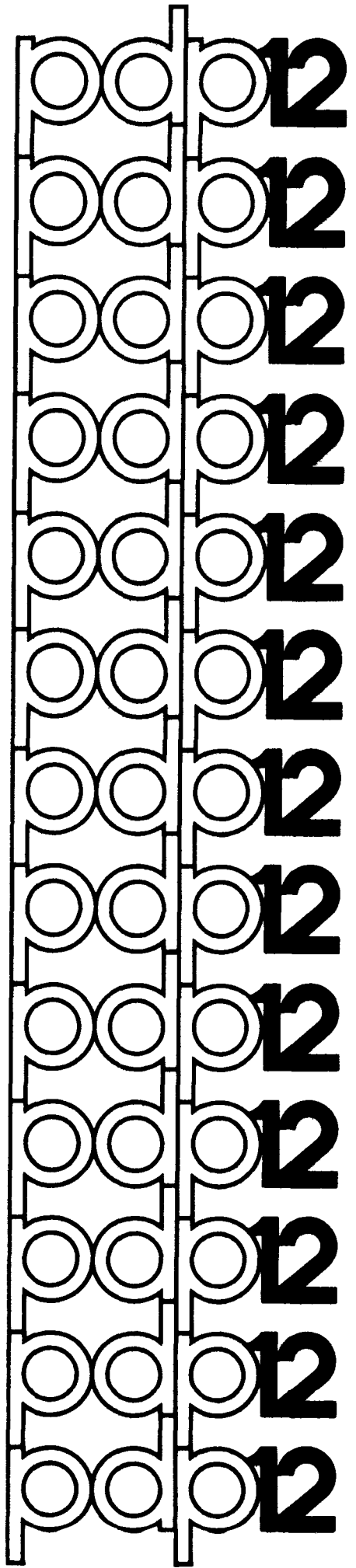


# TED





DEC-12-EOSA-D  
First Printing  
June 1971

T E D

(Tape EDitor)

For additional copies, order DEC-12-EOSA-D from Digital  
Equipment Corporation, Program Library, Maynard, Mass. 01754  
Price \$5.00

Your attention is invited to the last two pages of this document. The "How to Obtain Software Information" page tells you how to keep up-to-date with DEC's software. The "Reader's Comments" page, when filled in and mailed, is beneficial to both you and DEC; all comments received are acknowledged and are considered when documenting subsequent manuals.

The material in this handbook is for information purposes and is subject to change without notice.

Copyright © 1971 Digital Equipment Corporation

The following are trademarks of Digital Equipment Corporation, Maynard, Massachusetts

DEC	PDP
FLIP CHIP	FOCAL
DIGITAL	COMPUTER LAB
OMNIBUS	UNIBUS
GLC	LABCOM
DDT	

## CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	1
2.0 HARDWARE REQUIREMENTS	1
3.0 LOADING PROCEDURE	1
4.0 USAGE	1
5.0 CORE LAYOUT	4
6.0 INTERNAL DESCRIPTION	4
7.0 ASSEMBLY INSTRUCTIONS	4



## 1.0 INTRODUCTION

TED (Tape Editor) allows selective modification of any specified block of tape or disk via a CRT display and simple keyboard commands. Ten locations of the block are displayed at a time with a movable cursor. Multi-word as well as single-digit changes are easily accomplished.

## 2.0 HARDWARE REQUIREMENTS

TED will run on any PDP-12 system that supports DIAL-MS<sup>1</sup>.

## 3.0 LOADING PROCEDURE

The program uses the DIAL-MS I/O routines for its input and output, and reads the I/O routines from a system device (tape unit  $\emptyset$  if tape system or disk unit  $\emptyset$  if disk system). Therefore, before loading, make sure that the system has been initialized (by starting at 731 $\emptyset$ ) for the particular machine configuration being used.

The program is loaded by the command

```
→ LO TED,u ↵
```

where u = unit. Starting address, if not self-starting, is 4 $\emptyset$ 2 $\emptyset$ , LINC-mode. After the program has been started and the I/O routines read into core, the tape on unit  $\emptyset$  may be dismounted if desired.

## 4.0 USAGE

An initial QANDA (question and answer) frame will appear

```
      TED  
      (Tape Editor)  
  
      READ BLOCK____  
  
      FROM UNIT__
```

Legal blocks are  $\emptyset\emptyset\emptyset\emptyset$ -7777 and legal units are  $\emptyset\emptyset$ -77. If nonexistent blocks or units are specified, results are questionable. A nonexistent unit should give a "NO" message; type RETURN to return to DIAL, or re-start at 4 $\emptyset$ 2 $\emptyset$ .

---

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

Once the block and unit have been specified (illegal characters will cause the frame to be redisplayed), the block will be read into core and the following display will appear.

```

UNIT XX
BLOCK XXXX

      LOC / CONTENTS
      ØØØ / XXXX  XX
      ØØ1 / XXXX  XX
      ØØ2 / XXXX  XX
      ØØ3 / XXXX  XX
      ØØ4 / XXXX  XX
      ØØ5 / XXXX  XX
      ØØ6 / XXXX  XX
      ØØ7 / XXXX  XX

```

The extreme right column gives the two 6-bit ASCII equivalents of the octal number. Most of these are obvious (Ø1=A, etc.), but there are a few exceptions:

- 43 (DIAL code for carriage return) is displayed as a curved down-arrow (↵).
- 47 (DIAL code for TAB) is displayed as a horizontal "T" (→).
- 37 (Back-arrow) is displayed as such even though DIAL ignores it (←).

The cursor, initially under the first digit of the contents of location Ø, may be moved by pressing the following keys (there is no Teletype<sup>1</sup> echo).

<u>Key</u>	<u>Action</u>
SPACE	Moves cursor one digit to right
RUBOUT	Moves cursor one digit to left
RETURN	Moves cursor down one line and to left
ALTMODE	Moves cursor up one line and to left
DIGITS Ø - 7	When a digit is typed, the number typed replaces the digit under which the cursor is located. The cursor then moves one space to the right.

The "window" may be moved to display new locations by typing the following keys.

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



<u>Key</u>	<u>Action</u>
CTRL/F <sup>1</sup>	Advances window by 10; thus, if initially locations 000-007 are displayed, CTRL/F will cause locations 010-017 to be displayed.
F	Same as CTRL/F, except by 1.
CTRL/B	Backs up window by 10 (just the reverse of CTRL/F).
B	Backs up window by 1 (the reverse of F).
LINEFEED + a number 000 to 377	Positions the window so that the specified location is at the top of the window. (371-377 position the display such that 370 is at the top of the window.)
LINEFEED + S	Searches the block starting at the current location (location displayed at the top of the window) for the contents of the Right Switches masked by the contents of the Left Switches. If the search is not successful, the window is positioned to location zero. If the search is successful, the location with the desired number is positioned at the top of the window. Exception: If a match is found in locations 371-377, the window is set starting at location 370 and the cursor is positioned under the first occurrence of the matching number.

In addition, if at any time the cursor is at the beginning or end of the window and a command is given that would move the cursor beyond the window, the window will be moved to give the desired result. Thus, if the cursor is on the last line of the window and RETURN is typed, the whole window will move up 1 frame.

If the window is at 000 or 377, attempts to go beyond the ends are ignored.

Various other keys are used to control the reading and writing of the blocks:

<u>Key</u>	<u>Action</u>
CTRL/R	Rereads the current block (RESTORE).
CTRL/C	Returns to initial QANDA display.
CTRL/W	Writes back the current block, with any changes, and returns to the initial display.

---

<sup>1</sup>A CTRL/F is typed by holding down the CTRL key and typing the letter F.

<u>Key</u>	<u>Action</u>
CTRL/N	Reads in the next sequential block (does not write).
CTRL/P	Reads in the previous block (current block - 1).
CTRL/D	Returns to DIAL (active during most question and answer displays).

## 5.0 CORE LAYOUT

SEGMENT 0	All the display routines and pointer update routines, except for QANDA.
SEGMENT 1	Locations 0-377 are the tape block buffer.
SEGMENT 2	The code to call the QANDA displays and interpret the answers is here, plus the I/O calls. Also in this segment are the QANDA text frames.
SEGMENT 3	QANDA is in locations 0-777 of this segment, along with routines that actually JMP to QANDA itself, since QANDA can only be called from its own segment. The DIAL-MS I/O routines are in locations 1000-1777 (absolute 7000-7777).

FIELD 1 is entirely free.

## 6.0 INTERNAL DESCRIPTION OF TED

Operation of TED is quite straightforward. The display is controlled by three main pointers, RBASE, LINE, and LINPOS. By setting these, the display routines are set to display the desired information. RBASE points to the word that is to be the top of the display "window". It can range from 0 to 370. RBASE is added to BASE (the actual starting address in core of the tape or disk block being worked on) to provide a pointer to the core location of the first word to be displayed. It is the "relative base" of the window. Note that BASE is 2000, which is location 0 of an LMODE data field and a legal PDP-8 core location pointer at the same time. If BASE is changed, be careful to check for LMODE references that depend on it being 2000. LINPOS and LINE control the position of the cursor. LINE can range from 0 to 7 and indicates which of the eight locations currently being displayed on the scope the cursor should be under. LINPOS ranges from 0 to 3 and indicates the digit on the line. LINPOS may be thought of as the "X" and LINE the "Y" of the cursor, though they must be changed to actual scope coordinates before display.

There are three major display routines. One of these is QANDA which is used to display the text "BLOCK XXXX, UNIT XX, LOC, CONTENTS." The QANDA internal keyboard check is removed to permit scanning of characters by the main program. The check is put back in when the first question frame is being displayed.

DISCUR takes the pointers LINPOS and LINE and converts them to a scope (X,Y), then displays the cursor.

DIS1Ø displays the location numbers, the octal contents, and the ASCII equivalents of the ten consecutive locations pointed to by RBASE. It uses the QANDA character pattern table for this purpose, but DIS1Ø handles its own DSC instructions.

When a key is typed, an operation dispatch routine scans a list of characters and transfers control to a number of little routines depending on the key that was typed. If "F" is typed, for example, control goes to the KF routine.

LINEFEED is a special case. When a LINEFEED is typed, the terminating 34 in the QANDA text string is moved from its initial location following "CONTENTS" to a location immediately after the "=" sign. This permits the "=" to be displayed in the lower left corner of the scope. If an "S" is then typed, the 34 is moved back to its original location, the left and right switches are read, and control goes to the "GOTS" routine. If a digit is typed, it is placed in the text string immediately after the "=" and the terminating 34 is moved over one half word. Up to 3 digits may be typed; after 3 digits, the only legal characters are RUBOUT (which backs up the 34 one half word) or carriage return (which causes the 3-digit number to be decoded). RUBOUT can also erase the "=" sign; in this case, the 34 is moved back and the original display resumed.

## 7.0 ASSEMBLY INSTRUCTIONS

TED is assembled as required by the DIAL Assembler. Briefly, the correct sequence is:

```
→ZE )  
→AS TED,u )      (u=unit)  
→SB TED,u,L )    (for load & go)
```



```

0000      *20
0001      /          ***** TED *****
0002      /
0003      /          TAPE EDITOR
0004      /
0005      /COPYRIGHT 1971
0006      /DIGITAL EQUIPMENT CORPORATION
0007      /MAYNARD, MASS, 01754
0010      /
0011      /
0012      /ALLOWS SELECTIVE EDITING OF ANY TAPE OR
0013      /DISK BLOCK, CONTROL KEYS ARE:
0014      /
0015      /CTRL/R --- RE-READ CURRENT BLOCK
0016      /CTRL/C --- RETURN TO INITIAL DISPLAY
0017      /CTRL/W --- WRITE CURRENT BLOCK, RETURN TO INITIAL DISPLAY
0020      /CTRL/N --- READ NEXT SEQUENTIAL BLOCK
0021      /CTRL/P --- READ PREVIOUS BLOCK (CURRENT BLOCK-1)
0022      /CTRL/D --- RETURN TO DIAL
0023      /
0024      /FOR EDITING:
0025      /<RETURN>      MOVES CURSOR DOWN 1 LINE
0026      /<ALTMODE>     MOVES CURSOR UP ONE LINE
0027      /<F>          MOVES WINDOW DOWN ONE LOCATION
0030      /<B>          MOVES WINDOW UP ONE LOCATION
0031      /<CTRL/F>     SAME AS F, EXCEPT 10
0032      /<CTRL/B>     SAME FOR B
0033      /DIGITS 0-7  REPLACE DIGIT CURSOR IS UNDER
0034      /<SPACE>      MOVES CUROSR OVER 1 DIGIT
0035      /<RUBOUT>     MOVES CURSOR BACK 1 DIGIT
0036      /<LINEFEED+NUMBER> MOVES WINDOW TO THAT LOCATION 000-370
0037      /<LINEFEED+S> SEARCHES STARTING AT CURRENT LINE (TOP OF WINDOW)
0040      /          FOR RSW MASKED BY LSW
0041      /
0042      /STARTING ADDRESS IS 4020, LINC MODE
0043      /
0044      /IN THE INTEREST OF REDUCING NOISE POLLUTION,
0045      /THERE IS NO TELETYPE ECHO
0046      /
0047      /SGW
0050      /3/71
0051      /
0052      /
0053      EJECT

```

-

```

0054          /PAGE 0
0055          PMODE
0056          /
0057          *10
0060 0010 0000 COUNT1, 0
0061 0011 0000 COUNT2, 0
0062 0012 0000 GETPNT, 0
0063 0013 0000 PUTPNT, 0
0064 0014 0000 PUTB, 0
0065 0015 0000 PATPNT, 0
0066 0016 0000 XTEMP, 0
0067          *20
0070 0020 0000 WRDCNT, 0
0071 0021 0000 MASK, 0          /MASK FOR "S" COMMAND
0072 0022 0000 MATCH, 0        /CHAR, TO MATCH ON "S" COMMAND
0073 0023 0000 LINE, 0         /LINE CURSOR IS ON, 0-7
0074 0024 0000 LINPOS, 0       /DIGIT CURSOR IS ON, 0-3
0075 0025 0000 HOLD, 0
0076 0026 4132 EXIT, DLOOP      /HOW TO GET BACK TO DISPLAY LOOP
0077 0027 0000 TEMP, 0
0100 0030 7770 M10, -10
0101 0031 0000 XCOR, 0          /X OF DIGIT BEING DISPLAYED
0102 0032 6727 IQ2, 02         /A QANDA THING
0103 0033 0000 YCOR, 0         /Y OF DIGIT BEING DISPLAYED
0104 0034 0077 P77, 77
0105 0035 7740 M40, -40
0106 0036 3443 P3443, 3443
0107 0037 4356 SLASH1, FRAME2+27
0110 0040 0020 P20, 20
0111 0041 0377 P377, 377
0112 0042 0000 WORD, 0
0113 0043 6476 BNUM, NUMPAT!2000 /WHERE THE CHAR, PATTERNS ARE
0114 0044 7672 PCRMS, +215-323 /+CAR,RET, - "S"
0115 0045 7401 M377, -377
0116 0046 0007 P7, 7
0117 0047 7774 M4, -4
0120 0050 4141 IDISPLA, DISPLAY /POINTER TO DISPLAY EVERYTING
0121 0051 0600 IDIS10, DIS10    /POINTER TO DISPLAY WINDOW
0122 0052 0522 IDISCUR, DISCUR  /POINTER TO DISPLAY CURSOR
0123 0053 7410 M370, -370
0124 0054 7420 M360, -360
0125 0055 0010 P10, 10
0126 0056 7771 M7, -7
0127 0057 7520 M260, -260
0130 0060 0370 P370, 370
0131 0061 0012 P12, 12
0132 0062 0000 CURY, 0          /Y OF CURSOR
0133 0063 0000 CHAR, 0         /TEMP, FOR KEY TYPED
0134 0064 2000 BASE, 2000       /WHERE THE BLOCK IS
0135 0065 0162 MCRRUB, -215+377 /-CAR,RET, + RUBOUT
0136 0066 0043 P43, 43         /CAR, RET,
0137 0067 0034 P34, 34         /BACKSLASH
0140 0070 0000 RBASE, 0        /RELATIVE BASE OF "WINDOW"
0141 0071 6367 LNOPUT, FRAME2+40:6000 /WHERE TO PUT 3 DIGITS TYPED AFTER "LINEFEED"
0142          EJECT

```

0143	0072	7774	READ,	7774	/MS DIAL POINTERS
0144	0073	7775	WRITE,	7775	
0145	0074	5772	P5772,	5772	
0146	0075	7776	P7776,	7776	
0147	0076	5773	P5773,	5773	
0150	0077	7777	P7777,	7777	
0151	0100	7200	PMOVE,	7200	
0152	0101	0100	SYSBLK,	100	/SYS UNIT
0153	0102	0034		34	/*6000
0154	0103	0022		22	/BLK 22
0155	0104	0002		2	/2 BLKS
0156			EJECT		

-

			PAGE	
0157			/COME HERE AFTER LINEFEEDS	
0160			/	
0161			KLF,	
0162	0200	7346	CLA CLL CMA RTL	/-3
0163	0201	3016	DCA	XTEMP /3 DIGITS
0164	0202	3025	DCA	HOLD /ZERO OUT NUMBER
0165	0203	1071	TAD	LNOPUT /TEXT FRAME ADDR.
0166	0204	3014	DCA	PUTB /OF WHERE TO PUT NOS.
0167	0205	6141	LINC	
0170			LMODE	
0171	0206	2066	ADD	P43 /CARRIAGE RETURN
0172	0207	1340	STH	/ZAP FIRST BACKSLASH
0173	0210	2356		FRAME2+2712000
0174	0211	1000	LDA	
0175	0212	0067	P34	
0176	0213	1340	STH	/PUT BACKSLASH HERE
0177	0214	6367		FRAME2+4016000
0200	0215	0002	PDP	
0201			Pmode	
0202	0216	4450	LISN,	JMS I IDISPLAY
0203	0217	6031	KSF	
0204	0220	5216	JMP	, -2
0205	0221	6036	KRB	/READ TTY
0206	0222	3063	DCA	CHAR
0207	0223	1063	TAD	CHAR
0210	0224	1045	TAD	M377
0211	0225	7450	SNA	/RUBOUT?
0212	0226	5314	JMP	RUBGOT /YES
0213	0227	1065	TAD	MCRRUB /-215+377
0214	0230	7450	SNA	/CARRIAGE RET?
0215	0231	5272	JMP	CRGOT /YES
0216	0232	1044	TAD	PCRMS
0217	0233	7650	SNA CLA	/S?
0220	0234	5744	JMP I	IGOTS
0221	0235	1016	TAD	XTEMP /SEE WHERE BUFFER IS
0222	0236	7700	SMA CLA	/COUNT<0?
0223	0237	5216	JMP	LISN /NO-SO ONLY RUBOUT OR CR LEGAL
0224	0240	1063	TAD	CHAR
0225	0241	1057	TAD	M260
0226	0242	7510	SPA	/<260?
0227	0243	5216	JMP	LISN /YES-NO GOOD
0230	0244	1030	TAD	M10
0231	0245	7700	SMA CLA	/>267?
0232	0246	5216	JMP	LISN /YES
0233	0247	1063	TAD	CHAR /GET THE CHAR
0234	0250	6141	LINC	
0235			LMODE	
0236	0251	1354	STH	PUTB /PUT IN DISPLAY
0237	0252	1000	LDA	
0240	0253	0067	P34	
0241	0254	1374	STH I	PUTB /PUT "\ " AFTER IT
0242	0255	0002	PDP	
0243			Pmode	
0244	0256	7200	CLA	
0245	0257	1063	TAD	CHAR
0246	0260	0046	AND	P7
0247	0261	3063	DCA	CHAR
0250	0262	1025	TAD	HOLD /THE NUMBER WE'RE BUILDING
0251	0263	7104	CLL RAL	



0252	0264	7006		RTL		
0253	0265	1063		TAD	CHAR	/ADD IN MOST RECENT
0254	0266	3025		DCA	HOLD	
0255	0267	2016		ISZ	XTEMP	
0256	0270	7000		NOP		/IN CASE OF SKIP
0257	0271	5216		JMP	LISN	/WAIT FOR NEXT
0260	0272	7200	CRGOT,	CLA		
0261	0273	1036		TAD	P3443	
0262	0274	3437		DCA I	SLASH1	
0263	0275	1025		TAD	HOLD	/GET LINE NO.
0264	0276	1045		TAD	M377	
0265	0277	7540		SMA SZA		/>377?
0266	0300	5426		JMP I	EXIT	/YES - IGNORE
0267	0301	1046		TAD	P7	/=-370
0270	0302	7700		SMA CLA		/>370?
0271	0303	5306		JMP	,+3	
0272	0304	1025		TAD	HOLD	
0273	0305	5310		JMP	SL	
0274	0306	1025		TAD	HOLD	/YES
0275	0307	0060		AND	P370	/SO MAKE IT 370
0276	0310	3070	SL,	DCA	RBASE	/SET RELATIVE BASE POINTER
0277	0311	3023		DCA	LINE	/SET CURSOR
0300	0312	3024		DCA	LINPOS	/TO UPPER LEFT
0301	0313	5426		JMP I	EXIT	
0302	0314	7325	RUBGOT,	CLA CLL	CML RAL	IAC/+3
0303	0315	1016		TAD	XTEMP	
0304	0316	7650		SNA GLA		/ALREADY ERASED ALL?
0305	0317	5341		JMP	SLSHBK	/YES-SO EXIT THIS MADNESS
0306	0320	7040		CMA		
0307	0321	1014		TAD	PUTB	/BACK UP POINTER
0310	0322	3014		DCA	PUTB	
0311	0323	7040		CMA		
0312	0324	1016		TAD	XTEMP	/BACK UP COUNTER
0313	0325	3016		DCA	XTEMP	
0314	0326	6141		LINC		
0315				LMODE		
0316	0327	2067		ADD	P34	
0317	0330	1374		STH I	PUTB	/PUT SLASH BACK 1/2 WORD
0320	0331	1000		LDA		
0321	0332	0025		HOLD		/REMOVE LAST DIGIT TYPED
0322	0333	1560		BCL I		
0323	0334	0007		0007		
0324	0335	0303		ROR 3		
0325	0336	4025		STC	HOLD	
0326	0337	0002		PDP		
0327				PMODE		
0330	0340	5216		JMP	LISN	/WAIT FOR NEXT CHAR
0331	0341	7332	SLSHBK,	CLA CLL	CML RTR	/TO RESET BACKSLASH
0332	0342	3025		OCA	HOLD	/PUT IN A RIDICULOUS LINE NUMBER
0333	0343	5272		JMP	CRGOT	/THEN GO TO CR ROUTINE
0334	0344	0400	IGOTS,	GOTS		
0335				EJECT		

```

0336                                     PAGE
0337 /COME HERE AFTER <LINEFEED+S>
0340 /
0341 0400 6141 GOTS, LINC
0342 LMODE
0343 0401 0517 LSW /READ LSW=MASK
0344 0402 4021 STC MASK
0345 0403 0002 POP
0346 PMODE
0347 0404 7604 LAS /GET WHAT TO MATCH
0350 0405 0021 AND MASK
0351 0406 3022 DCA MATCH
0352 0407 7200 SCAN, CLA /
0353 0410 1070 TAD RBASE /SET UP FOR AUTO-INDEX
0354 0411 1064 TAD BASE /FORM POINTER
0355 0412 3012 DCA GETPNT
0356 0413 1412 TAD I GETPNT
0357 0414 0021 AND MASK
0360 0415 7041 CIA
0361 0416 1022 TAD MATCH
0362 0417 7650 SNA CLA
0363 0420 5232 JMP SAME /GOOD
0364 0421 1070 TAD RBASE /BUMP
0365 0422 7001 IAC
0366 0423 3070 DCA RBASE
0367 0424 1070 TAD RBASE
0370 0425 1045 TAD M377
0371 0426 7710 SPA CLA /DONE?
0372 0427 5207 JMP SCAN /ONE MORE TIME
0373 0430 3025 DCA HOLD
0374 0431 5652 JMP I ICRGOT
0375 0432 1070 SAME, TAD RBASE /NOW SEE WHERE WE ARE
0376 0433 7001 IAC
0377 0434 3025 DCA HOLD
0400 0435 1025 TAD HOLD
0401 0436 1053 TAD M370
0402 0437 7710 SPA CLA />=370?
0403 0440 5652 JMP I ICRGOT /NO
0404 0441 1025 TAD HOLD
0405 0442 0046 AND P7
0406 0443 3023 DCA LINE
0407 0444 3024 DCA LINPOS
0410 0445 1036 TAD P3443
0411 0446 3437 DCA I SLASH1
0412 0447 1060 TAD P370
0413 0450 3070 DCA RBASE
0414 0451 5426 JMP I EXIT
0415 0452 0272 ICRGOT, CRGOT
0416 /
0417 EJECT

```

```

0420          /COME HERE TO CHANGE A CHARACTER
0421          /
0422          0453 7200 KDIGIT, CLA          /COME HERE WITH TYPED CHAR IN "CHAR"
0423          0454 1023          TAD          LINE          /LINE CURSOR IS ON
0424          0455 1070          TAD          RBASE          /+OFFSET OF WINDOW
0425          0456 1064          TAD          BASE          /+BASE OF BLOCK
0426          0457 3012          DCA          GETPNT          /=POINTER TO WORD CURSOR IS ON
0427          0460 6141          LINC
0430          LMODE
0431          0461 2024          ADD          LINPOS          /WORD POSITION ON LINE
0432          0462 0017          COM
0433          0463 4010          STC          COUNT1
0434          0464 2046          ADD          P7
0435          0465 0303          ROR 3
0436          0466 4512          STC          BITC
0437          0467 2063          ADD          CHAR
0440          0470 1560          BCL 1
0441          0471 7770          7770
0442          0472 0303          ROR 3
0443          0473 4514          STC          BITS
0444          0474 0210          XSK          COUNT1          /OK THERE?
0445          0475 0456          SKP
0446          0476 6507          JMP          BITSET          /YES
0447          0477 2514          SHIFT, ADD          BITS
0450          0500 0303          ROR 3          /TRY NEXT
0451          0501 4514          STC          BITS
0452          0502 2512          ADD          BITC
0453          0503 0303          ROR 3
0454          0504 4512          STC          BITC
0455          0505 0230          XSK 1          COUNT1          /?
0456          0506 6477          JMP          SHIFT          /NOT YET
0457          0507 0641          BITSET, LDF 1
0460          0510 1012          LDA          GETPNT
0461          0511 1560          BCL 1          /REMOVE OLD
0462          0512 0000          BITC, 000
0463          0513 1620          BSE 1          /ADD NEW
0464          0514 0000          BITS, 0
0465          0515 1052          STA          GETPNT          /REPLACE THE NUMBER
0466          0516 0642          LDF 2
0467          0517 0002          PDP
0470          PMODE
0471          0520 5721          JMP 1          .+1
0472          0521 1266          KSPACE          /NOW DO THIS
0473          EJECT

```

```

0474                                     /COME HERE TO DISPLAY CURSOR
0475                                     /
0476      0522  0000  DISCUR, 0
0477      0523  6141                                     LINC
0500                                     LMODE
0501      0524  2024      ADD      LINPOS  /LINE POSITION 0-3
0502      0525  0017      COM
0503      0526  4010      STC      COUNT1  /HOW MANY TIMES TO BUMP X
0504      0527  2023      ADD      LINE    /LINE NO, 0-7
0505      0530  0017      COM
0506      0531  4011      STC      COUNT2  /HOW MANY TIMES TO BUMP Y
0507      0532  2562      ADD      P140   /INITIAL Y
0510      0533  0211  SUBY,  XSK      COUNT2  /DO WE NEED TO BUMP Y?
0511      0534  0456      SKP
0512      0535  6541      JMP      SAVEY  /Y OK-SAVE & BUMP X
0513      0536  2035      ADD      M40   /ZAP DOWN Y
0514      0537  0231      XSK I    COUNT2  /MORE?
0515      0540  6533      JMP      SUBY   /YES
0516      0541  4062  SAVEY, STC      CURY   /Y CURSOR POSITION
0517      0542  2563      ADD      P302  /INITIAL X OF CURSOR
0520      0543  0210  SUBX,  XSK COUNT1  /NEED TO BUMP X?
0521      0544  0456      SKP
0522      0545  6551      JMP      SAVEX  /X OK
0523      0546  2061      ADD      P12   /BUMP OVER X
0524      0547  0230      XSK I    COUNT1
0525      0550  6543      JMP      SUBX  /MORE FOR X
0526      0551  4001  SAVE X, STC      1     /X GOES HERE FOR DSC
0527      0552  2062      ADD      CURY  /Y IN AC
0530      0553  1760      DSC I
0531      0554  7434      7434   /PATTERN
0532      0555  1760      DSC I
0533      0556  3474      3474   /FOR CURSOR
0534      0557  0002      PDP
0535      PMODE
0536      0560  7200      CLA
0537      0561  5722      JMP I    DISCUR  /GET OUT OF HERE
0540      0562  0140  P140,  140
0541      0563  0302  P302,  302
0542      EJECT
-

```

```

0543                                     PAGE
0544 /DISPLAY LOC AND CONTENTS
0545 /FOR 10 SUCCESSIVE WORDS
0546 /
0547 0600 0000 DIS10, 0
0550 0601 7200 CLA
0551 0602 1070 TAD RBASE /STARTING WORD NUMBER
0552 0603 3344 DCA RB
0553 0604 1030 TAD M10
0554 0605 3020 DCA WRDCNT /10 WRDS IN ALL
0555 0606 1345 TAD P160 /INITIAL Y
0556 0607 3033 BUMPY, DCA YCOR
0557 0610 1346 TAD P204 /INITIAL X
0560 0611 3031 DCA XCOR
0561 0612 1344 TAD RB
0562 0613 1064 TAD BASE
0563 0614 2344 ISZ RB /BUMP FOR NEXT TIME
0564 0615 3217 DCA ,*2
0565 0616 4226 JMS LOCDIS
0566 0617 0000 0 /ADDR. TO DISPLAY
0567 0620 2020 ISZ WRDCNT /DONE ALL WORDS?
0570 0621 7410 SKP
0571 0622 5600 JMP I DIS10 /YES
0572 0623 1035 TAD M40
0573 0624 1033 TAD YCOR /BUMP DOWN Y
0574 0625 5207 JMP BUMPY /DO NEXT LOC & CONTENTS
0575 /
0576 0626 0000 / LOCDIS, 0 /DISPLAY LOCATION & CONTENTS
0577 0627 7040 CMA /-1
0600 0630 1626 TAD I LOCDIS /GET ADDR TO DISPLAY
0601 0631 3012 DCA GETPNT
0602 0632 2226 ISZ LOCDIS
0603 0633 1412 TAD I GETPNT /GET CONTENTS
0604 0634 3042 DCA WORD
0605 0635 7346 CLA CLL CMA RTL /-3
0606 0636 3010 DCA COUNT1
0607 0637 7344 CLA CLL CMA RAL /-2
0610 0640 3011 DCA COUNT2 /2 NOS. TO DO
0611 0641 1012 TAD GETPNT /GET ADDR,
0612 0642 0041 AND P377 /MAKE IT A RELATIVE BLOCK ADDR
0613 0643 7104 CLL RAL
0614 0644 7006 RTL /LEFT-JUSTIFY
0615 0645 7104 DONUM, CLL RAL /ONCE TO LINK
0616 0646 3027 DCA TEMP
0617 0647 7004 RAL
0620 0650 3347 DCA LINK /PRESERVE THE LINK
0621 0651 1347 GETNUM, TAD LINK
0622 0652 7010 RAR
0623 0653 1027 TAD TEMP
0624 0654 7004 RAL
0625 0655 7006 RTL
0626 0656 3027 DCA TEMP
0627 0657 7004 RAL
0630 0660 3347 DCA LINK /PRESERVE LINK
0631 0661 1027 TAD TEMP
0632 0662 0046 AND P7 /GET DIGIT
0633 0663 7004 RAL /MULT BY 2
0634 0664 1043 TAD BNUM /BASE OF NUMBER PATTERNS
0635 0665 0075 AND P7776

```

0636	0666	3015	DCA	PATPNT	
0637	0667	4350	JMS	DISCAR	/OUTPUT TO SCOPE
0640	0670	2010	ISZ	COUNT1	/DONE ALL DIGITS?
0641	0671	5251	JMP	GETNUM	/NO
0642	0672	2011	ISZ	COUNT2	/DONE BOTH LOC & CONTENTS?
0643	0673	5316	JMP	DOCON	/GOT TO DO CONTENTS
0644	0674	7344	CLA CLL	CMA RAL	/-2
0645	0675	3010	DCA	COUNT1	/NOW GIVE ASCII EQUIVALENTS
0646	0676	4336	JMS	BUMPX	
0647	0677	1042	TAD	WORD	
0650	0700	7012	RTR		
0651	0701	7012	RTR		
0652	0702	7012	RTR		
0653	0703	0034	DISALF,	AND	P77
0654	0704	7104	CLL RAL		/MULT BY 2
0655	0705	1315	TAD	BALF	/GET BASE OF ASCII PATTERNS
0656	0706	3015	DCA	PATPNT	
0657	0707	4350	JMS	DISCAR	/DISPLAY ASCII
0660	0710	1042	TAD	WORD	/DO 2ND HALF
0661	0711	2010	ISZ	COUNT1	/OR HAVE E ALREADY DONE IT?
0662	0712	5303	JMP	DISALF	/NOT YET
0663	0713	7200	CLA		
0664	0714	5626	JMP I	LOCDIS	/DONE!!
0665	0715	6336	BALF,	QAVI 6000	
0666	0716	4336	DOCON,	JMS	BUMPX /SET UP TO DISPLAY CONTENTS
0667	0717	6141	LINC		
0670			LMODE		
0671	0720	0041	SET 1		
0672	0721	0031	XCOR		
0673	0722	1000	LDA		
0674	0723	0033	YCOR		
0675	0724	1760	DSC I		
0676	0725	0402	402		/PATTERN
0677	0726	1760	DSC I		
0700	0727	2010	2010		/FOR "/"
0701	0730	0002	PDP		
0702			PMODE		
0703	0731	4336	JMS	BUMPX	
0704	0732	1047	TAD	M4	
0705	0733	3010	DCA	COUNT1	/SET TO 4 DIGITS
0706	0734	1042	TAD	WORD	
0707	0735	5245	JMP	DONUM	
0710	0736	0000	BUMPX,	0	
0711	0737	7200	CLA		
0712	0740	1040	TAD	P20	
0713	0741	1031	TAD	XCOR	
0714	0742	3031	DCA	XCOR	
0715	0743	5736	JMP I	BUMPX	
0716	0744	0000	RB,	0	
0717	0745	0160	P160,	160	
0720	0746	0204	P204,	204	
0721	0747	0000	LINK,	0	
0722			EJECT		

```

0723      0750  0000  DISCAR, 0          /SUBROUTINE TO DISPLAY CHAR
0724      0751  6141          LINC          /POINTED TO BY PATPNT
0725          LMODE
0726      0752  0041          SET 1
0727      0753  0031          XCOR
0730      0754  1000          LDA
0731      0755  0033          YCOR
0732      0756  0643          LDF 3
0733      0757  1755          DSC          PATPNT
0734      0760  1775          DSC I      PATPNT /
0735      0761  0642          LDF 2
0736      0762  1020          LDA I
0737      0763  0012          12
0740      0764  1140          ADM
0741      0765  0031          XCOR          /SPACE X
0742      0766  0002          POP
0743          PMODE
0744      0767  7200          CLA
0745      0770  5750          JMP I      DISCAR
0746          PAGE
0747          /KEY DECODER
0750          /
0751      1000  1225  KEYDEC, TAD      LISLEN /HOW MANY IN LIST
0752      1001  3010          DCA      COUNT1
0753      1002  1223          TAD      BLST /BLST,KEYLST-1
0754      1003  3012          DCA      GETPNT
0755      1004  1412  G,      TAD I    GETPNT /PICK UP LIST
0756      1005  1063          TAD      CHAR
0757      1006  7650          SNA CLA
0760      1007  5213          JMP      GOT
0761      1010  2010          ISZ     COUNT1
0762      1011  5204          JMP      G
0763      1012  5426          JMP I    EXIT /NOT IN LIST
0764      1013  1010  GOT,    TAD      COUNT1
0765      1014  1226          TAD      PLEN /FORM POINTER
0766      1015  1224          TAD      BROUTE
0767      1016  3027          DCA      TEMP
0770      1017  1427          TAD I    TEMP /GET THE ADDR.
0771      1020  3222          DCA      ,+2
0772      1021  5622          JMP I    ,+1
0773      1022  0000          0
0774      1023  1026  BLST,    KEYLST-1
0775      1024  1060  BROUTE,  JMPLST
0776      1025  7747  LISLEN,  KEYLST-JMPLST
0777      1026  0031  PLEN,    JMPLST=KEYLST
1000          /
1001          EJECT

```

		/DISPATCH TABLES FOR KEYS	
1002			/
1003			
1004	1027	7576	KEYLST, -202 /CTRL/B
1005	1030	7476	-302 /B
1006	1031	7575	-203 /CTRL/C
1007	1032	7574	-204 /CTRL/D
1010	1033	7572	-206 /CTRL/F
1011	1034	7472	-306 /F
1012	1035	7566	-212 /LINEFEED
1013	1036	7563	-215 /CARR, RET,
1014	1037	7562	-216 /CTRL/N
1015	1040	7560	-220 /CTRL/P
1016	1041	7556	-222 /CTRL/R
1017	1042	7551	-227 /CTRL/W
1020	1043	7545	-233 /ONE FLAVOR OF ALTMODE
1021	1044	7540	-240 /SPACE
1022	1045	7520	-260 /THE DIGITS,..
1023	1046	7517	-261
1024	1047	7516	-262
1025	1050	7515	-263
1026	1051	7514	-264
1027	1052	7513	-265
1030	1053	7512	-266
1031	1054	7511	-267
1032	1055	7403	-375 /ANOTHER ALTMODE
1033	1056	7402	-376 /AND ANOTHER
1034	1057	7401	-377 /RUBOUT
1035	1060	1200	JMPLST, KCB /WHERE TO GO, CTRL/B
1036	1061	1143	KB /JUST B
1037	1062	1216	KTC /CTRL/C
1040	1063	1221	KTD /CTRL/D
1041	1064	1164	KCF /CTRL/F
1042	1065	1153	KF /F
1043	1066	0200	KLF /LINEFEED
1044	1067	1243	KRET /CAR,RET
1045	1070	1240	KCN /CTRL/N
1046	1071	1256	KCP /CTRL/P
1047	1072	1213	KCR /CTRL/R
1050	1073	1234	KCW /CTRL/W
1051	1074	1132	KALT /ALTMODE
1052	1075	1266	KSPACE /SPACE
1053	1076	0453	KDIGIT /DIGITS 0-7
1054	1077	0453	KDIGIT
1055	1100	0453	KDIGIT
1056	1101	0453	KDIGIT
1057	1102	0453	KDIGIT
1060	1103	0453	KDIGIT
1061	1104	0453	KDIGIT
1062	1105	0453	KDIGIT
1063	1106	1132	KALT /ANOTHER ALTMODE
1064	1107	1132	KALT /...OR 2
1065	1110	1111	KRUB /RUBOUT
1066			EJECT



```

1067          /ALL THE POINTER DIDDLERS
1070          /DEPENDING ON WHAT KEY IS TYPED
1071          /
1072          1111  7200  KRUB,   CLA           /COME HERE ON RUBOUT
1073          1112  1024          TAD           LINPOS  /START OF LINE?
1074          1113  7650          SNA  CLA
1075          1114  5321          JMP           KRUB2  /YES-SET AT END OF PREVIOUS LINE
1076          1115  7040          CMA           /-1
1077          1116  1024          TAD           LINPOS
1100          1117  3024          DCA           LINPOS  /BACK UP ON THIS LINE BY 1
1101          1120  5426          JMP  I      EXIT
1102          1121  7325  KRUB2,  CLA  CLL  STL  RAL  IAC/+3
1103          1122  3024          DCA           LINPOS  /SET CURSOR AT RIGHT
1104          1123  1023          TAD           LINE
1105          1124  7650          SNA  CLA           /FIRST LINE?
1106          1125  5343          JMP           KB           /YES-DO A "B"
1107          1126  7040          CMA           /-1
1110          1127  1023          TAD           LINE
1111          1130  3023          DCA           LINE  /BACK UP ONE LINE
1112          1131  5426          JMP  I      EXIT
1113          /
1114          /
1115          1132  7200  KALT,   CLA           /COME HERE FOR ALTMODE
1116          1133  3024          DCA           LINPOS  /SET TO LEFT
1117          1134  1023          TAD           LINE  /LINE 0?
1120          1135  7650          SNA  CLA
1121          1136  5343          JMP           KB           /YES-DO A "B"
1122          1137  7040          CMA
1123          1140  1023          TAD           LINE  /JUST BACK UP 1
1124          1141  3023          DCA           LINE
1125          1142  5426          JMP  I      EXIT
1126          /
1127          /
1130          1143  7200  KB,     CLA           /COME HERE ON "B"
1131          1144  1070          TAD           RBASE
1132          1145  7650          SNA  CLA           /CAN WE BACK UP?
1133          1146  5426          JMP  I      EXIT  /NO-WE"RE AT LINE 0 ALREADY
1134          1147  7040          CMA
1135          1150  1070          TAD           RBASE
1136          1151  3070          DCA           RBASE
1137          1152  5426          JMP  I      EXIT
1140          /
1141          /
1142          1153  7200  KF,     CLA           /COME HERE ON "F"
1143          1154  1070          TAD           RBASE
1144          1155  1053          TAD           M370
1145          1156  7700          SMA  CLA           /CAN WE GO AHEAD?
1146          1157  5426          JMP  I      EXIT  /NO-WE"RE AT 377 NOW
1147          1160  7001          IAC
1150          1161  1070          TAD           RBASE
1151          1162  3070          DCA           RBASE
1152          1163  5426          JMP  I      EXIT
1153          /
1154          EJECT

```

1155	1164	7200	KCF,	CLA		/COME HERE FOR CTRL/F
1156	1165	1070		TAD	RBASE	
1157	1166	1054		TAD	M360	
1160	1167	7700		SMA	CLA	/CAN WE ADD 10?
1161	1170	5375		JMP	KCF2	/NO
1162	1171	1055		TAD	P10	
1163	1172	1070		TAD	RBASE	
1164	1173	3070		DCA	RBASE	
1165	1174	5426		JMP	I	EXIT
1166	1175	1060	KCF2,	TAD	P370	/SO SET TO 370
1167	1176	3070		DCA	RBASE	
1170	1177	5426		JMP	I	EXIT
1171	1200	7200	KCB,	CLA		/COME HERE FOR CTRL/B
1172	1201	1070		TAD	RBASE	
1173	1202	1030		TAD	M10	
1174	1203	7710		SPA	CLA	/CAN WE SUBTRACT 10?
1175	1204	5211		JMP	KCB2	/NO
1176	1205	1030		TAD	M10	
1177	1206	1070		TAD	RBASE	
1200	1207	3070		DCA	RBASE	
1201	1210	5426		JMP	I	EXIT
1202	1211	3070	KCB2,	DCA	RBASE	/SO SET TO 0
1203	1212	5426		JMP	I	EXIT
1204	1213	7200	KCR,	CLA		/COME HERE FOR CTRL/R
1205	1214	5615		JMP	I	,+1
1206	1215	4074		GB		
1207			/			
1210	1216	6141	KTC,	LINC		/COME HERE FOR CTRL/C
1211				LMODE		
1212	1217	0602		LIF	2	
1213	1220	6047		JMP	DISP1	
1214				PMODE		
1215	1221	7200	KTD,	CLA		/COME HERE FOR CTRL/D
1216	1222	4633		JMS	I	MOVE
1217	1223	6201		CDF	0	/MOVE I/O TO FIELD 1
1220	1224	7000		7000		
1221	1225	6211		CDF	10	
1222	1226	7000		7000		
1223	1227	1000		1000		
1224	1230	6213		CIF	CDF	10
1225	1231	5632		JMP	I	,+1
1226	1232	7777		7777		/BOOT DIAL
1227	1233	7200	MOVE,	7200		
1230			/			
1231	1234	7200	KCW,	CLA		/COME HERE FOR CTRL/W
1232	1235	4473		JMS	I	WRITE
1233	1236	4147		PARAM		
1234	1237	5216		JMP	KTC	
1235	1240	2642	KCN,	ISZ	I	IBLOCK
1236	1241	5213		JMP	KCR	/COME HERE FOR CTRL/N
1237	1242	4151	IBLOCK,	BLOCK		
1240				EJECT		

1241	1243	7200	KRET,	CLA		/COME HERE FOR CARR. RET,
1242	1244	3024		DCA	LINPOS	/SET CURSOR TO LEFT
1243	1245	1023		TAD	LINE	
1244	1246	1056		TAD	M7	
1245	1247	7700		SMA	CLA	/AT LINE 7?
1246	1250	5655		JMP I	IKF	/YES
1247	1251	7001		IAC		
1250	1252	1023		TAD	LINE	
1251	1253	3023		DCA	LINE	
1252	1254	5426		JMP I	EXIT	
1253	1255	1153	IKF,	KF		
1254			/			
1255	1256	7200	KCP,	CLA		/COME PERE FOR CTRL/P
1256	1257	1642		TAD I	IBLOCK	
1257	1260	7650		SNA	CLA	/0?
1260	1261	5426		JMP I	EXIT	/YES-DONT BACK UP
1261	1262	7040		CMA		
1262	1263	1642		TAD I	IBLOCK	
1263	1264	3642		DCA I	IBLOCK	
1264	1265	5213		JMP	KCR	
1265			/			
1266	1266	7346	KSPACE,	CLA	CLL CMA RTL	/-3
1267	1267	1024		TAD	LINPOS	
1270	1270	7700		SMA	CLA	/END OF LINE?
1271	1271	5243		JMP	KRET	/YES
1272	1272	7001		IAC		
1273	1273	1024		TAD	LINPOS	
1274	1274	3024		DCA	LINPOS	/MOVE OVER 1
1275	1275	5426		JMP I	EXIT	
1276			/			
1277			/			
1300				EJECT		

.

1301				LMODE		
1302				SEGMNT 2		
1303				*20		
1304	0020	0500	XXX,	IOB		
1305	0021	6046		6046		/JIGGLE TTY
1306	0022	1020		LDA I		
1307	0023	6047		JMP	DISP1	
1310	0024	4022		STC	, -2	/MAKE THIS ONCE-ONLY
1311	0025	0002		PDP		
1312				PMODE		
1313	4026	6213		CIF CDF 10		
1314	4027	3473		DCA I	WRITE	/*7775
1315	4030	1074		TAD	P5772	
1316	4031	3475		DCA I	P7776	
1317	4032	1076		TAD	P5773	
1320	4033	3477		DCA I	P7777	
1321	4034	6201		CDF 0		
1322	4035	4472		JMS I	READ	
1323	4036	0101		SYSBLK		
1324	4037	6212		CIF 10		
1325	4040	4500		JMS I	PMOVE	
1326	4041	6211		CDF 10		
1327	4042	6000		6000		
1330	4043	6201		CDF 0		
1331	4044	7000		7000		
1332	4045	1000		1000		
1333	4046	6141		LINC		
1334				LMODE		
1335	0047	0643	DISP1,	LDF 3		
1336	0050	1020		LDA I		
1337	0051	6555		JMP	GETKBD	/UNZAP KEYBOARD CHECK IN QANDA
1340	0052	1040		STA		
1341	0053	2156		QAJI2000		
1342	0054	0603		LIF 3		
1343	0055	0642		LDF 2		
1344	0056	6720		JMP	Q1	/QANDA AT 6020
1345	0057	0070	GETANS,	SET I	COUNT1	
1346	0060	7773		-4		/HOW MANY DIGITS
1347	0061	0072		SET I	GETPNT	/WHERE ANSWER IS
1350	0062	0372		ANSR1		
1351	0063	6153		JMP	GET	/GET THE BLOCK NO.
1352	0064	4151		STC	BLOCK	
1353			/			
1354	0065	0070		SET I	COUNT1	/NOW UNIT
1355	0066	7775		-2		
1356	0067	0072		SET I	GETPNT	
1357	0070	4374		ANSR1+2!	4000	
1360	0071	6153		JMP	GET	/GET THE UNIT
1361	0072	4147		STC	UNIT	
1362	0073	0002		PDP		
1363				PMODE		
1364	4074	6141	GB,	LINC		
1365				LMODE		
1366	0075	1000		LDA		
1367	0076	4147		UNIT		
1370			/			
1371	0077	0070		SET I	COUNT1	/NOW PUT UNIT IN TEXT FRAME
1372	0100	7775		-2		/2 DIGITS
1373	0101	0073		SET I	PUTPNT	/WHERE TO STORE

1374	0102	2331		FRAME2+2!2000	
1375	0103	6205		JMP	UNPACK
1376			/		
1377	0104	0070		SET I	COUNT1 /PUT BLOCK IN FRAME
1400	0105	7773		-4	/4 DIGITS
1401	0106	0073		SET I	PUTPNT
1402	0107	6335		FRAME2+6!6000	
1403	0110	1000		LDA	
1404	0111	4151		BLOCK	
1405	0112	6205		JMP	UNPACK
1406	0113	0002		PDP	
1407				PMODE	
1410	4114	4472		JMS I	READ /NOW GET THE BLOCK
1411	4115	4147		PARAM	
1412	4116	6141		LINC	
1413				LMODE	
1414	0117	1020		LDA I	
1415	0120	6024		JMP	QAB
1416	0121	0643		LDF 3	
1417	0122	1040		STA	
1420	0123	2156		QAJ!2000	/ZAP KEYBOARD CHECK IN QANDA
1421	0124	0642		LDF 2	
1422	0125	0002		PDP	
1423				PMODE	
1424	4126	7200		CLA	
1425	4127	3023		DCA	LINE
1426	4130	3024		DCA	LINPOS /SET CURSOR TO UPPER LEFT
1427	4131	3070		DCA	RBASE /AND WINDOW TO BEGINNING
1430	4132	4341	DLOOP,	JMS	DISPLAY /NOW SHOW THE SCOPE
1431	4133	6031		KSF	/KEY TYPED?
1432	4134	5332		JMP	,-2 /NO
1433	4135	6036		KRB	/GRAB IT!
1434	4136	3063		DCA	CHAR
1435	4137	5740		JMP I	,+1 /WHAT DO WE DO NOW?
1436	4140	1000		KEYDEC	/GO HERE TO FIND OUT
1437	4141	0000	DISPLAY,0		
1440	4142	7200		CLA	
1441	4143	4451		JMS I	IDIS10 /FLASH LOCATIONS
1442	4144	4452		JMS I	IDISCUR /FLASH CURSOR
1443	4145	4432		JMS I	IQ2 /FLASH TEXT
1444	4146	5741		JMP I	DISPLAY
1445			/		
1446				PARAM=,	
1447	4147	0000	UNIT,	0	/PARAMETER LIST FOR MS I/O
1450	4150	0004		4	/*2000
1451	4151	0000	BLOCK,	0	
1452	4152	0001		1	
1453				EJECT	

```

1454                                     LMODE
1455                                     /
1456                                     /DECODES A QANDA FRAME
1457      0153      1000      GET,      LDA      /SAVE RETURN
1460      0154      0000                                     0
1461      0155      4204                                     STC      GETOUT
1462      0156      4203                                     STC      QHOLD
1463      0157      1332      NEXT,      LDH I      GETPNT      /DECODE QANDA FRAME
1464      0160      1460                                     SAE I      /GETPNT IS POINTER TO ANSWER FRAME
1465      0161      0000                                     0
1466      0162      0456                                     SKP
1467      0163      6200                                     JMP      QHOLD-3
1470      0164      1560                                     BCL I
1471      0165      7707                                     7707
1472      0166      1460                                     SAE I      /IS IT A 60-67?
1473      0167      0060                                     60
1474      0170      6047                                     JMP      DISP1      /NO
1475      0171      1312                                     LDH      GETPNT
1476      0172      1560                                     BCL I
1477      0173      7770                                     7770
1500      0174      0303                                     ROR 3
1501      0175      2203                                     ADD      QHOLD
1502      0176      0243                                     ROL 3
1503      0177      4203                                     STC      QHOLD
1504      0200      0230                                     XSK I      COUNT1
1505      0201      6157                                     JMP      NEXT
1506      0202      1020                                     LDA I
1507      0203      0000      QHOLD, 0
1510      0204      0000      GETOUT, 0
1511                                     /
1512                                     /
1513                                     EJECT

```

```

1514 /MAKE 6-BIT ASCII FROM OCTAL NO,
1515 0205 4025 UNPACK, STC HOLD /SAVE AC
1516 0206 2000 ADD 0 /GET RETURN
1517 0207 4244 STC UNOUT
1520 0210 0051 SET COUNT2
1521 0211 0010 COUNT1 / - MAX NO, OF DIGITS
1522 0212 1020 LDA I
1523 0213 0004 4 /MAX OF 4
1524 0214 2010 ADD COUNT1 /HOW MANY WE HAVE
1525 0215 0017 COM
1526 0216 1040 STA
1527 0217 0016 XTEMP
1530 0220 0470 AZE I
1531 0221 6230 JMP GETDIG /=0?
1532 0222 1000 LDA /YES-NO NEED TO SHIFT
1533 0223 0025 HOLD
1534 0224 0243 ROL 3 /LEFT-JUSTIFY
1535 0225 0236 XSK I XTEMP
1536 0226 6224 JMP ,-2
1537 0227 4025 STC HOLD /GOT IT
1540 0230 1000 GETDIG, LDA
1541 0231 0025 HOLD
1542 0232 0243 ROL 3
1543 0233 1040 STA
1544 0234 0025 HOLD
1545 0235 1560 BCL I
1546 0236 7770
1547 0237 1620 BSE I
1550 0240 0060 60
1551 0241 1373 STH I PUTPNT
1552 0242 0230 XSK I COUNT1
1553 0243 6230 JMP GETDIG
1554 0244 0000 UNOUT, 0
1555 /
1556 EJECT

```

1557			/QANDA TEXT FRAMES
1560			FRAME1, TEXT "F
1561	0245	0643	
1561			F
1562	0246	0643	
1562	0247	0640	
1562	0250	4040	
1562	0251	4040	
1562	0252	4040	
1562	0253	4024	
1562			F TED
1563	0254	0504	
1563	0255	4340	
1563	0256	4040	
1563	0257	4040	
1563	0260	4040	
1563	0261	4040	
1563	0262	4040	
1563	0263	4040	
1563	0264	5024	
1563	0265	0120	
1563	0266	0540	
1563	0267	0504	
1563	0270	1124	
1563	0271	1722	
1563			(TAPE EDITOR)
1564	0272	5143	
1564			F
1565	0273	0643	
1565	0274	4040	
1565	0275	4040	
1565	0276	4040	
1565	0277	4040	
1565	0300	4040	
1565	0301	4040	
1565	0302	2205	
1565	0303	0104	
1565	0304	4002	
1565	0305	1417	
1565	0306	0313	
1565	0307	4074	
1565			READ BLOCK <4
1566	0310	6443	
1566			H
1567	0311	1043	
1567	0312	4040	
1567	0313	4040	
1567	0314	4040	
1567	0315	4040	
1567	0316	4040	
1567	0317	4040	
1567	0320	0622	
1567	0321	1715	
1567	0322	4025	
1567	0323	1611	
1567	0324	2440	
1567	0325	7462	
1567	0326	3400	
1567			FROM UNIT <2\

.



```

1570
1571      0327  2516 /
1571      0330  1124
1571      0331  4030
1571
1572      0332  3043
1572      0333  0214
1572      0334  1703
1572      0335  1340
1572      0336  3030

```

FRAME2, TEXT "UNIT XX

```

1572
1573      0337  3030
1573      0340  4340
1573      0341  4040
1573      0342  4040
1573      0343  4040
1573      0344  4040
1573      0345  4040
1573      0346  4040
1573      0347  1417
1573      0350  0340
1573      0351  4040
1573      0352  0317
1573      0353  1624
1573      0354  0516
1573      0355  2423

```

BLOCK XXXX

LOC CONTENTS\

```

1574      0356  3443
1574
1575      0357  0643
1575
1576      0360  0643
1576
1577      0361  0643
1577
1600      0362  0643
1600
1601      0363  0643
1601
1602      0364  0643
1602
1603      0365  0643
1603      0366  4040
1603      0367  7530
1603      0370  3030
1603      0371  3400

```

F  
F  
F  
F  
F  
F  
F  
F

=XXX\"

```

1604      0372  0000
1605      0373  0000
1606      0374  0000
1607      0375  0000
1610      0376  0000
1611      0377  0000

```

ANSR1, 0  
0  
0  
0  
0  
0

/CAUTION! I THINK THIS ANSWER BUFFER  
/GOES OVER THE PAGE BOUNDARY WHEN IT'S F

EJECT

-

```

1614                               SEGMENT 3
1615                               *20
1616                               /QANDA SUBROUTINE FOR THE
1617                               /PDP-12
1620                               /
1621                               /TO HERE TO INITIALIZE THE ROUTINE
1622                               /
1623 0020 1020 QAINIT, LDA I           /SAVE JMP RETURN
1624 0021 0002                2
1625 0022 2000                ADD 0
1626 0023 1060                STA I
1627 0024 0000 QAB,          0           /JMP    +3
1630 0025 2220                ADD QAL+3
1631 0026 4001                STC 1       /PTR TO FIRST PARAM
1632 0027 1001                LDA 1       /GET FIRST PARAM
1633 0030 2304                ADD QAQ+1   /PTR TO HALFWORD-1
1634 0031 4077                STC QAG-3
1635 0032 1021                LDA I 1
1636 0033 4072                STC QARFSH-1
1637 0034 4006                STC 6       /XR6 USED AS A SWITCH, =0 IF NO ANSWER FIELD, =1777
1640 0035 0043 QACA,        SET 3     /XR3 TO PTR TO ANSWERS
1641 0036 0072                QARFSH-1   IF YES
1642 0037 0044                SET 4       /XR4 TO PTR TO QUESTIONS
1643 0040 0077                QAG-3
1644                               /TO HERE IF FIRST TIME THROUGH OR FOLLOWING
1645 0041 0041                SET 1
1646 0042 0004                4
1647 0043 6310                JMP QAT
1650 0044 0016                NOP        /F
1651 0045 1324                LDH I 4     /H, BUMP PTR IF H OR F
1652 0046 6251 QAD,        JMP QAO
1653 0047 6055                JMP ,+6   /74
1654 0050 6070                JMP QAE   /34
1655 0051 1460                SAE I     /CR?
1656 0052 0043                43
1657 0053 6046                JMP QAD   /NO
1660 0054 6041                JMP QACA+4 /EXAMINE NEXT CHAR
1661                               /INITIALIZE ANSWER BUFR
1662 0055 1343                STH 3       /74 TO ANSWERS
1663 0056 1324                LDH I 4     /NEXT HALFWORD
1664 0057 1120                ADA I
1665 0060 7717                -60
1666 0061 0017                COM
1667 0062 4006                STC 6
1670 0063 1363                STH I 3    /0 IN AC
1671 0064 0226                XSK I 6
1672 0065 6063                JMP , -2
1673 0066 1323                LDH I 3    /BUMP PTR TO ANSWERS
1674 0067 6046                JMP QAD
1675                               /ANSWER BUFR IS INITIATED
1676 0070 1343 QAE,        STH 3
1677 0071 0064                SET I 4    /XR4 TO PTR TO LAST TYPED CHAR IN ANSWER BUFR
1700 0072 0000                0
1701                               /----RE-ENTER HERE TO REFRESH----
1702 0073 1020 QARFSH, LDA I           /INITIAL Y POSITION
1703 0074 0377                377
1704 0075 4133                STC QAH-1
1705 0076 0063                SET I 3    /XR3 TO PTR TO HALFWORD QUESTIONS-1
1706 0077 0000                0

```

1707	0100	0045		SET 5	/XR5 TO PTR TO LAST DISPLAYED CHAR IN ANSWER BUFR
710	0101	0072		QARFSH-1	
1711	0102	0041	QAG,	SET 1	
1712	0103	0003		3	
1713	0104	6310		JMP QAT	
1714	0105	6114		JMP ,+7	/F
1715	0106	1323		LDH I 3	/H, BUMP PTR
1716	0107	1020		LDA I	/NEITHER, ASSUME HALF SIZE
1717	0110	1560		BCL I	
1720	0111	4123		STC QAM+2	/SET INSTR TO CLEAR FF FOR HALF SIZE
1721	0112	2542		ADD QAW	/NOP IN AC
1722	0113	6121		JMP QAM	
1723	0114	1323		LDH I 3	/BUMP PTR
1724	0115	1020		LDA I	
1725	0116	1620		BSE I	
1726	0117	4123		STC QAM+2	/SET INSTR TO SET FF FOR FULL SIZE
1727	0120	2543		ADD QAW+1	/ADD 9U IN AC
1730	0121	4265	QAM,	STC QAP+3	
1731	0122	0024		MSC I 4	/EAD CONTROL REGISTER
1732	0123	1620		BSE I	/THIS INSTR CHANGES, EITHER BSE & OR BCL &
1733	0124	0200		200	
1734	0125	0004		MSC 4	/AC TO CONTROL REGISTER
1735	0126	0061		SET I 1	/XR1 TO INITIAL X POSITION
1736	0127	0000		0	
1737	0130	1020		LDA I	/Y COORDINATE MULTIPLE
1740	0131	7737		-40	
1741	0132	1160		ADM I	/Y COORDINATE
1742	0133	0000		0	
1743	0134	1323	QAH,	LDH I 3	
1744	0135	6252		JMP QAO+1	
1745	0136	6321		JMP QAZ	/74 BUMP PTR TO NEXT CHAR, PUT 40 IN AC
1746	0137	6156		JMP QAJ	/34
1747	0140	1420		SHD I	/NEITHER
1750	0141	4300		4300	
1751	0142	6102		JMP QAG	/CR, MOVE X AND Y COORDINATE
1752	0143	6262		JMP QAP	/ISPLAY CHAR
1753	0144	6134		JMP QAH	/PICK UP NEXT CHAR
1754	0145	6262		JMP QAP	/TO HERE IF DISPLAYING ANSWER BUFR
1755	0146	1520		SRO I	/SWITCH TO DISPLAY CURSOR, EITHER 0000 OR 7777
1756	0147	0000		0	/IFXR4=XR5, THEN SWITCH=7777
1757	0150	6536		JMP QAF	
1760					/QUESTION MODE
1761	0151	1325	QAI,	LDH I 5	
1762	0152	6252		JMP QAO+1	
1763	0153	6134		JMP QAH	/74
1764	0154	6134		JMP QAH	/34
1765	0155	6145		JMP QAI-4	/NEITHER, DISPLAY IT
1766	0156	6555	QAJ,	JMP GETKBD	/TO HERE IF DISPLAYED BUFFER
1767	0157	0470		AZE I	
1770	0160	6024		JMP QAB	/NOTHING TYPED, EXIT
1771	0161	0062		SET I 2	
1772	0162	0551		QAY	
1773	0163	1402		SHD 2	/LF?
1774	0164	6331		JMP QAK+4	/YES, EXIT
1775	0165	1422		SHD I 2	/CR?
1776	0166	6243		JMP QAN	
1777	0167	0206		XSK 6	/IS THERE AN ANSWER FIELD?
2000	0170	6073		JMP QARFSH	
2001	0171	1422		SHD I 2	/<?

2002	0172	6215		JMP QAL	
2003	0173	1422		SHD I 2	/>?
2004	0174	6325		JMP QAK	
2005	0175	1422		SHD I 2	/ALT?
2006	0176	6035		JMP QACA	/RE INITIALIZE
2007	0177	1422		SHD I 2	/BACK SLASH?
2010	0200	6073		JMP QARFSH	/IGNORE
2011	0201	1422		SHD I 2	/RUBOUT?
2012	0202	6215		JMP QAL	/IGNORE
2013	0203	1422		SHD I 2	/TAB?
2014	0204	6073		JMP QARFSH	/IGNORE
2015	0205	4212		STC ,+5	/ACCEPTABLE CHAR
2016	0206	6251		JMP QAO	/TEST NEXT CHAR
2017	0207	6303		JMP QAO	/74 BACK PTR UP BY 1
2020	0210	6303		JMP QAO	/34 ?
2021	0211	1020		LDA I	/OK, STORE IT
2022	0212	0000		0	
2023	0213	1344		STH 4	
2024	0214	6073		JMP QARFSH	/REDISPLAY
2025	0215	1304	QAL,	LDH 4	/TO HERE IF RUBBOUT OR <
2026	0216	6252		JMP QAO+1	
2027	0217	6073		JMP QARFSH	/74 IGNORE
2030	0220	1775		-6002	
2031	0221	1302		LDH 2	/TEST THE CHAR
2032	0222	1460		SAE I	/RUBOUT?
2033	0223	0037		37	
2034	0224	6303		JMP QAO	/NO, BACK PTR UP BY 1
2035	0225	0045		SET 5	
2036	0226	0004		4	
2037	0227	0043		SET 3	
2040	0230	0004		4	
2041	0231	6233		JMP ,+2	
2042	0232	1325		LDH I 5	/BUMP PTR
2043	0233	1323		LDH I 3	/GET NEXT CHAR
2044	0234	6252		JMP QAO+1	
2045	0235	0016		NOP	/IF 74 OR 34, REPLACE CURRENT CHAR WITH 0
2046	0236	0011		CLR	
2047	0237	1345		STH 5	
2050	0240	0450		AZE	/WAS IT 74 OR 34?
2051	0241	6232		JMP , -7	/NO, CONTINUE
2052	0242	6303		JMP QAO	/BACK PTR UP BY 1
2053					/TO HERE IF CR
2054	0243	0206	QAN,	XSK 6	
2055	0244	6331		JMP QAK+4	/EXIT ROUTINE IF NO ANSWER FIELD
2056	0245	6251		JMP QAO	
2057	0246	6073		JMP QARFSH	/74 MOVE PTR TO NEXT QUESTION FIELD
2060	0247	6071		JMP QAE+1	/34 END OF BUFR, MOVE PTR TO FIRST QUESTION FIELD
2061	0250	6245		JMP QAN+2	
2062					
2063	0251	1324	QAO,	LDH I 4	/S\R
2064	0252	1420		SHD I	/
2065	0253	7400		7400	+1 74 BEGIN FIELD
2066	0254	6000		JMP 0	+2 34 END BUFR
2067	0255	1460		SAE I	+3 NEITHER 74 NOR 34
2070	0256	0034		34	
2071	0257	0220		XSK I 0	
2072	0260	0220		XSK I 0	
2073	0261	6000		JMP 0	
2074					/S\R TO DISP LING CHAR IN AC

2075	0262	0241	QAP,	ROL 1	/MULT BY 2 FOR INDEX TO ADDRESS OF TABLE
2076	0263	2550		ADD QAX+4	
2077	0264	4002		STC 2	/ADDRESS OF CHAR TO DISP IN XR2
2100	0265	2541		ADD QAU	/THIS INSTR CHANGES, EITHER OP OR ADD 9U
2101	0266	2541		ADD QAU	
2102	0267	2001		ADD 1	/ADD 4 TO XR1 TO SPACE CHAR
2103	0270	4001		STC 1	
2104	0271	2005		ADD 5	/GET ADDRESS OF ANSWER BUFR
2105	0272	0017		COM	
2106	0273	2004		ADD 4	
2107	0274	0450		AZE	
2110	0275	0011		CLR	
2111	0276	4147		STC QAI-2	/SWITCH=0 OR 7777
2112	0277	2133		ADD QAH-1	/Y COORDINATE IN AC
2113	0300	1742		DSC 2	
2114	0301	1762		DSC I 2	/DISPLAY CHAR
2115	0302	6000		JMP 0	
2116	0303	1020	QAQ,	LDA I	/BACK UP PTR BY 1
2117	0304	3777		-4000	
2120	0305	1140		ADM	
2121	0306	0004		4	
2122	0307	6073		JMP QARFSH	/REDISPLAY
2123					/
2124	0310	1321	QAT,	LDH I 1	/S\R
2125	0311	1420		SHD I	/ +1 F
2126	0312	0600		0600	/ +2 H
2127	0313	6000		JMP 0	/ +3 NEITHER
2130	0314	1460		SAE I	
2131	0315	0010		10	
2132	0316	0220		XSK I 0	
2133	0317	0220		XSK I 0	
2134	0320	6000		JMP 0	
2135					/
2136	0321	1323	QAZ,	LDH I 3	
2137	0322	1020		LDA I	
2140	0323	0040		40	
2141	0324	6145		JMP QAI-4	
2142					/TO HERE IF >
2143	0325	1324	QAK,	LDH I 4	
2144	0326	0470		AZE I	/IS CURRENT CHAR BLANK?
2145	0327	6303		JMP QAQ	/YES, IGNORE
2146	0330	6544		JMP QAX	/MOVE DOT FORWARD
2147					/TO HERE TO EXIT WITH SKIP
2150	0331	1020		LDA I	
2151	0332	0001		1	
2152	0333	1140		ADM	
2153	0334	0024		QAB	
2154	0335	6024		JMP QAB	
2155					/CHARACTER PATTERNS
2156	0336	0101	QAV,	0101	/KBD 0, ILLEGAL, USED AS MARKER
2157	0337	0101		0101	
2160	0340	4477		4477	/11A
2161	0341	7744		7744	
2162	0342	5177		5177	/21B
2163	0343	2651		2651	
2164	0344	4136		4136	/31C
2165	0345	2241		2241	
2166	0346	4177		4177	/41D
2167	0347	3641		3641	

2170	0350	4577	4577	/5:E
2171	0351	4145	4145	
2172	0352	4477	4477	/6:F
2173	0353	4044	4044	
2174	0354	4136	4136	/7:G
2175	0355	2645	2645	
2176	0356	1077	1077	/10:H
2177	0357	7710	7710	
2200	0360	7741	7741	/11:I
2201	0361	0041	0041	
2202	0362	4142	4142	/12:J
2203	0363	4076	4076	
2204	0364	1077	1077	/13:K
2205	0365	4324	4324	
2206	0366	0177	0177	/14:L
2207	0367	0301	0301	
2210	0370	3077	3077	/15:M
2211	0371	7730	7730	
2212	0372	3077	3077	/16:N
2213	0373	7706	7706	
2214	0374	4177	4177	/17:O
2215	0375	7741	7741	
2216	0376	4477	4477	/20:P
2217	0377	3044	3044	
2220	0400	4276	4276	/21:Q
2221	0401	0376	0376	
2222	0402	4477	4477	/22:R
2223	0403	3146	3146	
2224	0404	5121	5121	/23:S
2225	0405	4651	4651	
2226	0406	4040	4040	/24:T
2227	0407	4077	4077	
2230	0410	0177	0177	/25:U
2231	0411	7701	7701	
2232	0412	0176	0176	/26:V
2233	0413	7402	7402	
2234	0414	0677	0677	/27:W
2235	0415	7701	7701	
2236	0416	1463	1463	/30:X
2237	0417	6314	6314	
2240	0420	0770	0770	/31:Y
2241	0421	7007	7007	
2242	0422	4543	4543	/32:Z
2243	0423	6151	6151	
2244	0424	4177	4177	/33:[
2245	0425	0000	0000	
2246				/34:BACKSLASH IGNORED ON INPUT
2247	0426	1020	1020	
2250	0427	0204	204	
2251	0430	0000	0000	/35:]
2252	0431	7741	7741	
2253				/CODES 36:ALT, 37:RUBOUT NOT DISPLAYED
2254	0432	2000	2000	/36:<UPARROW>
2255	0433	2077	2077	
2256	0434	1604	1604	/<BACKARROW>
2257	0435	0404	0404	
2260	0436	0000	0000	/40:SPACE
2261	0437	0000	0000	
2262	0440	7500	7500	/41:!

2263	0441	0000	0000	
2264	0442	7000	7000	/42:"
2265	0443	0070	0070	
2266				
2267	0444	4200	4200	/CODES 43:, 44:, 45:LF NOT DISPLAYED
2270	0445	0237	0237	/43:<CARRIAGE RETURN>
2271	0446	5721	5721	
2272	0447	4671	4671	/44:\$
2273	0450	0423	0423	/45:%
2274	0451	6210	6210	
2275	0452	5166	5166	/46: &
2276	0453	0526	0526	
2277				
2300	0454	0404	0404	/CODE 47:TAB NOT DISPLAYED
2301	0455	3704	3704	/47:<TAB>
2302	0456	3600	3600	
2303	0457	0041	0041	/50:(
2304	0460	4100	4100	
2305	0461	0036	0036	/51:)
2306	0462	2050	2050	/52:*
2307	0463	0050	0050	
2310	0464	0404	0404	/53:+
2311	0465	0437	0437	
2312	0466	0500	0500	/54:,
2313	0467	0006	0006	
2314	0470	0404	0404	/55:-
2315	0471	0404	0404	
2316	0472	0001	0001	/56:,
2317	0473	0000	0000	
2320	0474	0601	0601	/57:\
2321	0475	4030	4030	
2322	0476	4536	4536	/60:0
2323	0477	3651	3651	
2324	0500	2101	2101	/6111
2325	0501	0177	0177	
2326	0502	4523	4523	/6212
2327	0503	2151	2151	
2330	0504	4122	4122	/63:3
2331	0505	2651	2651	
2332	0506	2414	2414	/64:4
2333	0507	0477	0477	
2334	0510	5172	5172	/65:5
2335	0511	0651	0651	
2336	0512	1506	1506	/66:6
2337	0513	4225	4225	
2340	0514	4443	4443	/67:7
2341	0515	6050	6050	
2342	0516	5126	5126	/70:8
2343	0517	2651	2651	
2344	0520	5122	5122	/71:9
2345	0521	3651	3651	
2346	0522	2200	2200	/72:;
2347	0523	0000	0000	
2350	0524	4601	4601	/73:;
2351	0525	0000	0000	
2352				/CODE 74:<NOT DISPLAYED
2353	0526	1204	1204	
2354	0527	0021	21	
2355	0530	1212	1212	/75:=

```

2356      0531  1212      1212
2357
2360      0532  2100      2100      /CODE 76: > NOT DISPLAYED
2361      0533  0412      412
2362      0534  4020      4020      /77: ?
2363      0535  2055      2055
2364      0536  1760      QAF,   DSC I
2365      0537  6000      6000
2366      0540  6151      JMP QA I
2367      0541  0002      QAU,   2      /CONSTANT
2370      0542  0016      QAW,   NOP
2371      0543  2541      ADD QAU
2372      0544  6252      QAX,   JMP QA0+1
2373      0545  6303      JMP QAQ
2374      0546  6303      JMP QAQ
2375      0547  6073      JMP QARFSH
2376      0550  0336      QAV
2377      0551  4543      QAY,   4543      /LF, CR
2400      0552  7476      7476      /<, >
2401      0553  3634      3634      /ALT, BACKSLASH
2402      0554  3747      3747      /RUBOUT, TAB
2403
2404      /
2405      /KEYBOARD INPUT ROUTINE
2406      /
2407      QAKRB=6036      /PDP-8 IOT KBD
2410      /
2411      0555  1000      GETKBD, LDA
2412      0556  0000      0
2413      0557  4703      STC QAEXIT+6      /SAVE RETURN
2414      0560  2001      ADD 1      /SAVE XRS 1 AND 2
2415      0561  4700      STC QAEXIT+3
2416      0562  2002      ADD 2
2417      0563  4702      STC QAEXIT+5
2420      0564  4676      STC QAEXIT+1
2421      0565  0415      KST      /WAS SOMETHING TYPED?
2422      0566  6000      JMP 0      /NO: EXIT
2423      0567  0500      IOB
2424      0570  6036      QAKRB      /GET TTY CHAR, CLEAR FLAG
2425      0571  1460      SAE I
2426      0572  0204      204      /CTRL/D?
2427      0573  0456      SKP
2430      0574  6737      JMP      DIAL      /YES
2431      0575  1060      STA I      /SAVE IT
2432      0576  0000      QATY,   0
2433      0577  1120      ADA I
2434      0600  7540      -237
2435      0601  0451      APO      /BETWEEN 200 AND 237?
2436      0602  6644      JMP QACNTR      /CONTROL CHAR, CHECK FOR CR,LF,TAB
2437      0603  0061      SET I 1      /NO
2440      0604  0706      QACHAR-1
2441      0605  0062      SET I 2
2442      0606  7770      -7
2443      0607  1000      LDA
2444      0610  0576      QATY
2445      0611  1461      SAE I 1
2446      0612  6614      JMP ,+2
2447      0613  6675      JMP QAEXIT      /ILLEGAL CHAR, DONT ECHO
2450      0614  0222      XSK I 2 /CHECKED THEM ALL?

```



2451	0615	6611	JMP , -4	
2452	0616	1120	ADA I	
2453	0617	7440	-337	
2454	0620	0451	APQ	/BETWEEN 240 AND 337?
2455	0621	6635	JMP QALEGL	/YES, LEGAL CHAR
2456			/	
2457	0622	1461	SAE I 1	/NO, CHECK FURTHER,
2460	0623	6632	JMP , +7	
2461	0624	1020	LDA I	/RUBOUT
2462	0625	0334	334	
2463	0626	6704	JMP QATPE	/ECHO BACKSLASH
2464	0627	1020	LDA I	
2465	0630	0037	37	
2466	0631	6677	JMP QAEXIT+2	/LEGAL EXIT
2467	0632	1461	SAE I 1	
2470	0633	6675	JMP QAEXIT	/ILLEGAL
2471				/ALT
2472	0634	6677	JMP QAEXIT+2	/EXIT, DONT ECHO
2473	0635	1000	GALEGL, LDA	
2474	0636	0576	QATY	
2475	0637	6704	JMP QATPE	/ECHO CHAR
2476	0640	2576	ADD QATY	
2477	0641	1560	BCL I	/STRIP IT TO 6-BIT
2500	0642	7700	7700	
2501	0643	6677	JMP QAEXIT+2	
2502			/TO HERE IF CONTROL CHAR	
2503	0644	1460	QACNTR, SAE I	
2504	0645	7755	7755	
2505	0646	6661	JMP QACKLF	
2506	0647	1020	LDA I	/CR
2507	0650	0043	43	
2510	0651	4676	STC QAEXIT+1	
2511	0652	1020	LDA I	
2512	0653	0215	215	
2513	0654	6704	JMP QATPE	
2514	0655	1020	LDA I	
2515	0656	0212	212	
2516	0657	6704	JMP QATPE	
2517	0660	6675	JMP QAEXIT	
2520			/	
2521	0661	1460	QACKLF, SAE I	
2522	0662	7752	7752	
2523	0663	6667	JMP , +4	
2524	0664	1020	LDA I	/LF
2525	0665	0045	45	
2526	0666	6651	JMP QACNTR+5	
2527	0667	1460	SAE I	
2530	0670	7751	7751	
2531	0671	6675	JMP QAEXIT	/ILLEGAL
2532	0672	1020	LDA I	
2533	0673	0047	47	
2534	0674	6677	JMP QAEXIT+2	/EXIT, DONT ECHO
2535			/	
2536	0675	1020	QAEXIT, LDA I	/GET 6-BIT ASCII
2537	0676	0000	0	
2540	0677	0061	SET I 1	/RESTORE XRS
2541	0700	0000	0	
2542	0701	0062	SET I 2	
2543	0702	0000	0	

```

2544      0703  6000      JMP                /EXIR S\R GETKBD
2545      /S\R TO PRINT C(AC)
2546      0704  0016  QATPE,  NOP/PDP          /DQNT ECHO
2547      /PMODE
2550      /TSF
2551      /JMP          ,-1
2552      /TLS
2553      0705  0011      CLR
2554      /LINC
2555      /LMODE
2556      0706  6000      JMP                /EXIT
2557      /
2560      0707  0243  QACHAR, 243      /HASH
2561      0710  0244      244      /DOLLAR SIGN
2562      0711  0245      245      /PER CENT
2563      0712  0247      247      /APOSTROPHE
2564      0713  0300      300      /AT SIGN
2565      0714  0336      336      /UP ARROW
2566      0715  0337      337      /BACK ARROW
2567      0716  0040      40       /RUBOUT
2570      0717  0036      36       /ALT
2571      /END OF S\R GETKBD
2572      EJECT

```

-

2573	0720	0642	Q1,	LDF 2	
2574	0721	6020		JMP	QAINIT
2575	0722	2245		FRAME1!2000	/TYPE IN BLOCK, UNIT"
2576	0723	2372		ANSR1!2000	
2577	0724	6073		JMP	QARFSH
2600	0725	0602		LIF 2	
2601	0726	6057		JMP	GETANS
2602			/		
2603				PMODE	
2604	6727	0000	Q2,	0	
2605	6730	6141		LINC	
2606				LMODE	
2607	0731	0642		LDF 2	
2610	0732	6020		JMP	QAINIT
2611	0733	2327		FRAME2!2000	
2612	0734	2372		ANSR1!2000	
2613	0735	0002		PDP	
2614				PMODE	
2615	6736	5727		JMP I	Q2
2616			/		
2617	6737	0002	DIAL,	0002	/PDP
2620	6740	5741		JMP I	,+1
2621	6741	1221		KTD	/DIAL BOOTER
2622				LISTAPE 12	

NO ERRORS

0264 SYMBOLS  
1011 REFERENCES

SYMBOL	VALUE	DEF	REFERENCE	LINE	NUMBERS
ANSR1	4372	1604	1350	1357	2576 2612
BALF	0715	0665	0655		
BASE	0064	0134	0354	0425	0562
BITC	0512	0462	0436	0452	0454
BITS	0514	0464	0443	0447	0451
BITSET	0507	0457	0446		
BLOCK	4151	1451	1237	1352	1404
BLST	1023	0774	0753		
BNUM	0043	0113	0634		
BROUTE	1024	0775	0766		
BUMPX	0736	0710	0646	0666	0703 0715
BUMPY	0607	0556	0574		
CHAR	0063	0133	0206	0207	0224 0233 0245 0247 0253 0437 0756 1434
COUNT1	0010	0060	0433	0444	0455 0503 0520 0524 0606 0640 0645 0661 0705 0752 0761 0764 1345 1354 1371 1377 1504 1521 1524 1552
COUNT2	0011	0061	0506	0510	0514 0610 0642 1520
CRGOT	0272	0260	0215	0333	0415
CURY	0062	0132	0516	0527	
DIAL	6737	2617	2430		
DISALF	0703	0653	0662		
DISCAR	0750	0723	0637	0657	0745
DISCUR	0522	0476	0122	0537	
DISPLA	4141	1437	0120	1430	1444
DISP1	4047	1335	1213	1307	1474
DIS10	0600	0547	0121	0571	
DLOOP	4132	1430	0076		
DOCON	0716	0666	0643		
DONUM	0645	0615	0707		
EXIT	0026	0076	0266	0301	0414 0763 1101 1112 1125 1133 1137 1146 1152 1165 1170 1201 1203 1252 1260 1275
FRAME1	4245	1560	2575		
FRAME2	4327	1571	0107	0141	0173 0177 1374 1402 2611
G	1004	0755	0762		
GB	4074	1364	1206		
GET	4153	1457	1351	1360	
GETANS	4057	1345	2601		
GETDIG	4230	1540	1531	1553	
GETKBD	6555	2411	1337	1766	
GETNUM	0651	0621	0641		
GETOUT	4204	1510	1461		
GETPNT	0012	0062	0355	0356	0426 0460 0465 0601 0603 0611 0754 0755 1347 1356 1463 1475
GOT	1013	0764	0760		
GOTS	0400	0341	0334		
HOLD	0025	0075	0164	0250	0254 0263 0272 0274 0321 0325 0332 0373 0377 0400 0404 1515 1533 1537 1541 1544
IBLOCK	1242	1237	1235	1256	1262 1263
ICRGOT	0452	0415	0574	0403	
IDISCU	0052	0122	1442		
IDISPL	0050	0120	0202		
IDIS10	0051	0121	1441		
IGOTS	0344	0334	0220		
IKF	1255	1253	1246		
IQ2	0032	0102	1443		

SYMBOL	VALUE	DEF	REFERENCE	LINE	NUMBERS
JMPLST	1060	1035	0775	0776	0777
KALT	1132	1115	1051	1063	1064
KB	1143	1130	1036	1106	1121
KCB	1200	1171	1035		
KCB2	1211	1202	1175		
KCF	1164	1155	1041		
KCF2	1175	1166	1161		
KCN	1240	1235	1045		
KCP	1256	1255	1046		
KCR	1213	1204	1047	1236	1264
KCW	1234	1231	1050		
KDIGIT	0453	0422	1053	1054	1055 1056 1057 1060 1061 1062
KEYDEC	1000	0751	1436		
KEYLST	1027	1004	0774	0776	0777
KF	1153	1142	1042	1253	
KLF	0200	0162	1043		
KRET	1243	1241	1044	1271	
KRUB	1111	1072	1065		
KRUB2	1121	1102	1075		
KSPACE	1266	1266	0472	1052	
KTC	1216	1210	1037	1234	
KTD	1221	1215	1040	2621	
LINE	0023	0073	0277	0406	0423 0504 1104 1110 1111 1117 1123 1124 1243 1250 1251 1425
LINK	0747	0721	0620	0621	0630
LINPOS	0024	0074	0300	0407	0431 0501 1073 1077 1100 1103 1116 1242 1267 1273 1274 1426
LISLEN	1025	0776	0751		
LISN	0216	0202	0223	0227	0232 0257 0330
LNOPUT	0071	0141	0165		
LOCDIS	0626	0576	0565	0600	0602 0664
MASK	0021	0071	0344	0350	0357
MATCH	0022	0072	0351	0361	
MCRRUB	0065	0135	0213		
MOVE	1233	1227	1216		
M10	0030	0100	0230	0553	1173 1176
M260	0057	0127	0225		
M360	0054	0124	1157		
M370	0053	0123	0401	1144	
M377	0045	0115	0210	0264	0370
M4	0047	0117	0704		
M40	0035	0105	0513	0572	
M7	0056	0126	1244		
NEXT	4157	1463	1505		
NUMPAT	6476	2322	0113		
PARAM	4147	1446	1233	1411	
PATPNT	0015	0065	0636	0656	0733 0734
PCRMS	0044	0114	0216		
PLEN	1026	0777	0765		
PMOVE	0100	0151	1325		
PUTB	0014	0064	0166	0236	0241 0307 0310 0317
PUTPNT	0013	0063	1373	1401	1551
P10	0055	0125	1162		
P12	0061	0131	0523		
P140	0562	0540	0507		
P160	0745	0717	0555		
P20	0040	0110	0712		
P204	0746	0720	0557		
P302	0563	0541	0517		

SYMBOL	VALUE	DEF	REFERENCE	LINE	NUMBERS
P34	0067	0137	0175	0240	0316
P3443	0036	0106	0261	0410	
P370	0060	0130	0275	0412	1166
P377	0041	0111	0612		
P43	0066	0136	0171		
P5772	0074	0145	1315		
P5773	0076	0147	1317		
P7	0046	0116	0246	0267	0405 0434 0632
P77	0034	0104	0653		
P7776	0075	0146	0635	1316	
P7777	0077	0150	1320		
QAB	6024	1627	1415	1770	2153 2154
QACA	6035	1640	1660	2006	
QACHAR	6707	2560	2440		
QACKLF	6661	2521	2505		
QACNTR	6644	2503	2436	2526	
QAD	6046	1652	1657	1674	
QAE	6070	1676	1654	2060	
QAEXIT	6675	2536	2413	2415	2417 2420 2447 2466 2470 2472 2501 2510 2517 2531 2534
QAF	6536	2364	1757		
QAG	6102	1711	1634	1643	1751
QAH	6134	1743	1704	1753	1763 1764 2112
QAI	6151	1761	1765	2111	2141 2366
QAINIT	6020	1623	2574	2610	
QAJ	6156	1766	1341	1420	1746
QAK	6325	2143	1774	2004	2055
QAKRB	6036	2407	2424		
QAL	6215	2025	1630	2002	2012
QALEGL	6635	2473	2455		
QAM	6121	1730	1720	1722	1726
QAN	6243	2054	1776	2061	
QAO	6251	2063	1652	1744	1762 2016 2026 2044 2056 2372
QAP	6262	2075	1730	1752	1754
QAQ	6303	2116	1633	2017	2020 2034 2052 2145 2373 2374
QARFSH	6073	1702	1636	1641	1710 2000 2010 2014 2024 2027 2057 2122 2375 2577
QAT	6310	2124	1647	1713	
QATPE	6704	2546	2463	2475	2513 2516
QATY	6576	2432	2444	2474	2476
QAU	6541	2367	2100	2101	2371
QAV	6336	2156	0665	2376	
QAW	6542	2370	1721	1727	
QAX	6544	2372	2076	2146	
QAY	6551	2377	1772		
QAZ	6321	2136	1745		
QHOLD	4203	1507	1462	1467	1501 1503
Q1	6720	2573	1344		
Q2	6727	2604	0102	2615	
QB	0744	0716	0552	0561	0563
RBASE	0070	0140	0276	0353	0364 0366 0367 0375 0413 0424 0551 1131 1135 1136 1143 1150 1151 1156 1163 1164 1167 1172 1177 1200
			1202	1427	
			1322	1410	
READ	0072	0143			
RUBGOT	0314	0302	0212		
SAME	0432	0375	0363		
SAVEX	0551	0526	0522		
SAVEY	0541	0516	0512		
SCAN	0407	0352	0372		
SHIFT	0477	0447	0456		

SYMBOL	VALUE	DEF	REFERENCE LINE NUMBERS
SL	0310	0276	0273
SLASH1	0037	0107	0262 0411
SLSHBK	0341	0331	0305
SUBX	0543	0520	0525
SUBY	0533	0510	0515
SYSBLK	0101	0152	1323
TEMP	0027	0077	0616 0623 0626 0631 0767 0770
UNIT	4147	1447	1361 1367
UNOUT	4244	1554	1517
UNPACK	4205	1515	1375 1405
WORD	0042	0112	0604 0647 0660 0706
WRDCNT	0020	0070	0554 0567
WRITE	0073	0144	1232 1314
XCOR	0031	0101	0560 0672 0713 0714 0727 0741
XTEMP	0016	0066	0163 0221 0255 0303 0312 0313 1527 1535
XXX	4020	1304	
YCOR	0033	0103	0556 0573 0674 0731





## INDEX

ALTMODE, 2  
Assembly instructions, 5

B command, 3  
Block specification, 1

Commands

- ALTMODE, 2
- B, 3
- CTRL/B, 3
- CTRL/C, 3
- CTRL/F, 3
- CTRL/N, 4
- CTRL/O, 4
- CTRL/P, 4
- CTRL/R, 3
- CTRL/W, 3
- Cursor, 2
- Digits 0-7, 2
- Display, 2
- F, 3
- LINEFEED, 3, 5
- Reading, 3
- RETURN, 2
- RUBOUT, 2, 5
- SPACE, 2
- Writing, 3

Core layout, 4

- CTRL/B, 3
- CTRL/C, 3
- CTRL/F, 3
- CTRL/N, 4
- CTRL/O, 4
- CTRL/P, 4
- CTRL/R, 3
- CTRL/W, 3

Cursor commands, 2

Digits 0-7, 2  
DIS10, 5  
DISCUR, 5  
Display commands, 2

F command, 3  
Frames, question and answer, 1

Hardware requirements, 1

Internal description, 4

LINE, 4  
LINEFEED, 3,5  
LINPOS, 4  
Loading procedures, 1

Pointers

- RBASE, 4
- LINE, 4
- LINPOS, 4

QANDA (question and answer)

- frames, 1
- routines, 5

RBASE, 4  
RETURN, 2

Routines

- DISCUR, 5
- DIS10, 5
- QANDA, 5
- RUBOUT, 2,5

SPACE, 2  
Starting address, 1

Unit specification, 1



## HOW TO OBTAIN SOFTWARE INFORMATION

Announcements for new and revised software, as well as programming notes, software problems, and documentation corrections are published by Software Information Service in the following newsletters.

Digital Software News for the PDP-8 & PDP-12  
Digital Software News for the PDP-11  
Digital Software News for the PDP-9/15 Family

These newsletters contain information applicable to software available from Digital's Program Library, Articles in Digital Software News update the cumulative Software Performance Summary which is contained in each basic kit of system software for new computers. To assure that the monthly Digital Software News is sent to the appropriate software contact at your installation, please check with the Software Specialist or Sales Engineer at your nearest Digital office.

Questions or problems concerning Digital's Software should be reported to the Software Specialist. In cases where no Software Specialist is available, please send a Software Performance Report form with details of the problem to:

Software Information Service  
Digital Equipment Corporation  
146 Main Street, Bldg. 3-5  
Maynard, Massachusetts 01754

These forms which are provided in the software kit should be fully filled out and accompanied by teletype output as well as listings or tapes of the user program to facilitate a complete investigation. An answer will be sent to the individual and appropriate topics of general interest will be printed in the newsletter.

Orders for new and revised software and manuals, additional Software Performance Report forms, and software price lists should be directed to the nearest Digital Field office or representative. U.S.A. customers may order directly from the Program Library in Maynard. When ordering, include the code number and a brief description of the software requested.

Digital Equipment Computer Users Society (DECUS) maintains a user library and publishes a catalog of programs as well as the DECUSCOPE magazine for its members and non-members who request it. For further information please write to:

DECUS  
Digital Equipment Corporation  
146 Main Street, Bldg. 3-5  
Maynard, Massachusetts 01754



READER'S COMMENTS

Digital Equipment Corporation maintains a continuous effort to improve the quality and usefulness of its publications. To do this effectively we need user feedback -- your critical evaluation of this manual.

Please comment on this manual's completeness, accuracy, organization, usability and readability.

---

---

---

---

Did you find errors in this manual? If so, specify by page.

---

---

---

---

---

How can this manual be improved?

---

---

---

---

---

Other comments?

---

---

---

---

---

Please state your position. \_\_\_\_\_ Date: \_\_\_\_\_

Name: \_\_\_\_\_ Organization: \_\_\_\_\_

Street: \_\_\_\_\_ Department: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip or Country \_\_\_\_\_





**Digital Equipment Corporation  
Maynard, Massachusetts**

