

LENGTH OF PRG 03405

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IDENT MACRO SCHEDULR  
NAME DINTC  
IF DEBUG EQ 0, EXIT  
CRA  
ASE 0  
HLT \*  
EXIT  
NAME LEVELC  
IF DEBUG EQ 0, EXIT  
EXT INTPDL  
TMA 363  
ASE INTPDL  
HLT \*  
END

00001

DEBUG EQU 1

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\*  
\* THE FOLLOWING SHOULD BE AT LOCATIONS 14 AND 15 OCTAL \*  
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\* OCT 00000000 \*  
\* UJP ILLWRITE \*  
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\* THE FOLLOWING SHOULD BE AT LOCATIONS 20 - 22 OCTAL \*  
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\* OCT 00000000 \*  
\* NOP \*  
\* UJP PARINT \*  
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02451 P  
02472 P  
02640 P  
02514 P  
02724 P  
02734 P  
00020  
00120  
00004  
00004  
03335 P  
03372 P  
03375 P  
03273 P  
03263 P  
00001  
03211 P  
03104 P  
03223 P  
01321 P  
02710 P  
00153 P  
02302 P  
01224 P  
01216 P  
01221 P  
01213 P  
03314 P  
02511 P  
02466 P  
02462 P  
00040 P  
00050 P  
02524 P  
03320 P  
02507 P  
05000 P  
03327 P  
01275 P

+001 SYSMAC INCLUDE ↑SYSMAC  
COSY/ 03 V4.1 08/17/74 0453  
ENTRY CMQSET  
ENTRY CLEARN  
ENTRY CHCHKRTN  
ENTRY CREATBAT  
ENTRY CREATE  
ENTRY DESTRUCT  
ENTRY DIEBIT  
ENTRY DIEPSUS  
ENTRY DISKIBT  
ENTRY FBPP  
ENTRY FPCNT  
ENTRY FRCNT  
ENTRY FRONTP3  
ENTRY FREECHN  
ENTRY FREEMEM  
ENTRY FSWAITB  
ENTRY FSX  
ENTRY GETMEM  
ENTRY GETPAGE  
ENTRY GIVEPAGE  
ENTRY HSITABP,HSITABLP FOR ANYONE WHO WANTS TO LOOK  
EXT HSITAB,HSILOG,HSITABL  
ENTRY ILLWRITE  
ENTRY IMPURE02  
ENTRY INAOV  
ENTRY INBCD  
ENTRY INDVF  
ENTRY INFPE  
ENTRY INHIBIT  
ENTRY IDLEP  
ENTRY IOCLEAR  
ENTRY IOSET  
ENTRY IRUNBIT  
ENTRY IRUNPEND  
ENTRY LATEFLAG  
ENTRY LIBLAD  
ENTRY LOGOFF  
ENTRY MAXDEST  
ENTRY MEMARRAY  
ENTRY MEMSET

FILE BLOCKS/PAGE  
FREE PAGE COUNT

FOR DUMPER



155	EXT	MSBIT
156	EXT	MSCPTR
157	EXT	MSWAIT
158	EXT	MXQCOM
159	EXT	MXQQ
160	EXT	NBATCHQ
161	EXT	NBATPSA
162	EXT	NBIT23
163	EXT	NBIT22
164	EXT	NBITS
165	EXT	NIFWAIT
166	EXT	NKBITS
167	EXT	NMSWAIT
168	EXT	NMTWAIT
169	EXT	NPAGESM1
170	EXT	NQWAIT
171	EXT	NSWAPUNT
171+001	EXT	NTAPEQ
172	EXT	NTBITS
173	EXT	NUMPAGES
173+001	EXT	O7777777
174	EXT	OPMSG
174+001	EXT	OPMSGX
175	EXT	PAGEMSA
176	EXT	PAGEREQ
177	EXT	PAGETABL
178	EXT	PAGETIME
179	EXT	PC
180	EXT	PCHARS
181	EXT	PSABLK
182	EXT	PTRTTY
183	EXT	PTRUNIT
184	EXT	PURELIST
185	EXT	PURETABL
186	EXT	QCONTROL
187	EXT	QTABLE
188	EXT	RADITY
189	EXT	RADUNIT
190	EXT	READ
191	EXT	REGSAVE
192	EXT	RETURN
193	EXT	REWRITE
194	EXT	RF
195	EXT	RF77
196	EXT	RTN
197	EXT	RTNCOUNT
198	EXT	SCREAM
199	EXT	SELECT
200	EXT	SWAP
201	EXT	SWAPBIT
202	EXT	SWBIT
203	EXT	SYSCM
204	EXT	SYSCODE
205	EXT	SYSERR
206	EXT	T1
207	EXT	T2
208	EXT	T3
209	EXT	T4
210	EXT	T5
211	EXT	TBATCHN
212	EXT	TERMINAL
213	EXT	TIMECUT
214	EXT	TIMEKILL
215	EXT	TIMELEFT
216	EXT	TIMSET
217	EXT	TOTALTIM
217+001	EXT	TPUNITS
218	EXT	TRUNTIME
219	EXT	UDBITS
219+001	EXT	UDESTLP
219+002	EXT	UTAPEMAX
220	EXT	VALUE
221	EXT	VMM
222	EXT	XNSKIP
223	EXT	XQUANTUM
224	EXT	ZROPAGE
224+001	EQU	07777777
226	EQU	00000000,60000000
227	OCT	07700000

NUMBER OF BATCH PSA#S

NUMBER OF SWAP UNITS - 1

VMM MASK

TABLES, PAGE MASS STORAGE ADDRESS

00000 00000000 X  
 00002 07700000

VMMASK  
 VMMASK  
 LOGMASK

FOR LOOKS

SPECIAL DEVICE BITS IN PSA BLOCK

00140	229	PS	EQU	1408
00040	230	NPU	EQU	32
	231	*		
00000	231+001	STAT	EQU	0
00004	232	F8PP	EQU	4
00200	233	PSALNTH	EQU	128
00000	234	IMPURE	EQU	0
	235	*		
	236	*		
00001	237	PFLOC	EQU	0018
04000	238	CORE	EQU	40008
00000	239	PFR	EQU	0
	240	*		
	241	*		
00000	242	PFW	EQU	0
	243	*		
	244	*		
00000	245	PSA	EQU	0
	246	*		
00000	247	BLK	EQU	0
	248	*		
	249	*		
00022	250	CLOCK	EQU	228
07773	251	DINT	EQU	77738
07774	252	EINT	EQU	77748
00000	253	JMP	EQU	0008
00035	254	NU	EQU	358
00550	255	RIS	EQU	5508
00554	256	ROS	EQU	5548
01000	257	AOV	EQU	10008
04000	258	BCD	EQU	40008
02000	259	DVF	EQU	20008
00400	260	FPF	EQU	04008
00001	261	X1	EQU	1
00002	262	X2	EQU	2
00003	263	X3	EQU	3
	264			
05000	264+001	MAXDEST	EQU	47778+1
	265			
00000	266	CNBLK	EQU	0
00004	267	HICR	EQU	048
00000	268	FCS	EQU	0
00001	269	FCT	EQU	FCS+1
00002	270	FCA	EQU	FCS+2
00003	271	FCB	EQU	FCS+3
	272			
X	273	IOP	EQU	BIT23
X	274	RESERVED	EQU	BIT22
X	275	OCC	EQU	BIT16
X	276	ALT	EQU	BIT15
	277			
	278			
	279	*		
	280			
00002	281	BCDLOC	EQU	000028
00004	282	DVFLOC	EQU	000048
00006	283	AOVLOC	EQU	000068
00010	284	FPFLOC	EQU	000108
	285	*		
	286	*		
	287	*		
	288	*		
	288	VFD		A1/RIS,A7/0,A16/ADDRESS
	290	FCBDEF		
	65	*		*
	66	*****		*****
	67	*		*
	68	*		*
	69	*		*
	70	*		*
00000	71	ACGWORD	EQU	0
00001	72	LP	EQU	1
00002	73	COREP	EQU	2
	74	*		
	75	*		
00003	76	CBP	EQU	COREP+1
00004	77	CPP	EQU	4
	78	*		
	79	*		
	80	*		

BASE ADDRESS IN PAGE INDEX FILE  
NUMBER OF PAGES PER USER  
MUST BE A POWER OF TWO

4 FILE BLOCKS PER PAGE  
LENGTH OF A PSA  
INSTRUCTIONS WITH THIS SYMBOL IN  
THEIR ADDRESS FIELDS ARE STORED  
INTO BY OTHER INSTRUCTIONS  
PAGE FILE ADDRESS FOR RESIDENT  
PFLOC \* 2+11  
ALL INSTRUCTIONS THAT READ OUT OF  
THE PAGE FILE HAVE THIS IN THEIR  
ADDRESS FIELDS  
ALL INSTRUCTIONS THAT WRITE INTO  
THE PAGE FILE HAVE THIS IN THEIR  
ADDRESS FIELDS  
INSTRUCTIONS WITH THIS ARE  
USING A PROGRAM STATUS AREA  
THIS INDICATES THAT THE  
INSTRUCTION IS USING THE  
PSA BLOCK

RF WORD FOR NUMBER OF USERS

MAX DESTINATION CODE (NOT MACRO)

HARDWARE TYPE OF CARD READER

I/O IN PROGRESS  
SEZ FC BLOCK RESERVED FOR PAGE  
OCCUPIED  
ALTERED

USER INTERRUPT LOCATIONS

BCD FAULT  
DIVIDE FAULT  
ARITHMETIC FAULT  
FLOATING POINT FAULT  
AN INTERRUPT STORES INTO WORD M  
AND JUMPS TO M+1  
M CONTAINS THE FOLLOWING

FILE CONTROL BLOCK DEFINITIONS

ACCOUNTING WORD (MUST BE 0)  
LOAD POINT BLOCK  
CORE POINTER IF NON-ZERO  
IF BIT23 = 1, CORE BLOCK HAS  
BEEN WRITTEN INTO  
BLOCK NUMBER OF THE CURRENT BLOC  
CURRENT POSITION POINTER  
(REL. POSIT. WITHIN BLOCK CBP)  
BIT23 SEZ REAC-ONLY  
BIT22 SEZ AT LOAD POINT



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00006

00007

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BLKR EQU 5  
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EPP EQU 6  
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. \*  
TFL EQU 7

BIT21 SEZ END OF DATA \*  
BIT20 SEZ FILE MARK JUST READ \*  
BIT18 SEZ BINARY RECORD PROCESSE \*  
BIT17 SEZ ABNCRMAL/UNAVAILABLE \*  
BIT16 SEZ ADDRESS ERROR \*  
BIT15 SEZ SAVED FILE \*  
NUMBER OF BLOCKS BEYOND \*  
THE CURRENT BLOCK \*  
END POSITION POINTER \*  
BIT22 SEZ THE FILE HAS CHANGED \*  
BIT21 SEZ POSITIONER READY \*  
BIT20 SEZ DESTRUCTIVE READ \*  
FILE DIRECTORY \*  
BITS 15-18 CONTAIN THE HT \*  
BITS 00-14 CONTAIN END POSITION \*  
TOTAL LENGTH IN BLOCKS \*

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*****
294 *
295 * MEMORY PARITY INTERRUPT PROCESSOR.
296 * OS3 WILL RECOVER FROM SOME PARITY ERRORS.
297 * THE PARITY ERROR IS NOT FATEL IF IT OCCURED
298 * IN THE USERS PROGRAM, OR IF IT WAS A BLOCK
299 * CONTROL PARITY ERROR (READ OR WRITE), OR IF A
300 * RNI PARITY ERROR OCCURED WITHIN A #PURE# SECTION
301 * OF THE RESIDENT. IF THE PARITY ERROR CANNCT BE
302 * PROCESSED THE SYSTEM EXECUTES A #RTJ MACHERR#
303 * WHICH MAY BE RESTARTED AFTER THE PARITY ERROR
304 * HAS BEEN MANUALLY CORRECTED (THROUGH THE CONSOL)
305 * BY RESTARTING AT #MPAREXIT#.
306 * HOWEVER, IF THE PARITY ERROR RESULTED IN A #RTJ
307 * SYSERR#, A CORE DUMP SHOULD PROBABLY BE MADE
308 * SINCE THIS IS CAUSED BY THE SYSTEM (OR CONSCL)
309 * ATTEMPTING TO REFERRECE NON-EXISTANT MEMORY.
310 *
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00003	45003332	P		312				
00004	47200043	P		313	PARINT	STAQ	PARTEMP	
00005	77630000			314		STI	MPAR02,X2	
00006	42000227	P	00045 3	315		CRA		
00007	17600040			316		SACH	CRSAVE+3	
00010	03000107	P		317		ANA	408	LEAVE THE PROGRAM STATE BIT
00011	20000021			318		AZJ,EQ	MPARITY	JUMP IF FROM MONITOR STATE
00012	13077766			319		LDA	00021B	
00013	14277775			320		SHAQ	-9	
00014	13000003			321		ENI	-2,X2	
00015	17600007			322		SHAQ	3	
00016	42415436	P	03307 2	323		ANA	00007B	
00017	02200014	P		324		SACH	RPARMSG+22,X2	
00020	11015410	P	03302 0	325		IJI	*-3,X2	
00021	14700030			326		ECHA	RPARMSG	
00022	14200024	P		327		ENQ	24	
00023	01077777	X		328		ENI	*+2,X2	
00024	77674000			329		UJP	OPMSG	
00025	03000107	P		330		ISA		CHECK FOR PROGRAM STATE SYSTEM
00026	77670000			331		AZJ,EQ	MPARITY	ROUTINES
00027	03000107	P		332		OSA		
00030	54200021			333		AZJ,EQ	MPARITY	JUMP IF THIS IS THE PHANTOM.
00031	17200007			334		LDI	00021B,X2	LOAD THE INTERRUPT CODE
00032	01200033	P		335		ANI	0007B,X2	
00033	00777777	X		336		UJP	*+1,X2	
00034	00700033	X		337		RTJ	SYSERR	XXX0 = NON-EXISTANT MEMORY
00035	01000076	P		338		RTJ	SYSERR	XXX1 = NON-EXISTANT MEMORY
00036	01000042	P		339		UJP	BPARITY	XXX2 = BLOCK CONTROL PARITY ERROR
00037	00777777	X		340		UJP	MPAR01	XXX3 = RNI/RAD PARITY ERROR
00040	00700034	X		341		RTJ	MACHERR	XXX4
00041	00700037	X		342		RTJ	SYSERR	XXX5 = NON-EXISTANT MEMORY
00042	25003332	P		343		RTJ	MACHERR	XXX6
				344	MPAR01	LDAQ	PARTEMP	XXX7 = ROP/STC PARITY ERROR

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\*  
\* THE PARITY ERROR WAS IN THE USERS PROGRAM.  
\* SAVE THE USERS STATUS AND GIVE THE USER THE  
\* BAD NEWS (MEMORY PARITY ERROR). ALSO, SYSTEM  
\* PURE CODE PAGES THE USER WAS USING NEED TO BE  
\* READ BACK INTO MEMORY SINCE THE PARITY ERROR  
\* MAY HAVE OCCURED WITHIN THEM.  
\*\*\*\*\*

00043 14200000  
00044 00777777 X  
00045 14600000  
00046 44277777 X  
00047 20000020  
00050 40277777 X  
00051 14200037  
00052 147J4001  
00053 77654140  
J0054 03700071 P  
00055 12077775  
00056 17600177  
00057 53700000  
00060 20377777 X  
00061 53500000  
00062 12000001  
00063 03300071 P  
00064 14600000  
00065 40300060 X  
J0066 20377777 X  
00067 35077777 X  
00070 40100000  
00071 02600053 P

356  
357 MPAR02 ENI IMPURE,X2  
358 RTJ REGSAVE  
359 CRSAVE ENA IMPURE ENTER THE CONDITION REGISTER BITS  
360 SWA CR,X2+PSA STORE IT INTO THE PSA  
361 LDA 00020B  
362 STA PC,X2+PSA STORE THE PC  
363 ENI NPU-1,X2  
364 ENQ 4001B  
365 MPAR03 PFA PS+PFR,X2 SEARCH FOR LIBRARY PAGE  
366 AQJ,LT MPAR04 JUMP IF NOT A PURE-CODE PAGE.  
367 SHA -2 ...THE PURE CCDE PAGE  
368 ANA 0177B  
369 TAI X3  
370 LDA PAGETABL,X3 GET THE PAGETABL ENTRY  
371 TAI X1  
372 SHA 1 CHECK FOR A USER PURE PAGE  
373 AZJ,LT MPAR04 JUMP IF NOT A SYSTEM PAGE  
374 ENA 0  
375 STA PAGETABL,X3 FREE THE PAGE  
376 LDA PAGEMSA,X3 GET THE MASS STORAGE ADDRESS  
377 SSA BIT22 MAKE THE LIBTAB ENTRY  
378 STA 0,X1 STORE INTO PAGE ACCESS WORD  
379 MPAR04 IJD MPAR03,X2

00072 54303323 P  
00073 14677777 X  
00074 00702451 P  
00075 01001046 P

380  
381 \* ENTER HERE TO GIVE THE USER  
382 \* A MEMORY PARITY ERROR MESSAGE.  
383 MPARKILL LDI RPSAPTR,X3  
384 ENA MEMPARTY  
385 RTJ CMQSET ENTER CONTROL MODE  
386 UJP RMDONE

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\*  
\* THIS SECTION PROCESSES BLOCK CONTROL PARITY ERRORS  
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00076 20000021  
00077 12077774  
00100 53600000  
00101 17200007  
00102 17600010  
00103 16600010  
00104 35277777 X  
00105 40200104 X  
00106 01000145 P

393  
394 BPARITY LDA 00021B 00X2 = DATA CHANNEL ACTIVITY  
395 SHA -3 01X2 = SEARCH/MOVE OR TYPEWRITER  
396 TAI X2  
397 ANI 00007B,X2 MASK TO THE CHANNEL NUMBER  
398 ANA 00010B  
399 XOA 00010B  
400 SSA CHERRTAB,X2 SET THE MEMORY PARITY BIT  
401 STA CHERRTAB,X2 IF IT WAS DATA CHANNEL ACTIVITY  
402 UJP MPAREXIT

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405 *
406 * THIS SECTION PROCESSES PARITY ERRORS THAT
407 * OCCURE WITHIN THE MONITOR.
408 *
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00107 54200021 410
00110 17200007 411 MPARITY LDI 00021B,X2 LOAD THE INTERRUPT CODE
00111 01200112 P 412 ANI 00007B,X2
00112 00700040 X 413 UJP *+1,X2
00113 00700112 X 414 RTJ SYSERR XXX0 = NON-EXISTANT MEMORY
00114 01000076 P 415 RTJ SYSERR XXX1 = NON-EXISTANT MEMORY
00115 01000122 P 416 UJP BPARITY XXX2 = BLCK CONTROL PARITY ERROR
00116 00700041 X 417 UJP MPARRCVR XXX3 = RNI/RAC PARITY ERROR
00117 00700113 X 418 RTJ MACHERR XXX4
00120 00700116 X 419 RTJ SYSERR XXX5 = NON-EXISTANT MEMORY
00121 00700120 X 420 RTJ MACHERR XXX6
00122 22000107 00021 3 421 RTJ MACHERR XXX7 = ROP/STC PARITY ERROR
00123 04600003 422 MPARRCVR LACH 21B*4+3 LOAD THE INTERRUPT CODE
00124 00700121 X 423 ASE 03B SKIP IF AN RNI CORE CYCLE
00125 14777777 424 RTJ MACHERR
00126 27000020 425 ENQ 77777B
00127 14277777 X 426 LOL 00020B
00130 07177777 X 427 ENI PURELIST,X2 DETERMINE IF THE PARITY ERROR
00131 00700124 X 428 MTH PURETABL,1 OCCURRED WITHIN A PURE REGION
00132 25200130 X 429 RTJ MACHERR BETTER LUCK NEXT TIME
00133 03300131 P 430 LOAQ PURETABL,X2
00134 44000142 P 431 AZJ,LT *-2
00135 16677777 432 SWA RECREATE RECREATE THE WORD IN ERROR BY
00136 53040000 433 XQA 77777B VIRTUE OF THE FACT THAT PURE CODE
00137 53600000 434 AQA REGIONS HAVE AN EVEN PARITY WORD
00140 14600000 435 TAI X2 IN THE LAST LOCATION
00141 40400020 436 ENA 0
00142 36200000 437 STA,I 00020B ZERO THE WORD IN ERROR
00143 02600142 P 438 RECREATE SCA IMPURE,X2 CREATE THE XOR OF THE REGION
00144 40400020 439 IJD *-1,X2
00145 54200043 P 440 STA,I 00020B RESTORE THE WORD IN ERROR
00146 22000227 P 00045 3 441 MPAREXIT LDI MPAR02,X2 RESTORE INDEX 2
00147 77730000 442 LACH CRSAVE+3
00150 77634000 443 VFD A12/DINT ENABLE PARITY ERROR INTERRUPTS
00151 25003332 P 444 ACR RESTORE THE CONDITION REGISTER
00152 01400020 445 LOAQ PARTEMP RESTORE A AND Q
446 UJP,I 00020B RETURN
00153 P 447
448 PURE02 EQU * BEGINNING OF PURE REGION 02
    
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*****
*
* THIS ROUTINE PROCESSES ILLEGAL WRITE INTERRUPTS.
* THE ILLEGAL WRITE IS ANALYSED AND THE PAGE WHICH
* WILL ALLOW THE USER TO CONTINUE RUNNING WILL BE
* REQUESTED. IF THE PAGE IS IN MEMORY, THE PAGE
* FILE WILL BE UPDATED TO INDICATE THE PAGE IS
* LEGAL TO REFERENCE.
*
*****
    
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00153	00700044	X		462	ILLWRITE EQU	*		
00154	77740000			463	RTJ	REGSAVE	SAVE THE INTERNAL STATUS	
00155	77537000			464	VFD	A12/EINT		
				465	SCIM	7000B	PREVENT INTERNAL FAULT INTERRUPTS	
				466	*		ALLOWED IN THIS ROUTINE	
00156	20077777	X		467	LDA	SCREAM		
00157	03100162	P		468	AZJ,NE	*+3	THIS CODE LEAVES THE ILLEGAL	
00160	77300040			469	INS	40B,0	WRITE LIGHT ON IF SCREAM	
00161	01000162	P		470	UJP	*+1	IS NON-ZERO	
00162	20000014			471	LDA	14B	GET THE PROGRAM COUNTER	
00163	40200050	X		472	STA	PC,X2+PSA	AND STORE IT INTO THE PSA	
00164	13077760			473	SHAQ	-15		
00165	77674000			474	ISA			
00166	13000004			475	SHAQ	4		
00167	53600000			476	TAI	X2		
00170	77654000			477	PFA	PFR,X2		
00171	14704000			478	ENQ	4000B		
00172	03400705	P		479	AQJ,EQ	RMPAGEIN	JUMP IF RNI WAS NOT POSSIBLE	
00173	77670000			480	OSA			
00174	42015544	P	03331 0	481	SACH	OSRSAVE	SAVE THE CSR	
00175	77674000			482	ISA			
00176	77660000			483	AOS		PUT THE ISR INTO THE OSR	
00177	55400000			484	VFD	A9/ROS		
00200	21400014			485	LDQ,I	000148	FETCH THE OFFENDING INSTRUCTION	
00201	55000000			486	VFD	A9/RIS		
00202	41003321	P		487	STQ	IRTEMP1	SAVE THE INSTRUCTION	
00203	22015504	P	03321 0	488	LACH	IRTEMP1	LOAD THE OPERATION CODE	
00204	53500000			489	TAI	X1		
00205	22401044	P	00211 0	490	LACH	IRITABLE,X1	LOAD THE OPCODE TYPE	
00206	53500000			491	TAI	X1	AND PUT IT INTO INDEX 1	
00207	13000030			492	SHAQ	24	OFFENDING INSTRUCTION TO A	
00210	01100231	P		493	UJP	IRDECODE,X1	JUMP TO THE APPROPRIATE ROUTINE	

00211	16010000			494				
00212	00001314			495	IRITABLE	OCT	16010000	00 03
00213	15000000			496		OCT	00001314	04 07
00214	00000000			497		OCT	15000000	10 13
00215	01010710			498		OCT	00000000	14 17
00216	01030301			499		OCT	01010710	20 23
00217	01010303			500		OCT	01030301	24 27
00220	04010101			501		OCT	01010303	30 33
00221	04041112			502		OCT	04010101	34 37
00222	04060405			503		OCT	04041112	40 43
00223	01010100			504		OCT	04060405	44 47
00224	02000303			505		OCT	01010100	50 53
00225	03030303			506		OCT	02000303	54 57
00226	17171717			507		OCT	03030303	60 63
00227	15000000			508		OCT	17171717	64 67
00230	00000000			509		OCT	15000000	70 73
				510		OCT	00000000	74 77
				511		OCT		

00231	01000605	P		513	IRDECODE	UJP	IRALARM	00 - SHOULD NOT GET HERE
00232	01000262	P		514	*	UJP	IRLDA	01-UJP,LDA,LDQ,LCA,LDL,ADA,SBA
				515				SSA,SCA,LPA,MUA,DVA,CPR
00233	01000444	P		516		UJP	IRLOI	02-LDI
00234	01000320	P		517	*	UJP	IRLDAQ	03-LDAQ,LCAQ,ADAQ,SBAQ,MUAQ
				518				DVAG,FAD,FSB,FMU,FDV
00235	01000316	P		519		UJP	IRSTA	04-RAD,STA,STG,SWA,SCHA
00236	01000442	P		520		UJP	IRSTI	05-STI
00237	01000330	P		521		UJP	IRSTAQ	06-STAG
00240	01000370	P		522		UJP	IRLACH	07-LACH
00241	01000366	P		523		UJP	IRLQCH	10-LQCH
00242	01000363	P		524		UJP	IRSACH	11-SACH
00243	01000361	P		525		UJP	IRSQCH	12-SQCH
00244	01000414	P		526		UJP	IRMEQ	13-MEQ
00245	01000412	P		527		UJP	IRMTH	14-MTH



00246	01000410	P	528	UJP	IRSSH	15-SSH,LBR,SBR
00247	01000251	P	529	UJP	IRRTJ	16-RTJ
00250	01000466	P	530	UJP	IRBDP	17 - BDP INSTRUCTIONS (64-67)

00251	14300343	P	532	*****RTJ*****		
00252	13077760		533	IRRTJ	ENI	IRCHK,X3
00253	77670000		534	IRZAPX	SHAQ	-15
00254	13000004		535	IRZAPZ	OSA	
00255	53600000		536	IRZAPQ	SHAQ	4
00256	77654000		537		TAI	X2
00257	14704000		538		PFA	PFR,X2
00260	03400703	P	539		ENQ	4000B
00261	01300000		540		AQJ,EQ	RMOSR
			541		UJP	0,X3
			542			RETURN
			543	*****LDA*****		
00262	14300605	P	544	IRLDA	ENI	IRALARM,X3
00263	40003322	P	545	IRCEA	STA	IRTEMP2
00264	53500000		546		TAI	X1
00265	12077760		547		SHA	-15
00266	17600003		548		ANA	3B
00267	03000276	P	549		AZJ,EQ	IRCEPAST
00270	30003323	P	550		ADA	RPSAPTR
00271	53600000		551		TAI	X2
00272	20277777	X	552		LDA	I0,X2
00273	12000011		553		SHA	9
00274	12077766		554		SHA	-9
00275	53540000		555		IAI	X1
00276	20003322	P	556	IRCEPAST	LDA	IRTEMP2
00277	12000006		557		SHA	6
00300	03200432	P	558		AZJ,GE	IRCEARET
			559	*		JUMP IF NO INDIRECT BIT. PERFORM THE INDIRECT ADDRESSING. (INDEXED) ADDRESS TO A. 15 BIT ADDRESS TO Q UPPER 3 BITS OF 18 BIT ADDRESS GENERATE THE PAGE NUMBER GLOBAL PAGE NUMBER TO X2.
00301	53100000		560		TIA	X1
00302	13077760		561		SHAQ	-15
00303	77674000		562		ISA	
00304	13000004		563		SHAQ	4
00305	53600000		564		TAI	X2
00306	77654000		565		PFA	PFR,X2
00307	14704000		566		ENQ	4000B
00310	03400625	P	567		AQJ,EQ	RMPLAGUE
			568	*		INDIRECTLY ADDRESSED WORD IS NOT IN PHYSICAL MEMORY
00311	47103331	P	569		STI	XTEMP,X1
00312	55400000		570		VFD	A9/ROS
00313	20403331	P	571		LDA,I	XTEMP
00314	55000000		572		VFD	A9/RIS
00315	01000263	P	573		UJP	IRCEA
			574	*		GO TO CHECK AGAIN FOR INDEXING AND INDIRECT ADDRESSING.
			575			
			576	*****STA*****		
00316	14300343	P	577	IRSTA	ENI	IRCHK,X3
00317	01000263	P	578		UJP	IRCEA
			579			ENTER THE RETURN ADDRESS
			580	*****LDAQ*****		
00320	14300322	P	581	IRLDAQ	ENI	*+2,X3
00321	01000263	P	582		UJP	IRCEA
00322	53200000		583		TIA	X2
00323	13000024		584		SHAQ	20
00324	30077777	X	585		ADA	BIT20
00325	13000034		586		SHAQ	28
00326	53600000		587		TAI	X2
00327	01000703	P	588		UJP	RMOSR
			589			
			590	*****STAQ*****		
00330	14300332	P	591	IRSTAQ	ENI	*+2,X3
00331	01000263	P	592		UJP	IRCEA
00332	03600343	P	593		AQJ,GE	IRCHK
00333	53200000		594		TIA	X2
00334	13000024		595		SHAQ	20
00335	30000324	X	596		ADA	BIT20
00336	13000034		597		SHAQ	28
00337	53600000		598		TAI	X2
00340	77654000		599		PFA	PFR,X2
00341	14704000		600		ENQ	4000B
00342	03400703	P	601		AQJ,EQ	RMOSR
			602			
	00343	P	603	IRCHK	EQU	*
						A STORE HAS BEEN DETECTED



00343	54303323	P	604	LDI	RPSAPTR,X3+PSA	GET POINTER TO RUNNING USER PSA
00344	21300046	X	605	LDQ	CR,X3+PSA	GET MEMORY PROTECT BIT
00345	53200000		606	TIA	X2	GET VMM PAGE NUMBER + 140B
00346	17600037		607	ANA	NPU-1	GET USER PAGE NUMBER
00347	53740000		608	IAI	X3+PSA	
00350	20377777	X	609	LDA	VMM,X3+PSA	GET VMM WORD
00351	03300672	P	610	AZJ,LT	IRMP	JUMP IF A SYSTEM PURECODE PAGE
			611			
00352	17600177		612	ANA	177B	USER PURE PAGE, GET PAGE NUMBER
00353	40300350	X	613	STA	VMM,X3+PSA	INDICATE NOT PURE
00354	53700000		614	TAI	X3	PUT PAGE NUMBER IN X3
00355	20077777	X	615	LDA	BIT21	
00356	35300065	X	616	SSA	PAGETABL,X3	INDICATE IMPURE USER PAGE...
00357	40300356	X	617	STA	PAGETABL,X3	...IN PAGETABL
00360	01000703	P	618	UJP	RMSR	GO TO UPDATE THE PAGE FILE
00361	14677777	X	620	IRSQCH	ENA	*****SQCH*****
00362	01000364	P	621	UJP	IRSACH1	
00363	14677777	X	622	IRSACH	ENA	*****SACH*****
00364	14300343	P	623	IRSACH1	ENI	IRCHK,X3
00365	01000372	P	624	UJP	IRCCA	
00366	14600363	X	625	IRLQCH	ENA	*****LQCH*****
00367	01000371	P	626	UJP	IRLACH1	
00370	14600361	X	627	IRLACH	ENA	*****LACH*****
00371	14300605	P	628	IRLACH1	ENI	IRALARM,X3
00372	30003323	P	629	IRCCA	ADA	RPSAPTR
00373	53600000		630	TAI	X2	
00374	20200000		631	LDA	0,X2	
00375	53600000		632	TAI	X2	
00376	20003321	P	633	LDA	IRTEMP1	GET THE INSTRUCTION
00377	12000006		634	SHA	6	
00400	03200406	P	635	AZJ,GE	IRCCARET	JUMP IF NOT INDEXED
00401	12000001		636	SHA	1	
00402	12077770		637	SHA	-7	
00403	53240000		638	AIA	X2	
00404	12077775		639	SHA	-2	
00405	01000433	P	640	UJP	IRZAP	
00406	12000020		641	IRCCARET	SHA	16
00407	01000433	P	642	UJP	IRZAP	
			643			
			644	*****SSH*****		
00410	14300343	P	645	IRSSH	ENI	IRCHK,X3
00411	01000433	P	646	UJP	IRZAP	
			647			
			648	*****MTH*****		
00412	54303323	P	649	IRMTH	LDI	RPSAPTR,X3
00413	02300415	P	650	IJI	IRSHARE,X3+PSA	JUMP AND SET BIAS FOR I2
			651			
			652	*****MEQ*****		
00414	54303323	P	653	IRMEQ	LDI	RPSAPTR,X3
00415	20300370	X	654	IRSHARE	LDA	I1,X3+PSA
00416	53500000		655		TAI	X1
00417	20003321	P	656		LDA	IRTEMP1
00420	13077760		657		SHAQ	-15
00421	17600007		658		ANA	7
00422	05600001		659		ASG	1
00423	14600010		660		ENA	10B
00424	53140000		661		AIA	X1
00425	44300415	X	662		SWA	I1,X3+PSA
00426	13000030		663		SHAQ	24
00427	12077766		664		SHA	-9
00430	53540000		665		IAI	X1
00431	14300605	P	666		ENI	IRALARM,X3
00432	53100000		667	IRCEARET	TIA	X1
00433	13077760		668	IRZAP	SHAQ	-15
00434	54203323	P	669		LDI	RPSAPTR,X2
00435	20200344	X	670		LDA	CR,X2+PSA
00436	17600004		671		ANA	04B
00437	03000253	P	672		AZJ,EQ	IRZAPZ
00440	22015544	P	673		LACH	OSRSAVE
00441	01000254	P	674		UJP	IRZAPQ
			675			
			676			
			677	*		SECTION TO PROCESS LDI AND STI
			678	*****STI*****		
00442	14300343	P	679	IRSTI	ENI	IRCHK,X3
00443	01000445	P	680		UJP	IRCIA
			681			ENTER THE RETURN ADDRESS

00444	14300605	P	682	***** LDI *****		
00445	44003331	P	683	IRLDI	ENI	IRALARM,X3
00446	53500000		684	IRCIA	SWA	XTEMP
00447	12077764		685		TAI	X1
00450	53600000		686		SHA	-11
00451	17200017		687		TAI	X2
00452	12000021		688		ANI	17B,X2
00453	03200432	P	689		SHA	17
00454	77674000		690		AZJ,GE	IRCEARET
00455	12000004		691		ISA	
00456	53640000		692		SHA	4
00457	77654000		693		IAI	X2
00460	14704000		694		PFA	PFR,X2
00461	03400622	P	695		ENQ	4000B
00462	55400000		696		AQJ,EQ	RMBARF
00463	20403331	P	697		VFD	A9/ROS
00464	55000000		698		LDA,I	XTEMP
00465	01000445	P	699		VFD	A9/RIS
			700		UJP	IRCIA
			701			

SAVE THE TARGET ADDRESS.  
 LOCAL PAGE NUMBER TO X2.  
 INDIRECT BIT TO HIGH A.  
 JUMP IF NO INDIRECT ADDRESSING.  
 MAKE A GLOBAL PAGE NUMBER.  
 JUMP IF THE PAGE IS NOT IN CORE.

\*\* SECTION FOR BDP INSTRUCTIONS.

00466	11700002		703	IRBDP	ECHA,S	300002B	
00467	30000014		704		ADA	00014B	CALCULATE THE VALUE OF P+2 WITH THE APPROPRIATE SIGN EXTENSION
00470	53500000		705		TAI	X1	SAVE THE ADDRESS
00471	14300473	P	706		ENI	*+2,X3	VERIFY THAT THE THIRD WORD CAN BE LOADED ON THE RNI CYCLE
00472	01000252	P	707		UJP	IRZAPX	RELOCATE TO THE USER MEMORY
00473	55400000		708		VFD	A9/ROS	LOAD THE THIRD WORD
00474	20100000		709		LDA	0,X1	SINCE Q HAD 4000 IN IT, THIS LEAVES 0000XXXX IN Q
00475	13077763		710		SHAQ	-12	MASK TO THE FIELD LENGTH
00476	12400014		711		SHQ	12	CALCULATE A MAXIMUM SIZE FOR THE LENGTHS OF THE FIELDS
00477	17607777		712		ANA	7777B	AND LEAVE IT IN X1
00500	03600502	P	713		AQJ,GE	*+2	CERTAIN 66.X INSTRUCTIONS ALWAYS PROCESS 16 CHARACTERS
00501	13000030		714		SHAQ	24	LOAD THE FIRST TWO WORDS
00502	53500000		715		TAI	X1	
00503	05100020		716		ISG	16,X1	
00504	14100020		717		ENI	16,X1	
00505	25400014		718		LDAQ,I	00014B	
00506	12000006		719		SHA	6	
00507	53600000		720		TAI	X2	SAVE OPERATION IN X2
00510	12000001		721		SHA	1	
00511	12077770		722		SHA	-7	SIGN EXTEND THE CHARACTER ADDRESS
00512	55000000		723		VFD	A9/RIS	
00513	45003321	P	724		STAQ	IRTEMP1	SAVE INTERMEDIATE RESULTS
00514	53200000		725		TIA	X2	IN ADDITION TO THE OPERATION, THE LEFT THREE BITS OF WORD TWO HAVE A LOT OF INFLUENCE, SO MERGE THEM IN AND MASK THE RESULT
00515	13000003		726		SHAQ	3	
00516	53600000		727		TAI	X2	
00517	17200037		728		ANI	37B,X2	
00520	05100020		729		ISG	16,X1	
00521	14100020		730		ENI	16,X1	ASSUME AT LEAST 16 CHARACTERS
00522	25000620	P	731		LDAQ	IRBDPRL	DETERMINE IF THE INSTRUCTION IS ONE OF THE RIGHT-TO-LEFT KLUDGES
00523	13200000		732		SHAQ	0,X2	SKIP IF LEFT-TO-RIGHT ADDRESSING HANDLE RIGHT-TO-LEFT PROPERLY
00524	05400000		733		ASG,S	0	LOAD THE ADDRESS OF THE PSA
00525	16177777		734		XOI	-0,X1	LOAD THE USERS CONDITION REGISTER
00526	54303323	P	735		LDI	RPSAPTR,X3	LEAVE THE ROS BIT
00527	20300435	X	736		LDA	CR,X3+PSA	JUMP IF RIS IS IN EFFECT
00530	17600004		737		ANA	04B	LOAD THE USERS CSR
00531	03000534	P	738		AZJ,EQ	*+3	
00532	22015544	P	739		LACH	OSRSAVE	
00533	77660000		740		AOS		
00534	22015510	P	741		LACH	IRTEMP2	LEAVE THE INDEX BITS
00535	17600006		742		ANA	06B	JUMP IF NO INDEXING
00536	03000545	P	743		AZJ,EQ	IRBDPNRX	
00537	21300366	X	744		LQ	I2,X3+PSA	
00540	04600004		745		ASE	04B	SKIP IF BY X2
00541	21300425	X	746		LQ	I1,X3+PSA	OTHERWISE, USE X1
00542	13000041		747		SHAQ	33	
00543	12077766		748		SHA	-9	CREATE THE SIGN EXTENDED INDEX AND ADD IT TO THE ADDRESS
00544	34003321	P	749		RAD	IRTEMP1	
00545	20003321	P	750	IRBDPNRX	LDA	IRTEMP1	LOAD STARTING CHARACTER ADDRESS
00546	14300550	P	751		ENI	*+2,X3	CHECK IT OUT
00547	01000602	P	752		UJP	IRZAPC	
00550	20003321	P	753		LDA	IRTEMP1	MISSED ON THAT ONE
00551	53140000		754		AIA	X1	CREATE ENDING ADDRESS
00552	14300554	P	755		ENI	*+2,X3	AND CHECK IT OUT ALSO
00553	01000602	P	756		UJP	IRZAPC	
00554	20003322	P	757		LDA	IRTEMP2	MISSED AGAIN, SO WORK ON THE
			758				

00555	13000007		759		SHAQ	7	OTHER FIELD
00556	12077770		760		SHA	-7	SIGN EXTEND CHARACTER ADDRESS
00557	17700003		761		ANQ	3	LEAVE APPROPRIATE INDEX BITS
00560	05700001		762		QSG	1	SKIP IF INDEXING
00561	01000573	P	763		UJP	IR3DPNSX	
00562	54303323	P	764		LDI	RPSAPTR,X3	
00563	04700002		765		QSE	2	SKIP IF WITH X2
00564	01000567	P	766		UJP	*+3	
00565	21300537	X	767		LDQ	I2,X3+PSA	LOAD X2
00566	01000570	P	768		UJP	*+2	
00567	21300541	X	769		LDQ	I1,X3+PSA	OTHERWISE, USE X1
00570	12400011		770		SHQ	9	SIGN EXTEND THE INDEX REGISTER
00571	12477766		771		SHQ	-9	
00572	53040000		772		AQA		AND ADD IT TO THE ADDRESS
00573	40003322	P	773	IRBDPNSX	STA	IRTEMP2	STORE THE STARTING ADDRESS
00574	14300576	P	774		ENI	*+2,X3	AND CHECK IT OUT
00575	01000602	P	775		UJP	IRZAPC	
00576	03600343	P	776		AQJ,GE	IRCHK	CHECK FOR READ ONLY PAGE
00577	20003322	P	777		LDA	IRTEMP2	THREE TIME LOSER
00600	53140000		778		AIA	X1	CREATE THE ENDING ADDRESS
00601	14300604	P	779		ENI	*+3,X3	AND CHECK IT OUT
00602	13077756		780	IRZAPC	SHAQ	-17	
00603	01000253	P	781		UJP	IRZAPZ	
00604	03600343	P	782		AQJ,GE	IRCHK	CHECK FOR READ ONLY PAGE
			783				
00605	22015544	P	784	IRALARM	LACH	OSRSAVE	
00606	77660000		785		AOS		
00607	11015440	P	785+001		ECHA	ILWERM	TELL THE OPERATOR
00610	14700020		785+002		ENQ	ILWERM	THAT EITHER HE IS PLAYING
00611	14277777	X	785+003		ENI	RETURN,X2	WITH SWITCHES OR KOMPEWTER IS
00612	77730000		785+004		VFD	A12/DINT	CRAZY.
00613	01077777	X	785+005		UJP	OPMSGX	
			785+006				
00614	22015544	P	785+007	IRFLAKE	LACH	OSRSAVE	
00615	77660000		785+008		AOS		
00616	54303323	P	786		LDI	RPSAPTR,X3+PSA	
00617	01077777	X	787		UJP	IRERROR	ILLEGAL WRITE
			788				
00620	00050014		789	IRBDPRL	VFD	08/000,08/120,08/014,08/350	

				791	*	A PAGE IS MISSING FOR AN INDIRECT CYCLE OF A STI OR LDI.	
				792			
00622	54103331	P		793	RMSARF	LDI	XTEMP,X1
00623	14701171	P		794		ENQ	RMINDR
00624	01000630	P		795		UJP	RMZORCH
				796			
				797	*	A PAGE IS MISSING FOR AN INDIRECT CYCLE OF A LDA TYPE INSTRUCTION.	
				798			
00625	14600040			799	RMPLAGUE	ENA	408
00626	42015505	P	03321 1	800		SACH	IRTEMP1+1
00627	14701062	P		801		ENQ	RMCHAIN
00630	47103321	P		802	RMZORCH	STI	IRTEMP1,X1
00631	54303323	P		803		LDI	RPSAPTR,X3
00632	22015544	P	03331 0	804		LACH	OSRSAVE
00633	77660000			805		AOS	
00634	20300163	X		806		LDA	PC,X3+PSA
00635	41300634	X		807		STQ	PC,X3+PSA
00636	21003321	P		808		LJQ	IRTEMP1
00637	14100705	P		809		ENI	RMPAGEIN,X1
				810			
				811	*	SETUP WILL SAVE THE USERS CURRENT STATUS AND	
				812	*	ALLOW THE USER TO RUN IN PROGRAM STATE ZERO.	
				813			
00640	40377777	X		814	SETUP	STA	T1,X3+PSA
00641	20003316	P		815		LDA	RMINCON
00642	35377777	X		816		SSA	I3,X3+PSA
00643	45377777	X		817		STAQ	T2,X3+PSA
00644	53300000			818		TIA	X3+PSA
00645	40300642	X		819		STA	I3,X3+PSA
00646	21300527	X		820		LDQ	CR,X3+PSA
00647	12400025			821		SHQ	21
00650	77670000			822		OSA	
00651	13077774			823		SHAQ	-3
00652	77674000			824		ISA	
00653	77660000			825		AOS	
00654	13077774			826		SHAQ	-3
00655	20003317	P		827		LDA	RMINCON+1
00656	12077770			828		SHA	-7
00657	13000007			829		SHAQ	7
00660	40377777	X		830		STA	T4,X3+PSA
00661	25377777	X		831		LDAQ	A,X3+PSA
00662	45377777	X		832		STAQ	T5,X3+PSA
00663	20077777	X		833		LDA	B210R822
00664	77664000			834		AIS	
00665	37377777	X		835		LPA	IS,X3+PSA
00666	34300640	X		836		RAD	T1,X3+PSA
00667	16477777			837		XOA,S	777778
00670	34300665	X		838		RAD	IS,X3+PSA
00671	01100000			849	SETRET	UJP	0,X1

CR ROS BIT TO HIGH Q.

PREPARE FOR PROGRAM STATE ZERO.  
LEAVE ANY OVERFLOW OR FAULT BITS.

RETURN

				851					
		00672	P	852	IRMP	EQU	*		
		00673		853		QSG,S	0		
		00674	P	854	UJP		IRFLAKE		JUMP IF MEMORY PROTECTION
		00675		855		TAI	X1		
		00676		856		LDA	0,X1		LOAD THE PHYSICAL PAGE NUMBER
		00677		857		TAI	X1		
		00700	X	858		ANI	1778,X1		
		00701	X	859		LDA	PAGEMSA,X1		GET THE MASS STORAGE ADDRESS
		00702	X	860		SSA	BIT22		MAKE INTO A PAGE ACCESS WORD
		00703	X	861		STA	VMM,X3+PSA		
		00704	P	862	RMSR	LACH	OSRSAVE		
		00705	P	863		AOS			RESTORE OSR
		00705	P	864	SIM01	EQU	*		USED FOR SYSTEM SIMULATION
		00706	P	865	RMPAGEIN	LDA	RPSAPTR		POINT TO THE RUNNING USER.
		00707		866		TAI	X1		
		00710		867		ANI	NPU-1,X2		CHANGE GLOBAL PAGE NO. TO LOCAL.
		00711	X	868		AIA	X2		
		00712	X	869		INA	VMM		POINT TO THE PROPER VMM WORD.
		00713	P	870		TAI	X3		POINTER TO INDEX 3.
		00714	P	871		STI	L1TEMP1,X3		SAVE VMM POINTER
		00715		872		ENQ	0		SAY THIS PAGE IS NOT PURE.
		00716		873		VFD	A12/DINT		PREVENT INTERFERENCE
		00717	P	874		LDA	0,X3		GET THE VMM WORD.
		00720		875		AZJ,GE	*+4		JUMP IF NOT PURE CODE.
		00721		876		TAI	X3		POINT TO THE PAGE ACCESS WORD.
		00722		877		ENQ	1		REMEMBER THE PAGE IS SYSTEM PURE
		00723	P	878		LDA	0,X3		
		00724		879		STA	L1TEMP2		SAVE MASS STORAGE ADDRESS
		00725	P	880		SHA	1		
		00726		881		AZJ,LT	RMHAULIN		JUMP IF PAGE IN BACKUP STORAGE.
		00727	P	882		SHA	1		
		00730		883		AZJ,LT	RMPUREQ		JUMP IF PAGE IS PURE, COMING IN.
		00731		884		APF	PS+PFW,X2		FIX THE PAGE FILE.
		00732		885		SHA	-2		FORM THE LOCAL PAGE NUMBER.
		00733		886		ANA	1778		
		00734		887		TAI	X1		
		00735	X	888		TMA	CLOCK		GET THE CURRENT TIME.
		00736	X	889		ADA	HOUR		
		00737	X	890		STA	PAGEIME,X1		SAY THE PAGE WAS REFERENCED.
				891		UJP	RETURN		
				892					** THE DESIRED PAGE IS PURE AND BEING SWAPPED IN.
		00740	P	893	RMPUREQ	STI	XTEMP,X3		SAVE INDEX X3 (POINTS TO LIST).
		00741		894		ENI	1,X3		TWO WORDS ARE NEEDED
		00742	P	895		RTJ	GETMEM		GET THE BLOCK OF MEMORY
		00743	P	896		LDQ,I	XTEMP		GET POINTER TO FIRST LIST NODE.
		00744	P	897		LDA	RPSAPTR		GET THE PSA POINTER
		00745		898		STAQ	0,X3		SET THE CONTENTS OF THIS NODE.
		00746	P	899		STI,I	XTEMP,X3		LINK THE NODE INTO THE LIST.
		00747	P	900		UJP	RMQ04X		SET MASS STORAGE WAIT AND EXIT
				901					** THE DESIRED PAGE HAS BEEN SWAPPED OUT TO BACK-UP STORAGE.
		00750		902					
		00751	P	903	RMHAULIN	SHA	1		MEMORY PARITY BIT TO SIGN
		00752	X	904		AZJ,GE	RMOK		JUMP IF NO MEMORY PARITY ERROR
		00753	X	905		LDA	BIT22		CLAIM IT IS A ZEROPAGE
		00754	P	906		STA	0,X3		STORE THE WORD BACK
				907		UJP	MPARKILL		UNLOAD THE PROBLEM ON THE USER
				908					** THERE WAS NOT A MEMORY PARITY ERROR WHEN THE PAGE WAS SWAPPED OUT.
				909					** GENERATE A REQUEST TO PULL IT BACK IN FROM MASS STORAGE.
		00755	P	910	RMOK	EQU	*		
		00756	X	911		LDA	BIT21		
		00757		912		QSE,S	0		SKIP IF THIS IS NOT A PURE PAGE,
		00760		913		STA	0,X3		ELSE SAY IT IS BEING SWAPPED IN.
		00761	P	914		QSE	1		SKIP IF PURE CODE REQUEST
		00762	P	915		LDA	EPAGECNT		
		00763	P	916		AZJ,NE	RMRS		MEMORY NOT FULL, QUEUE SWAP
		00764		917		ENA,S	677768		MEMORY FULL, ...
		00765	P	918		SHA	23		TELL SWITCH TO PREFORM SCHEDULING
		00766	P	919		STA	SFLAG		
		00767	X	920		ENQ	0		INITIAL VALUE FOR PAGECNT
				921		ENI	IDLE,X3+PSA		START AT IDLE



00770	53130035		930		TMI	NU,X1	
00771	15177776		931		INI	-1,X1	REMOVE IDLE
00772	01001010	P	932		UJP	RMP04	
00773	20300000		933				
00774	53700000		934	RMP02	LDA	0,X3+PSA	GET NEXT PSA
00775	36003324	P	935		TAI	X3+PSA	
00776	03001010	P	936		SCA	PRTYPSA	DO NOT DELAY LAST DELAYED USER
00777	20377777	X	937		AZJ, EQ	RMP04	
01000	03301010	P	938		LDA	SYSCM,X3+PSA	
01001	20377777	X	939		AZJ, LT	RMP04	DO NOT DELAY IF IN CONTROL MODE
01002	17677777	X	940		LDA	IOBOUND,X3+PSA	
01003	03101010	P	941		ANA	NK8BITS	EXAMINE ALL TERMINAL DELAY BITS
01004	20377777	X	942		AZJ, NE	RMP04	DO NOT DELAY I/O BOUND USERS
01005	03701010	P	943		LDA	PAGEREQ,X3+PSA	GET NUMBER OF PAGES USED
01006	47303340	P	944		AQJ, LT	RMP04	JUMP IF LESS PAGES
01007	13000030		945		STI	PAGEAGE,X3+PSA	CORE HOGGS PSA TO TEMP
01010	02500773	P	946	RMP04	SHAQ	24	REMEMBER HIS NUMBER OF PAGES
01011	05500010		947		IJD	RMP02,X1	JUMP IF MORE USERS
01012	01001016	P	948				
01013	54303340	P	949		QSG, S	108	SKIP IF SOME ONE FOUND
01014	14677777	X	950		UJP	RMSDLAY	JUMP IF NOONE TO DELAY
01015	00702462	P	951		LDI	PAGEAGE,X3+PSA	GET CORE HOGGS PSA POINTER
01016	54103323	P	952		ENA	DELAY	DELAY THE SELECTED USER
01017	20101001	X	953	RMSDLAY	RTJ	IOSET	
01020	03301023	P	954		LDI	RPSAPTR,X1+PSA	IS THIS USER DESERVING OF...
01021	17601014	X	955		LDA	IOBOUND,X1+PSA	...A PAGE. YES, IF NEGATED
01022	03101046	P	956		AZJ, LT	RMNOOLAY	OR IF NOT DELAYED
01023	01023	P	957		ANA	DELAY	FORGET HIM IF DELAYED.
01024	14300002	P	958		AZJ, NE	RM DONE	
01025	00703104	P	959	RMRS	EQU	*	
01026	40300000	P	960	RMNOOLAY	EQU	*	
01027	25003336	P	961		ENI	2,X3	GET A FOUR WORD BLOCK OF MEMORY
01030	53100000		962		RTJ	GETMEM	
01031	36003324	P	963		STA	0,X3	MAKE IT POINT TO ITSELF.
01032	03001052	P	964		LDAQ	L1TEMP1	(WORD2) = VMM PCINTER
01033	20177777	X	965		STAQ	2,X3	(WORD3) = MSA
01034	17600010		966		TIA	X1+PSA	(RPSAPTR) TO A.
01035	03101052	P	967		SCA	PRTYPSA	TEST FOR PRIORITY USER
01036	53300000		968		AZJ, EQ	RMQ07	JUMP IF THE PRIORITY USER
01037	35077777	X	969		LDA	UDBITS,X1+PSA	CHECK THE USER PRIORITY
01040	40403326	P	970		ANA	108	
01041	14600001	P	971		AZJ, NE	RMQ07	PUT REQUEST IN TOP PRIORITY Q.
01042	34003063	P	972				
01043	14677777	X	973		TIA	X3	
01044	34101017	X	974		SSA	BIT17	
01045	00703057	P	975		STA, I	PTSWAPQ	PUT BLOCK AT END OF LOW PRI. Q.
01046	14677777	X	976	RMQ03	EQU	*	
01050	40001047	X	977		ENA	1	
01051	01000737	X	978		RAD	QCOUNT	INDICATE ONE MORE SWAP REQUEST
			979	RMQ04X	EQU	*	
			980		ENA	MSWAIT	
			981		RAD	IOBOUND,X1	GENERATE SWAPBOUND STATUS IN PSA
			982	SWAPSTRT	EQU	*	START SWAPPING LOGIC (LEVEL ONE)
			983		RTJ	RMSWAP	ACTIVATE THE SWAPPING QUEUE
			984	RMDONE	EQU	*	
			985		ENA	SWBIT	
			986		SSA	FLAGS	
			987		STA	FLAGS	
			988		UJP	RETURN	
			989				
			991				
			992				
			993				
			995				
			996	RMQ07	EQU	*	
01052	20003325	P	997		LDA	RMSWAPQ	GET PRIORITY QUEUE POINTER
01053	40300000	P	998		STA	0,X3	LINK THIS REQUEST INTO THE...
01054	47303325	P	999		STI	RMSWAPQ,X3	...HIGH PRIORITY SWAP QUEUE
01055	01001041	P	1000		UJP	RMQ03	
			1001				
01056	54303323	P	1003	RMTERM	LDI	RPSAPTR,X3	
01057	77730000		1004		VFD	A12/DINT	
01060	00702462	P	1005		RTJ	IOSET	
01061	01001046	P	1006		UJP	RMDONE	

\*\*\*\*\*  
 \*  
 \* LINK REQUEST INTO HIGH PRIORITY QUEUE. \*  
 \*  
 \*\*\*\*\*



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1010 *
1011 *      INDIRECT ADDRESSING CHAIN FOLLOWER AND FINISHER.
1012 *
1013 *      THIS ROUTINE IS ENTERED WHEN AN ILLEGAL WRITE OCCURS
1014 *      DURING A READ ADDRESS CYCLE. THE ROUTINE SIMULATES THE
1015 *      HARDWARE EFFECTIVE ADDRESS CALCULATION BUT ALLOWS THE
1016 *      OPERATION TO PROCEED TO COMPLETION WHEN ONLY ONE PAGE OF
1017 *      THE USER'S MEMORY IS RESIDENT AT ANY TIME.
1018 *      THIS ROUTINE RUNS IN PROGRAM STATE (ISR = 0).
1019 *
*****

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01062 55000000 1021
01063 20377777 X 1022 RMCHAIN VFD A9/RIS
01064 12077760 1023 LDA T3,X3+PSA LOAD THE INTERRUPTED INSTRUCTION.
01065 17500003 1024 RMCHAIN1 SHA -15
01066 03101122 P 1025 ANA 3 LEAVE THE INDEXING BITS.
01067 20301063 X 1026 AZJ,NE RMCHAIN4 JUMP IF THERE IS INDEXING TO DO.
01070 12000006 1027 LDA T3,X3+PSA
01071 03301107 P 1028 RMCHAIN2 SHA 6
01072 17500077 1029 AZJ,LT RMCHAIN3 JUMP IF INDIRECT ADDRESSING.
01073 05600002 1030 RMINDT ANA 77B GET THE OPCODE
01074 01001143 P 1031 ASG 2 SKIP IF IT IS NOT A JUMP
01075 13000030 1032 UJP RMCHAIN6
01076 20300660 X 1033 SHAQ 24
01077 12000027 1034 LDA T4,X3+PSA
01100 05400000 1035 SHA 23
01101 00077777 1036 ASG,S 00000
01102 14600052 1037 VFD A9/JMP,A15/AOS
01103 03401151 P 1038 ENA 52B
01104 25300662 X 1039 AQJ,EQ RMCHAIN8 JUMP IF A CPR INSTRUCTION
01105 55400000 1040 LDAQ T5,X3+PSA RESTORE ORIGINAL (A) AND (Q).
01106 01300643 X 1041 VFD A9/ROS
1042 UJP T2,X3+PSA
1043
1044 ** PERFORM INDIRECT ADDRESSING.
01107 37077777 X 1045 RMCHAIN3 LPA NBIT23 CLEAR THE INDIRECTION BIT.
01110 12000022 1046 SHA 18
01111 40301067 X 1047 STA T3,X3+PSA PUT THE INSTRUCTION BACK.
01112 55400000 1048 VFD A9/ROS
01113 20701111 X 1049 LDA,I T3,X3+PSA TRY TO LOAD THE INDICATED ADDRESS
01114 55000000 1050 VFD A9/RIS
01115 21301113 X 1051 LDQ T3,X3+PSA SIMULATE THE F-REGISTER ACTION:
01116 13000006 1052 SHAQ 6
01117 12000022 1053 SHA 18
01120 40301115 X 1054 STA T3,X3+PSA
01121 01001064 P 1055 UJP RMCHAIN1 GO TO TRY AGAIN.
1056
1057 ** PERFORM INDEXING ON THE INTERRUPTED INSTRUCTION.
01122 13000030 1058 RMCHAIN4 SHAQ 24 INDEX BITS TO LOW Q.
01123 20301106 X 1059 LDA T2,X3+PSA LOAD (X3).
01124 05700003 1060 QSG 3 GET PROPER INDEX REG. CONTENTS.
01125 53200000 1061 TIA X2
01126 05700002 1062 QSG 2
01127 53100000 1063 TIA X1
01130 21301120 X 1064 LDQ T3,X3+PSA AGAIN LOAD THE INSTRUCTION.
01131 13000011 1065 SHAQ 9
01132 12077766 1066 SHA -9
01133 12477766 1067 SHQ -9 SIGN-EXTEND A AND Q.
01134 53040000 1068 AQA MODIFIED ADDRESS TO A.
01135 21301130 X 1069 LDQ T3,X3+PSA
01136 13000011 1070 SHAQ 9
01137 17477774 1071 ANA,S 77774B REMOVE INDEX BITS FROM INSTR.
01140 12000017 1072 SHA 15 COMPLETE THE INDEXED INSTRUCTION.
01141 40301135 X 1073 STA T3,X3+PSA SAVE THE NEW VERSION.
01142 01001070 P 1074 UJP RMCHAIN2
1075
01143 20301141 X 1076 RMCHAIN6 LDA T3,X3+PSA
01144 44300666 X 1077 RMCHAIN7 SWA T1,X3+PSA SIMULATE A JUMP INSTRUCTION
01145 14677777 X 1078 ENA XNSKIP ENTER THE RETURN ADDRESS
01146 40301145 X 1079 STA T3,X3+PSA STORE THIS JMP XNSKIP.
01147 25301104 X 1080 LDAQ T5,X3+PSA LOAD ORIGINAL (A) AND (Q).
01150 01301123 X 1081 UJP T2,X3+PSA
1082
1083 ** THIS WAS A CPR INSTRUCTION.
01151 25301147 X 1084 RMCHAIN8 LDAQ T5,X3+PSA LOAD THE A AND Q REGISTERS
01152 55400000 1085 VFD A9/ROS
01153 52701146 X 1086 CPR,I T3,X3+PSA TRY THE INSTRUCTION AGAIN.
01154 01001162 P 1087 UJP RMCHAIN9

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01155	01001160	P	1088	UJP	*+3	
01156	14600003		1089	ENA	3	
01157	01001163	P	1090	UJP	*+4	
01160	14600002		1091	ENA	2	
01161	01001163	P	1092	UJP	*+2	
01162	14600001		1093	ENA	1	
01163	55000000		1094	VFD	A9/RIS	
01164	21301144	X	1095	LJQ	T1,X3+PSA	LOAD THE ORIGINAL P.C.
01165	12400011		1096	SHQ	9	
01166	12477766		1097	SHQ	-9	EXTEND THE SIGN.
01167	53040000		1098	AQA		ADVANCE THE P.C. APPROPRIATELY.
01170	01001144	P	1099	UJP	RMCHAIN7	
			1100			
			1101	** CONTINUATION: A	PAGE HAD BEEN MISSING FOR A RADR, WITH LDI OR STI.	
01171	55000000		1102	RMINDR	VFD	
01172	20301153	X	1103	LDA	T3,X3+PSA	LOAD THE INTERRUPTED INSTRUCTION.
01173	12000006		1104	RMINLOOP	SHA	INDIRECTION BIT TO HIGH A.
01174	03201072	P	1105	AZJ,GE	RMINDT	JUMP IF NC INDIRECT ADDRESSING.
01175	12000003		1106	SHA	3	
01176	13077766		1107	SHAQ	-9	
01177	17677777		1108	ANA	777778	
01200	40301172	X	1109	STA	T3,X3+PSA	STORE THE ADDRESS ONLY.
01201	55400000		1110	VFD	A9/RIS	
01202	20701200	X	1111	LDA,I	T3,X3+PSA	TRY TO GET THE WORD POINTED TO.
01203	55000000		1112	VFD	A9/RIS	
01204	13000006		1113	SHAQ	6	ORIGINAL OP CODE TO LOW A.
01205	12000001		1114	SHA	1	NEW INDIRECT BIT TO LCW A.
01206	12400001		1115	SHQ	1	
01207	13000002		1116	SHAQ	2	ORIGINAL INDEX BITS TO LOW A.
01210	12000017		1117	SHA	15	NEW ADDRESS AROUND INTO PLACE.
01211	40301202	X	1118	STA	T3,X3+PSA	STORE MODIFIED INSTRUCTION.
01212	01001173	P	1119	UJP	RMINLOOP	GO TO TRY AGAIN.

1123  
1124  
1125

\*\*\*\*\*  
\*  
\* THIS SECTION PROCESSES USER ARITHMETIC AND BCD FAULTS \*  
\*  
\*\*\*\*\*

01213	14700010		1127			
01214	14477377		1128	INFPF	ENQ	FPFLOC
01215	01001226	P	1129		ENA,S	-FPF
01216	14700002		1130		UJP	RMININT
01217	14473777		1131	INBCD	ENQ	BCDLOC
01220	01001226	P	1132		ENA,S	-BCD
01221	14700004		1133		UJP	RMININT
01222	14475777		1134	INDVF	ENQ	DVFLC
01223	01001226	P	1135		ENA,S	-DVF
01224	14700006		1136		UJP	RMININT
01225	14476777		1137	INAOV	ENQ	AOVLOC
01226	54303323	P	1138		ENA,S	-AOV
01227	34300670	X	1139	RMININT	LDI	RPSAPTR,X3
01230	41301164	X	1140		RAD	IS,X3+PSA
01231	25003316	P	1141		STQ	T1,X3+PSA
01232	35300645	X	1142		LDAQ	RMINCON
01233	45301211	X	1143		SSA	T3,X3+PSA
01234	20300635	X	1144		STAQ	T3,X3+PSA
01235	13077760		1145		LDA	PC,X3+PSA
01236	77674000		1146		SHAQ	-15
01237	13077776		1147		ISA	
01240	20300646	X	1148		SHAQ	-1
01241	12000005		1149		LDA	CR,X3+PSA
01242	17600200		1150		SHA	5
01243	16600200		1151		ANA	00200B
01244	13077767		1152		XOA	00200B
01245	41301150	X	1153		SHAQ	-8
01246	20301227	X	1154		STQ	T2,X3+PSA
01247	37000663	X	1155		LDA	IS,X3+PSA
01250	77664000		1156		LPA	B210RB22
01251	34301230	X	1157		AIS	
01252	16477777		1158		RAD	T1,X3+PSA
01253	34301246	X	1159		XOA,S	77777B
01254	14600006		1160		RAD	IS,X3+PSA
01255	77660000		1161		ENA	PS/16
01256	14601261	P	1162		AOS	
01257	40301234	X	1163		ENA	RMRTJ
01260	01001051	X	1164		STA	PC,X3+PSA
			1165		UJP	RETURN
			1166			
			1167	*		THIS CODE STORES THE RETURN ADDRESS INTO THE USERS CORE.
			1168	*		THIS ROUTINE RUNS IN PROGRAM STATE WITH ZERO IN THE ISR.
			1169			
01261	55000000		1170	RMRTJ	VFD	A9/RIS
01262	54303323	P	1171		LDI	RPSAPTR,X3
01263	45301151	X	1172		STAQ	T5,X3+PSA
01264	25301251	X	1173		LDAQ	T1,X3+PSA
01265	53700000		1174		TAI	X3
01266	55400000		1175		VFD	A9/ROS
01267	41300000		1176		STQ	G,X3
01270	55000000		1177		VFD	A9/RIS
01271	54303323	P	1178		LDI	RPSAPTR,X3
01272	25301263	X	1179		LDAQ	T5,X3+PSA
01273	01301233	X	1180		UJP	T3,X3+PSA

CLEAR THE FAULT BIT  
REMEMBER LOW-CORE FAULT ENTRY LOC

CONVERT THE ROS BIT TO A RIS BIT

SAVE INTERUPT MASK BITS  
ZERO THE ISR.  
SAVE THE BITS IN T1.

REMOVE THE BITS FROM IS.

SAVE THE ORIGINAL (A) AND (Q).

STORE INTO USER'S LOW CORE.

RESTORE ORIGINAL (A) AND (Q).

```

1184 *
1185 * CALL MEMSET WITH:
1186 * (A) = RETURN ADDRESS
1187 * (Q) = NEW VMM WORD
1188 * (X2) = RELEVANT LOCAL PAGE NUMBER
1189 * (X3) = PSA POINTER.
1190 * X1 AND X3 ARE NOT CHANGED
1191 * MEMSET SETS THE APPROPRIATE PAGE INDEX FILE ENTRY TO NOT-AVAILABLE
1192 * AND REPLACES THE OLD VMM WORD IN THE PSA WITH THE NEW.
1193 * THEN, IF THE OLD PAGE (AS INDICATED BY THE VMM WORD) WAS:
1194 * (1) PURE, THEN EXIT IMMEDIATELY;
1195 * (2) IMPURE AND ON BACKUP STORAGE, THEN FREE THE FOUR BLOCKS;
1196 * (3) IMPURE AND IN CORE, THEN SET THE PAGETABL ENTRY TO ZERO.
1197 *
1198 * IF A PHYSICAL MEMORY PAGE IS FREED, THE SWAPPER WILL
1199 * BE CALLED.
1200 *
*****
    
```

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1202
01274 21077777 X
01275 44003057 P
01276 47103055 P
01277 47303056 P
01300 14604000
01301 05200040
01302 77644140
01303 53300000
01304 53640000
01305 20200711 X
01306 41201305 X
01307 03303055 P
01310 21000752 X
01311 77730000
01312 03701315 P
01313 00703066 P
01314 01003055 P
1220
01315 01315 P
01316 17600177
01317 53500000
01320 20100700 X
01320 00703066 P
01321 01321 P
01321 14600000
01322 40100357 X
01323 40101317 X
01324 14600001
01325 34003335 P
01326 20003060 P
01327 01003063 P
1221
1222
1223
1224
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1228
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1232
1233
ZEROPG LDQ ZROPAGE
MEMSET SWA SWAPPC SAVE RETURN ADDRESS
STI SWAPX1,X1 SAVE X1
STI SWAPX3,X3 SAVE X3
ENA 4000B ILLEGAL PAGE TO REFERENCE
ISG 40B,X2 SKIP IF NOT IN THE PAGE FILE
APF PS+PEW,X2 MAKE PAGE ILLEGAL TO REFERENCE
TIA X3+PSA MAKE PCINTER TO USER'S VMM WORD
IAI X2
LDA VMM,X2 GET THE OLD PAGE ACCESS WORD
STQ VMM,X2 SET THE NEW ONE.
AZJ,LT SWAPEXIT JUMP IF THE OLD PAGE WAS PURE
LDQ BIT22
VFD A12/DINT
AQJ,LT MEMSET03 JUMP IF THE PAGE IS IN CORE
RTJ FRBKPAGE
UJP SWAPEXIT RETURN
MEMSET03 EQU * THE PAGE OCCUPIES PHYSICAL CORE
ANA 177B REMOVE PROTECTION BIT
TAI X1
LDA PAGEMSA,X1 GET THE MASS STORAGE ADDRESS
RTJ FRBKPAGE
GIVEPAGE EQU *
ENA 0
STA PAGETABL,X1 SET THE PAGE TO UN-USED
STA PAGEMSA,X1 REMOVE EXTRANIOUS MASS STORAGE AD
ENA 1
RAD FPCNT INDICATE ANOTHER FREE PAGE
LDA SWAPNUMB NUMBER OF SWAPS IN PROGRESS
UJP SWAPER98
    
```

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1237 *
1238 * THIS ROUTINE FINDS THE LEAST VALUABLE PAGE.
1239 *
1240 * THE ROUTINE MAY BE CALLED WITH THE INTERRUPTS CN, BUT
1241 * MUST ALWAYS BE CALLED ON LEVEL ONE.
1242 * INTERRUPTS WILL BE OFF ON RETURNING.
1243 * ENTER WITH THE RETURN ADDRESS IN INDEX X2.
1244 *
1245 * THE LEAST VALUABLE PAGE NUMBER WILL BE
1246 * LEFT IN LOWVALPN AND X1. IF NO PAGE WAS FREE, LOWVALPN
1247 * WILL BE ZERO.
1248 *
*****

```

```

01330 47203342 P 1250
1251 PAGEVALU STI PVALEXIT,X2 SAVE RETURN ADDRESS
01331 01331 P 1252
1253 PVAL08 EQU *
1254 LEVELC
01334 24077777 X 1255
1256 LCA BIT23
01335 40003340 P 1257 STA PAGEAGE INITIAL VALUE FOR PAGEAGE
01336 47003341 P 1258 STI LOWVALPN,0 INITIAL VALUE FOR LOW VAL P N
1259
01337 14177777 X 1260 ENI NPAGESM1,X1 NUMBER OF PAGES MINUS ONE
1261
01340 20101322 X 1262 PVAL10 LDA PAGETABL,X1 GET THE PAGETABL ENTRY
01341 03301366 P 1263 AZJ,LT PVAL14 JUMP IF SYSTEM PAGE
01342 53700000 1264 TAI X3 SAVE LOCATION OF PAGE ACCESS WORD
01343 12077752 1265 SHA 3-24 GET UPPER OCTAL DIGIT
01344 21100736 X 1266 LDQ PAGETIME,X1 GET PAGE AGE
01345 53600000 1267 TAI X2
01346 01201347 P 1268 UJP *+1,X2 JUMP DECODE ON UPPER OCTAL DIGIT
1269
01347 01001400 P 1270 UJP PVAL18 0 = UNUSED PAGE
01350 01001375 P 1271 UJP PVAL16 1 = SYSTEM PURE PAGE
01351 15500000 1272 INQ,S 2 = USER PURE PAGE
01352 17377600 1273 ANI 77600B,X3 3 = USER IMPURE PAGE
1274 * X3 IS PSA POINTER
01353 20301044 X 1275 LDA IOBOUND,X3+PSA A IS PAGE OWNER'S STATUS
01354 03301362 P 1276 AZJ,LT PVAL12 JUMP IF NEGATED (ACTIVE)
01355 17401002 X 1277 ANA,S NKBITS EXAMIN TERMINAL WAIT BITS
01356 03001362 P 1278 AZJ,EQ PVAL12 JUMP IF NOT TERMINAL WAIT
01357 17601021 X 1279 ANA DELAY
01360 03101402 P 1280 AZJ,NE PVAL20
01361 15566167 1281 INQ,S -5000 CORE IS NOT ACTIVE, -5 SECONDS
01362 20003340 P 1282 LDA PAGEAGE GET PREVIOUS CLOEST PAGE DATE
01363 03701366 P 1283 AQJ,LT PVAL14 JUMP IF THIS PAGE IS NOT OLDER
01364 41003340 P 1284 STQ PAGEAGE SAVE DATE OF LOW-VALUE PAGE
01365 47103341 P 1285 STI LOWVALPN,X1 SAVE NUMBER OF LOW-VALUE PAGE
01366 02501340 P 1286 PVAL14 IJO PVAL10,X1 EXAMINE NEXT PAGE
1287
01367 54103341 P 1288 LDI LOWVALPN,X1
1289 PVAL15 EQU *
01370 77730000 1290 VFD A12/DINT
01371 20101340 X 1291 LDA PAGETABL,X1
01372 04100000 1292 ISE 0,X1 SKIP IF NO PAGE FOUND
01373 03301331 P 1293 AZJ,LT PVAL08 SINCE THE INTERRUPTS WERE ON,
1294 * A PAGE MAY HAVE BEEN STOLEN FOR
1295 * FOR FREE STORAGE EXPANTION.
01374 01003342 P 1296 UJP PVALEXIT
1297
01375 20003335 P 1298 PVAL16 LDA FPCNT SYSTEM PURE CODE PAGE IF HERE
01376 03301366 P 1299 AZJ,LT PVAL14 JUMP IF NCT ENOUGH PURE PAGES
01377 01001362 P 1300 UJP PVAL12
1301
01400 20003335 P 1302 PVAL18 LDA FPCNT FOUND A FREE PAGE IF HERE
01401 03301366 P 1303 AZJ,LT PVAL14 JUMP IF FREE PAGE NEEDED
01402 47103341 P 1304 PVAL20 STI LOWVALPN,X1 FOUND FREE PAGE
01403 01001370 P 1305 UJP PVAL15 DONE, EXIT

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*****
1309 *
1310 *
1311 *          PAGETABL ENTRIES
1312 *
1313 *          THE PAGETABL CONSISTS OF A ONE WORD ENTRY FOR EACH
1314 *          PHYSICAL MEMORY PAGE (2046 WORDS).  EACH ENTRY DESCRIBES
1315 *          THE USE OF THE CORESPONDING PAGE OF MEMCRY.
1316 *
1317 *          0000 0000 THE PAGE IS NOT USED.
1318 *
1319 *          100X XXXX THE PAGE IS A SYSTEM PURE PAGE WITH MEMORY
1320 *          PROTECTION SO THAT MORE THAN ONE USER MAY BE
1321 *          USING THE PAGE FOR MEMORY.  XXXXX POINTS TO AN
1322 *          ENTRY IN LISTAB WHICH CONTAINS A PAGE ACCESS
1323 *          WORD.
1324 *
1325 *          200X XXXX THE PAGE IS A USER PURE PAGE WITH NO MEMORY
1326 *          PROTECTION.  XXXXX IS A POINTER TO THE USERS
1327 *          VIRTUAL MEMORY ENTRY (ALSO A PAGE ACCESS WORD).
1328 *
1329 *          300X XXXX THE PAGE IS A USER IMPURE PAGE WITH A FORMAT
1330 *          THE SAME AS FOR 200X XXXX.
1331 *
1332 *          4000 0000 SYSTEM PAGE CONTAINING EITHER RESIDENT PROGRAMS OR
1333 *          RESIDENT LINKED LIST (FREE STORAGE).  ALSO USED
1334 *          WHEN THE PAGE IS BEING SWAPPED EITHER IN OR OUT.
1335 *
1336 *          400X XXXX XXXXX IS A POINTER TO THE FIRST OF FOUR 4-WORD
1337 *          F. C. LIST ENTRIES.  THE PAGE IS USED AS FOUR
1338 *          FILE-CORE BLOCKS (512 WORD I/O BUFFERS) WHICH
1339 *          ARE DESCRIBED BY THE 4 F. C. LIST ENTRIES.
1340 *
1341 *
1342 *          VIRTUAL MEMORY MAP (VMM)
1343 *
1344 *          EACH USER HAS A VIRTUAL MEMORY MAP IN HIS PROGRAM STATUS
1345 *          AREA (PSA).  EACH USERS VMM CONTAINS 32 1-WORD ENTRIES.
1346 *          EACH ENTRY DESCRIBES THE PHYSICAL LOCATION OF ONE PAGE
1347 *          (2048 WORDS) OF MEMCRY.  THE ENTRIES HAVE THE FOLLOWING
1348 *          FORMS..
1349 *
1350 *          0000 0XXX THE PAGE IS IN PHYSICAL CORE.  IT IS A PRIVATE
1351 *          ALTERED PAGE WITH NO MEMORY PROTECTION.
1352 *          XXX IS THE PHYSICAL CORE PAGE NUMBER.
1353 *
1354 *          0000 1XXX THE PAGE IS IN PHYSICAL CORE.  IT IS A PRIVATE
1355 *          UNALTERED PAGE WITH TEMPORARY MEMCRY PROTECTION.
1356 *          XXX IS THE PHYSICAL CORE PAGE NUMBER.
1357 *
1358 *          2000 0000 THE PAGE IS A ZEROPAGE.  THE PAGE DOES NOT
1359 *          OCCUPY PHYSICAL MEMORY OR MASS STORAGE.
1360 *          IF THESE ADDRESSES ARE REFERENCED BY A USER,
1361 *          A PAGE CONTAINING ZEROS WILL BE GIVEN TO
1362 *          THE USER.
1363 *
1364 *          2XXX XXXX THE PAGE IS IN MASS STORAGE.  XXXXXXXX IS THE
1365 *          MASS STORAGE FILE BLOCK ADDRESS.
1366 *
1367 *          3XXX XXXX THE PAGE IS IN MASS STORAGE MEMORY, HOWEVER, A
1368 *          PARITY ERROR OCCURED WHILE MOVING THE PAGE.
1369 *
1370 *          400X XXXX THE PAGE IS A PURE CODE PAGE WITH MEMORY
1371 *          PROTECTION SO THAT MORE THAN ONE USER MAY BE USING
1372 *          THE PAGE FOR MEMORY.  THE XXXXX IS A POINTER
1373 *          WHICH POINTS TO A TWO WORD PAIR (PAGE ACCESS
1374 *          WORD) IN LISTAB.
1375 *
1376 *
1377 *          PAGE ACCESS WORD
1378 *
1379 *          THE PAGE ACCESS WORD IS USUALLY AN ENTRY IN THE USERS
1380 *          VIRTUAL MEMORY.  HOWEVER, SYSTEM PURE CODE PAGES HAVE
1381 *          PAGE ACCESS WORDS THAT RESIDE IN LISTAB AND HAVE A SLIGHTLY
1382 *          DIFFERENT FORMAT.  THESE PAGE ACCESS WORDS ARE POINTED
1383 *          TO WITH 400X XXXX ENTRIES IN THE USERS VMM.
1384 *
1385 *          0000 1XXX THE PAGE IS IN PHYSICAL CORE (AS WELL AS ON MASS
1386 *          STORAGE) AND HAS THE PAGE ADDRESS OF XXX.

```



```
1387 *
1388 * 2XXX XXXX THE PAGE IS IN MASS STORAGE. XXXXXXXX IS THE MASS
1389 * STORAGE FILE BLOCK ADDRESS OF THE FIRST WORD.
1390 *
1391 * 100X XXXX THE PAGE EXISTS ONLY IN MASS STORAGE. HOWEVER, A
1392 * REQUEST FOR THE PAGE HAS ALREADY BEEN MADE AND
1393 * XXXXX IS A POINTER TO A LINKED CHAIN CONTAINING
1394 * ADDRESS OF USERS PSA#S WHICH HAVE REQUESTED THE PAGE.
1395 *
1396 *
```

\*\*\*\*\*

1400  
1401  
1402  
1403  
1404

\*\*\*\*\*  
\*  
\* HERE A PAGE IS MADE AVAILABLE INORDER TO PROCESS \*  
\* AN ITEM IN THE SWAP QUEUE. IF NECESSARY, THE \*  
\* PAGE WILL BE SWAPPED OUT TO THE DISK. \*  
\*\*\*\*\*

1406

01404 01404 P  
01405 77740000  
01406 14201407 P  
01407 01001330 P  
01408 54203341 P  
01409 05200001  
01410 01003055 P  
01411 14600001  
01412 34003060 P  
01413 53200000  
01414 00703251 P  
01415 20201371 X  
01416 53700000  
01417 12077752  
01418 53500000  
01419 01101423 P  
01420 01001473 P  
01421 01001470 P  
01422 01001470 P  
01423 14300002  
01424 00703104 P  
01425 25001466 P  
01426 45300000  
01427 53200000  
01428 21201416 X  
01429 45300002  
01430 15300001  
01431 20201323 X  
01432 21003320 P  
01433 03601450 P  
01434 54103343 P  
01435 10177777 X  
01436 14000000  
01437 47103343 P  
01438 15177777 X  
01439 14200004  
01440 00777777 X

1407  
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1442  
1443  
1444  
1445

SWAPER10 EQU \*  
VFD A12/EINT  
ENI \*+2,X2  
UJP PAGEVALU  
LDI LOWVALPN,X2  
ISG 1,X2  
UJP SWAPEXIT  
ENA 1  
RAD SWAPNUMB  
TIA X2  
RTJ PAGEZAP  
LOA PAGETABL,X2  
TAI X3  
SHA 3-24  
TAI X1  
UJP \*+1,X1  
UJP SWAPER32  
UJP SWAPER30  
UJP SWAPER30  
ENI 2,X3  
RTJ GETMEM  
LDAQ SWAPRTN1  
STAQ 0,X3  
TIA X2  
LDQ PAGETABL,X2  
STAQ 2,X3  
INI 1,X3  
LDA PAGEMSA,X2  
LDQ LIBLAD  
AQJ,GE SWAPER16  
LDI LSWAPUNT,X1  
ISI NSWAPUNT,X1  
NOP  
STI LSWAPUNT,X1  
INI FSWAPUNT,X1  
ENI FBPP,X2  
RTJ GETBLK

FIND LEAST VALUABLE PAGE  
GET LOW VALUE PAGE NUMBER  
SKIP IF A PAGE FOUND  
ONE MORE REQUEST IN PROCESS  
KILL THE PAGE IF CURRENTLY USED  
GET THE PAGETABL ENTRY  
PAGE ACCESS WORD LOCATION  
GET UPPER OCTAL DIGIT  
SET UP FOR JUMP DECODE TABLE  
JUMP DECODE  
0 = UN-USED PAGE  
1 = SYSTEM PURE PAGE  
2 = USER UNALTERED PAGE  
3 = USER IMPURE PAGE  
GET 4 WORD BLOCK  
SET UP TO WRITE OUT PAGE  
RETURN LINKAGE FROM DISKCOP  
PAGE NUMBER  
VMM ADDRESS  
COMPLETION ADDRESS IN X3  
GET THE MASS STORAGE ADDRESS  
JUMP IF DISK ADDRESS IN A  
GET LAST SWAPUNIT  
NUMBER OF SWAP UNITS MINUS ONE  
ADD FIRST SWAP UNIT NUMBER  
ASK FOR A PAGE



```

1477 *
1478 *
1479 *
*****
*
*   HERE WE PROCESS THE NEXT ITEM OF THE SWAP QUEUE
*
*****
1481
1482 SWAPER30 EQU *
1483 LDA PAGEMSA,X2 GET MASS STORAGE ADDRESS
1484 SSA BIT22 BIT 22 SEZ PAGE NOT IN CORE
1485 STA 0,X3 PUT INTO PAGE ACCESS WORD
1486
1487 * AN AVAILABLE PAGE HAS BEEN FOUND.
1488 * THE PAGE NUMBER IS IN LOWVALPN.
1489 * THE INTERRUPTS MUST BE OFF AND LEVEL ONE IS A MUST.
1490
1491 SWAPER32 EQU *
1492 ENA,S -1
1493 ISG 2,X1 SKIP IF USER PURE CODE
1494 RAD 2,PCNT INDICATE ONE LESS FREE PAGE
1495 SWAPER34 EQU *
1496 LEVELC
1497 DINTC
1498 LDI LOWVALPN,X1 GET FREE PAGE NUMBER
1499 LDA PAGETABL PAGE ZERO IS ALWAYS SYSTEM
1500 STA PAGETABL,X1 MARK THIS PAGE AS SYSTEM
1501
1502 LDI RMSWAPQ,X3 CHECK THE SECONDARY QUEUE
1503 ISG 1,X3
1504 UJP SWAPER42 SECONDARY QUEUE EMPTY
1505 LDA 0,X3 TAKE A NODE FROM SECONDARY QUEUE.
1506 SWA RMSWAPQ
1507 UJP SWAPER50
1508
1509 SWAPER42 EQU *
1510 LDI PTSWAPQ,X3 CHECK OUT MAIN QUEUE.
1511 ISE PTSWAPQ,X3 SKIP IF EMPTY
1512 UJP SWAPER48
1513
1514 LDI LOWVALPN,X1 GET UN-USED PAGE NUMBER
1515 ENA 0
1516 STA PAGETABL,X1 INDICATE A FREE PAGE
1517 ENA 1
1518 RAD 1,PCNT INDICATE ANOTHER FREE PAGE
1519 UJP SWAPER68 LEAVE.
1520
1521 SWAPER48 EQU *
1522 LDQ 0,X3 MAIN Q IS NOT EMPTY
1523 LDL BIT17 REMOVE AND PROCESS 1ST ITEM
1524 ASG,S 1 SKIP IF THIS IS NOT THE ONLY NODE
1525 ENQ PTSWAPQ
1526 STQ PTSWAPQ
1527
1528 SWAPER50 EQU *
1529 VFD A12/EINT
1530
1531 * X3 POINTS TO THE REQUEST BLOCK
1532 * AND LOWVALPN CONTAINS A FREE PAGE NUMBER
1533
1534 LDAQ SWAPRTN2
1535 STAQ 0,X3 SETUP RETURN LINKAGE FROM DISKOP
1536
1537 * THE CONTENTS OF THE REQUEST BLOCK IS..
1538
1539 * WORD 0 RTJ SWAPER2 ERROR RETURN FROM DISKOP
1540 * WORD 1 RTJ SWAP2 NORMAL RETURN
1541 * WORD 2 VFD A9/0,A15/VMM-POINTER
1542 * WORD 3 VFD A24/MASS-STORAGE-ADDRESS
1543 * WORD 3 GETS CHANGED TO..
1544 * WORD 3 VFD A6/0,A18/CORE-ADDRESS
1545
1546 LDI LOWVALPN,X2 GET THE FREE PAGE NUMBER
1547 TIA X2
1548 ENQ 0
1549 SHAQ -13 Q CONTAINS THE 18 BIT CORE ADDRES
1550 LDA 2,X3 GET THE VMM PCINTER
1551 AZJ,LT SWAPER53 JUMP IF A PAGE REQUEST
1552 LDA 3,X3 GET THE MASS STORAGE ADDRESS
1553 STQ 3,X3 SAVE THE CORE ADDRESS
1554 LPA VMMASK REMOVE TOP OCTAL DIGIT

```



1585  
1586  
1587  
1588  
1589  
1590

```

*****
*
* THIS ROUTINE IS CALLED WHEN A USER FIRST REFERENCES
* A ZEROPAGE. THIS ROUTINE FILLS THE PAGE WITH ZEROS
* NOT ALLOWING THE USER TO EXAMINE SOME OTHER USERS
* MEMORY.
*
*****
    
```

		1592				
		1593	SWAPZP	EQU	*	
		1594		TIA	X2	PHYSICAL PAGE NUMBER TO A
		1595		SHA	2	
		1596		APF	PFLOC+PFW	POINT PAGE FILE 1 AT THE PAGE
		1597		SHAQ	-48	ZERO A AND Q
		1598		ENI	7768,X2	
		1599		STAQ	CORE+0000B,X2	ZERO EIGHT WORDS...
		1600		STAQ	CORE+1000B,X2	...IN 14 CORE CYCLES.
		1601		STAQ	CORE+2000B,X2	
		1602		STAQ	CORE+3000B,X2	
		1603		ISD	0,X2	
		1604		IJD	*-5,X2	
		1605		VFD	A12/DINT	
		1606		TIA	X3	MOVE REQUEST BLOCK POINTER...
		1607		TAI	X2	...TO INDEX 2.
		1608				
		1609	SWAPER54	EQU	*	
		1610		LEVELC		
		1611		DINTC		
		1612		LDA,I	2,X2	GET VMM WORD
		1613		AZJ,GE	SWAPER64	JUMP IF NOT SYSTEM PURE CODE
		1614		TAI	X1	
		1615		LDA	0,X1	GET LIBTAB WORD
		1616				
		1617	*	FORMAT OF THE PURE CODE 2-WORD LINK LIST IS..		
		1618	*	WORD 0	VFD	A9/0,A15/PSA-POINTER
		1619	*	WORD 1	VFD	A9/0,A15/POINTER TO NEXT, OR ZERO
		1620				
		1621	SWAPER60	EQU	*	
		1622		TAI	X1	
		1623		ISG	1,X1	
		1624		UJP	SWAPER62	JUMP IF CHAIN PROCESSED
		1625		LDA	0,X1	FIND USERS WAITING FOR...
		1626		TAI	X3	...THIS PAGE TO BE SWAPPED IN.
		1627		ENA,S	NMSWAIT	CLEAR THE MASS STORAGE WAIT.
		1628		RAD	IOBOUND,X3	
		1629		TIA	X1	ADDRESS OF BLOCK TO FREE
		1630		ENI	1,X3	INDICATE 2 WORDS
		1631		RTJ	FREEMEM	
		1632		LDA	1,X1	ADDRESS OF NEXT 2 WORD ELEMENT
		1633		UJP	SWAPER60	
		1634				
		1635	SWAPER62	EQU	*	
		1636		ENA	1	
		1637		RAD	FPONT	INDICATE ONE MORE FREE PAGE
		1638				
		1639	SWAPER64	EQU	*	
		1640				
		1641		VFD	A12/EINT	
		1642		LDAQ	2,X2	VMM POINTER, 18 BIT CORE ADDRESS
		1643		TAI	X1	GET THE VMM POINTER
		1644		LDA	0,X1	GET THE VMM WORD
		1645		AZJ,GE	*+2	JUMP IF NOT SYSTEM PURE CODE
		1646		TAI	X1	PUT PAGE ACCESS POINTER IN X1
		1647		ENA	0	
		1648		SHAQ	24-11	GET THE PAGE NUMBER
		1649		TAI	X3	PAGE NUMBER IS PUT INTO X3
		1650		XOA	1000B	INDICATE PURE PAGE
		1651		STA	0,X1	SET UP PAGE ACCESS WORD
		1652		LDQ	BIT22	USER PURE PAGE
		1653		LDA,I	2,X2	GET VMM WORD
		1654		ASG,S	0	SKIP IF USER PAGE
		1655		LDQ	BIT21	MAKE INTO SYSTEM PURE PAGE
		1656		TIA	X1	PAGE ACCESS WORD POINTER
		1657		AQA		NEW PAGETABL WORD IS FORMED IN A
		1658		VFD	A12/DINT,A12/0	
		1659	SWAPER65	EQU	*	
		1660		STA	PAGETABL,X3	
		1661		TMA	CLOCK	
		1662		ADA	HOUR	





```

01705 54103323 P 1688 ** TIME INTERRUPT: A QUANTUM IS FINISHED.
01706 14600000 1689 RMTIMEUP LDI RPSAPTR,X1 POINT TO THE RUNNING USER.
01707 40177777 X 1690 ENA 0
01710 42015560 P 03334 0 1691 STA TIMELEFT,X1+PSA SAY THIS USER HAS NO TIME LEFT.
01711 14601672 X 1692 SACH XFLAG SAY WE GOT THE INTERRUPT.
01712 35001674 X 1693 ENA SWBIT SWITCH USERS.
01713 40001712 X 1694 SSA FLAGS
01714 01300000 1695 STA FLAGS
1696 UJP 0,X3
1697
01715 01715 P 1698 SWITCH EQU * COME HERE TO SWITCH USERS.
01715 00502250 P 1699 SJ5 RUNIDLE
01716 20003334 P 1700 LDA XFLAG
01717 03201724 P 1701 AZJ,GE SWITCHX JUMP IF WE GOT THE LAST SWITCHING
01720 20002303 P 1702 LDA TIMEUP INTERRUPT. SUPPRESS IT IF NOT.
01721 00777777 X 1703 RTJ TIMEKILL
01722 54203323 P 1704 LDI RPSAPTR,X2
01723 40201707 X 1705 STA TIMELEFT,X2+PSA
01724 53130035 1706 SWITCHX TMI NU,X1 GET THE NUMBER OF USERS.
01725 20003314 P 1707 LDA INHIBIT
01726 17600205 1708 ANA FSWAITB+DISKIBT+RUNIBIT CHECK BITS OF INTEREST.
01727 03102250 P 1709 AZJ,NE RUNIDLE
01730 10003356 P 1710 SSH SFLAG SKIP IF SCHEDULING NOT NEEDED
01731 01001754 P 1711 UJP SCHED PROCEED TO DO CORE SCHEDULING
01732 14200000 1712 ENI 0,X2 COUNT READY USERS IN X1.
01733 54303334 P 1713 LDI XFLAG,X3+PSA GET LAST USER'S PSA
01734 05300001 1714 ISG 1,X3+PSA SKIP IF WE ARE POINTING AT A PSA.
01735 54703323 P 1715 LDI,I RPSAPTR,X3+PSA START THE NEXT USER IF NOT.
01736 20301670 X 1716 RMSW3 LDA IOBOUND,X3+PSA
01737 03201741 P 1717 AZJ,GE **2
01740 17677777 X 1718 ANA NBITS EXAMINE ONLY NBITS IF NEGATED
01741 03101750 P 1719 AZJ,NE RMSW4 JUMP IF THIS USER IS I/O BOUND.
01742 15200001 1720 INI 1,X2 INCREMENT COUNT OF UNBOUND
1721 * USERS WE HAVE LOOKED AT.
01743 05200002 1722 ISG 2,X2 SKIP IF THIS IS NOT THE FIRST.
01744 47303331 P 1723 STI XTEMP,X3+PSA REMEMBER HIM IF HE IS.
01745 20301723 X 1724 LDA TIMELEFT,X3+PSA
01746 14777777 X 1725 ENQ MQUANTUM
01747 03602310 P 1726 AQJ,GE RMSW8 JUMP IF ENOUGH TIME LEFT.
01750 20300000 1727 RMSW4 LDA 0,X3+PSA LOOK AT THE NEXT USER.
01751 53700000 1728 TAI X3+PSA
01752 02501736 P 1729 IJD RMSW3,X1 LOOP THROUGH ALL THE USERS.
01753 02602304 P 1730 IJO RMSW1,X2 JUMP IF ANY USER NOT IOBOUND.

```

```

1734 *
1735 * THIS CODE CONVERTS PAGES TO FILE CORE BLOCKS AND FILE CORE
1736 * BLOCKS TO PAGES. USER DELAYING IS ALSO CONTROLLED IN THIS
1737 * SECTION. THE CODE IS ENTERED BEFORE RUNNING IDLE OR WHEN
1738 * IDLE IS NOT RUN AND 12 USER SWITCHES OCCURE.
1739 *
*****

```

```

01754 01754 P
01754 77740000
01755 53020022
01756 30001662 X
01757 15474057
01760 40003344 P
1741
1742 SCHED EQU *
1743 VFD A12/EINT
1744 TMA CLOCK
1745 ADA HOUR COMPUTE EMPTY AGE REFFERENCE TIME
1746 INA,S -2000 TWO SECCNDS
1747 STA AGE LIMIT
1748

```

```

1750 *
1751 * HERE WE COMPUTE THE NUMBER OF LOW-VALUED PAGES.
1752 *
*****

```

```

01761 47003346 P
01762 14101337 X
01763 20101660 X
01764 03302011 P
01765 53700000
01766 12077752
01767 21101663 X
01770 53600000
01771 01201772 P
01772 01002026 P
01773 01002027 P
01774 15500000
01775 17377600
01776 20301736 X
01777 03302005 P
02000 17401355 X
02001 03002005 P
02002 17601357 X
02003 03102007 P
02004 15566167
02005 20003344 P
02006 03702017 P
02007 14600001
02010 34003346 P
02011 02501763 P
1754
1755 STI EPAGECNT,0 START WITH ZERO
1756 ENI NPAGESM1,X1 NUMBER OF PAGETABL ENTRIES - 1
1757 SVAL10 LDA PAGETABL,X1 GET PAGETABL ENTRY
1758 AZJ,LT SVAL14 JUMP IF SYSTEM PAGE
1759 TAI X3 SAVE VMM PCOUNTER
1760 SHA 3-24 GET UPPER 3 BITS
1761 LDQ PAGETIME,X1 GET LAST REFFERENCED TIME
1762 TAI X2 PAGE USEAGE CODE TO X2
1763 UJP *+1,X2
1764 UJP SVAL18 0 = UNUSED PAGE
1765 UJP SVAL16 1 = SYSTEM PURE PAGE
1766 INQ,S 0 2 = USER PURE PAGE
1767 ANI 77600B,X3 3 = USER IMPURE PAGE
1768 LDA IOBOUND,X3+PSA GET IOBOUND STATUS
1769 AZJ,LT SVAL12 JUMP IF NEGATED
1770 ANA,S NKBITS LOOK AT TERMINAL WAIT BITS
1771 AZJ,EQ SVAL12 JUMP IF NOT IN TERMINAL WAIT
1772 ANA DELAY
1773 AZJ,NE SVAL13
1774 INQ,S -5000 DEDUCT 5 SEC FOR BEING I/O BOUND
1775 LDA SVAL12 AGE LIMIT
1776 AQJ,LT SVAL15 JUMP IF VALUABLE
1777 SVAL13 ENA 1
1778 RAD EPAGECNT ANOTHER WORTHLESS PAGE
1779 SVAL14 IJD SVAL10,X1 JUMP IF MORE ENTRIES
1780
1781 LDQ AGE LIMIT
1782 ENI 0,X2 NUMBER OF EMPTY PAGES IN X2
1783 VFD A12/DINT
1784 LDI FCLIST,X3 GET START OF FC LIST
1785 UJP SCV04
1786
1787 SVAL15 TIA X3+PSA
1788 SCA PRTYPSA DO NOT BILL THE PRIORITY
1789 AZJ,EQ SVAL14 FOR HIS PAGES
1790 LCA UDBITS,X3+PSA GET THE USERS PAGE VALUE
1791 ANA 7B GET THE VALUE OF HIS MEMORY
1792 RAD PAGEREQ,X3+PSA ADD ONE TO THE OWNERS PAGECNT
1793 UJP SVAL14
1794
1795 SVAL18 ENQ 0 UNUSED PAGE HAS NO AGE
1796 SVAL16 LDA FPCNT NUMBER OF FREE PAGES
1797 AZJ,LT SVAL14 JUMP IF NOT ENOUGH FREE PAGES
1798 ENI IDLE,X3+PSA SAY IDLE OWNES THE PAGE
1799 UJP SVAL12
1800
1801
1802

```

```

1804 *
1805 * HERE WE COMPUTE THE NUMBER OF LOW-VALUE FILE CORE BLOCKS.
1806 *
*****

```

```

02033 20300000
02034 03302052 P
02035 12000001
1808
1809 SCV01 LDA FCS,X3 GET STATUS
1810 AZJ,LT SCV03 JUMP IF I/O IN PROGRESS
1811 SHA 1 GET RESERVED BIT

```

02036	03302051	P	1812		AZJ,LT	SCV02	JUMP IF RESERVED
02037	12077757		1813		SHA	-16	GET ALTERED AND OCCUPIED BITS
02040	53500000		1814		TAI	X1	PUT A INTO X1
02041	17100003		1815		ANI	3B,X1	
02042	20300003		1816		LDA	FCS,X3	
02043	05100002		1817		ISG	2,X1	SKIP IF OCCUPIED
02044	03302050	P	1818		AZJ,LT	SCV06	JUMP IF A FREE BLOCK FOUND
02045	20300001		1819		LDA	FCT,X3	GET THE LAST REFERENCE TIME
02046	30177777	X	1820		ADA	VALUE,X1	BIAS THE TIME WITH ALTERED AND...
02047	03602051	P	1821		AQJ,GE	SCV02	...OCCUPIED. JUMP IF NOT OLDER
02050	15200001		1822	SCV06	INI	1,X2	INCREMENT NUMBER OF F. FC BLOCKS
02051	20300000		1823	SCV02	LDA	FCS,X3	GET ADDRESS OF NEXT FC LIST EL.
02052	53700000		1824	SCV03	TAI	X3	
02053	04300000		1825	SCV04	ISE	0,X3	SKIP IF LAST ELEMENT
02054	01002033	P	1826		UJP	SCV01	
			1827				
02055	77740000		1828		VFD	A12/EINT	

```

1831 *
1832 *
1833 * THE TOTAL NUMBER OF LOW VALUE PAGES IS ADJUSTED TO REFLECT
1834 * THE LENGTH OF THE SWAP QUEUE.
1835 * THE TOTAL NUMBER OF LOW VALUE FILE BLOCKS IS ADJUSTED TO
1836 * COMPENSATE FOR LARGE NUMBER OF FILE BLOCKS BEING RE-WRITEN
1837 * AND THE NUMBER OF AVAILABLE PAGES.

```

Address	Code	Label	Value	Description
02056	P	LDA	SWAPNUMB	SWAPS IN PROGRESS
02057	P	SBA	QCOUNT	LENGTH OF SWAP QUEUE
02060		SHA	9	EXTEND SIGN
02061		SHA	-9	A= - FUTURE PAGE DEMAND
02062		TAM	17B	
02063	P	ADA	EPAGECNT	AVAILABLE PAGES-DEMAND FOR PAGES
02064	P	AZJ,GE	*+2	JUMP IF POSITIVE
02065		ENA	0	NEGATIVE NOT LEGAL
02066	P	STA	EPAGECNT	
02067	P	LCA	EPAGECNT	
02070		SHA	1	ALLCW 2 FCB PER FREE PAGE
02071	X	ADA	RTNCOUNT	
02072		INA,S	-8	THIS MAY LIMIT RTNCOUNT WHEN...
02073	P	AZJ,GE	*+2	...EPAGECNT IS SMALL
02074		ENA	0	
02075		AIA	X2	ADD IN NUMBER OF EMPTY FC BLOCKS
02076		SHA	-2	DIVIDE BY 4 (PAGES)
02077	P	AZJ,GE	*+2	NEGATIVE NUMBERS SUPPRESSED HERE
02100		ENA	0	
02101	P	STA	EFCCOUNT	
02102	P	LDA	EPAGECNT	
02103	P	LDQ	EFCCOUNT	
02104		SHQ	12	
02105		SHAQ	12	
02106		TAM	7B	



1867  
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1872

\*\*\*\*\*  
\*  
\* THE DIFFERENCE BETWEEN THE NUMBER OF LOW VALUE PAGES AND  
\* LCW VALUE FILE CORE BLOCKS IS EXAMINED TO DETERMIN  
\* WHEN TO CONVERT PAGES TO FILE CORE BLOCKS AND WHEN TO  
\* CONVERT FILE CORE BLOCKS TO PAGES.  
\*  
\*\*\*\*\*

02107 14100003  
02110 20003346 P  
02111 05400002  
02112 15177775  
02113 20003347 P  
02114 05400002  
02115 15177776  
02116 22415624 P 03345 0  
02117 15477776  
02120 34003350 P  
  
02121 21003350 P  
02122 53410016  
02123 14600004  
02124 05500062  
02125 14600000  
02126 77300000  
02127 05500024  
02130 01002220 P  
02131 34003351 P

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ENI 3,X1  
LDA EPAGECNT  
ASG,S 2  
INI -2,X1  
LDA EFCCOUNT  
ASG,S 2  
INI -1,X1  
LACH FCPT,X1  
INA,S -1  
RAD FCPAGELV  
  
LQJ FCPAGELV  
TQM 168  
ENA 4  
QSG,S 50  
ENA 0  
VFD A12/DINT  
QSG,S 20  
UJP CSD4  
RAD NRESB

NUMBER OF UN-USED PAGES  
SKIP IF MORE THAN 1 UN-USED PAGE  
PAGES ARE VALUABLE, NOTE IT.  
NUMBER OF UN-USED FC BLOCK PAGES  
SKIP IF MORE THAN 1  
FC BLOCKS ARE VALUABLE, NOTE IT.  
GET THE SOLUTION TO THIS PROBLEM  
A MAY BE 1, 0, OR -1.  
FC TO PAGE LEVEL  
  
GET FC TO PAGE EQUILIBRIUM  
  
RESERVE 4 MORE BLOCKS  
  
RESERVE NO FC BLOCKS  
  
DO NOT CONVERT FC TO PAGES  
INCREASE NUMBER OF FC BLOCKS...  
...TO RESERVE

1898  
1899  
1900  
1901  
1902

\*\*\*\*\*  
\*  
\* HERE WE ATTEMPT TO CONVERT FILE CORE BLOCKS TO PAGES.  
\* FILE CORE BLOCKS MAY BE RESERVED FOR CONVERSION TO A  
\* PAGE IF NECESSARY.  
\*  
\*\*\*\*\*

02132 54203351 P  
02133 14302015 X  
02134 47303352 P  
02135 47003353 P  
02136 20300000  
02137 53700000  
02140 05600001  
02141 01002244 P  
02142 20300000  
02143 35001651 X  
02144 10600000  
02145 40300000  
02146 03302157 P  
02147 37077777 X  
02150 03002160 P  
02151 05200001  
02152 01002157 P  
02153 20300002  
02154 53500000  
02155 25100002  
02156 00777777 X  
02157 47303353 P  
02160 10003354 P  
02161 01002136 P  
02162 54103353 P  
02163 02502134 P

1904  
1905  
1906  
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1933  
1934

LDI NRESB,X2  
ENI FCLIST,X3  
STI TEMP6,X3  
STI FCBBUSY,0  
LDA FCS,X3  
TAI X3  
ASG 1  
UJP ESCHED  
LDA FCS,X3  
SSA RESERVED  
ISD 0,X2  
STA FCS,X3  
AZJ,LT FTP06  
LPA ALT  
AZJ,EQ FTP08  
ISG 1,X2  
UJP FTP06  
LDA FCA,X3  
TAI X1  
LDAQ COREP,X1  
RTJ REWRITE  
STI FCBBUSY,X3  
SSH EPFLAG  
UJP FTP04  
LDI FCBBUSY,X1  
IJD FTP02,X1

NUMBER OF FC BLOCKS TO RESERVE  
GET POINTER TO START OF F.C. LIST  
POINTER TO FIRST OF 4 CONSECUTIVE  
FILE CORE BLOCKS.  
FCS POINTS TO NEXT FC LIST EL.  
  
SKIP IF NOT END OF F.C. LIST  
GO TO RUNIDLE  
GET STATUS OF F.C. BLOCK  
SET THE RESERVED BIT IF...  
...X2 IS NOT ZERO  
  
JUMP IF I/O IN PROGRESS  
CHECK THE ALTERED BIT  
JUMP IF NOT ALTERED  
SKIP IF RESERVED BIT IS SET  
JUMP IF NOT RESERVED  
WE HAVE DECIDED TO REWRITE THE...  
...FILE CORE BLOCK.  
  
INDICATE THE FCB NOT AVAILABLE  
SKIP IF 4 FCB'S EXAMINED  
LOOK AT THE REST OF THE PAGE  
GET THE FCB BUSY FLAG  
JUMP IF ANY FCB WAS BUSY

1935  
1936  
1937  
1938  
1939  
1940  
1941  
1942  
1943  
1944

\* A PAGE HAS BEEN FOUND. THE FC LIST ELEMENTS MUST BE FREED  
  
ENI CRESERVE  
SWA SWAPPC  
LDA FCS,X3  
LDI,I TEMP6,X1  
SWA,I TEMP6  
LDA FCS,X1  
SWA TEMP6  
LPA OCC  
AZJ,EQ FTP12  
LDA FCA,X1

CLEAR RESERVE  
RETURN ADDRESS  
HERE WE UNLINK THE FOUR  
...F C LIST ELEMENTS FROM  
...THE F C LIST.  
GET THE STATUS AND NEXT POINTER  
SAVE THE POINTER  
CHECK THE OCCUPIED BIT  
JUMP IF NOT OCCUPIED

02164 14602222 P  
02165 44003057 P  
02166 20300000  
02167 54503352 P  
02170 44403352 P  
02171 20100000  
02172 44003352 P  
02173 37077777 X  
02174 03002201 P  
02175 20100002

Address	Hex	Mode	Page	Schedulr	Page/File	Core-Block	Management
02176	53700000		1945	TAI	X3		
02177	14600000		1946	ENA	0		
02200	40300002		1947	STA	COREP,X3		
02201	53100000		1948	TIA	X1		GET ADDRESS OF F C LIST ELEMENT
02202	14300002		1949	ENI	2,X3		LENGTH OF F C LIST ELEMENT
02203	00703263	P	1950	RTJ	FREEMEM		FREE THE ELEMENT
02204	21100002		1951	LDQ	FCA,X1		FCA CONTAINS THE PAGE NUMBER
02205	54103352	P	1952	LDI	TEMP6,X1		GET POINTER TO NEXT ELEMENT
02206	10003354	P	1953	SSH	EPFLAG		SKIP IF 4 ELEMENTS PROCESSED
02207	01002171	P	1954	UJP	FTP10		PROCESS ANOTHER ELEMENT
02210	53020006		1955	TMA	6B		
02211	15407774		1956	INA,S	1000B-4		
02212	53420006		1957	TAM	6B		
02213	14600000		1958	ENA	0		RESET FC TO PAGE LEVEL
02214	40003350	P	1959	STA	FCPAGELV		
02215	13000007		1960	SHAQ	7		GET THE PAGE NUMBER
02216	53500000		1961	TAI	X1		
02217	01001321	P	1962	UJP	GIVEPAGE		RETURN TO THE SCHEDULR WITH...
			1963				...THE PAGE ALREADY FREED.
			1964				
02220	05577753		1965	QSG,S	-20		SKIP IF EVERYTHING IS OK
02221	01002235	P	1966	UJP	CS06		MAKE MORE FILE CORE BLOCKS

1969  
1970  
1971  
1972  
1973

\*\*\*\*\*  
\*  
\* IF HERE, NEITHER PAGES NOR FILE CORE BLOCKS NEED TO BE MADE.  
\* IF ANY FILE CORE BLOCKS ARE RESERVED FOR CONVERSION TO  
\* PAGES, THEY ARE UN-RESERVED.  
\*  
\*\*\*\*\*

02222 24003351 P  
02223 03002244 P  
02224 34003351 P  
02225 20002133 X  
02226 01002232 P  
02227 24002143 X  
02230 37300001  
02231 40300001  
02232 53700000  
02233 02702227 P  
02234 01002244 P

1975  
1976  
1977  
1978  
1979  
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1981  
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1983  
1984  
1985  
1986  
1987  
1988

CRESERVE LCA NRESB NUMBER OF RESERVED BLOCKS  
AZJ, EQ ESCHED GO TO RUNIDLE  
RAU NRESB ZERO NUMBER OF RESERVED BLOCKS  
LDA FCLIST  
UJP CRES06  
CRES04 LCA RESERVED  
LPA FCS+1, X3 REMOVE RESERVED BIT  
STA FCS+1, X3  
CRES06 TAI X3  
IJD CRES04, X3 JUMP IF NOT LAST ELEMENT  
UJP ESCHED GO TO RUNIDLE

1990  
1991  
1992  
1993

\*\*\*\*\*  
\*  
\* HERE WE NEED TO MAKE FILE CORE BLOCKS.  
\* A PAGE IS REQUESTED FOR CONVERSION TO FILE CORE BLOCKS.  
\*  
\*\*\*\*\*

02235 20003355 P  
02236 03102244 P  
02237 14302402 P  
02240 47303355 P  
02241 00703223 P  
02242 14600004  
02243 34002071 X  
  
02244 21003356 P  
02245 14467776  
02246 40003356 P  
02247 03401724 P

1995  
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2008  
2009

CS06 EQU \*  
LDA REQPAGE  
AZJ, NE ESCHED JUMP IF PAGE ALREADY REQUESTED  
ENI GTC12, X3 RETURN ADDRESS  
STI REQPAGE, X3 INDICATE PAGE HAS BEEN REQUESTED  
RTJ GETPAGE REQUEST A PAGE  
ENA 4 SAY THAT 4 FILE BLOCKS ARE...  
RAD RTNCOUNT ...GOING TO MATERIALIZE  
  
ESCHED LDQ SFLAG GET OLD SFLAG VALUE  
ENA, S 67776B  
STA SFLAG STORE NEW VALUE INTO SFLAG  
AQJ, EQ SWITCHX JUMP IF IDLE NOT TO BE RUN  
\*\*\*\*\*UJP\*\*\*\*\*RUNIDLE\*\*\*\*\*

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02250 14302031 X 2012 RUNIDLE ENI IDLE,X3+PSA
02251 14677777 X 2013 ENA IQUANTUM
2013+001 IF STAT NE 0, GOTO STAT
02252 47303331 P 2013+002 STI XTEMP,X3+PSA SAVE THE PSA POINTER
02253 14100000 2013+003 ENI 0,X1
02254 01002256 P 2013+004 UJP RMSW5.0
2013+005 .STAT
2013+006 IF STAT NE 0, UJP RMSW9
2015
2016 * LOOP TO GIVE QUANTA TO ALL USERS.
02255 14677777 X 2017 RMSW5 ENA XQUANTUM USERS QUANTUM
02256 31301745 X 2017+001 RMSW5.0 EQU *
02257 34302256 X 2018 SBA TIMELEFT,X3+PSA
02260 30377777 X 2019 RAD TIMELEFT,X3+PSA GIVE USER ANOTHER QUANTUM.
02261 40302260 X 2020 ADA TOTALTIM,X3+PSA
02262 21377777 X 2021 STA TOTALTIM,X3+PSA CHARGE HIM FOR IT.
02263 03702277 P 2022 LDQ TRUNTIME,X3+PSA
02264 20377777 X 2023 AQJ,LT RMSW6 JUMP IF NOT OUT OF TIME
02265 03102270 P 2024 LDA CMCODE,X3+PSA CHECK FOR ANY PENDING CM REQUESTS
02266 14677777 X 2025 AZJ,NE *+3 JUMP IF A REQUEST EXISTS
02267 40302264 X 2026 ENA TIMECUT ENTER A TIMEOUT REQUEST
02270 14477777 X 2027 STA CMCODE,X3+PSA
02271 37301776 X 2028 ENA,S NTBITS ALLOW CERTAIN I/O BOUND JOBS
02272 03102277 P 2029 LPA IOBOUND,X3+PSA TO PROCEED
02273 20300777 X 2030 AZJ,NE RMSW6
02274 03302277 P 2031 LDA SYSCM,X3+PSA IGNORE TIME CUT IF IN
02275 14602266 X 2032 AZJ,LT RMSW6 CONTROL MODE.
02276 00702451 P 2033 ENA TIMECUT SAY #TIME CUT#
02277 20300000 2034 RTJ CMQSET GO TO SCARE THE USER.
02300 53700000 2035 LDA 0,X3+PSA POINT TO THE NEXT USER.
02301 01002306 P 2036 TAI X3+PSA
2037 UJP RMSW2
2038
02302 00000000 2039 IMPURE02 VFD A24/IMPURE EVEN PARITY WORD FOR REGION 02
2040
02303 01001705 2041 TIMEUP VFD 06/01,03/0,A15/RMTIMEUP REQUEST NUMBER, INTERRUPT AD
02304 54303331 P 2042 RMSW1 LDI XTEMP,X3+PSA GET 1ST USER WE FOUND OUT OF TIME
02305 53130035 2043 TMI NU,X1 GET THE NUMBER OF USERS.
02306 02502255 P 2044 IJD RMSW5,X1 LOOP THROUGH ALL THE USERS.
02307 54303331 P 2045 LDI XTEMP,X3+PSA RUN THAT SAME 1ST TIMELESS USER.
02310 21377777 X 2046 RMSW8 LDQ TERMINAL,X3+PSA LOAD THE TERMINAL NUMBER
02311 53300000 2047 TIA X3+PSA
02312 13000011 2048 SHAQ 9
02313 53420034 2049 TAM 348 RF34 POINTS TO THE RUNNING USER.
02314 20302257 X 2050 LDA TIMELEFT,X3+PSA LOAD THE TIME HE HAS LEFT.
02315 21002303 P 2051 RMSW9 LDQ TIMEUP GET REQUEST NO., RETURN ADDRESS.
02316 00777777 X 2052 RTJ TIMESET ASK FOR AN INTERRUPT.
02317 20001334 X 2053 LDA BIT23 REMEMBER THAT WE HAVE MADE AN
02320 40003334 P 2054 STA XFLAG INTERRUPT REQUEST.
02321 77740000 2055 VFD A12/EINT
02322 14200037 2056 ENI NPU-1,X2
02323 14604000 2057 ENA 4000B
02324 77644140 2058 APF PS+PFW,X2 INITIALIZE THE USERS PAGE FILE
02325 02602324 P 2059 IJD *-1,X2 LOOP UNTIL DONE
02326 53300000 2060 TIA X3+PSA
02327 36003323 P 2061 SCA RPSAPTR ARE WE CONTINUING THE LAST USER.
02330 03002374 P 2062 AZJ,EQ CMCHK CHECK FOR CONTROL MODE
2063 * BEFORE STARTING TO RUN HIM.
2064
2065 ** WE ARE REALLY SWITCHING USERS. SAVE THE REMAINING REGISTERS OF
2066 ** THE PREVIOUS USER.
2067
02331 55300000 2067 EAQ SAVE HIS E REGISTER.
02332 54203323 P 2068 LDI RPSAPTR,X2
02333 45277777 X 2069 STAQ E,X2+PSA
02334 77670000 2070 OSA GET HIS ISR AND OSR.
02335 13077774 2071 SHAQ -3
02336 77674000 2072 ISA
02337 13077774 2073 SHAQ -3
02340 20201253 X 2074 LDA IS,X2+PSA
02341 12077771 2075 SHA -6
02342 13000006 2076 SHAQ 6
02343 40202340 X 2077 STA IS,X2+PSA SAVE THE MODIFIED INTERNAL STATUS
02344 20077777 X 2078 LDA BDPCR GET BCR FROM INTSORT
02345 40277777 X 2079 STA BCR,X2+PSA
02346 02346 P 2091 RMLJANC EQU *
02347 47303323 P 2092 STI RPSAPTR,X3+PSA SAVE THE NEW PSA POINTER
02350 14110040 2093 ENI 10040B,X1 15 BITS OF TMG 40B
02351 47102352 P 2094 RMPACKRF STI RMPF01,X1
02351 47102355 P 2095 STI RMPF02,X1

```

02352	53010040		2096	RMPFU1	TMQ	408+IMPURE	SAVE THE LAST USERS REGISTER FILE
02353	41277777	X	2097		STQ	RF,X2+PSA	
02354	21302353	X	2098		LDQ	RF,X3+PSA	PUT THE NEXT USERS RF AREA
02355	53410040		2099	RMPF02	TQM	408+IMPURE	INTO THE REGISTER FILE
02356	15300001		2100		INI	1,X3	
02357	10110077		2101		ISI	100778,X1	LOOP THROUGH RF 77
02360	02202350	P	2102		IJI	RMPACKRF,X2	
02361	54303323	P	2103		LDI	RPSAPTR,X3+PSA	RESTORE PSA PCINTER
02362	20377777	X	2104		LDA	ACCNUM,X3+PSA	
02363	53420026		2105		TAM	268	PUT THE JOB NUMBER INTO RF26.
02364	25302333	X	2106		LDAQ	E,X3+PSA	
02365	55700000		2107		AQE		
02366	20302345	X	2108		LDA	BCR,X3+PSA	
02367	40002344	X	2109		STA	90PCR	RESTORE THE BCR IN INTSORT
02370	20302343	X	2110		LDA	IS,X3+PSA	
02371	77660000		2111		AOS		RESTORE THE (ISR) AND (OSR).
02372	12077774		2112		SHA	-3	
02373	77664000		2113		AIS		
02374	20302271	X	2114	CMCHEK	LDA	I03OUND,X3+PSA	NEGATED USERS ARE NOT TO BE
02375	03301260	X	2115		AZJ,LT	RETURN	PUT INTO CONTROL MODE.
02376	21302267	X	2116		LDQ	CMCODE,X3+PSA	CHECK FOR REQUEST TO ENTER C.M.
02377	05500000		2117		QSG,S	0	SKIP IF NO REQUEST
02400	01077777	X	2118		UJP	QCONTROL	EXIT TO ENTER CONTROL MODE
02401	01002375	X	2119		UJP	RETURN	RUN THE USER



2122

```
*****
*
* THIS GETS CALLED BY SCHEDULER AFTER IT HAS FOUND A PAGE
* TO BE CONVERTED TO FILE CORE BLOCKS.
*
* THIS USES TEMP6 TO SAVE ITS RETURN ADDRESS
*
*****
```

2131

02402	47302450	P	2131					
02403	53200000		2132	GTC12	STI	GTC14,X3	SAVE THE RETURN ADDRESS	
02404	12000002		2133		TIA	X2	GLOBAL PAGE NUMBER TO A.	
02405	40003355	P	2134		SHA	2	CHANGE TO 1/4 PAGE NUMBER	
02406	14100003		2135		STA	REQPAGE	SAVE THE ADDRESS AND CLEAR THE	
02407	14300002		2136		ENI	3,X1	SWAP REQUEST BIT 4 1/4 PAGES	
02410	00703104	P	2137	GTC13	ENI	2,X3	GO GET A FOUR WORD BLOCK	
02411	44201763	X	2138		RTJ	GETMEM		
02412	20002225	X	2139		SWA	PAGETABL,X2	USE PAGETABL FOR FCLIST POINTER	
02413	47302412	X	2140		LDA	FCLIST	INSERT THE 1/4 PAGE INTO THE	
02414	35002317	X	2141		STI	FCLIST,X3	FCLIST	
02415	40300000		2142		SSA	IOP	SAY I/O IN PROGRESS	
02416	20003355	P	2143		STA	0,X3		
02417	53140000		2144		LDA	REQPAGE	GET THE 1/4 PAGE ADDRESS OF THIS	
02420	12000017		2145		AIA	X1	FILE CORE BLOCK	
02421	14577777		2146		SHA	15		
02422	45300002		2147		ENQ,S	77777B	SAY NO INFORMATION PRESENT	
02423	14300003		2148		STAQ	FCA,X3		
02424	00703104	P	2149		ENI	3,X3	GET 8 WORDS FOR A COMPLETION BLOC	
02425	40300000		2150		RTJ	GETMEM		
02426	35001527	X	2151		STA	0,X3	LINK THE ELEMENT INTO THE MASS	
02427	40477777	X	2152		SSA	BIT17	STORAGE COMPLETION QUEUE	
02430	14677777	X	2153		STA,I	MSCRIPT		
02431	40377777	X	2154		ENA	RTN	SET THE RETURN FOR MSC	
02432	20003355	P	2155		STA	MXQCOM,X3		
02433	53140000		2156		LDA	REQPAGE	GET THE PAGE NUMBER	
02434	12000011		2157		AIA	X1	FORM THE 1/4 PAGE NUMBER	
02435	40377777	X	2158		SHA	9		
02436	02502407	P	2159		STA	MXQQ,X3	PUT IT INTO THE BLOCK	
02437	14677777	X	2160		IJD	GTC13,X1	LOOP FOR 4 1/4 PAGES	
02440	35001713	X	2161		ENA	MSBIT		
02441	40002440	X	2162		SSA	FLAGS		
02442	47003355	P	2163		STA	FLAGS		
02443	14600000		2164		STI	REQPAGE,0	ALLOW ANOTHER CONVERSION	
02444	40003350	P	2165		ENA	0		
02445	53020006		2166		STA	FOPAGELV	RESET FC TO PAGE LEVEL	
02446	15400004		2167		TMA	6B		
02447	53420006		2168		INA,S	4		
02450	01000000		2169		TAM	6B		
			2170	GTC14	UJP	IMPURE	RETURN	

2174  
2175  
2176  
2177  
2178

\*\*\*\*\*  
\*  
\* ROUTINE CMQSET ENTER WITH ERROR CODE FOR  
\* CONTROL MODE IN THE A REGISTER  
\* AND THE PSA PCINTER IN X3.  
\*\*\*\*\*

02451 01000000  
02452 21302376 X  
02453 35002414 X  
02454 05500000  
02455 03702457 P  
02456 40302452 X  
02457 14477777 X  
02460 00702466 P  
02461 01002451 P

2180  
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2187  
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2189

CMQSET UJP IMPURE  
LDQ CMCODE,X3+PSA  
SSA BIT23  
QSG,S 0  
AQJ,LT \*+2  
STA CMCODE,X3+PSA  
ENA,S NIFWAIT  
RTJ IOCLEAR  
UJP CMQSET

SKIP IF NOT ALREADY ENTERING CM  
JUMP IF A LOWER PRIORITY CODE  
SAVE THE ERROR CODE  
CLEAR CMWAIT AND IFWAIT  
CLEAR ALL USER DELAY BITS

2192  
2193  
2194  
2195  
2196

\*\*\*\*\*  
\*  
\* ROUTINE IOSET ENTER WITH IOBOUND BITS IN THE  
\* A REGISTER AND THE PSA  
\* POINTER IN X3.  
\*\*\*\*\*

02462 01000000  
02463 35302374 X  
02464 40302463 X  
02465 01002462 P

2198  
2199  
2200  
2201  
2202

IOSET UJP IMPURE  
SSA IOBOUND,X3+PSA  
STA IOBOUND,X3+PSA  
UJP IOSET

2205  
2206  
2207  
2208  
2209

\*\*\*\*\*  
\*  
\* ROUTINE IOCLEAR ENTER WITH THE IOBOUND MASK  
\* IN THE A REGISTER AND  
\* THE PSA PCINTER IN X3.  
\*\*\*\*\*

02466 01000000  
02467 37302464 X  
02470 40302467 X  
02471 01002466 P

2211  
2212  
2213  
2214  
2215

IOCLEAR UJP IMPURE  
LPA IOBOUND,X3+PSA  
STA IOBOUND,X3+PSA  
UJP IOCLEAR

```

2219 *
2220 *
2221 * ROUTINE CLEARN THIS ROUTINE CLEARS THE
2222 * IOBOUND NEGATE BIT. X3 MUST
2223 * BE THE PSA POINTER.
*****

```

```

2225
2226
02472 01000000
02473 21302456 X
02474 14601711 X
02475 35002441 X
02476 05500000
02477 40002475 X
02500 24002453 X
02501 00702466 P
02502 01002472 P
2227 CLEARN UJP IMPURE
2228 LDQ CMCODE,X3+PSA DOES THIS USER WANT TO BE PUT
2229 ENA SWBIT INTO CONTROL MODE
2230 SSA FLAGS
2231 QSG,S 0 SKIP IF HE DOES NOT
2232 STA FLAGS
2233 LCA BIT23
2234 RTJ IOCLEAR
2235 UJP CLEARN

```

```

*****
2238 *
2239 * ROUTINE SETN THIS ROUTINE SETS THE IOBOUND
2240 * NEGATED BIT. X3 MUST BE
2241 * THE PSA PCINTER.
2242 *
*****

```

```

02503 01000000
02504 20002500 X
02505 00702462 P
02506 01002503 P
2244 SETN UJP IMPURE
2245 LDA BIT23
2246 RTJ IOSET
2247 UJP SETN

```

```

2248
2249
*****
2251 *
2252 * THIS ROUTINE REMOVES A PSA FROM THE SCHEDULER QUEUE AND
2253 * RETURNS HIS PSA TO THE FREE STORAGE LIST.
2254 *
*****

```

```

02507 02507 P
02507 77730000
02510 00702734 P
02511 14302250 X
02512 54203323 P
02513 01002346 P
2256 LOGOFF EQU *
2257+001 VFD A12/DINT
2258 DESTRUCT
2259 RTJ
2260 IDLE,X3+PSA RUN IDLE TO LET THINGS SETTLE.
2261 ENI STORE THE REGISTER FILE
2262 LDI RPSAPTR,X2+PSA
2263 UJP RMLJANC INTO THE PSA JUST FREED

```

2264+001

UWBDEF

```

102 . *
103 . *****
104 . *
105 . *
106 . *
107 . *
00000 108 CONBLOCK EQU 0 POINTER TO 8 WORD CONTROL BLOCK *
00001 109 BFPTR EQU CONBLOCK+1 POINTER TO CURRENT CORE BUFFER *
110 . * -0 IF NO BUFFER PRESENT *
00002 111 BLKPOS EQU BFPTR+1 CURRENT BLOCK POSITION *
00003 112 IMADR EQU BLKPOS+1 ADDRESS OF WCRD CCUNT AND IMAGE *
00004 113 CALLBAD EQU IMADR+1 CALL BACK ADDRESS *
114 . *
00006 115 RDIST EQU CALLBAD+2 RTJ MACHERR *
116 . * UJP IMPURE *
00010 117 WCNT EQU RDIST+2 TEMPORARY WORD COUNT *
00011 118 CBLOCK EQU WCNT+1 ADDRESS OF CURRENT BLOCK *
00012 119 TIMAD EQU CBLOCK+1 TEMPORARY FOR CURRENT POSITION *
00013 120 PSALOC EQU TIMAD+1 ADDRESS OF ASSOCIATED PSA *
00013 121 DISKBUSY EQU PSALOC BUFFER UNSAFE FLAG *
122 . *
00015 123 EXITADD EQU PSALOC+2 UJP IMPURE RETURN ADDRESS *
00016 124 PFSAVE EQU EXITADD+1 TEMP TO SAVE THE CONTENTS OF PF1 *
00017 125 UWBWC EQU PFSAVE+1 TEMP TO SAVE WC AND CALL BACK *
00020 126 UWBRET EQU UWBWC+1 ADDRESS IF CALL TO UWBLOCKB *
00021 127 UWBX3 EQU UWBWC+2 TEMP TO SAVE RETURN ADDRESS IF *
128 . * CALL TO UWBLOCKB *
129 . * BIT23 IF LAST RECCRD WAS ILOGOFF *
00022 130 BATCHPNT EQU UWBX3+1 POINTER TO THE PROPER BATCH Q *
00023 131 DESTLP EQU BATCHPNT+1 DESTINATION LINE PRINTER CODE *
00024 132 UWMAX EQU DESTLP+1 NUMBER OF WORDS IN BLOCK *
133 . *
134 . *
135 . *
00024 136 EXPDATA EQU UWMAX THE FOLLOWING ARE USED ONLY FOR *
137 . * DEVICES THAT COME FROM THE PDP8 *
138 . * BIT23 SEZZ EXPECTING DATA *
139 . * BITS 14--0 HAVE 64 WORD BLOCK *
00025 140 COMWORD EQU EXPDATA+1 ADDRESS *
141 . * 12 BIT BYTES WITH THE CONTROL *
00026 142 DEVTYPE EQU COMWORD+1 BLOCK INFORMATION *
143 . * BITS 14--0 HAVE UWBLOCK ROUTINE *
00027 144 UWMAXA EQU DEVTYPE+1 POINTER *
145 . * NUMBER OF WORDS IN LONGER BLOCKS *
146 . * *****

```

02514	14177777	X	2265	CREATBAT	EQU	*		
02515	20002426	X	2266		ENI	NBATCHQ,X1	NUMBER OF BATCH QUEUES	
02516	21002515	X	2267	CRBAT01	LDA	BIT17	BIT 17 SEZ THE QUEUE IS...	
02517	05277777	X	2268		LDQ	BIT17	..NOT EMPTY	
02520	01002640	P	2269		MEQ	BATCHQ,2	SEARCH FOR NON-EMPTY QUEUE	
02521	20177777	X	2270		UJP	CHCHKRTN	RETURN	
02522	03302515	P	2272		LDA	QTABLE,X1	NUMBER OF PSA LEGAL	
02523	47002551	P	2273		AZJ,LT	CRBAT01	JUMP IF LIMIT REACHED	
02524	05100001	P	2273+001		STI	CRBATAPS,0	SET TAPES TO ZERO	
02525	01002640	P	2273+002	LATEFLAG	ISG	1+IMPURE,X1	ZERO IF NIGHT QUEUE CAN RUN	
02526	20102517	X	2273+003		UJP	CHCHKRTN		
02527	03202540	P	2273+004		LDA	BATCHQ,X1		
02530	14477777	X	2273+005		AZJ,GE	CRBAT01A	LOG IN IF NOT TAPE QUEUE	
02531	53140000		2273+006		ENA,S	NTAPEQ	PREPARE FOR TAPE SCHEDULING	
02532	12077776		2273+007		AIA	X1	POINT INTO THE BATCHQ	
02533	21003315	P	2273+008		SHA	-1		
02534	03602515	P	2273+009		LDQ	TAPESAVL		
02535	15600001		2273+010		AQJ,GE	CRBAT01	JUMP IF CANNOT LOG IN	
02536	16477777		2273+011		INA	1		
02537	44002551	P	2273+012		XOA,S	-0		
02540	47102563	P	2273+013		SWA	CRBATAPS	SAVE REQUESTED TAPES	
02541	14177777	X	2274	CRBAT01A	STI	QNUMBER,X1	SAVE QUEUE NUMBER	
02542	14600000		2275		ENI	NBATPSA,X1	NOW LOCK FOR A PSA	
02543	14577777		2276		ENA	0		
02544	06177777	X	2277		ENQ,S	77777B		
02545	01002640	P	2278		MEQ	BATCHPSA,1		
02546	15177777	X	2279		UJP	CHCHKRTN	NO BATCH PSA'S, RETURN	
02547	14202640	P	2280		INI	BATCHNUM,X1	POINT TO THE BATCH QUEUES	
02550	00702724	P	2281		ENI	CHCHKRTN,X2	ENTER REJECT ADDRESS	
02551	14400000		2282		RTJ	CREATE	CREATE A PSA	
02552	34003315	P	2282+001	CRBATAPS	ENA,S	IMPURE	GET TAPES REQUESTED	
02553	16477777		2282+002		RAD	TAPESAVL	SAY TAPES IN USE	
02554	12000006		2282+003		XOA,S	-0		
02555	34377777	X	2282+004		SHA	6		
02556	47302576	P	2282+005		RAD	UTAPEMAX,X3+PSA	SET USER MAXIMUM TAPES	
02557	20077777	X	2283		STI	CRBAT02,X3+PSA	SAVE THE PSA POINTER	
02560	34377777	X	2284		LDA	BIT19	INDICATE A BATCH JOB	
02561	14300001		2285		RAD	SYSCODE,X3+PSA	IN SYSCODE	
02562	00703104	P	2286		ENI	1,X3	GET 2 WORDS FOR LUNLIST	
02563	14100000		2287		RTJ	GETMEM		
02564	14477776		2288	QNUMBER	ENI	IMPURE,X1	BATCH QUEUE NUMBER	
02565	34102521	X	2289		ENA,S	-1		
02566	20102526	X	2290		RAD	QTABLE,X1	REDUCE PSA LIMIT	
02567	53600000		2291		LDA	BATCHQ,X1		
02570	13077760		2292		TAI	X2+CNBLK		
02571	11144004		2293		SHAQ	-15	BLOCK ADDRESS TO Q	
02572	13077766		2294		VFD	06/11,A9/100,A9/HTCR	ECHA LUN 100 = CR	
02573	12000017		2295		SHAQ	-9	MERGE HARDWARE TYPE AND PCINTER	
02574	45300000		2296		SHA	15	LUN TO HIGH A	
02575	53300000		2297		STAQ	0,X3	STORE LUNLIST ELEMENT	
02576	14300000		2298		TIA	X3	LUNLIST PCINTER TO A	
02577	40377777	X	2299	CRBAT02	ENI	IMPURE,X3+PSA	RESTORE THE PSA POINTER	
02600	17777777		2300		STA	LUNLIST,X3+PSA		
02601	20200000		2301		ANQ	77777B		
02602	03302604	P	2301+001		LDA	ACCWORD,X2+CNBLK	GET TASK FLAG	
02603	41777777	X	2301+002		AZJ,LT	*+2	JUMP IS A TASK	
02604	20200001		2303		STQ,I	ACCSTUFF,X3+PSA	ELSE CHARGE FOR CARDS READ	
02605	40200003		2304		LDA	LP,X2+CNBLK	GET FILE LOAD POINT	
02606	14600000		2305		STA	CBP,X2+CNBLK	SAY THIS IS CURRENT BLOCK POINTER	
02607	40200004		2306		ENA	0		
02610	24002504	X	2307		STA	CPP,X2+CNBLK	ZERO CURRENT POSITION POINTER	
02611	37200000		2307+001		LCA	BIT23	3777777B FOR REMOVING BIT23	
02612	21102566	X	2307+002		LPA	0,X2+CNBLK	REMOVE THE #TASK# BIT IF SET	
02613	05500000		2307+003		LDQ	BATCHQ,X1		
02614	35002610	X	2307+004		QSG,S	0	SKIP IF NOT TAPE Q	
02615	40102612	X	2307+005		SSA	BIT23	REMEMBER THIS IS A TAPE QUEUE	
02616	12000006		2309		STA	BATCHQ,X1	MAKE IT THIS PCINTER	
02617	03302623	P	2310		SHA	23-17	EXAMINE INDIRECT BIT	
02620	14602615	X	2311		AZJ,LT	CRBAT04	JUMP IF PCINTER WAS CORRECT	
02621	53140000		2312		ENA	BATCHQ	END OF CHAIN PCINTER IS...	
02622	44102620	X	2313		AIA	X1	...GENERATED HERE	
02623	53100000		2314		SWA	BATCHQ,X1		
02624	12000022		2315	CRBAT04	TIA	X1	QUEUE NUMBER	
02625	34377777	X	2315+001		SHA	24-6	TO UPPER 6 BITS	
02626	20200006		2319		RAD	SELECT,X3+PSA	SET THE QUEUE NUMBER INTO SELECT	
02627	53500000		2320		LDA	EPP,X2+CNBLK	SET THE PSA PCINTER INTO THE	
02630	05105000		2320+001		TAI	X1		
02631	01002635	P	2320+002		ISG	MAXDEST,X1	SKIP IF CARDREADER NOT FINISHED	
			2320+003		UJP	CRBAT08	JUMP IF INFO HERE - NOT IN MACRO	



02632	53300000	2320+004	TIA	X3+PSA	PSA ADDRESS TO A
02633	44100013	2320+005	SWA	PSALOC,X1	PLACE PSA PCINTER INTO MACRO
02634	20100023	2320+006	LDA	DESTLP,X1	GET WHERE TO GO FROM MACRO
02635	17507777	2320+007	CRBAT08 ANA	7777B	
02636	120J0014	2320+008	SHA	12	
02637	34377777 X	2320+009	RAD	UDESTLP,X3+PSA	PLACE DESTINATION LP IN PSA
02640	01000000	2325	CHCHKRTN UJP	IMPURE	ONE SECOND INTERRUPT RETURN

```

*****
2328 *
2329 * CREATE THIS ROUTINE GENERATES A PSA
2329+001 *
2329+002 * ENI <ERROR RETURN>,X2
2329+003 * ENI TERMINAL,X1
2329+004 * RTJ CREATE
2329+005 * X1 = TERMINAL
2329+006 * X2 = MANGLED
2329+007 * X3 = PSA POINTER
2329+008 * AQ = MANGLED
2330 *
*****
    
```

02641	20003327	P	2332	CR01	EQU	*	
02642	03102651	P	2332+001		LOA	MEMARRAY	GET BIT MAP OF FREE PAGES
02643	14300003		2332+002		AZJ,NE	CR011	JUMP IF FREE PAGES AVAILABLE
02644	12000001		2332+003		ENI	3,X3	LOOK INTO FOUR SIZES OF BLOCKS
02645	30303401	P	2332+004		SHA	1	MULTIPLY BY 2
02646	02702644	P	2332+005		ADA	FRONT+7,X3	ADD UP 128+256+512+1024 BLOCKS
02647	05600002		2332+006		IJD	*-2,X3	LOOP TIL DONE
02650	01002730	P	2332+007		ASG	2	SKIP IF AT LEAST 2 LEFT
	02651	P	2332+008		UJP	CR03	TAKE REJECT RETURN
02651	14300007		2332+009	CR011	EQU	*	
02652	00703104	P	2332+010		ENI	7,X3	GET A 128 WORD BLOCK
02653	44177777	X	2332+011		RTJ	GETMEM	GET THE 128 WORD BLOCK
02654	14200177		2338		SWA	PSABLK,X1+BLK	SAVE THE POINTER TO THE PSA
02655	15300200		2340		ENI	PSALNTH-1,X2	COPY THE PSA FROM IDLE INTO THE
02656	20202511	X	2341		INI	PSALNTH,X3+PSA	FREE STORAGE
02657	15377776		2342	CR02	LOA	IDLE,X2	
02660	40300000		2343		INI	-1,X3+PSA	
02661	02602656	P	2344		STA	0,X3+PSA	
02662	47302656	X	2345		IJD	CR02,X2	
02663	53020035		2346		STI	IDLE,X3	LINK INTO THE PSA QUEUE
02664	15600001		2347		TMA	NU	INDICATE ONE MORE USER
02665	53420035		2348		INA	1	IN THE PSA QUEUE
02666	14600076		2349		TAM	NU	
02667	40302370	X	2350		ENA	768	
02670	47302673	P	2351		STA	IS,X3+PSA	GIVE THE USER LEGAL ISR, OSR
02671	14300003		2352		STI	*+3,X3+PSA	SAVE THE PSA POINTER
02672	00703104	P	2353		ENI	3,X3	GET 8 WORDS FOR THE ACCOUNTING
02673	14300000		2354		RTJ	GETMEM	INFORMATION
02674	40302603	X	2355		ENI	IMPURE,X3+PSA	RESTORE THE PSA POINTER
02675	14600000		2356		STA	ACCSTUFF,X3+PSA	
02676	40302273	X	2357		ENA	0	CLEAR THE IO BOUND WORD
02677	40302470	X	2358		STA	SYSCM,X3+PSA	INDICATE NOT IN CONTROL MODE YET
02700	40702674	X	2359		STA	IOBOUND,X3+PSA	
02701	53100000		2360		STA,I	ACCSTUFF,X3+PSA	CLEAR THE CARD READER POINTER
02702	12000017		2361		TIA	X1+BLK	TERMINAL NUMBER TO A
02703	40302310	X	2362		SHA	15	SHIFT TO THE UPPER NINE BITS
02704	14677777	X	2363		STA	TERMINAL,X3+PSA	AND SAVE IT
02705	00702451	P	2364		ENA	LOGREQ	LOGON CODE FOR CONTROL MODE
02706	47102723	P	2365		RTJ	CMQSET	
02707	14700377		2366		STI	CREATX1,X1	SAVE TERMINAL NUMBER
02710	14177777	X	2367		ENI	3778	SET THE MASK
02711	27002723	P	2368	HSITABLP	ENI	HSITABL,X1	SET TABLE LENGTH
02712	13000017		2369	CRMEQ	LDL	CREATX1	FETCH TERMINAL NUMBER ONLY
02713	06277777	X	2370		SHAQ	24-9	UP TO TOP
02714	01002723	P	2371	HSITABP	MEQ	HSITAB,2	LOOK FOR IT
02715	12400011		2372		UJP	CR04	EXIT DONE
02716	53300000		2373		SHQ	9	RESTORE Q
02717	44577777	X	2374		TIA	X3+PSA	GET PSA POINTER
02720	20102713	X	2375		SWA,I	HSILOC,X1	SET INTO MACRO
02721	44302577	X	2376		LDA	HSITAB,X1	FETCH LUNLIST POINTER
02722	01002711	P	2377		SWA	LUNLIST,X3+PSA	AND SET IN PSA
	02723	P	2378		UJP	CRMEQ	GO BACK FOR MORE
02723	14100000		2379	CR04	EQU	*	
02724	01000000		2380	CREATX1	ENI	IMPURE,X1	RESTORE X1 WITH TERMINAL NUMBER
02725	20003314	P	2381	CREATE	UJP	IMPURE	
02726	03002641	P	2382		LDA	INHIBIT	TEST THE INHIBIT WORD
02727	05102546	X	2383		AZJ,EQ	CR01	JUMP IF OK TO LOG IN.
02730	01200000		2384		ISG	BATCHNUM,X1+BLK	SKIP IF A BATCH JOB
02731	17477767		2385	CR03	UJP	0,X2	OTHERWISE, FORGET IT
02732	03102730	P	2386		ANA,S	-NOENDBIT	IGNORE END MODE BIT
02733	01002641	P	2387		AZJ,NE	CR03	INHIBIT
			2388		UJP	CR01	TRY TO CREATE THE PSA
			2389				

2392  
2393  
2394  
2395  
2396

```

*****
*
*           DESTRUCT   THIS ROUTINE WILL DESTROY A PSA.
*           THE USER  MUST BE THE RUNNING USER.
*           X1 IS NOT  CHANGED.
*
*****
    
```

02734	01000000		2398				
02735	53300000		2399	DESTRUCT	UJP	IMPURE	
02736	36003324	P	2400		TIA	X3+PSA	
02737	05600001		2401		SCA	PRTYPSA	
02740	47003324	P	2402		ASG	1	SKIP IF NOT PRIORITY USER
02741	53130035		2403		STI	PRTYPSA,0	INDICATE NO PRIORITY USER
02742	15177776		2404		TMI	NU,X1	INDICATE ONE LESS USER
02743	53530035		2405		INI	-1,X1	IN THE PSA QUEUE
02744	15177776		2406		TIM	NU,X1	
02745	20300000		2407		INI	-1,X1	FIGURE OUT HOW TO UNLINK
02746	53600000		2408		LDA	0,X3	THIS USER.
02747	20200000		2409		TAI	X2	
02750	02502746	P	2410		LDA	0,X2	
02751	20300000		2411		IJD	*-2,X1	
02752	44200000		2412		LDA	0,X3+PSA	
02753	00777777	X	2413		SWA	0,X2	UNLINK THIS PSA
02754	20302703	X	2414		RTJ	CMEEXIT	
02755	12077760		2415		LDA	TERMINAL,X3	GET THE TERMINAL NUMBER
02756	53500000		2416		SHA	-15	
02757	24077777	X	2417		TAI	X1+BLK	
02760	37102653	X	2417+001		LCA	LIBMASK	LDA =007700000
02761	40102760	X	2417+002		LPA	PSABLK,X1+BLK	REMOVE ONLY LCGIN STATE BITS
02762	00777777	X	2420		STA	PSABLK,X1+BLK	CLEAR PSABLK POINTER
02763	20302700	X	2421		RTJ	PCHARS	REMOVE ANY TELETYPE STRING
02764	14300003		2422		LDA	ACCSTUFF,X3+PSA	LOAD THE ACCOUNTING BLOCK POINTER
02765	00703263	P	2423		ENI	3,X3	
02766	20003323	P	2424		RTJ	FREEMEM	
02767	14300007		2425		LDA	RPSAPTR	GET ADDRESS OF THE PSA
02770	00703263	P	2426		ENI	7,X3	FOR 128 WORD BLOCCKS
02771	47103004	P	2427		RTJ	FREEMEM	BYE BYE
02772	14102710	X	2428		STI	DEST01,X1	SAVE THE TERMINAL NUMBER
02773	14700377		2429		ENI	HSITABL,X1	SET THE TABLE LENGTH
02774	27003004	P	2430		ENQ	3778	SET THE MASK
02775	13000017		2431	DEST02	LDL	DEST01	NEED TERMINAL NUMBER ONLY
02776	06202720	X	2432		SHAQ	24-9	TO TOP OF A AND Q
02777	01003004	P	2433		MEQ	HSITAB,2	SEARCH FOR ENTRY
03000	12400011		2434		UJP	DEST01	NONE EXIT
03001	14600000		2435		SHQ	9	RESTORE Q
03002	44502717	X	2436		ENA	0	CLEAR THE PSA POINTER
03003	01002774	P	2437		SWA,I	HSILOC,X1	CLEAR PSA POINTER IN MACRO
			2438		UJP	DEST02	CHECK FOR SOME MORE
			2439				
03004	14100000		2440	DEST01	ENI	IMPURE,X1	RESTORE THE TERMINAL NUMBER
03005	01002734	P	2442		UJP	DESTRUCT	

			2454			
			2455	*	ENTER HERE ON A MEMORY PARITY ERROR DURING SWAP OUT	
			2456			
			2457	SWAPMPE1	EQU *	
03006	00000000	P	2458	VFD	09/000,A15/IMPURE	
03007	54103006	P	2459	LDI	*-1,X1	GET REQUEST BLOCK LOCATION
03010	20100002		2460	LDA	2,X1	GET VMM PCINTER
03011	53600000		2461	TAI	X2	
03012	20001654	X	2462	LDA	BIT21	MEMORY PARITY ERROR BIT
03013	34200000		2463	RAD	0,X2	SET BIT IN VMM
03014	02103017	P	2464	IJI	SWAPER22,X1	
			2465			
			2466	*	ENTER HERE ON COMPLETED SWAP OUT	
			2467	SWAP1	EQU *	
03015	00000000	P	2468	VFD	09/000,A15/IMPURE	
03016	54103015	P	2469	LDI	*-1,X1	GET REQUEST BLOCK ADDRESS
			2470			
			2471	*	REQUEST BLOCK FORMAT AT THIS TIME	
			2472			
			2473	*	WORD 0	RTJ SWAPMPE1 ENTRY FOR MEMORY PARITY ERROR
			2474	*	WORD 1	RTJ SWAP1 NORMAL COMPLETION RETURN
			2475	*	WORD 2	VFD A17/0,A7/PAGE-NUMBER
			2476	*	WORD 3	VFD A9/0,A15/VMM-POINTER
			2477			
			2478	SWAPER22	EQU *	
03017	47303057	P	2479	STI	SWAPPC,X3	SAVE RETURN ADDRESS
03020	15177775	P	2480	INI	-2,X1	MAKE THE BLOCK ADDRESS
03021	53100000		2481	TIA	X1	
03022	14300002		2482	ENI	2,X3	LENGTH OF THE BLOCK, 4 WORDS
03023	00703263	P	2483	RTJ	FREEMEM	FREE THE BLOCK
03024	20100002		2484	LDA	2,X1	GET THE PAGE NUMBER
03025	44003341	P	2485	SWA	LOWVALPN	THIS IS THE PAGE NUMBER JUST FREE
03026	01001476	P	2486	UJP	SWAPER34	





			2515				
			2516	SWAPEXIT	EQU	*	
03055	14100000	P	2517	SWAPX1	ENI	IMPURE,X1	
03056	14300000		2518	SWAPX3	ENI	IMPURE,X3	
			2519				
03057	01000000		2520	RMSWAP	UJP	IMPURE	ENTER ON LEVEL 1 TO START SWAPS
	03057	P	2521	SWAPPC	EGU	RMSWAP	
			2522				
	03060	P	2523	SWAPER99	EQU	*	
			2524	*	SWAPNUMB	IS THE NUMBER OF SWAPS IN PROGRESS.	
03060	14600000		2525	SWAPNUMB	ENA	IMPURE	
03061	14700004		2526		ENQ	4	MAX. NUMBER OF SIMOTANIOUS SWAPS.
03062	03603055	P	2527		AQJ,GE	SWAPEXIT	EXIT, SWAPPER TOO BUSY
			2528				
	03063	P	2529	SWAPER98	EQU	*	
			2530	*	QCOUNT	IS THE NUMBER OF UNPROCESSED SWAP REQUESTS	
03063	05600000		2531	QCOUNT	ASG	IMPURE	
03064	01001404	P	2532		UJP	SWAPER10	START ANOTHER SWAP
03065	01003055	P	2533		UJP	SWAPEXIT	EXIT, ALL REQUESTS ARE BEING...
			2534	*			...PROCESSED.
			2535				
			2537	FRBKPAGE	UJP	IMPURE	GIVE BACK MASS STORAGE PAGE
03066	01000000		2538		LPA	VMMASK	MAKE A MASS STORAGE ADDRESS
03067	37001546	X	2539		LDQ	LIBLAD	LARGEST LIBRARY ADDRESS
03070	21003320	P	2540		AQJ,LT	FRBKPAGE	NEVER FREE LIBRARY PAGES
03071	03703066	P	2541		ENI	FBPP,X2	INDICATE 4 FILE BLOCKS
03072	14200004		2542		RTJ	FREEBLK	
03073	00777777	X	2543		UJP	FRBKPAGE	
03074	01003066	P					

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```

*****
*
* ROUTINE TO GET A BLOCK OF FREE STORAGE. CALL WITH BASE TWO
* LOG OF DESIRED BLOCK LENGTH IN INDEX 3, AND EXECUTE AN
* RTJ GETMEM GET A BLOCK OF FREE STORAGE
* WITH THE INTERRUPTS DISABLED
* RETURNS WITH THE ADDRESS OF THE BLOCK IN BOTH INDEX 3 AND
* THE A REGISTER
*
*****
    
```

```

03075 15477776 2558
03076 40303372 P 2559 GETMEM01 INA,S -1 DECREMENT THE COUNT
03077 21303357 P 2560 STA FRCNT,X3 AND STORE IT BACK
03100 20703357 PP 2561 LDQ FRPTR,X3 LOAD THE ADDRESS OF THE BLOCK
03101 44303357 P 2562 LDA,I FRPTR,X3 LOAD THE ADDRESS FROM THE BLOCK
03102 13000030 2563 SWA FRPTR,X3 ADVANCE THE PCINTER
03103 53700000 2564 SHAQ 24 BLOCK ADDRESS TO A
03104 01000000 2565 GETMEM02 TAI X3 PUT IT INTO INDEX 3 ALSO
03105 77730000 2566 GETMEM UJP IMPURE
03106 20303372 P 2567 VFD A12/DINT PREVENT INTERFERENCE
03107 03103075 P 2568 LDA FRCNT,X3 LOAD THE COUNT OF FREE BLOCKS
2569 AZJ,NE GETMEM01 JUMP IF THERE ARE SOME OF THE
2570 * REQUESTED SIZE
03110 14700001 2571 ENQ 1 RLEVEL WILL TELL WHEN TO QUIT
03111 12400027 2572 GETMEM03 SHQ 23 RECURSING
03112 41003330 P 2573 STQ RLEVEL
03113 05300012 2574 ISG 10,X3 SKIP IF A 2048 WORD BLOCK NEEDED
03114 01003170 P 2575 UJP GETMEM07
2576 ** FIND A PAGE TO USE FOR FREE STORAGE.
03115 47103165 P 2577 STI GETMEMX1,X1 SAVE INDEX 1
03116 47203166 P 2578 STI GETMEMX2,X2 SAVE INDEX 2
03117 14177777 X 2579 ENI NUMPAGES,X1
03120 25000000 P 2580 LDQA VMMASK
03121 06102411 X 2581 MEQ PAGETABL,X1 SEARCH FOR P.C. OR FREE PAGES
03122 00700117 X 2582 RTJ SYSERR NO FREE PAGES.
03123 20103121 X 2583 LDA PAGETABL,X1 GET PAGETABL ENTRY FOR THE PAGE
03124 53600000 2584 TAI X2 SAVE PAGE ACCESS WORD POINTER
03125 12077752 2585 SHA -21 LEAVE UPPER OCTAL DIGIT
03126 03003132 P 2586 AZJ,EQ GETMEM30 JUMP IF FREE PAGE
03127 20101547 X 2587 LDA PAGEMSA,X1 GET MASS STORAGE ADDRESS
03130 35002227 X 2588 SSA BIT22 MAKE INTO A PAGE ACCESS WORD
03131 40200000 2589 STA 0,X2 INDICATE PAGE IS ON THE DISK
03132 03132 P 2590 GETMEM30 EQU *
03133 20003123 X 2591 LDA PAGETABL GET SYSTEM PAGE FLAG
03134 40103132 X 2592 STA PAGETABL,X1 FLAG THIS PAGE AS SYSTEM
03135 20003335 P 2593 LDA FPCNT
03136 15477776 2594 INA,S -1 REDUCE FREE PAGE COUNT
03137 40003335 P 2595 STA FPCNT
03140 14600001 2596 AZJ,GE GETMEM34 JUMP IF STILL MORE PAGES
03141 35003314 P 2597 ENA FSWAITB INDICATE FREE STORAGE WAIT.
03142 40003314 P 2598 SSA INHIBIT
03143 14677777 X 2599 STA INHIBIT
03144 35002477 X 2600 ENA FXBIT INDICATE IMMEDIATE CORRECTIVE...
03145 40003144 X 2601 SSA FLAGS ...ACTION TO GET AN AVAILABLE...
03146 03146 P 2602 STA FLAGS ...FREE OR SYSTEM PURE PAGE.
03147 53100000 2603 GETMEM34 EQU *
03148 00703251 P 2604 TIA X1 GET THE PAGE NUMBER
03150 20003327 P 2605 RTJ PAGEZAP KILL THE PAGE IF CURRENTLY IN USE
03151 05400001 2606 LDA MEMARRAY LOAD THE MEMORY ADDRESS ARRAY
03152 00703122 X 2607 ASG,S 00001 SKIP IF ADDRESSES ARE AVAILABLE
03153 13600026 2608 RTJ SYSERR
03154 53100000 2609 SCAQ 22,X2 PAGE NUMBER TO INDEX 2
03155 12000002 2610 TIA X1
03156 77644000 2611 SHA 2 SHIFT FOR THE PAGE FILE
03157 14477776 2612 APF PFW,X2
03160 12200000 2613 ENA,S 77776B
03161 37003327 P 2614 SHA 0,X2 GENERATE THE MASK FOR RESETTING
03162 40003327 P 2615 LPA MEMARRAY THE BIT IN MEMARRAY
03163 53200000 2616 STA MEMARRAY
03164 12000013 2617 TIA X2 PAGE NUMBER TO A
03165 14100000 2618 SHA 11 CONVERT TO AN ADDRESS
03166 14200000 2619 GETMEMX1 ENI IMPURE,X1 RESTORE INDEX 1
03167 01003202 P 2620 GETMEMX2 ENI IMPURE,X2 RESTORE INDEX 2
2621 UJP GETMEM09
2622
03170 15300001 2623 GETMEM07 INI 1,X3 CHECK THE COUNT OF THE NEXT SIZE
03171 20303372 P 2624 LDA FRCNT,X3 LARGER BLOCKS
    
```

03172	03003111	P	2625	AZJ, EQ	GETMEM03	JUMP IF THERE ARE NONE
03173	15477776		2626	INA, S	-1	DECREMENT THE COUNT
03174	40303372	P	2627	STA	FRONT, X3	AND STORE IT BACK
03175	20303357	P	2628	LDA	FRPTR, X3	LOAD THE ADDRESS OF THE BLOCK
03176	21703357	P	2629	LDQ, I	FRPTR, X3	ADVANCE THE PCINTER
03177	17777777		2630	ANQ	77777B	
03200	41303357	P	2631	STQ	FRPTR, X3	
03201	15377776		2632	INI	-1, X3	DECREASE THE BLOCK SIZE.
03202	44003205	P	2633	GETMEM09 SWA	*+3	SAVE THE ADDRESS OF THE BLOCK
03203	00703263	P	2634	RTJ	FREEMEM	FREE HALF OF THE BLOCK
03204	12300000		2635	SHA	0, X3	SET A = 2 POWER INDEX 3
03205	15600000		2636	INA	IMPURE	
03206	10003330	P	2637	SSH	RLEVEL	SKIP IF DONE
03207	02703202	P	2638	IJD	GETMEM09, X3	
03210	01003103	P	2639	UJP	GETMEM02	RETURN

03211	14303214	P	2641	FSX	EQU	*		
03212	00703223	P	2642		ENI	FXAP,X3	COMPLETION ADDRESS	
03213	01002401	X	2643		RTJ	GETPAGE	START A PAGE COMMING IN	
			2644		UJP	RETURN		
			2645					
03214	14600001	P	2646	FXAP	EQU	*		
03215	40203133	X	2647		ENA	1	FREE STORAGE PAGE HAS ARRIVED	
03216	34003335	P	2648		STA	PAGETABL,X2	INDICATE FREE PAGE	
03217	20003314	P	2649		RAD	FPCNT	INDICATE ONE MORE AVAILABLE PAGE	
03220	17477776		2650		LDA	INHIBIT		
03221	40003314	P	2651		ANA,S	NFSWAITB		
03222	01300000		2652		STA	INHIBIT	...EXPANTION INHIBIT BIT.	
			2653		UJP	0,X3	RETURN	
			2654					
			2655					
03223	01000000		2656	GETPAGE	UJP	IMPURE		
03224	77630000		2657		DINTC			
03227	47303245	P	2658		STI	GETPX3,X3	SAVE RETURN ADDRESS	
03230	14300002		2659		ENI	2,X3	ASK FOR A 4 WCRD BLOCK	
03231	00703104	P	2660		RTJ	GETMEM	OF FREE STORAGE	
03232	20003245	P	2661		LDA	GETPX3	GET RETURN ADDRESS, COMPLETION	
03233	40300002		2662		STA	2,X3	PUT IT IN THE PAGE REQUEST BLOCK	
03234	20003325	P	2663		LDA	RMSWAPQ	LINK IN THE PAGE REQUEST BLOCK	
03235	47303325	P	2664		STI	RMSWAPQ,X3		
03236	40300000		2665		STA	0,X3		
03237	14600001		2666		ENA	1		
03240	34003063	P	2667		RAD	QCOUNT	INDICATE ONE MORE PAGE REQUEST	
03241	14677777	X	2668		ENA	SWAPBIT	INDICATE THAT SWAPPING SHOULD...	
03242	35003145	X	2669		SSA	FLAGS	...BE STARTED.	
03243	40003242	X	2670		STA	FLAGS		
03244	01003223	P	2671		UJP	GETPAGE	IMMEDIATE RETURN	
			2672					
03245	40000000		2673	GETPX3	VFD	A1/1,A8/0,A15/IMPURE		
03246	14604000		2675	PZP02	ENA	4000B		
03247	77644140		2676		APF	PS+PFW,X2	REMOVE THE PAGE FROM THE ...	
03250	14200000		2677	PAGEZX2	ENI	IMPURE,X2	...RUNNING USER	
			2678					
03251	01000000		2679	PAGEZAP	UJP	IMPURE	SEARCH AND DESTROY THE PAGE FILE	
			2680					
03252	47203250	P	2681		STI	PAGEZX2,X2	SAVE X2	
03253	13000030		2682		SHAQ	24	PAGE NUMBER TO 0	
03254	12400002		2683		SHQ	2	MAKE INTO A QUARTER PAGE NUMBER	
03255	14200037		2684		ENI	NPU-1,X2	SEARCH ALL USERS PAGE FILE	
03256	77654140		2685	PZP01	PFA	PS+PFW,X2	GET QUARTER PAGE NUMBER	
03257	17600774		2686		ANA	774B	REMOVE THE PRCTECT BIT	
03260	03403246	P	2687		AQJ,EQ	PZP02	JUMP IF PAGE IN USE	
03261	02603256	P	2688		IJD	PZP01,X2	JUMP IF MORE USER PAGES	
03262	01003250	P	2689		UJP	PAGEZX2	RETURN	

2691  
2692

```

*****
*
* ROUTINE TO RETURN A BLOCK OF MEMORY TO THE FREE STORAGE LIST
* CALL WITH THE BASE TWO LOG OF THE BLOCK SIZE IN INDEX 3 AND
* THE ADDRESS OF THE BLOCK IN THE A REGISTER AND EXECUTE AN
* RTJ FREEMEM RETURN THE BLOCK OF MEMORY
*
*****

```

2701  
2702  
2703  
2704  
2705  
2706  
2707  
2708  
2709  
2710  
2711  
2712

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03263 01000000
03264 77730000
03265 21303357 P
03266 44303357 P
03267 41703357 P
03270 14600001
03271 34303372 P
03272 01003263 P

```

```

FREEMEM UJP IMPURE
VFD A12/DINT PREVENT INTERFERENCE
LDQ FRPTR,X3 LOAD THE FREE STORAGE POINTER
SWA FRPTR,X3 ADVANCE THE PCINTER
STQ,I FRPTR,X3 LINK THE BLOCK IN
ENA 1
RAD FRCNT,X3 INCREMENT THE COUNTER
UJP FREEMEM RETURN

```

2714  
2715  
2716  
2717  
2718  
2719  
2720  
2721  
2722

```

*****
*
* ROUTINE TO RETURN A LINKED LIST OF BLOCKS TO THE FREE STORAGE
* LIST. CALL WITH THE BASE TWO LOG OF THE BLOCK SIZE IN INDEX
* THREE, THE FIRST ADDRESS IN THE A REGISTER, AND THE ENDING
* BLOCK ADDRESS IN INDEX TWO, AND THE COUNT OF BLOCKS IN INDEX
* ONE, AND EXECUTE AN
* RTJ FREECHN FREE THE LINKED LIST
* WITH THE INTERRUPTS DISABLED
*
*****

```

2724  
2725  
2726  
2727  
2728  
2729  
2730  
2731

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03273 01000000
03274 21303357 P
03275 44303357 P
03276 41200000
03277 53100000
03300 34303372 P
03301 01003273 P

```

```

FREECHN UJP IMPURE
LDQ FRPTR,X3
SWA FRPTR,X3
STQ 0,X2
TIA X1
RAD FRCNT,X3
UJP FREECHN

```



Job ID	Address	Label	Mode	Priority	Description
	02375	2734			
		2735	SIM02	EQU	*-SIM01 USED FOR SYSTEM SIMULATION
03302	44254446	2736			
		2737	RPARMSG	BCD	6, MEMORY PARITY ERROR XXX^
03310	54546031	2738			
	00020	2738+001	ILWERM	BCD	4, ** ILLWRITE ERR^
		2738+002	ILWERML	EQU,C	*-ILWERM
03314	00000000	2738+003			
		2739	INHIBIT	VFD	A24/IMPURE NON-ZERO SEZ AVCID CSP
	00001	2740			
	00002	2741	FSWAITB	EQU	1B FREE STORAGE WAIT
	00004	2742	OPIBIT	EQU	2B OPERATOR INHIBIT
	00010	2743	DISKIBT	EQU	4B EXPAND DISK TABLES INHIBIT
	00020	2744	NOENDBIT	EQU	10B SEZZ THAT END HAS BEEN LOADED
	00040	2745	DIEBIT	EQU	20B PUT END ROUTINE IN DIE MODE
	00100	2746	IRUNBIT	EQU	40B SEZ INITIAL IS RUNNING, DONT END
	00200	2747	SUSBIT	EQU	100B SUSPEND BATCH - DEVICE OPERATION
	00120	2748	RUNIBIT	EQU	200B
	00050	2749	DIEPSUS	EQU	DIEBIT+SUSBIT
		2750	IRUNPEND	EQU	IRUNBIT+NOENDBIT
	77776	2751			
	77775	2752	NFSWAITB	EQU	-FSWAITB
	77773	2753	NOPIBIT	EQU	-OPIBIT
	77737	2754	NDISKIBT	EQU	-DISKIBT
		2755	NIRUNBIT	EQU	-IRUNBIT
03315	00077777	2756			
03316	14300000	2756+001	TAPESAVL	VFD	A9/0,A15/TPUNITS NUMBER OF TAPE UNITS AVAILABLE
03320	00000000	2757	RMINCON	OCT	14300000,77664156 ENI IMPURE,X3 / AIS 156
03321	00000000	2758	LIBLAD	VFD	A24/IMPURE LAST LIBRARY BLOCK NUMBER
	03322 P	2759	IRTEMP1	VFD	A24/IMPURE,A24/IMPURE
		2760	IRTEMP2	EQU	IRTEMP1+1
03323	00002662	2761	RPSAPTR	VFD	09/000,A15/IDLE PSA POINTER FOR CURRENT USER
03324	00000000	2762	PRTYPSA	VFD	09/000,A15/IMPURE LAST PSA THAT WAS DELAYED
03325	00000000	2763	RMSWAPQ	VFD	A6/IMPURE,03/0,A15/IMPURE FRONT OF SECONDARY QUEUE.
03326	00003326	2764	PISWAPQ	VFD	A9/IMPURE,A15/**IMPURE PUSH-THROUGH SWAP QUEUE.
03327	00000000	2765	MEMARRAY	VFD	A24/IMPURE
03330	00000000	2766	RLEVEL	VFD	A24/IMPURE RECURSION LEVEL FOR GETMEM
03331	00000000	2767	XTEMP	VFD	A6/IMPURE,03/0,A15/IMPURE
	15544 P	2768	OSRSAVE	EQU,C	XTEMP 1 CHARACTER OF TEMPORARY STORAGE
03332	00000000	2769	PARTEMP	VFD	A24/IMPURE,A24/IMPURE
03334	00000000	2770	XFLAG	VFD	A6/IMPURE,03/0,A15/IMPURE
03335	77777775	2771	FPCNT	VFD	A24/IMPURE-2 NUMBER OF FREE PAGES (STEALABLE)
03336	00000000	2772	L1TEMP1	VFD	A24/IMPURE,A24/IMPURE LEVEL 1 SWAPPER TEMPS
	03337 P	2773	L1TEMP2	EQU	L1TEMP1+1
03340	00000000	2774	PAGEAGE	VFD	A24/IMPURE DATE OF OLDEST PAGE
03341	00000000	2775	LOWVALPN	VFD	A24/IMPURE PAGE NUMBER OF LOW-VALUE PAGE.
03342	01000000	2776	PVALEXIT	UJP	IMPURE PAGEVALU RETURN ADDRESS
03343	00000000	2777	LSWAPUNT	VFD	A9/0,A15/IMPURE NEXT SWAP UNIT NUMBER-FSWAPUNT
03344	00000000	2778	AGELIMIT	VFD	A24/IMPURE
03345	01020001	2779	FCPT	OCT	01020001 01 SEZ LEAVE THINGS AS THEY ARE
		2780	*		00 SEZ TO MAKE FILE CORE BLOCKS
		2781	*		02 SEZ TO MAKE PAGES
03346	00000000	2782	EPAGECNT	VFD	A24/IMPURE NUMBER OF EMPTY PAGES
03347	00000000	2783	EPFCOUNT	VFD	A24/IMPURE NUMBER OF EMPTY FC PAGES
03350	00000000	2784	FCPAGELV	VFD	A24/IMPURE + = MAKE PAGES, - = MAKE FC BLOCKS
03351	00000000	2785	NRESB	VFD	A9/0,A15/IMPURE NUMBER OF FC BLOCKS TO RESERVE
03352	00000000	2786	TEMP6	VFD	A9/0,A15/IMPURE
03353	00000000	2787	FCBBUSY	VFD	A9/0,A15/IMPURE ZERO IF A PAGE CAN BE MADE
03354	04210421	2788	EPFLAG	VFD	A24/IMPURE+04210421B SSH SKIP EVERY 4TH TIME
03355	00000000	2789	REQPAGE	VFD	A24/IMPURE NON-ZERO IF PAGE TO FC IN PROGRES
03356	00000000	2790	SFLAG	VFD	A24/IMPURE SSH FLAG SEZ WHEN TO SCHEDULE
03357	00000000	2791	FRPTR	OCT	0,0,0,0,0,0,0,0,0,0,0
03372	00000000	2792	FRCNT	OCT	0,0,0,0,0,0,0,0,0,0,0
	03375 P	2793	FRCNTP3	EQU	FRCNT+3
		2794			END

NO LINES WITH ERRORS















QTABLE	X		187	2272	02521P	2290	02565P						
* RADTTY	X		188										
* RADUNIT	X		189										
RDIST		00006	115	117	02514P								
READ	X		190	1558	01551P								
RECREATE		00142P	438	432	00134P								
REGSAVE	X		191	358	00044P	463	00153P						
REQPAGE		03355P	2789	1997	02235P	2000	02240P	2135	02405P	2144	02416P	2156	02432P
RESERVED	X		274	1914	02143P	1981	02227P						
RETURN	X		192	785+3	00611P	894	00737P	988	01051P	1165	01260P	2115	02375P
				2644	03213P								
REWRITE	X		193	1925	02156P								
RF	X		194	2097	02353P	2098	02354P						
* RF77	X		195										
RIS		00550	255	486	00201P	572	00314P	699	00464P	724	00512P	1022	01062P
				1094	01163P	1102	01171P	1112	01203P	1170	01261P	1177	01270P
				1094	01163P	2637	03206P						
RLEVEL		03330P	2766	2573	03112P								
RM3ARF		00622P	793	696	00461P								
RMCHAIN	E	01062P	1022	88	00000P	801	00627P						
RMCHAIN1		01064P	1024	1055	01121P								
RMCHAIN2		01070P	1028	1074	01142P								
RMCHAIN3		01107P	1045	1029	01071P								
RMCHAIN4		01122P	1058	1026	01066P								
RMCHAIN6		01143P	1076	1032	01074P								
RMCHAIN7		01144P	1077	1099	01170P								
RMCHAIN8		01151P	1084	1039	01103P								
RMCHAIN9		01162P	1093	1087	01154P								
RMDONE	E	01046P	984	89	00000P	386	00075P	958	01022P	1006	01061P		
RMHAULIN		00750P	909	884	00725P								
RMINCON		03316P	2757	815	00641P	827	00655P	1142	01231P				
RMINDR		01171P	1102	794	00623P								
RMINDT		01072P	1030	1105	01174P								
RMININT		01226P	1139	1130	01215P	1133	01220P	1136	01223P				
RMINLOOP		01173P	1104	1119	01212P								
RMLJANC		02346P	2091	2263	02513P								
RMNODLAY		01023P	960	956	01020P								
RMOK		00755P	918	910	00751P								
RMOSR		00703P	862	540	00260P	588	00327P	601	00342P	618	00360P		
RMP02		00773P	934	947	01010P								
R P04		01010P	947	932	00772P	937	00776P	939	01000P	942	01003P	944	01005P
RMPACKRF		02350P	2094	2102	02360P								
RMPAGEIN		00705P	867	479	00172P	809	00637P						
RMPF01		02352P	2096	2094	02350P								
RMPF02		02355P	2099	2095	02351P								
RMPLAGUE		00625P	799	567	00310P								
RMPUREQ		00740P	898	886	00727P								
RMQ03		01041P	976	1000	01055P								
RMQ04X		01043P	979	905	00747P								
RMQ07		01052P	996	968	01032P	971	01035P						
RMRS		01023P	959	924	00762P								
RMRTJ		01261P	1170	1163	01256P								
RMSDLAY		01016P	954	950	01012P								
RMSW1		02304P	2042	1730	01753P								
RMSW2		02306P	2044	2037	02301P								
RMSW3		01736P	1716	1729	01752P								
RMSW4		01750P	1727	1719	01741P								
RMSW5		02255P	2017	2044	02306P								
RMSW5.0		02256P	2017+1	2013+4	02254P								
RMSW6		02277P	2035	2023	02263P	2030	02272P	2032	02274P				
RMSW8		02310P	2046	1726	01747P								
* RMSW9		02315P	2051										
RMSWAP		03057P	2520	2521	03060P	983	01045P						
RMSWAPQ	E	03325P	2763	90	00000P	997	01052P	999	01054P	1502	01507P	1506	01513P
				2664	03235P								2663
				91	00000P								
RMTERM	E	01056P	1003	2041	02303P								
RMTIMEUP		01705P	1689	795	00624P								
RMZORCH		00630P	802	484	00177P	570	00312P	697	00462P	709	00473P	1041	01105P
ROS		00554	256	1085	01152P	1110	01201P	1175	01266P				1048
				324	00016P	326	00020P						
RPARMSG	E	03302P	2737	92	00000P	383	00072P	550	00270P	604	00343P	629	00372P
RPSAPTR	E	03323P	2761	653	00414P	669	00434P	736	00526P	764	00562P	786	00616P
				867	00705P	902	00744P	954	01016P	1003	01056P	1139	01226P
				1178	01271P	1689	01705P	1704	01722P	1715	01735P	2061	02327P
				2092	02346P	2103	02361P	2262	02512P	2425	02766P	2068	02332P
RTN	X		196	2154	02430P								
RTNCOUNT	X		197	1851	02071P	2003	02243P						
RUNIBIT	E	00200	2748	93	00000P	1708	01726P						
RUNIDLE		02250P	2012	1699	01715P	1709	01727P						

SCHED		01754P	1742	1711	01731P								
SCREAM	X		198	467	00156P								
SCV01		02033P	1809	1826	02054P								
SCV02		02051P	1823	1812	02036P	1821	02047P						
SCV03		02052P	1824	1810	02034P								
SCV04		02053P	1825	1785	02016P								
SCV06		02050P	1822	1818	02044P								
SELECT	X		199	2319	02625P								
SETN	E	02503P	2244	94	00000P	2247	02506P						
* SETRET		00671P	849										
SETUP	E	00640P	814	95	00000P								
SFLAG		03356P	2790	927	00765P	1710	01730P	2005	02244P	2007	02246P		
SIM01	E	00705P	865	2735	03302P	96	00000P						
SIM02	E	02375	2735	97	00000P								
STAT		00000	231+1	2013+1	02252P	2013+6	02255P						
SUSBIT	E	00100	2747	2749	03315P	98	00000P						
SVAL10		01763P	1757	1779	02011P								
SVAL12		02005P	1775	1769	01777P	1771	02001P	1799	02032P				
SVAL13		02007P	1777	1773	02003P								
SVAL14		02011P	1779	1758	01764P	1789	02021P	1793	02025P	1797	02030P		
SVAL15		02017P	1787	1776	02006P								
SVAL16		02027P	1796	1765	01773P								
SVAL18		02026P	1795	1764	01772P								
SWAP	X		200	1471	01465P	1561	01554P						
SWAP1		03015P	2467	1474	01467P								
SWAP2		03027P	2489	1564	01556P	2492	03031P						
SWAPBIT	X		201	2668	03241P								
SWAPER10		01404P	1407	2532	03064P								
SWAPER16		01450P	1450	1437	01440P								
SWAPER22		03017P	2478	2464	03014P								
SWAPER30		01470P	1482	1425	01424P	1426	01425P						
SWAPER32		01473P	1491	1424	01423P								
SWAPER34		01476P	1495	2486	03026P								
SWAPER42		01515P	1509	1504	01511P								
SWAPER48		01526P	1521	1512	01517P								
SWAPER50		01533P	1528	1507	01514P								
SWAPER53		01557P	1573	1551	01543P								
SWAPER54		01606P	1609	2494	03033P								
SWAPER60		01620P	1621	1633	01633P								
SWAPER62		01634P	1635	1624	01622P								
SWAPER64		01636P	1639	1613	01615P								
SWAPER65		01660P	1659	2513	03054P								
SWAPER66		01700P	1678	1578	01563P								
SWAPER68		01702P	1682	1519	01525P								
SWAPER98		03063P	2529	1233	01327P								
SWAPER99		03060P	2523	1685	01704P								
SWAPEXIT	E	03055P	2516	99	00000P	1214	01307P	1219	01314P	1413	01411P	2527	03062P
SWAPMPE1		03006P	2457	1473	01466P								
SWAPNUMB		03060P	2525	1232	01326P	1415	01413P	1684	01703P	1840	02056P		
SWAPPC	E	03057P	2521	100	00000P	1204	01275P	1936	02165P	2479	03017P	2491	03030P
SWAPPE2		03034P	2496	1563	01555P	2499	03036P						
SWAPRTN1		01466P	1473	1429	01430P								
SWAPRTN2		01555P	1563	1534	01534P								
SWAPSTR	E	01045P	982	101	00000P								
SWAPX1		03055P	2517	1205	01276P								
SWAPX3		03056P	2518	1206	01277P								
SWAPZP		01570P	1593	1556	01550P								
SWBIT	X		202	985	01046P	1670	01672P	1693	01711P	2229	02474P		
SWITCH	E	01715P	1698	102	00000P								
SWITCHX		01724P	1706	1701	01717P	2008	02247P						
SYSCM	X		203	938	00777P	2031	02273P	2358	02676P				
SYSCODE	X		204	2285	02560P								
SYSERR	X		205	337	00033P	338	00034P	342	00040P	414	00112P	415	00113P
				2582	03122P	2608	03152P						
T1	X		206	814	00640P	836	00666P	1077	01144P	1095	01164P	1141	01230P
				1173	01264P								
T2	X		207	817	00643P	1042	01106P	1059	01123P	1081	01150P	1154	01245P
T3	X		208	1023	01063P	1027	01067P	1047	01111P	1049	01113P	1051	01115P
				1064	01130P	1069	01135P	1073	01141P	1076	01143P	1079	01146P
				1103	01172P	1109	01200P	1111	01202P	1118	01211P	1144	01233P
T4	X		209	830	00660P	1034	01076P						
T5	X		210	832	00662P	1040	01104P	1080	01147P	1084	01151P	1172	01263P
* TAPESAVL	E	03315P	2756+1	102+1	00000P	2273+9	02533P	2282+2	02552P				
* TBATCHN	X		211										
TEMP6		03352P	2786	1907	02134P	1938	02167P	1939	02170P	1941	02172P	1952	02205P
TERMINAL	X		212	2046	02310P	2363	02703P	2415	02754P				
* TFL		00007	97										
TIMAD		00012	119	120	02514P								
TIMECUT	X		213	2026	02266P	2033	02275P						

TIMEKILL	X		214	1703	01721P														
TIMELEFT	X		215	1691	01707P	1705	01723P	1724	01745P	2018	02256P	2019	02257P	2050	02314P				
TIMEUP		02303P	2041	1702	01720P	2051	02315P												
TIMSET	X		216	2052	02316P														
TOTALTIM	X		217	2020	02260P	2021	02261P												
TPUNITS	X		217+1	2756+1	03315P														
TRUNTIME	X		218	2022	02262P														
UDBITS	X		219	969	01033P	1790	02022P												
UDESTLP	X		219+1	2320+9	02637P														
UTAPEMAX	X		219+2	2282+5	02555P														
* UWBRET		00020	126																
UWBWC		00017	125	126	02514P	127	02514P												
UWBX3		00021	127	130	02514P														
UWMAX		00024	132	137	02514P														
* UWMAXA		00027	144																
VALUE	X		220	1820	02046P														
VMM	X		221	609	00350P	613	00353P	861	00702P	871	00711P	1212	01305P	1213	01306P				
VMMASK		00000P	226	2580	03120P														
VMMMASK	X		224+1	1554	01546P	2538	03067P												
WCNT		00010	117	118	02514P														
X1		00001	261	371	00061P	378	00070P	489	00204P	490	00205P	491	00206P	493	00210P				
				546	00264P	555	00275P	560	00301P	569	00311P	565	00416P	661	00424P				
				665	00430P	667	00432P	685	00446P	706	00470P	710	00474P	716	00502P				
				717	00503P	718	00504P	730	00520P	731	00521P	735	00525P	755	00551P				
				778	00600P	793	00622P	802	00630P	809	00637P	849	00671P	855	00674P				
				856	00675P	857	00676P	858	00677P	859	00700P	868	00706P	890	00733P				
				893	00736P	930	00770P	931	00771P	947	01010P	954	01016P	955	01017P				
				966	01030P	969	01033P	981	01044P	1063	01127P	1205	01276P	1223	01316P				
				1224	01317P	1228	01322P	1229	01323P	1260	01337P	1262	01340P	1266	01344P				
				1285	01365P	1286	01366P	1288	01367P	1291	01371P	1292	01372P	1304	01402P				
				1421	01421P	1422	01422P	1439	01441P	1440	01442P	1442	01444P	1443	01445P				
				1452	01451P	1453	01452P	1459	01460P	1460	01461P	1493	01474P	1498	01504P				
				1500	01506P	1514	01520P	1516	01522P	1575	01560P	1582	01567P	1614	01616P				
				1615	01617P	1622	01620P	1623	01621P	1625	01623P	1629	01627P	1632	01632P				
				1643	01640P	1644	01641P	1646	01643P	1651	01650P	1656	01655P	1665	01665P				
				1666	01666P	1668	01670P	1669	01671P	1689	01705P	1691	01707P	1706	01724P				
				1729	01752P	1756	01762P	1757	01763P	1761	01767P	1779	02011P	1814	02040P				
				1815	02041P	1817	02043P	1820	02046P	1875	02107P	1878	02112P	1881	02115P				
				1882	02116P	1923	02154P	1924	02155P	1929	02162P	1930	02163P	1938	02167P				
				1940	02171P	1944	02175P	1948	02201P	1951	02204P	1952	02205P	1961	02216P				
				2013+3	02253P	2043	02305P	2044	02306P	2093	02347P	2094	02350P	2095	02351P				
				2101	02357P	2136	02406P	2145	02417P	2157	02433P	2160	02436P	2266	02514P				
				2272	02521P	2273+2	02524P	2273+4	02526P	2273+7	02531P	2274	02540P	2275	02541P				
				2280	02546P	2288	02563P	2290	02565P	2291	02566P	2307+3	02612P	2309	02615P				
				2313	02621P	2314	02622P	2315	02623P	2320+1	02627P	2320+2	02630P	2320+5	02633P				
				2320+6	02634P	2339	02653P	2361	02701P	2366	02706P	2368	02710P	2375	02717P				
				2376	02720P	2380	02723P	2384	02727P	2404	02741P	2405	02742P	2406	02743P				
				2407	02744P	2411	02750P	2417	02756P	2417+2	02760P	2420	02761P	2428	02771P				
				2429	02772P	2437	03002P	2440	03004P	2459	03007P	2460	03010P	2464	03014P				
				2469	03016P	2480	03020P	2481	03021P	2484	03024P	2517	03055P	2577	03115P				
				2579	03117P	2581	03121P	2583	03123P	2587	03127P	2592	03133P	2604	03146P				
				2610	03154P	2619	03165P	2729	03277P										
X2		00002	262	314	00004P	321	00013P	324	00016P	325	00017P	328	00022P	334	00030P				
				335	00031P	336	00032P	357	00043P	360	00046P	362	00050P	363	00051P				
				365	00053P	379	00071P	396	00100P	397	00101P	400	00104P	401	00105P				
				411	00107P	412	00110P	413	00111P	427	00127P	430	00132P	435	00137P				
				438	00142P	439	00143P	441	00145P	472	00163P	476	00167P	477	00170P				
				537	00255P	538	00256P	551	00271P	552	00272P	564	00305P	565	00306P				
				583	00322P	587	00326P	594	00333P	598	00337P	599	00340P	606	00345P				
				630	00373P	631	00374P	632	00375P	638	00403P	669	00434P	670	00435P				
				687	00450P	688	00451P	693	00456P	694	00457P	721	00507P	726	00514P				
				728	00516P	729	00517P	733	00523P	785+3	00611P	869	00707P	870	00710P				
				887	00730P	1061	01125P	1208	01301P	1209	01302P	1211	01304P	1212	01305P				
				1213	01306P	1251	01330P	1267	01345P	1268	01346P	1409	01405P	1411	01407P				
				1412	01410P	1416	01414P	1418	01416P	1431	01432P	1432	01433P	1435	01436P				
				1444	01446P	1454	01453P	1457	01456P	1462	01462P	1483	01470P	1546	01536P				
				1547	01537P	1555	01547P	1558	01551P	1594	01570P	1598	01574P	1599	01575P				
				1600	01576P	1601	01577P	1602	01600P	1603	01601P	1604	01602P	1607	01605P				
				1612	01614P	1642	01637P	1653	01652P	1664	01664P	1674	01675P	1704	01722P				
				1705	01723P	1712	01732P	1720	01742P	1722	01743P	1730	01753P	1762	01770P				
				1763	01771P	1782	02013P	1822	02050P	1855	02075P	1905	02132P	1915	02144P				
				1920	02151P	2056	02322P	2058	02324P	2059	02325P	2068	02332P	2069	02333P				
				2074	02340P	2077	02343P	2079	02345P	2097	02353P	2102	02360P	2133	02403P				
				2139	02411P	2262	02512P	2281	02547P	2292	02567P	2301+1	02601P						



X3	00003	263	2677 03250P	2681 03252P	2684 03255P	2685 03256P	2688 03261P	2728 03276P
			369 00057P	370 00060P	375 00065P	376 00066P	383 00072P	533 00251P
			541 00261P	544 00262P	577 00316P	581 00320P	591 00330P	604 00343P
			605 00344P	608 00347P	609 00350P	613 00353P	614 00354P	616 00356P
			617 00357P	623 00364P	628 00371P	645 00410P	649 00412P	650 00413P
			653 00414P	654 00415P	662 00425P	666 00431P	679 00442P	683 00444P
			707 00471P	736 00526P	737 00527P	745 00537P	747 00541P	752 00546P
			756 00552P	764 00562P	767 00565P	769 00567P	774 00574P	779 00601P
			786 00616P	803 00631P	806 00634P	807 00635P	814 00640P	816 00642P
			817 00643P	818 00644P	819 00645P	820 00646P	830 00660P	831 00661P
			832 00662P	835 00665P	836 00666P	838 00670P	861 00702P	872 00712P
			873 00713P	876 00716P	878 00720P	880 00722P	898 00740P	899 00741P
			903 00745P	904 00746P	912 00753P	921 00757P	929 00767P	934 00773P
			935 00774P	938 00777P	940 01001P	943 01004P	945 01006P	951 01013P
			961 01023P	963 01025P	965 01027P	973 01036P	998 01053P	999 01054P
			1003 01056P	1023 01063P	1027 01067P	1034 01076P	1040 01104P	1042 01106P
			1047 01111P	1049 01113P	1051 01115P	1054 01120P	1059 01123P	1064 01130P
			1069 011135P	1073 011141P	1076 011143P	1077 011144P	1079 011146P	1080 011147P
			1081 011150P	1084 011151P	1086 011153P	1095 011164P	1103 011172P	1109 011200P
			1111 011202P	1118 011211P	1139 011226P	1140 011227P	1141 011230P	1143 011232P
			1144 011233P	1145 011234P	1149 011240P	1154 011245P	1155 011246P	1158 011251P
			1160 011253P	1164 011257P	1171 011262P	1172 011263P	1173 011264P	1174 011265P
			1176 011267P	1178 011271P	1179 011272P	1180 011273P	1206 011277P	1210 011303P
			1264 011342P	1273 011352P	1275 011353P	1419 011417P	1427 011426P	1430 011431P
			1433 011434P	1434 011435P	1485 011472P	1502 011507P	1503 011510P	1505 011512P
			1510 011515P	1511 011516P	1522 011526P	1535 011535P	1550 011542P	1552 011544P
			1553 011545P	1559 011552P	1574 011557P	1576 011561P	1578 011563P	1606 011604P
			1626 011624P	1628 011626P	1630 011630P	1649 011646P	1660 011660P	1663 011663P
			1675 011676P	1696 011714P	1713 011733P	1714 011734P	1715 011735P	1716 011736P
			1723 011744P	1724 011745P	1727 011750P	1728 011751P	1759 011765P	1767 011775P
			1768 011776P	1784 02015P	1787 02017P	1790 02022P	1792 02024P	1798 02031P
			1809 02033P	1816 02042P	1819 02045P	1823 02051P	1824 02052P	1825 02053P
			1906 02133P	1907 02134P	1909 02136P	1910 02137P	1913 02142P	1916 02145P
			1922 02153P	1926 02157P	1937 02166P	1945 02176P	1947 02200P	1949 02202P
			1982 02230P	1983 02231P	1984 02232P	1985 02233P	1999 02237P	2000 02240P
			2012 02250P	2013+2 02252P	2018 02256P	2019 02257P	2020 02260P	2021 02261P
			2022 02262P	2024 02264P	2027 02267P	2029 02271P	2031 02273P	2035 02277P
			2036 02300P	2042 02304P	2045 02307P	2046 02310P	2047 02311P	2050 02314P
			2060 02326P	2092 02346P	2098 02354P	2100 02356P	2103 02361P	2104 02362P
			2106 02364P	2108 02366P	2110 02370P	2114 02374P	2116 02376P	2132 02402P
			2137 02407P	2141 02413P	2143 02415P	2148 02422P	2149 02423P	2151 02425P
			2155 02431P	2159 02435P	2182 02452P	2186 02456P	2200 02463P	2201 02464P
			2213 02467P	2214 02470P	2228 02473P	2261 02511P	2282+5 02555P	2283 02556P
			2285 02560P	2286 02561P	2297 02574P	2298 02575P	2299 02576P	2300 02577P
			2303 02603P	2319 02625P	2320+4 02632P	2320+9 02637P	2332+4 02643P	2332+6 02645P
			2332+7 02646P	2332+11 02651P	2341 02655P	2343 02657P	2344 02660P	2346 02662P
			2351 02667P	2352 02670P	2353 02671P	2355 02673P	2356 02674P	2358 02676P
			2359 02677P	2360 02700P	2363 02703P	2374 02716P	2377 02721P	2400 02735P
			2408 02745P	2412 02752P	2415 02754P	2422 02763P	2423 02764P	2426 02767P
			2479 03017P	2482 03021P	2491 03030P	2498 03035P	2501 03040P	2502 03041P
			2506 03045P	2509 03050P	2518 03056P	2560 03076P	2561 03077P	2562 03100P
			2563 03101P	2565 03103P	2568 03106P	2574 03113P	2623 03170P	2624 03171P
			2627 03174P	2628 03175P	2629 03176P	2631 03200P	2632 03201P	2635 03204P
			2638 03207P	2642 03211P	2653 03222P	2658 03227P	2659 03230P	2662 03233P
			2664 03235P	2665 03236P	2704 03265P	2705 03266P	2706 03267P	2708 03271P
			2726 03274P	2727 03275P	2730 03300P			

XFLAG	E	03334P	2770	103 00000P	1689 01671P	1692 01710P	1700 01716P	1713 01733P	2054 02320P
XNSKIP	X		222	1078 01145P					
XQUANTUM	X		223	2017 02255P					
XTEMP		03331P	2767	2768 03332P	569 00311P	571 00313P	684 00445P	698 00463P	793 00622P
				898 00740P	901 00743P	904 00746P	1723 01744P	2013+2 02252P	2042 02304P
ZEROPG	E	01274P	1203	2045 02307P					
ZROPAGE	X		224	104 00000P					
				1203 01274P					