

digital**MAINDEC CHANGE
NOTICE**CHANGE NO.
11- DZQMA-A - 1
Sheet 1 of 1

AUTHOR B. Brain	PROGRAM DATE APRIL 72	PRODUCT LINE PDP-11 V20 06641	MAINDEC NUMBER 11-DZQMA-A
DATE 7/6/72	EXT. 3096		

PROGRAM NAME Memory Exerciser**DEVICE** Memories

ITEM Ø.	This program is to be used to check memories with the use of an I/O device and KT11C/D if available. It also checks the EA bits on mass storage devices.														
1. 7/14/72	Power fail locks out all devices including TTY because the PS had priority 7 set. Change: <table border="0" style="margin-left: 40px;"> <tr> <td>LOCATION</td> <td>TO</td> </tr> <tr> <td>12326</td> <td>137</td> </tr> <tr> <td>1233Ø</td> <td>12416</td> </tr> <tr> <td>12416</td> <td>5Ø37</td> </tr> <tr> <td>1242Ø</td> <td>177776</td> </tr> <tr> <td>12422</td> <td>137</td> </tr> <tr> <td>12424</td> <td>2Ø64</td> </tr> </table>	LOCATION	TO	12326	137	1233Ø	12416	12416	5Ø37	1242Ø	177776	12422	137	12424	2Ø64
LOCATION	TO														
12326	137														
1233Ø	12416														
12416	5Ø37														
1242Ø	177776														
12422	137														
12424	2Ø64														

M. C. N. REQUIRED
THIS PROGRAM REQUIRES MCN(S)
IN ORDER TO WORK PROPERLY

IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZQMA-A-D
PRODUCT NAME: MEMORY EXERCISER
DATE CREATED: 1-APR-72
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: BOB BRAIN

COPYRIGHT (C) 1972
DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASS.

CONTENTS

1.	ABSTRACT
2.	REQUIREMENTS
2.1	Equipment
2.2	Storage
2.3	Preliminary programs
3.	LOADING PROCEDURE
4.	STARTING PROCEDURE
4.1	Control switch settings
4.2	Starting address
4.3	Program and/or operator action
5.	OPERATING PROCEDURE
5.1	Operational switch settings
5.2	Subroutine abstract
6.	ERRORS
7.	RESTRICTIONS
8.	MISCELLANEOUS
8.1	Execution time
8.2	Stack pointer
8.3	Power fail
9.	PROGRAM DESCRIPTION

1. Abstract
This program checks bank selection, EA bits, and memory using any NPR device with EA bits. It runs stand alone or with KT11C or KT11D to access extended memory. Worst case noise patterns are used with the NPR device to test the memory.
2. Requirements
 - 2.1 Equipment
PDP11 standard computer with a minimum of 8K of memory
KT11C/D for memory expansion (optional)
 - 2.2 Storage
Program Storage - the routines use memory 0 - 17776
 - 2.3 Preliminary programs
Memory diagnostics
Device diagnostics
3. Loading procedure
Use standard procedure for ABS tapes.
4. Starting Procedure
 - 4.1 Control switch settings
See 5.1.1 (all down for worst case testing)
 - 4.2 Starting address
Start at 200.
 - 4.3 Program and/or operator action
 - 1) Start at 200
 - 2) Type device (RP11, RK11, RP11, RC11, TC11, TM11, DM11, or DR11B) and RETURN.
 - 3) Test will start (C will return to step 2 and restore the

loader)
or
1) Start at 200
2) Type a RETURN
3) Type the lower bank to be tested i.e., 1=20000-37777 etc.
4) Type the upper bank to be tested
5) Type device (RF11, RK11, RP11, RC11, TC11, TM11, DM11, or
DR11B) and RETURN,
6) Test will start (+C will return to step 2 and restore the
loader)

5. Operating procedure

5.1 Operational switch settings

At SA 200 ,, all switches down is worst case testing. The
bell will ring upon completion of a pass.

5.1.1 Switch settings are:

SW<15> = 1, HALT ON ERROR
SW<14> = 1, HANG ON CURRENT BANK
SW<13> = 1, INHIBIT PRINTOUT
SW<10> = 1, INHIBIT BELL ON PASS COMPLETE
SW<09> = 1, INHIBIT USE OF MEMORY EXPANSION DEVICE
SW<08> = 1, TRACE BANK UNDER TEST

5.2 SUBROUTINE ABSTRACTS

5.2.1 TRAPCATCHER

A "+2" = "HALT" sequence is repeated from 0 - 776 to catch
any unexpected traps. Thus any unexpected traps or
interrupts will HALT at the vector + 2.

5.2.2 Trap handler

Most of the subroutine calls are done via a TRAP+n call. To
find the subroutine being called, look in the comment
section of the trap definition table for the name of the
trap, then scan to the left margin for the starting address
of the subroutine.

6. Errors

6.1 Error printout

The format is as follows:

RF11 ERROR: CS = 100305 ER = 001000

RF11 = Device under test
CS = Control and status register
ER = Error register

DATA ERROR AT 401220 TRUE = 177777 RECEIVED = 177757

401220 = Address of bad data (18 bit)
TRUE = Data sent
RECEIVED = Data found

6.2 Error recovery

Restart at 200

7. Restrictions

None

8. Miscellaneous

8.1 Execution time

The execution time is dependant on the amount of memory and the device used. The bell should ring within 20 minutes (using DM11 at 110 BAUD in 124K.)

8.2 Stack Pointer

Stack is initially set to 500

8.3 Power Fail

After the program is started, power down then up. There should be no error timeouts.

9. Program Description

The program sizes core and test sequentially all core or any section of core in 4K chunks using the device specified and memory expansion device. Worst case noise patterns are used for each memory type on each pass.

104	DEVICE ADDRESSES
156	SETUP, CORE, AND OPTION SCAN
255	TTY INPUT AREA
354	TRAP HANDLER
405	SUBROUTINES
597	RF11 DISK HANDLER
625	ERROR ROUTINE FOR RF11
665	RC11 DISK HANDLER
693	ERROR ROUTINE FOR RC11
733	RP11 DISK HANDLER
768	ERROR ROUTINE FOR RP11
811	RK11 DISK HANDLER
839	ERROR ROUTINE FOR RK11
882	TC11 DTA HANDLER
903	ERROR ROUTINE FOR TC11
1022	TM11 MAGTAPE HANDLER
1054	ERROR ROUTINE FOR TM11
1094	DM11 ASYNCHRONOUS MODEM
1232	DR11-B HANDLER
1267	ERROR ROUTINE FOR DR11
1391	ROUTINES TO GET LOADER AND RESTORE IT
1426	TTY I/O ROUTINES
1468	OCTAL DUMP OF A WORD & 18 BIT ADDRESS TYPED
1514	POWER FAIL AND +C ROUTINES

1 ,TITLE MAINDEC-11-DZQMA-A MEMORY EXERCISER
2 .REM*
3 Abstract
4

5 This program checks bank selection, EA bits, and memory using
6 any NPR device with EA bits. It runs stand alone or with
7 KT11C or KT11D to access extended memory. Worst case noise
8 patterns are used with the NPR device to test the memory.
9

10
11 Requirements

12 PDP-11 with at least 8K of memory (KT11C or KT11D are
13 optional.)
14

15
16 Storage = First 4K

17
18 Loading = Absolute Loader
19

20
21
22 Execution time

23 The time is dependent on the amount of memory and the device
24 which is used. A bell will signify end of pass. Maximum run
25 time is no greater than 5 minutes.
26
27

28
29 Starting procedure

- 30
31 1) Start at 200
32 2) Type device (RF11, RK11, RP11, RC11, TC11, TM11, DM11, or
33 DR11B) and RETURN.
34 3) Test will start (*C will return to step 2 and restore the
35 loader)
36 or
37 1) Start at 200
38 2) Type a RETURN
39 3) Type the lower bank to be tested ;, 1 = 20000-37777 etc,
40 4) Type the upper bank to be tested
41 5) Type device (RF11, RK11, RP11, RC11, TC11, TM11, DM11, or
42 DR11B) and RETURN.
43 6) Test will start (*C will return to step 2 and restore the
44 loader)
45

46
47 Switch register options - yes

- 48
49 SW15 - HALT ON ERROR
50 SW14 - LOOP ON CURRENT BANK
51 SW13 - INHIBIT TYPEOUTS
52 SW10 - INHIBIT BELL
53 SW09 - INHIBIT USE OF MEMORY EXPANTION DEVICE
54 SW08 - TYPE BANK UNDER TEST*

ICOPYRIGHT 1972,DIGITAL EQUIPMENT CORP, MAYNARD MASS;
PROGRAM BY BOB BRAIN
ENABL ABS

ITRAP CATCHER 0 = 776

55				, =	7		
56							
57							
58							
59	000000						
60							
61	000000			R0=	X0		
62	000001			R1=	X1		
63	000002			R2=	X2		
64	000003			R3=	X3		
65	000004			R4=	X4		
66	000005			R5=	X5		
67	000005			TTY=	X5		
68	000006			SP=	X6		
69	000007			PC=	X7		
70	177570			SWR=	177570		
71	177570			DISPLAY=	SWR		
72	000004			TYPE=	IOT		
73	000007			BELL=	7		
74	000000			N=	0		
75	040000			SW14=	40000		
76	020000			SW13=	20000		
77	010000			SW12=	10000		
78	004000			SW11=	4000		
79	002000			SW10=	2000		
80	001000			SW09=	1000		
81	000400			SW08=	400		
82							
83							
84	000200			, =	200		
85							
86	000200	000167	001012		JMP	GOT	
87							
88	001000			, =	1000		
89							
90	001000	000000		MXI	0		
91	001002	000000		MINI	7		
92	001004	000000		LIMITI	0		
93	001006	000000		OPTIONI	0		
94							
95	001010	000204	000206	RETRAPI	204,206		
96	001014	000210	000212	RCTRAPI	210,212		
97	001020	000254	000256	RPTRAPI	254,256		
98	001024	000220	000222	RKTRAPI	220,222		
99	001030	000214	000216	TCTRAPI	214,216		
100	001034	000124	000126	DRTRAPI	124,126		
101	001040	000224	000226	TMTRAPI	224,226		
102	001044	000330	000332	DMRVECI	330,332		
103	001050	000250	000252	SEGVECI	250,252		

IBANK UNDER TEST
IFIRST BANK
ILAST BANK
IOPTION = MI = MX11 = GT = KT11

104 001054 177460
 105 001056 177470
 106 001060 177462
 107 001062 177464
 108 001064 177466
 109 001066 177446
 110 001070 177444
 111 001072 177450
 112 001074 177452
 113 001076 177442
 114 001100 176714
 115 001102 176716
 116 001104 176720
 117 001106 176724
 118 001110 176712
 119 001112 176710
 120 001114 177404
 121 001116 177402
 122 001120 177406
 123 001122 177410
 124 001124 177412
 125 001126 177342
 126 001130 177340
 127 001132 177344
 128 001134 177346
 129 001136 177350
 130 001140 172522
 131 001142 172520
 132 001144 172524
 133 001146 172526
 134 001150 175000
 135 001152 175002
 136 001154 175004
 137 001156 175006
 138 001160 172410
 139 001162 172412
 140 001164 172414
 141 001166
 142 001166 172416
 143 001170 177572
 144 001172 172340
 145 001174 172300
 146 001176 172354
 147 001200 172314
 148 001202 172356
 149 001204 172316
 150 001206 177604
 151
 152 001210 140000
 153 001212 160000
 154 001214 170000

RFCS: 177460
 RFER: 177470
 RFWC: 177462
 RFCA: 177464
 RFDA: 177466
 RCCS: 177446
 RCER: 177444
 RCWC: 177450
 RCCA: 177452
 RCOA: 177442
 RPCS: 176714
 RPWC: 176716
 RPCA: 176720
 RPDA: 176724
 RPER: 176712
 RPDS: 176710
 RKCS: 177404
 RKER: 177402
 RKWC: 177406
 RKCA: 177410
 RKDA: 177412
 TCCS: 177342
 TCER: 177340
 TCWC: 177344
 TCCA: 177346
 TCDB: 177350
 TMCS: 172522
 TMER: 172520
 TMBC: 172524
 TMCA: 172526
 DMCS: 175000
 DMACT: 175002
 DMBRK: 175004
 DMADR: 175006
 DRWC: 172410
 DRCA: 172412
 DRCS: 172414
 DRER:
 DRDB: 172416
 SR0: 177572
 KISAR0: 172340
 KISDR0: 172300
 KISAR6: 172354
 KISDR6: 172314
 KISAR7: 172356
 KISDR7: 172316
 MXC3: 177604
 LOLIM: 140000
 HILIM: 160000
 WRDNT: -10000

JRF11 DISK (256K)
 JRC11 DISK (64K)
 JRP11 DISK (PACK)
 JRK11 DISK (CARTRIDGE)
 JTC11 DECTAPE
 JTM11 MAGTAPE
 JDM11 ASYNCHRONOUS MODEM
 JDR11
 JKT11 MEMORY MANAGEMENT
 JMX11
 JBEGINNING OF BANK
 JEND OF BANK
 JWORD COUNT

155	001216	000005			GOT:	RESET			
156	001220	012726	000500			MOV	#500,SP		IZAP THE WORLD
157	001224	012767	011652	176566		MOV	#,IOT,20		I *STACK AT 500*
158	001232	012767	000340	176562		MOV	#340,22		ITTY OUTPUT TRAP
159	001240	012767	012244	176556		MOV	#POWR,24		ILOCK OUT WORLD
160	001246	012767	000340	176552		MOV	#340,26		ISET POWER FAIL ADDRESS
161	001254	012767	002602	176552		MOV	#,TRP,34		
162	001262	012767	000340	176546		MOV	#340,36		ISET UP TRAP ADDRESS
163	001270	012777	004070	177512		MOV	#TRP,RF,@RFTRAP		
164	001276	012777	000240	177506		MOV	#240,@RFTRAP+2		
165	001304	012777	004452	177502		MOV	#TRP,RC,@RCTRAP		
166	001312	012777	000240	177476		MOV	#240,@RCTRAP+2		
167	001320	012777	005162	177472		MOV	#TRP,RP,@RPTRAP		
168	001326	012777	000240	177466		MOV	#240,@RPTRAP+2		
169	001334	012777	005462	177462		MOV	#TRP,RK,@RKTRAP		
170	001342	012777	000240	177456		MOV	#240,@RKTRAP+2		
171	001350	012777	006066	177452		MOV	#TRP,TC,@TCTRAP		
172	001356	012777	000300	177446		MOV	#300,@TCTRAP+2		
173	001364	012777	006774	177446		MOV	#TRP,TM,@TMTRAP		
174	001372	012777	000240	177442		MOV	#240,@TMTRAP+2		
175	001400	012777	010352	177426		MOV	#TRP,DR,@DRTRAP		
176	001406	012777	000240	177422		MOV	#240,@DRTRAP+2		
177	001414	012767	012332	176436		MOV	#READR,60		IKEYBOARD VECTOR
178	001422	012767	140000	177560		MOV	#140000,LOLIM		IINIT LOLIM
179	001430	012767	160000	177554		MOV	#160000,HILIM		IINIT HILIM
180	001436	012767	000001	177336		MOV	#,MIN		
181	001444	012767	000000	177326		MOV	#,MX		
182	001452	005067	002074			CLR	MEMORY		IWHICH MEMORY BEING CHECKED
183	001456	005067	177324			CLR	OPTION		IATYPE THE OPTION
184	001462	032737	001000	177570		BIT	#SW09,@#SWR		IINHIBIT USE OF MEMORY EXTENTION DEVICE
185	001470	001036				BNE	SIZEIT		ISKIP
186	001472	012737	001526	000004		MOV	#15,@#4		ISET FOR TIMEOUT
187	001500	005777	177464			TST	@SR0		ICHECK FOR KT11
188	001504	105167	177276			COMB	OPTION		IOPTION IS KT11
189	001510	012777	002710	177332		MOV	#SEGERR,@SEGVEC		
190	001516	012777	000340	177326		MOV	#340,@SEGVEC+2		
191	001524	000415				BR	25		
192									
193	001526	012737	001560	000004	15I	MOV	#25,@#4		ISET FOR TIMEOUT
194	001534	005777	177446			TST	@MXC3		ICHECK FOR MX11
195	001540	105167	177243			COMB	OPTION+1		IOPTION IS MX11
196	001544	012767	000004	177230		MOV	#4,MIN		
197	001552	012767	000003	177220		MOV	#3,MX		
198	001560	012737	000006	000004	25I	MOV	#6,@#4		IRESET FOR NEM
199									
200	001566	005767	177214		SIZEIT:	TST	OPTION		IWHICH OPTION AM I
201	001572	100417				BMI	OOMX		IMUST HAVE MX11
202	001574	001037				BNE	DOSEG		IMUST HAVE MEMORY MANAGEMENT

203	001576	012737	001630	000004	DOCORE:	MOV	#2S,@#4	ISET FOR NEM
204	001604	012701	017776			MOV	#17776,R1	ISET UP ADDRESS
205	001610	005000				CLR	R0	ISET UP BANK COUNT
206	001612	062701	020000		1S:	ADD	#20000,R1	IMOVE TO NEXT BANK
207	001616	005200				INC	R0	IINC THE BANK COUNT
208	001620	005711				TST	(1)	ITIMEOUT?
209	001622	022701	177776			CMP	#177776,R1	IEND?
210	001626	001371				BNE	1S	ILOOP IF NOT AT THE END
211	001630	000446			2S:	BR	TYPEIT	I
212								
213	001632	012737	001664	000004	DOMX:	MOV	#2S,@#4	ISET UP FOR NEM
214	001640	012700	000003			MOV	#3,R0	ISET BANK COUNT
215	001644	005200			1S:	INC	R0	IMOVE TO NEXT BANK
216	001646	010077	177334			MOV	R0,@MXC3	ISET UP MXC3
217	001652	005737	157776			TST	@#157776	ITIMEOUT?
218	001656	022700	000036			CMP	#36,R0	IEND?
219	001662	001370				BNE	1S	ILOOP IF NOT END
220	001664	012777	000006	177314	2S:	MOV	#6,@MXC3	IMAP INTO SELF
221	001672	000425				BR	TYPEIT	I
222								
223	001674	104446			DOSEG:	MAPIT		ISETUP MEMORY MANAGEMENT REGISTERS
224	001676	005277	177266			INC	@SR0	ITURN ON MEMORY MANAGEMENT
225	001702	012737	001732	000004		MOV	#2S,@#4	ISET TIMEOUT ADDRESS FOR CORE CALCULATIONS
226	001710	005737	157776		1S:	TST	@#157776	ITRAP ON NON EX MEM
227	001714	062777	000200	177254		ADD	#200,@KISAR6	IGO TO NEXT BANK
228	001722	022777	007600	177246		CMP	#7600,@KISAR6	ILAST ONE?
229	001730	003367				BGT	1S	ITRY NEXT
230	001732	017700	177240		2S:	MOV	@KISAR6,R0	ISAVE ASR6 IN R0
231	001736	006300				ASL	R0	I *ASH #-7,R0*
232	001740	000300				SWAB	R0	IKLUDGY ISN'T IT
233	001742	042700	177740			BIC	#177740,R0	ICLEAR JUNK
234								
235	001746	005300			TYPEIT:	DEC	R0	IDROP BACK
236	001750	012737	000006	000004		MOV	#6,@#4	ISET FOR NEM
237	001756	012706	000500			MOV	#500,SP	ICLEAR STACK **500**
238	001762	005227	177777			INC	#=1	ITYPE THE OPTION ONLY ONCE
239	001766	001022				BNE	REDO	IFIRST TIME?
240	001770	004767	007516			JSR	7,LODGET	IGET THE LOADER ONLY THE FIRST TIME
241	001774	000004	011140			TYPE	,M14A	
242	002000	010005				MOV	R0,TTY	ITYPE R0 IN OCTAL
243	002002	004767	010044			JSR	PC,PRINYS	IAND SUPPRESS LEADING ZERO'S
244	002006	000004	011156			TYPE	,M14	ITYPE "BANKS EXIST"
245	002012	005767	176770			TST	OPTION	IWHICH OPTION?
246	002016	001406				BEG	REDO	INOTHING
247	002020	100403				BMI	1S	IMX11
248	002022	000004	011464			TYPE	,WITHSG	IMEMORY MANAGEMENT
249	002026	000402				BR	REDO	ISKIP
250	002030	000004	011477		1S:	TYPE	,WITHMX	IMX11
251	002034	010067	176744		REDO:	MOV	R0,LIMIT	ISAVE UPPER BANK
252	002040	004767	007534			JSR	7,LODRES	IRESTORE LOADER

253	002044	012737	002534	000004	T01	MOV	#NODEV,@#4	ISET UP TRAP IF NO DEVICE	
254	002052	005037	177776			CLR	@#177776	IORJP PRIORITY	
255	002056	000004	011004			TYPE	,M2	ISNOWFLAKE HIM	
256	002062	104430				ACCEPT		IINPUT DATA FROM TTY	
257	002064	052737	000100	177560	RTPF1	BIS	#100,@#177560	IIF THE TTY	
258	002072	022767	041522	010336		CMP	#"RC,INPUT	IICHECK FOR RC11	
259	002100	001004				BNE	T1		
260	002102	052777	000100	176756		BIS	#100,@RCCS	IURN ON INTERRUPT	
261	002110	000503				BR	WAIT		
262	002112	022767	050122	010316	T11	CMP	#"RP,INPUT	IICHECK FOR RP11	
263	002120	001004				BNE	T2		
264	002122	052777	000100	176750		BIS	#100,@RPCS	IURN ON INTERRUPT	
265	002130	000473				BR	WAIT		
266	002132	022767	043122	010276	T21	CMP	#"RF,INPUT	IICHECK FOR RF11	
267	002140	001004				BNE	T3		
268	002142	052777	000100	176704		BIS	#100,@RFCS	IURN ON INTERRUPT	
269	002150	000463				BR	WAIT		
270	002152	022767	045522	010256	T31	CMP	#"RK,INPUT	IICHECK FOR RK11	
271	002160	001004				BNE	T4		
272	002162	052777	000100	176724		BIS	#100,@RKCS	IURN ON INTERRUPT	
273	002170	000453				BR	WAIT		
274	002172	022767	046524	010236	T41	CMP	#"TM,INPUT	IICHECK FOR TM11	
275	002200	001004				BNE	T5		
276	002202	052777	000100	176730		BIS	#100,@TMCS	IURN ON INTERRUPT	
277	002210	000443				BR	WAIT		
278	002212	022767	041524	010216	T51	CMP	#"TC,INPUT	IICHECK FOR TC11	
279	002220	001004				BNE	T6		
280	002222	052777	000100	176676		BIS	#100,@TCCS	IURN ON INTERRUPT	
281	002230	000433				BR	WAIT		
282	002232	022767	046504	010176	T61	CMP	#"DM,INPUT	IICHECK FOR DM11	
283	002240	001007				BNE	T7		
284	002242	005777	176702			TST	@DMCS	IIS IT THERE?	
285	002246	012737	000006	000004		MOV	#6,@#4	IRESTORE 4	
286	002254	000167	005074			JMP	TRP,DM		
287	002260	022767	051104	010150	T71	CMP	#"DR,INPUT	IICHECK FOR DR11	
288	002266	001004				BNE	T8		
289	002270	052777	000100	176666		BIS	#100,@DRCS	IURN ON INTERRUPT	
290	002276	000410				BR	WAIT		
291	002300	105767	010132		T81	TSTB	INPUT	IICR ALONE	
292	002304	001420				BEQ	CRLF		
293	002306	000004	010710			TYPE	,M1		
294	002312	005037	177560			CLR	@#177560	IID THE TTY	
295	002316	000652				BR	T0		
296									
297	002320	012737	000006	000004	WAIT1	MOV	#6,@#4	ISET NEM TRAP	
298	002326	016704	176656		1\$1	MOV	LOLIM,R4	ISET LOW LIMIT	*****
299	002332	026704	176654		2\$1	CMP	HILIM,R4	IEND OF RANGE	* * *
300	002336	001773				BEQ	1\$	IYES = RESET	* BACKGROUND *
301	002340	000241				CLC		IICLEAR CARRY BIT	* TEST *
302	002342	005524				ADC	(4)+	IINP WITH READ/WRITE	* * *
303	002344	000772				BR	2\$	ILOOP	*****

304	002346	012737	000006	000004	CRLF1	MOV	#6,@#4	
305	002354	005037	177560			CLR	@#177560	!DID THE TTY
306	002360	000004	011171			TYPE	,M11	!ASK FOR LOWER LIMIT
307	002364	104430				ACCEPT		!GET IT
308	002366	005067	176410			CLR	MIN	
309	002372	012701	012436			MOV	#INPUT,R1	
310	002376	105711			CR1:	TSTB	(1)	!CR?
311	002400	001414				BEQ	CR2	
312	002402	106011				RORB	(1)	
313	002404	106011				RORB	(1)	
314	002406	106011				RORB	(1)	
315	002410	106167	176366			ROLB	MIN	
316	002414	106111				ROLB	(1)	
317	002416	106167	176360			ROLB	MIN	
318	002422	106121				ROLB	(1)+	
319	002424	106167	176352			ROLB	MIN	
320	002430	000762				BR	CR1	
321	002432	005767	176344		CR2:	TST	MIN	!MIN MUST BE >0
322	002436	003743				BLE	CRLF	!NOPE!
323	002440	016767	176336	176332		MOV	MIN,MX	!SAVE LOWER LIMIT
324	002446	005367	176326			DEC	MX	
325	002452	000004	011117		NXTCR1	TYPE	,M12	!ASK FOR UPPER LIMIT
326	002456	104430				ACCEPT		!READ IT
327	002460	005000				CLR	R0	
328	002462	012701	012436			MOV	#INPUT,R1	
329	002466	105711			CR3:	TSTB	(1)	!CR?
330	002470	001411				BEQ	CR4	!TEST FOR END
331	002472	106011				RORB	(1)	
332	002474	106011				RORB	(1)	
333	002476	106011				RORB	(1)	
334	002500	106100				ROLB	R0	
335	002502	106111				ROLB	(1)	
336	002504	106100				ROLB	R0	
337	002506	106121				ROLB	(1)+	
338	002510	106100				ROLB	R0	
339	002512	000765				BR	CR3	
340	002514	020067	176264		CR4:	CMP	R0,LIMIT	!GREATER THAN THE MAX?
341	002520	003354				BGT	NXTCR	!YES - TRY AGAIN
342	002522	020067	176254			CMP	R0,MIN	!R0 MUST BE > MIN
343	002526	002707				BLT	CRLF	!IT'S NOT
344	002530	000167	177310			JMP	T0	!GET ANOTHER
345								
346	002534	000004	011135		NODEVI	TYPE	,M13	!TYPES NO DEVICE
347	002540	000004	011135			TYPE	,M13	
348	002544	000004	012436			TYPE	,INPUT	
349	002550	000004	002554			TYPE	,+2	!ASCIZ " DOES NOT EXIST"<15><12>
350	002576	000167	176414			JMP	GOT	!RETURN TO TTY INPUT MODE

```

351 002602 011601
352 002604 162701 000002
353 002610 111101
354 002612 062701 002634
355 002616 022701 002706
356 002622 100401
357 002624 000171 000000
358 002630 000000
359 002632 000776
360
361 002634
362 002634 003554
363 002636 003612
364 002640 004216
365 002642 004600
366 002644 005212
367 002646 005610
368 002650 006160
369 002652 007124
370 002654 010454
371 002656 006424
372 002660 007032
373 002662 003236
374 002664 011740
375 002666 006160
376 002670 003416
377 002672 003632
378 002674 003434
379 002676 003726
380 002700 002774
381 002702 004016
382 002704 012376
383 002706 012416
384
385
386 002710 017701 176254
387 002714 005077 176250
388 002720 000004 011406
389 002724 000004 011425
390 002730 012105
391 002732 004767 007104
392 002736 000004 011436
393 002742 012105
394 002744 004767 007072
395 002750 000004 011447
396 002754 011105
397 002756 004767 007060
398 002762 000004 011135
399 002766 000000
400 002770 000167 177070
  
```

```

,TRP: MOV (6),R1 ;GET TRAP INSTRUCTION
SUB #2,R1 ;BACK UP BY 2
MOVB (1),R1 ;GET THE RIGHT BYTE OF TRAP
ADD #ADRTAB,R1 ;INDEX TO TABLE
CMP #ENDTAB,R1 ;CHECK FOR END OF TABLE
BMI ,+4 ;OUT OF BOUNDS
JMP @ (1) ;GO TO ROUTINE
HALT ;TRAP OUT OF BOUNDS
BR ,=2 ;HANG UP
  
```

```

ADRTAB:
WRADR ;CORE = TRAP+0 (104400)
WRCADR ;COMCOR = TRAP+2 (104402)
CH,RF ;CHK,RF = TRAP+4 (104404)
CH,RC ;CHK,RC = TRAP+6 (104406)
CH,RP ;CHK,RP = TRAP+10 (104410)
CH,RK ;CHK,RK = TRAP+12 (104412)
CH,TC ;CHK,TC = TRAP+14 (104414)
CH,TM ;CHK,TM = TRAP+16 (104416)
CH,DR ;CHK,DR = TRAP+20 (104420)
S,TC ;SEARCH = TRAP+22 (104422)
RW,TM ;REWIND = TRAP+24 (104424)
CDATA ;CKDATA = TRAP+26 (104426)
GOGET ;ACCEPT = TRAP+30 (104430)
CH,TC ;ERR2 = TRAP+32 (104432)
POTS ;STOP = TRAP+34 (104434)
ERS ;ERR3 = TRAP+36 (104436)
SEGIN ;START = TRAP+40 (104440)
SETBAK ;SETBAN = TRAP+42 (104442)
NXT ;NEXT = TRAP+44 (104444)
MAP ;MAPIT = TRAP+46 (104446)
PATCH1 ;DUM1 = TRAP+50 (104450)
PATCH2 ;DUM2 = TRAP+52 (104452)
ENDTAB=,=2
  
```

```

SEGERR: MOV @SR0,R1
CLR @SR0
TYPE ,SEGA ;MEMORY MANAGEMENT ERROR
TYPE ,SEG1 ;TYPE SR0
MOV (1)+,TTY ;TYPE (1)+ IN OCTAL
JSR PC,PRINTR ;TYPE LEADING ZERO'S
TYPE ,SEG2 ;TYPE SR1
MOV (1)+,TTY ;TYPE (1)+ IN OCTAL
JSR PC,PRINTR ;TYPE LEADING ZERO'S
TYPE ,SEG3 ;TYPE SR2
MOV (1),TTY ;TYPE (1) IN OCTAL
JSR PC,PRINTR ;TYPE LEADING ZERO'S
TYPE ,M13
HALT
JMP RTPF
  
```


401	002774	032737	040000	177570	NXTI	BIT	#SW14,@#SWR	ILOOP ON BANK?
402	003002	001111				RNE	2\$	
403	003004	126700	175770			CMPB	MX,R0	I LAST PAGE?
404	003010	002461				BLT	1\$	
405	003012	032737	002000	177570		BIT	#SW10,@#SWR	IINHIBIT BELL
406	003020	001005				RNE	5\$	IYES!
407	003022	112767	000007	007010		MOVB	#BELL,,TYPE	I TYPE A BELL
408	003030	000004	012040			TYPE	,,TYPE	
409	003034	013703	000042		5\$!	MOV	@#42,R3	I GET MONITOR ADDRESS
410	003040	001406				BEQ	10\$	I SKIP IF 0
411	003042	004767	006532			JSR	PC,LODRS	I RESTORE THE LOADER
412	003046	004713				JSR	PC,(3)	I GO TO MONITOR
413	003050	000240				NOP		
414	003052	000240				NOP		
415	003054	000240				NOP		
416	003056	016767	175720	175714	10\$!	MOV	MIN,MX	I RESET MX
417	003064	016737	175710	177570		MOV	MX,@#DISPLAY	I DISPLAY IT
418	003072	032737	000400	177570		BIT	#SW08,@#SWR	I TYPE BANK NUMBER??
419	003100	001410				BEQ	6\$	I NO!
420	003102	000004	003106			TYPE	,,+2	I,ASCIZ <15><12>" "
421	003112	016705	175662			MOV	MX,TTY	I TYPE MX IN OCTAL
422	003116	004767	006730			JSR	PC,PRINTS	I AND SUPPRESS LEADING ZERO'S
423	003122	005767	000424		6\$!	TST	MEMORY	I CHECK STATE OF FLAG
424	003126	100407				BMI	4\$	I SWAB IT
425	003130	001403				BEQ	3\$	I COM IT
426	003132	005067	000414			CLR	MEMORY	I INIT IT
427	003136	000433				BR	2\$	I CONTINUE
428	003140	105167	000407		3\$!	COMB	MEMORY+1	I MAKE IT 177400
429	003144	000430				BR	2\$	I SKIP
430	003146	000367	000400		4\$!	SWAB	MEMORY	I MAKE IT 377
431	003152	000425				BR	2\$	
432	003154	005267	175620		1\$!	INC	MX	I GO TO NEXT BANK
433	003160	016737	175614	177570		MOV	MX,@#DISPLAY	I DISPLAY THE BANK IN USE
434	003166	032737	000400	177570		BIT	#SW08,@#SWR	I TYPE BANK NUMBER??
435	003174	001414				BEQ	2\$	I NO!
436	003176	000004	003202			TYPE	,,+2	I,ASCIZ " "
437	003204	016705	175570			MOV	MX,TTY	I SET FOR TYPING
438	003210	032705	000007			BIT	#7,TTY	I MULTIPLE OF 10?
439	003214	001402				BEQ	7\$	I YES
440	003216	042705	177770			BIC	#177770,TTY	I CLEAR OUT UPPER BITS
441	003222	004767	006624		7\$!	JSR	PC,PRINTS	I TYPE MX AND SUPPRESS LEADING ZEROES
442	003226	104442			2\$!	SETBANK		I SET MXC
443	003230	016704	175754			MOV	LOLIM,R4	I SET UP FOR BACKGROUND
444	003234	000002				RTI		

445 003236 104442
 446 003240 005767 005442
 447 003244 001401
 448 003246 000002
 449 003250 005067 000272
 450 003254 005067 000270
 451 003260 016702 175724
 452 003264 004767 000022
 453 003270 026712 000252
 454 003274 001401
 455 003276 104436
 456 003300 005722
 457 003302 026702 175704
 458 003306 001366
 459 003310 000002
 460
 461 003312 005767 000234
 462 003316 100430
 463 003320 003016
 464
 465 003322 010203
 466 003324 000303
 467 003326 006103
 468 003330 060203
 469 003332 006003
 470 003334 066703 000210
 471 003340 006003
 472 003342 103404
 473 003344 005167 000200
 474 003350 005167 000172
 475 003354 000207
 476
 477 003356 010203
 478 003360 010205
 479 003362 000303
 480 003364 006105
 481 003366 006105
 482 003370 006105
 483 003372 006105
 484 003374 060503
 485 003376 000756
 486
 487 003400 010203
 488 003402 006003
 489 003404 010305
 490 003406 000305
 491 003410 006003
 492 003412 006003
 493 003414 000767

CODATA1 SETBANK ICHECK DATA
 TST EX
 BEQ ,+4
 RTI
 CLR DATA
 CLR BIT
 MOV LOLIM,R2 ;SET UP BEGINNING OF BUFFER
 JSR PC,GDATA
 CMP DATA,(2)
 BEQ ,+4
 ERR3
 TST (2)+
 CMP HILIM,R2 ICHECK FOR END
 BNE 1\$
 RTI
 GDATA1 TST MEMORY ICHECK FLAG
 BMI T3XOR9 IMM11G
 RGT T8XOR13 IMM11F
 T1XOR81 MOV R2,R3 IMM11E MEMORY
 SWAB R3
 ROL R3
 ADD R2,R3
 ROR R3
 ALLOR1 ADD BIT,R3
 ROR R3
 BCS 1\$
 COM BIT
 COM DATA
 1\$1 RTS PC
 T8XOR131 MOV R2,R3 IMM11F MEMORY
 MOV R2,R5
 SWAB R3
 ROL R5
 ROL R5
 ROL R5
 ROL R5
 T3X91 ADD R5,R3
 BR ALLOR
 T3XOR91 MOV R2,R3 IMM11G MEMORY
 ROR R3
 MOV R3,R5
 SWAB R5
 ROR R3
 ROR R3
 BR T3X9

494 003416 005037 177776
 495 003422 005737 177570
 496 003426 100001
 497 003430 000000
 498 003432 000002
 499
 500 003434 016705 175340
 501 003440 000241
 502 003442 006005
 503 003444 006005
 504 003446 006005
 505 003450 006005
 506 003452 042705 017777
 507 003456 017646 000000
 508 003462 017646 000000
 509 003466 010576 000000
 510 003472 022626
 511 003474 062716 000002
 512 003500 016705 175274
 513 003504 006105
 514 003506 042705 177717
 515 003512 057605 000000
 516 003516 062716 000002
 517 003522 017646 000000
 518 003526 017646 000000
 519 003532 010576 000000
 520 003536 022626
 521 003540 062716 000002
 522 003544 000002
 523
 524 003546 000000
 525 003550 000000
 526 003552 000000
 527
 528
 529 003554 104444
 530 003556 005067 177764
 531 003562 005067 177762
 532 003566 016702 175416
 533 003572 004767 177514
 534 003576 016722 177744
 535 003602 026702 175404
 536 003606 001371
 537 003610 000002
 538
 539 003612 104442
 540 003614 016702 175370
 541 003620 005122
 542 003622 026702 175364
 543 003626 001374
 544 003630 000002

POTS: CLR @#177776 ;DROF PRIORITY
 YST @#SWR ;HALT ON ERROR?
 BPL ,+4
 HALT
 RTI

BEGIN: MOV MX,TTY
 CLC ; *ASH #13,TTY*
 ROR TTY ;TO GET
 ROR TTY ;THE THREE
 ROR TTY ;UPPER BITS
 ROR TTY ;TO MAKE
 BIC #17777,TTY ;THE ADDRESS
 MOV @(6),=(6) ;GET ADDRESS
 MOV @(6),=(6) ;GET ADDRESS
 MOV TTY,@(6) ;LOAD MEMORY ADDRESS
 CMP (6)+,(6)+ ;RESTORE STACK
 ADD #2,(6) ;INCREMENT STACK
 MOV MX,TTY ;GET UPPER 2 BITS OF MXC
 ROL TTY ;GET INTO POSITION
 BIC #177717,TTY ;CLEAR JUNK
 BIS @(6),TTY ;GET REST OF COMMAND
 ADD #2,(6) ;INCREMENT STACK
 MOV @(6),=(6) ;GET ADDRESS
 MOV @(6),=(6) ;GET ADDRESS
 MOV TTY,@(6) ;LOAD MEMORY ADDRESS
 CMP (6)+,(6)+ ;RESTORE STACK
 ADD #2,(6) ;INCREMENT STACK
 RTI

DATA: 0
 BIT: 0
 MEMORY: 0

WRADR: NEXT
 CLR DATA
 CLR BIT
 MOV LOLIM,R2 ;SET THE STARTING ADDRESS
 JSR PC,GDATA
 MOV DATA,(2)+
 CMP HILIM,R2 ;END?
 BNE 1\$
 RTI

WRCADR: SETBANK
 MOV LOLIM,R2 ;SET UP BEGINNING OF BUFFER
 1\$ COM (2)+ ;COMPLIMENT IT
 CMP HILIM,R2
 BNE 1\$;LOOP TIL END OF CORE
 RTI

545	003632	032737	020000	177570	ER3:	BIT	#SW13,@#SWR	IINHIBIT TYPEOUTS
546	003640	001401				REQ	,+4	
547	003642	000002				RTI		
548	003644	022767	041524	006564		CMP	#"TC,INPUT	
549	003652	001003				SNE	1\$	
550	003654	012777	000001	175244		MOV	#1,@TCCS	
551	003662	000004	011030		1\$:	TYPE	,M7	
552	003666	010205				MOV	R2,TTY	I)TYPE R2 WITH MX AS 18 BIT ADDRESS
553	003670	004767	006202			JSR	PC,PRINTA	
554	003674	000004	011051			TYPE	,M8	
555	003700	016705	177642			MOV	DATA,TTY	I)TYPE DATA IN OCTAL
556	003704	004767	006132			JSR	PC,PRINTR	I)TYPE LEADING ZERO'S
557	003710	000004	011063			TYPE	,M9	
558	003714	011205				MOV	(2),TTY	I)TYPE (2) IN OCTAL
559	003716	004767	006120			JSR	PC,PRINTR	I)TYPE LEADING ZERO'S
560	003722	104434				STOP		
561	003724	000002				RTI		
562								
563	003726	016705	175046		SETBAK:	MOV	MX,TTY	
564	003732	005767	175050			TST	OPTION	I)WHAT AM I
565	003736	001411				BEQ	2\$	I)I'M NOTHING
566	003740	100405				BMI	1\$	I)I'M AN MX11
567	003742	000305				SWAB	TTY	I) *ASH #7,TTY*
568	003744	006205				ASR	TTY	
569	003746	010577	175224			MOV	TTY,@KISAR6	
570	003752	000002				RTI		
571	003754	010577	175226		1\$:	MOV	TTY,@MXC3	I)LOAD THE MXC
572	003760	000002				RTI		
573	003762	000241			2\$:	CLC		I) *ASH #13,TTY*
574	003764	006005				ROR	TTY	I)ROTATE
575	003766	006005				ROR	TTY	I)THE UPPER
576	003770	006005				ROR	TTY	I)THREE BITS
577	003772	006005				ROR	TTY	I)TO MAKE
578	003774	042705	017777			BIC	#17777,TTY	I)CLEAR JUNK
579	004000	010567	175204			MOV	TTY,LOLIM	I)ADDRESS
580	004004	062705	020000			ADD	#20000,TTY	I)MAKE UPPER
581	004010	010567	175176			MOV	TTY,HILIM	I)LIMIT
582	004014	000002				RTI		
583								
584								
585	004016	012777	000000	175146	MAP:	MOV	#0,@KISAR0	
586	004024	012777	077406	175142		MOV	#77406,@KISDR0	
587	004032	012777	000200	175136		MOV	#200,@KISAR6	
588	004040	012777	077406	175132		MOV	#77406,@KISDR6	
589	004046	012777	007600	175126		MOV	#7600,@KISAR7	
590	004054	012777	077406	175122		MOV	#77406,@KISDR7	
591	004062	000002				RTI		

619	004216	005067	004464		CH,RF1	CLR	EX	ICLEAR ERROR FLAG
620	004222	005777	174626			TST	@RFCS	IANY ERRORS?
621	004226	100026				BPL	1\$	I\$BRANCH IF NO ERRORS
622	004230	005267	004452			INC	EX	ISET ERROR FLAG
623	004234	032737	020000	177570		BIT	#SW13,@#SWR	IINHIBIT ERROR TYPEOUT
624	004242	001020				BNE	1\$	IINHIBIT TYPEOUTS
625	004244	017705	174604			MOV	@RFCS,TTY	ISET TTY FOR TYPING
626	004250	000004	011174			TYPE	,RF,M1	I\$TYPE DEVICE MESSAGE
627	004254	000004	011010			TYPE	,M3	I\$TYPE CS
628	004260	004767	005556			JSR	PC,PRINTR	I\$TYPE RFCS IN OCTAL
629	004264	000004	011020			TYPE	,M4	I\$TYPE ER
630	004270	017705	174562			MOV	@RFR,TTY	I\$TYPE @RFR IN OCTAL
631	004274	004767	005542			JSR	PC,PRINTR	I\$TYPE LEADING ZERO'S
632	004300	104434				STOP		IHALT ON ERROR
633	004302	000002				RTI		IRETURN
634	004304	032737	020000	177570	1\$1	BIT	#SW13,@#SWR	IINHIBIT ERROR TYPEOUT
635	004312	001054				BNE	2\$	IYES!
636	004314	117767	174534	004362		MOVB	@RFCS,CHK	IGET EA BITS
637	004322	116767	174452	004355		MOVB	MX,CHK+1	IGET MX BITS
638	004330	105267	004351			INCB	CHK+1	IINCREMENT INTO EA BITS
639	004334	106067	004344			RORB	CHK	IMOVE OVER BY 1
640	004340	006067	004340			ROR	CHK	IMOVE IT
641	004344	006067	004334			ROR	CHK	IINTO
642	004350	006067	004330			ROR	CHK	IPOSITION
643	004354	042767	176374	004322		BIC	#176374,CHK	ICLEAR JUNK
644	004362	126767	004316	004315		CMPB	CHK,CHK+1	IMAKE SURE EA BITS INCREMENT
645	004370	001425				BEO	2\$	IRETURN IF EQUAL
646	004372	000004	011174			TYPE	,RF,M1	I\$TYPE DEVICE MESSAGE
647	004376	000004	011165			TYPE	,M15	I\$TYPE "BANK"
648	004402	016705	174372			MOV	MX,TTY	I\$TYPE MX IN OCTAL
649	004406	004767	005440			JSR	PC,PRINTS	IAND SUPPRESS LEADING ZERO'S
650	004412	000004	011051			TYPE	,M8	ITRUE
651	004416	116705	004263			MOVB	CHK+1,TTY	IGET BYTE
652	004422	004767	005424			JSR	7,PRINTS	I\$TYPE TRUE EA BITS
653	004426	000004	011063			TYPE	,M9	I\$RECEIVED
654	004432	116705	004246			MOVB	CHK,TTY	IGET BYTE
655	004436	004767	005410			JSR	7,PRINTS	I\$TYPE RECEIVED EA BITS
656	004442	104434				STOP		IWAIT
657	004444	000002			2\$1	RTI		IRETURN

658	004446	104406		
659	004450	104426		
660	004452	104400		
661	004454	012777	004506	174332
662	004462	016777	174526	174402
663	004470	005077	174402	
664	004474	104440		
665	004476	001074	000103	001066
666	004504	000002		
667				
668	004506	104406		
669	004510	012777	004542	174276
670	004516	016777	174472	174346
671	004524	005077	174346	
672	004530	104440		
673	004532	001074	000107	001066
674	004540	000002		
675				
676	004542	104406		
677	004544	104402		
678	004546	012777	004446	174240
679	004554	016777	174434	174310
680	004562	005077	174310	
681	004566	104440		
682	004570	001074	000105	001066
683	004576	000002		
684				

W,RCI CHK,RC
 CKDATA
 TRP,RCI CORE
 MOV #C,RC,@RCTRAP
 MOV WRDCNT,@RCWC
 CLR @RCDA
 START
 RCCA,10013,RCCS
 RTI

ICHECK FOR ERRORS
 ICHECK CORE
 ILOAD CORE WITH DATA
 I/CHECK/ TRAP ADDRESS
 IWORD COUNT
 IFSK ADDRESS
 ILOAD CURRENT ADDRESS & IE13 AND GO

C,RCI CHK,RC
 MOV #R,RC,@RCTRAP
 MOV WRDCNT,@RCWC
 CLR @RCDA
 START
 RCCA,10017,RCCS
 RTI

ICHECK FOR ERRORS
 I/READ/ TRAP ADDRESS
 IWORD COUNT
 IFSK ADDRESS
 ILOAD CURRENT ADDRESS & IE17 AND GO

R,RCI CHK,RC
 COMCOR
 MOV #W,RC,@RCTRAP
 MOV WRDCNT,@RCWC
 CLR @RCDA
 START
 RCCA,10015,RCCS
 RTI

ICHECK FOR ERRORS
 ICOMPLIMENT CORE
 I/WRITE/ TRAP ADDRESS
 IWORD COUNT
 IFSK ADDRESS
 ILOAD CURRENT ADDRESS & IE15 AND GO

,PAGE

685	004600	005067	004102		CH,RC1	CLR	EX	ICLEAR ERROR FLAG
686	004604	005777	174256			TST	@RCCS	IANY ERRORS?
687	004610	100026				BPL	1\$	I BRANCH IF NO ERRORS
688	004612	005267	004070			INC	EX	ISET ERROR FLAG
689	004616	032737	020000	177570		BIT	#SW13,@#SWR	IINHIBIT ERROR TIMEOUT
690	004624	001020				BNE	1\$	IINHIBIT TIMEOUTS
691	004626	017705	174234			MOV	@RCCS,TTY	ISET TTY FOR TYPING
692	004632	000004	011217			TYPE	,RC,M1	ITYPE DEVICE MESSAGE
693	004636	000004	011010			TYPE	,M3	ITYPE CS
694	004642	004767	005174			JSR	PC,PRINTR	ITYPE RCCS IN OCTAL
695	004646	000004	011020			TYPE	,M4	ITYPE ER
696	004652	017705	174212			MOV	@RCER,TTY	ITYPE @RCER IN OCTAL
697	004656	004767	005160			JSR	PC,PRINTR	ITYPE LEADING ZERO'S
698	004662	104434				STOP		IHALT ON ERROR
699	004664	000002				RTI		IRETURN
700	004666	032737	020000	177570	1\$1	BIT	#SW13,@#SWR	IINHIBIT ERROR TIMEOUT
701	004674	001054				BNE	2\$	IYES!
702	004676	117767	174164	004000		MOVB	@RCCS,CHK	IGET EA BITS
703	004704	116767	174070	003773		MOVB	MX,CHK+1	IGET MX BITS
704	004712	105267	003767			INCB	CHK+1	IINCREMENT INTO EA BITS
705	004716	106067	003762			RORB	CHK	IMOVE OVER BY 1
706	004722	006067	003756			ROR	CHK	IMOVE IT
707	004726	006067	003752			ROR	CHK	IINTO
708	004732	006067	003746			ROR	CHK	IPOSITION
709	004736	042767	176374	003740		BIC	#176374,CHK	ICLEAR JUNK
710	004744	126767	003734	003733		CMPB	CHK,CHK+1	IMAKE SURE EA BITS INCREMENT
711	004752	001425				BEQ	2\$	IRETURN IF EQUAL
712	004754	000004	011217			TYPE	,RC,M1	ITYPE DEVICE MESSAGE
713	004760	000004	011165			TYPE	,M15	ITYPE "BANK"
714	004764	016705	174010			MOV	MX,TTY	ITYPE MX IN OCTAL
715	004770	004767	005056			JSR	PC,PRINTS	IAND SUPPRESS LEADING ZERO'S
716	004774	000004	011051			TYPE	,M8	ITRUE
717	005000	116705	003701			MOVB	CHK+1,TTY	IGET BYTE
718	005004	004767	005042			JSR	7,PRINTS	ITYPE TRUE EA BITS
719	005010	000004	011063			TYPE	,M9	I RECEIVED
720	005014	116705	003664			MOVB	CHK,TTY	IGET BYTE
721	005020	004767	005026			JSR	7,PRINTS	ITYPE RECEIVED EA BITS
722	005024	104434				STOP		IWAIT
723	005026	000002			2\$1	RTI		IRETURN

724	005030	104410			W,RP1	CHK,RP				ICHECK FOR ERRORS
725	005032	104426				CKDATA				ICHECK CORE
726	005034	104400			TP,RP1	CORE				ILOAD CORE WITH DATA
727	005036	012777	005070	173754		MOV	#C,RP,@RPTRAP			ICHECK TRAP ADDRESS
728	005044	016777	174144	174030		MOV	WRDCNT,@RPWC			IWORD COUNT
729	005052	005077	174030			CLR	@RPDA			IDISK ADDRESS
730	005056	104440				START				ILOAD CURRENT ADDRESS & IE13 AND GO
731	005060	001104	000103	001100		RPCA,10013,RPCS				
732	005066	000002				RTI				
733										
734	005070	104410			C,RP1	CHK,RP				ICHECK FOR ERRORS
735	005072	012777	005124	173720		MOV	#R,RP,@RPTRAP			I'READ' TRAP ADDRESS
736	005100	016777	174110	173774		MOV	WRDCNT,@RPWC			IWORD COUNT
737	005106	005077	173774			CLR	@RPDA			IDISK ADDRESS
738	005112	104440				START				ILOAD CURRENT ADDRESS & IE17 AND GO
739	005114	001104	000107	001100		RPCA,10017,RPCS				
740	005122	000002				RTI				
741										
742	005124	104410			R,RP1	CHK,RP				ICHECK FOR ERRORS
743	005126	104402				COMCOR				ICOMPLIMENT CORE
744	005130	012777	005030	173662		MOV	#W,RP,@RPTRAP			I'WRITE' TRAP ADDRESS
745	005136	016777	174052	173736		MOV	WRDCNT,@RPWC			IWORD COUNT
746	005144	005077	173736			CLR	@RPDA			IDISK ADDRESS
747	005150	104440				START				ILOAD CURRENT ADDRESS & IE15 AND GO
748	005152	001104	000105	001100		RPCA,10015,RPCS				
749	005160	000002				RTI				
750	005162	012777	000011	173710	TRP,RP1	MOV	#11,@RPCS			
751	005170	105777	173704			TSTB	@RPCS			
752	005174	100375				BPL	,=4			
753	005176	005777	173710			TST	@RPDS			
754	005202	100375				BPL	,=4			
755	005204	005077	173670			CLR	@RPCS			
756	005210	000711				BR	TP,RP			
757										

,PAGE

758	005212	005067	003470		CH, RPI	CLR	EX	ICLEAR ERROR FLAG
759	005216	005777	173656			TST	@RPCS	IANY ERRORS?
760	005222	100034				RPL	1\$	IBRANCH IF NO ERRORS
761	005224	005267	003456			INC	EX	ISET ERROR FLAG
762	005230	032737	020000	177570		BIT	#SW13,@#SWR	IINHIBIT ERROR TYPEOUT
763	005236	001026				BNE	1\$	IINHIBIT TYPEOUTS
764	005240	017705	173634			MOV	@RPCS,TTY	ISET TTY FOR TYPING
765	005244	000004	011265			TYPE	,RP,M1	ITYPE DEVICE MESSAGE
766	005250	000004	011010			TYPE	,M3	ITYPE CS
767	005254	004767	004562			JSR	PC,PRINTR	ITYPE RPCS IN OCTAL
768	005260	000004	011020			TYPE	,M4	ITYPE ER
769	005264	017705	173620			MOV	@RPER,TTY	ITYPE @RPER IN OCTAL
770	005270	004767	004546			JSR	PC,PRINTR	ITYPE LEADING ZERO'S
771	005274	104434				STOP		IHALT ON ERROR
772	005276	012777	000001	173574		MOV	#1,@RPCS	ILOAD A CLEAR
773	005304	105777	173570			TSTB	@RPCS	IWAIT FOR
774	005310	100375				BPL	,=4	IDONE
775	005312	000002				RTI		IRETURN
776	005314	032737	020000	177570	1\$1	BIT	#SW13,@#SWR	IINHIBIT ERROR TYPEOUT
777	005322	001054				BNE	2\$	IYES!
778	005324	117767	173550	003352		MOVB	@RPCS,CHK	IGET EA BITS
779	005332	116767	173442	003345		MOVB	MX,CHK+1	IGET MX BITS
780	005340	105267	003341			INCB	CHK+1	IINCREMENT INTO EA BITS
781	005344	106067	003334			RORB	CHK	IMOVE OVER BY 1
782	005350	006067	003330			ROR	CHK	IMOVE IT
783	005354	006067	003324			ROR	CHK	IINTO
784	005360	006067	003320			ROR	CHK	IPOSITION
785	005364	042767	176374	003312		BIC	#176374,CHK	ICLEAR JUNK
786	005372	126767	003306	003305		CMPB	CHK,CHK+1	IMAKE SURE EA BITS INCREMENT
787	005400	001425				BEQ	2\$	IRETURN IF EQUAL
788	005402	000004	011265			TYPE	,RP,M1	ITYPE DEVICE MESSAGE
789	005406	000004	011165			TYPE	,M15	ITYPE "BANK"
790	005412	016705	173362			MOV	MX,TTY	ITYPE MX IN OCTAL
791	005416	004767	004430			JSR	PC,PRINTS	IAND SUPPRESS LEADING ZERO'S
792	005422	000004	011051			TYPE	,M8	ITRUE
793	005426	116705	003253			MOVB	CHK+1,TTY	IGET BYTE
794	005432	004767	004414			JSR	7,PRINTS	ITYPE TRUE EA BITS
795	005436	000004	011063			TYPE	,M9	IRECEIVED
796	005442	116705	003236			MOVB	CHK,TTY	IGET BYTE
797	005446	004767	004400			JSR	7,PRINTS	ITYPE RECEIVED EA BITS
798	005452	104434				STOP		IWAIT
799	005454	000002			2\$1	RTI		IRETURN

800	005456	104412			W,RK1	CHK,RK				ICHECK FOR ERRORS
801	005460	104426				CKDATA				ICHECK CORE
802	005462	104400			TRP,RK1	CORE				ILOAD CORE WITH DATA
803	005464	012777	005516	173332		MOV	#C,RK,@RKTRAP			ICHECK/ TRAP ADDRESS
804	005472	016777	173516	173420		MOV	WRDCNT,@RKWC			IWORD COUNT
805	005500	005077	173420			CLR	@RKDA			IDSK ADDRESS
806	005504	104440				START				ILOAD CURRENT ADDRESS & IE13 AND GO
807	005506	001122	000103	001114		RKCA,100!3,RKCS				
808	005514	000002				RTI				
809										
810	005516	104412			C,RK1	CHK,RK				ICHECK FOR ERRORS
811	005520	012777	005552	173276		MOV	#R,RK,@RKTRAP			I/READ/ TRAP ADDRESS
812	005526	016777	173462	173364		MOV	WRDCNT,@RKWC			IWORD COUNT
813	005534	005077	173364			CLR	@RKDA			IDSK ADDRESS
814	005540	104440				START				ILOAD CURRENT ADDRESS & IE17 AND GO
815	005542	001122	000107	001114		RKCA,100!7,RKCS				
816	005550	000002				RTI				
817										
818	005552	104412			R,RK1	CHK,RK				ICHECK FOR ERRORS
819	005554	104402				COMCOR				ICOMPLIMENT CORE
820	005556	012777	005456	173240		MOV	#W,RK,@RKTRAP			I/WRITE/ TRAP ADDRESS
821	005564	016777	173424	173326		MOV	WRDCNT,@RKWC			IWORD COUNT
822	005572	005077	173326			CLR	@RKDA			IDSK ADDRESS
823	005576	104440				START				ILOAD CURRENT ADDRESS & IE15 AND GO
824	005600	001122	000105	001114		RKCA,100!5,RKCS				
825	005606	000002				RTI				
826										

,PAGE

827	005610	005067	003072		CH,RKI	CLR	EX	ICLEAR ERROR FLAG
828	005614	005777	173274			TST	@RKCS	IANY ERRORS?
829	005620	100034				BPL	1\$	I BRANCH IF NO ERRORS
830	005622	005267	003060			INC	EX	ISET ERROR FLAG
831	005626	032737	020000	177570		BIT	#SW13,@#SWR	IINHIBIT ERROR TYPEOUT
832	005634	001026				BNE	1\$	IINHIBIT TYPEOUTS
833	005636	017705	173252			MOV	@RKCS,TTY	ISET TTY FOR TYPING
834	005642	000004	011242			TYPE	,RK,M1	I TYPE DEVICE MESSAGE
835	005646	000004	011010			TYPE	,M3	I TYPE CS
836	005652	004767	004164			JSR	PC,PRINTR	I TYPE RKCS IN OCTAL
837	005656	000004	011020			TYPE	,M4	I TYPE ER
838	005662	017705	173230			MOV	@RKCR,TTY	I TYPE @RKCR IN OCTAL
839	005666	004767	004150			JSR	PC,PRINTR	I TYPE LEADING ZERO'S
840	005672	104434				STOP		IHALT ON ERROR
841	005674	012777	000001	173212		MOV	#1,@RKCS	ILOAD A CLEAR
842	005702	105777	173206			TSTB	@RKCS	IWAIT FOR
843	005706	100375				BPL	1=4	IDONE
844	005710	000002				RTI		IRETURN
845	005712	032737	020000	177570	1\$1	BIT	#SW13,@#SWR	IINHIBIT ERROR TYPEOUT
846	005720	001054				BNE	2\$	IYES!
847	005722	117767	173166	002754		MOVB	@RKCS,CHK	IGET EA BITS
848	005730	116767	173044	002747		MOVB	MX,CHK+1	IGET MX BITS
849	005736	105267	002743			INCB	CHK+1	IINCREMENT INTO EA BITS
850	005742	106067	002736			RORB	CHK	I MOVE OVER BY 1
851	005746	006067	002732			ROR	CHK	I MOVE IT
852	005752	006067	002726			ROR	CHK	I INTO
853	005756	006067	002722			ROR	CHK	I POSITION
854	005762	042767	176374	002714		BIC	#176374,CHK	ICLEAR JUNK
855	005770	126767	002710	002707		CMPB	CHK,CHK+1	IMAKE SURE EA BITS INCREMENT
856	005776	001425				BEB	2\$	IRETURN IF EQUAL
857	006000	000004	011242			TYPE	,RK,M1	I TYPE DEVICE MESSAGE
858	006004	000004	011165			TYPE	,M15	I TYPE "BANK"
859	006010	016705	172764			MOV	MX,TTY	I TYPE MX IN OCTAL
860	006014	004767	004032			JSR	PC,PRINTS	IAND SUPPRESS LEADING ZERO'S
861	006020	000004	011051			TYPE	,M8	I TRUE
862	006024	116705	002655			MOVB	CHK+1,TTY	IGET BYTE
863	006030	004767	004016			JSR	7,PRINTS	I TYPE TRUE EA BITS
864	006034	000004	011063			TYPE	,M9	I RECEIVED
865	006040	116705	002640			MOVB	CHK,TTY	IGET BYTE
866	006044	004767	004002			JSR	7,PRINTS	I TYPE RECEIVED EA BITS
867	006050	104434				STOP		IWAIT
868	006052	000002			2\$1	RTI		IRETURN

869	006054	104414		
870	006056	104426		
871	006060	012777	000001	173040
872	006066	104400		
873	006070	104422	000010	
874	006074	012777	006122	172726
875	006102	016777	173106	173022
876	006110	104440		
877	006112	001134	000115	001126
878	006120	000002		
879				
880	006122	104414		
881	006124	104402		
882	006126	104422	000010	
883	006132	012777	006054	172670
884	006140	016777	173050	172764
885	006146	104440		
886	006150	001134	000105	001126
887	006156	000002		
888				

W,TCI	CHK,TC	ICHECK FOR ERRORS
	CKDATA	ICHECK CORE
	MOV #1,@TCCS	ISTOP ALL TRANSPORTS
TRP,TCI	CORE	ILOAD WORST CASE NOISE
	SEARCH ,10	ISEARCH FOR BLOCK 10
	MOV #R,TC,@TCTRAP	ITRAP ADDRESS
	MOV WRDCNT,@TCWC	IWORD COUNT
	START	ILOAD CURRENT ADDRESS & IE115 AND GO
	TCCA,100:15,TCCS	
	RTI	
R,TCI	CHK,TC	ICHECK FOR ERROR
	COMCOR	ICOMPLIMENT CORE
	SEARCH ,10	ISEARCH FOR BLOCK 10
	MOV #W,TC,@TCTRAP	ITRAP ADDRESS
	MOV WRDCNT,@TCWC	IWORD COUNT
	START	ILOAD CURRENT ADDRESS & IE15 AND GO
	TCCA,100:15,TCCS	
	RTI	
	,PAGE	

889	006160	205067	002522		CH,TC1	CLR	EX	ICLEAR ERROR FLAG
890	006164	205777	172736			TST	@TCCS	IANY ERRORS?
891	006170	100034				BPL	1\$	IBRANCH IF NO ERRORS
892	006172	005267	002510			INC	EX	ISET ERROR FLAG
893	006176	032737	020000	177570		RIT	#SW13,@#SWR	IINHIBIT ERROR TYPEOUT
894	006204	001026				BNE	1\$	IINHIBIT TYPEOUTS
895	006206	017705	172714			MOV	@TCCS,ITY	ISET TTY FOR TYPING
896	006212	012777	000001	172706		MOV	#1,@TCCS	ILOAD A CLEAR
897	006220	105777	172702			TSTB	@TCCS	IWAIT FOR
898	006224	100375				RPL	,=4	IDONE
899	006226	000004	011310			TYPE	,TC,M1	ITYPE DEVICE MESSAGE
900	006232	000004	011010			TYPE	,M3	ITYPE CS
901	006236	004767	003600			JSR	PC,PRINTR	ITYPE TCCS IN OCTAL
902	006242	000004	011020			TYPE	,M4	ITYPE ER
903	006246	017705	172656			MOV	@TCER,ITY	ITYPE @TCER IN OCTAL
904	006252	004767	003564			JSR	PC,PRINTR	ITYPE LEADING ZERO'S
905	006256	104434				STOP		IHALT ON ERROR
906	006260	000002				RTI		IRETURN
907	006262	032737	020000	177570	1\$1	BIT	#SW13,@#SWR	IINHIBIT ERROR TYPEOUT
908	006270	001054				BNE	2\$	IYES!
909	006272	117767	172630	002404		MOVB	@TCCS,CHK	IGET EA BITS
910	006300	116767	172474	002377		MOVB	MX,CHK+1	IGET MX BITS
911	006306	105267	002373			INCB	CHK+1	IINCREMENT INTO EA BITS
912	006312	106067	002366			RORB	CHK	IMOVE OVER BY 1
913	006316	006067	002362			ROR	CHK	IMOVE IT
914	006322	006067	002356			ROR	CHK	IINTO
915	006326	006067	002352			ROR	CHK	IPOSITION
916	006332	042767	176374	002344		BIC	#176374,CHK	ICLEAR JUNK
917	006340	126767	002340	002337		CMPB	CHK,CHK+1	IMAKE SURE EA BITS INCREMENT
918	006346	001425				BEG	2\$	IRETURN IF EQUAL
919	006350	000004	011310			TYPE	,TC,M1	ITYPE DEVICE MESSAGE
920	006354	000004	011165			TYPE	,M15	ITYPE "BANK"
921	006360	016705	172414			MOV	MX,TTY	ITYPE MX IN OCTAL
922	006364	004767	003462			JSR	PC,PRINTS	IAND SUPPRESS LEADING ZERO'S
923	006370	000004	011051			TYPE	,M8	ITRUE
924	006374	116705	002305			MOVB	CHK+1,ITY	IGET BYTE
925	006400	004767	003446			JSR	7,PRINTS	ITYPE TRUE EA BITS
926	006404	000004	011063			TYPE	,M9	IRECEIVED
927	006410	116705	002270			MOVB	CHK,TTY	IGET BYTE
928	006414	004767	003432			JSR	7,PRINTS	ITYPE RECEIVED EA BITS
929	006420	104434				STOP		IWAIT
930	006422	000002			2\$1	RTI		IRETURN

931	006424	017667	000000	000330	S,TCI	MOV	@(6),TC,TA	
932	006432	062716	000002			ADD	#2,(6)	
933	006436	005767	000320			TST	TC,TA	I FOWARD OR REVERSE
934	006442	100064				BPL	FOWSER	I LEAVE IT IN REVERSE
935	006444	005467	000312			NEG	TC,TA	I GET PLUS BLOCK NUMBER
936	006450	012777	006510	172352		MOV	#SR1,@TCTRAP	I TRAP ADDRESS
937	006456	016767	000300	000274		MOV	TC,TA,WANT	
938	006464	062767	000002	000266		ADD	#2,WANT	I 2 PAST BLOCK
939	006472	012667	000270			MOV	(6)+,RETURN	I SAVE RETURN ADDRESS
940	006476	005726				TST	(6)+	
941	006500	012777	000103	172420	RETI	MOV	#103,@TCCS	I SEARCH FOWARD
942	006506	000002				RTI		
943								
944	006510	005777	172412		SR1:	TST	@TCCS	I CHECK FOR ERROR
945	006514	100005				BPL	SR1A	I NO ERRORS
946	006516	005777	172406			TST	@TCER	I CHECK FOR END OF TAPE
947	006522	100401				BMI	,+4	
948	006524	104436				ERR3		
949	006526	000405				BR	SF1	
950								
951	006530	026777	000224	172400	SR1A:	CMP	WANT,@TCDB	I ON BLOCK?
952	006536	002401				BLT	SF1	I GO FOWARD
953	006540	000757				BR	RETI	I CONTINUE AS YOU WERE
954								
955	006542	012777	006560	172260	SF1:	MOV	#SF2,@TCTRAP	I TRAP ADDRESS
956	006550	012777	004103	172350	RETR:	MOV	#4103,@TCCS	I SEARCH REVERSE
957	006556	000002				RTI		
958								
959	006560	005777	172342		SF2:	TST	@TCCS	I ERROR?
960	006564	100005				BPL	SF1A	I NO ERRORS
961	006566	005777	172336			TST	@TCER	I END OF TAPE?
962	006572	100401				BMI	,+4	
963	006574	104432				ERR2		I NO
964	006576	000740				BR	RETI	I SWITCH DIRECTIONS
965								
966	006600	026777	000156	172330	SF1A:	CMP	TC,TA,@TCDB	I RIGHT BLOCK?
967	006606	001360				RETR		I NO
968	006610	000177	000152			JMP	@RETURN	

969	006614	012777	006654	172206	FOWSERI	MOV	#SC1,@TCTRAP	I TRAP ADDRESS
970	006622	016767	000134	000130		MOV	TC,TA,WANT	
971	006630	162767	000002	000122		SUB	#2,WANT	I 2 PAST BLOCK
972	006636	012667	000124			MOV	(6)+,RETURN	I SAVE RETURN ADDRESS
973	006642	005726				TST	(6)+	
974	006644	012777	004103	172254	RETI11	MOV	#4103,@TCCS	I SEARCH REVERSE
975	006652	000002				RTI		
976								
977	006654	005777	172246		SC11	TST	@TCCS	I CHECK FOR ERROR
978	006660	100005				BPL	SC1A	I NO ERRORS
979	006662	005777	172242			TST	@TCER	I CHECK FOR END OF TAPE
980	006666	100401				BMI	,+4	
981	006670	104436				ERR3		
982	006672	000405				BR	SCF1	
983								
984	006674	026777	000060	172234	SC1A1	CMP	WANT,@TCDB	I ON BLOCK?
985	006702	003001				RGT	SCF1	I GO REVERSE
986	006704	000757				BR	RETI1	I CONTINUE AS YOU WERE
987								
988	006706	012777	006724	172114	SCF11	MOV	#SCF2,@TCTRAP	I TRAP ADDRESS
989	006714	012777	000103	172204	RETR11	MOV	#103,@TCCS	I SEARCH FOWARD
990	006722	000002				RTI		
991								
992	006724	005777	172176		SCF21	TST	@TCCS	I ERROR?
993	006730	100005				BPL	SCF1A	I NO ERRORS
994	006732	005777	172172			TST	@TCER	I END OF TAPE?
995	006736	100401				BMI	,+4	
996	006740	104432				ERR2		I NO
997	006742	000740				BR	RETI1	I SWITCH DIRECTIONS
998								
999	006744	026777	000012	172164	SCF1A1	CMP	TC,TA,@TCDB	I RIGHT BLOCK?
1000	006752	001360				BNE	RETR1	I NO
1001	006754	000177	000006			JMP	@RETURN	
1002								
1003	006760	000000				WANTI	0	
1004	006762	000000				TC,TAI	0	
1005	006764	000000				TC,WCI	0	
1006	006766	000000				RETURNI	0	

1027	006770	104416			W,TM1	CHK,TM			I CHECK FOR ERROR
1028	006772	104426				CKDATA			
1029	006774	104420			TRP,TM1	CORE			I SET UP CORE
1010	006776	104424				REWIND			
1011	007000	012777	007062	172032		MOV	#R,TM,@TMTRAP		I TRAP ADDRESS
1012	007006	016777	172202	172130		MOV	WRDCNT,@TMBC		I BYTE COUNT
1013	007014	006377	172124			ASL	@TMBC		I MAKE BYTE COUNT
1014	007020	104440				START			I LOAD CURRENT ADDRESS & IE160005 AND GO
1015	007022	001146	060105	001140		TMCA,100160005,TMCS			
1016	007030	000002				RTI			
1017									
1018	007032	012777	007056	172000	RW,TM1	MOV	#X,TM,@TMTRAP		I TRAP ADDRESS
1019	007040	012667	000056			MOV	(6)+,TMRET		I SAVE ADDRESS
1020	007044	005726				TST	(6)+		I RESTORE STACK
1021	007046	012777	060117	172064		MOV	#60117,@TMCS		I REWIND
1022	007054	000002				RTI			
1023									
1024	007056	000177	000040		X,TM1	JMP	@TMRET		
1025									
1026	007062	104416			R,TM1	CHK,TM			I ANY ERRORS?
1027	007064	104402				COMCOR			I COMPLIMENT CORE
1028	007066	104424				REWIND			
1029	007070	012777	006770	171742		MOV	#W,TM,@TMTRAP		I TRAP ADDRESS
1030	007076	016777	172112	172040		MOV	WRDCNT,@TMBC		I BYTE COUNT
1031	007104	006377	172034			ASL	@TMBC		I MAKE BYTE COUNT
1032	007110	104440				START			I LOAD CURRENT ADDRESS & IE160003 AND GO
1033	007112	001146	060103	001140		TMCA,100160003,TMCS			
1034	007120	000002				RTI			
1035									
1036	007122	000000			TMRET1	0			
1037					,PAGE				

1038	007124	005067	001556		CH,TM1	CLR	EX	ICLEAR ERROR FLAG
1039	007130	005777	172004			TST	@TMCS	IANY ERRORS?
1040	007134	100026				BPL	1\$	IBRANCH IF NO ERRORS
1041	007136	005267	001544			INC	EX	ISET ERROR FLAG
1042	007142	032737	020000	177570		BIT	#SW13,@#SWR	IINHIBIT ERROR TYPEOUT
1043	007150	001020				BNE	1\$	IINHIBIT TYPEOUTS
1044	007152	017705	171762			MOV	@TMCS,TTY	ISET TTY FOR TYPING
1045	007156	000004	011331			TYPE	,TM,M1	ITYPE DEVICE MESSAGE
1046	007162	000004	011010			TYPE	,M3	ITYPE CS
1047	007166	004767	002650			JSR	PC,PRINTR	ITYPE TMCS IN OCTAL
1048	007172	000004	011020			TYPE	,M4	ITYPE ER
1049	007176	017705	171740			MOV	@TMER,TTY	ITYPE *TMER IN OCTAL
1050	007202	004767	002634			JSR	PC,PRINTR	ITYPE LEADING ZERO'S
1051	007206	104434				STOP		IHALT ON ERROR
1052	007210	000002				RTI		IRETURN
1053	007212	032737	020000	177570	1\$1	BIT	#SW13,@#SWR	IINHIBIT ERROR TYPEOUT
1054	007220	001054				BNE	2\$	IYES!
1055	007222	117767	171712	001454		MOVB	@TMCS,CHK	IGET EA BITS
1056	007230	116767	171544	001447		MOVB	MX,CHK+1	IGET MX BITS
1057	007236	105267	001443			INCB	CHK+1	IINCREMENT INTO EA BITS
1058	007242	106067	001436			RORB	CHK	IMOVE OVER BY 1
1059	007246	006067	001432			ROR	CHK	IMOVE IT
1060	007252	006067	001426			ROR	CHK	IINTO
1061	007256	006067	001422			ROR	CHK	IPOSITION
1062	007262	042767	176374	001414		BIC	#176374,CHK	ICLEAR JUNK
1063	007270	126767	001410	001407		CMPB	CHK,CHK+1	IMAKE SURE EA BITS INCREMENT
1064	007276	001425				BEQ	2\$	IRETURN IF EQUAL
1065	007300	000004	011331			TYPE	,TM,M1	ITYPE DEVICE MESSAGE
1066	007304	000004	011165			TYPE	,M15	ITYPE "BANK"
1067	007310	016705	171464			MOV	MX,TTY	ITYPE MX IN OCTAL
1068	007314	004767	002532			JSR	PC,PRINTS	IAND SUPPRESS LEADING ZERO'S
1069	007320	000004	011051			TYPE	,M8	ITRUE
1070	007324	116705	001355			MOVB	CHK+1,TTY	IGET BYTE
1071	007330	004767	002516			JSR	7,PRINTS	ITYPE TRUE EA BITS
1072	007334	000004	011063			TYPE	,M9	I RECEIVED
1073	007340	116705	001340			MOVB	CHK,TTY	IGET BYTE
1074	007344	004767	002502			JSR	7,PRINTS	ITYPE RECEIVED EA BITS
1075	007350	104434				STOP		IWAIT
1076	007352	000002			2\$1	RTI		IRETURN

1114	007544	110122		DMPRID:	MOVB	R1,(2)+	GENERATE BINARY COUNT	
1115	007546	105201			INCB	R1	THIS WILL BE THE TRANSMITTED DATA	
1116	007550	001375			BNE	DMPRID		
1117	007552	005077	171372		CLR	@DMCS		
1118	007556	005077	171370		CLR	@DMACT		
1119	007562	005077	171366		CLR	@DMBRK		
1120	007566	005067	000206		CLR	DMTDAT		
1121	007572	016777	000214	171356	MOV	DMCAT,@DMADR		
1122	007600	016767	171404	000174	MOV	LOLIM,DMPTR		
1123	007606	062767	000200	000166	ADD	#200,DMPTR		
1124	007614	016767	000162	000162	MOV	DMPTR,ENDPTR		
1125	007622	062767	000200	000154	ADD	#200,ENDPTR		
1126	007630	016701	171210		MOV	DMRVEC,R1		
1127	007634	012721	010024		MOV	#DMRINT,(1)+		
1128	007640	012721	000240		MOV	#240,(1)+		
1129	007644	012721	007722		MOV	#DMTINY,(1)+		
1130	007650	012711	000240		MOV	#240,(1)		
1131	007654	016705	171120		MOV	MX,TTY		
1132	007660	006305			ASL	TTY		
1133	007662	042705	177717		BIC	#177717,TTY		
1134	007666	010577	171256		MOV	TTY,@DMCS		
1135	007672	052777	010105	171250	BIS	#10105,@DMCS		
1136	007700	016777	000102	171244	MOV	DMBAIM,@DMACT	START TRANSMITTING	
1137	007706	012601			MOV	(6)+,R1		
1138	007710	012602			MOV	(6)+,R2		
1139	007712	005037	177776		CLR	#177776	CLEAR PS	
1140	007716	000167	172376		JMP	WAIT		
1141								
1142								
1143								
1144	007722	032777	060000	171220	DMTINT:	BIT	#60000,@DMCS	TEST FOR ERROR FLAGS
1145	007730	001414				BEO	DMTING	BRANCH IF NO ERROR FLAGS
1146	007732	000004	011352			TYPE	,DM,M1	
1147	007736	000004	011010			TYPE	,M3	
1148	007742	017705	171202		MOV	@DMCS,TTY	TYPE @DMCS IN OCTAL	
1149	007746	004767	002070		JSR	PC,PRINTR	TYPE LEADING ZERO'S	
1150	007752	104434			STOP			
1151	007754	042777	060000	171166	BIC	#60000,@DMCS	CLEAR ERROR FLAGS	
1152	007762	005777	171162		DMTING:	TST	@DMCS	TEST FOR READY FLAG
1153	007766	100003				BPL	1\$	
1154	007770	042777	100000	171152	BIC	#100000,@DMCS	CLEAR READY	
1155	007776	000002			1\$:	RTI	EXIT	
1156								
1157								
1158	010000	000000			DMTDAT:	0	STORAGE LOCATION FOR LAST TRANSMITTED CHAR	
1159	010002	000000			DMPTR:	0	DM11 SOFTWARE TUMBLE TABLE POINTER	
1160	010004	000000			ENDPTR:	0		
1161	010006	177777			DMBAIM:	177777	INITIALIZE TO TRANSMIT ON ALL LINES.	
1162	010010	177400			MASK:	177400		
1163	010012	000000			DMCAT:	0		
1164	010014	000000			DMWCT:	0		
1165	010016	000000			DMBAT:	0		
1166	010020	000000			TUMTAB:	0		
1167	010022	000000			BINCNT:	0		

```

1168                                ;DM11 RECEIVER INTERRUPT SERVICE ROUTINE
1169
1170 010024 010246 DMRINT: MOV R2,-(6)
1171 010026 016702 177750      MOV DMPTR,R2
1172 010032 104442      SETBANK
1173 010034 005712      TST (2) ;TEST FOR VALID DATA ENTRY
1174 010036 100446      BMI DMRINC ;BRANCH IF VALID DATA ENTRY
1175 010040 000004 011352      TYPE ,DM,M1
1176 010044 000004 010050      TYPE ,,+2 ;ASCIZ " NO DATA RECEIVED"
1177 010074 104434      STOP
1178 010076 000457      BR DMRINX ;GO TO EXIT
1179
1180 010100 005742 DMRINB: TST -(2) ;CHECK LAST ENTRY
1181 010102 001421      BEQ 1$ ;OK IF 0
1182 010104 000004 011352      TYPE ,DM,M1
1183 010110 000004 010114      TYPE ,,+2 ;ASCIZ " TABLE OVERFLOW"
1184 010136 012602      MOV (6)+,R2 ;RESTORE R2
1185 010140 022626      CMP (6)+,(6)+ ;CLEAR RETURN
1186 010142 000167 177206      JMP TRP,DM ;LOOP
1187 010146 005722 1$: TST (2)+ ;MOD POINTER
1188 010150 005712      TST (2) ;INVALID DATA ENTRY?
1189 010152 100031      BPL DMRINX ;EXIT IF NO MORE ENTRIES
1190 010154 032712 017000 DMRINC: BIT #17000,(2) ;DATA ON LINE 0?
1191 010160 001013      BNE DMRIND ;BRANCH IF DATA RECEIVED ON OTHER THAN LINE 0
1192 010162 146712 177622      BICB MASK,(2) ;CLEAR NON TRANSMITTED BITS
1193 010166 016767 177606 173352      MOV DMTDAT,DATA
1194 010174 121267 173346      CMPB (2),DATA ;COMPARE RECEIVED & TRANSMITTED DATA
1195 010200 001401      BEQ 1$
1196 010202 104436      ERR3
1197 010204 105267 177570 1$: INCB DMTDAT ;FORM WHAT NEXT RECEIVED CHAR, SHOULD BE
1198 010210 005022 DMRIND: CLR (2)+ ;CLEAR TUMBLE TABLE ENTRY
1199 010212 020267 177566      CMP R2,ENDPTR ;IS POINTER AT THE END OF THE TABLE
1200 010216 001004      BNE 1$
1201 010220 016702 170764      MOV LOLIM,R2
1202 010224 062702 000200      ADD #200,R2
1203 010230 010267 177546 1$: MOV R2,DMPTR ;RESTORE POINTER
1204 010234 000721      BR DMRINB ;LOOK AT NEXT ENTRY
1205
1206 010236 012602 DMRINX: MOV (6)+,R2 ;RESTORE R0
1207 010240 005777 170706      TST @DMACT
1208 010244 001003      BNE BICX
1209 010246 022626      CMP (6)+,(6)+
1210 010250 000167 177100      JMP TRP,DM
1211
1212 010254 042777 000200 170666 BICX: BIC #200,@DMCS ;CLEAR DONE FLAG
1213 010262 000002      RTI
  
```

1214	010264	104442			SET,DR1	SETBANK		
1215	010266	104420				CHK,DR		
1216	010270	005767	000412			TST	EX	!ANY ERRORS
1217	010274	001026				BNE	TRP,DR	!YES
1218	010276	016702	170706			MOV	LOLIM,R2	!SET ADDRESS
1219	010302	012767	000001	173236		MOV	#1,DATA	!SET DATA
1220	010310	026712	173232		NX,DR1	CMP	DATA,(2)	!CHECK FIRST WORD
1221	010314	001401				BEQ	,+4	!SAME?
1222	010316	104436				ERR3		!NO
1223	010320	062702	000002			ADD	#2,R2	!INC ADDRESS
1224	010324	026712	173216			CMP	DATA,(2)	!SECOND WORD OK?
1225	010330	001401				BEQ	,+4	
1226	010332	104436				ERR3		!NO
1227	010334	062702	000002			ADD	#2,R2	!UP IT
1228	010340	005267	173202			INC	DATA	!GET NEXT DATA
1229	010344	026702	170642			CMP	HILIM,R2	!END?
1230	010350	001357				BNE	NX,DR	!NO?
1231	010352	104444			TRP,DR1	NEXT		
1232	010354	005037	177776			CLR	0#177776	!CLR PS
1233	010360	016702	170624			MOV	LOLIM,R2	!SET ADDRESS
1234	010364	012767	000001	173154		MOV	#1,DATA	!SET DATA
1235	010372	016722	173150		NX1,DR1	MOV	DATA,(2)+	!SET UP DATA
1236	010376	005167	173144			COM	DATA	!NEXT DATA
1237	010402	016722	173140			MOV	DATA,(2)+	!LOAD IT
1238	010406	005467	173134			NEG	DATA	!MAKE IT POSITIVE
1239	010412	026702	170574			CMP	HILIM,R2	!END?
1240	010416	001365				BNE	NX1,DR	!NO?
1241	010420	012737	000240	177776		MOV	#240,0#177776	!LOCK AGAIN
1242	010426	012777	010264	170400		MOV	#SET,DR,0DRTRAP	!SET VECTOR
1243	010434	016777	170534	170516		MOV	WRDCNT,0DRWC	!SET WORD COUNT
1244	010442	104440				START		!LOAD CURRENT ADDRESS & !E110001 AND GO
1245	010444	001162	010101	001164		DRCA,100:10001,DRCS		
1246	010452	000002				RTI		
1247								

,PAGE

1248	010454	705067	000226		CH,DR1	CLR	EX	ICLEAR ERROR FLAG
1249	010460	005777	170500			TST	@DRCS	IANY ERRORS?
1250	010464	100026				BPL	1\$	I BRANCH IF NO ERRORS
1251	010466	005267	000214			INC	EX	ISET ERROR FLAG
1252	010472	032737	020000	177570		BIT	#SW13,@#SWR	IINHIBIT ERROR TYPEOUT
1253	010500	001020				BNE	1\$	IINHIBIT TYPEOUTS
1254	010502	017705	170456			MOV	@DRCS,TTY	ISET TTY FOR TYPING
1255	010506	000004	011370			TYPE	,DR,M1	I TYPE DEVICE MESSAGE
1256	010512	000004	011010			TYPE	,M3	I TYPE CS
1257	010516	004767	001320			JSR	PC,PRINTR	I TYPE DRCS IN OCTAL
1258	010522	000004	011020			TYPE	,M4	I TYPE ER
1259	010526	017705	170434			MOV	@DRER,TTY	I TYPE @DRER IN OCTAL
1260	010532	004767	001304			JSR	PC,PRINTR	I TYPE LEADING ZERO'S
1261	010536	104434				STOP		IHALT ON ERROR
1262	010540	000002				RTI		IRETURN
1263	010542	032737	020000	177570	1\$;	BIT	#SW13,@#SWR	IINHIBIT ERROR TYPEOUT
1264	010550	001054				BNE	2\$	IYES?
1265	010552	117767	170406	000124		MOVB	@DRCS,CHK	I GET EA BITS
1266	010560	116767	170214	000117		MOVB	MX,CHK+1	I GET MX BITS
1267	010566	105267	000113			INCB	CHK+1	I INCREMENT INTO EA BITS
1268	010572	106067	000106			RORB	CHK	I MOVE OVER BY 1
1269	010576	006067	000102			ROR	CHK	I MOVE IT
1270	010602	006067	000076			ROR	CHK	I INTO
1271	010606	006067	000072			ROR	CHK	I POSITION
1272	010612	042767	176374	000064		BIC	#176374,CHK	ICLEAR JUNK
1273	010620	126767	000060	000057		CMPB	CHK,CHK+1	I MAKE SURE EA BITS INCREMENT
1274	010626	001425				BEO	2\$	I RETURN IF EQUAL
1275	010630	000004	011370			TYPE	,DR,M1	I TYPE DEVICE MESSAGE
1276	010634	000004	011165			TYPE	,M15	I TYPE "BANK"
1277	010640	016705	170134			MOV	MX,TTY	I TYPE MX IN OCTAL
1278	010644	004767	001202			JSR	PC,PRINTS	I AND SUPPRESS LEADING ZERO'S
1279	010650	000004	011051			TYPE	,M8	I TRUE
1280	010654	116705	000025			MOVB	CHK+1,TTY	I GET BYTE
1281	010660	004767	001166			JSR	7,PRINTS	I TYPE TRUE EA BITS
1282	010664	000004	011063			TYPE	,M9	I RECEIVED
1283	010670	116705	000010			MOVB	CHK,TTY	I GET BYTE
1284	010674	004767	001152			JSR	7,PRINTS	I TYPE RECEIVED EA BITS
1285	010700	104434				STOP		I WAIT
1286	010702	000002			2\$;	RTI		I RETURN

1287	010704	000000			CHK:	?	
1288	010706	000000			EX:	?	
1289	010710	005015	041522	030461	M1:	,ASCII	<15><12>"RC11,RP11,RF11,RK11,FM11,TC11,DR11, OR DM11 AND "
1290	010716	051054	030520	026061			
1291	010724	043122	030461	051054			
1292	010732	030513	026061	046524			
1293	010740	030461	052054	030503			
1294	010746	026061	051124	030461			
1295	010754	026102	047440	020122			
1296	010762	046504	030461	040440			
1297	010770	042116	040				
1298	010773	074	042522	052524		,ASCIIZ	"<RETURN>"
1299	011000	047122	000076				
1300	011004	005015	000052		M2:	,ASCIIZ	<15><12>"*"
1301	011010	020040	051503	036440	M3:	,ASCIIZ	" CS = "
1302	011016	000040					
1303	011020	020040	051105	036440	M4:	,ASCIIZ	" ER = "
1304	011026	000040					
1305	011030	005015	040504	040524	M7:	,ASCIIZ	<15><12>"DATA ERROR AT "
1306	011036	042440	051122	051117			
1307	011044	040440	020124	000			
1308	011051	040	052040	052522	M8:	,ASCIIZ	" TRUE = "
1309	011056	020105	020075	000			
1310	011063	040	051040	041505	M9:	,ASCIIZ	" RECEIVED = "
1311	011070	044505	042526	020104			
1312	011076	020075	000				
1313	011101	114	053517	051105	M11:	,ASCIIZ	"LOWER BANK = "
1314	011106	041040	047101	020113			
1315	011114	020075	000				
1316	011117	125	050120	051105	M12:	,ASCIIZ	"UPPER BANK = "
1317	011124	041040	047101	020113			
1318	011132	020075	000				
1319	011135	015	000012		M13:	,ASCIIZ	<15><12>
1320	011140	005015	041012	047101	M14A:	,ASCIIZ	<15><12><12>"BANKS 0 = "
1321	011146	051513	030040	026440			
1322	011154	000040					
1323	011156	042440	044530	052123	M14:	,ASCIIZ	" EXIST"
1324	011164	000					
1325	011165	040	040502	045516	M15:	,ASCIIZ	" BANK "
1326	011172	000040					
1327							
1328	011174	005015	043122	030461	RF,M1:	,ASCIIZ	<15><12>"RF11 DISK ERROR"
1329	011202	042040	051511	020113			
1330	011210	051105	047522	035122			
1331	011216	000					
1332	011217	015	051012	030523	RC,M1:	,ASCIIZ	<15><12>"RC11 DISK ERROR"
1333	011224	020061	044504	045523			
1334	011232	042440	051122	051117			
1335	011240	000072					
1336	011242	005015	045522	030461	RK,M1:	,ASCIIZ	<15><12>"RK11 DISK ERROR"
1337	011250	042040	051511	020113			
1338	011256	051105	047522	035122			
1339	011264	000					
1340	011265	015	051012	030520	RP,M1:	,ASCIIZ	<15><12>"RP11 DISK ERROR"

1371	011512	005767	167270	LODGET:	TST	OPTION	IWHICH OPTION?
1372	011516	003402			BLE	3\$	I NO MEMORY MANAGEMENT
1373	011520	005077	167444		CLR	@SR0	I TURN MEMORY MANAGEMENT OFF
1374	011524	010001		3\$:	MOV	R0,R1	I GET THE BANK
1375	011526	022701	000006		CMP	#6,R1	I IS IT > 6?
1376	011532	100002			RPL	1\$	
1377	011534	012701	000006		MOV	#6,R1	I IF > 7 MAKE 7
1378	011540	006001		1\$:	ROR	R1	I GET THE
1379	011542	006001			ROR	R1	I UPPER
1380	011544	006001			ROR	R1	I THREE
1381	011546	006001			ROR	R1	I BITS
1382	011550	042701	017777		BIC	#17777,R1	I CLEAR JUNK
1383	011554	012702	012456		MOV	#ENDP,R2	I GET SAVE ADDRESS
1384	011560	060201			ADD	R2,R1	I MAKE OTHER ONE
1385	011562	010167	000062		MOV	R1,LOD	I SAVE ADDRESS
1386	011566	012122		2\$:	MOV	(1)+,(2)+	I MOVE WORD
1387	011570	022702	020000		CMP	#20000,R2	I END?
1388	011574	001374			RNE	2\$	I NO!
1389	011576	000207			RTS	PC	I RETURN
1390							
1391	011600	005767	167202	LODRES:	TST	OPTION	IWHICH OPTION?
1392	011604	003402			BLE	2\$	I NO MEMORY MANAGEMENT
1393	011606	005077	167356		CLR	@SR0	I TURN MEMORY MANAGEMENT OFF
1394	011612	012702	012456	2\$:	MOV	#ENDP,R2	I GET END OF PROGRAM
1395	011616	016701	000026		MOV	,LOD,R1	I GET SAVE ADDRESS
1396	011622	012221		1\$:	MOV	(2)+,(1)+	I RESTORE WORD
1397	011624	022702	020000		CMP	#20000,R2	I END?
1398	011630	001374			BNE	1\$	I LOOP
1399	011632	005767	167150		TST	OPTION	IWHICH OPTION?
1400	011636	003403			BLE	3\$	I NO MEMORY MANAGEMENT
1401	011640	012777	000001 167322		MOV	#1,@SR0	I TURN MEMORY MANAGEMENT ON
1402	011646	000207		3\$:	RTS	PC	I RETURN
1403							
1404	011650	000000		,LOD:	0		

1446	012042	112767	000001	000172	PRINTR	MOVB	#1,,PR	ISET ZERO FILL SWITCH
1447	012050	200402				BR	,+6	ISKIP
1448	012052	205067	000164		PRINTS	CLR	,PR	ISUPPRESS LEADING ZERO'S
1449	012056	112767	177772	000157		MOVB	#-6,,PR+1	ISET COUNT
1450	012064	210446				MOV	R4,-(6)	ISAVE R4
1451	012066	212704	012232			MOV	#,PRBUF,R4	ISET POINTER TO FIRST ASCII CHAR.
1452	012072	105014				CLRB	(4)	ICLEAR FIRST BYTE
1453	012074	000426				BR	,PRF	IROTATE FIRST BIT
1454	012076	010446			PRINTAI	MOV	R4,-(6)	ISAVE R4
1455	012100	012704	012232			MOV	#,PRBUF,R4	ISET UP POINTER TO OUTPUT AREA
1456	012104	116714	166670			MOVB	MX,(4)	IMX CONTAINS UPPER 5 BITS
1457	012110	006305				ASL	TTY	IGET RID
1458	012112	006305				ASL	TTY	IOF 3
1459	012114	006305				ASL	TTY	IJUNK BITS
1460	012116	106214				ASRB	(4)	IGET BIT13
1461	012120	006005				ROR	TTY	IPACK IT
1462	012122	106214				ASRB	(4)	IGET BIT14
1463	012124	006005				ROR	TTY	IPACK IT
1464	012126	152724	000060			BISB	#10,(4)+	IMAKE IT ASCII
1465	012132	012767	175401	000102		MOV	#175401,,PR	I=5,,1 = 5 BYTES AND FILL
1466	012140	105014			,PRLI	CLRB	(4)	ICLEAR BYTE OF CHARACTER
1467	012142	006105				ROL	TTY	IROTATE BIT INTO C
1468	012144	106114				ROLB	(4)	IPACK IT
1469	012146	006105				ROL	TTY	IROTATE BIT INTO C
1470	012150	106114				ROLB	(4)	IPACK IT
1471	012152	006105			,PRFI	ROL	TTY	IROTATE BIT INTO C
1472	012154	106114				ROLB	(4)	IPACK IT
1473	012156	105714				TSTB	(4)	IS IS IT ZERO?
1474	012160	001402				BEQ	,+6	ISKIP INC
1475	012162	105267	000054			INCB	,PR	ISET FILL SWITCH
1476	012166	105767	000050			TSTB	,PR	ICHECK FILL SWITCH
1477	012172	001402				BEQ	,+6	ISKIP BITSET
1478	012174	152724	000060			BISB	#10,(4)+	IMAKE INTO ASCII CHAR
1479	012200	105267	000037			INCB	,PR+1	IINC COUNT
1480	012204	001355				BNE	,PRL	I REPEAT
1481	012206	022704	012232			CMP	#,PRBUF,R4	IEMPTY BUFFER?
1482	012212	001002				BNE	,+6	ISKIP IF NOT
1483	012214	112724	000060			MOVB	#10,(4)+	ILOAD I ZERO
1484	012220	105014				CLRB	(4)	INULL TERMINATOR
1485	012222	000004	012232			TYPE	,PRBUF	ITYPE IT
1486	012226	012604				MOV	(6)+,R4	IRESTORE R4
1487	012230	000207				RTS	PC	IRETURN
1488								
1489	012232	000004			,PRBUF	,BLKW	4	IOUTPUT BUFFER
1490	012242	000000			,PRI	2		ICOUNT AND SWITCH

1491	012244	012767	012274	165552	POWR:	MOV	#RESTOR,24	
1492	012252	010046				MOV	R0,=(6)	
1493	012254	010146				MOV	R1,=(6)	
1494	012256	010246				MOV	R2,=(6)	
1495	012260	010346				MOV	R3,=(6)	
1496	012262	010446				MOV	R4,=(6)	
1497	012264	010546				MOV	R5,=(6)	
1498	012266	010667	000102			MOV	SP,SAVE	
1499	012272	000000				HALT		
1500	012274	012767	012244	165522	RESTOR:	MOV	#POWR,24	
1501	012302	016706	000066			MOV	SAVE,SP	
1502	012306	012605				MOV	(6)+,R0	
1503	012310	012604				MOV	(6)+,R1	
1504	012312	012603				MOV	(6)+,R2	
1505	012314	012602				MOV	(6)+,R3	
1506	012316	012601				MOV	(6)+,R4	
1507	012320	012600				MOV	(6)+,R5	
1508	012322	012706	000500			MOV	#500,SP	
1509	012326	000167	167532			JMP	RTRF	
1510								
1511	012332	116767	165224	000076	READR:	MOVSB	177562,INPUT	READ THE CHARACTER
1512	012340	142767	000200	000070		BICB	#200,INPUT	!CLEAR JUNK
1513	012346	122767	000003	000062		CMPB	#3,INPUT	!IS IT A *C?
1514	012354	001401				BEB	,**	!SKIP IF *C
1515	012356	000002				RTI		!RETURN IF NOT
1516	012362	000004	012364			TYPE	,,+2	!ISCCIE *C"
1517	012370	000137	000200			JMP	@#200	!RESTART
1518								
1519	012374	000000			SAVE1	0		
1520	012376	000010			PATCH1:	,BLKW	10	!PATCH AREA #1
1521	012416	000010			PATCH2:	,BLKW	10	!PATCH AREA #2
1522	012436	000010			INPUT:	,BLKW	10	!INPUT BUFFER
1523	012456	000000			ENDP:	0		!LAST LOC OF PROGRAM
1524		000001			.END			

ACCEPT	=	104430	AORTAB	002634	ALLOR	003334	REGIN	003434			
BELL	=	000007	BICX	010254	BINCNT	010022	RI*	003550			
CDATA	003236	CHK	010704	CHK,DR	=	104420	CHK,RC	=	104406		
CHK,RF	=	104404	CHK,RK	=	104412	CHK,RP	=	104410	CHK,TC	=	104414
CHK,TM	=	104416	CH,DR	010454	CH,RC	004600	CH,RF	004216			
CH,RK	005610	CH,RP	005212	CH,TC	006160	CH,TM	007124				
CKDATA	=	104426	COMCOR	=	104402	CORE	=	104400	CRUF	002346	
CR1	002376	CR2	002432	CR3	002466	CR4	002514				
C,RC	004506	C,RF	004124	C,RK	005516	C,RP	005070				
DATA	003546	DISPLA	=	177570	DMACT	001152	DMADR	001156			
DMBAIM	010006	DMBAT	010016	DMBRK	001154	DMCAT	010012				
DMCS	001150	DMPRIA	007476	DMPRIB	007512	DMPRIC	007534				
DMPRID	007544	DMPTR	010002	DMRINB	010100	DMRINC	010154				
DMRIND	010210	DMRINT	010024	DMRINX	010236	DMRVEC	001044				
DMTDAT	010000	DMTINC	007762	DMTINT	007722	DMWCT	010014				
DM,M1	011352	DOCORE	001576	DOOX	001632	DOSEG	001674				
DRCA	001162	DRCS	001164	DRDB	001166	DRER	001166				
DRTRAP	001034	DRWC	001160	DR,M1	011370	DUM1	=	104450			
DUM2	=	104452	ENDP	012456	ENDPTR	010004	ENDTAB	=	002706		
ERR2	=	104432	ERR3	=	104436	ER3	003632	FX	010706		
FOUSER	006614	GOATA	003312	GOGET	011740	GOT	001216				
HILIM	001212	INPUT	012436	KISAR0	001172	KISAR6	001176				
KISAR7	001202	KISDR0	001174	KISDR6	001200	KISDR7	001204				
LIMIT	001004	LODGET	011512	LORES	011600	LOLIM	001210				
MAP	004016	MAPIT	=	104446	MASK	010010	MEMORY	003552			
MIN	001002	MX	001000	MXC3	001206	M1	010710				
M11	011101	M12	011117	M13	011135	M14	011156				
M14A	011140	M15	011165	M2	011004	M3	011010				
M4	011020	M7	011030	M8	011051	M9	011063				
N	=	000054	NEXT	=	104444	NXT	002774				
NXTCR	002452	NX,DR	010310	NODEV	002534	OPTION	001006				
PATCH1	012376	PATCH2	012416	NX1,DR	010372	POTS	003416				
POWR	012244	PRINTA	012076	PC	=	%000007	PRINTS	012052			
QUES	011460	RCCA	001074	PRINTR	012042	PCDA	001076				
RCER	001070	RCCS	001066	RCCS	001066	RC,M1	011217				
READR	012332	RCTRAP	001014	RCWC	001072	RETI	006500				
RETI1	006644	REDO	002034	RESTOR	012274	RETURN	006766				
REWIND	=	104424	RETR	006550	RETR1	006714	PFDA	001364			
RFER	001056	RFCA	001062	RFCS	001054	RF,M1	011174				
RKCA	001122	RFTRAP	001010	RFWC	001060	RKER	001116				
RKTRAP	001024	RKCS	001114	RKDA	001124	RPCA	001104				
RPCS	001100	RKWC	001120	RK,M1	011242	RPER	001110				
RPTRAP	001020	RPDA	001106	RPOS	001112	RYPF	002764				
RW,TM	007032	RPWC	001102	RP,M1	011265	P,RK	005552				
R,RP	005124	R,RC	004542	R,RF	004160	R0	=	%000000			
R1	=	%000001	R,TC	006122	R,TM	007062	R4	=	%000004		
R5	=	%000005	R2	=	%000002	R3	=	%000003	SCF1A	006744	
SCF2	006724	SAV6	012374	SCF1	006706	SC1A	006674	SEARCH	=	104422	
SEGA	011406	SC1	006654	SC1A	006674	SEGVEC	001050	SEG1	011425		
SEG2	011436	SEGERR	002710	SETBAK	003726	SETBAN	=	104442	SF2	006560	
SET,DR	010264	SEG3	011447	SF1A	006600	SRI	006510				
SIZEIT	001566	SF1	006542	SR0	001170	SWR	=	177570			
SR1A	006530	SP	=	%000006	STOP	=	104434	SW11	=	004000	
SW08	=	000400	START	=	104440	SW10	=	002000			
			SW09	=	001000						

SW12	= 010000	SW13	= 020000	SW14	= 040000	S,TC	006424
TCCA	001134	TCCS	001126	TCDB	001136	TCER	001130
TCTRAP	001030	TCWC	001132	TC,M1	011310	TC,TA	006762
TC,WC	026764	TMBC	001144	TMCA	001146	TMCS	001140
TMER	001142	TMRET	007122	TMTRAP	001040	TM,M1	011331
TP,RP	005034	TRP,DM	007354	TRP,DR	010352	TRP,RC	004452
TRP,RF	004070	TRP,RK	005462	TRP,RP	005162	TRP,TC	006066
TRP,TM	006774	TTY	=X000005	TUMTAB	010020	TYPE	= 000004
TYPEIT	001746	T0	002044	T1	002112	T1XOR8	003322
T2	002132	T3	002152	T3XOR9	003400	T3X9	003374
T4	002172	T5	002212	T6	002232	T7	002260
T8	002300	T8XOR1	003356	WAIT	002320	WANT	006760
WITHMX	011477	WITHSG	011464	WRADR	003554	WRCADR	003612
WRDCNT	001214	W,RC	004446	W,RF	004064	W,RK	005456
W,RP	005030	W,TC	006054	W,TM	006770	X,TM	007056
,IOT	011652	,LOD	011650	,PR	012242	,PRBUF	012232
,PRF	012152	,PRL	012140	,TRP	002602	,TYPE	012040
.	= 012460						

ERRORS DETECTED: 0