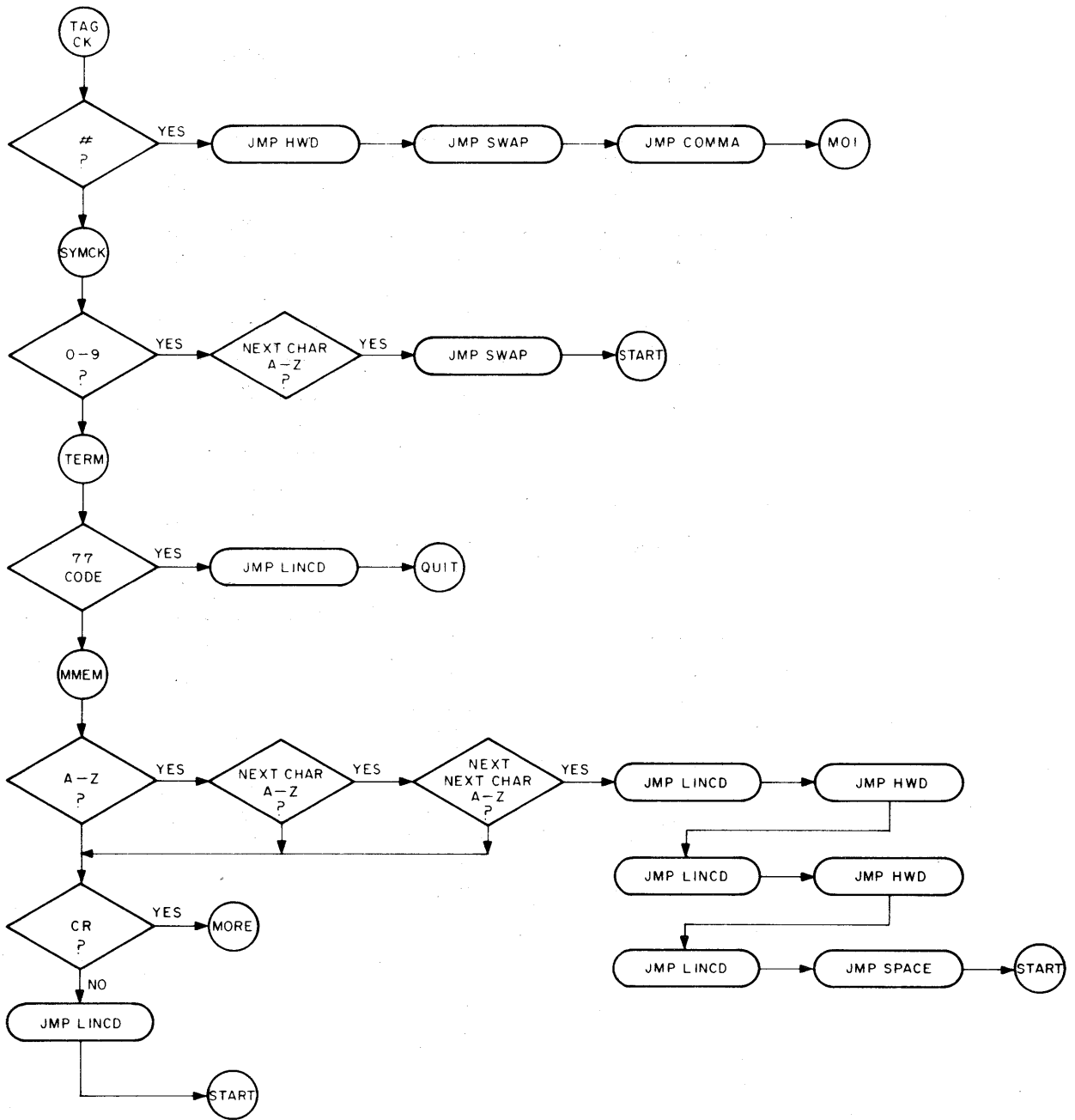
LAP		DIAL	
<u>Code</u>	<u>Character</u>	<u>Character</u>	<u>Code</u>
72	<	<	74
73	>	>	76
74]]	35
75	*	*	52
76	:	:	72
77	illegal (eof)	eof	00
100	illegal	TAB	47
		↑	36
		\$	44
		%	45

INTERNAL MACRO-FLOW CHART

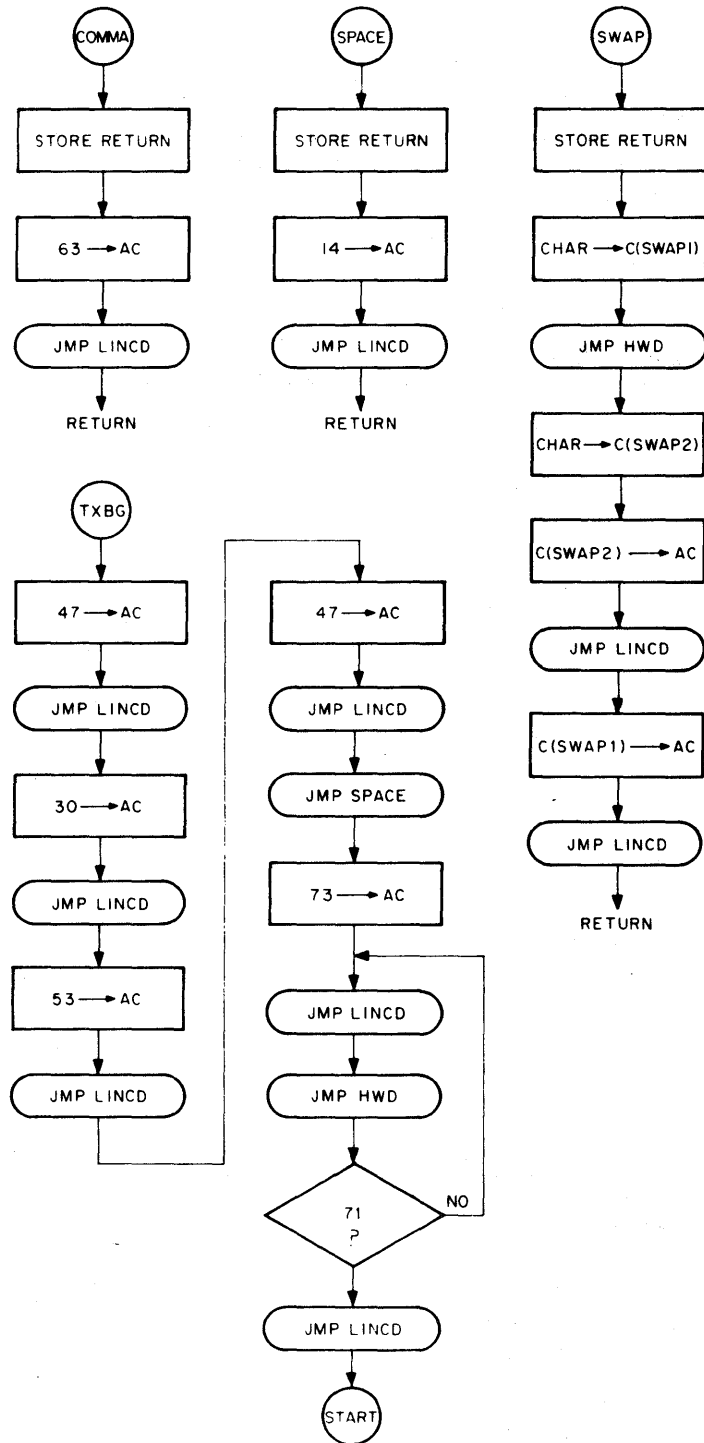
- AC = Reference to Accumulator
- IX10 = Reference to the Auto-Index Register used as the input half-word pointer.
- IX11 = Reference to the Auto-Index Register used as the output buffer half-word pointer.
- CR = Carriage Return
- HWD = Routine that reads in the next character (half-word) from the input buffer and, if necessary, refills the input buffer. Each buffer refill reads in two blocks to eliminate character look-ahead problems.
- LINCD = Routine that stores a converted character into the output buffer. When filled the output buffer is written into the next block of the DIAL working area.
- WA = Working Area on Unit 0.
- SWAP - Routine that reverses half-word characters to create a legal DIAL tag.



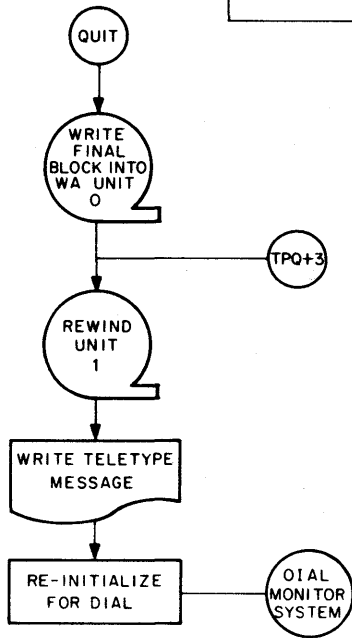
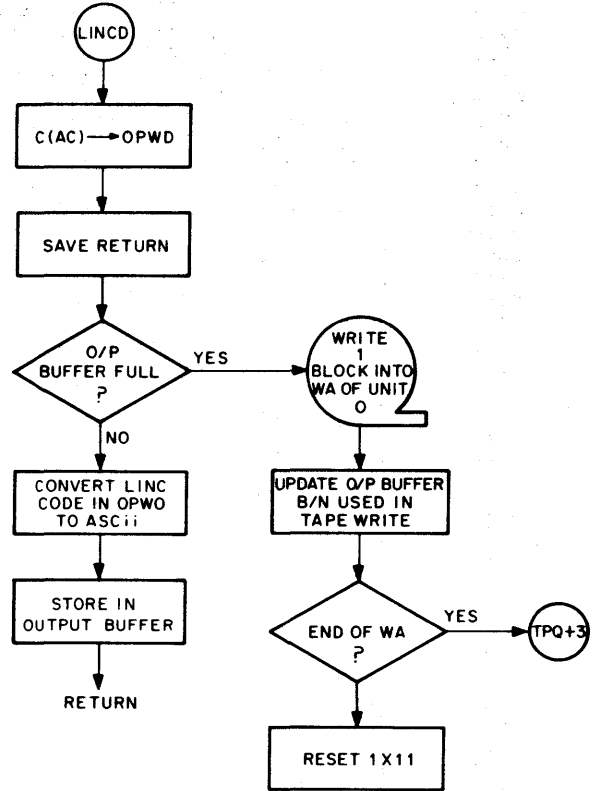
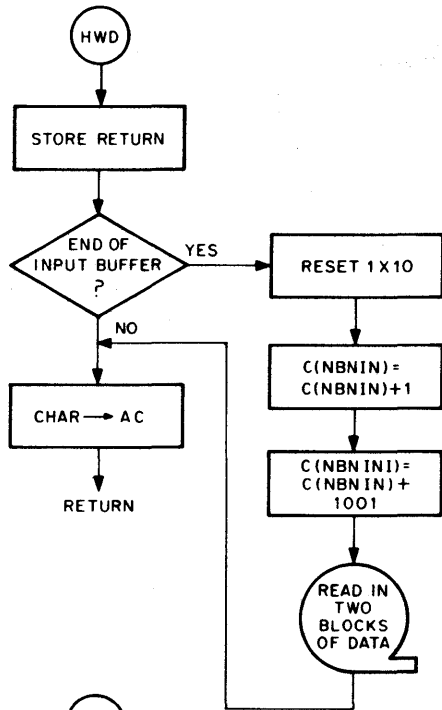
Flow Chart (Part 1 Of 4)



Flow Chart (Part 2 of 4)



Flow Chart (Part 3 of 4)



Flow Chart (Part 4 of 4)

```

0000          *20
0001          /PROGRAM          CONVERT
0002          /PDP-12 PROGRAM
0003          /INPUT: PACKED LINC SOURCE
0004          /FILED IN LAP6,LAP6A-3L,OR
0005          /LAP6-3L SYSTEM ON UNIT 1
0006          /OUTPUT:          PACKED ASCII SOURCE
0007          /IN WA OF DIAL ON UNIT 0
0010          /
0011          0020  6071          JMP QAINIT
0012          0021  0025          TEX1
0013          0022  0066          ANS1
0014          0023  6144          JMP QARFSH
0015          0024  7060          JMP SETUP
0016          0025  0603
0016          0026  1716
0016          0027  2605
0016          TEX1, TEXT >FCONVERT
0017          0030  2224
0017          0031  4310
0017          H
0020          0032  4043
0020          0033  1014
0020          0034  0120
0020          0035  6640
0020          0036  2317
0020          0037  2522
0020          0040  0305
0020          0041  4020
0020          0042  2217
0020          0043  0722
0020          HLAP6 SOURCE PROGRAM
0021          0044  0115
0021          0045  4310
0021          0046  2324
0021          0047  0122
0021          0050  2423
0021          0051  4011
0021          0052  1640
0021          0053  0214
0021          0054  1703
0021          0055  1374
0021          HSTARTS IN BLOCK<3
0022          0056  6343
0022          0057  1017
0022          0060  1640
0022          0061  2516
0022          0062  1124
0022          0063  4017
0022          0064  1605
0022          0065  3400
0022          HON UNIT ONE\>
0023          0066  7400          ANS1,  7400
0024          0067  0000          0000
0025          0070  3400          3400
0026          /PUT QANA HERE
0027
0030          0071  1020          /Q+A ROUTINE FOR PDP-12
0031          0072  0002          /SAVE JMP RETURN
0032          0073  2000          2
0033          0074  1060          ADD 0
0034          0075  0000          STA I
          GAB,  0          /JMP  +3

```

0035	0076	2271	ADD QAL+3	
0036	0077	4001	STC 1	/PTR TO FIRST PARAM
0037	0100	1001	LDA 1	/GET FIRST PARAM
0040	0101	2355	ADD QAG+1	/PTR TO HALFWORD-1
0041	0102	4150	STC QAG-3	
0042	0103	1021	LDA I 1	
0043	0104	4143	STC QARFSH-1	
0044	0105	4006	STC 6	
0045	0106	0043	QACA, SET 3	
0046	0107	0143	QARFSH-1	
0047	0110	0044	SET 4	/XR4 TO PTR TO QUESTIONS
0050	0111	0150	QAG-3	
0051				/TO HERE IF FIRST TIME THROUGH OR FOLLOWING A CR
0052	0112	0041	SET 1	
0053	0113	0004	4	
0054	0114	6361	JMP QAT	
0055	0115	0016	NOP	/F
0056	0116	1324	LDH I 4	/H, BUMP PTR IF H OR F
0057	0117	6322	QAD, JMP QAO	
0060	0120	6126	JMP ,+6	/74
0061	0121	6141	JMP QAE	/34
0062	0122	1460	SAE I	/CR?
0063	0123	0043	43	
0064	0124	6117	JMP QAD	/NO
0065	0125	6112	JMP QACA+4	
0066				/INITIALIZE ANSWER BUFR
0067	0126	1343	STH 3	/74 TO ANSWERS
0070	0127	1324	LDH I 4	/NEXT HALFWORD
0071	0130	1120	ADA I	
0072	0131	7717	-60	
0073	0132	0017	COM	
0074	0133	4006	STC 6	
0075	0134	1363	STH I 3	/0 IN AC
0076	0135	0226	XSK I 6	
0077	0136	6134	JMP , -2	
0100	0137	1323	LDH I 3	/BUMP PTR TO ANSWERS
0101	0140	6117	JMP QAD	
0102				/ANSWER BUFR IS INITIATED
0103	0141	1343	QAE, STH 3	
0104	0142	0064	SET I 4	/XR4 TO PTR TO LAST TYPED CHAR IN ANSWER BUFR
0105	0143	0000	0	
0106				/----RE-ENTER HERE TO REFRESH----
0107	0144	1020	QARFSH, LDA I	/INITIAL Y POSITION
0110	0145	0137	137	
0111	0146	4204	STC QAH-1	
0112	0147	0063	SET I 3	/XR3 TO PTR TO HALFWORD QUESTIONS-1
0113	0150	0000	0	
0114	0151	0045	SET 5	/XR5 TO PTR TO LAST DISPLAYED CHAR IN ANSWER BUFR
0115	0152	0143	QARFSH-1	
0116	0153	0041	QAG, SET 1	
0117	0154	0003	3	
0120	0155	6361	JMP QAT	
0121	0156	6165	JMP ,+7	/F
0122	0157	1323	LDH I 3	/H, BUMP PTR
0123	0160	1020	LDA I	/NEITHER, ASSUME HALF SIZE
0124	0161	1560	BCL I	
0125	0162	4174	STC QAM+2	/SET INSTR TO CLEAR FF FOR HALF SIZE
0126	0163	2603	ADD QAW	/NOP IN AC
0127	0164	6172	JMP QAM	
0130	0165	1323	LDH I 3	/BUMP PTR
0131	0166	1020	LDA I	
0132	0167	1620	BSE I	
0133	0170	4174	STC QAM+2	/SET INSTR TO SET FF FOR FULL SIZE

0134	0171	2604		ADD QAW+1	/ADD 9U IN AC
0135	0172	4336	QAM,	STC QAP+3	
0136	0173	0024		MSC I 4	/EAD CONTROL REGISTER
0137	0174	1620		BSE I	/THIS INSTR CHANGES, EITHER BSE & OR BCL &
0140	0175	0200		200	
0141	0176	0004		MSC 4	/AC TO CONTROL REGISTER
0142	0177	0061		SET I 1	/XR1 TO INITIAL X POSITION
0143	0200	0100		100	
0144	0201	1020		LDA I	/Y COORDINATE MULTIPLE
0145	0202	7737		-40	
0146	0203	1160		ADM I	/Y COORDINATE
0147	0204	0000		0	
0150	0205	1323	QAH,	LDH I 3	
0151	0206	6323		JMP QAO+1	
0152	0207	6372		JMP QAZ	/74 BUMP PTR TO NEXT CHAR, PUT 40 IN AC
0153	0210	6227		JMP QAJ	/34
0154	0211	1420		SHD I	/NEITHER
0155	0212	4300		4300	
0156	0213	6153		JMP QAG	/CR, MOVE X AND Y COORDINATE
0157	0214	6333		JMP QAP	/ISPLAY CHAR
0160	0215	6205		JMP QAH	/PICK UP NEXT CHAR
0161	0216	6333		JMP QAP	/TO HERE IF DISPLAYING ANSWER BUFR
0162	0217	1520		SRO I	/SWITCH TO DISPLAY CURSOR, EITHER 0000 OR 7777
0163	0220	0000		0	/IFXR4=XR5, THEN SWITCH=7777
0164	0221	6607		JMP QAF	
0165					/QUESTION MODE
0166	0222	1325	QAI,	LDH I 5	
0167	0223	6323		JMP QAO+1	
0170	0224	6205		JMP QAH	/74
0171	0225	6205		JMP QAH	/34
0172	0226	6216		JMP QAI-4	/NEITHER, DISPLAY IT
0173	0227	6612	QAJ,	JMP GETKBD	/TO HERE IF DISPLAYED BUFFER
0174	0230	0470		AZE I	
0175	0231	6075		JMP QAB	/NOTHING TYPED, EXIT
0176	0232	0062		SET I 2	
0177	0233	0503		QAY	
0200	0234	1402		SHD 2	/LF?
0201	0235	6402		JMP QAK+4	/YES, EXIT
0202	0236	1422		SHD I 2	/CR?
0203	0237	6314		JMP QAN	
0204	0240	0206		XSK 6	/IS THERE AN ANSWER FIELD?
0205	0241	6144		JMP QARFSH	
0206	0242	1422		SHD I 2	/<?
0207	0243	6266		JMP QAL	
0210	0244	1422		SHD I 2	/>?
0211	0245	6376		JMP QAK	
0212	0246	1422		SHD I 2	/ALT?
0213	0247	6106		JMP QACA	
0214	0250	1422		SHD I 2	/BACK SLASH?
0215	0251	6144		JMP QARFSH	/IGNORE
0216	0252	1422		SHD I 2	/RUBOUT?
0217	0253	6266		JMP QAL	/IGNORE
0220	0254	1422		SHD I 2	/TAB?
0221	0255	6144		JMP QARFSH	/IGNORE
0222	0256	4263		STC ,+5	/ACCEPTABLE CHAR
0223	0257	6322		JMP QAO	/TEST NEXT CHAR
0224	0260	6354		JMP QAQ	/74 BACK PTR UP BY 1
0225	0261	6354		JMP QAQ	/34 *
0226	0262	1020		LDA I	/OK, STORE IT
0227	0263	0000		0	
0230	0264	1344		STH 4	
0231	0265	6144		JMP QARFSH	/REDISPLAY
0232	0266	1304	QAL,	LDH 4	/TO HERE IF RUBBOUT OR <

0233	0267	6323	JMP QAO+1	
0234	0270	6144	JMP QARFSH	/74 IGNORE
0235	0271	1775	-6002	
0236	0272	1302	LDH 2	/TEST THE CHAR
0237	0273	1460	SAE I	/RUBOUT?
0240	0274	0037	37	
0241	0275	6354	JMP QAO	/NO, BACK PTR UP BY 1
0242	0276	0045	SET 5	
0243	0277	0004	4	
0244	0300	0043	SET 3	
0245	0301	0004	4	
0246	0302	6304	JMP ,+2	
0247	0303	1325	LDH I 5	/BUMP PTR
0250	0304	1323	LDH I 3	/GET NEXT CHAR
0251	0305	6323	JMP QAO+1	
0252	0306	0016	NOP	/IF 74 OR 34, REPLACE CURRENT CHAR WITH 0
0253	0307	0011	CLR	
0254	0310	1345	STH 5	
0255	0311	0450	AZE	/WAS IT 74 OR 34?
0256	0312	6303	JMP ,-7	/NO, CONTINUE
0257	0313	6354	JMP QAO	/BACK PTR UP BY 1
0260				/TO HERE IF CR
0261	0314	0206	QAN, XSK 6	
0262	0315	6402	JMP QAK+4	/EXIT ROUTINE IF NO ANSWER FIELD
0263	0316	6322	JMP QAO	
0264	0317	6144	JMP QARFSH	/74 MOVE PTR TO NEXT QUESTION FIELD
0265	0320	6142	JMP QAE+1	/34 END OF BUFR, MOVE PTR TO FIRST QUESTION FIELD
0266	0321	6316	JMP QAN+2	
0267				
0270	0322	1324	QAO, LDH I 4	/S/R
0271	0323	1420	SHD I	/
0272	0324	7400	7400	+1 74 BEGIN FIELD
0273	0325	6000	JMP 0	/
0274	0326	1460	SAE I	+2 34 END BUFR
0275	0327	0034	34	/
0276	0330	0220	XSK I 0	+3 NEITHER 74 NOR 34
0277	0331	0220	XSK I 0	
0300	0332	6000	JMP 0	
0301				
0302	0333	0241	QAP, ROL 1	/S/R TO DISP LINC CHAR IN AC
0303	0334	2521	ADD QAX+4	/MULT BY 2 FOR INDEX TO ADDRESS OF TABLE
0304	0335	4002	STC 2	
0305	0336	2577	ADD QAU	/ADDRESS OF CHAR TO DISP IN XR2
0306	0337	2577	ADD QAU	/THIS INSTR CHANGES, EITHER OP OR ADD 9U
0307	0340	2001	ADD 1	
0310	0341	4001	STC 1	/ADD 4 TO XR1 TO SPACE CHAR
0311	0342	2005	ADD 5	
0312	0343	0017	COM	/GET ADDRESS OF ANSWER BUFR
0313	0344	2004	ADD 4	
0314	0345	0450	AZE	
0315	0346	0011	CLR	
0316	0347	4220	STC QAI-2	/SWITCH=0 OR 7777
0317	0350	2204	ADD QAH-1	/Y COORDINATE IN AC
0320	0351	1742	DSC 2	
0321	0352	1762	DSC I 2	/DISPLAY CHAR
0322	0353	6000	JMP 0	
0323	0354	1020	QAQ, LDA I	/BACK UP PTR BY 1
0324	0355	3777	-4000	
0325	0356	1140	ADM	
0326	0357	0004	4	
0327	0360	6144	JMP QARFSH	/REDISPLAY
0330				/
0331	0361	1321	QAT, LDH I 1	/S/R

0332	0362	1420		SHD I	/	+1 F
0333	0363	0600		0600	/	+2 H
0334	0364	6000		JMP 0	/	+3 NEITHER
0335	0365	1460		SAE I		
0336	0366	0010		10		
0337	0367	0220		XSK I 0		
0340	0370	0220		XSK I 0		
0341	0371	6000		JMP 0		
0342					/	
0343	0372	1323	QAZ,	LDH I 3		
0344	0373	1020		LDA I		
0345	0374	0040		40		
0346	0375	6216		JMP QAI-4		
0347						/TO HERE IF >
0350	0376	1324	QAK,	LDH I 4		
0351	0377	0470		AZE I		/IS CURRENT CHAR BLANK?
0352	0400	6354		JMP QAO		/YES, IGNORE
0353	0401	6515		JMP QAX		/MOVE DOT FORWARD
0354						/TO HERE TO EXIT WITH SKIP
0355	0402	1020		LDA I		
0356	0403	0001		1		
0357	0404	1140		ADM		
0360	0405	0075		QAB		
0361	0406	6075		JMP QAB		
0362						/CHARACTER PATTERNS
0363	0407	0101	QAV,	0101		/KBD 0, ILLEGAL, USED AS MARKER
0364	0410	0101		0101		
0365	0411	4477		4477		/11A
0366	0412	7744		7744		
0367	0413	5177		5177		/21B
0370	0414	2651		2651		
0371	0415	4136		4136		/31C
0372	0416	2241		2241		
0373	0417	4177		4177		/41D
0374	0420	3641		3641		
0375	0421	4577		4577		/51E
0376	0422	4145		4145		
0377	0423	4477		4477		/61F
0400	0424	4044		4044		
0401	0425	4136		4136		/71G
0402	0426	2645		2645		
0403	0427	1077		1077		/101H
0404	0430	7710		7710		
0405	0431	7741		7741		/111I
0406	0432	0041		0041		
0407	0433	4142		4142		/121J
0410	0434	4076		4076		
0411	0435	1077		1077		/131K
0412	0436	4324		4324		
0413	0437	0177		0177		/141L
0414	0440	0301		0301		
0415	0441	3077		3077		/151M
0416	0442	7730		7730		
0417	0443	3077		3077		/161N
0420	0444	7706		7706		
0421	0445	4177		4177		/171O
0422	0446	7741		7741		
0423	0447	4477		4477		/201P
0424	0450	3044		3044		
0425	0451	4276		4276		/211Q
0426	0452	0376		0376		
0427	0453	4477		4477		/221R
0430	0454	3146		3146		

0431	0455	5121	5121	/23: S
0432	0456	4651	4651	
0433	0457	4040	4040	/24: T
0434	0460	4077	4077	
0435	0461	0177	0177	/25: U
0436	0462	7701	7701	
0437	0463	0176	0176	/26: V
0440	0464	7402	7402	
0441	0465	0677	0677	/27: W
0442	0466	7701	7701	
0443	0467	1463	1463	/30: X
0444	0470	6314	6314	
0445	0471	0770	0770	/31: Y
0446	0472	7007	7007	
0447	0473	4543	4543	/32: Z
0450	0474	6151	6151	
0451	0475	4177	4177	/33: /
0452	0476	0000	0000	
0453				/34: BACKSLASH IGNORED ON INPUT
0454	0477	0000	0	/NOT USED
0455	0500	0000	0	/NOT USED
0456	0501	0000	0000	/35: J
0457	0502	7741	7741	
0460				/CODES 36: ALT, 37: RUBOUT NOT DISPLAYED
0461	0503	4543	4543	/LF, CR
0462	0504	7476	7476	/<, >
0463	0505	3634	3634	/ALT, BACKSLASH
0464	0506	3747	3747	/RUBOUT, TAB
0465	0507	0000	0000	/40: SPACE
0466	0510	0000	0000	
0467	0511	7500	7500	/41: X!
0470	0512	0000	0000	
0471	0513	7000	7000	/42: "
0472	0514	0070	0070	
0473				/CODES 43:, 44:, 45: LF NOT DISPLAYED
0474	0515	6323	JMP QAO+1	
0475	0516	6354	JMP QAQ	
0476	0517	6354	JMP QAQ	
0477	0520	6144	JMP QARFSH	
0500	0521	0407	QAV	
0501	0522	0000	0	/NOT USED
0502	0523	5166	5166	/46: &
0503	0524	0526	0526	
0504				/CODE 47: TAB NOT DISPLAYED
0505	0525	0000	0	/NOT USED
0506	0526	0000	0	/NOT USED
0507	0527	3600	3600	/50: (
0510	0530	0041	0041	
0511	0531	4100	4100	/51:)
0512	0532	0036	0036	
0513	0533	2050	2050	/52: *
0514	0534	0050	0050	
0515	0535	0404	0404	/53: +
0516	0536	0437	0437	
0517	0537	0500	0500	/54: ,
0520	0540	0006	0006	
0521	0541	0404	0404	/55: -
0522	0542	0404	0404	
0523	0543	0001	0001	/56: .
0524	0544	0000	0000	
0525	0545	0601	0601	/57: /
0526	0546	4030	4030	
0527	0547	4536	4536	/60: 0

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0530      0550  3651      3651
0531      0551  2101      2101      /61:1
0532      0552  0177      0177
0533      0553  4523      4523      /62:2
0534      0554  2151      2151
0535      0555  4122      4122      /63:3
0536      0556  2651      2651
0537      0557  2414      2414      /64:4
0540      0560  0477      0477
0541      0561  5172      5172      /65:5
0542      0562  0651      0651
0543      0563  1506      1506      /66:6
0544      0564  4225      4225
0545      0565  4443      4443      /67:7
0546      0566  6050      6050
0547      0567  5126      5126      /70:8
0550      0570  2651      2651
0551      0571  5122      5122      /71:9
0552      0572  3651      3651
0553      0573  2200      2200      /72:11
0554      0574  0000      0000
0555      0575  4601      4601      /73:11
0556      0576  0000      0000
0557
0560      0577  0002  QAU,    2      /CODE 74: <NOT DISPLAYED
0561      0600  0000      0      /CONSTANT
0562      0601  1212      1212      /NOT USED
0563      0602  1212      1212      /75:11
0564
0565      0603  0016  QAW,    NOP      /CODE 76: > NOT DISPLAYED
0566      0604  2577      ADD QAU
0567      0605  4020      4020      /77:1?
0570      0606  2055      2055
0571      /
0572      0607  1760  QAF,    DSC I
0573      0610  6000      6000
0574      0611  6222      JMP QAI
0575      /
0576      /      /END Q+A
0577      /
0600      /
0601      /
0602      /
0603      /KEYBOARD INPUT ROUTINE
0604      /
0605      LKRB= 6036      /PDP-8 IOT KBD
0606      LTSF= 6041      /TSF
0607      LTLS= 6046      /TLS
0610      /
0611      0612  1000  GETKBD, LDA
0612      0613  0000      0
0613      0614  4734      STC EXIT+6      /SAVE RETURN
0614      0615  2001      ADD 1      /SAVE XRS 1 AND 2
0615      0616  4731      STC EXIT+3
0616      0617  2002      ADD 2
0617      0620  4733      STC EXIT+5
0620      0621  4727      STC EXIT+1
0621      0622  0415      KST      /WAS SOMETHING TYPED?
0622      0623  6000      JMP 0      /NO: EXIT
0623      0624  0500      IOB
0624      0625  6036      LKRB      /GET TTY CHAR, CLEAR FLAG
0625      0626  1060      STA I      /SAVE IT
0626      0627  0000  TY,    0

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0627	0630	1120	ADA I	
0630	0631	7540	-237	
0631	0632	0451	APO	/BETWEEN 200 AND 237?
0632	0633	6675	JMP CNTRL	/CONTROL CHAR. CHECK FOR CR,LF, TAB
0633			/	
0634	0634	0061	SET I 1	/NO
0635	0635	0745	CHARS-1	
0636	0636	0062	SET I 2	
0637	0637	7770	-7	
0640	0640	1000	LDA	
0641	0641	0627	TY	
0642	0642	1461	SAE I 1	
0643	0643	6645	JMP ,+2	
0644	0644	6726	JMP EXIT	/ILLEGAL CHAR, DON T ECHO
0645	0645	0222	XSK I 2	/CHECKED THEM ALL?
0646	0646	6642	JMP , -4	
0647			/	
0650	0647	1120	ADA I	
0651	0650	7440	-337	
0652	0651	0451	APO	/BETWEEN 240 AND 337?
0653	0652	6666	JMP LEGAL	/YES, LEGAL CHAR
0654			/	
0655	0653	1461	SAE I 1	/NO, CHECK FURTHER,
0656	0654	6663	JMP ,+7	
0657	0655	1020	LDA I	/RUBOUT
0660	0656	0334	334	
0661	0657	6735	JMP TPE	/ECHO BACKSLASH
0662	0660	1020	LDA I	
0663	0661	0037	37	
0664	0662	6730	JMP EXIT+2	/LEGAL EXIT
0665			/	
0666	0663	1461	SAE I 1	
0667	0664	6726	JMP EXIT	/ILLEGAL
0670				/ALT
0671	0665	6730	JMP EXIT+2	/EXIT, DON T ECHO
0672			/	
0673	0666	1000	LEGAL, LDA	
0674	0667	0627	TY	
0675	0670	6735	JMP TPE	/ECHO CHAR
0676	0671	2627	ADD TY	
0677	0672	1560	BCL I	/STRIP IT TO 6-BIT
0700	0673	7700	7700	
0701	0674	6730	JMP EXIT+2	
0702			/TO HERE IF CONTROL CHAR	
0703	0675	1460	CNTRL, SAE I	
0704	0676	7755	7755	
0705	0677	6712	JMP CKLF	
0706	0700	1020	LDA I	/CR
0707	0701	0043	43	
0710	0702	4727	STC EXIT+1	
0711	0703	1020	LDA I	
0712	0704	0215	215	
0713	0705	6735	JMP TPE	
0714	0706	1020	LDA I	
0715	0707	0212	212	
0716	0710	6735	JMP TPE	
0717	0711	6726	JMP EXIT	
0720			/	
0721	0712	1460	CKLF, SAE I	
0722	0713	7752	7752	
0723	0714	6720	JMP ,+4	
0724	0715	1020	LDA I	/LF
0725	0716	0045	45	

0726	0717	6702	JMP CNTRL+5	
0727	0720	1460	SAE I	
0730	0721	7751	7751	
0731	0722	6726	JMP EXIT	/ILLEGAL
0732	0723	1020	LDA I	
0733	0724	0047	47	
0734	0725	6730	JMP EXIT+2	/EXIT, DON T ECHO
0735			/	
0736	0726	1020	EXIT, LDA I	/GET 6-BIT ASCII
0737	0727	0000	0	
0740	0730	0061	SET I 1	/RESTORE XRS
0741	0731	0000	0	
0742	0732	0062	SET I 2	
0743	0733	0000	0	
0744	0734	6000	JMP	/EXIR S/R GETKBD
0745			/S/R TO PRINT C(AC)	
0746	0735	0500	TPE, IOB	
0747	0736	6046	LTLS	/PRINT IT
0750	0737	1000	LDA	
0751	0740	0000	0	
0752	0741	4745	STC ,+4	/SAVE RETURN
0753	0742	0500	IOB	
0754	0743	6041	LTSF	
0755	0744	6742	JMP , -2	/WAIT FOR FLAG
0756	0745	6000	JMP	/EXIT
0757	0746	0243	CHARS, 243	/HASH
0760	0747	0244	244	/DOLLAR SIGN
0761	0750	0245	245	/PER CENT
0762	0751	0247	247	/APOSTROPHE
0763	0752	0300	300	/AT SIGN
0764	0753	0336	336	/UP ARROW
0765	0754	0337	337	/BACK ARROW
0766	0755	0040	40	/RUBOUT
0767	0756	0036	36	/ALT
0770			/END OF S/R GETKBD	
0771	0757	0060	CONV, 60	/0-9
0772	0760	0061	61	
0773	0761	0062	62	
0774	0762	0063	63	
0775	0763	0064	64	
0776	0764	0065	65	
0777	0765	0066	66	
1000	0766	0067	67	
1001	0767	0070	70	
1002	0770	0071	71	
1003	0771	0043	43	/CR
1004	0772	0037	37	/RO
1005	0773	0040	40	/SPACE
1006	0774	0011	11	/I
1007	0775	0056	56	/P
1010	0776	0055	55	/-
1011	0777	0053	53	/+
1012	1000	0034	34	/VERT BAR
1013	1001	0032	32	/LB
1014	1002	0036	36	/CASE
1015	1003	0001	01	/A-Z
1016	1004	0002	02	
1017	1005	0003	03	
1020	1006	0004	04	
1021	1007	0005	05	
1022	1010	0006	06	
1023	1011	0007	07	
1024	1012	0010	10	

1025	1013	0011	11	
1026	1014	0012	12	
1027	1015	0013	13	
1030	1016	0014	14	
1031	1017	0015	15	
1032	1020	0016	16	
1033	1021	0017	17	
1034	1022	0020	20	
1035	1023	0021	21	
1036	1024	0022	22	
1037	1025	0023	23	
1040	1026	0024	24	
1041	1027	0025	25	
1042	1030	0026	26	
1043	1031	0027	27	
1044	1032	0030	30	
1045	1033	0031	31	
1046	1034	0032	32	/Z
1047	1035	0045	45	/LF
1050	1036	0077	77	
1051	1037	0077	77	/?
1052	1040	0075	75	/=
1053	1041	0025	25	/U
1054	1042	0054	54	/COMMA
1055	1043	0056	56	/PERIOD
1056	1044	0052	52	/ORIGIN
1057	1045	0057	57	/LT BRAC TO SLASH
1060	1046	0077	77	/UNDERLINE??
1061	1047	0074	74	/QUOTES
1062	1050	0076	76	/QUOTES
1063	1051	0074	74	/QUOTES
1064	1052	0076	76	/QUOTES
1065	1053	0035	35	/RT BRACKET
1066	1054	0052	52	
1067	1055	0072	72	/COLON
1070	1056	0000	00	
1071	1057	0047	47	/TAB
1072	1060	1020		SETUP, LDA I
1073	1061	4000		4000
1074	1062	1040		STA
1075	1063	1152		BNIN
1076	1064	1000		LDA
1077	1065	0067		ANS1+1
1100	1066	0450		AZE
1101	1067	7077		JMP SETUP1
1102	1070	1300		LDH
1103	1071	4066		ANS1+4000
1104	1072	1560		BCL I
1105	1073	0070		70
1106	1074	1140		ADM
1107	1075	1152		BNIN
1110	1076	7145		JMP SETUP3
1111	1077	1300		SETUP1, LDH
1112	1100	4067		ANS1+4001
1113	1101	0450		AZE
1114	1102	7121		JMP SETUP2
1115	1103	1300		LDH
1116	1104	0067		ANS1+1
1117	1105	1560		BCL I
1120	1106	0070		70
1121	1107	1140		ADM
1122	1110	1152		BNIN
1123	1111	1300		LDH

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1124      1112  4066          ANS1+4000
1125      1113  1560          BCL I
1126      1114  0070          70
1127      1115  0243          ROL 3
1130      1116  1140          ADM
1131      1117  1152          BNIN
1132      1120  7145          JMP SETUP3
1133      1121  1560  SETUP2, BCL I
1134      1122  0070          70
1135      1123  1140          ADM
1136      1124  1152          BNIN
1137      1125  1300          LDH
1140      1126  0067          ANS1+1
1141      1127  1560          BCL I
1142      1130  0070          70
1143      1131  0243          ROL 3
1144      1132  1140          ADM
1145      1133  1152          BNIN
1146      1134  1300          LDH
1147      1135  4066          ANS1+4000
1150      1136  1560          BCL I
1151      1137  0070          70
1152      1140  0246          ROL 6
1153      1141  1140          ADM
1154      1142  1152          BNIN
1155      1143  1040          STA
1156      1144  1526          NBNIN
1157      1145  1120  SETUP3, ADA I
1160      1146  1001          1001
1161      1147  1040          STA
1162      1150  1154          BNIN1
1163
1164      1151  0710  /READ INITIAL BLOCKS IN
1165      1152  0000  OVRTEX, RDC U
1166      1153  0710  BNIN, 0 /2000-2377
1167      1154  0000  RDC U
1170      1155  0070  BNIN1, 0 /2400-2777
1171      1156  5166          SET I 10
1172      1157  0071          4\INIT-1
1173      1160  6777          SET I 11 /Q6:3000-3377
1174      1161  1330          6777
1175      1162  0450          LDH I 10
1176      1163  7165          AZE /NULL?
1177      1164  7251          JMP ,+2
1200      1165  1371          JMP OVRIN /END
1201      1166  7161          STH I 11
1202      1167  5262          JMP , -5
1202
1203      1170  6043          INIT, TEXT >*20
1203      1171  5724
1203      1172  1011
1203      1173  2340
1203      1174  2022
1203      1175  1707
1203      1176  2201
1203      1177  1540
1203      1200  0417
1203
1204      1201  0523          /THIS PROGRAM DOES
1204      1202  4357
1204      1203  1617
1204      1204  2440
1204      1205  2422

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1204	1206	0116	
1204	1207	2314	
1204	1210	0124	
1204	1211	0540	
1204	1212	0114	
1204			/NOT TRANSLATE ALL
1205	1213	1443	
1205	1214	5723	
1205	1215	1124	
1205	1216	2501	
1205	1217	2411	
1205	1220	1716	
1205			/SITUATIONS,
1206	1221	2356	
1206	1222	4357	
1206	1223	0310	
1206	1224	0503	
1206	1225	1340	
1206	1226	1411	
1206	1227	2324	
1206	1230	1116	
1206	1231	0741	
1206			/CHECK LISTING!!
1207	1232	4143	
1207	1233	3224	
1207	1234	0175	
1207			ZTA=5
1210	1235	6543	
1210	1236	1415	
1210	1237	0275	
1210	1240	6066	
1210			LMB=0600
1211	1241	6060	
1211	1242	4325	
1211	1243	1502	
1211	1244	7560	
1211	1245	6664	
1211			UMB=0640
1212	1246	6043	
1212	1247	4000	
1212			>
1213	1250	0000	0
1214	1251	0070	OVRIN, SET I 10
1215	1252	6001	4\2001
1216	1253	1020	LDA I
1217	1254	6370	6370
1220	1255	1040	STA
1221	1256	1601	TPOUT
1222	1257	7476	START, JMP HWD
1223	1260	1460	SAE I
1224	1261	0066	66
1225	1262	7311	JMP TXMETA
1226			/COMMENT MODE
1227	1263	1460	COMMT, SAE I
1230	1264	0012	12
1231	1265	7306	JMP MOCT
1232			/END OF COMMENT
1233	1266	7570	MORE, JMP LINCD
1234	1267	0052	SET 12
1235	1270	0010	10
1236	1271	1332	LDH I 12
1237	1272	1460	SAE I
1240	1273	0066	66

1241	1274	7276	JMP ,+2
1242	1275	7257	JMP START
1243	1276	1460	SAE I
1244	1277	0022	22
1245	1300	7302	JMP ,+2
1246	1301	7257	JMP START
1247	1302	1020	MOI, LDA I
1250	1303	0100	100
1251	1304	7570	JMP LINC0
1252	1305	7257	JMP START
1253			/MORE COMMENTS
1254	1306	7570	MOCT, JMP LINC0
1255	1307	7476	JMP HWD
1256	1310	7263	JMP COMMT
1257			/CHECK FOR TEXT META
1260	1311	1460	TXMETA, SAE I
1261	1312	0070	70 /ALT-A
1262	1313	7342	JMP ICK
1263	1314	1020	TXBG, LDA I
1264	1315	0047	0047
1265	1316	7570	JMP LINC0
1266	1317	1020	LDA I
1267	1320	0030	0030
1270	1321	7570	JMP LINC0
1271	1322	1020	LDA I
1272	1323	0053	53
1273	1324	7570	JMP LINC0
1274	1325	1020	LDA I
1275	1326	0047	47
1276	1327	7570	JMP LINC0
1277	1330	7532	JMP SPACE
1300	1331	1020	LDA I
1301	1332	0071	71
1302	1333	7570	TXAGIN, JMP LINC0
1303	1334	7476	JMP HWD
1304	1335	1460	SAE I
1305	1336	0071	71
1306	1337	7333	JMP TXAGIN
1307			/END OF TEXT META
1310	1340	7570	JMP LINC0
1311	1341	7257	JMP START
1312			/SMALL I CHECK
1313	1342	1460	ICK, SAE I
1314	1343	0015	15
1315	1344	7350	JMP UCK
1316			/SMALL I
1317	1345	7570	JMP LINC0
1320	1346	7532	JMP SPACE
1321	1347	7257	JMP START
1322			/SMALL U CHECK
1323	1350	1460	UCK, SAE I
1324	1351	0062	62
1325	1352	7356	JMP TAGCK
1326			/SMALL U
1327	1353	7570	JMP LINC0
1330	1354	7532	JMP SPACE
1331	1355	7257	JMP START
1332			/TAG CHECK
1333	1356	1460	TAGCK, SAE I
1334	1357	0022	22
1335	1360	7365	JMP SYMCK
1336			/TAG
1337	1361	7476	JMP HWD

1340	1362	7550	JMP SWAP
1341	1363	7541	JMP COMMA
1342	1364	7302	JMP M01
1343			/SYMBOL CHECK
1344	1365	0052	SYMCK, SET 12
1345	1366	0010	10
1346	1367	1120	ADA I
1347	1370	7766	-11
1350	1371	0471	APO I /NUMBER?
1351	1372	7412	JMP TERM
1352	1373	0052	SET 12 /YES
1353	1374	0010	10
1354	1375	1332	LDH I 12 /PEEK AT NEXT HWD
1355	1376	1120	ADA I
1356	1377	7722	-55 /Z OR BELOW
1357	1400	0471	APO I
1360	1401	7412	JMP TERM
1361	1402	1312	LDH 12 /YES
1362	1403	1120	ADA I
1363	1404	7754	-23
1364	1405	0451	APO
1365	1406	7412	JMP TERM
1366	1407	1310	LDH 10 /YES,A-Z
1367	1410	7550	JMP SWAP
1370	1411	7257	JMP START
1371	1412	1310	TERM, LDH 10
1372	1413	1460	SAE I
1373	1414	0077	77
1374	1415	7420	JMP ,+3
1375	1416	7570	JMP LINCD
1376	1417	7627	JMP QUIT
1377	1420	0052	MNEM, SET 12
1400	1421	0010	10
1401	1422	1120	ADA I
1402	1423	7722	-55
1403	1424	0471	APO I
1404	1425	7467	JMP CRMORE
1405	1426	1312	LDH 12
1406	1427	1120	ADA I
1407	1430	7754	-23
1410	1431	0451	APO
1411	1432	7467	JMP CRMORE
1412			/LETTER, IS NEXT CHAR
1413			/A LETTER?
1414	1433	1332	LDH I 12
1415	1434	1120	ADA I
1416	1435	7722	-55
1417	1436	0471	APO I
1420	1437	7467	JMP CRMORE
1421	1440	1312	LDH 12
1422	1441	1120	ADA I
1423	1442	7754	-23
1424	1443	0451	APO
1425	1444	7467	JMP CRMORE
1426			/YES, CHECK LAST CHAR
1427	1445	1332	LDH I 12
1430	1446	1120	ADA I
1431	1447	7722	-55
1432	1450	0471	APO I
1433	1451	7467	JMP CRMORE
1434	1452	1312	LDH 12
1435	1453	1120	ADA I
1436	1454	7754	-23

1437	1455	0451	APO	
1440	1456	7467	JMP CRMORE	
1441	1457	1310	LDH 10	/MNEMONIC
1442	1460	7570	JMP LINCD	
1443	1461	7476	JMP HWD	
1444	1462	7570	JMP LINCD	
1445	1463	7476	JMP HWD	
1446	1464	7570	JMP LINCD	
1447	1465	7532	JMP SPACE	
1450	1466	7257	JMP START	
1451	1467	1312	CRMORE, LDH 12	
1452	1470	1460	SAE I	
1453	1471	0012	12	
1454	1472	7474	JMP ,+2	
1455	1473	7266	JMP MORE	
1456	1474	7570	JMP LINCD	
1457	1475	7257	JMP START	
1460			/HWD MUST CHECK	
1461			/FOR END OF Q4	
1462			/AND BRING-IN NEW	
1463			/HALF WORD	
1464	1476	0011	HWD, CLR	
1465	1477	2000	ADD 0	
1466	1500	5510	STC BACK	
1467	1501	1000	LDA	
1470	1502	0010	10	
1471	1503	1460	SAE I	
1472	1504	6377	6377	
1473	1505	7507	JMP ,+2	
1474	1506	7511	JMP EQ4	
1475	1507	1330	LDH I 10	
1476	1510	0000	BACK, 0	
1477	1511	0070	EQ4, SET I 10	
1500	1512	7777	7777	
1501	1513	1000	LDA	
1502	1514	1526	NBNIN	
1503	1515	1120	ADA I	
1504	1516	0001	1	
1505	1517	1040	STA	
1506	1520	1526	NBNIN	
1507	1521	1120	ADA I	
1510	1522	1001	1001	
1511	1523	1040	STA	
1512	1524	1530	NBNIN1	
1513	1525	0710	RDC U	
1514	1526	0000	NBNIN, 0	
1515	1527	0710	RDC U	
1516	1530	0000	NBNIN1, 0	
1517	1531	7507	JMP BACK-1	
1520			/SPACE CREATES A SPACE	
1521	1532	0011	SPACE, CLR	
1522	1533	2000	ADD 0	
1523	1534	5540	STC BACK1	
1524	1535	1020	LDA I	
1525	1536	0014	14	
1526	1537	7570	JMP LINCD	
1527	1540	0000	BACK1, 0	
1530			/COMMA OUTPUTS A COMMA	
1531	1541	0011	COMMA, CLR	
1532	1542	2000	ADD 0	
1533	1543	5547	STC BACK2	
1534	1544	1020	LDA I	
1535	1545	0063	63	

1536			JMP LINC0
1537	1546	7570	BACK2, 0
1540	1547	0000	/SWAP INTERCHANGES NUMBER
1541			/AND LETTER COMBINATIONS
1542			/THEN OUTPUTS BOTH
1543	1550	0011	SWAP, CLR
1544	1551	2000	ADD 0
1545	1552	5567	STC BACK3
1546	1553	1310	LDH 10
1547	1554	1040	STA
1550	1555	1565	SWAP1
1551	1556	7476	JMP HWD
1552	1557	1040	STA
1553	1560	1562	SWAP2
1554	1561	1020	LDA I
1555	1562	0000	SWAP2, 0
1556	1563	7570	JMP LINC0
1557	1564	1020	LDA I
1560	1565	0000	SWAP1, 0
1561	1566	7570	JMP LINC0
1562	1567	0000	BACK3, 0
1563			/LINC SETS UP O/P
1564			/BUFFER IN Q6
1565	1570	5617	LINC0, STC OPWD
1566	1571	2000	ADD 0
1567	1572	5626	STC BACK4
1570	1573	1000	LDA
1571	1574	0011	11
1572	1575	1460	SAE I
1573	1576	7377	7377
1574	1577	7616	JMP OUTPUT
1575	1600	0704	WRC /YES, END OF OP BUFFER
1576	1601	0000	TPOUT, 0
1577	1602	1000	LDA
1600	1603	1601	TPOUT
1601	1604	1120	ADA I
1602	1605	0001	1
1603	1606	1460	SAE I
1604	1607	6467	6467
1605	1610	7612	JMP ,+2
1606	1611	7637	JMP TPQ+3
1607	1612	1040	STA
1610	1613	1601	TPOUT
1611	1614	0071	SET I 11
1612	1615	6777	6777
1613	1616	1020	OUTPUT, LDA I
1614	1617	0000	OPWD, 0
1615	1620	1120	ADA I
1616	1621	0757	CONV
1617	1622	5624	STC PICKUP
1620	1623	1000	LDA
1621	1624	0000	PICKUP, 0
1622	1625	1371	STH I 11
1623	1626	0000	BACK4, 0
1624	1627	1000	QUIT, LDA
1625	1630	1601	TPOUT
1626	1631	1040	STA
1627	1632	1634	TPQ
1630	1633	0704	WRC
1631	1634	0000	TPQ, 0
1632	1635	0416	0416
1633	1636	7635	JMP ,-1
1634	1637	0717	CHK U

1635	1640	0000	0000
1636	1641	0416	0416
1637	1642	7641	JMP , -1
1640	1643	0075	SET I 15
1641	1644	0701	RCG
1642	1645	0076	SET I 16
1643	1646	7300	7300
1644	1647	0074	SET I 14
1645	1650	7720	-57
1646	1651	0073	SET I 13
1647	1652	1663	TEXTZ-1
1650	1653	1033	LDA I 13
1651	1654	0500	IOB
1652	1655	6041	6041 /TSF
1653	1656	7654	JMP , -2
1654	1657	0500	IOB
1655	1660	6046	6046 /TLS
1656	1661	0234	XSK I 14
1657	1662	7653	JMP , -7
1660	1663	6015	JMP 15
1661	1664	0215	TEXTZ, 0215
1662	1665	0212	0212
1663	1666	0322	322
1664	1667	0305	305
1665	1670	0315	315
1666	1671	0317	317
1667	1672	0326	326
1670	1673	0305	305
1671	1674	0240	240
1672	1675	0324	324
1673	1676	0301	301
1674	1677	0320	320
1675	1700	0305	305
1676	1701	0240	240
1677	1702	0306	306
1700	1703	0322	322
1701	1704	0317	317
1702	1705	0315	315
1703	1706	0240	240
1704	1707	0325	325
1705	1710	0316	316
1706	1711	0311	311
1707	1712	0324	324
1710	1713	0240	240
1711	1714	0261	261
1712			/REMOVE TAPE FROM UNIT 1
1713	1715	0215	0215
1714	1716	0212	0212
1715	1717	0324	324
1716	1720	0331	331
1717	1721	0320	320
1720	1722	0305	305
1721	1723	0240	240
1722	1724	0314	314
1723	1725	0306	306
1724	1726	0240	240
1725	1727	0301	301
1726	1730	0320	320
1727	1731	0240	240
1730	1732	0263	263
1731	1733	0267	267
1732	1734	0260	260
1733	1735	0254	254

1734	1736	0260	260
1735	1737	0240	240
1736	1740	0303	303
1737	1741	0322	322
1740	1742	0215	215
1741	1743	0212	212
1742			
1743			
1744			

/TYPE LF AP 370.0 CR
/CONVERT
/18 DEC 69

0000 ERRORS

ANSI	4066
BACK	5510
BACK1	5540
BACK2	5547
BACK3	5567
BACK4	5626
BNIN	5152
BNIN1	5154
CHARS	4746
CKLF	4712
CNTRL	4675
COMMA	5541
COMMT	5263
CONV	4757
CRMORE	5467
EQ4	5511
EXIT	4726
GETKBD	4612
HWD	5476
ICK	5342
INIT	5167
LEGAL	4666
LINCD	5570
LKRB	6036
LTLS	6046
LTSF	6041
MNEM	5420
MOCT	5306
MORE	5266
MO1	5302
NBNIN	5526
NBNIN1	5530
OPWD	5617
OUTPUT	5616
OVRIN	5251
OVRTEX	5151
PICKUP	5624
QAB	4075
QACA	4106
QAD	4117
QAE	4141
QAF	4607
QAG	4153
QAH	4205
QAI	4222
QAINIT	4071
QAJ	4227
QAK	4376
QAL	4266
QAM	4172
QAN	4314

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QAO	4322
QAP	4333
QAQ	4354
QARFSH	4144
QAT	4361
QAU	4577
QAV	4407
QAW	4603
QAX	4515
QAY	4503
QAZ	4372
QUIT	5627
SETUP	5060
SETUP1	5077
SETUP2	5121
SETUP3	5145
SPACE	5532
START	5257
SWAP	5550
SWAP1	5565
SWAP2	5562
SYMCK	5365
TAGCK	5356
TERM	5412
TEXTZ	5664
TEX1	4025
TPE	4735
TPOUT	5601
TPQ	5634
TXAGIN	5333
TXBG	5314
TXMETA	5311
TY	4627
UCK	5350