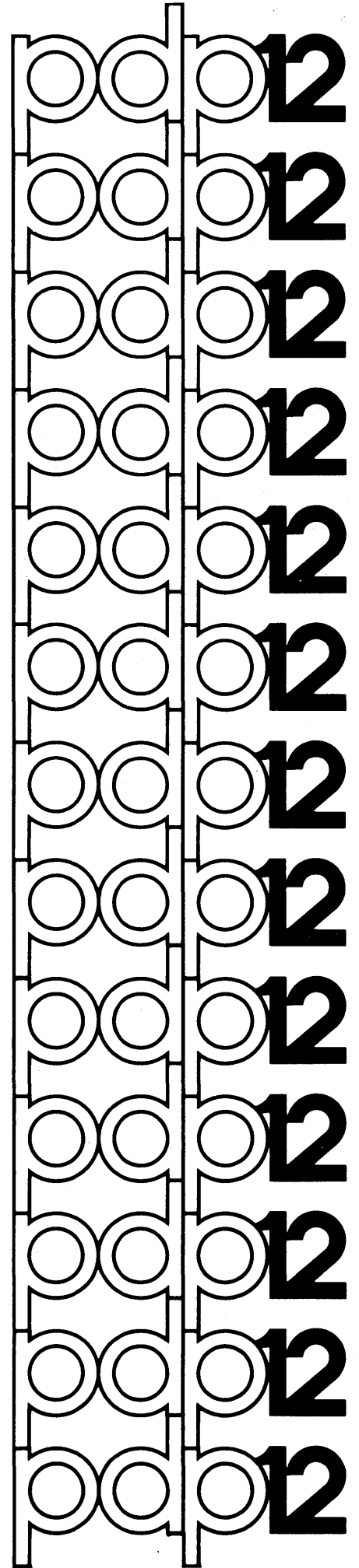


digital

patch





DEC-12-YU2A-D

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## 1.0 INTRODUCTION

The PATCH program will modify any location in any TBLK on tape unit 1. Its primary function is to provide a method for making small patches to LINctape binaries. For example, PATCH can be used to modify load and go arguments in a LAP6-DIAL<sup>1</sup> binary header TBLK. Because PATCH converses with the user via QANDA, an understanding of QANDA conventions is necessary before using PATCH. Refer to DEC-12-FISA-D for that information.

## 2.0 HARDWARE REQUIREMENTS

The minimum configuration is a PDP-12B.

## 3.0 CORE USAGE

PATCH uses MBLKs 0, 2, and 3 of segment 2 and MBLK 4 of segment 3. The starting address is 4020.

## 4.0 LOADING PROCEDURE

PATCH is loaded by the command

```
→LO PATCH, UNIT 1
```

The tape to be modified must be on transport unit 1; it can be placed on unit 1 either before or after loading PATCH. PATCH is a load and go program.

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<sup>1</sup> LAP6-DIAL is hereafter referred to as DIAL.

## 5.0 SENSE SWITCH OPTIONS

Raising Sense Switch  $\emptyset$  causes PATCH to return to DIAL. Therefore, MAKE SURE SENSE SWITCH  $\emptyset$  IS DOWN BEFORE LOADING PATCH.

## 6.0 QANDA DIALOGUE

PATCH will query the user by presenting him with 4 successive scope messages. All input is from the Teletype<sup>1</sup> and output is to both the scope and the Teletype. Pressing LINE FEED causes the program to advance to the next message in sequence. There is no option to repeat the displayed messages.

All input must be octal and must be three or four digits, as appropriate. Leading zeros, if any, are required. RUBOUT will delete the previous characters typed, one at a time.

### 6.1 MESSAGE 1

When PATCH is started, it displays the following message:

```
TBLK _ _ _
```

At this point the user types in the number of the tape block to be modified.

---

<sup>1</sup>Teletype is the registered trademark of the Teletype Corporation.

When the LINE FEED key is pressed, PATCH will read in the requested TBLK. If the input is not octal, the message is redisplayed.

### 6.2 MESSAGE 2

The next message is

LOC \_ \_ \_

Now the user must type in a value between 000 and 377 to specify which word within the TBLK is to be modified. If the value is not between 0-377, the message will be redisplayed. Location 000 is defined as the first word in the TBLK; location 377 is defined as the last word in the TBLK. When the LINE FEED key is pressed, PATCH retrieves the contents of the requested location and displays them in the next message. If non-octal characters are typed, "LOC" is redisplayed.

### 6.3 MESSAGE 3

OLD VAL  $X_1X_2X_3X_4$

NEW VAL \_ \_ \_

$X_1X_2X_3X_4$  is the current contents of the requested location. The user may now type in the change. If, upon examination, no change is to be made, retype the old value as the new

value input, followed by LINE FEED. When LINE FEED is pressed, NEW VAL will replace OLD VAL in core. If an error was made in TBLK, simply type LINE FEED or some non-octal characters followed by LINE FEED. The first display (TBLK \_ \_ \_) will reappear. (Note that any previous changes made in core up to this point will not be written onto the tape.)

#### 6.4 MESSAGE 4

```
DO _  
1 WRITE  
2 MORE CHANGES
```

If the user types LINE FEED or any key other than 1 followed by LINE FEED, PATCH returns to message 2 to accept more changes within the same TBLK. If option 1 is requested, all the changes up to that point are written out on the requested TBLK and PATCH goes back to message 1. The program can be aborted at any point and reinitialized by stopping and restarting at 4020. A return to DIAL can be effected while any display is active simply by raising Sense Switch 0.



```

0000      *20
0001      /LINC TAPE PATCHER (PATCH)
0002      /ALLOWS USER TO MODIFY
0003      /ANY WORD ON ANY TBLK OF UNIT 1
0004      /ADD QANDA BEFORE ASSEMBLY
0005      /5 MAR 70
0006      0020 1020      LDA I          /DO I\O
0007      0021 0020      20          /PRESET
0010      0022 0004      ESF
0011      0023 0643      LDF 3
0012      0024 6032      START,  JMP MESS1
0013      0025 6057      JMP MESS2
0014      0026 6137      JMP MESS3
0015      0027 6160      JMP MESS4
0016      0030 6024      JMP START
0017      0031 6024      JMP START
0020
0021
0022      0032 1000      MESS1,  LDA          /DISPLAY
0023      0033 0000      0          /TBLK - - -
0024      0034 4056      STC XITMS1  /RTN
0025      0035 7000      JMP QAINIT /JMP
0026      0036 0242      TXT1
0027      0037 0307      ANS1
0030      0040 6130      JMP CHKSNS /CHK SSW 0 UPON
0031
0032
0033      0041 1020      LDA I          /RTN FROM QANDA
0034      0042 0307      ANS1          /HERE WHEN DONE
0035      0043 6200      JMP DECODE   /PTR TO
0036      0044 6024      JMP START   /TBLK
0037      0045 1000      LDA          /CVRT TO OCTAL
0040      0046 0241      ANSWD       /NOT OCTAL
0041      0047 1620      BSE I       /HOLDS
0042      0050 4000      4000      /TBLK
0043      0051 1040      STA          /MBLK 4
0044      0052 0055      TPWD1      /READ
0045      0053 4176      STC TPWD2  /WRITE
0046      0054 0710      RDC U
0047      0055 0000      TPWD1, 0
0050      0056 0000      XITMS1, 0
0051
0052
0053      0057 1000      MESS2,  LDA          /DISPLAY
0054      0060 0000      0          /LOC ---
0055      0061 4127      STC XITMS2 /RTN
0056      0062 7000      JMP QAINIT /JMP
0057      0063 0246      TXT2
0060      0064 0312      ANS2
0061      0065 6130      JMP CHKSNS
0062      0066 1020      LDA I       /PTR TO
0063      0067 0312      ANS2       /LOC
0064      0070 6200      JMP DECODE
0065      0071 6025      JMP START+1 /NOT OCTAL
0066      0072 1000      LDA          /HOLDS LOC
0067      0073 0241      ANSWD      /REL TO
0070      0074 1120      ADA I
0071      0075 7400      -377
0072      0076 0471      APO I
0073      0077 6025      JMP START+1
0074      0100 1120      ADA I       /2000
0075      0101 2377      2000+377

```

0076	0102	1040	STA	/SAVE
0077	0103	0233	LOC	/HERE
0100	0104	4016	STC 16	
0101	0105	0077	SET I 17	/PTR TO OLD
0102	0106	0256	TXT3+4	/VAL WD
0103	0107	1016	LDA 16	/OLD VAL TO AC
0104	0110	0076	SET I 16	/CVRT TO DIAL
0105	0111	7773	-4	/CODES FOR
0106	0112	4232	STC TEMP	/QANDA
0107	0113	1000	LOOP, LDA	
0110	0114	0232	TEMP	
0111	0115	0243	ROL 3	/1 DIGIT AT
0112	0116	4232	STC TEMP	/A TIME
0113	0117	2232	ADD TEMP	
0114	0120	1560	BCL I	
0115	0121	7770	7770	
0116	0122	1120	ADA I	
0117	0123	0060	60	
0120	0124	1577	STH I 17	/PUT IN QANDA
0121				/TEXT STRING
0122	0125	0236	XSK I 16	/DONE ?
0123	0126	6113	JMP LOOP	/NO
0124	0127	0000	XITMS2, 0	/YES RTN
0125	0130	0440	CHKSNS, SNS 0	/BACK TO DIAL ?
0126	0131	7053	JMP QARFSH	/NO REFRESH
0127				/MESSAGE
0130	0132	0076	SET I 16	
0131	0133	0721	RCG I	
0132	0134	0077	SET I 17	
0133	0135	7300	7300	
0134	0136	6016	JMP 16	/GO EDITOR
0135				/DISPLAY
0136				/OLD VAL XXXX
0137				/NEW VAL ----
0140	0137	1000	MESS3, LDA	
0141	0140	0000	0	/RTN
0142	0141	4157	STC XITMS3	/JMP
0143	0142	7000	JMP GAINIT	
0144	0143	0252	TXT3	
0145	0144	0315	ANS3	
0146	0145	6130	JMP CHKSNS	
0147	0146	1020	LDA I	/PTR TO
0150	0147	0315	ANS3	/NEW VAL
0151	0150	6200	JMP DECODE	/CVRT TO OCTAL
0152	0151	0024	JMP START	/NOT OCTAL
0153	0152	1000	LDA	
0154	0153	0241	ANSWD	/HOLDS NEW VAL
0155	0154	0056	SET 16	/PTR TO
0156	0155	0233	LOC	/LOC
0157	0156	1356	STA 16	/CHANGE IS IN
0160	0157	0000	XITMS3, 0	
0161				/DISPLAY
0162				/DO -
0163				/1 WRITE
0164				/2 MORE CHANGES
0165	0160	1000	MESS4, LDA	
0166	0161	0000	0	
0167	0162	4177	STC XITMS4	
0170	0163	7000	JMP GAINIT	
0171	0164	0267	TXT4	
0172	0165	0320	ANS4	
0173	0166	6130	JMP CHKSNS	
0174	0167	0077	SET I 17	

0175	0170	0320		ANS4	
0176	0171	1337		LDH I 17	
0177	0172	1460		SAE I	
0200	0173	0061		61	
0201	0174	6025		JMP START+1	
0202	0175	0714		WRC U	/WRITE IT OUT
0203	0176	0000	TPWD2,	0	
0204	0177	0000	XITMS4,	0	/RTN
0205					/STRIP DIAL
0206					/CODES AND
0207					/CONVERT TO 1
0210					/PACKED WORD
0211			/SKP RTN IF OCTAL		
0212					/PTR TO CODES
0213					/IS IN AC
0214	0200	0056	DECODE,	SET 16	/RTN
0215	0201	0000		0	/JMP
0216	0202	4017		STC 17	
0217	0203	4241		STC ANSWD	
0220	0204	0236		XSK I 16	/ASSUME ITS OK
0221	0205	1337	NXTCHR,	LDH I 17	/GET A CODE
0222	0206	1420		SHD I	
0223	0207	7400		7400	/DONE ?
0224	0210	6016		JMP 16	/YES
0225	0211	1420		SHD I	
0226	0212	3400		3400	/DONE ?
0227	0213	6016		JMP 16	/YES
0230	0214	1560		BCL I	/1 DIGIT
0231	0215	7770		7770	/ONLY
0232	0216	4232		STC TEMP	/SAVE
0233	0217	2241		ADD ANSWD	/OLD RESULT
0234	0220	0243		ROL 3	/MOVE OVER
0235	0221	2232		ADD TEMP	/UPDATE
0236	0222	4241		STC ANSWD	/NEW RESULT
0237	0223	1317		LDH 17	/CHK THAT ITS OCTAL
0240	0224	1560		BCL I	
0241	0225	7707		7707	
0242	0226	1460		SAE I	
0243	0227	0060		0060	
0244	0230	6234		JMP LOCFIX	/NOT OCTAL
0245	0231	6205		JMP NXTCHR	
0246	0232	0000	TEMP,	0	
0247	0233	0000	LOC,	0	
0250	0234	1020	LOCFIX,	LDA I	
0251	0235	7776		-1	
0252	0236	2016		ADD 16	/RTN TO PC+1
0253	0237	4016		STC 16	/VS PC+2
0254	0240	6016		JMP 16	
0255	0241	0000	ANSWD,	0	
0256	0242	0624			
0256	0243	0214			
0256	0244	1374			
0256	0245	6334			
0256			TXT1,	TEXT ZFTBLK<3\Z	
0257	0246	0614			
0257	0247	1703			
0257	0250	7463			
0257	0251	3400			
0257			TXT2,	TEXT ZFLOC<3\Z	
0260	0252	0617			
0260	0253	1404			
0260	0254	4026			
0260	0255	0114			

0200	0256	4040
0260	0257	4040
0260		
0261	0260	4043
0261	0261	0616
0261	0262	0527
0261	0263	4026
0261	0264	0114
0261	0265	7464
0261	0266	3400
0261		
0262	0267	0604
0262	0270	1774
0262		
0263	0271	6143
0263	0272	0661
0263	0273	4027
0263	0274	2211
0263		
0264	0275	2405
0264	0276	4306
0264	0277	6240
0264	0300	1517
0264	0301	2205
0264	0302	4003
0264	0303	1001
0264	0304	1607
0264	0305	0523
0264	0306	3400
0264		
0265	0307	0000
0266	0310	0000
0267	0311	0000
0270	0312	0000
0271	0313	0000
0272	0314	0000
0273	0315	0000
0274	0316	0000
0275	0317	0000
0276	0320	0000
0277	0321	0000
0300	0322	0000
0301		
0302		
0303		
0304		
0305		
0306		
0307		
0310		
0311		
0312		
0313		
0314		
0315		
0316	1000	1020
0317	1001	0002
0320	1002	2000
0321	1003	1000
0322	1004	0000
0323	1005	3200
0324	1006	4001
0325	1007	1001

TXT3, TEXT ZFOLD VAL

FNEW VAL<4\Z

TXT4, TEXT ZFDO<1

F1 WRITE

F2 MORE CHANGES\Z

```

ANS1, 0
      0
      0
ANS2, 0
      0
      0
ANS3, 0
      0
      0
ANS4, 0
      0
      0
AAAEND, 0
/ADD QANDA
/ASSEMBLE
/DO SB PATCH,UNIT,L(CR)
/5 MAR 70
/QANDA SUBROUTINE FOR THE
/PDP-12
/REMOVE *1000 BELOW IF
/INSERTING SOURCE DIRECTLY
/INTO YOUR PROGRAM SOURCE
*1000 /REMOVE,IF DESIRED
/
/TO HERE TO INITIALIZE THE ROUTINE
/
GAINIT, LDA I          /SAVE JMP RETURN
      2
      ADD 0
      STA I
QAB, 0                /JMP +3
      ADD QAL+3
      STC 1           /PTR TO FIRST PARAM
      DA 1            /GET FIRST PARAM

```

0326	1010	3264		ADD QAO+1	/PTR TO HALFWORD-1
0327	1011	5057		STC QAG-3	
0330	1012	1021		LDA I 1	
0331	1013	5052		STC QARFSH-1	
0332	1014	4006		STC 6	/XR6 USED AS A SWITCH, =0 IF NO ANSWER FIELD, =1777 IF YES
0333	1015	0043	QACA,	SET 3	/XR3 TO PTR TO ANSWERS
0334	1016	1052		QARFSH-1	
0335	1017	0044		SET 4	/XR4 TO PTR TO QUESTIONS
0336	1020	1057		QAG-3	
0337					/TO HERE IF FIRST TIME THROUGH OR FOLLOWING A CR
0340	1021	0041		SET 1	
0341	1022	0004		4	
0342	1023	7270		JMP QAT	
0343	1024	0016		NOP	/F
0344	1025	1324		LDH I 4	/H, BUMP PTR IF H OR F
0345	1026	7231	QAD,	JMP QAO	
0346	1027	7035		JMP .+6	/74
0347	1030	7050		JMP QAE	/34
0350	1031	1460		SAE I	/CR?
0351	1032	0043		43	
0352	1033	7026		JMP QAD	/NO
0353	1034	7021		JMP QACA+4	/EXAMINE NEXT CHAR
0354					/INITIALIZE ANSWER BUFR
0355	1035	1343		STH 3	/74 TO ANSWERS
0356	1036	1324		LDH I 4	/NEXT HALFWORD
0357	1037	1120		ADA I	
0360	1040	7717		-60	
0361	1041	0017		COM	
0362	1042	4006		STC 6	
0363	1043	1363		STH I 3	/0 IN AC
0364	1044	0226		XSK I 6	
0365	1045	7043		JMP .-2	
0366	1046	1323		LDH I 3	/BUMP PTR TO ANSWERS
0367	1247	7026		JMP QAD	
0370					/ANSWER BUFR IS INITIATED
0371	1050	1343	QAE,	STH 3	
0372	1051	0064		SET I 4	/XR4 TO PTR TO LAST TYPED CHAR IN ANSWER BUFR
0373	1052	0000		0	
0374					/----RE-ENTER HERE TO REFRESH----
0375	1053	1020	QARFSH,	LDA I	/INITIAL Y POSITION
0376	1054	0277	277		
0377	1055	5113		STC QAH-1	
0400	1056	0063		SET I 3	/XR3 TO PTR TO HALFWORD QUESTIONS-1
0401	1057	0000		0	
0402	1060	0045		SET 5	/XR5 TO PTR TO LAST DISPLAYED CHAR IN ANSWER BUFR
0403	1061	1052		QARFSH-1	
0404	1062	0041	QAG,	SET 1	
0405	1063	0003		3	
0406	1064	7270		JMP QAT	
0407	1065	7074		JMP .+7	/F
0410	1066	1323		LDH I 3	/H, BUMP PTR
0411	1067	1020		LDA I	/NEITHER, ASSUME HALF SIZE
0412	1070	1560		HCL I	
0413	1071	0103		STC QAM+2	/SET INSTR TO CLEAR FF FOR HALF SIZE
0414	1072	0012		ADD 3AW	/NOP IN AC
0415	1073	7101		JMP QAM	
0416	1074	1323		LDH I 3	/BUMP PTR
0417	1075	1020		LDA I	
0420	1076	1020		BSE I	
0421	1077	0103		STC QAM+2	/SET INSTR TO SET FF FOR FULL SIZE
0422	1100	0513		ADD QAW+1	/ADD 9U IN AC
0423	1101	0045	GAM,	STC QAP+3	
0424	1102	0024		MSC I 4	/EAD CONTROL REGISTER

0423	1133	1520	BSE I	/THIS INSTR CHANGES, EITHER BSE & OR BCL &
0423	1134	2200	200	
0427	1135	2004	MSC 4	/AC TO CONTROL REGISTER
0430	1136	2061	SET I 1	/XR1 TO INITIAL X POSITION
0431	1137	2100	100	
0432	1110	1020	LDA I	/Y COORDINATE MULTIPLE
0433	1111	7737	-40	
0434	1112	1100	ADM I	/Y COORDINATE
0435	1113	2000	0	
0436	1114	1323	LDH I 3	
0437	1115	7232	JMP QAO+1	
0440	1116	7301	JMP QAZ	/74 BUMP PTR TO NEXT CHAR, PUT 40 IN AC
0441	1117	7136	JMP QAJ	/34
0442	1120	1420	SHD I	/NEITHER
0443	1121	4300	4300	
0444	1122	7062	JMP QAG	/CR, MOVE X AND Y COORDINATE
0445	1123	7242	JMP QAP	/ISPLAY CHAR
0446	1124	7114	JMP QAH	/PICK UP NEXT CHAR
0447	1125	7242	JMP QAP	/TO HERE IF DISPLAYING ANSWER BUFR
0450	1126	1520	SRO I	/SWITCH TO DISPLAY CURSOR, EITHER 0000 OR 7777
0451	1127	2000	0	/IFXR4=XR5, THEN SWITCH=7777
0452	1130	7516	JMP QAF	
0453				/QUESTION MODE
0454	1131	1325	LDH I 5	
0455	1132	7232	JMP QAO+1	
0456	1133	7114	JMP QAH	/74
0457	1134	7114	JMP QAH	/34
0460	1135	7125	JMP QAI-4	/NEITHER, DISPLAY IT
0461	1136	7521	JMP GETKBD	/TO HERE IF DISPLAYED BUFFER
0462	1137	2470	AZE I	
0463	1140	7004	JMP QAB	/NOTHING TYPED, EXIT
0464	1141	2062	SET I 2	
0465	1142	1412	QAY	
0466	1143	1402	SHD 2	/LF?
0467	1144	7311	JMP QAK+4	/YES, EXIT
0470	1145	1422	SHD I 2	/CR?
0471	1146	7223	JMP QAN	
0472	1147	2206	XSK 6	/IS THERE AN ANSWER FIELD?
0473	1150	7053	JMP QARFSH	
0474	1151	1422	SHD I 2	/<?
0475	1152	7175	JMP QAL	
0476	1153	1422	SHD I 2	/>?
0477	1154	7305	JMP QAK	
0500	1155	1422	SHD I 2	/ALT?
0501	1156	7015	JMP QACA	/REINITIALIZE
0502	1157	1422	SHD I 2	/BACK SLASH?
0503	1160	7053	JMP QARFSH	/IGNORE
0504	1161	1422	SHD I 2	/RUBOUT?
0505	1162	7175	JMP QAL	/IGNORE
0506	1163	1422	SHD I 2	/TAB?
0507	1164	7053	JMP QARFSH	/IGNORE
0510	1165	2172	STC ,+5	/ACCEPTABLE CHAR
0511	1166	7231	JMP QAO	/TEST NEXT CHAR
0512	1167	7263	JMP QAG	/74 BACK PTR UP BY 1
0513	1170	7263	JMP QAO	/34 +
0514	1171	1020	LDA I	/OK, STORE IT
0515	1172	2000	0	
0516	1173	1344	STH 4	
0517	1174	7053	JMP QARFSH	/REDISPLAY
0520	1175	1304	LDH 4	/TO HERE IF RUBB OR <
0521	1176	7232	JMP QAO+1	
0522	1177	7053	JMP QARFSH	/74 IGNORE
0523	1178	1775	-6222	

0524	1201	1502		LDH 2	/TEST THE CHAR
0525	1202	1460		SAE 1	/RUBOUT?
0526	1203	0037		37	
0527	1204	7263		JMP QAO	/NO. BACK PTR BY 1
0530	1205	0145		SET 5	
0531	1206	0104		4	
0532	1207	0043		SET 3	
0533	1210	0004		4	
0534	1211	7213		JMP ,+2	
0535	1212	1325		LDH I 5	/BUMP PTR
0536	1213	1323		LDH I 3	/GET NEXT CHAR
0537	1214	7232		JMP QAO+1	
0540	1215	0016		NOP	/IF 74 OR 34, REPLACE CURRENT CHAR WITH 0
0541	1216	0011		CLR	
0542	1217	1345		STH 5	
0543	1220	0450		AZE	/WAS IT 74 OR 34?
0544	1221	7212		JMP .-7	/NO, CONTINUE
0545	1222	7263		JMP QAO	/BACK PTR UP BY 1
0546					/TO HERE IF CR
0547	1223	0206	QAN,	XSK 6	
0550	1224	7311		JMP QAK+4	/EXIT ROUTINE IF NO ANSWER FIELD
0551	1225	7231		JMP QAO	
0552	1226	7053		JMP QARFSH	/74 MOVE PTR TO NEXT QUESTION FIELD
0553	1227	7051		JMP QAE+1	/34 END OF BUFR, MOVE PTR TO FIRST QUESTION FIELD
0554	1230	7225		JMP QAN+2	
0555					
0556	1231	1524	QAO,	LDH I 4	/S\R
0557	1232	1420		SHD I	/
0560	1233	7400		7400	+1 74 BEGIN FIELD
0561	1234	6000		JMP 0	+2 34 END BUFR
0562	1235	1460		SAE I	+3 NEITHER 74 NOR 34
0563	1236	0034		34	
0564	1237	0220		XSK I 0	
0565	1240	0220		XSK I 0	
0566	1241	6000		JMP 0	
0567					/S\R TO DISP LINC CHAR IN AC
0570	1242	0241	GAP,	ROL 1	/MULT BY 2 FOR INDEX TO ADDRESS OF TABLE
0571	1243	3430		ADD QAX+4	
0572	1244	4002		STC 2	/ADDRESS OF CHAR TO DISP IN XR2
0573	1245	3506		ADD QAU	/THIS INSTR CHANGES, EITHER OP OR ADD 9U
0574	1246	3506		ADD QAU	
0575	1247	2001		ADD 1	/ADD 4 TO XR1 TO SPACE CHAR
0576	1250	4001		STC 1	
0577	1251	2005		ADD 5	/GET ADDRESS OF ANSWER BUFR
0600	1252	0017		COM	
0601	1253	2004		ADD 4	
0602	1254	0450		AZE	
0603	1255	0011		CLR	
0604	1256	5127		STC QAI-2	/SWITCH=0 OR 7777
0605	1257	5113		ADD QAH-1	/Y COORDINATE IN AC
0606	1260	1742		DSC 2	
0607	1261	1762		DSC I 2	/DISPLAY CHAR
0610	1262	6000		JMP 0	
0611	1263	1020	QAO,	LDA I	/BACK UP PTR BY 1
0612	1264	3777		-4000	
0613	1265	1140		ADM	
0614	1266	0004		4	
0615	1267	7053		JMP QARFSH	/REDISPLAY
0616					/
0617	1270	1321	QAT,	LDH I 1	/S\R
0620	1271	1420		SHD I	/
0621	1272	0600		0600	+1 F
0622	1273	6000		JMP 0	+2 H
					+3 NEITHER

0623	1274	1460		SAE I	
0624	1275	0010		10	
0625	1276	0220		XSK I 0	
0626	1277	0220		XSK I 0	
0627	1300	6000		JMP 0	
0630					
0631	1301	1023	QAZ,	LDH I 3	
0632	1302	1020		LDA I	
0633	1303	0040		40	
0634	1304	7125		JMP QAI-4	
0635					/TO HERE IF >
0636	1305	1324	QAK,	LDH I 4	
0637	1306	0470		AZE I	/IS CURRENT CHAR BLANK?
0640	1307	7263		JMP QAQ	/YES, IGNORE
0641	1310	7424		JMP QAX	/MOVE DOT FORWARD
0642					/TO HERE TO EXIT WITH SKIP
0643	1311	1020		LDA I	
0644	1312	0001		1	
0645	1313	1140		ADM	
0646	1314	1004		QAB	
0647	1315	7004		JMP QAB	
0650					/CHARACTER PATTERNS
0651	1316	0101	QAV,	0101	/KBD 0, ILLEGAL, USED AS MARKER
0652	1317	0101		0101	
0653	1320	4477		4477	/1:A
0654	1321	7744		7744	
0655	1322	5177		5177	/2:B
0656	1323	2651		2651	
0657	1324	4136		4136	/3:C
0660	1325	2241		2241	
0661	1326	4177		4177	/4:D
0662	1327	3641		3641	
0663	1330	4577		4577	/5:E
0664	1331	4145		4145	
0665	1332	4477		4477	/6:F
0666	1333	4044		4044	
0667	1334	4136		4136	/7:G
0670	1335	2645		2645	
0671	1336	1077		1077	/10:H
0672	1337	7710		7710	
0673	1340	7741		7741	/11:I
0674	1341	0041		0041	
0675	1342	4142		4142	/12:J
0676	1343	4076		4076	
0677	1344	1077		1077	/13:K
0700	1345	4324		4324	
0701	1346	0177		0177	/14:L
0702	1347	0301		0301	
0703	1350	3077		3077	/15:M
0704	1351	7730		7730	
0705	1352	3077		3077	/16:N
0706	1353	7706		7706	
0707	1354	4177		4177	/17:O
0710	1355	7741		7741	
0711	1356	4477		4477	/20:P
0712	1357	3044		3044	
0713	1358	4276		4276	/21:Q
0714	1359	0376		0376	
0715	1362	4477		4477	/22:R
0716	1363	3146		3146	
0717	1364	5121		5121	/23:S
0720	1367	4651		4651	
0721	1368	4040		4040	/24:T



0722	1367	4077		4077	
0723	1370	0177		0177	/25:U
0724	1371	7701		7701	
0725	1372	0176		0176	/26:V
0726	1373	7402		7402	
0727	1374	0677		0677	/27:W
0730	1375	7701		7701	
0731	1376	1463		1463	/30:X
0732	1377	6314		6314	
0733	1400	0770		0770	/31:Y
0734	1401	7007		7007	
0735	1402	4543		4543	/32:Z
0736	1403	6151		6151	
0737	1404	4177		4177	/33:/
0740	1405	0000		0000	
0741					/34:BACKSLASH IGNORED ON INPUT
0742	1406	0000		0	/NOT USED
0743	1407	0000		0	/NOT USED
0744	1410	0000		0000	/35:J
0745	1411	7741		7741	
0746					/CODES 36:ALT, 37:RUBOUT NOT DISPLAYED
0747	1412	4543	QAY,	4543	/LF,CR
0750	1413	7476		7476	/<,>
0751	1414	3634		3634	/ALT, BACKSLASH
0752	1415	3747		3747	/RUBOUT, TAB
0753	1416	0000		0000	/40:SPACE
0754	1417	0000		0000	
0755	1420	7500		7500	/41:X!
0756	1421	0000		0000	
0757	1422	7000		7000	/42:"
0760	1423	0070		0070	
0761					/CODES 43:, 44:, 45:LF NOT DISPLAYED
0762	1424	7232	QAX,	JMP QA0+1	
0763	1425	7263		JMP QA0	
0764	1426	7263		JMP QA0	
0765	1427	7053		JMP QARFSH	
0766	1430	1316		QAV	
0767	1431	0000		0	/NOT USED
0770	1432	5166		5166	/46:&
0771	1433	0526		0526	
0772					/CODE 47:TAB NOT DISPLAYED
0773	1434	0000		0	/NOT USED
0774	1435	0000		0	/NOT USED
0775	1436	3600		3600	/50:(
0776	1437	0041		0041	
0777	1440	4100		4100	/51:)
1000	1441	0036		0036	
1001	1442	2050		2050	/52:*
1002	1443	0050		0050	
1003	1444	0404		0404	/53:+
1004	1445	0437		0437	
1005	1446	0500		0500	/54:,
1006	1447	0006		0006	
1007	1450	0404		0404	/55:-
1010	1451	0404		0404	
1011	1452	0001		0001	/56:.
1012	1453	0000		0000	
1013	1454	0001		0001	/57:\
1014	1455	4030		4030	
1015	1456	4536		4536	/60:0
1016	1457	3651		3651	
1017	1460	2101		2101	/61:1
1020	1461	0177		0177	

1021	1462	4523		4523	/62:2
1022	1463	2151		2151	
1023	1464	4122		4122	/63:3
1024	1465	2651		2651	
1025	1466	2414		2414	/64:4
1026	1467	0477		0477	
1027	1470	5172		5172	/65:5
1030	1471	0651		0651	
1031	1472	1506		1506	/66:6
1032	1473	4225		4225	
1033	1474	4443		4443	/67:7
1034	1475	6050		6050	
1035	1476	5126		5126	/70:8
1036	1477	2651		2651	
1037	1500	5122		5122	/71:9
1040	1501	3651		3651	
1041	1502	2200		2200	/72::
1042	1503	0000		0000	
1043	1504	4601		4601	/73:;
1044	1505	0000		0000	
1045					/CODE 74:<NOT DISPLAYED
1046	1506	0002	QAU,	2	/CONSTANT
1047	1507	0000		0	/NOT USED
1050	1510	1212		1212	/75:=
1051	1511	1212		1212	
1052					/CODE 76:> NOT DISPLAYED
1053	1512	0016	QAW,	NOF	
1054	1513	3506		ADD QAU	
1055	1514	4020		4020	/77:?
1056	1515	2055		2055	
1057			/		
1060	1516	1760	QAF,	DSC I	
1061	1517	6000		6000	
1062	1520	7131		JMP QAI	
1063			/		
1064					/END Q+A
1065			/		
1066			/		
1067			/		
1070			/		
1071			/KEYBOARD INPUT ROUTINE		
1072			/		
1073			QAKRB=6036	/PDP-8 IOT KBD	
1074			QATSF=6041	/TSF	
1075			QATLS=6046	/TLS	
1076			/		
1077	1521	1000	GETKBD, LDA		
1100	1522	0000		0	
1101	1523	5643		STC QAEXIT+6	/SAVE RETURN
1102	1524	2001		ADD 1	/SAVE XRS 1 AND 2
1103	1525	5640		STC QAEXIT+3	
1104	1526	2002		ADD 2	
1105	1527	5642		STC QAEXIT+5	
1106	1530	5636		STC QAEXIT+1	
1107	1531	0415		KST	/WAS SOMETHING TYPED?
1110	1532	6000		JMP 0	/NO: EXIT
1111	1533	0500		IOB	
1112	1534	0036		QAKRB	/GET TTY CHAR, CLEAR FLAG
1113	1535	1060		STA I	/SAVE IT
1114	1536	0000	QATY,	0	
1115	1537	1120		ADA I	
1116	1540	7540		-237	
1117	1541	2451		AP0	/BETWEEN 200 AND 237?

1120	1542	7604	JMP QACNTR	/CONTROL CHAR. CHECK FOR CR,LF,TAB
1121				
1122	1543	0061	SET I 1	/NO
1123	1544	1654	QACHAR-1	
1124	1545	0062	SET I 2	
1125	1546	7770	-7	
1126	1547	1300	LDA	
1127	1550	1536	QATY	
1130	1551	1461	SAE I 1	
1131	1552	7554	JMP ,+2	
1132	1553	7635	JMP QAEXIT	/ILLEGAL CHAR. DONT ECHO
1133	1554	2222	XSK I 2	/CHECKED THEM ALL?
1134	1555	7551	JMP , -4	
1135				
1136	1556	1120	ADA I	
1137	1557	7440	-337	
1140	1560	0451	AP0	/BETWEEN 240 AND 337?
1141	1561	7575	JMP QALEGL	/YES. LEGAL CHAR
1142				
1143	1562	1461	SAE I 1	/NO. CHECK FURTHER,
1144	1563	7572	JMP ,+7	
1145	1564	1020	LDA I	/RUBOUT
1146	1565	0334	334	
1147	1566	7644	JMP QATPE	/ECHO BACKSLASH
1150	1567	1220	LDA I	
1151	1570	0037	37	
1152	1571	7637	JMP QAEXIT+2	/LEGAL EXIT
1153				
1154	1572	1461	SAE I 1	
1155	1573	7635	JMP QAEXIT	/ILLEGAL
1156				/ALT
1157	1574	7637	JMP QAEXIT+2	/EXIT, DONT ECHO
1160				
1161	1575	1000	QALEGL, LDA	
1162	1576	1536	QATY	
1163	1577	7644	JMP QATPE	/ECHO CHAR
1164	1600	3536	ADD QATY	
1165	1601	1560	BCL I	/STRIP IT TO 6-BIT
1166	1602	7700	7700	
1167	1603	7637	JMP QAEXIT+2	
1170				/TO HERE IF CONTROL CHAR
1171	1604	1460	QACNTR, SAE I	
1172	1605	7755	7755	
1173	1606	7621	JMP QACKLF	
1174	1607	1020	LDA I	/CR
1175	1610	0043	43	
1176	1611	5636	STC QAEXIT+1	
1177	1612	1020	LDA I	
1200	1613	0215	215	
1201	1614	7644	JMP QATPE	
1202	1615	1020	LDA I	
1203	1616	0212	212	
1204	1617	7644	JMP QATPE	
1205	1620	7635	JMP QAEXIT	
1206				
1207	1621	1460	QACKLF, SAE I	
1210	1622	7752	7752	
1211	1623	7627	JMP ,+4	
1212	1624	1020	LDA I	/LF
1213	1625	0045	45	
1214	1626	7611	JMP QACNTR+5	
1215	1627	1460	SAE I	

1217	1631	7635	JMP QAEXIT	/ILLEGAL
1220	1632	1020	LDA I	
1221	1633	0247	47	
1222	1634	7637	JMP QAEXIT+2	/EXIT, DONT ECHO
1223			/	
1224	1635	1020	QAEXIT, LDA I	/GET 6-BIT ASCII
1225	1636	0200	0	
1226	1637	0381	SET I 1	/RESTORE XRS
1227	1640	0000	0	
1230	1641	0062	SET I 2	
1231	1642	0000	0	
1232	1643	6000	JMP	/EXIR S\ R GETKBD
1233			/S\ R TO PRINT C(AC)	
1234	1644	0500	QATPE, IOB	
1235	1645	6046	QATLS	/PDP-8 IOT TLS
1236	1646	1000	LDA	
1237	1647	0000	0	
1240	1650	5654	STC ,+4	/SAVE RETURN
1241	1651	0500	IOB	
1242	1652	6041	QATSF	/WAIT FOR FLAG
1243	1653	7651	JMP , -2	
1244	1654	6000	JMP	/EXIT
1245			/	
1246	1655	0243	QACHAR, 243	/HASH
1247	1656	0244	244	/DOLLAR SIGN
1250	1657	0245	245	/PER CENT
1251	1660	0247	247	/APOSTROPHE
1252	1661	0300	300	/AT SIGN
1253	1662	0336	336	/UP ARROW
1254	1663	0337	337	/BACK ARROW
1255	1664	0040	40	/RUBOUT
1256	1665	0036	36	/ALT
1257			/END OF S\ R GETKBD	

AAAEND	4322
ANSWD	4241
ANS1	4307
ANS2	4312
ANS3	4315
ANS4	4320
CHKSNS	4130
DECODE	4220
GETKBD	5521
LOC	4233
LOCFIX	4234
LOOP	4113
MESS1	4032
MESS2	4057
MESS3	4137
MESS4	4160
NXTCHR	4205
QAB	5004
QACA	5015
QACHAR	5655
QACKLF	5621
QACNTR	5604
QAD	5026
QAE	5050
QAEXIT	5635
QAF	5516
QAG	5062

QAH	5114
QAI	5131
QAINIT	5100
QAJ	5136
QAK	5305
QAKRB	6036
QAL	5175
QALEGL	5575
QAM	5101
QAN	5223
QAO	5231
QAP	5242
QAQ	5263
QARFSH	5053
QAT	5270
QATLS	6046
QATPE	5644
QATSF	6041
QATY	5536
QAU	5506
QAV	5316
QAW	5512
QAX	5424
QAY	5412
QAZ	5301
START	4024
TEMP	4232
TPWD1	4055
TPWD2	4176
TXT1	4242
TXT2	4246
TXT3	4252
TXT4	4267
XITMS1	4056
XITMS2	4127
XITMS3	4157
XITMS4	4177