

AR11

DIAGNOSTIC TEST II
MD-11-DZARB-B

EP-DZARB-B-DL

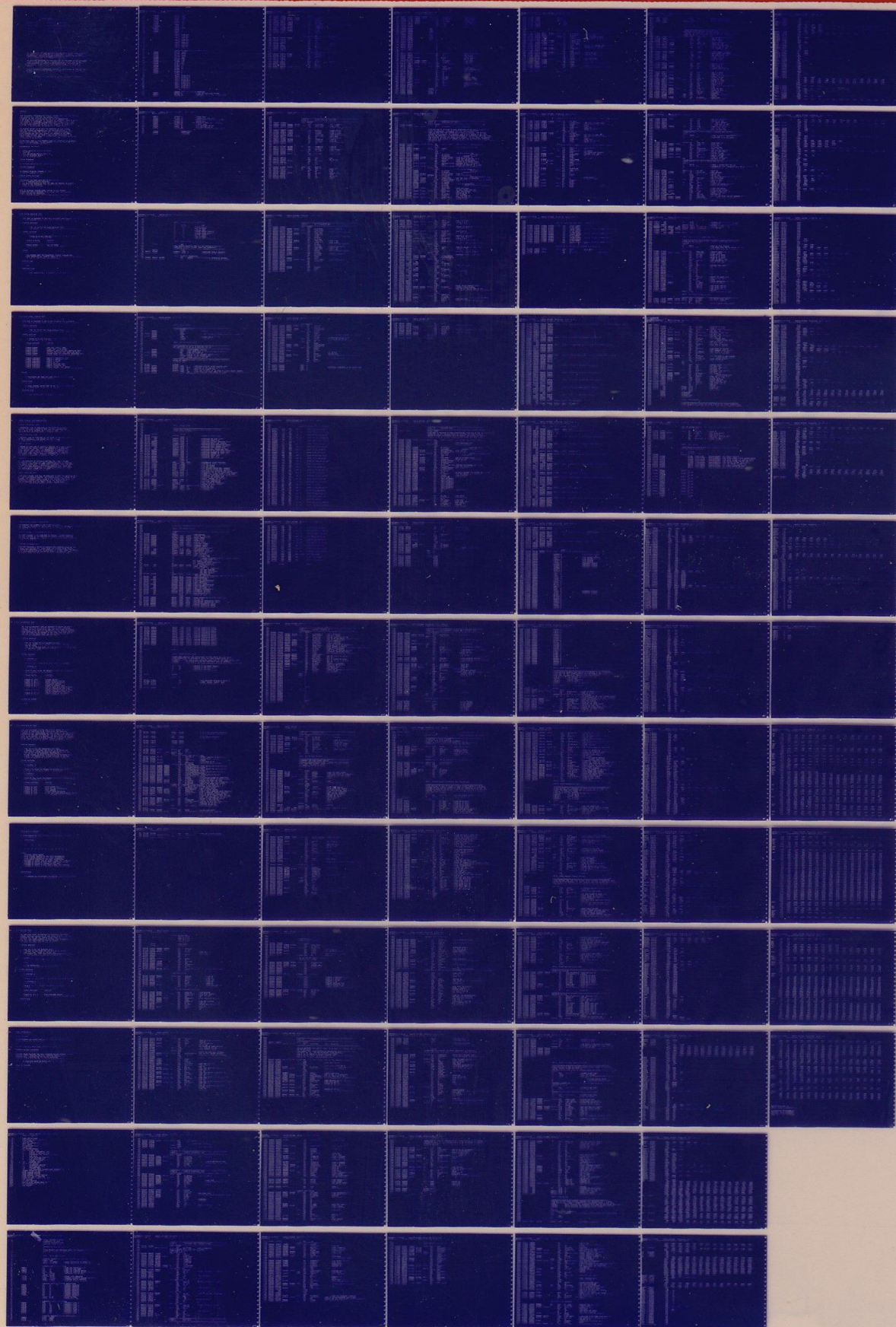
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MADE IN USA



IDENTIFICATION

PRODUCT CODE: MAINDEC-11-07ARB-R-D
PRODUCT NAME: AR-11 DIAGNOSTIC TEST 11
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MAINTAINER: DIAGNOSTIC GROUP

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1. ABSTRACT

THIS DIAGNOSTIC EXERCISES THE "AR-11" ANALOG CIRCUITRY. THE PROGRAM WHEN STARTED WILL TYPE OUT THE PROGRAM TITLE. A MESSAGE IS THEN PRINTED GIVING THE LETTER DESIGNATORS TO BE TYPED TO RUN ANY ONE OF THE FOUR (4) SEPERATE TESTS OF WHICH THIS PROGRAM IS COMPRISED. THE PROGRAM THEN TYPES A 'CR .' AND THEN WAITS IN A KEYBOARD MONITOR MODE FOR A LETTER TO BE TYPED. ALTHOUGH THESE TESTS MAY BE RUN IN ANY ORDER IT IS IMPERATIVE THAT TEST 1 IS RUN FIRST AND PROVED FULLY OPERATIONAL.

THE PROGRAM IS SET UP TO GIVE THE OPERATOR AS MUCH CONTROL OVER THE PROGRAM AS POSSIBLE VIA THE TELETYPE. TYPING A 'C' (OBTAINED VIA TYPING THE 'CNTR' AND 'C' KEYS SIMULTANEOUSLY) WHILE RUNNING ANY TEST WILL ENABLE THE PROGRAM TO RETURN TO THE KEYBOARD MONITOR AND AWAIT A NEW LETTER DESIGNATOR TO BE TYPED. TYPING A 'A' WHILE IN MONITOR MODE WILL ENABLE THE LETTER DESIGNATORS TO BE RETYPED.

UNLIKE AR-11 TEST 1, THIS PROGRAM DOES NOT DETERMINE IF ADDITIONAL AR-11'S ARE CONNECTED. TO RUN ANOTHER AR-11, THE OPERATOR MUST SUPPLY THE BUS ADDRESS INDIVIDUALLY.

2. REQUIREMENTS (EQUIPMENT)

- A. PDP-11 COMPUTER WITH 8K OF MEMORY
- B. TELETYPE
- C. AR11 HEX OPTION MODULE INSTALLED
- D. VOLTAGE STANDARD (E.D.C.)
- E. VR14 OR STORAGE SCOPE

3. LOADING PROCEDURE

USE STANDARD PROCEDURE FOR LOADING BINARY TAPES.

4. STARTING PROCEDURE

THE PROGRAM STARTING ADDRESS IS '200'.
THE RESTART ADDRESS IS '204'.

5. CONSOLE SWITCH SETTINGS

THIS PROGRAM HAS BEEN MODIFIED TO RUN WITH OR WITHOUT A HARDWARE SWITCH REGISTER.

- A. ALL SWITCHES SHOULD BE DOWN (0) WHEN THE PROGRAM IS STARTED.
- B. REFER TO THE INDIVIDUAL TEST DESCRIPTIONS FOR APPLICABLE CONSOLE SWITCH SETTINGS

WHILE IN KEYBOARD MONITOR MODE, TYPING 'S' WILL ENABLE THE SOFTWARE SWITCH REGISTER TO BE LOADED FROM THE TELETYPE WITHOUT HALTING THE PROCESSOR.

* TYPE 'CARRIAGE RETURN' (CR) TO TERMINATE ALL INPUT DATA.

6.

QUICK STATIC REGISTER TEST

A. THIS TEST IS DESIGNED TO PROVIDE A REGISTER VERIFICATION TEST IN THIS PROGRAM.
IF THIS SUB-TEST FAILS, AR-11 TEST 1 SHOULD BE LOADED.

B. STARTING SEQUENCE

1. TYPE 'A' TO RUN THE QUICK REGISTER TEST.
2. THE PROGRAM WILL THEN EXECUTE THE QUICK REGISTER TEST.

C. CONTROL SWITCHES

1. TYPING 'C' AT ANY TIME WILL ENABLE THE PROGRAM TO EXIT
AND RETURN TO THE MONITOR.

CONSOLE SWITCHES

FUNCTION

CONSOLE SW15=1
CONSOLE SW13=1

HALT ON ERROR
INHIBIT ERROR TYPEOUTS

D. ERRORS

THIS PROGRAM USES THE DIAGNOSTIC 'SYSMAC' PACKAGE FOR
ERROR REPORTING AND TYPEOUT. REFER TO THE "ERROR POINTER TABLE"
FOR TYPE OF LOGIC ERROR AND DESCRIPTION.

E. RESTRICTIONS

NONE

F. EXECUTION TIME

IT TAKES APPROXIMATELY 30 SECONDS TO THIS TEST.

7.

POINT PLOT VISUAL DISPLAY TEST

A. THIS TEST IS DESIGNED TO AID IN THE ADJUSTING AND ALIGNMENT OF THE VR14 OR STORAGE SCOPE SCOPE ON THE AR-11 DISPLAY CONTROL.

B. STARTING SEQUENCE

1. TYPE 'B' TO RUN THE VISUAL DISPLAY TEST.
2. THE PROGRAM WILL THEN EXECUTE THE VISUAL DISPLAY TEST.

C. CONTROL SWITCHES

1. TYPING 'C' AT ANY TIME WILL ENABLE THE PROGRAM TO EXIT AND RETURN TO THE MONITOR.

CONSOLE SWITCHES

FUNCTION

CONSOLE SW00=0	LOOP THRU DISPLAY TEST
CONSOLE SW00=1	SELECT TEST IN SW 00-02
CONSOLE SW07=0	HORIZONTAL SETTLING TEST <SETTLING TEST>
CONSOLE SW07=1	VERTICAL SETTLING TEST <SETTLING TEST>
CONSOLE SW05=0	STORAGE SCOPE NOT CONNECTED <PHOSPHOR TEST>
CONSOLE SW05=1	STORAGE SCOPE CONNECTED <PHOSPHOR TEST>
CONSOLE SW00-02=0	DISPLAY A HORIZONTAL LINE
CONSOLE SW00-02=1	DISPLAY A VERTICAL LINE
CONSOLE SW00-02=2	DISPLAY A SQUARE
CONSOLE SW00-02=3	DISPLAY AN 'X'
CONSOLE SW00-02=4	DISPLAY SETTLING TEST
CONSOLE SW00-02=5	DISPLAY CHARACTER TEST
CONSOLE SW00-02=6	DISPLAY CHANNEL TEST <VR14>
CONSOLE SW00-02=7	DISPLAY ERASE AND PHOSPHOR <STORAGE SCOPE>

D. ERRORS

NO PROVISIONS ARE MADE FOR LOGIC ERRORS. THE ONLY ERRORS IN THIS TEST ARE CHECKED VISUALLY.

E. RESTRICTIONS

IF VR14, CHANNEL SWITCH MUST BE SET TO "1 & 2" POSITION.
IF STORAGE SCOPE, POWER MUST BE APPLIED.

F. EXECUTION TIME

IT TAKES APPROXIMATELY 90 SECONDS TO THIS TEST.

B.

VISUAL DISPLAY TEST DESCRIPTIONS

DISPLAY HORIZONTAL LINE

A HORIZONTAL LINE IS DISPLAYED ON THE SCOPE BY INITIALLY SETTING THE X AND Y DAC'S TO ZERO AND THEN INCREMENTING THE X VALUE WHILE HOLDING THE Y VALUE AT 1000. THE POINTS ARE DISPLAYED USING THE DISPLAY INTERRUPT ENABLED.

DISPLAY VERTICAL LINE

A VERTICAL LINE IS DISPLAYED ON THE SCOPE IN THE SAME MANNER AS FOR A HORIZONTAL LINE EXCEPT NOW THE Y VALUE IS INCREMENTED WHILE HOLDING THE X VALUE AT 1000.

DISPLAY SQUARE

A SQUARE IS DISPLAYED BY INITIALLY SETTING THE X AND Y VALUES TO NEGATIVE FULL SCALE, THEN X IS INCREMENTED TO POSITIVE FULL SCALE (BOTTOM LINE) THEN Y IS INCREMENTED TO POSITIVE FULL SCALE (RIGHT LINE) THEN X IS DECREMENTED TO NEGATIVE FULL SCALE (TOP LINE) AND FINALLY Y IS DECREMENTED TO NEGATIVE FULL SCALE (LEFT LINE). MODE 01 (INTENSIFY ON LOADING X) AND MODE 10 (INTENSIFY ON LOADING Y) ARE USED.

DISPLAY X

AN X IS DISPLAYED BY INITIALLY SETTING THE X AND Y VALUES TO NEGATIVE FULL SCALE AND THEN INCREMENTING BOTH TO POSITIVE FULL SCALE (LOWER LEFT TO UPPER RIGHT DIAGONAL) THEN X IS RESET TO NEGATIVE FULL SCALE, Y REMAINS AT POSITIVE FULL SCALE AND THEN X IS INCREMENTED WHILE Y IS DECREMENTED UNTIL BOTH REACH FULL SCALE AGAIN (UPPER LEFT TO LOWER RIGHT DIAGONAL). MODE 01 (INTENSIFY ON LOADING X) IS USED.

DISPLAY SETTLING TEST

A TWO CYCLE SQUARE WAVE WILL BE DISPLAYED TO TEST THE SETTLING DELAY. IF A SETTLING PROBLEM EXISTS, THE LEADING EDGES WILL APPEAR TO BE ROUNDED. THE PROGRAM PLOTS A LINE AT THE MINIMUM AXIS VALUE. UPON COMPLETION, ANOTHER LINE IS PLOTTED AT THE MAXIMUM VALUE. THIS IS REPEATED WITH THE RESULT BEING A SQUARE WAVE. SWITCH BIT 7 DETERMINES HORIZ., OR VERT. SETTLING PATTERN.

DISPLAY ALPHA-NUMERIC CHARACTER SET

THE ALPHABET AND NUMBERS 0 THRU 9 ARE DISPLAYED.
THE FIRST ROW CONSISTS OF THE LETTERS 'A' THRU 'M'. THE SECOND CONTAINS
THE LETTERS 'N' THRU 'Z'. THE LAST LINE CONTAINS THE NUMBERS
'0' THRU '9'.

DISPLAY CHANNEL 1 AND CHANNEL 2 <VR14>

THE TEXT "CHANNEL 1" IS DISPLAYED ON CHANNEL 1 SWITCH POSITION.
THE TEXT "CHANNEL 2" IS DISPLAYED ON CHANNEL 2 SWITCH POSITION.
THE COMBINED MESSAGE WILL APPEAR IF THE CHANNEL SELECTOR SWITCH IS
IN THE 1 & 2 POSITION.

PHOSPHOR AND ERASE TEST

THIS TEST PROVIDES A METHOD OF CHECKING FOR PHOSPHOR BURNS ON THE
SCREEN. THIS ROUTINE WILL FIRST ERASE THE STORAGE SCOPE SCREEN.
A DESCENDING HORIZONTAL LINE IS DISPLAYED IN 'STORE' MODE. THE RESULT
IS AN INTENSIFICATION OF THE ENTIRE SCREEN. IF EXECUTED USING A VR14,
OR DISPLAY SCOPE THE RESULT WILL BE ONLY A DESCENDING LINE.

9. A TO D CALIBRATION TEST

- A. THE 'A/D CALIBRATION' TEST IS DESIGNED TO ACCEPT AN INPUT FROM THE TELETYPE TO INDICATE THE TYPE OF SYNC (EXTERNAL, INTERNAL OR AR-11 CLOCK TO BE USED AND THEN TAKES CONTINUOUS CONVERSIONS USING THE 'CH.' SELECTED VIA THE CONSOLE SWITCHES. THESE SETTINGS MAY BE CHANGED AT ANY TIME. THIS CAN ALSO BE USED FOR FINDING 50-50 POINT AND FOR FINDING MIDDLE OF A STATE FOR SUBSEQUENT REPEATABILITY TEST.

B. STARTING SEQUENCE

1. TYPE 'C' TO RUN THE A/D CALIBRATION TEST.
2. THE TEST HEADER PLUS A REQUEST FOR A SYNC TYPE WILL THEN BE TYPED.
3. TYPE IN THE DESIRED SYNC, 'I' FOR INTERNAL, 'E' FOR EXTERNAL 'C' FOR AR-11 CLOCK FOLLOWED BY 'CR'.
4. THE TEST WILL START.

C. CONTROL SWITCHES

1. 'A (CONTROL A)

TYPING 'A' WILL ENABLE A NEW SYNC TYPE TO BE ENTERED.

2. 'C (CONTROL C)

TYPING 'C' WILL CAUSE THE PROGRAM TO EXIT THE CALIBRATION TEST AND RETURN TO THE MONITOR.

3. CONSOLE SWITCH

FUNCTION

CONSOLE SW '0-3'	CHANNEL SELECT
CONSOLE SW 05 = 0	SELECT BIPOLAR CHANNEL
CONSOLE SW 05 = 1	SELECT UNIPOLAR CHANNEL
CONSOLE SW 06 = 0	CONTINUOUS SAMPLES
CONSOLE SW 06 = 1	FREEZE ON CURRENT DATA
CONSOLE SW 07 = 0	DISPLAY DATA ON X AXIS TO CHECK FOR AD INTERACTION WITH X DA
CONSOLE SW 07 = 1	DISPLAY DATA ON Y AXIS TO CHECK FOR AD INTERACTION WITH Y DA
CONSOLE SW 10 = 0	DISPLAY VALUE ON THE SCREEN
CONSOLE SW 10 = 1	PRINT CONVERSION VALUE

D. CALIBRATION ERRORS

NONE

10. A TO D REPEATABILITY TEST

- A. THIS TEST REQUESTS A CH.(S) AND A COUNT SPREAD OF '1-4' AND MODE OF OPERATION TO BE TYPED IN BY THE OPERATOR. A SERIES OF '512' CONVERSIONS ARE THEN TAKEN ON THE INPUT CH.(S) CONVERSIONS ARE THEN AVERAGED OUT AND IF THE COUNT SPREAD IS FOUND TO BE GREATER THAN REQUEST, THE RESULTS OF THE CONVERSIONS ARE TYPED OUT. A SINGLE CHANNEL OR A SERIES OF CHANNELS MAY BE TESTED VIA TYPING EITHER 'N(CR)' TO SELECT A SINGLE CHANNEL OR 'N,N(CR)' TO TEST A SERIES OF CHANNELS.

B. STARTING SEQUENCE

1. TYPE 'D' TO RUN THE 'REPEATABILITY' TEST.
2. A REQUEST IS THEN MADE FOR CH.(S) TO BE TESTED AND COUNT SPREAD (RANGE IN WHICH ALL 512 COUNTS MUST FALL FOR THE CH. TO BE CONSIDERED ACCEPTABLE).
3. IF THE CHANNEL IS FOUND TO BE WITHIN THE SELECTED COUNT SPREAD, THE PROGRAM WILL EITHER CONTINUE TO THE NEXT CHANNEL IF SELECTED OR RETEST THE CURRENT CHANNEL.

C. CONTROL SWITCHES

1. 'A (CONTROL A)

TYPING A 'A' WHILE THE PROGRAM IS RUNNING WILL ENABLE A NEW CH.(S) AND COUNT SPREAD TO BE SELECTED.

2. 'C (CONTROL)

TYPING 'C' WILL CAUSE THE PROGRAM TO EXIT THE 'REPEATABILITY' TEST AND RETURN TO THE MONITOR.

3. CONSOLE SWITCHES

FUNCTION

CONSOLE SW 10=0	PRINT ERRORS ONLY
CONSOLE SW 10=1	PRINT OUT ALL CONVERSIONS
CONSOLE SW 13=0	PRINT ERRORS
CONSOLE SW 13=1	INHIBIT ERROR PRINTOUTS
CONSOLE SW 15=0	DO NOT HALT UPON REPEATABILITY REPORT
CONSOLE SW 15=1	HALT UPON REPEATABILITY REPORT

D. REPEATABILITY ERRORS

ON ENCOUNTERING AN ERROR (CONSOLE SWITCHES DOWN) THE ERROR
DATA IS TYPED OUT.

1. ERROR FORMAT

CH.	HI					AV					LO				
A	B					C					D				
LO	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	HI			
E	F	G	H	I	J	K	L	M	N	O	P	Q			

WHERE:

A=CHANNEL BEING TESTED
B=THE HIGHEST READING OF THE '512' CONVERSIONS
C=THE AVERAGE READING OF THE '512' CONVERSIONS
D=THE LOWEST READING OF THE '512' CONVERSIONS
E=NUMBER OF COUNTS 'OUT OF RANGE' LOWER THAN 5 COUNTS
F-J=NUMBER OF COUNTS IN EACH PART LOWER THAN AVERAGE.
K=NUMBER OF COUNTS AT AVERAGE OF THE '512'
L-P=NUMBER OF COUNTS IN EACH PART HIGHER THAN AVERAGE.
Q=NUMBER OF COUNTS 'OUT OF RANGE' HIGHER THAN 5 COUNTS

E. RESTRICTIONS

1. IF A SECOND CH. IS ENTERED, IT MUST BE LARGER THAN THE FIRST
CH. OR THE INPUT WILL NOT BE ACCEPTED.

11. A TO D RECOVERY TEST

- A. THE "RECOVERY TEST" IS DESIGNED TO DETERMINE THE INTER-CHANNEL SETTLING CAPABILITY OF THE "AR-11 A TO D". THE TEST REQUESTS FOR TWO (2) CH. INPUTS TO BE TYPED IN. THE TEST THEN TAKES A SERIES OF SIXTEEN (16) CONVERSIONS (8 ON EACH CH.) AND THEN TYPES OUT THE "8" AVERAGE VALUES IN THE ORDER THEY WERE TAKEN ON THE SECOND CH.

B. STARTING SEQUENCE

1. TYPE 'E' TO RUN THE RECOVERY TEST.
2. A REQUEST IS THEN MADE FOR THE CH.S TO BE TESTED.
3. TYPE 'N,N (CR)' WHERE 'N' IS ANY CH.
4. THE PROGRAM WILL THEN TAKE CONTINUOUS CONVERSIONS TYPING OUT THE CONVERSION VALUES FOR THE SECOND CH.

EXAMPLE:

CH. A XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX

WHERE:

A = THE SECOND CH.

X = THE "8" CONVERSIONS TAKEN ON THAT CH.

C. CONTROL SWITCHES

1. "A (CONTROL A)

TYPING A "A" WILL ENABLE A NEW SET OF CH.S TO BE ENTERED.

2. "C (CONTROL C)

TYPING A "C" WILL ENABLE THE PROGRAM TO RETURN TO THE MONITOR.

3. CONSOLE SWITCHES

FUNCTION

CONSOLE SW 10 = 0

PRINT RECOVERY REPORT

CONSOLE SW 10 = 1

INHIBIT PRINTING OF RECOVERY REPORT

D. RESTRICTIONS

NONE

12. MISC. INFORMATION

ACT-11 OR XXDP

IF THE PROGRAM WAS LOADED FROM ACT-11 OR CHAINED FROM XXDP, THE
VISUAL DISPLAY TEST WILL BE RUN.

APT

THE APT HOOKS HAVE BEEN INSTALLED BUT NOT TESTED.

13. PROGRAM VARIABLE LOCATIONS

LOCATION SBASE CONTAINS THE AR-11 STARTING DEVICE ADDRESS <170400>

LOCATION SVECT1 CONTAINS THE AR-11 STARTING VECTOR <340>

LOCATION SNULL CONTAINS THE TTY FILLER CHARACTER

LOCATION SFILLS CONTAINS THE TTY FILLER CHARACTER COUNT

NOTE: IF LOCATIONS SBASE OR SVECT1 ARE CHANGED, THE TEST
MUST BE RE-INITIALIZED AT 200.

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ATTACHED

MAINDEC-11-DZARB-8 MACV11 27(732) 07-MAY-76 14117
DZARB8.P11 TABLE OF CONTENTS

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677	T6 PLOT CHARACTER SET
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2587	APT COMMUNICATIONS ROUTINE
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2662	TRAP TABLE

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000200

177776

177774

177772

177570

177570

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000003

000004

000005

000006

000007

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000040

000100

000140

000200

000240

000300

000340

100000

040000

020000

.TITLE MAINDEC-11-DZARR-B

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.MAYNARD, MASS. 01754

.*

.PROGRAM BY RAYMOND SHOND

.*

.THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC

.PACKAGE (MAINDEC-11-DZARR-B2), NOV 21, 1975.

.*

.SBTTL BASIC DEFINITIONS

.INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***

STACKS 1100

.EQUIV ENT,ERROR

;;BASIC DEFINITION OF ERROR CALL

.EQUIV IOY,SCOPE

;;BASIC DEFINITION OF SCOPE CALL

.MISCELLANEOUS DEFINITIONS

MYO 11

;;CODE FOR HORIZONTAL TAB

LFO 12

;;CODE FOR LINE FEED

CR0 13

;;CODE FOR CARRIAGE RETURN

CRLF0 200

;;CODE FOR CARRIAGE RETURN-LINE FEED

PS0 177776

;;PROCESSOR STATUS WORD

.EQUIV PS,PSW

SYKLMT0 177774

;;STACK LIMIT REGISTER

PIRQ0 177772

;;PROGRAM INTERRUPT REQUEST REGISTER

DSWR0 177570

;;HARDWARE SWITCH REGISTER

DISP0 177570

;;HARDWARE DISPLAY REGISTER

.GENERAL PURPOSE REGISTER DEFINITIONS

R00 X0

;;GENERAL REGISTER

R10 X1

;;GENERAL REGISTER

R20 X2

;;GENERAL REGISTER

R30 X3

;;GENERAL REGISTER

R40 X4

;;GENERAL REGISTER

R50 X5

;;GENERAL REGISTER

R60 X6

;;GENERAL REGISTER

R70 X7

;;GENERAL REGISTER

.EQUIV R6,SP

;;STACK POINTER

.EQUIV R7,PC

;;PROGRAM COUNTER

.PRIORITY LEVEL DEFINITIONS

PR00 0

;;PRIORITY LEVEL 0

PR10 40

;;PRIORITY LEVEL 1

PR20 100

;;PRIORITY LEVEL 2

PR30 140

;;PRIORITY LEVEL 3

PR40 200

;;PRIORITY LEVEL 4

PR50 240

;;PRIORITY LEVEL 5

PR60 300

;;PRIORITY LEVEL 6

PR70 340

;;PRIORITY LEVEL 7

.SWITCH REGISTER SWITCH DEFINITIONS

SW150 100000

SW140 40000

SW130 20000

57	010000	SW12=	10000
58	004000	SW11=	4000
59	002000	SW10=	2000
60	001000	SW09=	1000
61	000400	SW08=	400
62	000200	SW07=	200
63	000100	SW06=	100
64	000040	SW05=	40
65	000020	SW04=	20
66	000010	SW03=	10
67	000004	SW02=	4
68	000002	SW01=	2
69	000001	SW00=	1
70		.EQUIV	SW09,SW9
71		.EQUIV	SW08,SW8
72		.EQUIV	SW07,SW7
73		.EQUIV	SW06,SW6
74		.EQUIV	SW05,SW5
75		.EQUIV	SW04,SW4
76		.EQUIV	SW03,SW3
77		.EQUIV	SW02,SW2
78		.EQUIV	SW01,SW1
79		.EQUIV	SW00,SW0

80		J=DATA BIT DEFINITIONS (BIT00 TO BIT15)	
81		BIT15=	100000
82	100000	BIT14=	40000
83	040000	BIT13=	20000
84	020000	BIT12=	10000
85	010000	BIT11=	4000
86	004000	BIT10=	2000
87	002000	BIT09=	1000
88	001000	BIT08=	400
89	000400	BIT07=	200
90	000200	BIT06=	100
91	000100	BIT05=	40
92	000040	BIT04=	20
93	000020	BIT03=	10
94	000010	BIT02=	4
95	000004	BIT01=	2
96	000002	BIT00=	1
97	000001	.EQUIV	BIT09,BIT9
98		.EQUIV	BIT08,BIT8
99		.EQUIV	BIT07,BIT7
100		.EQUIV	BIT06,BIT6
101		.EQUIV	BIT05,BIT5
102		.EQUIV	BIT04,BIT4
103		.EQUIV	BIT03,BIT3
104		.EQUIV	BIT02,BIT2
105		.EQUIV	BIT01,BIT1
106		.EQUIV	BIT00,BIT0

107		J=BASIC "CPU" TRAP VECTOR ADDRESSES	
108	000004	ERRVEC=	4
109	000010	RESVEC=	10
110	000014	TBITVEC=	14
111		J=TIME OUT AND OTHER ERRORS	
112		J=RESERVED AND ILLEGAL INSTRUCTIONS	
		J="T" BIT	

113	000014	TRTVEC= 14	11TRACE TRAP
114	000014	BPTVEC= 14	11BREAKPOINT TRAP (BPT)
115	000020	IOTVEC= 20	11INPUT/OUTPUT TRAP (IOT) **SCOPE**
116	000024	PWRVEC= 24	11POWER FAIL
117	000030	EMTVEC= 30	11EMULATOR TRAP (EMT) **ERROR**
118	000034	TRAPVEC=34	11"TRAP" TRAP
119	000060	TKVEC= 60	11TTY KEYBOARD VECTOR
120	000064	TPVEC= 64	11TTY PRINTER VECTOR
121	000240	PIRQVEC=240	11PROGRAM INTERRUPT REQUEST VECTOR
122			
123	170400	ABASE=170400	
124	000340	AVECT1=340	
125	000200	APRIOR=200	

126				.SBTTL	OPERATIONAL SWITCH SETTINGS
127				I*	
128				I*	SWITCH
129				I*	USE
130				I*	-----
131				I*	-----
132				I*	15 HALT ON ERROR
133				I*	14 LOOP ON TEST
134				I*	13 INHIBIT ERROR TYPEOUTS
135				I*	12 STORAGE SCOPE CONNECTED
136				I*	11 INHIBIT ITERATIONS
137				I*	10 BELL ON ERROR
138				I*	9 LOOP ON ERROR
139				I*	8 LOOP ON TEST IN SWR47100
140					
141				.SBTTL	TRAP CATCHER
142					
143		000000		.00	
144				I*	ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
145				I*	SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
146				I*	LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
147		000174		.0174	
148	000174	000000		DISPREG:	.WORD 0
149	000176	000000		SWREG:	.WORD 0
150					
151				.SBTTL	STARTING ADDRESS(ES)
152	000200	000137	001356	JMP	00REGIN
153	000204	000137	001364	JMP	BEGIN

```

154
155
156      .SBTTL  ACT11 HOOKS
157
158      ;;*****
159      IHOOKS REQUIRED BY ACT11
160      SSVPC=      ISAVE PC
161      .B46
162      SENDAD      I1)SET LOC.46 TO ADDRESS OF SENDAD IN .TEOP
163      .B52
164      .WORD 0      I12)SET LOC.52 TO ZERO
165      .SSVPC      I1 RESTORE PC
166      .B1000
167
168      .SBTTL  APT PARAMETER BLOCK
169
170      ;;*****
171      ISET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
172      ;;*****
173      .BX=      I1SAVE CURRENT LOCATION
174      .B24      I1SET POWER FAIL TO POINT TO START OF PROGRAM
175      200      I1FOR APT START UP
176      .B44      I1POINT TO APT INDIRECT ADDRESS PTRN.
177      SAPTHDR I1POINT TO APT HEADER BLOCK
178      .B.BX      I1RESET LOCATION COUNTER
179      ;;*****
180      ISETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-POP11 DIAGNOSTIC
181      IINTERFACE SPEC.
182
183      SAPTHD1
184      SHIBTS1 .WORD 0      I1TWO HIGH BITS OF 16 BIT MAILBOX ADDR.
185      SHBADR1 .WORD SHAIL I1ADDRESS OF APT MAILBOX (BITS 0-15)
186      STSYM1 .WORD 30      I1RUN TIM OF LONGEST TEST
187      SPASTM1 .WORD 60      I1RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
188      SUNITH1 .WORD 120     I1ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
189      .WORD SETEND-SHAIL/2 I1LENGTH MAILBOX-ETABLE(WORDS)

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190					
191			.SRTTL	COMMON TAGS	
192					
193			11*****		
194			11THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS		
195			11USED IN THE PROGRAM.		
196					
197		001100			
198	001100		SCMTAG:	.=1100	11START OF COMMON TAGS
199	001100	000000			
200	001102	000	STSTNM:	.BYTE 0	11CONTAINS THE TEST NUMBER
201	001103	000	SERFLG:	.BYTE 0	11CONTAINS ERROR FLAG
202	001104	000000	SICNT:	.WORD 0	11CONTAINS SUBTEST ITERATION COUNT
203	001106	000000	SLPADR:	.WORD 0	11CONTAINS SCOPE LOOP ADDRESS
204	001110	000000	SLPERR:	.WORD 0	11CONTAINS SCOPE RETURN FOR ERRORS
205	001112	000000	SERTTL:	.WORD 0	11CONTAINS TOTAL ERRORS DETECTED
206	001114	000	SITEMR:	.BYTE 0	11CONTAINS ITEM CONTROL BYTE
207	001115	001	SERMAX:	.BYTE 1	11CONTAINS MAX. ERRORS PER TEST
208	001116	000000	SERRPC:	.WORD 0	11CONTAINS PC OF LAST ERROR INSTRUCTION
209	001120	000000	SGDADR:	.WORD 0	11CONTAINS ADDRESS OF 'GOOD' DATA
210	001122	000000	SBDADR:	.WORD 0	11CONTAINS ADDRESS OF 'BAD' DATA
211	001124	000000	SGDDAT:	.WORD 0	11CONTAINS 'GOOD' DATA
212	001126	000000	SBD DAT:	.WORD 0	11CONTAINS 'BAD' DATA
213	001130	000000		.WORD 0	11RESERVED--NOT TO BE USED
214	001132	000000		.WORD 0	
215	001134	000000		.WORD 0	
216	001136	177570	SWR:	.WORD DSWR	11ADDRESS OF SWITCH REGISTER
217	001140	177570	DISPLAY:	.WORD DDISP	11ADDRESS OF DISPLAY REGISTER
218	001142	177560	STKS:	177560	11TTY KBD STATUS
219	001144	177562	STKB:	177562	11TTY KBD BUFFER
220	001146	177564	STPS:	177564	11TTY PRINTER STATUS REG. ADDRESS
221	001150	177566	STPB:	177566	11TTY PRINTER BUFFER REG. ADDRESS
222	001152	000	SNUL:	.BYTE 0	11CONTAINS NULL CHARACTER FOR FILLS
223	001153	002	SPILLS:	.BYTE 2	11CONTAINS # OF FILLER CHARACTERS REQUIRED
224	001154	012	SPILLC:	.BYTE 12	11INSERT FILL CHARS. AFTER A "LINE FEED"
225	001155	000	STPFLG:	.BYTE 0	11"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
226	001156	000000	SREGAD:	.WORD 0	11CONTAINS THE ADDRESS FROM
227					11WHICH (SREGP) WAS OBTAINED
228	001160	000000	SREG0:	.WORD 0	11CONTAINS ((SREGAD)+0)
229	001162	000000	SREG1:	.WORD 0	11CONTAINS ((SREGAD)+2)
230	001164	000000	STIMES:	0	11MAX. NUMBER OF ITERATIONS
231	001166	000000	SESCAPE:	0	11ESCAPE ON ERROR ADDRESS
232	001170	177637 000377	SBELL:	.ASCIZ <207><377><377>	11CODE FOR BELL
233	001174	077	SQUES:	.ASCIZ /?/	11QUESTION MARK
234	001175	015	SCRLF:	.ASCIZ <15>	11CARRIAGE RETURN
235	001176	000012	SLF:	.ASCIZ <12>	11LINE FEED

236			11*****		
237					
238			.SMTTL	APT MAILBOX=FTABLE	
239					
240			11*****		
241			.EVEN		
242	001200		SMAIL:	11APT MAILBOX	
243	001200	000000	SMSGTY:	11MESSAGE TYPE CODE	
244	001202	000000	SFATAL:	11FATAL ERROR NUMBER	
245	001204	000000	STESTN:	11TEST NUMBER	
246	001206	000000	SPASS:	11PASS COUNT	
247	001210	000000	SDEVCT:	11DEVICE COUNT	
248	001212	000000	SUNIT:	11I/O UNIT NUMBER	
249	001214	000000	SMSGAD:	11MESSAGE ADDRESS	
250	001216	000000	SMSGLG:	11MESSAGE LENGTH	
251	001220		SETABLE:	11APT ENVIRONMENT TABLE	
252	001220	000	SENV:	11ENVIRONMENT BYTE	
253	001221	000	SENVH:	11ENVIRONMENT MODE BITS	
254	001222	000000	SSWREG:	11APT SWITCH REGISTER	
255	001224	000000	SUSWR:	11USER SWITCHES	
256	001226	000000	SCPUOP:	11CPU TYPE,OPTIONS	
257			1*	RITS 15-11=CPU TYPE	
258			1*	11/04=01,11/05=02,11/20=03,11/40=04,11/45=05	
259			1*	11/70=06,PDQ=07,Q=10	
260			1*	RIT 10=REAL TIME CLOCK	
261			1*	RIT 9=FLOATING POINT PROCESSOR	
262			1*	RIT 8=MEMORY MANAGEMENT	
263	001230	000	SHAMS1:	11HIGH ADDRESS,M.S. BYTE	
264	001231	000	SHTYP1:	11MEM. TYPE,BLK#1	
265			1*	MEM. TYPE BYTE -- (HIGH BYTE)	
266			1*	900 NSEC CORE=001	
267			1*	300 NSEC RIPOLAR=002	
268			1*	500 NSEC MOS=003	
269	001232	000000	SHADR1:	11HIGH ADDRESS,BLK#1	
270			1*	MEM, LAST ADDR, #3 BYTES, THIS WORD AND LOW OF "TYPE" ABOVE	
271	001234	000	SHAMS2:	11HIGH ADDRESS,M.S. BYTE	
272	001235	000	SHTYP2:	11MEM. TYPE,BLK#2	
273	001236	000000	SHADR2:	11MEM. LAST ADDRESS,BLK#2	
274	001240	000	SHAMS3:	11HIGH ADDRESS,M.S. BYTE	
275	001241	000	SHTYP3:	11MEM. TYPE,BLK#3	
276	001242	000000	SHADR3:	11MEM. LAST ADDRESS,BLK#3	
277	001244	000	SHAMS4:	11HIGH ADDRESS,M.S. BYTE	
278	001245	000	SHTYP4:	11MEM. TYPE,BLK#4	
279	001246	000000	SHADR4:	11MEM. LAST ADDRESS,BLK#4	
280	001250	340	SVECT1:	11INTERRUPT VECTOR#1	
281	001251	000	SVECT2:	11INTERRUPT VECTOR#2	
282	001252	200	SPRIOR:	11BUS PRIORITY #1,#2	
283	001253	000		11SPARE, NOT USED	
284			.EVEN		
285	001254	170400	SBASE:	11BASE ADDRESS OF EQUIPMENT UNDER TEST	
286	001256	000000	SDEVH:	11DFVICE MAP	
287	001260	000000	SCDW1:	11CONTROLLER DESCRIPTION WORD#1	
288	001262	000000	SCDW2:	11CONTROLLER DESCRIPTION WORD#2	
289	001264	000000	SDDW1:	11DEVICE DESCRIPTOR WORD#1	
290	001266	000000	SDDW2:	11DEVICE DESCRIPTOR WORD#2	
291	001270	000000			

292	001272	000000	800W3:	.WORD	ADDW3	11DEVICE	DESCRIPTOR	WORD03
293	001274	000000	800W4:	.WORD	ADDW4	11DEVICE	DESCRIPTOR	WORD04
294	001276	000000	800W5:	.WORD	ADDW5	11DEVICE	DESCRIPTOR	WORD05
295	001300	000000	800W6:	.WORD	ADDW6	11DEVICE	DESCRIPTOR	WORD06
296	001302	000000	800W7:	.WORD	ADDW7	11DEVICE	DESCRIPTOR	WORD07
297	001304	000000	800W8:	.WORD	ADDW8	11DEVICE	DESCRIPTOR	WORD08
298	001306	000000	800W9:	.WORD	ADDW9	11DEVICE	DESCRIPTOR	WORD09
299	001310	000000	800W10:	.WORD	ADDW10	11DEVICE	DESCRIPTOR	WORD10
300	001312	000000	800W11:	.WORD	ADDW11	11DEVICE	DESCRIPTOR	WORD11
301	001314	000000	800W12:	.WORD	ADDW12	11DEVICE	DESCRIPTOR	WORD12
302	001316	000000	800W13:	.WORD	ADDW13	11DEVICE	DESCRIPTOR	WORD13
303	001320	000000	800W14:	.WORD	ADDW14	11DEVICE	DESCRIPTOR	WORD14
304	001322	000000	800W15:	.WORD	ADDW15	11DEVICE	DESCRIPTOR	WORD15

305
306
307 001324

SETEND:

308
309
310
311

.SMTTL ERROR POINTER TABLE

312 1*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
313 1*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
314 1*LOCATION SITE#B, THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
315 1*NOTE1: IF SITE#B IS 0 THE ONLY PERTINENT DATA IS (SERRPC).
316 1*NOTE2: EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:

317				
318	1*	EM		11POINTS TO THE ERROR MESSAGE
319	1*	DM		11POINTS TO THE DATA HEADER
320	1*	DT		11POINTS TO THE DATA
321	1*	DF		11POINTS TO THE DATA FORMAT
322				

323
324 001324

SERRTR:

325
326
327

1ITEM 1

328	001324	013032	FM1	11DUAL REGISTER ADDRESSING DETECTED
329	001326	013075	DM1	11ERRPC RUPADR EXPECT READ
330	001330	013134	DT1	11ERRPC RUPADR SGN0AT SRO0AT
331	001332	000000	0	

332
333 001334 000000
334

NREXT: 0

335							
336	001336	170400			ADCS1	170400	IA TO D STATUS/CONTROL REGISTER
337	001340	170402			ADDR1	170402	IA TO D CONVERTED VALUE «READ»
338							
339	001342	170404			CSR1	170404	ICLOCK STATUS REGISTER
340	001344	170406			CS01	170406	ICLOCK PRESET BUFFER
341							
342	001346	170410			VCSTAT1	170410	
343	001350	170412			VCYREG1	170412	
344	001352	170414			VCYREG1	170414	
345							
346	001354	170416			CSC1	170416	
347							
348	001356	005037	013226		REGIN1	CLR	TEMP
349	001362	000403				BR	REG
350	001364	012737	000001	013226	BEGIN11	MOV	01,TEMP
351	001372	000005			REG1	RESET	
352					IICLEAR THE COMMON TAGS (SCHTAG) AREA		
353	001374	012706	001100		MOV	0SCHTAG,R6	IIFIRST LOCATION TO BE CLEARED
354	001400	005026			CLR	(R6)+	IICLEAR MEMORY LOCATION
355	001402	022706	001126		CMP	0SRDOAT,R6	IIDONE?
356	001406	001374			BNE	,=6	IILoop BACK IF NO
357	001410	012706	001100		MOV	0STACK,SP	IISetup THE STACK POINTER
358					IINITIALIZE A FEW VECTORS		
359	001414	012737	013344	000020	MOV	0SSCOPE,00IOTVEC	IIOOT VECTOR FOR SCOPE ROUTINE
360	001422	012737	000340	000022	MOV	0340,00IOTVEC+2	IILEVEL 7
361	001430	012737	013624	000030	MOV	0SEERROR,00EMTVEC	IIENT VECTOR FOR ERROR ROUTINE
362	001436	012737	000340	000032	MOV	0340,00EMTVEC+2	IILEVEL 7
363	001444	012737	016134	000034	MOV	0STRAP,00TRAPVEC	IITRAP VECTOR FOR TRAP CALLS
364	001452	012737	000340	000036	MOV	0340,00TRAPVEC+2	IILEVEL 7
365	001460	012737	014142	000024	MOV	0SPWRDN,00SPWRVEC	IIPower FAILURE VECTOR
366	001466	012737	000340	000026	MOV	0340,00SPWRVEC+2	IILEVEL 7
367	001474	005037	001164		CLR	0TIMES	IINITIALIZE NUMBER OF ITERATIONS
368	001500	005037	001166		CLR	0ESCAPE	IICLEAR THE ESCAPE ON ERROR ADDRESS
369	001504	112737	000001	001115	MOVR	01,0SERMAX	IIALLOW ONE ERROR PER TEST
370	001512	012737	001512	001106	MOV	0,,0LPADR	IINITIALIZE THE LOOP ADDRESS FOR SCOPE
371	001520	012737	001520	001110	MOV	0,,0LPERR	IISetup THE ERROR LOOP ADDRESS
372					IISIZE FOR A HARDWARE SWITCH REGISTER, IF NOT FOUND OR IT IS		
373					IIEQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.		
374	001526	013746	000004		MOV	0ERRVEC,-(SP)	IISAVE ERROR VECTOR
375	001532	012737	001570	000004	MOV	0648,0ERRVEC	IISet UP ERROR VECTOR
376	001540	012737	177570	001136	MOV	00SWR,SWR	IISetup FOR A HARDWARE SWICH REGISTER
377	001546	012737	177570	001140	MOV	00DISP,DISPLAY	IAND A HARDWARE DISPLAY REGISTER
378	001554	022777	177777	177354	CMP	0-1,0SWR	IITRY TO REFERENCE HARDWARE SWR
379	001562	001013			BNE	653	IIBRANCH IF NO TIMEOUT TRAP OCCURRED
380							IAND THE HARDWARE SWR IS NOT = -1
381	001564	005737	000001		TSY	001	IIFORCE A TRAP THROUGH ERRVEC
382	001570	012737	000176	001136	MOV	0SWREG,SWR	IIPoint TO SOFTWARE SWR
383	001576	012737	000174	001140	MOV	0DISPREG,DISPLAY	IIPoint TO SOFTWARE DISPLAY REG
384	001604	012716	001612		MOV	0648,(SP)	IIREPLACE OLD PC WITH NEW
385	001610	000002			RTY		IIRESTORE PC AND PSW
386	001612	012637	000004		MOV	(SP)+,0ERRVEC	IIRESTORE ERROR VECTOR
387							
388	001616				SARG11		
389	001616	005037	001206		CLR	0PASS	IICLEAR PASS COUNT
390	001622	132737	000200	001221	RTY	0APTSIZE,0ENVH	IITEST USER SIZE UNDER APT

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DZAR00.P11 ERROR POINTER TABLE

391	001630	001403			REQ	648	YES,USE NON-APT SWITCH
392	001632	012737	001222	001136	MOV	0394REG,SWR	NO,USE APT SWITCH REGISTER
393	001640						
394	001640	005037	177776	6481	CLR	00PS	

395					DETERMINE CPU TYPE		
396					I R0=3 IF 11/45		
397					I R0=2 IF 11/40		
398					I R0=1 IF 11/20		
399					I R0=0 IF 11/25		
400							
401		177772			PIRQ=177772		
402		177776			PS=177776		
403							
404	001644	012737	000002	000006	MOV	0RT1,006	
405	001652	012737	000006	000004	MOV	06,004	
406	001660	012700	000003		MOV	03,R0	ILOAD R0
407	001664	000261			SEC		ISET C BIT
408	001666	005737	177772		TST	00PIRQ	ITEST PIRQ
409	001672	005600			SBC	R0	
410	001674	000261			SEC		
411	001676	105737	177777		TST	0003+1	
412	001702	005600			SBC	R0	
413	001704	005037	177700		CLR	00177700	
414	001710	005037	000006		CLR	006	
415	001714	010037	010750		MOV	R0,CPTYPE	
416	001720	005237	010750		INC	CPTYPE	
417	001724	006300			ASI	R0	
418	001726	016037	010736	010746	MOV	CPDLAY(R0),CPTIME	IGET CP DELAY TIME
419	001734	000137	002042		JMP	INIT1	
420							
421							
422					ILOAD TRAP CATCHER		
423	001740	012702	000242		LDTRAP: MOV	0242,R2	ILOAD R2
424	001744	012701	000240		MOV	0240,R1	ILOAD R1
425	001750	010221			SSI MOV	R2,(R1)+	ILOAD .+2
426	001752	005021			CLR	(R1)+	ILOAD HALT
427	001754	010102			MOV	R1,R2	ILOAD R2
428	001756	005722			TST	(R2)+	IBUMP R2
429	001760	020227	001402		CMP	R2,01002	ITEST FOR LAST
430	001764	001371			BNE	SS	IBR UNTIL DONE
431							
432							
433					ILOAD DEVICE ADDRESSES LOCATIONS		
434	001766	012700	001336		MOV	0ADCS,R0	ILOAD POINTER
435	001772	013720	001254		1081 MOV	0BASE,(R0)+	ILOAD BASE ADDRESS
436	001776	022700	001356		CMP	0BEGIN,R0	ITEST FOR DONE
437	002002	001373			BNE	108	IBR
438	002004	013737	001254	010752	MOV	0BASE,ADCS1	ILOAD HIGH BYTE POINTER
439	002012	005237	010752		INC	ADCS1	
440	002016	012700	001340		MOV	0ADDBR,R0	ILOAD 2ND ADDRESS
441	002022	012701	000002		MOV	02,R1	ILOAD R1
442	002026	060120			1281 ADD	R1,(R0)+	IUPDATE REAL DEVICE WORD
443	002030	005721			TST	(R1)+	IBUMP R1
444	002032	022701	000020		CMP	020,R1	ITEST FOR DONE
445	002036	001373			BNE	128	IBR
446	002040	000207			RTS	PC	IEXIT

447											
448	002042	004737	001740		INIT11	JSR	PC,LOTRAP				
449	002046	005737	013226			TST	TEMP				ITEST IF START OR RESTART
450	002052	001011				RNF	INIT2				IRESTART
451	002054	005737	000042			TST	0042				ITEST IF MONITOR
452	002060	001402				BEG	18				IRR IF NOT
453	002062	000137	002254			JMP	VSUAL0				IRUN SCOPE IF UNDER MONITOR
454	002066	104400			181	TYPE					ICALL MESSAGE PRINTER VIA 'EMT'
455	002070	011706				TITLE					ITYPE PROGRAM HEADPR.
456	002072	104400			INITA1	TYPE					
457	002074	012070				MESS					IPRINT THE TEST CALL LETTERS.
458	002076	012737	002072	013152	INIT21	MOV	0INITA,AVECTR				ISET UP 'A' VECTOR ADDRESS.
459	002104	004737	001740			JSR	PC,LOTRAP				ILOAD TRAP CATCHER AND ADDRESSES
460	002110	104400				TYPE					
461	002112	012343				CNTRLC					IPRINT '.' TO INDICATE MONITOR READY
462	002114	005077	177216			CLR	0ANCS				
463	002120	005077	177216			CLR	0CSR				
464	002124	005077	177216			CLR	0VCSAT				
465	002130	004737	010206			JSR	PC,XTTYIN				IWAIT FOR TTY ENTRY
466	002134	122737	000101	010436		CMPR	0'A,INBUF				ITEST FOR 'A'
467	002142	001002				BNE	18				INOT 'A'
468	002144	000137	007444			JMP	REPTST				IYES, RUN QUICK REGISTER TEST
469	002150	122737	000102	010436	181	CMPS	0'B,INBUF				ITEST FOR 'B'
470	002156	001002				BNE	28				INOT 'B'
471	002160	000137	002236			JMP	VISUAL				IYES, RUN 'SCOPE ADJUSTMENT TEST'
472	002164	122737	000103	010436	281	CMPS	0'C,INBUF				ITEST FOR 'C'
473	002172	001002				BNE	38				INOT 'C'
474	002174	000137	005104			JMP	CALBRT				IYES, RUN 'A TO D CALIBRATION' TEST
475	002200	122737	000104	010436	381	CMPR	0'D,INBUF				ITEST FOR 'D'
476	002206	001002				BNE	48				INOT 'D'
477	002210	000137	006244			JMP	REPTST				IYES, RUN 'A TO D REPEATABILITY' TEST
478	002214	122737	000105	010436	481	CMPS	0'E,INBUF				ITEST FOR 'E'
479	002222	001002				BNE	58				INOT 'E'
480	002224	000137	007024			JMP	RFCVRV				IYES RUN 'A TO D RECOVERY TEST
481	002230	104400			581	TYPE					ILLEGAL ENTRY
482	002232	012365				MARK					ITYPE 'I'
483	002234	000720				OR	INIT2				IWAIT AGAIN

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484
485 002236 012737 002250 013152 VISUAL1 MOV 0VISAU1,AVECTR
486 002244 104400 TYPE
487 002246 012370 MES6 IHEADER ABOUT SCOPE ADJ.
488 002250 104400 VISAU11 TYPE
489 002252 012633 MES15 ITEXT ABOUT SWR
490 002254 000240 VSUAL01 NOP
491
492
493
494
495 002256 000004
496 002260 012737 000001 001164
497 002266 013700 001350
498 002272 013701 001352
499 002276 012737 000070 013210
500 002304 004737 005050
501 002310 004737 002370
502 002314 004737 004726
503 002320 000773
504
505
506
507
508 002322 000004
509 002324 012737 000001 001164
510 002332 013700 001352
511 002336 013701 001350
512 002342 012737 000070 013210
513 002350 004737 005050
514 002354 004737 002370
515 002360 004737 004726
516 002364 000773
517 002366 000427
518
519 002370 005077 176752
520 002374 013704 001346
521 002400 012703 001777
522 002404 012702 000001
523 002410 012711 001000
524 002414 012710 000000
525 002420 000210
526 002422 005214
527 002424 105714
528 002426 100376
529 002430 021003
530 002432 001372
531 002434 000207
532

//*****
//TEST 1 DISPLAY HORIZONTAL LINE
//*****
TST11 SCOPE
MOV 01,STIMES I100 1 ITERATION
PIC01 MOV VCXREG,R0
MOV VCVREG,R1
MOV 070,TICKS ILOAD TIMER FOR CP TYPE
JSR PC,CHTIME ICHANGE TIMER FOR CP TYPE
101 JSR PC,P00
JSR PC,TIMER IDONE ?
BR 10

//*****
//TEST 2 DISPLAY A VERTICAL LINE
//*****
TST21 SCOPE
MOV 01,STIMES I100 1 ITERATION
PIC11 MOV VCXREG,R0
MOV VCVREG,R1
MOV 070,TICKS ILOAD TIME
JSR PC,CHTIME ICHANGE TIMER FOR CP TYPE
101 JSR PC,P00
JSR PC,TIMER IDONE ?
BR 10
RR PIC3
P001 CLR 0VCSTAT
MOV VCSTAT,R4
MOV 01777,R3 ISET HIGH LIMIT
MOV 01,R2 IINITIALIZE INCRFMENTS BETWEEN POINTS
MOV 01000,(1)
MOV 00,(0)
101 ADD R2,(0) IINCREMENT
INC (4) INTENSIFY
TST0 (4)
BPL 0-2
CMP (0),R3 IDONE ALL POINTS?
BNE 10 INO
RTS PC

```

```

533
534
535
536
537 002436 000004
538 002440 012737 000001 001164
539
540
541
542 002446 005037 013200
543 002452 005077 176670
544 002456 012737 000100 013210
545 002464 004737 005050
546 002470 013701 001350
547 002474 013702 001352
548 002500 013703 001346
549 002504 012704 000004
550 002510 013777 013200 176652
551 002516 013777 013200 176626
552
553 002524 012700 000377
554 002530 012713 000004
555 002534 000411
556 002536 105713
557 002540 100376
558 002542 005300
559 002544 001373
560
561 002546 012713 000010
562 002552 012700 000377
563 002556 000412
564 002560 105713
565 002562 100376
566 002564 005300
567 002566 001373
568
569 002570 012713 000004
570 002574 012700 000377
571 002600 100411
572 002602 105713
573 002604 100376
574 002606 005300
575 002610 001373
576
577 002612 012713 000010
578 002616 012700 000377
579 002622 100412
580 002624 105713
581 002626 100376
582 002630 005300
583 002632 001373
584 002634 004737 000726
585 002640 000723
586
587
588

```

```

//*****
//TEST 3          PINCUSHION TEST (DISPLAY SQUARE)
//*****
TST31  SCOPE
      MOV      01,0TIMES          //DO 1 ITERATION
//PLOT A SQUARE FROM LOWER LEFT TO LOWER RIGHT TO
//UPPER RIGHT TO UPPER LEFT TO LOWER LEFT.
//NOW STORE DISPLAY
PIC31  CLR      LOW
      CLR      OVCSTAT
      MOV      0100,TICKS
      JSR      PC,CMTIME
      MOV      VCXREG,R1
      MOV      VCXREG,R2
      MOV      VCSTAT,R3
      MOV      04,R4
PS1    MOV      LOW,OVCXREG
      MOV      LOW,OVCYREG
//DRAW BOTTOM LINE
      MOV      0377,R0
      MOV      04,(3)
PSA1   ADD      R4,(1)
      TSTB     (3)
      BPL      -2
      DEC      R0
      BNE      PSA
      JNO
//DRAW RIGHT LINE
      MOV      010,(3)
      MOV      0377,R0
PSB1   ADD      R4,(2)
      TSTB     (3)
      RPL      -2
      DEC      R0
      BNE      PSB
      JNO
//DRAW TOP LINE
      MOV      04,(3)
      MOV      0377,R0
PSC1   SUB      R4,(1)
      TSTB     (3)
      BPL      -2
      DEC      R0
      BNE      PSC
      JNO
//DRAW LEFT LINE
      MOV      010,(3)
      MOV      0377,R0
PSD1   SUB      R4,(2)
      TSTB     (3)
      RPL      -2
      DEC      R0
      BNE      PSD
      JSR      PC,TIMER
      BR       PS
//*****
//TEST 4          PLOT AN X
//*****

```

580 002642 000000
590 002644 012737 000001 001144
591 002652 012737 000000 013200
592 002660 012737 001770 013202
593 002666 004077 176450
594 002672 012737 000200 013210
595 002700 004737 005050
596 002704 013701 001350
597 002710 013702 001352
598 002714 013703 001346
599 002720 012704 000000
600 002724 013712 013200
601 002730 011211
602
603
604 002732 012713 000000
605 002736 012700 000377
606 002742 105713
607 002744 100376
608 002746 060412
609 002750 060411
610 002752 005300
611 002754 001372
612 002756 105713
613 002760 100376
614
615 002762 013712 013202
616 002766 013711 013200
617 002772 012700 000377
618 002776 105713
619 003000 100376
620 003002 160412
621 003004 060411
622 003006 005300
623 003010 001372
624 003012 004737 004726
625 003016 000742

TST41 SCODE
MOV 01,STIMPS
PIC41 MOV 02,LOW
MOV 01770,HIGH
CLR OVSTAT
MOV 0200,TICKS
JSR PC,CHTIME
PIC401 MOV VCVREG,R1
MOV VCVREG,R2
MOV VCVSTAT,R3
MOV 00,R4
P41 MOV LOW,(2)
MOV (2),(1)

1100 1 ITERATION

1CHANGE TIMER FOR CP TYPE

1PLOT LINE BEGINNING IN LOWER LEFT CORNER

MOV 00,(3)
MOV 0377,R0
P4A1 TSTR (3)
RPL 0-2
ADD R0,(2)
ADD R0,(1)
DEC R0
RNF P4A
TSTR (3)
RPL 0-2

1ENABLE INTENSIFY ON LOADING Y

1+4 TO Y

1+4 TO X

1NO

1PLOT LINE BEGINNING IN UPPER LEFT CORNER

MOV HIGH,(2)
MOV LOW,(1)
MOV 0377,R0
P4R1 TSTR (3)
RPL 0-2
SUB R0,(2)
ADD R0,(1)
DEC R0
RNF P4R
JSR PC,TIMER
RR P4

1+4 TO Y

1+4 TO X

1NO

```

626
627
628
629
630 003020 000000
631 003022 012737 000001 001160
632 003030 012737 000200 013210
633 003036 004737 005050
634
635 003042 005077 176300
636 003046 005077 176276
637 003052 005077 176274
638 003056 013703 001346
639 003062 032777 000200 176046
640 003070 001407
641 003072 013701 001352
642 003076 013700 001350
643 003102 012713 000010
644 003106 000406
645
646 003110 013700 001352
647 003114 013701 001350
648 003120 012713 000004
649 003124 004537 003154
650 003130 000000
651 003132 004537 003154
652 003136 001777
653
654 003140 005710
655 003142 001370
656 003144 004737 004726
657 003150 000734
658 003152 000413
659
660 003154 012702 000200
661 003160 011511
662 003162 105713
663 003164 100376
664 003166 062710 000002
665 003172 005302
666 003174 001371
667 003176 005725
668 003200 000205

//*****
//TEST 5 SCOPE SETTLING TIME TEST
//*****
TST5: SCOPE
MOV 01,STIMES IEND 1 ITERATION
PIC5: MOV 0200,TICKS ILOAD TIMER
JSR PC,CMTIME ICHANGE TIMER FOR CP TYPE

15: CLR 0VCSTAT ICLEAR STATUS
CLR 0VCXREG ICLEAR X AXIS
CLR 0VCYREG ICLEAR Y AXIS
MOV VCONST,R3 ILOAD STATUS ADDRESS
AIT 00177,0SWR ITEST 0SWR
REQ 38 IRR IF CLEARED
MOV VCYREG,R1 ILOAD R1
MOV VCYREG,R0 ILOAD R0
MOV 010,(R3) ILOAD INTENS ON Y
RR 48

38: MOV VCYREG,R0 ILOAD R0
MOV VCYREG,R1 ILOAD R1
MOV 04,(R3) ILOAD INTENS ON X
48: JSR R5,LODPNT ILOAD A LINE
RR I
JSR R5,LODPNT ILOAD A LINE
1777

TST (R0) IEND
RNE 48 IRR IF NOT
JSR PC,TIMER ITEST TIME
RR 19
RR TST6 II

LODPNT: MOV 0200,R2
15: MOV (R5),(R1) ILOAD AXIS
28: TST (R5) IDONE
BPL 28 IWAIT
ADD 02,(R0) IUPDATE AXIS
DEC R2 IDONE
RNE 19 IRR IF NOT
TST (R5)+ IUPDATE
RTS R5 IEXIT

```

```

669
670
671
672
673
674 003202 000004
675 003204 012737 000001 001164
676 003212 012737 000100 013210
677 003220 004737 005050
678 003224 012737 000340 003546
679 003232 012737 001400 003544
680 003240 012702 003554
681 003244 005077 176076
682 003250 004737 003346
683 003254 012737 000340 003546
684 003262 012737 001000 003544
685 003270 012702 003653
686 003274 005077 176046
687 003300 004737 003346
688 003304 012737 000340 003546
689 003312 012737 000400 003544
690 003320 012702 003756
691 003324 005077 176016
692 003330 004737 003346
693 003334 004737 004726
694 003340 000731
695 003342 000137 004070
696 003346 012737 177763 003550
697 003354 013705 001346
698 003360 000240
699 003362 000240
700 003364 000240
701 003366 004737 003402
702 003372 005237 003550
703 003376 001373
704 003400 000207
705

*****
TEST 6 PLOT CHARACTER SET
*****
TST6: SCOPE
      MOV      01,STIMES      I100 1 ITERATION
      MOV      0100,TICKS
      JSR      PC,CMTIME      ICHANGE TIMER FOR CP TYPE
      MOV      0340,XPOS
      MOV      01400,YPOS
      MOV      0A,R2          ILOAD STARTING CHARACTER
      CLR      0VCSTAT
      JSR      PC,PIC60
      MOV      0340,XPOS      ILOAD X POS
      MOV      01000,YPOS     ILOAD Y POS
      MOV      0N,R2          ILOAD STARTING CHARACTER
      CLR      0VCSTAT
      JSR      PC,PIC60      IDISPLAY CHARACTERS
      MOV      0340,XPOS      ILOAD X POS
      MOV      0400,YPOS      ILOAD Y POS
      MOV      0N,R2          ILOAD STARTING CHARACTER
      CLR      0VCSTAT
      JSR      PC,PIC60      IDISPLAY CHARACTERS
      JSR      PC,TIMER
      RR      PIC6A
      JMP      PIC7
      MOV      0-13.,CHRCOL   ICHARACTERS PER ROW
      MOV      VCSTAT,R5
      NOP
      NOP
      NOP
      JSR      PC,CHAR
      INC      CHRCOL
      BNE      GEN1
      RTS      PC
      GEN1:

```

706									
707									
708	003402	013737	003544	003552	CHAR1	MOV	YPOS,YPT		
709	003410	042715	000010			RIC	#16,(5)		
710	003414	013777	003546	175726		MOV	XPOS,OVCYREG		
711	003422	013777	003544	175722		MOV	YPOS,OVCYREG		
712	003430	105777	175712		CHAR4:	TSTR	OVSTAT		
713	003434	100375				RPL	CHAR4		
714	003436	053715	003542			RIS	MODE,(5)		ENABLE INTENSIFY ON LOADING Y
715	003442	012704	000010			MOV	#10,R4		
716	003446	012702	177773			MOV	#-5,R0		INITIALIZE COLUMN COUNT
717	003452	012701	177771		CHAR1:	MOV	#-7,R1		INITIALIZE ROW COUNT
718	003456	112203				MOVH	(2)+,R3		INPUT CHARACTER POINTS IN R3
719	003460	106103			CHAR2:	ROLR	R3		
720	003462	100006				RPL	CHAR3		END
721	003464	013777	003546	175656		MOV	XPOS,OVCYREG		
722	003472	013777	003544	175652		MOV	YPOS,OVCYREG		
723	003500	105777	175642		CHAR3:	TSTR	OVSTAT		
724	003504	100375				RPL	CHAR3		
725	003506	060437	003544			ADD	R4,YPOS		
726	003512	005201				INC	R1		I+1 TO ROW
727	003514	001361				RNF	CHAR2		IFINISH ROW
728	003516	013737	003552	003544		MOV	YPT,YPOS		REINITIALIZE ROW FOR NEXT COLUMN
729	003524	060437	003546			ADD	R4,XPOS		
730	003530	005200				INC	R0		I+1 TO COLUMN COUNT
731	003532	001347				RNF	CHAR1		
732	003534	060437	003546			ADD	R4,XPOS		
733	003540	000207				RTS	PC		EXIT
734									
735	003542	000010			MODE:	10			
736	003544	000000			YPOS:	0			CONTAINS Y POSITION AT ANY GIVEN TIME
737	003546	000000			XPOS:	0			CONTAINS X POSITION AT ANY GIVEN TIME
738	003550	000000			CHRCOL:	0			
739	003552	000000			YPT:	0			
740									

Line	Character	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
741							
742							
743							
744	003554	176	021	021	A1	.BYTE	176,21,21,21,176
745	003557	021	176				
746	003561	177	111	111	B1	.BYTE	177,111,111,111,66
747	003564	111	066				
748	003566	076	101	101	C1	.BYTE	76,101,101,101,42
749	003571	101	042				
750	003573	177	101	101	D1	.BYTE	177,101,101,101,76
751	003576	101	076				
752	003600	177	111	111	E1	.BYTE	177,111,111,111,101
753	003603	111	101				
754	003605	177	011	011	F1	.BYTE	177,11,11,11,1
755	003610	011	001				
756	003612	076	101	121	G1	.BYTE	76,101,121,121,62
757	003615	121	062				
758	003617	177	010	010	H1	.BYTE	177,10,10,10,177
759	003622	010	177				
760	003624	000	101	177	I1	.BYTE	0,101,177,101,0
761	003627	101	000				
762	003631	060	100	100	J1	.BYTE	60,100,100,100,77
763	003634	100	077				
764	003636	177	010	024	K1	.BYTE	177,10,24,42,101
765	003641	042	101				
766	003643	177	100	100	L1	.BYTE	177,100,100,100,100
767	003646	100	100				
768	003650	177	004	010	M1	.BYTE	177,4,10,4,177
769	003653	004	177				
770	003655	177	004	010	N1	.BYTE	177,4,10,20,177
771	003660	020	177				
772	003662	076	101	101	O1	.BYTE	76,101,101,101,76
773	003665	101	076				
774	003667	177	011	011	P1	.BYTE	177,11,11,11,6
775	003672	011	006				
776	003674	076	101	121	Q1	.BYTE	76,101,121,141,176
777	003677	141	176				
778	003701	177	011	031	R1	.BYTE	177,11,31,51,106
779	003704	051	106				
780	003706	046	111	111	S1	.BYTE	46,111,111,111,62
781	003711	111	062				
782	003713	001	001	177	T1	.BYTE	1,1,177,1,1
783	003716	001	001				
784	003720	077	100	100	U1	.BYTE	77,100,100,100,77
785	003723	100	077				
786	003725	037	040	100	V1	.BYTE	37,40,100,40,37
787	003730	040	037				
788	003732	177	020	010	W1	.BYTE	177,20,10,20,177
789	003735	020	177				
790	003737	143	024	010	X1	.BYTE	143,24,10,24,143
791	003742	024	143				
792	003744	003	004	170	Y1	.BYTE	3,4,170,4,3
793	003747	004	003				
794	003751	141	121	111	Z1	.BYTE	141,121,111,105,103
795	003754	105	103				
796	003756	076	121	111	NA1	.BYTE	76,121,111,105,76

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DZARB.P11 T6

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PLOT CHARACTER SET

797	003761	105	076			
798	003763	000	102	177	N11	.BYTE 0,102,177,100,0
799	003766	100	000			
800	003770	102	121	111	N21	.BYTE 102,121,111,105,102
801	003773	105	102			
802	003775	002	101	111	N31	.BYTE 02,101,111,111,06
803	004000	111	066			
804	004002	030	020	022	N01	.BYTE 30,20,22,177,20
805	004005	177	020			
806	004007	047	105	105	N51	.BYTE 07,105,105,105,71
807	004012	105	071			
808	004014	076	111	111	N61	.BYTE 76,111,111,111,02
809	004017	111	062			
810	004021	101	001	021	N71	.BYTE 101,01,21,11,7
811	004024	011	007			
812	004026	066	111	111	N81	.BYTE 66,111,111,111,66
813	004031	111	066			
814	004033	046	111	111	N91	.BYTE 46,111,111,111,76
815	004036	111	076			
816	004040	000	000	000	SPACEA1	.BYTE 0,0,0,0,0
817	004043	000	000			
818	004045	000	000	000		.BYTE 0,0,0,0,0
819	004050	000	000			
820	004052	000	000	000		.BYTE 0,0,0,0,0
821	004055	000	000			
822						
823	004060					.EVEN

824					*****		
825					TEST 7	CHANNEL 1 CHANNEL 2	
826					*****		
827	004260	000000			TST7:	SCOPE	
828	004262	012737	000001	001164	MOV	01,STIMES	DO 1 ITERATION
829	004070	012737	000200	013210	PIC7:	MOV	0200,TICKS
830	004076	004737	005050		JSR	PC,CHTIME	CHANGE TIMER FOR CP TYPE
831	004102	013705	001306		MOV	VCSTAT,R5	SET UP R5 FOR STATUS REGISTER POINTER
832	004106	012777	000000	175232	PIC7AA:	MOV	00,0VCSTAT
833	004114	012737	000400	003546	MOV	0400,XPOS	LOAD X POSITION
834	004122	012737	001200	003544	MOV	01200,YPOS	LOAD Y POSITION
835	004130	012737	000011	004262	MOV	00,,P7CNT	SAVE THE NUMBER OF CHARACTERS
836	004136	012737	004266	004264	MOV	0CH01,P7PNT	SAVE CHANNEL 1 POINTER
837	004144	017702	000114		PIC7A:	MOV	0P7PNT,R2
838	004150	004737	003402		JSR	PC,CHAR	DISPLAY A CHARACTER
839	004154	062737	000002	004264	ADD	02,P7PNT	ADD 2 TO THE MESSAGE POINTER
840	004162	005337	004262		DEC	P7CNT	DECREMENT CHARACTER COUNT
841	004166	001366			RNE	PIC7A	NOT FINISHED WITH ALL CHARACTERS
842	004170	012777	001000	175150	MOV	01000,0VCSTAT	
843	004176	012737	000400	003546	MOV	0400,XPOS	SET UP X POS FOR CHANNEL 2
844	004204	012737	000600	003544	MOV	0600,YPOS	SET UP Y
845	004212	012737	000011	004262	MOV	00,,P7CNT	SET UP CHARACTER COUNT
846	004220	012737	004310	004264	MOV	0CH02,P7PNT	SET UP CHANNEL 2 POINTER
847	004226	017702	000032		PIC7B:	MOV	0P7PNT,R2
848	004232	004737	003402		JSR	PC,CHAR	DISPLAY A CHARACTER
849	004236	062737	000002	004264	ADD	02,P7PNT	ADD 2 TO THE POINTER
850	004244	005337	004262		DEC	P7CNT	DECREMENT COUNT
851	004250	001366			RNE	PIC7B	NOT FINISHED
852	004252	004737	004726		JSR	PC,TIMER	CHECK THE RUNTIME OF THIS ROUTINE
853	004256	000713			RR	PIC7AA	NOT FINISHED
854	004260	000424			RR	TST10	GO TO NEXT TEST
855	004262	000000			P7CNT:	0	
856	004264	000000			P7PNT:	0	
857	004266	003566			CH01:	C	
858	004270	003617				M	
859	004272	003554				A	
860	004274	003655				N	
861	004276	003655				N	
862	004300	003600				F	
863	004302	003643				L	
864	004304	004040				SPACEA	
865	004306	003763				N1	
866	004310	003566			CH02:	C	
867	004312	003617				M	
868	004314	003554				A	
869	004316	003655				N	
870	004320	003655				N	
871	004322	003600				F	
872	004324	003643				L	
873	004326	004040				SPACEA	
874	004330	003770				N2	
875							

```

11*****
1*TEST 1P          PHOSPHOR TEST
11*****
TST10:  SCOPF
        MOV      #1,STIMES          11DO 1 ITERATION
PIC12:  MOV      #2,TICKS
PIC12A: BIT      @R15,OSWR          11TEST IF STORAGE SCOPE
        BEQ      13                11R IF NOT
        JSR      PC,CLRVC          11ERASE THE SCREEN
13:     JSR      PC,LOADVF          11LOAD THE SCREEN
        JSR      PC,TIMER          11CHECK THE TIME
        RR       PIC12A
        BIT      @R15,OSWR          11TEST IF STORAGE SCOPE
        BEQ      23                11R IF NOT
        JSR      PC,CLRVC
23:     RESET

.SBTTL  END OF PASS ROUTINE

11*****
1*INCREMENT THE PASS NUMBER (SPASS)
1*INDICATE END-OF-PROGRAM AFTER 1 PASSES THRU THE PROGRAM
1*TYPE "END PASS @XXXX" (WHERE XXXX IS A DECIMAL NUMBER)
1*IF THERES A MONITOR GO TO IT
1*IF THERE ISN'T JUMP TO VSUAL0

SEOP:   SCOPE
        CLR      STSTNM            11ZERO THE TEST NUMBER
        CLR      STIMES            11ZERO THE NUMBER OF ITERATIONS
        INC      SPASS             11INCREMENT THE PASS NUMBER
        BIC      @10000,SPASS      11DON'T ALLOW A NEG. NUMBER
        DEC      (PC)+             11LOOP?
SEOPCT: .WORD    1
        BGT      S00AGN            11YES
        MOV      (PC)+,0(PC)+      11RESTORE COUNTER
SENDC1: .WORD    1
        SENDCT   SEOPCT
        TYPE     ,SENDMG           11TYPE "END PASS #"
        MOV      SPASS,-(SP)       11SAVE SPASS FOR TYPEOUT
        TYPE     ,SENDMG           11GO TYPE--DECIMAL ASCII WITH SIGN
        TYPE     ,SENUL            11TYPE A NULL CHARACTER
SGEY42: MOV      @042,R0            11GET MONITOR ADDRESS
        BEQ      S00AGN            11BRANCH IF NO MONITOR
        RESET                     11CLEAR THE WORLD
SENDAD: JSR      PC,(R0)            11GO TO MONITOR
        NOP                          11SAVE ROOM
        NOP                          11FOR
        NOP                          11ACT11
S00AGN: JMP      0(PC)+             11RETURN
SRTNAD: .WORD    VSUAL0
SENUL1: .BYTE    -1,-1,0           11NULL CHARACTER STRING
SENDMG: .ASCIIZ  <1><12>/END PASS #/

```

932									
933									
934	004536	012777	002000	174602	CLRVCI	MOV	00110,0VCSTAT		IFRASE THE SCREEN
935	004544	052777	010000	174574		BIS	00112,0VCSTAT		
936	004552	000240				NOP			
937	004554	012700	000020			MOV	020,00		1SET UP DELAY
938	004560	005001				CLR	R1		
939	004562	105777	174560		CLRVCAI	TSTB	0VCSTAT		1TEST FOR READY
940	004566	100416				RMT	CLRVCB		1RRANCH IF SET
941	004570	005301				DEF	R1		10FLAV
942	004572	001373				RNF	CLRVCA		
943	004574	005300				DEF	00		10ELAY
944	004576	001371				RNF	CLRVCA		
945	004600	037727	174332	010000		RIT	0SWR,0SW12		1TEST INHIBIT PRINTOUT
946	004606	001002				RNF	10		
947	004610	104400				TYPE			
948	004612	012023				MESS			
949	004614	005777	174316		101	TST	0SWR		1TEST 0SWR
950	004620	100001				RPL	CLRVCR		
951	004622	000000				HALT			1ERASE RETURN FAILED TO SET READY
952									
953	004624	000207			CLRVCB:	RTS	PC		
954									
955	004626	005077	174514		LOADVC:	CLR	0VCSTAT		1CLEAR STATUS
956	004632	012737	001777	013230		MOV	01777,TEMP1		
957	004640	013700	001346			MOV	VCSTAT,00		
958	004644	013701	001350			MOV	VCRREG,R1		
959	004650	013702	001352			MOV	VCRREG,R2		
960	004654	012710	002000			MOV	00110,(0)		1SET STORE MODE
961	004660	013712	013230			MOV	TEMP1,(2)		
962	004664	012711	001777		LODVCA:	MOV	01777,(1)		
963	004670	000402				RR	LODVCC		
964	004672	162711	000004		LODVCB:	SUB	04,(1)		
965	004676	005210			LODVCC:	INC	(0)		
966	004700	000240				NOP			
967	004702	105710				TSTB	(0)		
968	004704	100376				BPL	0-2		
969	004706	022711	000003			CMR	03,(1)		
970	004712	001367				RNE	LODVCR		
971	004714	104405				CKSWR			1TEST FOR "CTRL G"
972	004716	162712	000001			SUB	01,(2)		
973	004722	001360				RNF	LODVCA		
974	004724	000207				RTS	PC		
975									

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976
977
978          TIMER ROUTINE
979          I ENTER VIA JSR PC,TIMER
980
981 004726 104405          TIMER: CKSWR
982 004730 017737 174202 013206      MOV      @SWR,TIMSV
983 004736 004737 011672          JSR      PC,TSTFLG
984 004742 032737 000400 013206  TIMER: BIT      @RTA,TIMSV
985 004750 001006          BNF      TIMER2          IRT 0 SET 7
986 004752 005337 013210          DEC      TICKS      INO, DECREMENT TICKS
987 004756 001002          RNF      TIMER1
988 004760 062716 000002          ADD      @2,(6)      IADD 2 TO STACK POINTER
989 004764 000207          TIMER: RTS      PC          IRETURN
990
991          I SWR 0=1 SELECT TEST TO LOCK ON
992          I SWR 2=00 TEST NUMBER
993
994 004766 042737 177770 013206  TIMER: RLC      @177770,TIMSV
995 004774 006337 013206          ASL      TIMSV
996 005000 062737 005030 013206          ADD      @ROUTPT,TIMSV
997 005006 017737 006174 013206          MOV      @TIMSV,TIMSV
998 005014 022600          CMP      (SP)+,R0
999 005016 000240          NJP
1000 005020 000240          NOP
1001 005022 000240          NOP
1002 005024 000177 006156          TIMER: JMP      @TIMSV
1003
1004 005030 002266          ROUTPT: PIC0          IDISPLAY A HORIZONTAL LINE
1005 005032 002332          PIC1          IDISPLAY A VERTICAL LINE
1006 005034 002446          PIC3          IDISPLAY A SQUARE
1007 005036 002652          PIC4          IDISPALY A "X"
1008 005040 003030          PIC5          IDISPLAY SETTLING TIME
1009 005042 003212          PIC6          IDISPLAY CHARACTER SET
1010 005044 004070          PIC7          IDISPLAY CHANNEL TPST
1011 005046 004342          PIC12         IDISPLAY ERASE AND PHOSPHOR TEST
1012
1013 005050 013737 010750 013236  CHTIME: MOV      CPTYPE,BRLEV1
1014 005056 005337 013236          CHTMA: DEC      BRLEV1
1015 005062 001403          BEQ      CHTMB
1016 005064 006337 013210          ASL      TICKS
1017 005070 000772          RR      CHTMA
1018 005072 000207          CHTMB: RTS      PC

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1019                                     ;*****
1020                                     ;TEST 11      CALIBRATION ROUTINE
1021                                     ;*****
1022 005274 000000 TST111 SCOPE
1023 005076 012737 000001 001164      MOV      01,STIMES      ;DOO 1 ITERATION
1024                                     ;*****
1025
1026 ;ROUTINE REQUESTS THE TYPE OF 'SYNC' TO BE USED ('I' INTERNAL OR 'P' EXTERNAL
1027 ;OR 'C' AN CLOCK)
1028 ;THE PROGRAM THEN TAKES CONTINUOUS CONVERSIONS USING DATA SW'S 3-8
1029 ;TO SELECT THE CH., AND SW5 TO SELECT UNIPOLAR/BIPOLAR
1030 ;USE SW '6' TO FREEZE ON SINGLE 512 POINT BURST.
1031 ;USE SW '7' TO DISPLAY DATA ON Y AXIS TO CHECK FOR A/D INTERACTION
1032 ;USE SW '10' TO PRINT THE CONVERSION VALUE.
1033
1034 005104 012737 005116 013152 CALBT1: MOV      00CALBT1,AVECTR  ;SET UP 'A' RESTART ADDRESS
1035 005112 104400      TYPE
1036 005114 012420      MERT      ;TYPE TEST HEADER
1037 005116 104400 CALBT1: TYPE
1038 005120 012513      MES10      ;TEXT 'SYNC I OR E OR C'
1039 005122 004737 010206      JSR      PC,XTTYIN      ;WAIT FOR INPUT.
1040 005126 013737 010436 013154      MOV      INRUP,PROC      ;SAVE IT IN TEMP STORAGE
1041 005134 104400      TYPE
1042 005136 012356      ACRLF
1043 005140 005037 013222      CLR      USECLK      ;CLEAR CLOCK FLAG
1044 005144 012737 000001 013160      MOV      01,COUNT      ;SET UP FOR '1' CONVERSION
1045 005152 117737 173760 013147 CALBT2: MOVR      08WR,ADWRD2+1  ;GET CH. FROM THE SW REG.
1046 005160 042737 150377 013146      RIC      0150377,ADWRD2  ;CLR UNWANTED BITS, A/D WORD COMPLETE
1047 005166 005037 006224      CLR      ADWRD1
1048 005172 017737 173740 013164      MOV      08WR,KSTOR2      ;SAVE ORIGINAL SWITCH SETTING.
1049 005200 022737 000105 013154      CMP      0105,PROC      ;TEST SYNC SELECT
1050 005206 001004      BNF      10      ;BRANCH IF NOT 'E'
1051 005210 052737 000120 006224      RIS      0120,ADWRD1      ;OTHERWISE ADD 'PXT' SYNC BIT TO A/D.
1052 005216 000416      RR      CALB2A
1053 005220 122737 000103 013154 101      CMPR      0103,PROC
1054 005226 001007      RNE      20      ;BRANCH IF NOT 'C'
1055 005230 052737 000140 006224      RIS      0140,ADWRD1      ;OTHERWISE ADD 'CLOCK' SYNC TO A/D
1056 005236 012737 177777 013222      MOV      0-1,USECLK
1057 005244 000403      RR      CALB2A
1058 005246 052737 000101 006224 201      BIS      0101,ADWRD1
1059 005254 012777 006154 173766 CALB2A: MOV      00CNST51,08VECT1
1060 005262 000240      NOP

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CALIBRATION ROUTINE

1061	005264	012705	016200		MOV	0A0RUFF,R5	IRFSET POINTER	
1062	005270	000240		1181	NOP			
1063	005272	000240			NOP			
1064	005274	000240			NOP			
1065	005276	013777	013100	174032	MOV	ADWRD2,0A0CS	ILOAD A/D STATUS	
1066	005304	000240			NOP			
1067	005306	005077	174034		CLR	0VCSTAT	ICLEAR STAT	
1068	005312	005077	174032		CLR	0VCYREG		
1069	005316	005077	174030		CLR	0VCYREG		
1070	005322	032777	000200	173606	RIT	0RIT7,0SWR	ITEST RIT	
1071	005330	001410			REQ	20	IRR IF DOWN	
1072	005332	013703	001350		MOV	VCYREG,R3	ILOAD X ADDRESS	
1073	005336	013704	001352		MOV	VCYREG,R4	ILOAD Y ADDRESS	
1074	005342	012777	000004	173776	MOV	00,0VCSTAT	IINTEN. ON X LOAD	
1075	005350	000407			BR	30	I	
1076	005352	013703	001352	281	MOV	VCYREG,R3	ILOAD Y ADDRESS	
1077	005356	013704	001350		MOV	VCYREG,R4	ILOAD X ADDRESS	
1078	005362	012777	000010	173756	MOV	010,0VCSTAT	IINTEN. ON Y LOAD	
1079	005370	017737	173752	006226	381	MOV	0VCSTAT,AXIS1	ISAVE STATUS
1080	005376	010337	006230		MOV	R3,AXIS2	ISAVE R3	
1081	005402	010437	006232		MOV	R4,AXIS3	ISAVE R4	
1082	005406	012737	000004	006054	MOV	04,1010	ILOAD COUNT	
1083	005414	012700	000160	1081	MOV	0160,R0	ILOAD A CONVERSION COUNT	
1084	005420	012701	000000		MOV	00,R1	ICLEAR OFFSET	
1085	005424	005037	006222		CLR	MARKEP	INOT A MARKER SAMPLE	
1086	005430	004737	006112		JSR	PC,CNVT8V	ICONVERT AND SAVE	
1087								
1088	005434	012700	000020		MOV	020,R0	ILOAD MARKER COUNT	
1089	005440	012701	000011		MOV	011,R1	ILOAD OFFSET	
1090	005444	005237	006222		INC	MARKEP	ISET MARKER SAMPLE	
1091	005450	004737	006112		JSR	PC,CNVT8V	ICONVERT AND SAVE	
1092								
1093	005454	005337	006054		DEF	1010	IDONE ?	
1094	005460	001355			BNE	100	IRR IF NOT	
1095								
1096								
1097	005462	012737	000077	013230	1581	MOV	077,TEMP1	ILOAD CONVERSION COUNT
1098	005470	012737	000006	011330		MOV	06,CMPENT	ILOAD SHIFT COUNT
1099	005476	004737	011166		JSR	PC,CMPTEP	IAVERAGE	
1100	005502	013700	013266		MOV	AVRAGE,R0	IGET A VALUE	
1101	005506	006200			ASR	R0		
1102	005510	006200			ASR	R0		
1103	005512	005200			INC	R0		
1104	005514	006200			ASR	R0		
1105	005516	010037	006056		MOV	R0,1020	ISAVE FOR TYPEOUT	
1106	005522	012737	000004	006052	MOV	04,1000	ILOAD A COUNT	
1107	005530	012702	006070		MOV	00GT4,R2	ILOAD A POINTER	
1108	005534	000403			BR	160		
1109	005536	006200		1781	ASR	R0	IMOVE RIGHT	
1110	005540	006200			ASR	R0		
1111	005542	006200			ASR	R0		
1112	005544	010001		1681	MOV	R0,R1	IGET VALUE	
1113	005546	042701	177770		RIC	0177770,R1	IMASK	
1114	005552	006301			ASL	R1	IX2	
1115	005554	016142	006072		MOV	AND(R1),-(R2)	ILOAD ADDRESS	
1116	005560	005337	006052		DEC	1000	IFINISHED ?	

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1117	005564	001364				RNF	178		IRR IF NOT
1118						DISPLAY CONVERTED DIGITS			
1119	005566	005077	173554			1481	CLR	OVSTAT	
1120	005572	013703	001346				MOV	VCSTAT,R5	ILoad R5
1121	005576	012737	000000	003546			MOV	00,XPOS	ILoad X POSITION
1122	005604	012737	000200	003544			MOV	0200,YPOS	ILoad Y POSITION
1123	005612	004737	006010				JSR	PC,303	DISPLAY DIGITS
1124	005616	012737	001500	003546			MOV	01500,XPOS	ILoad X POS
1125	005624	012737	001500	003544			MOV	01500,YPOS	ILoad Y POS
1126	005632	004737	006010				JSR	PC,303	
1127	005636	032777	000100	173272			BIT	00176,0SWR	ITEST 0SWR
1128	005644	001432					REQ	228	IRR IF CONTINUOUS SAMPLES
1129									
1130	005646	012703	016200				MOV	000000,R5	ILoad BUFFER POINTER
1131	005652	012700	001000				MOV	01000,R0	ILoad COUNT
1132	005656	005077	173464				CLR	OVSTAT	ICLEAR STATUS
1133	005662	013703	006230				MOV	AX132,R3	IRESTORE R3
1134	005666	013704	006232				MOV	AX133,R4	IRESTORE R4
1135	005672	005013					CLR	(R3)	
1136	005674	005014					CLR	(R4)	
1137	005676	013777	006226	173442			MOV	AX131,OVSTAT	IRESTORE STATUS
1138	005704	012513			1381		MOV	(R5)+,(R3)	ILoad POINT
1139	005706	105777	173434		1281		TSTB	OVSTAT	WAIT FOR SCOPE
1140	005712	100373					RPL	128	
1141	005714	062714	000002				ADD	00,(R4)	UPDATE AXIS
1142	005720	005300					DEC	RR	IDONE ?
1143	005722	001370					BNE	138	IRR IF NOT
1144	005724	004737	011672				JSR	PC,TSTFLG	ITEST KEYBOARD FLAG
1145	005730	000716					RR	148	
1146	005732	012737	000001	013234	2281		MOV	01,TEMP3	ISFTUP TO PRINT '1' VALUE
1147	005740	032777	002000	173170			BIT	00W10,0SWR	
1148	005746	001406					REQ	218	
1149	005750	013746	006056				MOV	1020,-(SP)	
1150	005754	104402					TYPE		
1151	005756	004	001				.RYTE	4,1	
1152	005760	104400					TYPE		
1153	005762	012356					ACRLF		
1154	005764	004737	011672		2181		JSR	PC,TSTFLG	ITEST FOR KEYBOARD INTERRUPT
1155	005770	023777	013164	173140			CMP	KSTOR2,0SWR	ITEST IF SWITCH REGISTER HAS CHANGED
1156	005776	001402					REQ	238	IBRANCH AND TAKE NEXT BURST OF 512 CONVERSIONS
1157	006000	000137	005152				JMP	CAL072	YES, COMPUTE NEW INPUT
1158	006004	000137	005254		2381		JMP	CAL02A	

1159	006010	012737	000004	006054	3051	MOV	04,1013	LOAD COUNT
1160	006016	012737	006060	006052		MOV	00GTP,1005	LOAD POINTER
1161	006024	017702	000022		1051	MOV	01005,02	IGET ADDRESS
1162	006030	004737	003402			JSR	PC,CHAR	DISPLAY 0
1163	006034	062737	000002	006052		ADD	02,1005	UPDATE POINTER
1164	006042	005337	006054			DEC	1014	DEC COUNTER
1165	006046	001366				HALF	105	
1166	006050	000207				RTS	PC	EXIT
1167	006052	000000			10051	0		
1168	006054	000000			10151	0		
1169	006056	000000			10251	0		
1170	006060	000000			0GTP1	0		
1171	006062	000000			0GT11	0		
1172	006064	000000			0GT21	0		
1173	006066	000000			0GT31	0		
1174	006070	000000			0GT41	0		
1175	006072	003756			AND1	NO		
1176	006074	003763				N1		
1177	006076	003770				N2		
1178	006100	003775				N3		
1179	006102	004002				N4		
1180	006104	004007				N5		
1181	006106	004014				N6		
1182	006110	004021				N7		
1183								
1184	006112	005737	006222		CNVTSV1	TST	MARKER	TEST IF MARKER SAMPLE
1185	006116	001401				REQ	40	FOR IF NOT
1186	006120	005301				DEC	01	IFC OFFSET
1187	006122	005737	013222		451	TST	USECLK	CLOCK ENABLE
1188	006126	001406				REQ	50	FOR IF NOT
1189	006130	012777	177750	173206		MOV	0-TR,0CSR	LOAD PRESPT
1190	006136	012777	000003	173176		MOV	03,0CSR	LOAD RATE
1191	006144	153777	006224	173164	551	RISR	ADWRD1,0ADCS	IFNABLE A/D
1192	006152	000001				WAIT		
1193	006154	105077	173156		CNSTS11	CLR	0ADCS	
1194	006160	022626				CMR	(SP)+,(SP)+	CLEAN STACK
1195	006162	017702	173152			MOV	0ADWRD,R2	LOAD CONVERTED VALUE
1196	006166	060102				ADD	R1,R2	ADD OFFSET IF ANY
1197	006170	006302				ASL	R2	1X0
1198	006172	006302				ASL	R2	
1199	006174	006302				ASL	R2	
1200	006176	010213				MOV	R2,(R3)	LOAD AN AXIS
1201	006200	010225				MOV	R2,(R5)+	SAVE IN BUFFER
1202	006202	105777	173140		551	TSTR	OVSTAT	WAIT FOR SCOPE
1203	006206	100375				RPI	50	
1204	006210	062714	000002			ADD	02,(R4)	UPDATE O/A AXIS
1205	006214	005300				DEC	00	DONE ALL CONVERSIONS ?
1206	006216	001335				BNP	CNVTSV	FOR IF NOT
1207	006220	000207				RTS	PC	EXIT
1208	006222	000000			MARKER1	0		
1209	006224	000101			ADWRD11	101		
1210	006226	000000			AXIS11	0		
1211	006230	000000			AXIS21	0		
1212	006232	000000			AXIS31	0		

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1218 006234 000000
1219 006236 012737 000001 001164
1220
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1230
1231 006244 012737 006256 013152 REPTST1 MOV 0REPT1,AVECTR ISET UP CNTR 'A' VECTOR ADDRESS
1232 006252 104400 TYPE
1233 006254 012561 MES13 ITEXT 'REPEATABILITY TEST'
1234 006256 005037 013244 REPT11 CLR MESPRY
1235 006262 005037 013224 CLR OPS1
1236 006266 104400 TYPE
1237 006270 012617 MES14 IREQUEST CHANNEL (S)
1238 006272 004737 010206 JSR PC,XTTYIN IWAIT FOR INPUT
1239 006276 004737 010454 JSR PC,RCDBIN ICODE TO OCTAL
1240 006302 013737 010610 013162 MOV BCNTAB,KSTOR1 ISAVE AS INITIAL CH.
1241 006310 013737 013162 013164 MOV KSTOR1,KSTOR2 IALSO SAVE AS 2ND CH. ENTRY
1242 006316 005737 010612 TST RCNTAB+2 ITEST FOR SECOND ENTRY
1243 006322 001407 REPT2 REPT2 IBRANCH IF NO SECOND ENTRY
1244 006324 023737 010612 013162 CMP BCNTAB+2,KSTOR1 ICOMPARE ENTRY 1 TO ENTRY 2
1245 006332 100751 BMT REPT1 IBRANCH AND RESTART IF ILLEGAL
1246 006334 013737 010612 013164 MOV RCNTAB+2,KSTOR2 IOTHERWISE SAVE AS SECOND CH.
1247 006342 104400 REPT21 TYPE
1248 006344 012701 MES16 ITEXT 'COUNT SPREAD ?'
1249 006346 004737 010206 JSR PC,XTTYIN IWAIT FOR ENTRY
1250 006352 004737 010454 JSR PC,RCDBIN ICODE TO OCTAL
1251 006356 013737 010610 013166 MOV RCNTAB,KSTOR3 ISAVE IT
1252 006364 013737 013162 013170 REPT2A1 MOV KSTOR1,KSTOR4 ISAVE STARTING CH.
1253 006372 004737 011672 REPT31 JSR PC,TSTPLG ITEST FOR KEYBOARD FLAG
1254 006376 012737 001000 013160 MOV 01000,COUNT ISET FOR '512' CONVERSIONS
1255 006404 113737 013170 013147 MOV8 KSTOR4,ADWRD2+1 IMOV SELECTED CH. TO HIGH BYTE OF ADWRD
1256 006412 042737 100377 013146 RIC 0100377,ADWRD2 IMASK
1257 006420 052737 000001 013146 RIS 01,ADWRD2
1258 006426 004737 010620 JSR PC,ADCNVT ITAKE THE CONVERSIONS
1259 006432 004737 011152 JSR PC,CHPTE IAVERAGE & COMPUTE DISTRIBUTION
1260 006436 004737 011332 JSR PC,CATORZ
1261 006442 032777 002000 172466 RIT 00W10,00W8 ITEST DATA SW10
1262 006450 001047 BNF REPT4 IIF SET, FORCE TYPE OUT
1263 006452 032777 020000 172456 TSTCT41 RIT 00W13,00W8 ITEST FOR INHIBIT TYPEOUT
1264 006460 001142 BNE REPT7 IBRANCH IF SW SET
1265 006462 022737 000004 013166 CMP 04,KSTOR3 IAS 4 TYPED
1266 006470 001005 BNE TSTCT3 INO, TEST FOR '3'
1267 006472 022737 001000 013362 CMP 01000,XSPRD4 ITOTAL COUNTS WITHIN 4 COUNTS
1268 006500 001033 BNE REPT4 IBRANCH IF NO.

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1269	006502	000531			BR	REPT7		YES, TEST NEXT CH.
1270	006504	022737	000003	013166	TSTCT3: CMP	03,XSTOR3		ICOUNT = TO 3
1271	006512	001005			BNE	TSTCT2		INO TEST COUNT 2
1272	006514	022737	001000	013340	CMP	01000,XSPRD3		
1273	006522	001022			BNE	REPT4		IBRANCH IF COUNT NOT WITHIN 3
1274	006524	000520			RR	REPT7		YES, TEST NEXT CH.
1275								
1276	006526	022737	000002	013166	TSTCT2: CMP	02,XSTOR3		ICOUNT = TO 2
1277	006534	001005			BNE	TSTCT1		INO, TEST COUNT 1
1278	006536	022737	001000	013336	CMP	01000,XSPRD2		
1279	006544	001011			BNE	REPT4		IBRANCH IF NOT WITHIN 2
1280	006546	000507			RR	REPT7		YES, TEST NEXT CH.
1281	006550	022737	000001	013166	TSTCT1: CMP	01,XSTOR3		ICOUNT = TO 1
1282	006556	001004			BNE	REPT4		INO, REPORT EVEN IF NOT '0'
1283	006560	022737	001000	013334	CMP	01000,XSPRD1		
1284	006566	001477			REQ	REPT7		IBRANCH IF TOTAL WITHIN 1 COUNT
1285	006570	104400			REPT4: TYPE			
1286	006572	012356			ACRLF			
1287	006574	005737	013244		TST	MESPT		TEST IF HEADER HAS BEEN TYPED
1288	006600	001002			BNE	REPT5		IBRANCH IF YES
1289	006602	104400			TYPE			
1290	006604	012720			MES19			TEXT 'CH, LOW AVG, HIGH'
1291	006606	104400			REPT5: TYPE			
1292	006610	012356			ACRLF			ICARRIAGE RETURN, LINE FEED
1293	006612	013737	013170	007020	MOV	XSTOR4,REPT8A		IMOV, CH.
1294	006620	042737	177700	007020	RIC	0177700,REPT8A		
1295	006626	013746	007020		REPT8: MOV	REPT8A,-(SP)		
1296	006632	104402			TYPOS			
1297	006634	002	001		.BYTE	2,1		
1298	006636	004737	007662		JSR	PC,XSPACE		
1299	006642	013746	013252		MOV	ADLOW,-(SP)		ISAVE LOW VALUE
1300	006646	104402			TYPOS			
1301	006650	004	001		.BYTE	4,1		
1302	006652	004737	007662		JSR	PC,XSPACE		
1303	006656	013746	013266		MOV	AVRAGE,-(SP)		ISAVE AVERAGE
1304	006662	104402			TYPOS			
1305	006664	004	001		.BYTE	4,1		
1306	006666	004737	007662		JSR	PC,XSPACE		
1307	006672	013746	013250		MOV	ADMIGH,-(SP)		
1308	006676	104402			TYPOS			
1309	006700	004	001		.BYTE	4,1		
1310	006702	005737	013244		TST	MESPT		
1311	006706	001002			BNE	REPT6		
1312	006710	104400			TYPE			
1313	006712	012743			MES20			PRINT 'COUNT SPREAD' HEADER
1314	006714	052737	000007	013244	REPT6: RIS	07,MESPT		INHIBIT OTHER HEADERS
1315	006722	022737	001000	013316	CMP	01000,AVGCNT		TEST IF ALL COUNTS WERE AT AVG.
1316	006730	000240			NOP			IBREQ REPT7> BRANCH TO NEXT CH. IF YES.
1317	006732	104400			TYPE			
1318	006734	012356			ACRLF			
1319	006736	012704	013302		MOV	00RLOW,R4		
1320	006742	012402			REPT6A: MOV	(R4)+,R2		
1321	006744	004737	010754		JSR	PC,DECPRT		ITYPE OUT COUNT SPREAD
1322	006750	022704	013334		CMP	0XSPRD1,R4		TEST FOR DONE
1323	006754	001372			BNE	REPT6A		IBRANCH IF NO AND TYPE NEXT COUNT
1324	006756	005777	172154		TST	0SWR		

MAINDEC-11-DZARR-B
DZARRB.P11 Y12

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REPEATABILITY TEST

1325	006762	100001		RPL	REPT7	
1326	006764	000000		HALT		IREPEATABILITY ERROR
1327	006766	013700	013170	REPT71	MOV	KSTOR4,R4
1328	006772	042700	177700		RIC	0177700,R4
1329	006776	023700	013164		CMP	KSTOR2,R4
1330	007002	001400			REQ	REPT7A
1331	007004	005237	013170		INC	KSTOR4
1332	007010	000137	006372		JMP	REPT3
1333	007014	000137	006364	REPT7A1	JMP	REPT2A
1334						
1335	007220	000000		REPT8A1	R	

```

1336
1337
1338
1339
1340 007022 000000
1341
1342
1343
1344
1345
1346 007024 012737 007036 013152 RECVY1 MOV 007036,AVECTR ISET UP THE "A" RETURN ADDRESS
1347 007032 104400 TYPE
1348 007034 012454 MESA ITEXT 'RECOVERY TEST'
1349 007036 104400 RECVY1 TYPE IREQUEST CHANNELS
1350 007040 012617 MESA
1351 007042 004737 010206 JSR PC,XTTVIN IWAIT FOR INPUT
1352 007046 004737 010454 JSR PC,RCDBIN ICONVERT TO OCTAL
1353 007052 013737 010610 013162 MOV BCNTAB,KSTOR1 ISAVE 1ST CH.
1354 007060 013737 010612 013164 MOV BCNTAB+2,KSTOR2 ISAVE 2ND CH.
1355 007066 004737 011672 RECVY2 JSR PC,TSTFLG ICHECK FOR KEYBOARD FLAG
1356 007072 012737 000020 007406 MOV 016,,108 ILOAD COUNT
1357 007100 005037 007410 CLR 118
1358 007104 012737 000010 013234 MOV 010,TEMP3 ISET UP TO PRINT EIGHT
1359 007112 012737 000010 013160 MOV 010,COUNT ISETUP TO TAKE '8' CONVERSIONS
1360 007120 113737 013162 013147 181 MOVB KSTOR1,ADWRD2+1 ILOAD 1ST CH.
1361 007126 042737 140377 013146 BIC 0140377,ADWRD2
1362 007134 052737 000001 013146 BIS 01,ADWRD2
1363 007142 005237 013216 INC DELAY INO DELAY BETWEEN MUX CHANGE AND CONVERT
1364 007146 004737 010620 JSR PC,ADCNVT ITAKE THE CONVERSIONS
1365 007152 113737 013164 013147 MOVB KSTOR2,ADWRD2+1 ISET UP 2ND CH.
1366 007160 042737 140377 013146 BIC 0140377,ADWRD2
1367 007166 052737 000001 013146 BIS 01,ADWRD2
1368 007174 005237 013216 INC DELAY INO DELAY BETWEEN MUX CHANGE AND CONVERT
1369 007200 004737 010620 JSR PC,ADCNVT ITAKE 2ND SERIES OF CONVERSIONS
1370 007204 013701 007410 MOV 118,R1 ILOAD A POINTER
1371 007210 012700 016200 MOV 000000,R0 ILOAD POINTER
1372 007214 012061 016242 MOV (R0)+,ADTB0(R1)
1373 007220 012061 016304 MOV (R0)+,ADTB1(R1)
1374 007224 012061 016346 MOV (R0)+,ADTB2(R1)
1375 007230 012061 016410 MOV (R0)+,ADTB3(R1)
1376 007234 012061 016452 MOV (R0)+,ADTB4(R1)
1377 007240 012061 016514 MOV (R0)+,ADTB5(R1)
1378 007244 012061 016556 MOV (R0)+,ADTB6(R1)
1379 007250 012061 016620 MOV (R0)+,ADTB7(R1)
1380 007254 062737 000002 007410 ADD 02,118 IUPDATE POINTER
1381 007262 005337 007406 DEC 108
1382 007266 001314 BNE 18
1383
1384 007270 012700 000010 MOV 00,,R0 ILOAD COUNT
1385 007274 012702 016200 MOV 000000,R2 ILOAD POINTER
1386 007300 012701 000000 MOV 00,R1
1387 007304 012737 000017 013230 281 MOV 015,,TEMP1 ILOAD TEMP
1388 007312 012737 000004 011330 MOV 04,CMPENT ILOAD AVRG. COUNT
1389 007320 016104 007414 MOV LANTB(R1),R4 IGET POINTER
1390 007324 004737 011172 JSR PC,CMPTEA I AVERAGE
1391 007330 013722 013266 MOV AVRG,(R2)+ ISAVE AVERAGE

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MAINDEC-11-DZARR-8
DZARR00.P11

T13

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RECOVERY TEST

1392 007334 005721
1393 007336 005300
1394 007340 001361

TSY (R1)+
DEC RR
RNE 29

IUPDATE POINTER
JRR IF NOT DONE

1395
1396
1397 007342 032777 002000 171566

RIT 0SW10,0SWR
RNF RECVV2

ITEST BIT 10

1398 007350 001246
1399 007352 104400
1400 007354 012505
1401 007356 013746 013160

TYPE
MES0
MOV KSTOR2,-(SP)

ITEXT 'CH.'

1402 007362 104402
1403 007364 002 001
1404 007366 012737 000002 007712
1405 007374 004737 007662
1406 007400 004737 007714

TYPOS
BYTE 2,1
MOV 02,SPACEY
JSR PC,XSPACE
JSR PC,XPRVAV
RR RECVV2

PRINT VALUES OF 2ND CH.
DO IT AGAIN

1407 007404 000630
1408 007406 000000
1409 007410 000000
1410 007412 000000

108: 0
118: 0
128: 0

1411
1412 007414 016242
1413 007416 016304
1414 007420 016346
1415 007422 016410
1416 007424 016452
1417 007426 016514
1418 007430 016556
1419 007432 016620

LADTR: ADTR0
ADTR1
ADTR2
ADTR3
ADTR4
ADTR5
ADTR6
ADTR7

```

1420                                     ;*****
1421                                     ;*TEST 10      LOAD DIFFERENT NUMBERS INTO DIFFERENT REG.
1422                                     ;*****
1423 007434 000000 TST14: SCOPE
1424 007436 012737 000000 001164 MOV 000,STIMES      ;1000 40 ITERATIONS
1425 007444 012737 007452 013152 REYST1: MOV 0200,AVECTR
1426 007452 104400 200: TYPE
1427 007454 011772 MSG2 ;TYPE HEADER ABOUT TEST
1428 007456 005037 007636 CLR 710
1429 007462 000000 RESET
1430 007464 012737 000000 007634 110: MOV 00,700      ;LOAD COUNTER
1431 007472 000200 100: NOP
1432 007474 013700 001354 20: MOV CSC,00      ;LOAD STARTING ADDRESS
1433 007500 062700 000002 ADD 02,00
1434 007504 012701 007660 MOV 001FNUM+20,01      ;LOAD STARTING TABLE ADDRESS
1435 007510 012702 000010 MOV 00,,02      ;LOAD COUNT
1436 007514 010100 10: MOV -(01),-(00)      ;LOAD THE REG
1437 007516 005302 DEC 02      ;DONE ALL ?
1438 007520 001375 RNF 10      ;OR IF NOT
1439
1440 007522 013700 001336 MOV 0000,00      ;LOAD STARTING POINTER
1441 007526 012701 007640 MOV 001FNUM,01      ;LOAD STARTING POINTER <EXPECTED>
1442 007532 012702 000010 MOV 00,,02      ;LOAD # OF REG
1443
1444 007536 011137 001124 30: MOV (01),SGDDAT      ;READ REG
1445 007542 011037 001126 MOV (00),SDDAT      ;READ REG
1446 007546 023737 001124 001126 CMP SGDDAT,SDDAT      ;COMPARE
1447 007554 001003 REQ 40      ;IFR IF EQUAL
1448 007556 010037 007660 MOV 00,00FADR      ;SAVE BUS ADDRESS
1449 007562 104001 ERROR 1      ;INCORRECT DATA, REG. WAS CHANGED IN ERROR
1450 007564 022021 40: CMP (00)+,(01)+      ;UPDATE POINTERS
1451 007566 005302 DEC 02      ;DONE ALL REG ?
1452 007570 001362 RNF 30      ;OR IF NOT
1453 007572 005077 171550 CLR 00CESTAT
1454 007576 004737 011672 JSR PC,TSTFLG
1455 007602 005337 007634 DEC 700      ;DONE
1456 007606 001331 RNF 100      ;NO
1457 007610 104400 TYPE
1458 007612 004521 SENDMG
1459 007614 005237 007636 INC 710
1460 007620 013746 007636 MOV 710,-(00)
1461 007624 104400 TYPDS
1462 007626 104400 004516 TYPE ,SNULL
1463 007632 000714 RR 110      ;LOOP BACK
1464 007634 000000 700: R
1465 007636 000000 710: R
1466
1467 ;0 TO BE LOADED INTO DIFFERENT REG
1468
1469 007640 027560 BUFNUM: 27560      ;A TO D STATUS
1470 007642 000000 0      ;A TO D BUFFER
1471 007644 140736 140736      ;LOCK STATUS
1472 007646 000377 377      ;CLOCK PRESET
1473 007650 007214 7214      ;VC STATUS
1474 007652 001252 1252      ;VC X POS
1475 007654 000525 525      ;VC Y POS

```

1476	007656	000377		377					
1477									
1478	007660	170400		BUFADR: 170400					
1479									
1480									
1481									
1482									
1483									
1484									
1485									
1486	007662	105777	171260						
1487	007666	100375							
1488	007670	012777	000240	171252					
1489	007676	005337	007712						
1490	007702	003367							
1491	007704	005037	007712						
1492	007710	000207							
1493	007712	000000							
1494									
1495									
1496									
1497	007714	012737	016200	007724					
1498	007722	013746							
1499	007724	016200							
1500	007726	104402							
1501	007730	004	001						
1502	007732	062737	000002	007724					
1503	007740	012737	000002	007712					
1504	007746	004737	007662						
1505	007752	005337	013234						
1506	007756	001361							
1507	007760	000207							
1508									
1509									
1510									
1511									
1512									
1513									
1514									
1515									
1516									
1517									
1518									
1519									
1520									
1521									
1522	007762								
1523	007762	010046							
1524	007764	010146							
1525	007766	010246							
1526	007770	010346							
1527	007772	010546							
1528	007774	012746	020200						
1529	010000	016605	000020						
1530	010004	100000							
1531	010006	005405							

ICLOCK COUNTER

IBUS ADDRESS OF REG IN ERROR

ISUBROUTINE TO ISSUE N SPACES
IN IS ONE PLUS VALUE CONTAINED IN SPACEX
ISPACEX IS CLEARED WITHIN THE SUBROUTINE, SO THAT A CALL ON
ISPACE WITHOUT LOADING SPACEX ISSUES ONLY ONE SPACE

XSPACE: TSTR	0STPS	WAIT FOR TTY READY
RPL	.-4	
MOV	0240,0STPR	OUTPUT A SPACE
DEC	SPACEX	DECREMENT COUNT
RGY	XSPACE	LOOP IF NOT DONE
CLR	SPACEX	RESET COUNT TO ZERO
RTS	PC	RETURN

SPACEX: 0

ISUBROUTINE TO TYPE OUT AVERAGES FOR THE RECOVERY TEST

XPRTA1: MOV	0ADRUFF,AVGTAB
XPTA1: MOV	0(PC)+,-(SP)
AVGTAB: ADRUFF	
TYPOS	
.BYTE	0,1
ADD	02,AVGTAB
MOV	02,SPACEX
JSR	PC,XSPACE
DEC	TEMP3
RNE	XPTA1
RTS	PC

.SBTTL CONVERT BINARY TO DECIMAL AND TYPE ROUTINE

THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT, DEPENDING ON WHETHER THE
NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
REPLACED WITH SPACES.

CALL
MOV NUM,-(SP) INPUT THE BINARY NUMBER ON THE STACK
TYPDS GO TO THE ROUTINE

STYPDS:		
MOV	R0,-(SP)	PUSH R0 ON STACK
MOV	R1,-(SP)	PUSH R1 ON STACK
MOV	R2,-(SP)	PUSH R2 ON STACK
MOV	R3,-(SP)	PUSH R3 ON STACK
MOV	R4,-(SP)	PUSH R4 ON STACK
MOV	020200,-(SP)	SET BLANK SWITCH AND SIGN
MOV	20(SP),R5	GET THE INPUT NUMBER
BPL	15	IF INPUT IS POS.
NEG	R5	MAKE THE BINARY NUMBER POS.

1532	010010	112766	000055	000001		MOVR	0'-,1(SP)	MAKE THE ASCII NUMBER NEG.
1533	010016	005000			151	CLR	R0	ZERO THE CONSTANTS INDEX
1534	010020	012703	010176			MOV	000LK,R3	SETUP THE OUTPUT POINTER
1535	010024	112723	000040			MOVR	0' ,(R3)+	SET THE FIRST CHARACTER TO A BLANK
1536	010030	005002			251	CLR	R2	CLEAR THE BCD NUMBER
1537	010032	016001	010166			MOV	000L(R0),R1	GET THE CONSTANT
1538	010036	160105			351	SUB	R1,R5	FORM THIS BCD DIGIT
1539	010040	002402				RLT	00	IF DONE
1540	010042	005202				INC	R2	INCREASE THE BCD DIGIT BY 1
1541	010044	000774				RR	35	
1542	010046	060105			451	ADD	R1,R5	ADD BACK THE CONSTANT
1543	010050	005702				TST	R2	CHECK IF BCD DIGIT=0
1544	010052	001002				RNF	55	FALL THROUGH IF 0
1545	010054	105716				TSTB	(SP)	STILL DOING LEADING 0'S?
1546	010056	100407				BMJ	75	IF YES
1547	010060	106316			551	ASLR	(SP)	MSD?
1548	010062	103003				RCC	65	IF NO
1549	010064	116663	000001	177777		MOVR	1(SP),-1(R3)	YES--SET THE SIGN
1550	010072	052702	000060		651	RIS	0'0,R2	MAKE THE BCD DIGIT ASCII
1551	010076	052702	000040		751	RIS	0' ,R2	MAKE IT A SPACE IF NOT ALREADY A DIGIT
1552	010102	110223				MOV0	R2,(R3)+	PUT THIS CHARACTER IN THE OUTPUT BUFFER
1553	010104	005720				TST	(R0)+	JUST INCREMENTING
1554	010106	020027	000010			CMR	R0,R10	CHECK THE TABLE INDEX
1555	010112	002746				BLT	25	GO DO THE NEXT DIGIT
1556	010114	003002				RGY	05	GO TO EXIT
1557	010116	010502				MOV	R5,R2	GET THE LSD
1558	010120	000764				RR	65	GO CHANGE TO ASCII
1559	010122	105726			851	TSTR	(SP)+	WAS THE LSD THE FIRST NON-ZERO?
1560	010124	100003				RPI	05	IF NO
1561	010126	116663	177777	177776		MOVR	-1(SP),-2(R3)	YES--SET THE SIGN FOR TYPING
1562	010134	105013			951	CLRB	(R3)	SET THE TERMINATOR
1563	010136	012605				MOV	(SP)+,R5	POP STACK INTO R5
1564	010140	012603				MOV	(SP)+,R3	POP STACK INTO R3
1565	010142	012602				MOV	(SP)+,R2	POP STACK INTO R2
1566	010144	012601				MOV	(SP)+,R1	POP STACK INTO R1
1567	010146	012600				MOV	(SP)+,R0	POP STACK INTO R0
1568	010150	104400	010176			TYPE	,000LK	NOW TYPE THE NUMBER
1569	010154	016666	000002	000004		MOV	2(SP),4(SP)	ADJUST THE STACK
1570	010162	012616				MOV	(SP)+,(SP)	
1571	010164	000002				RTI		RETURN TO USER
1572	010166	023420			SDTBL:	10000.		
1573	010170	001750				1000.		
1574	010172	000144				100.		
1575	010174	000012				10.		
1576	010176	000004			SDBLK:	.0LKW	4	

				KEYBOARD SERVICE ROUTINE		
1577						
1578						
1579	010206	012704	010436	170722	XTTVINI: MOV	01N0UF, R4
1580	010212	042777	000100		BIC	00176, 08TK9
1581	010220	005037	013156		CLW	CHRCNT
1582	010224	005037	010436		CLW	INRUF
1583	010230	005037	010440		CLW	INRUF+2
1584	010234	105777	170702	118:	TSTR	09TK9
1585	010240	100375			BPL	118
1586	010242	017701	170676		MOV	09TK9, R1
1587	010246	042701	177640		BIC	0177640, R1
1588	010252	120127	000060		CMPR	R1, 060
1589	010256	100420			RMV	148
1590	010260	122701	000137		CMPR	0137, R1
1591	010264	100415			RMV	148
1592	010266	010124		128:	MOV	R1, (R4)+
1593	010270	005237	013156		INP	CHRCNT
1594	010274	022737	000006	013156	CMR	06, CHRCNT
1595	010302	100451			BMV	48
1596	010304	105777	170636	132:	TSTR	08TP8
1597	010310	100375			BPL	138
1598	010312	110177	170632		MOV8	R1, 08TP8
1599	010316	000746			BR	118
1600					ISUBROUTINE TO TEST FOR SPECIAL CHARACTERS 'A', 'C', 'G', 'CR', ',', OR 'RUBOUT'	
1601						
1602	010320	122701	000001	148:	CMRB	01, R1
1603	010324	001005			RNE	18
1604	010326	104400			TYPE	
1605	010330	012351			CNTRLA	
1606	010332	005726			TST	(SP)+
1607	010334	000177	002612		JMP	0AVECTR
1608	010340	122701	000003	18:	CMRB	03, R1
1609	010344	001003			RNE	28
1610	010346	005726			TST	(SP)+
1611	010350	000137	002076		JMP	INIT2
1612	010354	122701	000137	28:	CMRB	0137, R1
1613	010360	001011			RNE	38
1614	010362	005737	013156		TST	CHRCNT
1615	010366	001722			BEQ	118
1616	010370	005337	013156		DEC	CHRCNT
1617	010374	012701	000134		MOV	0134, R1
1618	010400	005744			TST	-(R4)
1619	010402	000740			RR	138
1620	010404	122701	000054	38:	CMRB	054, R1
1621	010410	001726			REQ	128
1622	010412	122701	000015		CMRB	015, R1
1623	010416	001003			RNE	48
1624	010420	104400			TYPE	
1625	010422	012356			ACRLF	
1626	010424	000207			RTS	PC
						1EXIT

1627 P10426 104405
 1628 010430 104400
 1629 010432 012365
 1630 010434 000664
 1631 010436 000000
 1632
 1633
 1634 P10450
 1635
 1636
 1637
 1638 P10454 012704 010436
 1639 P10460 012703 010610
 1640 010464 005037 010612
 1641 010470 005001
 1642 010472 005002
 1643 010474 005737 013156
 1644 010500 003424
 1645 010502 005337 013156
 1646 010506 122714 000054
 1647 010512 001417
 1648 010514 121427 000060
 1649 010520 002425
 1650 010522 021427 000067
 1651 010526 003022
 1652 010530 042714 177770
 1653 010534 012400
 1654 010536 010102
 1655 010540 006301
 1656 010542 006301
 1657 010544 006301
 1658 010546 000001
 1659 010550 000751
 1660 010552 020127 000077
 1661 010556 003006
 1662 010560 005724
 1663 010562 010123
 1664 010564 005737 013156
 1665 010570 001337
 1666 010572 000207
 1667 010574 104400
 1668 010576 012365
 1669 010600 004737 010206
 1670 010604 000137 010450
 1671 010610 000000
 1672 010612 000000
 1673 010614 000000
 1674 010616 000000

481 CKSWR
 TYPE
 QMARK
 RR XTTYIN
 INBUF: 0

TEST FOR CTRL G
 OTHERWISE TYPE '7'
 WAIT FOR NEW ENTRY
 CHARACTER STORAGE BUFFER

.0.14
 SUBROUTINE WILL CONVERT 'N' WORDS (SEPARATED VIA COMMA'S)
 WHICH WERE STORED IN A TABLE VIA 'TTYIN' TO OCTAL AND STORE THEM.

BCDRIN: MOV INBUF,R4
 MOV BCDTAB,R3
 CLR BCDTAB+2
 BCDON1: CLR R1
 CLR R2
 BCDON2: TST CHRCNT
 BLE BCDEND
 DEC CHRCNT
 CMPB 054,(R4)
 BEQ RCDERR
 CMPB (R4),060
 BLT RCDERR
 CMP (R4),067
 BGT RCDERR
 RLC 0177770,(R4)
 MOV (R4)+,R2
 MOV R1,R2
 ASL R1
 ASL R1
 ASL R1
 ADD R0,R1
 RR RCDON2
 BCDEND: CMP R1,077
 RGT RCDERR
 TST (R4)+
 MOV R1,(R3)+
 TST CHRCNT
 RNF RCDON1
 RTS PC
 BCDERR: TYPE
 QMARK
 JSR PC,XTTYIN
 JMP BCDON1
 BCDTAB: 0
 0
 0
 0

SETUP ASCII STORAGE TABLE
 TABLE FOR STORAGE OF CONVERTED WORDS
 REG. TO STORE RUNNING TOTAL
 TEMP. STORAGE FOR 'R1'
 END OF DATA?
 YES: EXIT
 DECREMENT CHARACTER COUNTER
 IS CHARACTER = TO ' '?
 YES: DECODE NEW WORD
 TEST FOR LEGAL NO.
 STRIP NO.
 SAVE NO. IN RR.
 SAVE CURRENT TOTAL
 INX2
 INX4
 INX8
 IN+NEW NO.
 UPDATE BUFFER
 SAVE CONVERTED VALUE & SETUP TO SAVE NEXT
 FINISHED?
 NO, CONVERT NEXT WORD
 YES: EXIT
 TYPE '7'.
 TO BE TYPED ON QUESTIONABLE ENTRIES.
 OCTAL STORAGE TABLE

```

1675          ISUBROUTINE TO TAKE 'N' CONVERSIONS AND STORE THEM IN AN A/D BUFFER. ROUTINE
1676          IS ENTERED WITH 'N' IN COUNT AND THE CM TO BE CONVERTED IN 'ADWORD'.
1677          ENTERING WITH DELAY = 0 CAUSES DELAY BETWEEN MUX LOAD AND START OF
1678          FIRST CONVERSION
1679
1680  P10620  005077  167152  ADCNVT: CLR      0PSW
1681  P10624  013737  013160  013270  MOV      COUNT,TEMP1  ISET UP NO. OF CONVERSIONS TO BE TAKEN
1682  P10632  012704  016200  MOV      ADBUFF,R4    ISET UP BUFFER ADDRESS.
1683  P10636  005737  013216  TST      DELAY        ICHECK IF DELAY SET
1684  P10642  001017  BNE      30           IOR IF INHIBIT DELAY
1685  P10644  113777  013147  000100  MOVR     ADWORD2+1,0ADCS1 ILOAD MUX
1686  P10652  013737  010746  013220  MOV      CPTIME,DELAY1  ISET UP TIMER
1687  P10660  005337  013220  40:      DEC      DELAY1  ILOOP
1688  P10664  001375  RNE      40
1689  P10666  113777  013146  170442  MOVB     ADWORD2,0ADCS  ILOAD LOW BYTE
1690  P10674  000405  RR       10
1691  P10676  000240  20:      NOP
1692  P10700  000240  NOP
1693  P10702  013777  013146  170426  30:      MOV      ADWORD2,0ADCS  ILOAD CONTROL
1694  ILOAD CM. & START CONVERT
1695  P10710  105777  170422  10:      TSTB     0ADCS  IWAIT FOR DONE
1696  P10714  100375  BPL      10           IDELAY
1697  P10716  017724  170416  MOV      0ADDBR,(R4)+  ISAVE DATA
1698  P10722  005337  013230  DEC      TEMP1        IDECREMENT COUNTER
1699  P10726  003363  BGT      20           IIF NOT '0' TAKE NEXT CONVERSION
1700  P10730  005037  013216  CLR      DELAY
1701  P10734  000207  RTS      PC
1702
1703  P10736  002000  CPDLAY: 2000  IPDP-11/05
1704  P10740  002400  2400  IPDP-11/20
1705  P10742  003500  3500  IPDP-11/40
1706  P10744  006000  6000  IPDP-11/45
1707
1708  P10746  002000  CPTIME: 2000
1709  P10750  000001  CPTYPE: 1
1710  P10752  170401  ADCS1: 170401
1711

```

1712									
1713									PRINT DECIMAL VALUE IN R2
1714									
1715	010754	005077	167010			DECPNT1	CLR	OPSW	
1716	010760	012737	177774	011134			MOV	0-4,DIGCNT	
1717	010766	012737	011102	011140			MOV	00FCPNT+2,DECPNT	
1718	010774	012737	000240	011136			MOV	0240,ZERO	
1719	011002	012737	177777	011132		TYPT11	MOV	0-1,DIGIT	
1720	011010	005237	011132			TYPT21	INC	DIGIT	
1721	011014	167702	000120				SUB	00DECPNT,X2	
1722	011020	100373					RPL	TYPT2	
1723	011022	067702	000112				ADD	00DECPNT,X2	
1724	011026	004737	011032				JSR	PC,DECOUT	
1725	011032	005237	011134				INP	DIGCNT	
1726	011036	001001					RNE	TYPT3	
1727	011040	000207					RTS	PC	
1728	011042	062737	000002	011140		TYPT31	ADD	02,DECPNT	
1729	011050	000754					BR	TYPT1	
1730	011052	005737	011132			DECOUT1	TSY	DIGIT	
1731	011056	001010					BNE	DEC1	
1732	011060	022737	177777	011134			CHP	0-1,DIGCNT	
1733	011066	001404					BEO	DEC1	
1734	011070	013737	011136	011132			MOV	ZERO,DIGIT	
1735	011076	000406					RR	DEC2	
1736	011100	012737	000260	011136		DEC11	MOV	0260,ZERO	
1737	011106	052737	000260	011132			RIS	0260,DIGIT	
1738	011114	105777	170026			DEC21	TSYA	0STPS	
1739	011120	100373					RPL	0-4	
1740	011122	013777	011132	170020			MOV	DIGIT,0STPS	
1741	011130	000207					RTS	7	

1742 011132 000000
 1743 011134 000000
 1744 011136 000200
 1745 011140 011100
 1746 011142 001750
 1747 011144 000100
 1748 011146 000012
 1749 011150 000001

DIGIT: 0
 DIGCNT: 0
 ZERO: 240
 DECPNT: .02
 1000.
 100.
 10.
 1.

1750
 1751
 1752 COMPUTE THE RESULTS OF 512 CONVERSIONS AS HIGH, LOW AND AVERAGE

1753 011152 012737 000777 013230
 1754 011160 012737 000011 011330
 1755 011166 012704 016200
 1756 011172 005037 013246
 1757 011176 012437 013266
 1758 011202 013737 013266 013250
 1759 011210 013737 013266 013252
 1760 011216 012437 013232
 1761 011222 023737 013232 013250
 1762 011230 003403
 1763 011232 013737 013232 013250
 1764 011240 023737 013232 013252
 1765 011246 003003
 1766 011250 013737 013232 013252
 1767 011256 003737 013232 013266
 1768 011264 005537 013246
 1769 011270 005537 013230
 1770 011274 001350
 1771 011276 013737 011330 013230
 1772 011304 006237 013246
 1773 011310 006037 013266
 1774 011314 005537 013230
 1775 011320 001371
 1776 011322 005537 013266
 1777 011326 000207
 1778
 1779 011330 000011

CMPT: MOV 0777,TEMP1
 MOV 011,CMPCNT
 CMPT: MOV 0000FF,04
 CMPT: CLR HIORDV
 MOV (04)+,AVRAGE
 MOV AVRAGE,ADHIGH
 MOV AVRAGE,ADLOW
 GETDAT: MOV (04)+,TEMP2
 CMP TEMP2,ADHIGH
 RLE TSLN
 MOV TEMP2,ADHIGH
 TSL: CMP TEMP2,ADLOW
 RGT TAGA
 MOV TEMP2,ADLOW
 TAGA: ADD TEMP2,AVRAGE
 ADC HIORDV
 DEC TEMP1
 RNF GETDAT
 MOV CMPCNT,TEMP1
 AVGDAT: ABR HIORDV
 ROR AVRAGE
 DEC TEMP1
 RNF AVGDAT
 ADC AVRAGE
 RTS PC

1753 SET UP TO COMPARE '511' NUMBERS
 1754 LOAD COUNTER
 1755 LOAD STARTING ADDRESS
 1756 CLR HI ORDER DIVIDEND
 1757 STORE 1ST VALUE AS AVERAGE
 1758 HIGH
 1759 IS LOW
 1760 IS NEW NO. GREATER THAN OLD NO. ?
 1761 BRANCH IF NOT GREATER
 1762 OTHERWISE SAVE AS NEW HIGH
 1763
 1764 OTHERWISE SAVE AS NEW LOW
 1765 ADD LOW ORDER
 1766 ADD CARRY TO HI ORDER
 1767
 1768 1512 ADDITIONS?
 1769 YES, DIVIDE/512
 1770
 1771 SHIFT CARRY BIT INTO LO ORDER
 1772
 1773 DONE?
 1774 YES, ADD REMAINDER TO LO ORDER

CMPCNT: 11

```

1780                                     ISUBROUTINE TO CALCULATE THE PLUS & MINUS 5 COUNT LIMITS FROM AN AVERAGE
1781
1782 011332 012737 000005 013230 CATR21 MOV 05,TEMP1
1783 011340 013737 013266 013232      MOV AVERAGE,TEMP2      IMOV AVER. TO WORK AREA
1784 011346 012703 013270      MOV AVERAGE,R3      ISETUP DISTRIBUTION TABLE (POS.)
1785 011352 005237 013232      FILE11 INC TEMP2      IABA+1
1786 011356 013723 013232      MOV TEMP2,(R3)+      ISAVE A+1
1787 011362 005337 013230      DEC TEMP1      ISAVED '5' COUNTS?
1788 011366 001371      BNE FILE1      IBRANCH IF NO
1789
1790 011370 012737 000005 013230      ISET UP TABLE OF AVG. -1 TO -5
1791 011376 013737 013266 013232      MOV 05,TEMP1
1792 011400 012703 013266      MOV AVERAGE,TEMP2      IMOV AVG. TO WORK AREA.
1793 011410 005337 013232      MOV AVERAGE,R3      ISET UP DISTRIBUTION TABLE NEG.
1794 011414 013743 013232      FILE21 DEC TEMP2      IAB1-1
1795 011420 005337 013230      MOV TEMP2,-(R3)      ISAVE 'A-1'
1796 011424 001371      DEC TEMP1      ISAVED '5' COUNTS?
1797      BNE FILE2      IBRANCH IF NO
1798
1799                                     ICATEGORIZE THE COUNT SPREAD AS '+6 & -6' COUNTS FROM THE AVERAGE
1800 011426 012703 013302      MOV 00RLOW,R3      ICLEAR COUNTS
1801 011432 005023      CATR11 CLR (R3)+
1802 011434 022703 013334      CMP 00RHIGH+2,R3      IFINISHED?
1803 011440 001374      BNE CATR1      INO, CLEAR NEXT COUNTER
1804 011442 012737 001001 013230      MOV 01001,TEMP1      ICOMPARE '512' COUNTS
1805 011450 012700 016200      MOV 0ADRUFF,R0      ISET UP A/D BUFFER
1806 011454 005337 013230      CATR21 DEC TEMP1
1807 011460 001437      BEQ CATR5      IEXIT IF '0'
1808 011462 012037 013232      MOV (R0)+,TEMP2
1809 011466 023737 013300 013232      CMP AVERP5,TEMP2
1810 011474 100423      BMT OVRH1
1811 011476 023737 013232 013254      CMP TEMP2,AVERM5
1812 011504 100422      BMT OVRLO
1813 011506 005001      CLR R1
1814 011510 012702 013254      MOV 0AVERM5,R2
1815 011514 022237 013232      CATR31 CMP (R2)+,TEMP2
1816 011520 001405      BEQ CATR4
1817 011522 005201      INC R1
1818 011524 022701 000013      CMP 013,R1
1819 011530 001371      BNE CATR3
1820 011532 000000      HALT
1821 011534 006301      CATR41 ASL R1      IFATAL ERROR
1822 011536 005261 013304      INC MINUS5(R1)      IMULTIPLY 'OFFSET' X2
1823 011542 000744      BR CATR2
1824 011544 005237 013332      OVRH1: INC 00RHIGH
1825 011550 000741      BR CATR2
1826 011552 005237 013302      OVRLO: INC 00RLOW
1827 011556 000736      BR CATR2

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1828
1829
1830          IADD THE COUNTS AND SAVE TOTAL IN SPREADS OF '1-4'
1831 011560 013737 013316 013334 CATRS1 MOV      AVGENT,XSPRD1
1832 011566 063737 013320 013334      ADD      PLUS1,XSPRD1
1833 011574 063737 013314 013334      ADD      MINUS1,XSPRD1      I=TO NO. COUNTS AT SPREAD OF '1'
1834 011602 013737 013334 013336      MOV      XSPRD1,XSPRD2
1835 011610 063737 013322 013336      ADD      PLUS2,XSPRD2
1836 011616 063737 013312 013336      ADD      MINUS2,XSPRD2      I=TO NO. COUNTS AT SPREAD OF '2'
1837 011624 013737 013336 013340      MOV      XSPRD2,XSPRD3
1838 011632 063737 013324 013340      ADD      PLUS3,XSPRD3
1839 011640 063737 013310 013340      ADD      MINUS3,XSPRD3      I=TO NO. COUNTS AT SPREAD OF '3'
1840 011646 013737 013340 013342      MOV      XSPRD3,XSPRD4
1841 011654 063737 013326 013342      ADD      PLUS4,XSPRD4
1842 011662 063737 013306 013342      ADD      MINUS4,XSPRD4      I=TO NO. COUNTS AT SPREAD OF '4'
1843 011670 000207      RTS      PC      IEXIT
1844
1845          ISUPROUTINE TO TEST FOR THE KEYBOARD FLAG BEING SET
1846
1847 011672 105777 167244      TSTFLG1 TSTB      08YK9      IFLAG SET?
1848 011676 100002      BPL      18      INO, EXIT
1849 011700 004737 010206      JSR      PC,XTTVIN      IYES,INQUIRE
1850 011704 000207      RTS      PC
1851

```

1052	011706	005015	040412	026522	TITLE: .ASCIIZ	<15><12><12>'AR-11 DIAGNOSTIC TEST II, (MAINDEC-11-DZARR-8)'<15><12>
1053	011714	030461	042040	040511		
1054	011722	047107	051517	044524		
1055	011730	020103	042524	052123		
1056	011736	044440	026111	024040		
1057	011744	040515	047111	042504		
1058	011752	026503	030461	042055		
1059	011760	040532	041122	041055		
1060	011766	006451	000012			
1061	011772	005015	052123	052101	MESS2: .ASCIIZ	<15><12>'STATIC REGISTER TEST'<15><12>
1062	012000	041511	051040	043505		
1063	012006	051511	042524	020122		
1064	012014	042524	052123	005015		
1065	012022	000				
1066	012023	015	042412	040522	MESS3: .ASCIIZ	<15><12>'ERASE RETURN FAILED TO SET READY'<15><12>
1067	012030	042523	051040	052105		
1068	012036	051125	020116	040506		
1069	012044	046111	042105	052040		
1070	012052	020117	042523	020124		
1071	012060	042522	042101	006531		
1072	012066	000012				
1073	012070	005015	054524	042520	MESS4: .ASCII	<15><12>'TYPE LETTER ' ' TO RUN DESIRED TEST'<15><12>
1074	012076	046040	052105	042524		
1075	012104	020122	020047	020047		
1076	012112	047524	051040	047125		
1077	012120	042040	051505	051111		
1078	012126	042105	052040	051505		
1079	012134	035124	005015			
1080	012140	040447	036447	052123	.ASCII	'A'STATIC REGISTER TEST'<15><12>
1081	012146	052101	041511	051040		
1082	012154	043505	051511	042524		
1083	012162	020122	042524	052123		
1084	012170	005015				
1085	012172	041047	036447	041523	.ASCII	'R'SCOPE ADJUSTMENT TESTS'<15><12>
1086	012200	050117	020105	042101		
1087	012206	052512	052123	042515		
1088	012214	052116	052040	051505		
1089	012222	051524	005015			
1090	012226	041447	036447	020101	.ASCII	'C'BA TO D CALIBRATION TEST'<15><12>
1091	012234	047524	042040	041440		
1092	012242	046101	041111	040522		
1093	012250	044524	047117	052040		
1094	012256	051505	006524	012		
1095	012263	047	0235'4	040475	.ASCII	'D'BA TO D REPEATABILITY'<15><12>
1096	012270	052040	020117	020104		
1097	012276	042522	042520	052101		
1098	012304	041101	046111	052111		
1099	012312	006531	012			
1900	012315	047	023505	040475	.ASCIIZ	'E'BA TO D RECOVERY'<15><12>
1901	012322	052040	020117	020104		
1902	012330	042522	047503	042526		
1903	012336	054522	005015	000		
1904	012343	136	006503	027012	CNTRLCL: .ASCIIZ	'C'<15><12><56>
1905	012350	000				
1906	012351	136	006501	000012	CNTRLAL: .ASCIIZ	'A'<15><12>
1907	012356	015	012	000	ACRLFI: .BVT	15,12,0

1908	012361	015	012	056	DOT:	.BUTP	15,12,56,0
1909	012364	000					
1910	012365	077	000040		QMARK:	.ASCIZ	'? '
1911	012370	005015	041523	050117	MES6:	.ASCIZ	<15><12>'SCOPE ADJUSTMENT TEST'
1912	012376	020105	042101	052512			
1913	012404	052123	042515	052116			
1914	012412	052040	051505	000124			
1915	012420	005015	020101	047524	MES7:	.ASCIZ	<15><12>'A TO D CALIBRATION TEST'<15><12>
1916	012426	042040	041440	046101			
1917	012434	041111	040522	044524			
1918	012442	047117	052040	051505			
1919	012450	006524	000012				
1920	012454	005015	020101	047524	MES8:	.ASCIZ	<15><12>'A TO D RECOVERY TEST'<15><12>
1921	012462	042040	051040	041505			
1922	012470	053117	051105	020131			
1923	012476	042524	052123	005015			
1924	012504	000					
1925	012505	015	041412	020110	MES9:	.ASCIZ	<15><12>'CM '
1926	012512	000					
1927	012513	015	023412	023505	MES10:	.ASCIZ	<15><12>'E'XT. OR 'I'NT. OR 'C'LOCK. SYNC? '
1928	012520	052130	020056	051117			
1929	012526	023440	023511	052116			
1930	012534	020056	051117	023440			
1931	012542	023503	047514	045503			
1932	012550	020056	054523	041516			
1933	012556	020077	000				
1934	012561	015	040412	052040	MES13:	.ASCIZ	<15><12>'A TO D REPEATABILITY TEST'<15><12>
1935	012566	020117	020104	042522			
1936	012574	042520	052101	041101			
1937	012602	046111	052111	020131			
1938	012610	042524	052123	005015			
1939	012616	000					
1940	012617	015	005012	044103	MES14:	.ASCIZ	<15><12><12>'CM.(S)? '
1941	012624	024056	024523	020077			
1942	012632	000					
1943	012633	015	051412	051127	MES15:	.ASCIZ	<15><12>'SWRB AND D THRU 2 CONTROL PATTERN'<15><12>
1944	012640	020070	047101	020104			
1945	012646	020060	044124	052522			
1946	012654	031040	041440	047117			
1947	012662	051124	046117	050040			
1948	012670	052101	042524	047122			
1949	012676	005015	000				
1950	012701	103	052517	052116	MES16:	.ASCIZ	'COUNT SPREAD? '
1951	012706	051440	051120	040505			
1952	012714	037504	000040				
1953	012720	005015	044103	020056	MES19:	.ASCIZ	<15><12>'CM. LO AV HI'
1954	012726	047514	020040	040440			
1955	012734	020126	020040	044510			
1956	012742	000					
1957	012743	015	020012	046040	MES20:	.ASCIZ	<15><12>' LO -5 -4 -3 -2 -1 AV +1 +2 +3 +4 +5 HI'
1958	012750	020117	026440	020065			
1959	012756	026440	020064	026440			
1960	012764	020063	026440	020062			
1961	012772	026440	020061	040440			
1962	013000	020126	025440	020061			
1963	013006	025440	020062	025440			

1964	013014	020063	025440	020064		
1965	013022	025440	020065	044040		
1966	013030	000111				
1967	013032	042522	044507	052123	EM11	.ASCIZ /REGISTER CONTENTS CHANGED IN ERROR/
1968	013040	051105	041440	047117		
1969	013046	042524	052116	020123		
1970	013054	044103	047101	042507		
1971	013062	020104	047111	042440		
1972	013070	051122	051117	000		
1973	013075	105	051122	041520	DM11	.ASCIZ /ERRPC BUFADR EXPECT RAD/
1974	013102	020040	041040	043125		
1975	013110	042101	020122	020040		
1976	013116	054105	042520	052103		
1977	013124	020040	020040	040502		
1978	013132	000104				
1979						
1980	013134	001116	007660	001124	DT11	.EVEN SEERRPC,BUFADR,SGDDAT,SHDDAT,0
1981	013142	001126	000000			
1982	013146	000000			ANWRD21	0 FLOW BYTE OF 'ANWORD'
1983	013150	000000			PRINT11	0
1984	013152	002072			AVECTR1	INITA JMA VECTOR ADDRESS
1985	013154	000000			PROC1	0 ITEMP STORAGE FOR 'PSW'
1986	013156	000000			CHRCNT1	0 ITEMP STORAGE
1987	013160	000000			COUNT1	0 ITEMP STORAGE
1988	013162	000000			KSTOR11	0 IPERMANENT STORAGE
1989	013164	000000			KSTOR21	0 IPERMANENT STORAGE
1990	013166	000000			KSTOR31	0 IPERMANENT STORAGE
1991	013170	000000			KSTOR41	0 IPERMANENT STORAGE
1992	013172	000000			KSTOR51	0
1993	013174	000000			KSTR111	0
1994	013176	000000			KSTR121	0
1995	013200	000000			LOW1	0
1996	013202	000000			HIGH1	0
1997	013204	000010			INCR1	10
1998	013206	000000			TIMSV1	0
1999	013210	000000			TICKS1	0
2000	013212	000000			STCHAN1	0
2001	013214	000000			FIRST1	0
2002	013216	000000			DELAY1	0
2003	013220	000000			DELAY11	0
2004	013222	007000			USECLK1	0
2005	013224	000000			OPS11	0
2006	013226	000000			TEMP1	0
2007	013230	000000			TEMP11	0 ITEMPORARY STORAGE
2008	013232	000000			TEMP21	0 ITEMPORARY STORAGE
2009	013234	000000			TEMP31	0 ITEMPORARY STORAGE
2010	013236	000000			BRLEV11	0
2011	013240	000000			BRLEV21	0
2012	013242	000000			BRLEV31	0
2013	013244	000000			MESPR11	0
2014	013246	000000			MIORDV1	0
2015	013250	000000			ADHIGH1	0
2016	013252	000000			ADLOW1	0
2017	013254	000000			AVRM51	0
2018	013256	000000			AVRM41	0
2019	013260	000000			AVRM31	0

2020 013262 000000
 2021 013264 000000
 2022 013266 000000
 2023 013270 000000
 2024 013272 000000
 2025 013274 000000
 2026 013276 000000
 2027 013300 000000
 2028 013302 000000
 2029 013304 000000
 2030 013306 000000
 2031 013310 000000
 2032 013312 000000
 2033 013314 000000
 2034 013316 000000
 2035 013320 000000
 2036 013322 000000
 2037 013324 000000
 2038 013326 000000
 2039 013330 000000
 2040 013332 000000
 2041 013334 000000
 2042 013336 000000
 2043 013340 000000
 2044 013342 000000

AVERM21 0
 AVERM11 0
 AVERAGE1 0
 AVERP11 0
 AVERP21 0
 AVERP31 0
 AVERP41 0
 AVERP51 0
 ORLOW1 0
 MINUS51 0
 MINUS41 0
 MINUS31 0
 MINUS21 0
 MINUS11 0
 AVGCNT1 0
 PLUS11 0
 PLUS21 0
 PLUS31 0
 PLUS41 0
 PLUS51 0
 ORHIGH1 0
 XSPRD11 0
 XSPRD21 0
 XSPRD31 0
 XSPRD41 0

.SBTTL SCOPE HANDLER ROUTINE

2045
 2046
 2047
 2048
 2049
 2050
 2051
 2052
 2053
 2054
 2055
 2056
 2057
 2058
 2059
 2060 013344
 2061 013344 104405
 2062 013346 032777 040000 165562
 2063 013350 001110
 2064
 2065 013356 000416
 2066
 2067 013360 013746 000004
 2068 013364 012737 013404 000004
 2069 013372 005737 177060
 2070 013376 012637 000004
 2071 013402 000443
 2072 013404 022626
 2073 013406 012637 000004
 2074 013412 000423
 2075 013414

11*****
 11THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
 11AND LOAD THE TEST NUMBER(STSTNM) INTO THE DISPLAY REG.(DISPLAY<7:R>)
 11AND LOAD THE ERROR FLAG (SERFLG) INTO DISPLAY<15:00>
 11THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
 11SW14=1 LOOP ON TEST
 11SW11=1 INHIBIT ITERATIONS
 11SW09=1 LOOP ON ERROR
 11SW08=1 LOOP ON TEST IN SWR<7:0>
 11CALL
 11 SCOPE 11SCOPE=TOT
 11SCOPE:
 11CKSWR
 11BIT 081714,08WR 11LOOP ON PRESENT TEST?
 11RNE 08WR 11YES IF SW14=1
 11000000START OF COOP FOR THE XOR TESTER000000
 11EXTSTRI RR 68 11IF RUNNING ON THE "XOR" TESTER CHANGE
 11MOV 08ERRVEC,=(SP) 11THIS INSTRUCTION TO A "NOP" (NOP=240)
 11MOV 050,08ERRVEC 11SAVE THE CONTENTS OF THE ERROR VECTOR
 11TST 00177060 11SET FOR TIMEOUT
 11MOV (SP)+,08ERRVEC 11TIME OUT ON XOR?
 11RR 88VLAD 11RESTORE THE ERROR VECTOR
 11581 CMP (SP)+,(SP)+ 11GO TO THE NEXT TEST
 11MOV (SP)+,08ERRVEC 11CLEAR THE STACK AFTER A TIME OUT
 11RR 79 11RESTORE THE ERROR VECTOR
 116811000000END OF CODE FOR THE XOR TESTER000000 11LOOP ON THE PRESENT TEST

2076	013414	032777	000400	165514		RTY	001708,0SWR	11LOOP ON SPEC. TEST?
2077	013422	001404				REQ	29	11RR IF NO
2078	013424	127737	165506	001102		CMPR	0SWR,STSTNM	11ON THE RIGHT TEST? SWR<7IP>
2079	013432	001465				REQ	SOVER	11RR IF YES
2080	013434	105737	001103		281	TSTR	SFRFLG	11HAS AN ERROR OCCURRED?
2081	013440	001421				REQ	35	11RR IF NO
2082	013442	123737	001115	001103		CMPR	SERMAX,SERFLG	11MAX. ERRORS FOR THIS TEST OCCURRED?
2083	013450	101015				RMV	35	11RR IF NO
2084	013452	032777	001000	165456		BIT	001709,0SWR	11LOOP ON ERROR?
2085	013460	001404				REQ	48	11RR IF NO
2086	013462	013737	001110	001106	781	MOV	SLPERR,SLPADR	11SET LOOP ADDRESS TO LAST SCOPE
2087	013470	000446				RR	SOVER	
2088	013472	105037	001103		481	CLRR	SFRFLG	11ZERO THE ERROR FLAG
2089	013476	005037	001164			CLR	STIMES	11CLEAR THE NUMPR OF ITERATIONS TO MAKE
2090	013502	000415				RR	18	11ESCAPE TO THE NEXT TEST
2091	013504	032777	000400	165424	381	RTY	001711,0SWR	11INHIBIT ITERATIONS?
2092	013512	001011				BNE	18	11RR IF YES
2093	013514	005737	001206			TST	SPASS	11IF FIRST PASS OF PROGRAM
2094	013520	001406				REQ	18	11 INHIBIT ITERATIONS
2095	013522	005237	001104			INC	STCNT	11INCREMENT ITERATION COUNT
2096	013526	023737	001164	001104		CMR	STIMES,STCNT	11CHECK THE NUMPR OF ITERATIONS MADE
2097	013534	002024				RGE	SOVER	11RR IF MORE ITERATION REQUIRED
2098	013536	012737	000001	001104	181	MOV	01,STCNT	11REINITIALIZE THE ITERATION COUNTER
2099	013544	013737	013622	001164		MOV	SMXCNT,STIMES	11SET NUMBER OF ITERATIONS TO DO
2100	013552	105237	001102		88VLAD1	INCR	STSTNM	11COUNT TEST NUMBERS
2101	013556	113737	001102	001204		MOVR	STSTNM,STSTNM	11SET TEST NUMBER IN APT MAILBOX
2102	013564	011637	001106			MOV	(SP),SLPADR	11SAVE SCOPE LOOP ADDRESS
2103	013570	011637	001110			MOV	(SP),SLPERR	11SAVE ERROR LOOP ADDRESS
2104	013574	005037	001166			CLR	BESCAPE	11CLEAR THE ESCAPE FROM ERROR ADDRESS
2105	013600	112737	000001	001115		MOVR	01,SERMAX	11ONLY ALLOW ONE(1) ERROR ON NEXT TEST
2106	013606	013777	001102	165324	SOVER1	MOV	STSTNM,0DISPLAY	11DISPLAY TEST NUMBER
2107	013614	013716	001106			MOV	SLPADR,(SP)	11FUDGE RETURN ADDRESS
2108	013620	000002				RTY		11FIXES PS
2109	013622	003720				SMXCNT1 2000.		11MAX. NUMBER OF ITERATIONS
2110								
2111								
2112								
2113								
2114								
2115								
2116								
2117								
2118								
2119								
2120								
2121								
2122								
2123								
2124								
2125	013624							
2126	013624	105237	001103		781	INCR	SERFLG	11SET THE ERROR FLAG
2127	013630	001775				REQ	78	11DON'T LET THE FLAG GO TO ZERO
2128	013632	013777	001102	165300		MOV	STSTNM,0DISPLAY	11DISPLAY TEST NUMBER AND ERROR FLAG
2129	013640	032777	002000	165270		RTY	001710,0SWR	11BELL ON ERROR?
2130	013646	001402				REQ	18	11NO - SKIP
2131	013650	104400	001170			TYPE	,SHELL	11RING BELL

.88TYL ERROR HANDLER ROUTINE

11*****
11THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
11SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
11AND GO TO SERRTYP ON ERROR
11THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
11SW15=1 HALT ON ERROR
11SW13=1 INHIBIT ERROR TYPEOUTS
11SW10=1 BELL ON ERROR
11SW09=1 LOOP ON ERROR
11CALL
11ERROR N 11ERROR=ENT AND N=ERROR ITEM NUMBER

SERRORI
781 INCR SERFLG 11SET THE ERROR FLAG
REQ 78 11DON'T LET THE FLAG GO TO ZERO
MOV STSTNM,0DISPLAY 11DISPLAY TEST NUMBER AND ERROR FLAG
RTY 001710,0SWR 11BELL ON ERROR?
REQ 18 11NO - SKIP
TYPE ,SHELL 11RING BELL

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2132 013654 005237 001112      181  INC  SERRTL      ;COUNT THE NUMBER OF ERRORS
2133 013660 011637 001116      MOV  (SP),SERRPC  ;GET ADDRESS OF ERROR INSTRUCTION
2134 013664 162737 000002 001116  SUM  02,SERRPC
2135 013672 117737 165220 001114  MOVA 0SFERRPC,SITEMR ;STRIP AND SAVE THE ERROR ITEM CODE
2136 013700 032777 020000 165230  RIT  001713,0SWR  ;SKIP TYPEOUT IF SET
2137 013706 001004  ANP  200  ;SKIP TYPEOUTS
2138 013710 004737 014006  JSR  PC,SERRTYP ;GO TO USER ERROR ROUTINE
2139 013714 104400 001175  TYPE ,SCRLF
2140 013720
2141 013720 122737 000001 001220 2001  CMRA 0APTENV,SENV ;RUNNING IN APT MODE
2142 013726 001007  ANP  20  ;NO,SKIP APT ERROR REPORT
2143 013730 113737 001114 013742  MOVA  SITEMB,210  ;SET ITEM NUMBER AS ERROR NUMBER
2144 013736 004737 015704  JSR  PC,0ATV4  ;REPORT FATAL ERROR TO APT
2145 013742 000
2146 013743 000
2147 013744 000777 2101  .BYTE 0
2148 013746 005777 165164 2201  .BYTE 0
2149 013752 100001 2201  RR  220 ;APT ERROR LOOP
2150 013754 000000 201  TST  0SWR ;HALT ON ERROR
2151 013756 032777 001000 165152 301  BPL  30 ;SKIP IF CONTINUE
2152 013760 001402  HALT ;HALT ON ERROR!
2153 013766 013716 001110  RIT  001709,0SWR ;LOOP ON ERROR SWITCH SET?
2154 013772 005737 001166 401  BEQ  40 ;IF NO
2155 013776 001402  MOV  0LPERR,(SP) ;FUDGE RETURN FOR LOOPING
2156 014000 013716 001166  TST  0ESCAPE ;CHECK FOR AN ESCAPE ADDRESS
2157 014004 001402  BEQ  50 ;IF NONE
2158 014006 013716 001166  MOV  0ESCAPE,(SP) ;FUDGE RETURN ADDRESS FOR ESCAPE
2159 014008 000002 501  RTI ;RETURN
2160
2161 .SBTTL ERROR MESSAGE TYPEOUT ROUTINE
2162
2163 ;*****
2164 ;THIS ROUTINE USES THE "ITEM CONTROL BYTE" (SITEMB) TO DETERMINE WHICH
2165 ;ERROR IS TO BE REPORTED, IT THEN OBTAINS, FROM THE "ERROR TABLE" (SERRTB),
2166 ;AND REPORTS THE APPROPRIATE INFORMATION CONCERNING THE ERROR.
2167
2168 P14006
2169 014006 104400 001175
2170 014012 010046
2171 014014 005000
2172 014016 153700 001114
2173 014022 001004
2174 P14024 013746 001116
2175
2176 014030 104401
2177 014032 000426
2178 014034 005300
2179 014036 006300
2180 014040 006300
2181 014042 006300
2182 014044 062700 001324
2183 014050 012037 014060
2184 014054 001404
2185 014056 104400
2186 014060 000000
2187 014062 104400 001175

SERRTYP:
TYPE ,SCRLF ;"CARRIAGE RETURN" & "LINE FEED"
MOV  00,-(SP) ;SAVE 00
CLR  00 ;PICKUP THE ITEM INDEX
RISA 00SITEMB,00 ;IF ITEM NUMBER IS ZERO, JUST
RNE  10 ;TYPE THE PC OF THE ERROR
MOV  SERRPC,-(SP) ;SAVE SERRPC FOR TYPEOUT
;ERROR ADDRESS
TPOC ;GO TYPE--OCTAL ASCII(ALL DIGITS)
RR  60 ;GET OUT
101 DEC 00 ;ADJUST THE INDEX SO THAT IT WILL
ASL  00 ; WORK FOR THE ERROR TABLE
ASL  00
ASL  00
ADD  0SERRTB,00 ;FORM TABLE POINTER
MOV  (00)+,20 ;PICKUP "ERROR MESSAGE" POINTER
REQ  30 ;SKIP TYPEOUT IF NO POINTER
TYPE ;TYPE THE "ERROR MESSAGE"
201 .WORD 0 ;"ERROR MESSAGE" POINTER GOES HERE
TYPE ,SCRLF ;"CARRIAGE RETURN" & "LINE FEED"

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2188 014066 012037 014076 351 MOV (R0)+,43 ;;PICKUP "DATA HEADER" POINTER
2189 014072 001404 REQ 55 ;;SKIP TYPEOUT IF 0
2190 014074 104400 TYPE ;;TYPE THE "DATA HEADER"
2191 014076 000000 451 .WORD 0 ;;"DATA HEADER" POINTER GOES HERE
2192 014100 104400 001175 TYPE ,SCRLF ;;"CARRIAGE RETURN" & "LINE FEED"
2193 014104 011000 551 MOV (R0),R0 ;;PICKUP "DATA TABLE" POINTER
2194 014106 001004 RNE 75 ;;GO TYPE THE DATA
2195 014110 012600 651 MOV (SP)+,R0 ;;RESTORE R0
2196 014112 104400 001175 TYPE ,SCRLF ;;"CARRIAGE RETURN" & "LINE FEED"
2197 014116 000207 RTS PC ;;RETURN
2198 014120 751
2199 014120 013046 MOV 0(R0)+,-(SP) ;;SAVE 0(R0)+ FOR TYPEOUT
2200 014122 104401 TYPOC ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
2201 014124 003710 TST (R0) ;;IS THERE ANOTHER NUMBER?
2202 014126 001770 BEQ 65 ;;BR IF NO
2203 014130 104400 014136 TYPE ,R5 ;;TYPE TWO(2) SPACES
2204 014134 000771 BR 75 ;;LOOP
2205 014136 020040 000 851 .ASCII / / ;;TWO(2) SPACES
2206 014142 .EVEN
2207
2208 .SBTTL POWER DOWN AND UP ROUTINES
2209
2210 ;;*****
2211 ;;POWER DOWN ROUTINE
2212 014142 012737 014306 000025 SPWRDN: MOV 0STLLUP,0SPWRVEC ;;SET FOR FAST UP
2213 014150 012737 000340 000026 MOV 0340,0SPWRVEC+2 ;;PRI017
2214 014156 010046 MOV R0,-(SP) ;;PUSH R0 ON STACK
2215 014160 010146 MOV R1,-(SP) ;;PUSH R1 ON STACK
2216 014162 010246 MOV R2,-(SP) ;;PUSH R2 ON STACK
2217 014164 010346 MOV R3,-(SP) ;;PUSH R3 ON STACK
2218 014166 010446 MOV R4,-(SP) ;;PUSH R4 ON STACK
2219 014170 010546 MOV R5,-(SP) ;;PUSH R5 ON STACK
2220 014172 017746 164740 MOV 0SWR,-(SP) ;;PUSH 0SWR ON STACK
2221 014176 010637 014312 MOV SP,0SAVR6 ;;SAVE SP
2222 014202 012737 014214 000024 MOV 0SPWRUP,0SPWRVEC ;;SET UP VECTOR
2223 014210 000000 HALT
2224 014212 000776 BR -2 ;;HANG UP
2225
2226 ;;*****
2227 ;;POWER UP ROUTINE
2228 014214 012737 014306 000024 SPWRUP: MOV 0STLLUP,0SPWRVEC ;;SET FOR FAST DOWN
2229 014222 013706 014312 MOV 0SAVR6,SP ;;GET SP
2230 014226 005037 014312 CLR 0SAVR6 ;;WAIT LOOP FOR THE TTY
2231 014232 005237 014312 151 INC 0SAVR6 ;;WAIT FOR THE INC
2232 014236 001375 BNE 15 ;;OF WORD
2233 014240 012677 164672 MOV (SP)+,0SWR ;;POP STACK INTO 0SWR
2234 014244 012605 MOV (SP)+,R5 ;;POP STACK INTO R5
2235 014246 012604 MOV (SP)+,R4 ;;POP STACK INTO R4
2236 014250 012603 MOV (SP)+,R3 ;;POP STACK INTO R3
2237 014252 012602 MOV (SP)+,R2 ;;POP STACK INTO R2
2238 014254 012601 MOV (SP)+,R1 ;;POP STACK INTO R1
2239 014256 012600 MOV (SP)+,R0 ;;POP STACK INTO R0
2240 014260 012737 014142 000024 MOV 0SPWRDN,0SPWRVEC ;;SET UP THE POWER DOWN VECTOR
2241 014266 012737 000340 000026 MOV 0340,0SPWRVEC+2 ;;PRI017
2242 014274 104400 TYPE ;;REPORT THE POWER FAILURE
2243 014276 014314 SPWRMSG: .WORD 0PWRMSG ;;POWER FAIL MESSAGE POINTER

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2244 014300 012716          MOV      (PC)+,(SP)      ;IRESTART AT BEGIN
2245 014302 001356          SPWRAD: .WORD      REGIN      ;IRESTART ADDRESS
2246 014304 000002          RTI
2247 014306 000000          SILLUP: HALT              ;THE POWER UP SEQUENCE WAS STARTED
2248 014310 000776          BR      .-2              ;BEFORE THE POWER DOWN WAS COMPLETE
2249 014312 000000          SSAYR6: R                  ;PUT THE SP HERE
2250 014314 005015 042522 052123  PWRMSG: .ASCIIZ <15><12>/RESTARTING AFTER A POWER FAILURE/<15><12><12>
2251 014322 051101 044524 043516
2252 014330 040440 052106 051105
2253 014336 040440 050040 053517
2254 014344 051105 043040 044501
2255 014352 052514 042522 005015
2256 014360 000012
2257                                     .EVEN
2258
2259
2260                                     .SBYTL  BINARY TO OCTAL (ASCII) AND TYPE
2261
2262                                     ;*****
2263                                     ;THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
2264                                     ;OCTAL (ASCII) NUMBER AND TYPE IT.
2265                                     ;STYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
2266                                     ;CALL:
2267                                     ;      MOV      NUM, -(SP)      ;NUMBER TO BE TYPED
2268                                     ;      TYPON      ;CALL FOR TYPEOUT
2269                                     ;      .BYTE      N          ;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
2270                                     ;      .BYTE      M          ;M=1 OR 0
2271                                     ;                                     ;I=TYPE LEADING ZEROS
2272                                     ;                                     ;I=0=SUPPRESS LEADING ZEROS
2273                                     ;
2274                                     ;STYPON---ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
2275                                     ;STYPOS OR STYPOC
2276                                     ;CALL:
2277                                     ;      MOV      NUM, -(SP)      ;NUMBER TO BE TYPED
2278                                     ;      TYPON      ;CALL FOR TYPEOUT
2279                                     ;
2280                                     ;STYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
2281                                     ;CALL:
2282                                     ;      MOV      NUM, -(SP)      ;NUMBER TO BE TYPED
2283                                     ;      TYPOC      ;CALL FOR TYPEOUT
2284
2285 014362 017646 000000 014605 STYPOS: MOV      0(SP), -(SP)      ;PICKUP THE MODE
2286 014366 116637 000001          MOVR      1(SP), 80FILL      ;LOAD ZERO FILL SWITCH
2287 014374 112637 014607          MOVR      (SP)+, 80MODE+1      ;NUMBER OF DIGITS TO TYPE
2288 014400 062716 000002          ADD      02, (SP)          ;ADJUST RETURN ADDRESS
2289 014404 000406          RR      STYPON
2290 014406 112737 000001 014605 STYPOC: MOVR      01, 80FILL      ;SET THE ZERO FILL SWITCH
2291 014414 112737 000006 014607          MOVR      06, 80MODE+1      ;SET FOR SIX(6) DIGITS
2292 014422 112737 000005 014604 STYPON: MOVR      05, 80CNT      ;SET THE ITERATION COUNT
2293 014430 010346          MOV      R3, -(SP)          ;SAVE R3
2294 014432 010446          MOV      R4, -(SP)          ;SAVE R4
2295 014434 010546          MOV      R5, -(SP)          ;SAVE R5
2296 014436 113704 014607          MOVR      80MODE+1, R4      ;GET THE NUMBER OF DIGITS TO TYPE
2297 014442 005404          NEG      R4
2298 014444 062704 000006          ADD      06, R4          ;SUBTRACT IT FOR MAX. ALLOWED
2299 014450 110437 014606          MOVR      R4, 80MODE      ;SAVE IT FOR USE

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2300	014454	113704	014605	MOV8	80FILL,R4	11GET THE ZERO FILL SWITCH
2301	014460	016605	000012	MOV	12(SP),R5	11PICKUP THE INPUT NUMBER
2302	014464	005003		CLR	R3	11CLEAR THE OUTPUT WORD
2303	014466	006105		ROL	R5	11ROTATE M80 INTO "C"
2304	014470	000404	181	RR	38	11GO DO M80
2305	014472	006105	281	ROL	R5	11FORM THIS DIGIT
2306	014474	006105		ROL	R5	
2307	014476	006105		ROL	R5	
2308	014500	010503		MOV	R5,R3	
2309	014502	006103	381	ROL	R3	11GET LSR OF THIS DIGIT
2310	014504	105337	014606	DECB	SOMODE	11TYPE THIS DIGIT?
2311	014510	100016		RPL	79	11RR IF NO
2312	014512	042703	177770	BIC	0177770,R3	11GET RID OF JUNK
2313	014516	001002		BNE	48	11TEST FOR 0
2314	014520	005704		TST	R4	11SUPPRESS THIS 0?
2315	014522	001403		REQ	58	11RR IF YES
2316	014524	005204	481	INC	R4	11DON'T SUPPRESS ANYMORE 0'S
2317	014526	052703	000060	BIS	0'0,R3	11MAKE THIS DIGIT ASCII
2318	014532	052703	000040	581	BIS	0' ,R3
2319	014536	110337	014602	MOV8	R3,08	11MAKE ASCII IF NOT ALREADY
2320	014542	104400	014602	TYPE	,R8	11SAVE FOR TYPING
2321	014546	105337	014604	781	DECB	SOCNT
2322	014552	003347		BGT	28	11COUNT BY 1
2323	014554	002402		BLT	68	11RR IF MORE TO DO
2324	014556	005204		INC	R4	11RR IF DONE
2325	014560	000744		RR	28	11INSURE LAST DIGIT ISN'T A BLANK
2326	014562	012605	681	MOV	(SP)+,R5	11GO DO THE LAST DIGIT
2327	014564	012604		MOV	(SP)+,R4	11RESTORE R5
2328	014566	012603		MOV	(SP)+,R3	11RESTORE R4
2329	014570	016606	000002 000004	MOV	2(SP),4(SP)	11RESTORE R3
2330	014576	012616		MOV	(SP)+,(SP)	11SET THE STACK FOR RETURNING
2331	014600	000002		RTT		11RETURN
2332	014602	000	881	.BYTE	0	11STORAGE FOR ASCII DIGIT
2333	014603	000		.BYTE	0	11TERMINATOR FOR TYPE ROUTINE
2334	014604	000	SOCNT:	.BYTE	0	11OCTAL DIGIT COUNTER
2335	014605	000	S0FILL:	.BYTE	0	11ZERO FILL SWITCH
2336	014606	000000	SOMODE:	.WORD	0	11NUMBER OF DIGITS TO TYPE
2337						
2338				.SBTTL	TYPE ROUTINE	
2339						
2340						
2341						
2342						
2343						
2344						
2345						
2346						
2347						
2348						
2349						
2350						
2351						
2352						
2353						
2354						
2355	014610	105737	001155	STYPE:	TSTB	STPFLG
						11IS THERE A TERMINAL?

2356	014614	100002			RPL	18	110R IF YES
2357	014616	000000			HALT		11HALT HERE IF NO TERMINAL
2358	014620	000430			RR	38	11LEAVE
2359	014622	010046		181	MOV	RR,-(SP)	11SAVE RR
2360	014624	017600	000002		MOV	02(SP),RR	11GET ADDRESS OF ASCII STRING
2361	014630	122737	000001	001220	CMPR	0APTENV,SENV	11RUNNING IN APT MODE
2362	014636	001011			BNE	628	11NO,GO CHECK FOR APT CONSOLE
2363	014640	132737	000100	001221	RITR	0APTSP00L,SENVH	11SP00L MESSAGE TO APT
2364	014646	001405			REQ	628	11NO,GO CHECK FOR CONSOLE
2365	014650	010037	014660		MOV	RR,618	11SETUP MESSAGE ADDRESS FOR APT
2366	014654	004737	015674		JBR	PC,8ATV3	11SP00L MESSAGE TO APT
2367	014660	000000		6181	JHORN	0	11MESSAGE ADDRESS
2368	014662	132737	000040	001221	6281	RITR	0APTCSUP,SENVH
2369	014670	001003			BNE	608	11APT CONSOLE SUPPRESSED
2370	014672	112046		281	MOVR	(RR)+,-(SP)	11YES,SKIP TYPE OUT
2371	014674	001005			RNE	AS	11PUSH CHARACTER TO BE TYPED ONTO STACK
2372	014676	005726			TST	(SP)+	11R IF IT ISN'T THE TERMINATOR
2373	014700	012600		6081	MOV	(SP)+,RR	11IF TERMINATOR POP IT OFF THE STACK
2374	014702	062716	000002	381	ADD	02,(SP)	11RESTORE RR
2375	014706	000002			RTI		11ADJUST RETURN PC
2376	014710	122716	000011	481	CMPO	0MT,(SP)	11RETURN
2377	014714	001430			REQ	88	11BRANCH IF <MT>
2378	014716	122716	000200		CMPO	0CRLF,(SP)	11BRANCH IF NOT <CRLF>
2379	014722	001006			BNE	58	
2380	014724	005726			TST	(SP)+	11POP <CR><LF> EQUIV
2381	014726	104400			TYPE		11TYPE A CR AND LF
2382	014730	001175			0CRLF		
2383	014732	105037	015066		CLRB	0CHARCNT	11CLEAR CHARACTER COUNT
2384	014736	000755			BR	28	11GET NEXT CHARACTER
2385	014740	004737	015022	581	JBR	PC,0TYPEC	11GO TYPE THIS CHARACTER
2386	014744	123726	001154	681	CMPO	0FILLC,(SP)+	11IS IT TIME FOR FILLER CHARS.?
2387	014750	001350			BNE	28	11IF NO GO GET NEXT CHAR.
2388	014752	013746	001152		MOV	0NULL,-(SP)	11GET # OF FILLER CHARS. NEEDED
2389							11AND THE NULL CHAR.
2390	014756	105366	000001	781	DECR	1(SP)	11DOES A NULL NEED TO BE TYPED?
2391	014762	002770			BLT	68	11R IF NO--GO POP THE NULL OFF OF STACK
2392	014764	004737	015022		JBR	PC,0TYPEC	11GO TYPE A NULL
2393	014770	105337	015066		DECB	0CHARCNT	11DO NOT COUNT AS A COUNT
2394	014774	000770			BR	78	11LOOP
2395							
2396							
2397							
2398	014776	112716	000040	881	MOVB	0' ,(SP)	11REPLACE TAB WITH SPACE
2399	015002	004737	015022	981	JBR	PC,0TYPEC	11TYPE A SPACE
2400	015006	132737	000007	015066,	BITB	07,0CHARCNT	11BRANCH IF NOT AT
2401	015014	001372			RNE	98	11TAB STOP
2402	015016	005726			TST	(SP)+	11POP SPACE OFF STACK
2403	015020	000724			RR	28	11GET NEXT CHARACTER
2404	015022	105777	164120		STVPEC:	0STPB	11WAIT UNTIL PRINTER IS READY
2405	015026	100375			BPL	0TYPEC	
2406	015030	116677	000002	164112	MOVR	2(SP),0STPB	11LOAD CHAR TO BE TYPED INTO DATA REG.
2407	015036	122766	000015	000002	CMPR	0CR,2(SP)	11IS CHARACTER A CARRIAGE RETURN?
2408	015044	001003			BNE	18	11BRANCH IF NO
2409	015046	105037	015066		CLRB	0CHARCNT	11YES--CLEAR CHARACTER COUNT
2410	015052	000406			BR	0TYPEX	11EXIT
2411	015054	122766	000012	000002	181	CMPO	0LF,2(SP)
							11IS CHARACTER A LINE FEED?

1HORIZONTAL TAB PROCESSOR

2412	015262	201402		REF	STYPEX	11BRANCH IF YES
2413	015264	105227		INCR	(PC)+	11COUNT THE CHARACTER
2414	015266	000000		8CHARCNT:WORD	R	11CHARACTER COUNT STORAGE
2415	015270	000207		STYPEX:RTS	PC	
2416						
2417						
2418						
2419						
2420						
2421						
2422						
2423						
2424						
2425	015072	022737	000176 001136	SCKSWR: CMP	0SWREG,SWR	11IS THE SOFT-SWR SELECTED?
2426	015100	001073		RNF	100	11BRANCH IF NO
2427	015102	105777	164034	TSTR	0STKS	11CHAR THERE?
2428	015106	100070		BPI	100	11IF NO, DON'T WAIT AROUND
2429	015110	117746	164030	251: MOVR	0STKR,-(SP)	11SAVE THE CHAR
2430	015114	042716	177600	RIC	0177,(SP)	11STRIP-OFF THE ASCII
2431	015120	022726	000007	CMF	07,(SP)+	11IS IT A CONTROL G?
2432	015124	001061		RNF	100	11NO, RETURN TO USER
2433	015126	104400	015535	TYPE	,0CNTLG	11YES, ECHO CONTROL G
2434						
2435	015132	104400	015542	651: TYPE	,0MSWR	11TYPE CURRENT CONTENTS
2436	015136	013746	000176	MOV	SWREG,-(SP)	11SAVE SWREG FOR TYPEOUT
2437	015142	104401		TYPEOC		11GO TYPE-OCTAL ASCII(ALL DIGITS)
2438	015144	104400	015553	TYPE	,0MNEA	11PROMPT FOR NEW SWR
2439	015150	005046		CLR	-(SP)	11CLEAR COUNTER
2440	015152	005046		CLR	-(SP)	11THE NEW SWR
2441	015154	104406		751: RDCMR		11GET NEXT CHAR
2442						
2443	015156	022716	000025	851: CMP	025,(SP)	11IS IT A CONTROL U?
2444	015162	001005		BNE	00	11BRANCH IF NO
2445	015164	104400	015530	TYPE	,0CNTLU	11YES, ECHO IT
2446	015170	062706	000006	ADD	06,SP	11IGNORE PREVIOUS INPUT
2447	015174	000756		RR	05	11LET'S TRY IT AGAIN
2448						
2449	015176	022716	000015	951: CMP	015,(SP)	11IS IT A <CR>?
2450	015202	001011		RNE	110	11BRANCH IF NO
2451	015204	005766	000004	TST	0(SP)	11YES, IS IT THE FIRST CHAR?
2452	015210	201403		BEQ	100	11BRANCH IF YES
2453	015217	016677	000002 163716	MOV	2(SP),0SWR	11SAVE NEW SWR
2454	015220	062706	000006	1051: ADD	06,SP	11CLEAR UP STACK
2455	015224	000417		RR	170	11RETURN TO USER
2456	015226	022716	000012	1101: CMP	012,(SP)	11IS IT A <LF>
2457	015232	001017		RNE	150	11BRANCH IF NO
2458	015234	005766	000004	TST	0(SP)	11YES, IS IT THE FIRST CHAR?
2459	015240	001403		BEQ	120	11YES
2460	015242	016677	000002 163666	MOV	2(SP),0SWR	11SAVE NEW SWR
2461	015250	062706	000006	1251: ADD	04,SP	11CLEAR UP STACK
2462	015254	013716	000046	MOV	0046,(SP)	11GET RESTART
2463	015260	062716	000010	ADD	010,(SP)	11ADDRESS
2464	015264	104400	001175	1301: TYPE	,0CRLF	11ECHO <CR> AND <LF>
2465	015270	000002		1401: RTI		11RETURN
2466	015272	004737	015022	1501: JSR	PC,STYPEC	11ECHO CHAR
2467	015276	042726	177770	RIC	0177770,(SP)+	11RESTRICT TO 0-7

2468	015302	005766	000002	TSY	2(SP)	11IS THIS THE FIRST CHAR
2469	015306	001403		REQ	163	11BRANCH IF YES
2470	015310	006316		ASL	(SP)	11NO, SHIFT PRESENT
2471	015312	006316		ASL	(SP)	11 CHAR OVER TO MAKE
2472	015314	006316		ASL	(SP)	11 ROOM FOR NEW ONE.
2473	015316	005266	000002	1681 INC	2(SP)	11KEEP COUNT OF CHAR
2474	015322	056616	177776	BIS	-2(SP), (SP)	11SET IN NEW CHAR
2475	015326	000712		RR	78	11GET THE NEXT ONE
2476				11*****		
2477				11THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY		
2478				11CALL:		
2479				11	ROCHR	11INPUT A SINGLE CHARACTER FROM THE TTY
2480				11	RETURN HERE	11CHARACTER IS ON THE STACK
2481				11		11WITH PARITY BIT STRIPPED OFF
2482				11		
2483						
2484	015330	011646		SRDCHR: MOV	(SP), -(SP)	11PUSH DOWN THE PC
2485	015332	016666	000004 000002	MOV	4(SP), 2(SP)	11SAVE THE PS
2486	015340	105777	163576	181 TSTB	0STKS	11WAIT FOR
2487	015344	100375		BPL	15	11A CHARACTER
2488	015346	117766	163572 000004	MOVB	0STKR, 4(SP)	11READ THE TTY
2489	015354	042766	177600 000004	BIC	0C<177>, 4(SP)	11GET RID OF JUNK IF ANY
2490	015362	026627	000004 000140	CHP	4(SP), 0140	11IS IT UPPER CASE?
2491	015370	002407		BLT	29	11BRANCH IF YES
2492	015372	026627	000004 000175	CHP	4(SP), 0175	11IS IT A SPECIAL CHAR?
2493	015400	003003		BGT	29	11BRANCH IF YES
2494	015402	042766	000040 000004	BIC	040, 4(SP)	11MAKE IT UPPER CASE
2495	015410	000002		281 RTI		11GO BACK TO USER
2496				11*****		
2497				11THIS ROUTINE WILL INPUT A STRING FROM THE TTY		
2498				11CALL:		
2499				11	RDLIN	11INPUT A STRING FROM THE TTY
2500				11	RETURN HERE	11ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
2501				11		11TERMINATOR WILL BE A BYTE OF ALL 0'S
2502						
2503	015412	010346		SRDLIN: MOV	R3, -(SP)	11SAVE R3
2504	015414	012703	015520	181 MOV	0STVIN, R3	11GET ADDRESS
2505	015420	022703	015530	281 CHP	0STVIN+0, R3	11BUFFER FULL?
2506	015424	101405		RLOS	48	11OR IF YES
2507	015426	104406		ROCHR		11GO READ ONE CHARACTER FROM THE TTY
2508	015430	112613		MOVB	(SP)+, (R3)	11GET CHARACTER
2509	015432	122713	000177	1081 CHPB	0177, (R3)	11IS IT A RUBOUT
2510	015436	001003		RNE	39	11SKIP IF NOT
2511	015440	104400	001174	481 TYPE	, 0QUES	11TYPE A 'Q'
2512	015444	000763		OR	18	11CLEAR THE BUFFER AND LOOP
2513	015446	111337	015516	381 MOVB	(R3), 98	11ECHO THE CHARACTER
2514	015452	104400	015516	TYPE	, 98	
2515	015456	122723	000015	CHPB	015, (R3)+	11CHECK FOR RETURN
2516	015462	001356		RNE	28	11LOOP IF NOT RETURN
2517	015464	105063	177777	CLRB	-1(R3)	11CLEAR RETURN (THE 15)
2518	015470	104400	001176	TYPE	, 9LF	11TYPE A LINE FEED
2519	015474	012603		MOV	(SP)+, R3	11RESTORE R3
2520	015476	011646		MOV	(SP), -(SP)	11ADJUST THE STACK AND PUT ADDRESS OF THE
2521	015500	016666	000004 000002	MOV	4(SP), 2(SP)	11 FIRST ASCII CHARACTER ON IT
2522	015506	012766	015520 000004	MOV	0STVIN, 4(SP)	
2523	015514	000002		RTI		11RETURN

```

2524 015516 000 981 .BYTE 0 ; STORAGE FOR ASCII CHAR. TO TYPE
2525 015517 000 .BYTE 0 ; TERMINATOR
2526 015520 000010 STTVINI .BLKB 0 ; RESERVE 8 BYTES FOR TTY INPUT
2527 015530 052536 005015 000 SCNTLUI .ASCIZ /U/ <15> <12> ; CONTROL "U"
2528 015535 136 006507 000012 SCNTLGI .ASCIZ /G/ <15> <12> ; CONTROL "G"
2529 015542 005015 053523 020122 SHSWRI .ASCIZ <15> <12> /SWR = /
2530 015550 020075 000 SHNEWI .ASCIZ / NEW = /
2531 015553 040 047040 053505
2532 015560 036440 000040

2533
2534 .SBTTL READ AN OCTAL NUMBER FROM THE TTY
2535
2536 ; *****
2537 ; THIS ROUTINE WILL READ AN OCTAL (ASCII) NUMBER FROM THE TTY AND
2538 ; CHANGE IT TO BINARY.
2539 ; CALL:
2540 ; RDOCT
2541 ; RETURN HERE
2542 ;
2543 ; READ AN OCTAL NUMBER
2544 ; LOW ORDER BITS ARE ON TOP OF THE STACK
2545 ; HIGH ORDER BITS ARE IN SHIOCT
2546
2547 015564 011646 000004 000002 SRDOCT: MOV (SP), -(SP) ; PROVIDE SPACE FOR THE
2548 015566 016666 000004 000002 MOV 4(SP), 2(SP) ; INPUT NUMBER
2549 015574 010046 MOV R0, -(SP) ; PUSH R0 ON STACK
2550 015576 010146 MOV R1, -(SP) ; PUSH R1 ON STACK
2551 015600 010246 MOV R2, -(SP) ; PUSH R2 ON STACK
2552 015602 104407 181 RDLIN ; READ AN ASCII LINE
2553 015604 012600 MOV (SP)+, R0 ; GET ADDRESS OF 1ST CHARACTER
2554 015606 005001 CLR R1 ; CLEAR DATA WORD
2555 015610 005002 CLR R2
2556 015612 112046 281 MOVB (R0)+, -(SP) ; PICKUP THIS CHARACTER
2557 015614 001412 BEO 35 ; IF ZERO GET OUT
2558 015616 006301 ASL R1 ;
2559 015620 006102 ROL R2 ;
2560 015622 006301 ASL R1 ;
2561 015624 006102 ROL R2 ;
2562 015626 006301 ASL R1 ;
2563 015630 006102 ROL R2 ;
2564 015632 042716 177770 BIC 0^C7, (SP) ; STRIP THE ASCII JUNK
2565 015636 062601 ADD (SP)+, R1 ; ADD IN THIS DIGIT
2566 015640 000764 RR 25 ; LOOP
2567 015642 005726 381 TST (SP)+ ; CLEAN TERMINATOR FROM STACK
2568 015644 010166 000012 MOV R1, 12(SP) ; SAVE THE RESULT
2569 015646 010237 015664 MOV R2, SHIOCT
2570 015650 012602 MOV (SP)+, R2 ; POP STACK INTO R2
2571 015654 012601 MOV (SP)+, R1 ; POP STACK INTO R1
2572 015656 012600 MOV (SP)+, R0 ; POP STACK INTO R0
2573 015662 000002 RTI ; RETURN
2574 015664 000000 SHIOCT: .WORD 0 ; HIGH ORDER BITS GO HERE
2575
2576 .SBTTL APT COMMUNICATIONS ROUTINE
2577
2578 ; *****
2579 015666 112737 000001 016132 SATY11 MOVB 01, SPFLG ; TO REPORT FATAL ERROR
2580 015674 112737 000001 016130 SATY31 MOVB 01, SHFLG ; TO TYPE A MESSAGE
2581 015702 000403 RR SATYC
2582 015704 112737 000001 016132 SATY41 MOVB 01, SPFLG ; TO ONLY REPORT FATAL ERROR

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2580 015712 SATVCI
2581 015712 010046 MOV R0,-(SP) ;PUSH R0 ON STACK
2582 015714 010146 MOV R1,-(SP) ;PUSH R1 ON STACK
2583 015716 105737 016130 TSTR SMFLG ;ISHOULD TYPE A MESSAGE?
2584 015722 001450 REQ 55 ;IF NOT: BR
2585 015724 122737 000001 001220 CMPR 0APTENV,SENV ;OPERATING UNDER APT?
2586 015732 001031 BNE 35 ;IF NOT: BR
2587 015734 132737 000100 001221 RSTR 0APTSPool,SENVH ;ISHOULD SPOOL MESSAGES?
2588 015742 001425 REQ 35 ;IF NOT: BR
2589 015744 017600 000004 MOV 04(SP),R0 ;GET MESSAGE ADDR.
2590 015750 062766 000002 000004 ADD 02,4(SP) ;RUMP RETURN ADDR.
2591 015756 005737 001200 131 TST MSGTYPE ;SEE IF DONE W/ LAST XMISSION?
2592 015762 001375 BNE 15 ;IF NOT: WAIT
2593 015764 010037 001214 MOV R0,MSGAD ;PUT ADDR IN MAILBOX
2594 015770 105720 281 TSTR (R0)+ ;FIND END OF MESSAGE
2595 015772 001376 RNE 25
2596 015774 163700 001214 SUB MSGAD,R0 ;SUB START OF MESSAGE
2597 016000 006200 ASR R0 ;GET MESSAGE LGTH IN WORDS
2598 016002 010037 001216 MOV R0,MSGGLT ;PUT LENGTH IN MAILBOX
2599 016006 012737 000004 001200 MOV 04,MSGTYPE ;TELL APT TO TAKE MSG.
2600 016014 000413 BR 55
2601 016016 017637 000004 016042 331 MOV 04(SP),45 ;PUT MSG ADDR IN JSR LINKAGE
2602 016024 062766 000002 000004 ADD 02,4(SP) ;RUMP RETURN ADDRESS
2603 016032 013746 177776 MOV 177776,-(SP) ;PUSH 177776 ON STACK
2604 016036 004737 014610 JSR PC,STYPE ;CALL TYPE MACRO
2605 016042 000000 451 .WORD 0
2606 016044 531
2607 016044 105737 016132 1081 TSTR SFPLG ;ISHOULD REPORT FATAL ERROR?
2608 016050 001414 REQ 128 ;IF NOT: BR
2609 016052 005737 001220 TST SENV ;RUNNING UNDER APT?
2610 016056 001413 REQ 128 ;IF NOT: BR
2611 016060 005737 001200 1181 TST MSGTYPE ;FINISHED LAST MESSAGE?
2612 016064 001375 RNE 118 ;IF NOT: WAIT
2613 016066 017637 000004 001202 MOV 04(SP),SFATAL ;GET ERROR #
2614 016074 062766 000002 000004 ADD 02,4(SP) ;RUMP RETURN ADDR.
2615 016102 005237 001200 INC MSGTYPE ;TELL APT TO TAKE ERROR
2616 016106 105037 016132 1281 CLRR SFPLG ;CLEAR FATAL FLAG
2617 016112 105037 016131 CLRR SLPLG ;CLEAR LOG FLAG
2618 016116 105037 016130 CLRR SMPLG ;CLEAR MESSAGE FLAG
2619 016122 012601 MOV (SP)+,R1 ;POP STACK INTO R1
2620 016124 012600 MOV (SP)+,R0 ;POP STACK INTO R0
2621 016126 000207 RTS PC ;RETURN
2622 016130 000 SMPLG: .BYTE 0 ;MSG. FLAG
2623 016131 000 SLPLG: .BYTE 0 ;LOG FLAG
2624 016132 000 SFPLG: .BYTE 0 ;FATAL FLAG
2625 016134 .EVEN
2626 000200 APTSIZE=200
2627 000001 APTENV=001
2628 000100 APTSPool=100
2629 000040 APTCSUP=040
2630
2631 .SBTTL TRAP DECODER
2632
2633 ;*****
2634 ;THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
2635 ;AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS

```

2636
2637
2638
2639 016134 010046
2640 016136 016600 000002
2641 016142 005740
2642 016144 111000
2643 016146 006300
2644 016150 016000 016156
2645 016154 000200
2646
2647
2648
2649
2650
2651
2652
2653
2654
2655 016156
2656 016156 014610
2657 016160 014400
2658 016162 014362
2659 016164 014422
2660 016166 007762
2661 016170 015072
2662 016172 015330
2663 016174 015412
2664 016176 015564
2665
2666 016200 000000
2667 016242 016242
2668 016242 000000
2669 016304 016304
2670 016304 000000
2671 016346 016346
2672 016346 000000
2673 016410 016410
2674 016410 000000
2675 016452 016452
2676 016452 000000
2677 016514 016514
2678 016514 000000
2679 016556 016556
2680 016556 000000
2681 016620 016620
2682 016620 000000
2683 016662 016662
2684 000001

1-OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
1-GO TO THAT ROUTINE.

```
STRAP:  MOV  RR,=(SP)      ;SAVE RR
        MOV  2(SP),RR      ;GET TRAP ADDRESS
        TST  -(RR)         ;BACKUP RV 2
        MOVR (RR),RR       ;GET RIGHT BYTE OF TRAP
        ASL  RR            ;POSITION FOR INDEXING
        MOV  STRPAD(RR),RR  ;INDEX TO TABLE
        RTS  RR            ;GO TO ROUTINE
```

.SBTTL TRAP TABLE

1-THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
1-BY THE "TRAP" INSTRUCTION.

ROUTINE	
STRPAD:	
STVPE	TRAP+0(104400) TTY TYPEOUT ROUTINE
STVPOC	TRAP+1(104401) TYPE OCTAL NUMBER (WITH LEADING ZEROS)
STVPOS	TRAP+2(104402) TYPE OCTAL NUMBER (NO LEADING ZEROS)
STVPON	TRAP+3(104403) TYPE OCTAL NUMBER (AS PER LAST CALL)
STVPDS	TRAP+4(104404) TYPE DECIMAL NUMBER (WITH SIGN)
CKSWR	TRAP+5(104405) TEST FOR CHANGE IN SOFT-SWR
SRDCHR	TRAP+6(104406) TTY TYPEIN CHARACTER ROUTINE
SRDLIN	TRAP+7(104407) TTY TYPEIN STRING ROUTINE
SRDOCT	TRAP+1P(104410) READ AN OCTAL NUMBER FROM TTY

```
ADBUFF: 0
ADTB0: 0
ADTB1: 0
ADTB2: 0
ADTB3: 0
ADTB4: 0
ADTB5: 0
ADTB6: 0
ADTB7: 0
.END
```

[illegible]

[illegible]

BIT1	=	000002	1060																	
BIT10	=	002000	070	934	960	2129														
BIT11	=	004000	060	2091																
BIT12	=	010000	050	935																
BIT13	=	020000	040	2136																
BIT14	=	040000	030	2062																
BIT15	=	100000	020																	
BIT2	=	000004	1050																	
BIT3	=	000010	1040																	
BIT4	=	000020	1030																	
BIT5	=	000040	1020	002	000															
BIT6	=	000100	1010	1127	1500															
BIT7	=	000200	1000	639	1070															
BIT8	=	000400	990	904																
BIT9	=	001000	900																	
OPTVEC	=	000014	1140																	
ORLEV1	=	013236	10130	10140	20100															
ORLEV2	=	013240	20110																	
ORLEV3	=	013242	20120																	
BUFADR	=	007660	14400	14700	1900															
BUFNUM	=	007640	1430	1441	14690															
C	=	003566	7000	057	066															
CALBRY	=	005104	470	10340																
CALBT1	=	005116	1034	10370																
CALBT2	=	005152	10450	1157																
CALB2A	=	005254	1052	1057	10590	1150														
CATORZ	=	011332	1260	17020																
CATR1	=	011432	10010	1003																
CATR2	=	011454	10060	1023	1025	1027														
CATR3	=	011514	10150	1019																
CATR4	=	011534	1016	10210																
CATR5	=	011560	1007	10310																
CHAR	=	003402	701	7000	030	040	1162													
CHAR1	=	003452	7170	731																
CHAR2	=	003460	7190	727																
CHAR3	=	003500	720	7230	724															
CHAR4	=	003430	7120	713																
CHRCNT	=	013156	15010	15930	1590	1610	16160	1643	16450	1664	19060									
CHRCOL	=	003550	6960	7020	7300															
CHTIME	=	005050	500	513	545	595	633	677	030	10130										
CHTMA	=	005056	10140	1017																
CHTMO	=	005072	1015	10180																
CH01	=	004266	036	0570																
CH02	=	004310	046	0660																
CKSWR	=	104405	971	901	1627	2061	26610													
CLRVC	=	004536	004	090	9340															
CLRVCA	=	004562	9390	942	944															
CLRVCB	=	004624	940	950	9530															
CMPCNT	=	011330	10900	13000	17540	1771	17790													
CMPTC	=	011152	1250	17530																
CMPTCA	=	011172	1300	17560																
CMPTCB	=	011166	1090	17550																
CNSTS1	=	006154	1050	11030																
CNTRLA	=	012351	1605	10060																
CNTRLC	=	012343	461	10040																
CNVT3V	=	006112	1000	1091	11040	1206														

COUNT	01316P	1044*	1254*	1359*	1601	1947*								
CPDLAY	010736	410	1703*											
CPTIME	010746	410*	1686	1700*										
CPTYPE	010750	415*	416*	1013	1709*									
CR	000015	220	2407	2417										
CRLF	000200	230	2370	2417										
C80	001344	3400	1109*											
C8C	001354	3460	1432											
C8R	001342	3390	463*	1190*										
D	003573	7500												
DDISP	0177570	290	217	377										
DECOUT	011052	1724	1730*											
DECPNT	011140	1717*	1721	1723	1728*	1745*								
DECPRT	010754	1321	1715*											
DEC1	011100	1731	1733	1736*										
DEC2	011114	1735	1730*											
DELAY	013216	1363*	1360*	1603	1700*	2022*								
DELAY1	013220	1606*	1607*	2003*										
DGT0	006060	1160	1170*											
DGT1	006062	11710												
DGT2	006064	11720												
DGT3	006066	11730												
DGT4	006070	1107	11740											
DH1	013075	320	10730											
DIGCNT	011134	1716*	1725*	1732	1743*									
DIGIT	011132	1710*	1720*	1730	1734*	1737*	1740	1742*						
DISPLA	001140	2170	377*	303*	2106*	2120*								
DISPRE	000174	1400	303											
DOT	012361	19000												
DSHR	0177570	200	216	376										
DT1	013134	330	19000											
E	003600	7520	862	871										
EMTVEC	000030	1170	361*	362*										
EM1	013032	320	1967*											
ERRVEC	000004	1100	374	375*	386*	2067	2068*	2070*	2073*					
F	003605	7540												
FILE1	011352	17050	1700											
FILE2	011410	17030	1796											
FIRST	013214	20010												
G	003612	7560												
GEN1	003366	7010	703											
GETDAY	011216	17600	1770											
GNS	***** U	147	2656	2657	2658	2659	2660	2661	2662	2663	2664			
H	003617	7500	850	867										
HIGH	013202	592*	615	1906*										
HIORDV	013246	1750*	1760*	1772*	20140									
HT	000011	200	2376	2417										
I	003624	7600												
INBUF	010436	466	469	472	475	478	1040	1579	1582*	1583*	1631*	143A		
INCR	013204	19070												
INITA	002072	4560	450	1984										
INIT1	002042	410	4400											
INIT2	002076	450	4500	483	1611									
IOTVEC	000020	1150	350*	360*										
J	003631	7620												
K	003636	7640												

KSTOR1	013162	12400	1241	1244	1252	12530	1360	19800		
KSTOR2	013164	10400	1155	12410	12460	1229	13540	1365	1421	19890
KSTOR3	013166	12510	1265	1270	1276	1281	19900			
KSTOR4	013170	12520	1255	1293	1227	12310	19910			
KSTOR5	013172	19920								
KSTR11	013174	19930								
KSTR12	013176	19940								
L	003643	7660	863	872						
LADTB	007414	1309	14120							
LDTRAP	001740	4230	448	459						
LF	000012	210	2411	2417						
LOADVC	004626	8A5	9550							
LODPNT	003154	649	651	6600						
LODVCA	004664	9620	973							
LODVCS	004672	9640	970							
LODVCC	004676	963	9650							
LOW	013200	5420	550	551	9910	400	616	19950		
M	003650	7680								
MARKER	006222	10850	10900	1184	12080					
MESPT	013244	12340	1287	1310	12140	20130				
MES10	012513	1030	19270							
MES13	012561	1233	19340							
MES14	012617	1237	1350	19400						
MES15	012633	489	19430							
MES16	012701	1240	19500							
MES19	012720	1290	19530							
MES2	011772	1427	18610							
MES20	012743	1313	19570							
MES3	012023	940	18660							
MES4	012070	457	18730							
MES6	012370	487	19110							
MES7	012420	1036	19150							
MES8	012454	1340	19200							
MES9	012505	1400	19250							
MINUS1	013314	1033	20330							
MINUS2	013312	1036	20320							
MINUS3	013310	1039	20310							
MINUS4	013306	1042	20300							
MINUS5	013304	10220	20290							
MODE	003542	714	7350							
N	003655	685	7700	860	861	869	870			
NBEXT	001334	3330								
N0	003756	690	7960	1175						
N1	003763	7980	865	1176						
N2	003770	8000	874	1177						
N3	003775	8020	1178							
N4	004002	8040	1179							
N5	004007	8060	1180							
N6	004014	8080	1181							
N7	004021	8100	1182							
N8	004026	8120								
N9	004033	8140								
O	003662	7720								
OPS1	013224	12350	20050							
ORMIGH	013332	1002	10240	20400						
ORLOW	013302	1310	1000	10260	20200					

OVRL	011544	1010	10240																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		</
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PYCNY	004262	8350	8400	8450	8500	8550								
PYPNY	004264	8360	837	8390	8460	847	8490	8560						
Q	003674	7760												
QMARK	012365	482	1629	1660	19100									
R	003701	7780												
RDCNR	104406	2441	2507	26620										
RDLIN	104407	2549	26630											
RDOCT	104410	26640												
RECVRY	007024	480	13460											
RECVY1	007036	1346	13490											
RECVY2	007066	13550	1398	1407										
REPT8T	006244	477	12310											
REPT1	006256	1231	12340	1245										
REPT2	006342	1243	12470											
REPT2A	006364	12520	1333											
REPT3	006372	12530	1332											
REPT4	006570	1262	1260	1273	1279	1282	12A50							
REPT5	006606	1280	12910											
REPT6	006714	1311	13140											
REPT6A	006742	13200	1323											
REPT7	006766	1264	1269	1274	1280	1284	1325	13270						
REPT7A	007014	1330	13330											
REPT8	006626	12950												
REPT8A	007020	12930	12940	1295	13350									
REPT8T	007444	460	14250											
RESVEC	000010	1110												
ROUTPT	005030	996	10040											
RO	0000000	320	4060	4090	4120	415	4170	418	4340	4350	436	4400	4420	4470
		5100	5530	5580	5620	5660	5700	5740	5780	5820	6050	6100	6170	6220
		6420	6460	654	6640	7160	7300	9180	921	9370	9430	9570	998	10030
		10000	11000	11010	11020	11030	11040	1105	11090	11100	11110	1112	11310	11420
		12050	13710	1372	1373	1374	1375	1376	1377	1378	1379	13840	13930	14320
		14330	14360	14400	1445	1448	1450	1523	15330	1537	1553	1554	15670	16530
		1650	18050	1808	2160	21700	21710	21780	21790	21800	21810	21820	2183	2188
		21930	21950	2199	2201	2214	22390	2359	23600	2365	2370	23730	2546	25500
		2553	25690	2581	25890	2593	2594	25960	25970	2598	26200	2639	26400	2641
		26420	26430	26440	26450									
R1	0000001	330	4240	4250	4260	427	4410	442	443	444	4980	5110	5460	5960
		6410	6470	6610	7170	7260	9380	9410	9580	10840	10890	11120	11130	11140
		1115	11060	1196	13780	13720	13730	13740	13750	13760	13770	13780	13790	13860
		1389	1392	14340	1436	14410	1444	1450	1524	15370	1538	1542	15660	15860
		15870	1588	1590	1592	1598	1602	1608	1612	16170	1620	1622	16410	1654
		16550	16560	16570	16580	1660	1663	18130	18170	1818	18210	18220	2215	22380
		2547	25510	25550	25570	25590	25620	2565	25680	2582	26190			
R2	0000002	340	4230	425	4270	428	429	5220	525	5470	5970	6600	6650	6800
		6850	6900	8370	8470	9590	11070	11150	11610	11950	11960	11970	11980	11990
		1200	1201	13200	13850	13910	14350	14370	14420	14510	1525	15360	15400	1543
		15500	15510	1552	15570	15650	16420	16540	18140	1815	2216	22370	2548	25520
		25560	25580	25600	2566	25670								
R3	0000003	350	5210	529	5480	5980	6380	6430	6480	662	7180	7190	10720	10760
		1080	11330	11350	11380	12000	1526	15340	15350	15490	15520	15610	15620	15640
		16390	16630	17840	17860	17920	17940	18000	18010	1802	2217	22360	2293	23020
		23080	23090	23120	23170	23180	2319	23200	2503	25040	2505	25080	2509	2513
		2515	25170	25190										
R4	0000004	360	5200	5490	555	563	571	579	5900	608	609	620	621	7150
		725	729	732	10730	10770	1081	11340	11360	11410	12040	13190	1320	1322

		1327	1328	1329	1380	1479	1502	1610	1638	1646	1648	1650	1652	1653
		1662	1682	1697	1755	1757	1760	2218	2235	2244	2296	2297	2298	2299
		2300	2314	2316	2324	2327								
R5	01000005	370	649	651	661	667	668	697	831	1061	1120	1130	1138	1201
		1527	1529	1531	1538	1542	1557	1563	2219	2234	2295	2301	2303	2305
		2306	2307	2308	2324									
R6	01000006	380	40	353	154	155								
R7	01000007	390	41											
S	003706	7000												
SP	01000006	400	357	374	104	306	915	998	1149	1194	1295	1299	1303	1307
		1401	1460	1498	1523	1524	1525	1526	1527	1528	1529	1532	1545	1547
		1549	1559	1561	1563	1564	1565	1566	1567	1569	1570	1586	1610	2067
		2070	2072	2073	2102	2103	2107	2133	2153	2156	2169	2174	2195	2199
		2214	2215	2216	2217	2218	2219	2220	2221	2229	2233	2234	2235	2236
		2237	2238	2239	2244	2245	2286	2287	2288	2293	2294	2295	2301	2326
		2327	2328	2329	2330	2359	2360	2370	2372	2373	2374	2376	2378	2380
		2386	2388	2390	2398	2402	2406	2407	2411	2429	2430	2431	2436	2439
		2440	2443	2446	2449	2451	2453	2454	2456	2458	2460	2461	2462	2463
		2467	2468	2470	2471	2472	2473	2474	2484	2485	2488	2489	2490	2492
		2494	2503	2508	2519	2520	2521	2522	2544	2545	2546	2547	2548	2550
		2553	2561	2562	2564	2565	2567	2568	2569	2581	2582	2589	2590	2601
		2602	2603	2613	2614	2619	2620	2639	2640					
SPACEA	004040	8160	864	873										
SPACEX	007712	1404	1409	1491	1493	1493								
STACK	001100	150	357											
STCHAN	013212	20000												
STKLMT	177774	260												
SWR	001136	2160	374	378	102	392	639	882	888	945	949	982	1045	1048
		1070	1127	1147	1155	1261	1267	1324	1397	2062	2076	2078	2084	2091
		2129	2136	2148	2151	2220	2233	2425	2453	2460				
SWREG	000176	1490	382	2425	2436									
SW0	000001	790												
SW00	000001	690	79											
SW01	000002	680	78											
SW02	000004	670	77											
SW03	000010	660	76											
SW04	000020	650	75											
SW05	000040	640	74											
SW06	000100	630	73											
SW07	000200	620	72											
SW08	000400	610	71											
SW09	001000	600	70											
SW1	000002	780												
SW10	002000	590	1147	1261	1397									
SW11	004000	580												
SW12	010000	570	945											
SW13	020000	560	1263											
SW14	040000	550												
SW15	100000	540												
SW2	000004	770												
SW3	000010	760												
SW4	000020	750												
SW5	000040	740												
SW6	000100	730												
SW7	000200	720												
SW8	000400	710												

SW9	001022	700												
T	003713	7020												
TAGA	011256	1765	17670											
TBITVE	000014	1120												
TEMP	013226	3000	3500	400	20000									
TEMP1	013230	0560	061	10070	10070	10070	10070	10070	10070	10070	10070	10070	10070	10070
		17050	10040	10060	20070									
TEMP2	013232	17000	1761	1763	1764	1766	1767	17630	17050	1700	17010	17030	1704	10080
		1000	1011	1015	20000									
TEMP3	013234	11000	13500	15050	20000									
TICKS	013210	0000	5120	5000	0000	6320	6760	0000	0010	0000	10010	10000		
TIMER	004726	502	515	500	000	656	603	052	006	0010				
TIMERA	004742	0000												
TIMER1	004764	007	0000											
TIMER2	004766	005	0000											
TIMER4	005024	10020												
TIMSV	013206	0020	000	0000	0050	0060	0070	1022	10000					
TITLE	011706	055	10520											
TKVEC	000060	1100												
TPVEC	000064	1200												
TRAPVE	000034	1100	3630	3600										
TRTVEC	000014	1130												
TSLO	011240	1762	17600											
TSTCT1	006550	1277	12010											
TSTCT2	006526	1271	12700											
TSTCT3	006504	1266	12700											
TSTCT4	006452	12630												
TSTFLG	011672	003	1100	1150	1253	1355	1450	10070						
TST1	002256	0050												
TST10	004332	050	0700											
TST11	005074	10220												
TST12	006234	12100												
TST13	007022	13000												
TST14	007434	10230												
TST2	002322	5000												
TST3	002436	5370												
TST4	002642	5000												
TST5	003020	6300												
TST6	003202	650	6700											
TST7	004060	0270												
TYPDS	104404	016	1001	20000										
TYPE	104000	050	056	000	001	006	000	010	017	007	1035	1037	1001	1152
		1232	1236	1207	1205	1200	1201	1312	1317	1307	1300	1300	1026	1057
		1062	1560	1000	1020	1020	1067	2131	2130	2160	2105	2107	2100	2102
		2106	2203	2202	2320	2001	2033	2035	2030	2005	2000	2011	2010	2010
		26500												
TYPOC	104401	2170	2200	2037	20570									
TYPON	104403	20500												
TYPOS	104402	1150	1206	1300	1300	1300	1002	1500	20500					
TYPT1	011002	17100	1720											
TYPT2	011010	17200	1722											
TYPT3	011002	1726	17200											
U	003720	7000												
USECLK	013222	10030	10560	1107	20000									
V	003725	7000												
VCSTAT	001346	3020	0000	5100	520	5030	500	5030	000	6350	630	6010	6000	6010

		697	712	723	831	832	842	934	935	939	955	957	1067	1074
		1078	1079	1119	1120	1132	1137	1139	1202	1453				
VCXREG	001350	3430	497	511	546	550	596	636	642	647	710	721	950	1060
		1072	1077											
VCYREG	001352	3440	498	510	547	551	597	637	641	646	711	722	959	1069
		1073	1076											
VISAU1	002250	405	408											
VISUAL	002236	471	485											
VSUAL0	002254	453	490	927										
W	003732	708												
X	003737	790												
XPOS	003546	670	683	688	710	721	729	732	737	833	843	1121	1126	
XPRYAV	007714	1406	1497											
XPTA1	007722	1498	1506											
XSPACE	007662	1290	1302	1306	1405	1406	1490	1504						
XSPRD1	013334	1203	1322	1831	1832	1833	1834	2041						
XSPRD2	013336	1270	1834	1835	1836	1837	2042							
XSPRD3	013340	1272	1837	1838	1839	1840	2043							
XSPRD4	013342	1267	1840	1841	1842	2044								
XTTYIN	010206	465	1039	1230	1249	1351	1579	1630	1669	1849				
Y	003744	792												
YPOS	003544	679	684	689	708	711	722	725	728	736	834	844	1122	1125
YPT	003552	708	728	739										
Z	003751	794												
ZERO	011136	1710	1734	1736	1740									
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SARG1	001616	388												
SASTAT	***** U	2607	2622											
SATYC	015712	2570	2580											
SATY1	015666	2576												
SATY3	015674	2366	2577											
SATY4	015704	2144	2579											
SBASE	001254	2050	435	438										
SDDADR	001122	2100												
SDDDAY	001126	2120	355	1445	1446	1449								
SDELL	001170	2320	2131	2159										
SCDW1	001260	2070												
SCDW2	001262	2080												
SCHARC	015066	2303	2393	2400	2409	2414								
SCKSWR	015072	2425	2661											
SCMTAG	001100	1900	352	353	361	367	368							
SCM1	000002	2200	2290	2300										
SCM2	000004	2200	2290	2300										
SCM3	000002	2260	228											
SCNTLG	015535	2433	2520											
SCNTLU	015530	2445	2527											
SCPUOP	001226	2560												
SCRLP	001175	2340	2139	2159	2160	2187	2192	2196	2302	2417	2464	2527		
SDBLK	010176	1534	1560	1576										
SDDW0	001264	2090												
SDDW1	001266	2000												
SDDW10	001310	2990												
SDDW11	001312	3000												
SDDW12	001314	3010												
SDDW13	001316	3020												
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SDDW15	001322	3040							
SDDW2	001270	2910							
SDDW3	001272	2920							
SDDW4	001274	2930							
SDDW5	001276	2940							
SDDW6	001300	2950							
SDDW7	001302	2960							
SDDW8	001304	2970							
SDDW9	001306	2980							
SDEVCT	001210	2470							
SDEVM	001256	2860							
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SENDAD	004502	162	9210						
SENDCT	004450	9120							
SENDMG	004521	914	9290	1450					
SENULL	004516	917	9280	1462					
SENV	001220	2520	2141	2361	2405	2609			
SENVH	001221	2530	390	2363	2360	2507			
SEOP	004414	9020							
SEOPCT	004442	9090	913						
SERFLG	001103	2010	2051	2080	2082	2080	2110	2126	2159
SERMAX	001115	2070	360	2082	2105	2110			
SERROR	013624	361	21250						
SERRPC	001116	2000	1980	2133	2134	2135	2159	2174	
SERRTB	001324	3240	2102						
SERRTY	014006	2130	21670						
SERTYL	001112	2050	2132	2159					
SESCAP	001166	2310	360	2104	2154	2156	2159		
SETABL	001220	2510							
SETEND	001324	109	3070						
SFATAL	001202	2440	2613						
SFFLG	016132	2576	2579	2607	2616	26240			
SFILLC	001154	2240	2306	2417					
SFILLS	001153	2230	2417						
SGDADR	001120	2090							
SGDDAT	001124	2110	1444	1446	1480				
SGET42	004472	9100							
SHD	000000	11							
SHIBTS	001000	1840							
SHIOCT	015664	2566	25710						
SHCNT	001104	2020	2095	2096	2090	2109			
SHLLUP	014306	2212	2220	22470					
SHTEMB	001114	2060	2135	2143	2159	2171			
SLF	001176	2350	2159	2417	2418	2427			
SLFLG	016131	2617	26230						
SLPADR	001106	2030	370	2086	2102	2107	2109	2109	
SLPERR	001110	2040	371	2086	2103	2109	2153		
SHADR1	001232	2690							
SHADR2	001236	2730							
SHADR3	001242	2760							
SHADR4	001246	2790							
SHAIL	001200	185	189	2420	400	2101	2141	2361	
SHAMS1	001230	2630							
SHAMS2	001234	2710							
SHAMS3	001240	2740							

SMAMSA	001244	2770																	
SMADR	001002	1850																	
SMFLG	016130	25770	25A3	26100	26220														
SMNEW	015553	2430	25310																
SMGAD	001214	2490	25930	2596															
SMGLG	001216	2500	259A0																
SMGTY	001200	2430	2591	25990	2611	26150													
SMHR	015542	2435	25290																
SMTYP1	001231	2640																	
SMTYP2	001235	2720																	
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SMXCNT	013622	2099	21090																
SNUL	001152	2220	230A	2417															
SNWTST	000001	4920	5050	5340	5860	6270	6710	8240	8760	10190	12150	13370	14200						
SOCNT	014604	22920	23210	23340															
SOMODE	014606	22070	22910	2296	22990	23100	23360												
SOVER	013606	2063	2070	2087	2097	21060													
SPASS	001206	2460	3090	9060	9070	915	920	2093	2110										
SPASTH	001006	1870																	
SPRIOR	001252	2020																	
SPHRAD	014302	22450																	
SPHRDN	014142	365	22120	2240															
SPHRMG	014276	22430																	
SPHRUP	014214	2222	22280																
SQUES	001174	2330	2159	2417	2511	2527													
SRDCHR	015330	24840	2662																
SRDEEC	***** U	2665																	
SRDLIN	015412	25030	2663																
SRDOCT	015564	25440	2664																
SRDSZ	000010	24960																	
SREGAD	001156	2260																	
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SREG1	001162	2290																	
SRTNAD	004514	9270																	
SR2A	***** U	2665																	
SSAVRE	***** U	2665																	
SSAVR6	014312	22210	2229	22300	22310	22490													
SSCOPE	013344	359	20600																
SSETUP	000017	3260	3520	358	359	361	363	365	367	368	370	387	904	2061					
		2126	2151	2150															
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SSVLAD	013552	2071	21000																
SSVPC	000210	1600	165																
SSWR	167400	10	11	132	133	134	135	136	137	138	139	230	231	232					
		367	368	370	371	496	509	530	590	631	675	820	880	899					
		905	920	926	928	1023	1219	1341	1424	2052	2053	2054	2055	2056					
		2062	2074	2076	2077	2080	2081	2082	2089	2090	2091	2103	2106	2109					
		2117	2110	2119	2120	2121	2129	2136	2140	2151	2159	2246							
SSWREG	001222	2540	392																
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STESTN	001204	2450	21010																
STIMES	001164	2300	3670	4960	5090	5300	5900	6310	6750	8200	8800	9050	10230	12190					
		14240	20890	2096	20990	2109													
STKB	001144	2190	1506	2421	2429	2480													
STKS	001142	2180	15000	1504	1047	2421	2427	2486											

STN	000015	10	11	492	4960	505	5090	534	53A0	586	5900	627	6310	650
		671	6750	820	8280	850	876	8800	1019	10230	1215	12190	1337	13410
		1420	14240											
STPB	001150	2210	140A0	159A0	17400	24260	2417							
STPFLG	001155	2250	2355	2417										
STPS	001146	2200	1406	1596	173A	2404	2417							
STRAP	016134	363	26390											
STRP	000011	26470	26570	26580	26590	26600	26610	26620	26630	26640	26650			
STRPAD	016156	2640	26550											
STSYM	001004	1860												
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STTYIN	015520	2504	2505	2522	25260									
STYPON	***** U	2661												
STYPOS	007762	15220	2660											
STYPE	014610	23550	2604	2647	2656									
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STYPEX	015070	2410	2417	24150										
STYPOC	014406	22900	2657											
STYPON	014422	2209	22920	2659										
STYPOS	014362	22050	2650											
SUNIT	001212	2400												
SUNITM	001010	1800												
SUSWR	001224	2550												
SVECT1	001250	2000	10590											
SVECT2	001251	2010												
SYSTR	013356	20650												
SSGET4	000000	9200												
SOFILL	014605	22060	22900	2300	23350									
S00CAT	***** U	2062	2130											
.	016662	1430	1470	160	1610	1630	1650	1660	173	1740	1760	1780	1970	230
		356	370	371	520	597	565	573	501	607	613	610	8230	920
		932	960	1407	14760	16340	1730	1745	2100	2110	2150	22060	2224	2248
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COMHEN	1220														
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ERROR	160	1409													
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GETPRI	1220														
MULT	1220														
NEWST	1220	492	585	534	586	627	671	824	876	1019	1215	1337	1420		
POP	1220	1563	2233	2234	2567	2619	2620								
PUSH	1220	1522	2214	2220	2546	2580	2582	2603							
REPORT	1220														
SCOPE	170	495	580	537	589	630	674	827	879	903	1022	1218	1340	1423	
SETPRI	1220														
SETTRA	26470	2657	2658	2659	2660	2661	2662	2663	2664						
SETUP	1220	352													
SKIP	1220	650	854	1447											
SLASH	1220														
SPACE	1220														
STARS	1220	150	170	172	179	193	236	240	492	494	505	507	534	576	586
	500	627	629	671	673	824	826	876	878	895	1019	1021	1215	1217	1337
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	2575	2633													
SWRSU	1220	3720													
TRMTRP	26470														
TYPBIN	1220														
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TYPNUM	1220														
TYPOCS	1220														
TYPOCT	1220	2174	2198	2436											
TYPTXT	1220														
SSCHRE	1900	220	229												
SSCHTM	1900														
SSESCA	1220														
SSNEW	1220	492	585	534	586	627	671	824	876	1019	1215	1337	1420		
SSSET	26470	2657	2658	2659	2660	2661	2662	2663	2664						
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.SWRLO	1400														
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.SAPTH	10	167													
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.STRAP	1#	2630
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.STYPE	1#	2337
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ADC	1768	1776													
ADD	442	525	555	563	608	609	621	664	725	729	732	A30	A40	904	996
	1141	1163	1196	1204	1380	1433	1502	1542	1658	1723	1728	1767	1A32	1A33	1835
	1836	1838	1839	1841	1842	21A2	2288	2298	2374	2446	2454	2461	2463	2562	2598
	2602	2614													
ASL	417	995	1016	1114	1197	119A	1199	1655	1656	1657	1A21	2179	21A0	21A1	2478
	2471	2472	2555	2557	2559	2643									
ASLB	1547														
ASR	1101	1102	1104	1109	1110	1111	1772	2597							
BCC	1548														
BEO	391	452	648	883	889	919	1015	1071	1128	1148	1156	1185	1188	1243	1284
	1330	1447	1615	1621	1647	1733	1807	1816	2077	2079	20A1	2085	2094	2127	2138
	2152	2155	2184	2189	2202	2315	2364	2377	2412	2452	2459	2469	2554	2584	2588
	2608	2610													
BGE	2097														
BGT	910	1400	1556	1651	1661	1699	1765	2322	2493						
BHI	2083														
BIC	709	907	994	1046	1113	1256	1294	1328	1361	1366	1580	1587	1652	2312	2430
	2467	2489	2494	2561											
BIS	714	935	1051	1055	105A	1257	1314	1362	1367	1550	1551	1737	2317	2318	2474
BISB	1191	2171													
BIT	639	882	888	945	984	1070	1127	1147	1261	1263	1397	2062	2076	2084	2091
	2129	2136	2151												
BITB	390	2363	2368	2408	2587										
BLE	1644	1762													
BLOS	2506														
BLT	1539	1555	1649	2323	2391	2491									
BMI	940	1245	1546	1589	1591	1595	1810	1812							
BNE	356	379	430	437	445	450	467	470	473	476	479	530	559	567	575
	583	611	623	655	666	703	727	731	841	851	942	944	946	970	973
	985	987	1050	1054	1094	1117	1143	1165	1206	1262	1264	1266	1268	1271	1273
	1277	1279	1282	1288	1311	1323	1382	1394	1398	1438	1452	1456	1506	1544	1603
	1609	1613	1623	1665	1684	1688	1726	1731	1770	1775	1788	1796	1803	1819	2063
	2092	2137	2142	2172	2194	2232	2313	2362	2369	2371	2379	2387	2401	2408	2426
	2432	2444	2450	2457	2510	2516	2586	2592	2595	2612					
BPL	528	557	565	573	581	607	613	619	663	713	720	724	950	968	1140
	1203	1325	1407	1530	1560	1585	1597	1696	1722	1739	1848	2149	2311	2356	2485
	2428	2487													
BR	349	483	503	516	517	585	625	644	657	658	694	853	854	887	963
	1017	1052	1057	1075	1108	1145	1269	1274	1280	1407	1463	1541	155A	1599	1619
	1630	1659	1690	1729	1735	1823	1825	1827	2065	2071	2074	2087	2090	2147	2177
	2204	2224	2240	2289	2304	2325	2358	2384	2394	2403	2410	2447	2455	2475	2512
	2563	2578	2600												
CLR	348	354	367	368	389	394	413	414	426	462	463	464	519	542	543
	593	635	636	637	681	686	691	904	905	938	955	1043	1047	1067	1068
	1069	1085	1119	1132	1135	1136	1234	1235	1357	1428	1453	1491	1533	1536	1581
	1582	1583	1640	1641	1642	1680	1700	1715	1756	1801	1813	2089	2184	2170	2230
	2302	2439	2440	2551	2552										
CLRB	1193	1562	2088	2303	2409	2517	2616	2617	2618						
CMP	355	378	429	436	444	529	969	998	1049	1155	1194	1244	1265	1267	1270
	1272	1276	1278	1281	1283	1315	1322	1329	1446	1450	1554	1594	1658	1668	1732
	1761	1764	1802	1800	1811	1815	1818	2072	2096	2425	2431	2443	2449	2456	2490
	2492	2505													
CMPB	466	469	472	475	478	1053	1588	1590	1602	1608	1612	1620	1622	1646	1648
	2078	2082	2141	2361	2376	2378	2386	2407	2411	2509	2515	2585			
DEC	558	566	574	582	610	622	665	848	850	908	941	943	986	1014	1093

	1116	1142	1164	1186	1205	1301	1393	1437	1451	1459	1489	1505	1416	1645	1687
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DECB	2310	2321	2390	2393											
ENT	16														
HALT	147	951	1326	1820	2150	2223	2247	2357							
INC	416	439	526	702	726	740	906	945	1090	1103	1331	1363	1364	1459	1540
	1593	1720	1725	1705	1817	1822	1824	1826	2095	2132	2231	2316	2324	2473	2615
INCB	2100	2126	2413												
IOY	17														
JMP	152	153	419	453	468	471	474	477	480	695	926	1002	1157	1158	1332
	1333	1607	1611	1670											
JBR	440	459	465	500	501	502	513	514	515	545	584	595	624	633	649
	651	656	677	682	687	692	693	701	830	838	848	852	884	885	886
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MOV	1405	1406	1454	1504	1669	1724	1849	2138	2144	2364	2385	2392	2399	2466	2674
	350	353	357	359	360	361	362	363	364	365	366	370	371	374	375
	376	377	382	383	384	386	392	404	405	406	415	418	423	424	425
	427	434	435	438	440	441	458	485	496	497	498	499	509	510	511
	512	520	521	522	523	524	538	544	546	547	548	549	550	551	553
	554	561	562	569	570	577	578	590	591	592	594	596	597	598	599
	600	601	604	605	615	616	617	631	632	638	641	642	643	646	647
	648	660	661	675	676	678	679	680	683	684	685	688	689	690	696
	697	708	710	711	715	716	717	721	722	728	828	829	831	832	833
	834	835	836	837	842	843	844	845	846	847	880	881	911	915	918
	934	937	956	957	958	959	960	961	962	982	997	1013	1023	1034	1040
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	1374	1375	1376	1377	1378	1379	1384	1385	1386	1387	1388	1389	1391	1401	1404
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ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

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