

```
1 01 00001
2 * 01 00002
3 * 01 00003
4 * 01 00004
5 * 01 00005
6 * 01 00006
7 * 01 00007
8 * 01 00008
9 * 01 00009
10 * 01 00010
11 * 01 00011
12 * 01 00012
13 * 01 00013
14 * 01 00014
15 * 01 00015
16 * 01 00016
17 * 01 00017
18 * 01 00018
19 * 01 00019
20 * 01 00020
21 * 01 00021
22 * 01 00022
23 * 01 00023
24 * 01 00024
25 * 01 00025
26 * 01 00026
27 * 01 00027
28 * 01 00028
29 * 01 00029
30 * 01 00030
31 * 01 00031
32 * 01 00032
33 * 01 00033
34 * 01 00034
35 * 01 00035
36 * 01 00036
37 * 01 00037
38 * 01 00038
39 * 01 00039
40 * 01 00040
41 * 01 00041
42 * 01 00042
```

73/620 REAL TIME CLOCK TEST

```
***** * * ***** * * * * *
* * * * * * * * * * * * * * *
* * * * * * * * * * * * * * *
***** * * * * * * * * * *
* * * * * * * * * * * * * * *
* * * * * * * * * * * * * * *
* * * * * * * * * * * * * * *
* * * * * * * * * * * * * * *
* * * * * * * * * * * * * * *
* * * * * * * * * * * * * * *
* * * * * * * * * * * * * * *
* * * * * * * * * * * * * * *
* * * * * * * * * * * * * * *
* * * * * * * * * * * * * * *
* * * * * * * * * * * * * * *
* * * * * * * * * * * * * * *
* * * * * * * * * * * * * * *
* * * * * * * * * * * * * * *
* * * * * * * * * * * * * * *
* * * * * * * * * * * * * * *
```

THIS TEST PROGRAM IS A PART OF THE MAINTAIN II
TEST PROGRAM SYSTEM

THIS IS A COPYRIGHTED PROGRAM
COPYRIGHT 1973 BY VARIAN DATA MACHINES
V.D.M. PART NO.

```
*****
```

73/620 REAL TIME CLOCK TEST PROGRAM

73 AND 620/F: VARIABLE INTERVAL INTERRUPT, MEMORY OVERFLOW
INTERRUPT, AND READABLE FREE RUNNING COUNTER
ARE EXERCISED

620/I,L AND 622/I: INTERVAL INTERRUPT AND MEMORY OVERFLOW
INTERRUPT ARE EXERCISED

NOTE: NO SOFTWARE TIMING CHECKS ARE MADE.

43 *****01 0043

	44	EJEC			01 00044	
	45 *				01 00045	
	46 *				01 00046	
	47 *	*****			01 00047	
	48 *	*			01 00048	
	49 *	* AREAS RESERVED BY EXECUTIVE *			01 00049	
	50 *	*****			01 00050	
	51 *				01 00051	
	52 *				01 00052	
	53 *	ORG	0		01 00053	
	54 *	JMP	EXECUTIVE		01 00054	
	55 *	ORG	040		01 00055	
	56 *	JNPM	POWER DOWN ROUTINE		01 00056	
	57 *	JMP	POWER UP ROUTINE		01 00057	
	58 *	NOTE:	THE TEST EXECUTIVE ALSO RESERVES LOCATIONS 0400 TO 0477		01 00058	
	59 *		FOR A POINTER TABLE TO STANDARD ROUTINES, AND AS AN AREA		01 00059	
	60 *		FOR EXECUTIVE DATA, ALL TEST PROGRAMS WORKING WITH THE		01 00060	
	61 *		EXECUTIVE MUST PRESERVE THIS BLOCK.		01 00061	
	62 *		STANDARD ROUTINES WILL BE CALLED INDIRECTLY THRU		01 00062	
	63 *		THIS TABLE		01 00063	
	64 *				01 00064	
	65 *				01 00065	
	66 *				01 00066	
	67 *				01 00067	
	68 *				01 00068	
000400	69	ORG	0400		01 00069	
000400	70	OUTA	BSS	1	OUTPUT ONE CHAR ROUTINE	01 00070
000401	71	OUTB	BSS	1	OUTPUT TWO CHAR ROUTINE	01 00071
000402	72	OUTC	BSS	1	OUTPUT CR/LF ROUTINE	01 00072
000403	73	OUTD	BSS	1	OUTPUT MESSAGE ROUTINE	01 00073
000404	74	OUTE	BSS	1	OUTPUT OCTAL WORD ROUTINE	01 00074
000405	75	OUTF	BSS	1	OUTPUT OCTAL ADDR ROUTINE	01 00075
000406	76	OUTG	BSS	1	OUTPUT ERROR MSG ROUTINE	01 00076
000407	77	OUTH	BSS	1	OUTPUT CONTROL CHAR TO TTY ROUTINE	01 00077
000410	78	INPA	BSS	1	INPUT ONE CHAR ROUTINE	01 00078
000411	79	INPB	BSS	1	INPUT AND PRINT ONE CHAR ROUTINE	01 00079
000412	80	INPC	BSS	1	INPUT ONE CHAR EDITED ROUTINE	01 00080
000413	81	INPD	BSS	1	INPUT ONE ALPHA CHAR ROUTINE	01 00081
000414	82	INPE	BSS	1	INPUT TWO ALPHA CHAR ROUTINE	01 00082
000415	83	INPF	BSS	1	INPUT COMMA/PERIOD TERMINATION ROUTINE	01 00083
000416	84	INPG	BSS	1	INPUT OCTAL NUMBER ROUTINE	01 00084
000417	85	TOUT	BSS	1	TIME-OUT ROUTINE	01 00085

000420	86	TDLV	BSS	1	TIME DELAY	ROUTINE	01	00086
000421	87	SSWT	BSS	1	STANDARD SENSE SWITCH ROUTINE		01	00087
000422	88	SLWE	BSS	1	LOWEST WORD USED BY EXFC		01	00088
000423	89	ESZC	BSS	1	MEMORY SIZE DETERMINATION ROUTINE		01	00089
000424	90	\$MSM	BSS	1	MEMORY SIZE MESSAGE		01	00090
	91	*					01	00091
	92	*					01	00092
000440	93		ORG	0440			01	00093
	94	*					01	00094
	95	*	EXECUTIVE DATA TABLE				01	00095
	96	*					01	00096
000440	97	\$FLG	BSS	1	LOOP ON ERROR FLAG, 0=DON'T LOOP 1=LOOP		01	00097
000441	98	\$MEM	BSS	1	MEMORY SIZE (HIGHEST AVAIL CORE)		01	00098
000442	99	\$CON	BSS	1	0=CONSOLE MODE 1=TTY MODE		01	00099
000443	100		BSS	22			01	00100
000471	101	\$DCT	BSS	1	DIGIT COUNTER FOR INPG		01	00101
	102	*					01	00102
000047 A	103	RTC	EQU	047			01	00103

		104	EJEC				01 00104
000500		105	ORG	0500			01 00105
000500	001000	A 106	JMP	**7			01 00106
000501	000507	A					
000502		107	PNTQ BSS	5	INDIRECT POINTERS		01 00107
000507	005101	A 108	INCR	1	BIT SIZE DETERMINER		01 00108
000510	004260	A 109	LRLA	16			01 00109
000511	006130	A 110	ERAI	1			01 00110
000512	000001	A					
000513	001010	A 111	JAZ	**7			01 00111
000514	000522	A					
000515	006010	A 112	LDAI	18			01 00112
000516	000022	A					
000517	051156	A 113	STA	NBIT	18 BITS		01 00113
000520	001000	A 114	JMP	**5			01 00114
000521	000525	A					
000522	006010	A 115	LDAI	16			01 00115
000523	000020	A					
000524	051156	A 116	STA	NBIT	16 BITS		01 00116
000525	002000	A 117	CALL	BCNG	SET AFFECTED INSTRUCTIONS IN ARITH. SUBS.		01 00117
000526	003321	A					

			118		EJEC				01 00118
000527	100447	A	119	RTCT	EXC	0400+RTC			01 00119
000530	006020	A	120		LDBI	2			01 00120
000531	000002	A							
000532	005021	A	121		TBA		EXCEPT LOCATIONS 040 TO 043 (PF/R)		01 00121
000533	006110	A	122		DRAI	0400	INCLUSIVE-OR BIT 8 IN A REG.		01 00122
000534	000400	A							
000535	056000	A	123		STA	0,2			01 00123
000536	005122	A	124		IBR				01 00124
000537	005021	A	125		TBA				01 00125
000540	006140	A	126		SUBI	040	CHECK IF LOC 040 (POWER FAILURE RESTART		01 00126
000541	000040	A							
000542	001010	A	127		JAZ	**9	INTERRUPT ADDRESSES)		01 00127
000543	000553	A							
000544	005021	A	128		TBA				01 00128
000545	006140	A	129		SUBI	0377	CHECK IF ALL INTERRUPT LOCATIONS SETUP		01 00129
000546	000377	A							
000547	001010	A	130		JAZ	RTC1			01 00130
000550	000557	A							
000551	001000	A	131		JMP	RTCT+3			01 00131
000552	000532	A							
000553	006020	A	132		LDBI	044	JUMP OVER PF/R INTERRUPT ADDRESSES.		01 00132
000554	000044	A							
000555	001000	A	133		JMP	RTCT+3			01 00133
000556	000532	A							
000557	010442	A	134	RTCT	LDA	SCDN	CHECK IF CONSOLE MODE		01 00134
000560	001010	A	135		JAZ	RTCK			01 00135
000561	000570	A							
000562	002000	A	136		CALL*	OUTC	CR/LF		01 00136
000563	100402	A							
000564	006030	A	137		LDXI	MS1	WRITE (REAL TIME CLOCK TEST)		01 00137
000565	002767	A							
000566	002000	A	138		CALL*	OUTD			01 00138
000567	100403	A							
000570	010442	A	139	RTCK	LDA	SCDN	CHECK IF CONSOLE MODE		01 00139
000571	001010	A	140		JAZ	RTCP			01 00140
000572	000636	A							
000573	006030	A	141		LDXI	MS15	WRITE (COMPUTER IS AN)		01 00141
000574	003167	A							
000575	002000	A	142		CALL*	OUTD			01 00142
000576	100403	A							
000577	002000	A	143	RTCM	CALL*	INPB			01 00143

000600	100411	A						
000601	001000	A	144	JMP	RTCM			01 00144
000602	000577	A						
000603	005012	A	145	TAB				01 00145
000604	002000	A	146	CALL*	OUTC	CR/LF		01 00146
000605	100402	A						
000606	002000	A	147	CALL*	OUTC	CR/LF		01 00147
000607	100402	A						
000610	005021	A	148	TBA				01 00148
000611	006140	A	149	SUBI	0261	AN 'F' OR V73?		01 00149
000612	000261	A						
000613	001010	A	150	JAZ	RTCN			01 00150
000614	000627	A						
000615	006120	A	151	ADDI	1			01 00151
000616	000001	A						
000617	001010	A	152	JAZ	RTCD			01 00152
000620	000633	A						
000621	006030	A	153	LDXI	MS16	WRITE (INVALID)		01 00153
000622	003314	A						
000623	002000	A	154	CALL*	OUTD			01 00154
000624	100403	A						
000625	001000	A	155	JMP	RTCK			01 00155
000626	000570	A						
			156 *					01 00156
000627	005111	A	157	RTCN	IAR			01 00157
000630	051157	A	158	STA	COMP	SET COMPUTER FLAG FOR 'F'		01 00158
000631	001000	A	159	JMP	RTCL			01 00159
000632	000640	A						
			160 *					01 00160
000633	051157	A	161	RTCD	STA	COMP	SET COMPUTER FLAG FOR 'I'	01 00161
000634	001000	A	162	JMP	RTCL			01 00162
000635	000640	A						
			163 *					01 00163
000636	000000	A	164	RTCP	HLT	SET A=0 FOR I, OR A=1 FOR F		01 00164
000637	051157	A	165	STA	COMP	SET COMPUTER FLAG FROM REGISTER ENTRY		01 00165
000640	010442	A	166	RTCL	LDA	SCON	CHECK IF CONSOLE MODE	01 00166
000641	001010	A	167	JAZ	RTC2			01 00167
000642	000647	A						
000643	006030	A	168	LDXI	MS2	WRITE (I/O INST. AND INT. TEST)		01 00168
000644	003003	A						
000645	002000	A	169	CALL*	OUTD			01 00169
000646	100403	A						

PAGE 8 04/22/74

VORTEX DASM

1945 HOURS

		170		EJEC				01	00170
		171	*	FOLLOWING THREE TESTS PERFORM THE (VARIABLE) INTERVAL				01	00171
		172	*	INTERRUPT CHECK!				01	00172
		173	*					01	00173
000647	006010	A	174	RTC2	LDAI	1	SET ERROR COUNT TO ONE	** 1 **	01 00174
000650	000001	A							
000651	051160	A	175		STA	ERRC			01 00175
000652	006010	A	176		LDAI	02000	SET UP JUMP AND MARK IN INTERRUPT ADDRESSES		01 00176
000653	002000	A							
000654	050044	A	177		STA	044			01 00177
000655	050046	A	178		STA	046			01 00178
000656	006010	A	179		LDAI	ERRS	STORE LOC. OF ERROR SUBROUTINE AS JUMP ADDR		01 00179
000657	001165	A							
000660	050047	A	180		STA	047			01 00180
000661	006010	A	181		LDAI	RTC3	LOCATION TO RETURN UPON INTERRUPT		01 00181
000662	000677	A							
000663	050045	A	182		STA	045			01 00182
000664	006010	A	183		LDAI	*			01 00183
000665	000664	A							
000666	051155	A	184		STA	LOOP	SET LOOP ADDRESS		01 00184
000667	100447	A	185		EXC	0400+RTC	INITIALIZE RTC		01 00185
000670	100147	A	186		EXC	0100+RTC	ENABLE RTC		01 00186
000671	006030	A	187		LOXI	16	4 SEC. WAIT		01 00187
000672	000020	A							
000673	002000	A	188		CALL	TOSC			01 00188
000674	002721	A							
000675	002000	A	189		CALL	ERRS	NO INTERRUPT ERROR		01 00189
000676	001165	A							

		190	EJEC			01 00190
		191 *		ENTRANCE FROM RECEIVING INTERRUPT		01 00191
		192 *				*01 00192
000677	000000	A 193	RTCA ENTR			01 00193
000700	006010	A 194	LDAI *			01 00194
000701	000700	A				
000702	051155	A 195	STA LOOP	SET LOOP ADDR		01 00195
000703	100747	A 196	EXC 0700+RTC	INHIBIT VII		01 00196
000704	006010	A 197	LDAI 2	SET ERROR COUNT		01 00197
000705	000002	A				
000706	051160	A 198	STA ERRC			01 00198
000707	006010	A 199	LDAI ERRS	IF INTERRUPT = GO TO ERRC		01 00199
000710	001165	A				
000711	050045	A 200	STA 045			01 00200
000712	006030	A 201	LDXI 8	2 SEC. WAIT		01 00201
000713	000010	A				
000714	002000	A 202	CALL TDSC			01 00202
000715	002721	A				
000716	041160	A 203	INR ERRC	ERROR COUNT	** 3 **	01 00203
000717	006010	A 204	LDAI RTC4	LOC, TO RETURN UPON INTERRUPT		01 00204
000720	000735	A				
000721	050045	A 205	STA 045			01 00205
000722	006010	A 206	LDAI *			01 00206
000723	000722	A				
000724	051155	A 207	STA LOOP	SET LOOP ADDR		01 00207
000725	100647	A 208	EXC 0600+RTC	INITIALIZE VARIABLE INTERVAL INTERRUPT		01 00208
000726	100347	A 209	EXC 0300+RTC	ENABLE VII AND INHIBIT MOI		01 00209
000727	006030	A 210	LDXI 16			01 00210
000730	000020	A				
000731	002000	A 211	CALL TDSC			01 00211
000732	002721	A				
000733	002000	A 212	CALL ERRS			01 00212
000734	001165	A				

			213		EJEC				01 00213
			214	*		ENTRANCE FROM RECEIVING INTERRUPT			01 00214
			215	*					01 00215
000735	000000	A	216	RTC4	ENTR				01 00216
000736	100447	A	217		EXC	0400+RTC	INITIALIZE RTC		01 00217
000737	006010	A	218		LDAI	ERRS			01 00218
000740	001165	A							
000741	050045	A	219		STA	045			01 00219
000742	010442	A	220		LDA	\$CON	CHECK IF CONSOLE MODE		01 00220
000743	001010	A	221		JAZ	**13			01 00221
000744	000760	A							
000745	011157	A	222		LDA	COMP			01 00222
000746	001010	A	223		JAZ	**6			01 00223
000747	000754	A							
000750	006030	A	224		LDXI	MES4	WRITE (VARIABLE)		01 00224
000751	003035	A							
000752	002000	A	225		CALL*	OUTD			01 00225
000753	100403	A							
000754	006030	A	226		LDXI	MESA	TYPE (INTERVAL INTERRUPT)		01 00226
000755	003042	A							
000756	002000	A	227		CALL*	OUTD			01 00227
000757	100403	A							

			250		EJEC				01 00250
001013	000000	A	251	RTCS	ENTR				01 00251
001014	100147	A	252		EXC	0100+RTC	ENABLE RTC	*****	
001015	100247	A	253		EXC	0200+RTC	INHIBIT MOI		01 00252
001016	041160	A	254		INR	ERRC	ERROR COUNT	** 5 **	01 00253
001017	010045	A	255		LDA	045			01 00254
001020	006140	A	256		SUBI	040001			01 00255
001021	040001	A							
001022	001010	A	257		JAZ	*+5			01 00256
001023	001027	A							
001024	100447	A	258	RTCS	EXC	0400+RTC	ERROR INITIALIZE RTC		01 00257
001025	002000	A	259		CALL	ERRS			01 00258
001026	001165	A							
001027	011163	A	260		LDA	CNTL	CHECK IF TEST TRIED 50 TIMES		01 00259
001030	041163	A	261		INR	CNTL			01 00260
001031	006140	A	262		SUBI	50			01 00261
001032	000062	A							
001033	001002	A	263		JAP	RTTC			01 00262
001034	001042	A							
001035	006010	A	264		LDAI	04	RE-SETUP ERROR COUNT.		01 00263
001036	000004	A							
001037	051160	A	265		STA	ERRC			01 00264
001040	001000	A	266		JMP	RTT4			01 00265
001041	001000	A							

			267	EJEC					01 00266
001042	041160	A	268	RTTC	INR	ERRC	ERROR COUNT	** 6 **	01 00267
001043	006010	A	269		LDAI	ERRS	SET INTERRUPT ADDRESS TO ERROR SUBR.		01 00268
001044	001165	A							
001045	050047	A	270		STA	047			01 00269
001046	006030	A	271		LDXI	2	1/2 SECOND DELAY		01 00270
001047	000002	A							
001050	002000	A	272		CALL	TDSC			01 00271
001051	002721	A							
001052	041160	A	273		INR	ERRC	ERROR COUNT	** 7 **	01 00272
001053	010045	A	274		LDA	045	LOCATION 45 MUST BE GREATER THAN 40001		01 00273
001054	006140	A	275		SUBI	040001			01 00274
001055	040001	A							
001056	001010	A	276		JAZ	RTC6			01 00275
001057	001024	A							
001060	041160	A	277		INR	ERRC	ERROR 8 CHECK - INHIBIT MOI	** 10 **	01 00276
001061	006010	A	278		LDAI	*			01 00277
001062	001061	A							
001063	051155	A	279		STA	LOOP	SET LOOP ADDR		01 00278
001064	100447	A	280		EXC	0400+RTC	INITIALIZE RTC		01 00279
001065	006010	A	281		LDAI	037775			01 00280
001066	037775	A							
001067	050045	A	282		STA	045			01 00281
001070	006010	A	283		LDAI	ERRS	IF INTERRUPT GO TO ERROR ROUTINE		01 00282
001071	001165	A							
001072	050047	A	284		STA	047			01 00283
001073	100347	A	285		EXC	0300+RTC			01 00284
001074	006030	A	286		LDXI	4	1 SECOND DELAY		01 00285
001075	000004	A							
001076	002000	A	287		CALL	TDSC			01 00286
001077	002731	A							
001100	100447	A	288		EXC	0400+RTC	INITIALIZE RTC		01 00287
001101	010442	A	289		LDA	SCON			01 00288
001102	001010	A	290		JAZ	**6			01 00289
001103	001110	A							
001104	006030	A	291		LDXI	MESS	WRITE MESSAGE MOI		01 00290
001105	003061	A							
001106	002000	A	292		CALL*	OUTD			01 00291
001107	100403	A							
001110	011157	A	293		LDA	COMP			01 00292
001111	001010	A	294		JAZ	RT10	SKIP FREE RUNNING COUNTER CHECK FOR I'S		01 00293
001112	001217	A							

PAGE 15 04/22/74

VORTEX DASHR

1945 HOURS

		295	EJEC					01 00294
		296 *		CHECK FREE RUNNING				01 00295
		297 *		CHECK CLEAR OPTION OF FREE RUNNING COUNTER				01 00296
		298 *		CHECK IF FRC INCREMENTING				01 00297
001113	041160	A 299	INR	ERRC	ERROR COUNT = 11		** 11 **	01 00298
001114	006010	A 300	LDAI	*				01 00299
001115	001114	A						
001116	051155	A 301	STA	LOOP	SET LOOP ADDR			01 00300
001117	100047	A 302	EXC	RTC	CLEAR FREE RUNNING COUNTER			01 00301
001120	102547	A 303	CIA	RTC	INPUT FREE RUNNING COUNTER TO A			01 00302
001121	051161	A 304	STA	RTSA				01 00303
001122	006030	A 305	LDXI	2	DELAY 1/2 SEC.			01 00304
001123	000002	A						
001124	002000	A 306	CALL	TDSC				01 00305
001125	002721	A						
001126	102547	A 307	CIA	RTC	INPUT FRC TO A			01 00306
001127	141161	A 308	SUB	RTSA	IF COUNTER ZERO FRC NOT			01 00307
001130	002010	A 309	JAZM	ERRS	INCREMENTING CORRECTLY.			01 00308
001131	001165	A						
001132	041160	A 310	INR	ERRC	ERROR COUNT		** 12 **	01 00309
001133	006010	A 311	LDAI	*				01 00310
001134	001133	A						
001135	051155	A 312	STA	LOOP	SET LOOP ADDR			01 00311
001136	100047	A 313	EXC	RTC	CLEAR FRC			01 00312
001137	102547	A 314	CIA	RTC	INPUT FRC			01 00313
001140	001010	A 315	JAZ	**4				01 00314
001141	001144	A						
001142	002000	A 316	CALL	ERRS				01 00315
001143	001165	A						
001144	010442	A 317	RTC9	LDA	\$CON	TEST IF CONTINUE MODE.		01 00316
001145	001010	A 318	JAZ	RT10				01 00317
001146	001217	A						
001147	006030	A 319	LDXI	MES6	OUTPUT FRC (TEST COMPLETE)			01 00318
001150	003103	A						
001151	002000	A 320	CALL*	OUTD				01 00319
001152	100403	A						
001153	001000	A 321	JMP	RT10				01 00320
001154	001217	A						

			322	EJEC					01	00321
			323	*****					01	00322
			324	*	FLAGS, PRINTER AND MESSAGE BUFFERS				01	00323
			325	*****					01	00324
001155	000000	A	326	LOOP	DATA	0	ADDRESS FOR LOOPING ON ERRORS		01	00325
001156	000000	A	327	NBIT	DATA	0			01	00326
001157	000000	A	328	COMP	DATA	0			01	00327
001160	000000	A	329	ERRC	DATA	0			01	00328
001161	000000	A	330	RTSA	DATA	0			01	00329
001162	000000	A	331	TMSV	DATA	0	TEMP. STORAGE		01	00330
001163	000000	A	332	CNTL	DATA	0			01	00331
001164	000000	A	333	PINT	DATA	0			01	00332

			356	EJEC			01	00355
			357	*****			*01	00356
			358	*			*01	00357
			359	*	THE OPERATOR IS REQUESTED TO INPUT HARDWARE SETUP		*01	00358
			360	*			*01	00359
			361	*****			*01	00360
001217	005001	A	362	RT10 TZA	CLEAR PRINT FLAG		01	00361
001220	051164	A	363	STA PINT			01	00362
001221	010442	A	364	LDA \$CON	CHECK IF CONSOLE MODE.		01	00363
001222	001010	A	365	JAZ RT13			01	00364
001223	001265	A						
001224	002000	A	366	CALL* OUTC	CR/LF		01	00365
001225	100402	A						
001226	011157	A	367	LDA COMP			01	00366
001227	001010	A	368	JAZ **15			01	00367
001230	001246	A						
001231	006030	A	369	LDXI MES7	WRITE (INPUT FRC INCREMENTS PER SEC)		01	00368
001232	003122	A						
001233	002000	A	370	CALL* OUTD			01	00369
001234	100403	A						
001235	002000	A	371	CALL IPDC	INPUT DECIMAL NUMBER (DOUBLE PRECISION)		01	00370
001236	002337	A						
001237	052306	A	372	STA FROM			01	00371
001240	052307	A	373	STB FROM+1			01	00372
			374	* COMPUTE INTERRUPTS PER MIN			01	00373
			375	* THESE WILL BE USED LATER IN COMPUTING ELAPSED TIME			01	00374
001241	002000	A	376	CALL XDIM,D60			01	00375
001242	003402	A						
001243	002334	A						
001244	052324	A	377	STA IFM			01	00376
001245	052325	A	378	STB IFM+1			01	00377
001246	006030	A	379	LDXI MES8	WRITE (INPUT BASIC INTERRUPTS PER SEC)		01	00378
001247	003144	A						
001250	002000	A	380	CALL* OUTD			01	00379
001251	100403	A						
001252	002000	A	381	CALL IPDC			01	00380
001253	002337	A						
001254	052310	A	382	STA VIIF	INPUT DECIMAL NUMBER. (DOUBLE PRECISION)		01	00381
001255	052311	A	383	STB VIIF+1			01	00382
001256	002000	A	384	CALL XDIM,D60			01	00383
001257	003402	A						
001260	002334	A						

001261	052326	A	385	STA	IVM		01	00384
001262	052327	A	386	STB	IVM+1		01	00385
001263	001000	A	387	JMP	ITT	BGN INTERRUPT TIMING TEST	01	00386
001264	001320	A						
001265	011157	A	388	RT13	LDA	COMP	01	00387
001266	001010	A	389	JAZ	*+13	CONSOLE MODE	01	00388
001267	001303	A						
001270	005001	A	390	TZA			01	00389
001271	005002	A	391	TZB			01	00390
001272	005004	A	392	TZX			01	00391
001273	000020	A	393	HLT	020		01	00392
001274	052306	A	394	STA	FROM	INPUT IN A AND B REG. FRC INCR IN MICROSEC.	01	00393
001275	052307	A	395	STB	FROM+1	(DOUBLE-PRECISION) (OCTAL)	01	00394
001276	002000	A	396	CALL	XDIM,060	COMPUTE INTERRUPTS PER MIN	01	00395
001277	003402	A						
001300	002334	A						
001301	052324	A	397	STA	IFM		01	00396
001302	052325	A	398	STB	IFM+1		01	00397
001303	005004	A	399	TZX			01	00398
001304	005001	A	400	TZA			01	00399
001305	005002	A	401	TZB			01	00400
001306	000021	A	402	HLT	021		01	00401
001307	052310	A	403	STA	VIIF	INPUT IN A AND B REG. VII SOURCE FREQ.	01	00402
001310	052311	A	404	STB	VIIF+1	IN HZ, IN DOUBLE PRECISION (OCTAL)	01	00403
001311	002000	A	405	CALL	XDIM,060	COMPUTE INTERRUPTS PER MIN	01	00404
001312	003402	A						
001313	002334	A						
001314	052326	A	406	STA	IVM		01	00405
001315	052327	A	407	STB	IVM+1		01	00406
001316	001000	A	408	JMP	ITT	BGN INTERRUPT TIMING TEST	01	00407
001317	001320	A						

			409	EJEC			01	00408	
			410	*****			01	00409	
			411	*			*01	00410	
			412	* INTERUPT	TIMING TEST		01	00411	
			413	*			*01	00412	
			414	*****			01	00413	
001320	010442	A	415	ITT	LDA	SCON		01	00414
001321	001010	A	416		JAZ	I1		01	00415
001322	001471	A							
001323	002000	A	417		CALL*	OUTC		01	00416
001324	100402	A				CR/LF			
001325	006030	A	418		LDXI	IM1		01	00417
001326	003175	A							
001327	002000	A	419		CALL*	OUTD		01	00418
001330	100403	A				IDENTIFY TEST			
001331	011741	A	420		LDA	I151		01	00419
001332	006150	A	421		ANAI	0177700		01	00420
001333	177700	A				INIT TTY DEV ADDRESS			
001334	117000	T	422		ORA*	STTY		01	00421
001335	051741	A	423		STA	I151		01	00422
001336	006010	A	424		LDAI	1		01	00423
001337	000001	A							
001340	052323	A	425		STA	INTT		01	00424
001341	011157	A	426		LDA	COMP		01	00425
001342	001010	A	427		JAZ	I2		01	00426
001343	001402	A				INITIALIZE FOR I1 INTRVL TIMER			
001344	006030	A	428		LDXI	IM3		01	00427
001345	003212	A							
001346	002000	A	429		CALL*	OUTD		01	00428
001347	100403	A				FRC OR VII FOR INTERVAL TIMER			
001350	002000	A	430		CALL	IPDC		01	00429
001351	002337	A							
001352	052323	A	431		STB	INTT		01	00430
001353	006030	A	432	ISCR	LDXI	IM4		01	00431
001354	003223	A							
001355	002000	A	433		CALL*	OUTD		01	00432
001356	100403	A				REQUEST VII SELECT COUNT			
001357	002000	A	434		CALL	IPDC		01	00433
001360	002337	A							
			435	*	IF ZERO, SET TO HARDWARE	DEFAULT OF 10 AND SIGNAL THIS WAS		01	00434
			436	*	DONE BY SETTING HDEF TO ZERO			01	00435
001361	052336	A	437		STB	HDEF		01	00436
						SET FLAG APPROPRIATELY			

001362	001020	A	438	JRZ	++4	DEFAULT	01	00437
001363	001366	A						
001364	001000	A	439	JMP	++4	NO DEFAULT	01	00438
001365	001370	A						
001366	006020	A	440	LDRI	10	SET DEFAULT	01	00439
001367	000012	A						
001370	052313	A	441	STB	SELC+1		01	00440
001371	001010	A	442	JAZ	++4		01	00441
001372	001375	A						
001373	001000	A	443	JMP	ISCP	TOO LARGE	01	00442
001374	001452	A						
001375	005021	A	444	TBA			01	00443
001376	006140	A	445	SUBI	4096		01	00444
001377	010000	A						
001400	001002	A	446	JAP	ISCP	TOO LARGE	01	00445
001401	001452	A						
001402	006030	A	447 I2	LDXI	IM5	REQUEST INTERVAL LENGTH	01	00446
001403	003235	A						
001404	002000	A	448	CALL*	DUTD		01	00447
001405	100403	A						
001406	002000	A	449	CALL	IPOC		01	00448
001407	002337	A						
001410	005311	A	450	DAR			01	00449
001411	001002	A	451	JAP	I3	IF INTERVAL TOO LARGE, TRY AGAIN	01	00450
001412	001460	A						
001413	052321	A	452	STB	ILNG		01	00451
	453 *			FOLLOWING COMPUTES THE NUMBER OF INTERRUPTS PER INTERVAL			01	00452
001414	012323	A	454 I4	LDA	INTT	CJHOUSE CORRECT INTERRUPTS PER SEC VALUE	01	00453
001415	001010	A	455	JAZ	I5		01	00454
001416	001423	A						
001417	012310	A	456	LDA	VIIF		01	00455
001420	022311	A	457	LDB	VIIF+1		01	00456
001421	001000	A	458	JMP	I6		01	00457
001422	001425	A						
001423	012306	A	459 I5	LDA	FRCM		01	00458
001424	022307	A	460	LDB	FRCM+1		01	00459
001425	002000	A	461 I6	CALL	XDIM,ILNG	GET INTERRUPTS PER INTERVAL	01	00460
001426	003402	A						
001427	002321	A						
	462 *			CHECK TO SEE IF VII SELECT COUNT NEED BE CONSIDERED			01	00461
001430	031157	A	463	LDX	COMP	IS THERE A VII	01	00462
001431	001040	A	464	JXZ	I7	IF NOT, INTERRUPTS/INTERVAL VALUE IS OK	01	00463

			474	EJEC			01 00473
			475	*	FOLLOWING HANDLES ILLEGAL INPUTS FOR INTERVAL SELECT COUNT		01 00474
001452	006030	A	476	ISCP	LDXI	IM6	01 00475
001453	003256	A					
001454	002000	A	477	CALL*	OUTD		01 00476
001455	100403	A					
001456	001000	A	478	JMP	ISCR		01 00477
001457	001353	A					
			479	*			01 00478
			480	*	ROUTINE TO HANDLE INTERVALS WHICH ARE TO LARGE		01 00479
			481	*			01 00480
001460	010442	A	482	I3	LDA	SCON	01 00481
001461	001010	A	483		JAZ	I1	01 00482
001462	001471	A					
001463	006030	A	484		LDXI	IM6	01 00483
001464	003256	A					
001465	002000	A	485	CALL*	OUTD	GIVE ERROR MESSAGE	01 00484
001466	100403	A					
001467	001000	A	486	JMP	I2	GIVE ANOTHER CHANCE	01 00485
001470	001402	A					
			487	*			01 00486
			488	*	FOLLOWING HANDLES INITIALIZATION WHEN IN CONSOLE MODE		01 00487
			489	*			01 00488
001471	005001	A	490	I1	TZA		01 00489
001472	005002	A	491		TZB		01 00490
001473	005004	A	492		TZX		01 00491
001474	000022	A	493		HLT	022	01 00492
001475	052323	A	494		STA	INTT	01 00493
001476	062336	A	495		STB	HDEF	01 00494
001477	001020	A	495		JBZ	**4	01 00495
001500	001503	A					
001501	001000	A	497		JMP	**4	01 00496
001502	001505	A					
001503	006020	A	498		LDBI	10	01 00497
001504	000012	A					
001505	062313	A	499		STB	SELC+1	01 00498
001506	072321	A	500		STX	ILNG	01 00499
001507	001000	A	501		JMP	I4	01 00500
001510	001414	A					

			502	EJEC			01 00501
			503 *				01 00502
001511	005042	A	504 I71	TXB			01 00503
001512	062322	A	505 I7	STR	IINT		01 00504
001513	005311	A	506	DAR			01 00505
001514	001002	A	507	JAP	I3	TOO LARGE, IF HIGH HALF NOT ZERO OR NEG	01 00506
001515	001460	A					
001516	005021	A	508	TBA		CHECK AGAINST SIZE OF THE INTERVAL TIMER	01 00507
001517	006140	A	509	SUBI	037774		01 00508
001520	037774	A					
001521	001002	A	510	JAP	I3	IF TOO LARGE, REPORT IT	01 00509
001522	001460	A					
001523	012322	A	511	LDA	IINT		01 00510
001524	001010	A	512	JAZ	I3	IF TOO SMALL (IE ZERO), REPORT IT	01 00511
001525	001460	A					
			513 *	SETUP MOI INTERUPT TO UPDATAE	THE (V)II ELAPSED TIME COUNTER		01 00512
001526	006010	A	514 I9	LDAI	040045	STORE INR IN LOC 044	01 00513
001527	040045	A					
001530	050044	A	515	STA	044		01 00514
001531	006010	A	516	LDAI	02000	STORE JMPM IN 046	01 00515
001532	002000	A					
001533	050046	A	517	STA	046		01 00516
001534	006010	A	518	LDAI	I10	STORE INTERUPT HANDLING SUBROUTINE IN / 047	01 00517
001535	001640	A					
001536	050047	A	519	STA	047		01 00518
001537	010442	A	520	LDA	SCON	A TTY?	01 00519
001540	001010	A	521	JAZ	I70		01 00520
001541	001546	A					
001542	006030	A	522	LUXI	IM7	SIGNAL BEGINING OF TEST	01 00521
001543	003268	A					
001544	002000	A	523	CALL*	OUT0		01 00522
001545	100403	A					
			524 *	INITIALIZE AND START CLOCKS			01 00523
001546	100447	A	525 I70	EXC	0400+RTC	INIT RTC	01 00524
001547	005001	A	526	TZA			01 00525
001550	050045	A	527	STA	045		01 00526
001551	052316	A	528	STA	UFRC	INIT ELAPSED TIME COUNTERS	01 00527
001552	052314	A	529	STA	UVII		01 00528
001553	052315	A	530	STA	LVII		01 00529
001554	052317	A	531	STA	LFRC		01 00530
001555	012322	A	532	LDA	IINT		01 00531
001556	052320	A	533	STA	INXT	SET COUNT FOR END OF INTERVAL CHECK	01 00532

001557	011157	A	534	IX11	LDA	COMP			01 00533
001560	001010	A	535		JAZ	IX12			01 00534
001561	001571	A							
001562	012336	A	536		LDA	HDF	HARDWARE OFFAULT DESIRED		01 00535
001563	001010	A	537		JAZ	**4	YES, SO SKIP SETTING COUNT		01 00536
001564	001567	A							
001565	012313	A	538		LDA	SELC+1			01 00537
001566	103147	A	539		OAR	RTC	SET INTERVAL SELECT COUNT		01 00538
001567	100647	A	540		EXC	0600+RTC	INIT VII COUNTER		01 00539
001570	100047	A	541		EXC	RTC	CLEAR FRC		01 00540
001571	100147	A	542	IX12	EXC	0100+RTC	ENABLE VII		01 00541

		543		EJEC			01	00542
		544	*	LOOP TILL ABORT BY SS3			01	00543
001572	001400	A	545	I11	JSS3	RTCT		01 00544
001573	000527	A						
001574	002000	A	546		JMPM	IUPR		UPDATE FRC ELAPSED TIME COUNTER IF NECESSAR01 00545
001575	001703	A						
			547	*	CHECK FOR END OF INTERVAL			01 00546
001576	022323	A	548		LDB	INTT		01 00547
001577	001020	A	549		JBZ	I141		01 00548
001600	001604	A						
001601	010045	A	550		LDA	045		GET VII CNT 01 00549
001602	001000	A	551		JMP	I14		01 00550
001603	001614	A						
001604	012317	A	552	I141	LDA	LPRC		01 00551
001605	006150	A	553		ANAI	037777		01 00552
001606	037777	A						
001607	052330	A	554		STA	EMFR		STORE IN TEMP LOC 01 00553
001610	102547	A	555		CIA	RTC		01 00554
001611	122330	A	556		ADD	EMFR		DO ADD, NO OVERFLOW POSSIBLE 01 00555
001612	006150	A	557		ANAI	037777		01 00556
001613	037777	A						
001614	142320	A	558	I14	SUB	INXT		SUBTRACT TARGET NUMBER OF INTERRUPTS 01 00557
001615	001004	A	559		JAN	I15		IF TOO LOW, INTERVAL NOT UP 01 00558
001616	001736	A						
001617	006140	A	560		SUBI	04		IF CLOSE ENOUGH TO TARGET , TIME UP 01 00559
001620	000004	A						
001621	001002	A	561		JAP	I15		01 00560
001622	001736	A						
			562	*	SIGNAL INTERVAL UP			01 00561
			563	*	BLINK CONSOLE LIGHTS			01 00562
001623	102577	A	564	I162	CIA	077		01 00563
001624	005211	A	565		CPA			01 00564
001625	103177	A	566		QAR	077		01 00565
			567	*	BLINK THE OVERFLOW LIGHT			01 00566
001626	001001	A	568	I161	JOP	I17		01 00567
001627	001631	A						
001630	007401	A	569		SOP			01 00568
			570	*	COMPUTE NEW TARGET COUNT			01 00569
001631	012320	A	571	I17	LDA	INXT		GET OLD TARGET CNT 01 00570
001632	122322	A	572		ADD	IINT		COMPUTE NEW ONE 01 00571
001633	006150	A	573		ANAI	037777		MOD COUNTER SIZE 01 00572
001634	037777	A						

PAGE 28 04/22/74

VORTEX DASHR

1945 HOURS

001635 052320 A 574
001636 001000 A 575
001637 001736 A

STA INXT
JMP I15

01 00573
01 00574

			576	EJEC			01 00575
			577	*	FOLLOWING IS EXECUTED ON MDI INTERRUPT		01 00576
			578	*	IT UPDATES THE DOUBLE PRECISION II COUNT		01 00577
001640	000000	A	579	I10	DATA	0	01 00578
001641	100247	A	580		EXC	0200+RTC INHIBIT MDI	*****
001642	051677	A	581		STA	I10T	01 00579
001643	061700	A	582		STB	I10T+1	01 00580
001644	071701	A	583		STX	I10T+2	01 00581
001645	005004	A	584		TZX		01 00582
001646	005544	A	585		AOPX	SAVE ORIGINAL OVERFLOW CONDITION	01 00583
001647	010045	A	586		LDA	045	01 00584
001650	006150	A	587		ANAI	037777	01 00585
001651	037777	A					
001652	050045	A	588		STA	045	01 00586
001653	012315	A	589		LDA	LVII	01 00587
001654	007400	A	590		RDF		01 00588
001655	006120	A	591		ADDI	040000	01 00589
001656	040000	A					
001657	006150	A	592	XDAY	ANAI	077777	01 00590
001660	077777	A					
001661	052315	A	593		STA	LVII	01 00591
001662	012314	A	594		LDA	UVII	01 00592
001663	005511	A	595		AQFA		01 00593
001664	052314	A	596		STA	UVII	01 00594
001665	007400	A	597		RDF		01 00595
001666	001040	A	598		JXZ	I101	01 00596
001667	001671	A					
001670	007401	A	599		SQF	RESTORE OVERFLOW, IF NEC.	01 00597
001671	011677	A	600	I101	LDA	I10T	01 00598
001672	021700	A	601		LOB	I10T+1	01 00599
001673	031701	A	602		LDX	I10T+2	01 00600
001674	100147	A	603		EXC	0100+RTC	*****
001675	001000	A	604		JMP*	I10	01 00601
001676	101640	A					
001677	000000	A	605	I10T	DATA	0,0,0,0	01 00602
001700	000000	A					
001701	000000	A					
001702	000000	A					

			630	EJEC			01 00627
			631	*	FOLLOWING CHECKS FOR ELAPSED TIME READOUT REQUESTS		01 00628
001736	010442	A	632	I15	LDA	SCON	01 00629
001737	001010	A	633		JAZ	I30	01 00630
						IF NO TTY, MAKE SPEC CHECK	
001740	002150	A					
001741	101201	A	634	I151	SEN	0201,++4	01 00631
001742	001745	A				SEE IF A CHARACTER AWAITS	
001743	001000	A	635		JMP	I11	01 00632
001744	001572	A				IF NOT, LOOP BACK TO REPEAT PREV CHECKS	
001745	002000	A	636		CALL*	INPB	01 00633
001746	100411	A				OTHERWISE, GET THE CHARACTER	
001747	001000	A	637		JMP	I11	01 00634
001750	001572	A				IF SS3 ON, RETURN TO BEGINING OF TEST	
001751	005012	A	638		TAB		01 00635
001752	006140	A	639		SUBI	' '	01 00636
001753	000240	A					
001754	001010	A	640		JAZ	I50	01 00637
001755	001774	A				ELAPSED TIME WANTED	
001756	002000	A	641		CALL*	OUTC	01 00638
001757	100402	A				CR/LF	
001760	005021	A	642		TBA		01 00639
001761	006140	A	643		SUBI	'R'	01 00640
001762	000322	A					
001763	001010	A	644		JAZ	I70	01 00641
001764	001546	A				RESET ELAPSED TIME COUNTERS	
001765	005021	A	645		TBA		01 00642
001766	006140	A	646		SUBI	'K'	01 00643
001767	000313	A					
001770	001010	A	647		JAZ	ITT	01 00644
001771	001320	A				RESTART	
001772	001000	A	648		JMP	I11	01 00645
001773	001572	A				IF NONE OF THESE, IGNORE IT	

			649	EJEC			01 00646
			650 *	FOLLOWING COMPUTES ELAPSED TIME AND OUTPUTS IT			01 00647
			651 *	DURING THIS TIME, FREQUENT CALLS ARE MADE TO ROUTINE IUFR.			01 00648
			652 *	THIS IS NECESSARY SINCE A DELAY OF MORE THAN 1-6 SECONDS			01 00649
			653 *	BETWEEN CALLS COULD RESULT IN BIT 15 OF THE FRC COUNT BECOMING			01 00650
			654 *	A ONE, SUCH A SITUATION WOULD CAUSE ERRORS IN FRC ELAPSED			01 00651
			655 *	TIME COUNT			01 00652
			656 *				01 00653
001774	002000	A	657	I50 JPMH ICOM	COMPUTE ELAPSED TIMES		01 00654
001775	002176	A					
001776	002000	A	658	CALL* OUTC	CR/LF		01 00655
001777	100402	A					
002000	011157	A	659	LDA COMP			01 00656
002001	001010	A	660	JAZ I51	IF NO FRC, SKIP NEXYT		01 00657
002002	002055	A					
002003	002000	A	661	JPMH IUFR	UPDATE FRC ELAP, TIME CNTR IF NEC,		01 00658
002004	001703	A					
002005	006030	A	662	LDXI IM9			01 00659
002006	003275	A					
002007	002000	A	663	CALL* OUTD	TYPE 'FRC: '		01 00660
002010	100403	A					
002011	002000	A	664	CALL IUFR	CHECK FRC COUNT		01 00661
002012	001703	A					
002013	005001	A	665	TZA			01 00662
002014	022330	A	666	LDB EMFR	GET ELAPSED MIN FOR FRC		01 00663
002015	006030	A	667	LDXI BUFO			01 00664
002016	002614	A					
002017	002000	A	668	CALL CONV			01 00665
002020	002433	A					
002021	006030	A	669	LDXI BUFO+3	LAST FOUR CHARACTERS		01 00666
002022	002617	A					
002023	002000	A	670	CALL* OUTD	OUT ELAPSED MIN		01 00667
002024	100403	A					
002025	002000	A	671	CALL IUFR	CHECK FRC COUNT		01 00668
002026	001703	A					
002027	006030	A	672	LDXI IM10			01 00669
002030	003301	A					
002031	002000	A	673	CALL* OUTD	OUT 'MIN '		01 00670
002032	100403	A					
002033	002000	A	674	CALL IUFR	CHECK FRC COUNT		01 00671
002034	001703	A					
002035	005001	A	675	TZA			01 00672

002036	022331	A	576	LDB	ESFR	GET ELAPSED SEC FOR FRC	01	00673
002037	006030	A	577	LDXI	BUFO		01	00674
002040	002614	A						
002041	002000	A	578	CALL	CONV		01	00675
002042	002433	A						
002043	006030	A	579	LDXI	BUFO+3	LAST FOUR CHARACTERS	01	00676
002044	002617	A						
002045	002000	A	580	CALL*	OUTD		01	00677
002046	100403	A						
002047	002000	A	581	CALL	IUFR	CHECK FRC COUNT	01	00678
002050	001703	A						
002051	006030	A	582	LDXI	IM11		01	00679
002052	003304	A						
002053	002000	A	583	CALL*	OUTD	OUT 'SEC' AND CR/LF	01	00680
002054	100403	A						
002055	002000	A	584	JMPM	IUFR		01	00681
002056	001703	A						
002057	006030	A	585	LDXI	IM12		01	00682
002060	003310	A						
002061	002000	A	586	CALL*	OUTD		01	00683
002062	100403	A						
002063	002000	A	587	CALL	IUFR	CHECK FRC COUNT	01	00684
002064	001703	A						
002065	005001	A	588	TZA			01	00685
002066	022332	A	589	LDB	EMVI	GET ELAPSED MIN FOR VII	01	00686
002067	006030	A	590	LDXI	BUFO		01	00687
002070	002614	A						
002071	002000	A	591	CALL	CONV		01	00688
002072	002433	A						
002073	006030	A	592	LDXI	BUFO+3	LAST FOUR CHARACTERS	01	00689
002074	002617	A						
002075	002000	A	593	CALL*	OUTD	OUTPUT ELAPSED MIN	01	00690
002076	100403	A						
002077	002000	A	594	CALL	IUFR	CHECK FRC COUNT	01	00691
002100	001703	A						
002101	006030	A	595	LDXI	IM10		01	00692
002102	003301	A						
002103	002000	A	596	CALL*	OUTD	OUTPUT 'MIN, '	01	00693
002104	100403	A						
002105	002000	A	597	CALL	IUFR	CHECK FRC COUNT	01	00694
002106	001703	A						
002107	005001	A	598	TZA			01	00695

002110	022333	A	699	LDR	ESVI	GET ELAPSED SEC	01	00696
002111	006030	A	700	LDXI	RUF0		01	00697
002112	002614	A						
002113	002000	A	701	CALL	CONV		01	00698
002114	002433	A						
002115	006030	A	702	LDXI	RUF0+3	LAST FOUR CHARACTERS	01	00699
002116	002617	A						
002117	002000	A	703	CALL*	OUT0	OUTPUT ELAPSED SEC	01	00700
002120	100403	A						
002121	002000	A	704	CALL	IUF0	CHECK FRC COUNT	01	00701
002122	001703	A						
002123	006030	A	705	LDXI	IM11		01	00702
002124	003304	A						
002125	002000	A	706	CALL*	OUT0	OUTPUT 1 SEC	01	00703
002126	100403	A						
002127	002000	A	707	CALL	IUF0	CHECK FRC COUNT	01	00704
002130	001703	A						
			708 *	REINIT THE	INTERVAL TIMER	TARGET CNT	01	00705
002131	102547	A	709	CIA	RTC	ASSUME FRC THE INT TMR	01	00706
002132	122317	A	710	ADD	LFRC		01	00707
002133	006150	A	711	ANAI	037777		01	00708
002134	037777	A						
002135	022323	A	712	LDR	INTT	IS THE FRC THE INTERVAL TIMER?	01	00709
002136	001020	A	713	JBZ	I52	IF SO, ALL OK	01	00710
002137	002141	A						
002140	010045	A	714	LDA	045	ELSE, USE VIT	01	00711
002141	122322	A	715 I52	ADD	IINT	ADD IN INTERRUPTS PER INTERVAL	01	00712
002142	006150	A	716	ANAI	037777	MOD COUNTER SIZE	01	00713
002143	037777	A						
002144	052320	A	717	STA	INXT	USE AS NEW TARGET COUNT	01	00714
002145	007400	A	718	ROF		RESET OVERFLOW INDICATOR	01	00715
002146	001000	A	719	JMP	I11		01	00716
002147	001572	A						

			720	EJEC			01 00717
			721	* FOLLOWING HANDLES ELAPSED TIME READDUTS IN CONSOLE MODE			01 00718
002150	001100	A	722	I30 JSS1 **4	NEED ELAPSED TIME?		01 00719
002151	002154	A					
002152	001000	A	723	JMP I11	IF NOT, LOOP BACK		01 00720
002153	001572	A					
002154	002000	A	724	JMPM ICOM	OTHERWISE, GET ELAPSED TIME		01 00721
002155	002176	A					
002156	012332	A	725	LDA EMVI	GET MIN/SEC CNT		01 00722
002157	004246	A	726	LKLA 6			01 00723
002160	112333	A	727	ORA ESVI			01 00724
002161	005012	A	728	TAB			01 00725
002162	011157	A	729	LDA COMP	A FRC?		01 00726
002163	001010	A	730	JAZ I301			01 00727
002164	002170	A					
002165	012330	A	731	LDA EMFR	GET MIN/SEC COUNT		01 00728
002166	004246	A	732	LRLA 6			01 00729
002167	112331	A	733	ORA ESFR			01 00730
002170	005004	A	734	I301 TZX			01 00731
002171	000023	A	735	HLT 023	RETURN ELAPSED TIMES		01 00732
002172	001004	A	736	JAN ITT	REINIT?		01 00733
002173	001320	A					
002174	001000	A	737	JMP I70			01 00734
002175	001546	A					

			738	EJEC				01	00735
			739	*	FOLLOWING COMPUTES ELAPSED TIMES IN MIN AND SEC			01	00736
002176	000000	A	740	ICDM	DATA	0		01	00737
002177	005001	A	741		TZA			01	00738
002200	102647	A	742		CIB	RTC	GET CURRENT FRC COUNT	01	00739
002201	062331	A	743		STB	ESFR	SAVE IT TEMPORARILY IN ESFR	01	00740
002202	020045	A	744		LDB	045		01	00741
002203	002000	A	745		CALL	XDAO,UVII	GET CURRENT VII DOBL PREC CNT	01	00742
002204	003434	A							
002205	002314	A							
002206	031157	A	746		LDX	COMP		01	00743
002207	001040	A	747		JXZ	IC1		01	00744
002210	002215	A							
002211	002000	A	748		CALL	XDIM,SELC+1	IF VII, ADJUST FOR SELECT COUNT	01	00745
002212	003402	A							
002213	002313	A							
002214	005004	A	749		TZX			01	00746
002215	002000	A	750	IC1	CALL	XDSU,IVM	SUB INCR PER MIN	01	00747
002216	003502	A							
002217	002326	A							
002220	001004	A	751		JAN	IC2		01	00748
002221	002225	A							
002222	005144	A	752		IXR			01	00749
002223	001000	A	753		JMP	IC1		01	00750
002224	002215	A							
002225	002000	A	754	IC2	CALL	XDAO,IVM		01	00751
002226	003434	A							
002227	002326	A							
002230	072332	A	755		STX	EMVI	SAVE ELAPSED MIN	01	00752
002231	005004	A	756		TZX			01	00753
002232	002000	A	757	IC3	CALL	XDSU,VIIF		01	00754
002233	003502	A							
002234	002310	A							
002235	001004	A	758		JAN	IC4		01	00755
002236	002242	A							
002237	005144	A	759		IXR			01	00756
002240	001000	A	760		JMP	IC3		01	00757
002241	002232	A							
002242	072333	A	761	IC4	STX	ESVI	STORE ELAPSED SEC	01	00758
002243	011157	A	762		LDA	COMP	AN FRC?	01	00759
002244	001010	A	763		JAZ*	ICDM	IF NOT, DONE	01	00760
002245	002176	A							

002246	002000	A	764	CALL	IUFK	UPDATE FRC ELAP. TIME CNTR, IF NEC	01	00761
002247	001703	A						
002250	005001	A	765	TZA			01	00762
002251	022331	A	766	LDB	ESFR	GET CURRENT FRC COUNT FROM ITS TEMP STORAGE	01	00763
002252	002000	A	767	CALL	XDAD,UFRC	GET DBL PREC TOTAL	01	00764
002253	003434	A						
002254	002316	A						
002255	005004	A	768	TZX			01	00765
002256	002000	A	769	IC5	CALL	XDSU,IFM	SUB INCR PER MIN	01 00766
002257	003502	A						
002260	002324	A						
002261	001004	A	770	JAN	IC6		01	00767
002262	002266	A						
002263	005144	A	771	IXR			01	00768
002264	001000	A	772	JMP	IC5		01	00769
002265	002256	A						
002266	002000	A	773	IC6	CALL	XDAD,IFM	01	00770
002267	003434	A						
002270	002324	A						
002271	072330	A	774	STX	EMFR	STORE ELAP MIN	01	00771
002272	005004	A	775	TZX			01	00772
002273	002000	A	776	IC7	CALL	XDSU,FRCM	01	00773
002274	003502	A						
002275	002306	A						
002276	001004	A	777	JAN	IC8		01	00774
002277	002303	A						
002300	005144	A	778	IXR			01	00775
002301	001000	A	779	JMP	IC7		01	00776
002302	002273	A						
002303	072331	A	780	IC8	STX	ESFR	SAVE ELAPSED SEC	01 00777
002304	001000	A	781	JMP*	ICOM		01	00778
002305	102178	A						

			782	EJEC					01 00779
002306	000000	A	783	FRC4	DATA	0,0	FRC INCR. PER SEC (DOUBLE PREC.)		01 00780
002307	000000	A							
002310	000000	A	784	VII F	DATA	0,0	VII INTERRUPTS PER SEC (DOUBLE PREC.)		01 00781
002311	000000	A							
002312	000000	A	785	SELC	DATA	0,0			01 00782
002313	000000	A							
002314	000000	A	786	UVII	DATA	0	UPPER HALF, VII ELAP TIME CNTR		01 00783
002315	000000	A	787	LVII	DATA	0	LOWER HALF		01 00784
002316	000000	A	788	UFRC	DATA	0	UPPER HALF, FRC ELAP TIME CNTR		01 00785
002317	000000	A	789	LFRC	DATA	0	LOWER HALF, OBL PREC FRC ELAP TIME CNTR		01 00786
002320	000000	A	790	INXT	DATA	0	COUNT AT END OF NEXT INTERVAL		01 00787
002321	000000	A	791	ILNG	DATA	0	INTERVAL LENGTH		01 00788
002322	000000	A	792	IINT	DATA	0	NUMBER OF INTERRUPTS PER INTERVAL		01 00789
002323	000000	A	793	INTY	DATA	0	INTERVAL TIMER, 1=FRC, 1=VII		01 00790
002324	000000	A	794	IFM	DATA	0,0	OBL PREC INCR PER MIN FRC		01 00791
002325	000000	A							
002326	000000	A	795	IVM	DATA	0,0	OBL PREC VII INCR PER MIN		01 00792
002327	000000	A							
002330	000000	A	796	EMFR	DATA	0	TEMP LDC FOR ELAP TIME COMP		01 00793
002331	000000	A	797	ESFR	DATA	0			01 00794
002332	000000	A	798	EMVT	DATA	0			01 00795
002333	000000	A	799	ESVI	DATA	0			01 00796
002334	000074	A	800	D50	DATA	60			01 00797
002335	007370	A	801	STTY	DATA	07370	POINTER TO TTY DEV ADDRESS		01 00798
002336	000000	A	802	HDEF	DATA	0	FLAG: IF ZERO, HRDWR DEFAULT FOR SELC CNT		01 00799

	803	FJEC			01	00800
	804	*****			*01	00801
	805	*			*01	00802
	806	*	INPUT DECIMAL NUMBER SUBROUTINE (DOUBLE PRECISION)		*01	00803
	807	*	RETURN NUMBER IN A (HIGH ORDER) AND B (LOW ORDER)		*01	00804
	808	*			*01	00805
	809	*****			*01	00806
002337	000000	A	810 IPDC ENTR 0		01	00807
002340	005001	A	811 TZB	ZERO OUT DOUBLE PRECISION SUM,	01	00808
002341	052426	A	812 STA DPSM		01	00809
002342	052427	A	813 STA DPSM+1		01	00810
002343	002000	A	814 IPD1 CALL* INPB	GET 1 CHAR. IN A REG.	01	00811
002344	100411	A				
002345	001000	A	815 JMP RTCT	TERMINATION EXIT IF SS3 SET	01	00812
002346	000527	A				
002347	005012	A	816 TAB		01	00813
002350	006140	A	817 SUBI 0256	CHECK IF PERIOD	01	00814
002351	000256	A				
002352	001010	A	818 JAZ IPD4		01	00815
002353	002413	A				
002354	005021	A	819 TBA		01	00816
002355	006140	A	820 SUBI 0254	CHECK IF COMMA,	01	00817
002356	000254	A				
002357	001010	A	821 JAZ IPD5		01	00818
002360	002420	A				
002361	005021	A	822 TBA	CHECK IF LEGAL CHAR,	01	00819
002362	006140	A	823 SUBI 0260		01	00820
002363	000260	A				
002364	001004	A	824 JAN IPD3		01	00821
002365	002407	A				
002366	052431	A	825 STA VALU		01	00822
002367	006140	A	826 SUBI 012		01	00823
002370	000012	A				
002371	001002	A	827 JAP IPD3		01	00824
002372	002407	A				
002373	012426	A	828 LDA DPSM		01	00825
002374	022427	A	829 LDR DPSM+1		01	00826
002375	002000	A	830 CALL XDIM,TEN	MULTI DP SUM BY TEN	01	00827
002376	003402	A				
002377	002432	A				
002400	002000	A	831 CALL XDAD,VALU-1	ADD CHAR JUST READ	01	00828
002401	003434	A				

002402	002430	A						
002403	052426	A	832	STA	DPSM			01 00829
002404	052427	A	833	STB	DPSM+1			01 00830
002405	001000	A	834	JMP	IPD1	GET NEXT CHAR.		01 00831
002406	002343	A						
002407	002000	A	835	IPD3	CALL*	OUTG	ILLEGAL CHAR. MESSAGE	01 00832
002410	100406	A						
002411	001000	A	836	JMP	IPDC+1			01 00833
002412	002340	A						
002413	002000	A	837	IPD4	CALL*	OUTC	OUTPUT CR/LF	01 00834
002414	100402	A						
002415	005004	A	838	TZX			PERIOD CHAR.	01 00835
002416	001000	A	839	JMP	***			01 00836
002417	002422	A						
002420	006030	A	840	IPD5	LOXI	1	COMMA CHAR.	01 00837
002421	000001	A						
002422	012426	A	841	LDA	DPSM			01 00838
002423	022427	A	842	LDB	DPSM+1			01 00839
002424	001000	A	843	JMP*	IPDC			01 00840
002425	102337	A						
002426	000000	A	844	DPSM	DATA	0,0,0		01 00841
002427	000000	A						
002430	000000	A						
002431	000000	A	845	VALU	DATA	0		01 00842
002432	000012	A	846	TEN	DATA	10		01 00843

			847	FJFC				01	00844
			848	*****				01	00845
			849	*	CONVERT DOUBLE PRECISION OCTAL NUMBER TO ASCII DECIMAL			01	00846
			850	*				01	00847
			851	*****				01	00848
002433	000000	A	852	CONV	ENTR			01	00849
002434	072720	A	853	STX	ADDR+1	ADDRESS OF BUFFER		01	00850
002435	052636	A	854	STA	SAVN	TEMP STORAGE		01	00851
002436	052637	A	855	STB	SAVN+1			01	00852
002437	006030	A	856	LDXI	BUFC	LOC OF 9 WORD TABLE		01	00853
002440	002624	A							
002441	072717	A	857	STX	ADDR			01	00854
002442	006030	A	858	LDXI	TBDC	LOC OF TABLE		01	00855
002443	002570	A							
002444	072452	A	859	STX	CON1+2			01	00856
002445	072460	A	860	STX	CON3+2			01	00857
002446	072467	A	861	STX	CON4+2			01	00858
002447	005004	A	862	TZX		INTEGER COUNTER		01	00859
002450	002000	A	863	CON1	CALL	XDSU,0	SUB, VALUE FROM TABLE	01	00860
002451	003502	A							
002452	000000	A							
002453	001004	A	864	JAN	CON5		CHECK IF VALUE LESS THAN TABLE INTEGER	001	00861
002454	002472	A							
002455	005144	A	865	CON2	IXR		INCR, INTEGER COUNT	01	00862
002456	002000	A	866	CON3	CALL	XDSU,0	SUB, VALUE FROM TABLE	01	00863
002457	003502	A							
002460	000000	A							
002461	001004	A	867	JAN	**+4		CHECK IF VALUE NEG.	01	00864
002462	002465	A							
002463	001000	A	868	JMP	CON2		NO	01	00865
002464	002455	A							
002465	002000	A	869	CON4	CALL	XDAD,0	ADD TABLE VALUE BACK	01	00866
002466	003434	A							
002467	000000	A							
002470	052636	A	870	STA	SAVN		SAVE VALUE	01	00867
002471	052637	A	871	STB	SAVN+1			01	00868
002472	077000	T	872	CON5	STX*	ADDR	STORE INTEGER IN TABLE	01	00869
002473	042717	A	873	INR	ADDR			01	00870
002474	032452	A	874	LDX	CON1+2		UP-DATE BUFFER POINTER BY TWO,	01	00871
002475	005144	A	875	IXR				01	00872
002476	005144	A	876	IXR				01	00873
002477	072452	A	877	STX	CON1+2			01	00874

002500	072460	A	878		STX	CON3+2		01	00875
002501	072467	A	879		STX	CON4+2		01	00876
002502	035001	A	880		LDX	1,1	CHECK IF NEXT TABLE VALUE ZERO	01	00877
002503	001040	A	881		JXZ	CON9		01	00878
002504	002512	A							
002505	005004	A	882		TZX		ZERO INTEGER COUNTER	01	00879
002506	012636	A	883		LDA	SAVN	RETURN VALUE	01	00880
002507	022637	A	884		LDR	SAVN+1		01	00881
002510	001000	A	885		JMP	CON1		01	00882
002511	002450	A							
002512	006030	A	886	CON5	LOXI	(BUFC)	ADD ASCII NOTATION TO BINARY NUMBER	01	00883
002513	002624	A							
002514	005002	A	887		TZE		BLANK OUT HIGH ORDER DIGITS.	01	00884
002515	015000	A	888	CON1	LDA	0,1	GET BINARY NUMBER	01	00885
002516	001010	A	889		JAZ	CON7		01	00886
002517	002534	A							
002520	005322	A	890		OBR			01	00887
002521	006120	A	891	CON6	ADDI	0260	ADD ASCII CHARACTER ZERO.	01	00888
002522	000260	A							
002523	055000	A	892		STA	0,1		01	00889
002524	005144	A	893		IXR			01	00890
002525	005041	A	894		TXA			01	00891
002526	006140	A	895		SUBI	(BUFC+9)	CHECK IF 9 CHARACTERS CHECKED.	01	00892
002527	002635	A							
002530	001010	A	896		JAZ	CON8		01	00893
002531	002544	A							
002532	001000	A	897		JMP	CONL		01	00894
002533	002515	A							
002534	001020	A	898	CON7	JBZ	**4		01	00895
002535	002540	A							
002536	001000	A	899		JMP	CON6		01	00896
002537	002521	A							
002540	006120	A	900		ADDI	0240	BLANK OUT HIGH ORDER CHARACTER	01	00897
002541	000240	A							
002542	001000	A	901		JMP	CON6+2		01	00898
002543	002523	A							
002544	006030	A	902	CON8	LOXI	(BUFC-1)	PACK ASCII CHARACTERS	01	00899
002545	002623	A							
002546	015000	A	903	CON1	LDA	0,1	GET HIGH ORDER CHAR	01	00900
002547	005144	A	904		IXR			01	00901
002550	004250	A	905		LRLA	8		01	00902
002551	125000	A	906		ADD	0,1	GET LOW ORDER CHAR.	01	00903

002552	005144	A	907	IXR				01	00904
002553	057000	T	908	STA*	ADDR+1	STORE CHAR. IN BUFFER		01	00905
002554	042720	A	909	INR	ADDR+1			01	00906
002555	005041	A	910	IXA				01	00907
002556	006140	A	911	SUBI	(BUFC+9)	CHECK IF BUFFER BACKED		01	00908
002557	002635	A							
002560	001010	A	912	JAZ	++4			01	00909
002561	002564	A							
002562	001000	A	913	JMP	CO11	GET NEXT CHARACTERS.		01	00910
002563	002546	A							
002564	002000	A	914	CALL	IUF8	UPDATE FRC ELAP. TIME CNTR. IF NEC		01	00911
002565	001703	A							
002566	001000	A	915	JMP*	CONV			01	00912
002567	102433	A							
002570	005753	A	916	TBDC	DATA	05753,050400	100000000	01	00913
002571	060400	A							
002572	000461	A	917	DATA	DATA	0461,013200	100000000	01	00914
002573	013200	A							
002574	000036	A	918	DATA	DATA	036,041100	1000000	01	00915
002575	041100	A							
002576	000003	A	919	DATA	DATA	03,03240	100000	01	00916
002577	003240	A							
002600	000000	A	920	DATA	DATA	0,023420	10000	01	00917
002601	023420	A							
002602	000000	A	921	DATA	DATA	0,01750	1000	01	00918
002603	001750	A							
002604	000000	A	922	DATA	DATA	0,0144	100	01	00919
002605	000144	A							
002606	000000	A	923	DATA	DATA	0,012	10	01	00920
002607	000012	A							
002610	000000	A	924	DATA	DATA	0,01	1	01	00921
002611	000001	A							
002612	000000	A	925	DATA	DATA	0,0	0	01	00922
002613	000000	A							
002614		A	926	BUFB	BSS	5		01	00923
002621	120240	A	927	DATA	DATA	1,0		01	00924
002622	000000	A							
002623	000240	A	928	DATA	DATA	0240		01	00925
002624		A	929	BUFC	BSS	9		01	00926
002635	000000	A	930	FLGC	DATA	0		01	00927
002636	000000	A	931	SAVN	DATA	0,0		01	00928
002637	000000	A							

002640	000000	A	932	TIME	DATA	0	TEMP. FR TIME	01	00929
002641	000000	A	933	CONT	DATA	0	TIME COUNTER	01	00930
002642			934	TABT	BSS	34	TIME BUFFER FOR 20 TIME PERIOD COUNTS	01	00931
002704	000000	A	935	SUMH	DATA	0,0	DOUBLE PRECISION ADD	01	00932
002705	000000	A							
002706	000000	A	936	TWNT	DATA	0,20		01	00933
002707	000024	A							
002710	000006	A	937	SIXM	DATA	6		01	00934
002711	000000	A	938	VAR	DATA	0,0		01	00935
002712	000000	A							
002713	000000	A	939	HVAL	DATA	0,0	TOLERANCE HIGH	01	00936
002714	000000	A							
002715	000000	A	940	LVAL	DATA	0,0	TOLERANCE LOW	01	00937
002716	000000	A							
002717			941	ADDR	BSS	2	STORAGE LOCATIONS	01	00938

			942	EJEC				01	00939
			943	*****				*01	00940
			944	*	TIME DELAY OF 1/4 SECOND			*01	00941
			945	*	X = NO OF 1/4 SECONDS TO DELAY			*01	00942
			946	*	CALLING SEC.			*01	00943
			947	*	LDXI NUMBER			*01	00944
			948	*	CALL TDSC			*01	00945
			949	*				*01	00946
			950	*****				*01	00947
002721	000000	A	951	TDSC	ENTR			01	00948
002722	052742	A	952		STA TDSC	SAVE REGISTERS		01	00949
002723	062743	A	953		STB TDSC+1			01	00950
002724	072744	A	954		STX TDSC+2			01	00951
002725	002000	A	955	TDS1	CALL HLFS			01	00952
002726	002745	A							
002727	032744	A	956		LDX TDSC+2			01	00953
002730	005344	A	957		DXR	X = NO. OF 1/4 SEC. TIME OUTS.		01	00954
002731	072744	A	958		STX TDSC+2			01	00955
002732	001040	A	959		JXZ TDS2			01	00956
002733	002736	A							
002734	001000	A	960		JMP TDS1			01	00957
002735	002725	A							
002736	012742	A	961	TDS2	LDA TDSC	RESTORE REGISTERS		01	00958
002737	022743	A	962		LDB TDSC+1			01	00959
002740	001000	A	963		JMP* TDSC			01	00960
002741	102721	A							
002742	000000	A	964	TDSC	DATA 0,0,0			01	00961
002743	000000	A							
002744	000000	A							
002745	000000	A	965	HLFS	ENTR			01	00962
002746	011157	A	966		LDA COMP			01	00963
002747	001010	A	967		JAZ **4			01	00964
002750	002753	A							
002751	006010	A	968		LDAI 15632			01	00965
002752	036420	A							
002753	006120	A	969		ADDI 10684			01	00966
002754	024674	A							
002755	005014	A	970		TAX	1/4 SECOND TIME-OUT		01	00967
002756	001040	A	971	HLF1	JXZ* HLFS			01	00968
002757	102745	A							
002760	012762	A	972		LDA **2			01	00969
002761	012763	A	973		LDA **2			01	00970

PAGE 45 04/22/74

VORTEX DASPR

1945 HOURS

002762 012764 A 974
002763 012765 A 975
002764 005344 A 976
002765 001000 A 977
002766 002756 A

LDA **2
LDA **2
DXR
JMP HLEL

01 00971
01 00972
01 00973
01 00974

002767	151305	A	978	EJEC			01 00975
002770	140714	A	979	MFS1	DATA	'REAL TIME CLOCK TEST',0106612,0	01 00976
002771	120324	A					
002772	144715	A					
002773	142640	A					
002774	141714	A					
002775	147703	A					
002776	145640	A					
002777	152305	A					
003000	151724	A					
003001	106612	A					
003002	000000	A					
003003	144657	A	980	MES2	DATA	'I/O INSTRUCTION AND INTERRUPT TEST',0106612,0	01 00977
003004	147640	A					
003005	144716	A					
003006	151724	A					
003007	151325	A					
003010	141724	A					
003011	144717	A					
003012	147240	A					
003013	140716	A					
003014	142240	A					
003015	144716	A					
003016	152305	A					
003017	151322	A					
003020	152720	A					
003021	152240	A					
003022	152305	A					
003023	151724	A					
003024	106612	A					
003025	000000	A					
003026	142722	A	981	MES3	DATA	'ERROR NO. = 1,0	01 00978
003027	151317	A					
003030	151240	A					
003031	147317	A					
003032	127240	A					
003033	136640	A					
003034	000000	A					
003035	153301	A	982	MES4	DATA	'VARIABLE',0	01 00979
003036	151311	A					
003037	140702	A					

003040	146305	A				
003041	000000	A				
003042	120311	A	983 MISA	DATA	'INTERVAL INTERRUPT CHECK',0106612,0	01 00980
003043	147324	A				
003044	142722	A				
003045	153301	A				
003046	146240	A				
003047	144716	A				
003050	152305	A				
003051	151322	A				
003052	152720	A				
003053	152240	A				
003054	141710	A				
003055	142703	A				
003056	145640	A				
003057	106612	A				
003060	000000	A				
003061	146705	A	984 MESS	DATA	'MEMORY OVERFLOW INTERRUPT CHECK',0106612,0	01 00981
003062	146717	A				
003063	151331	A				
003064	120317	A				
003065	153305	A				
003066	151306	A				
003067	146317	A				
003070	153640	A				
003071	144716	A				
003072	152305	A				
003073	151322	A				
003074	152720	A				
003075	152240	A				
003076	141710	A				
003077	142703	A				
003100	145640	A				
003101	106612	A				
003102	000000	A				
003103	143322	A	985 MESS	DATA	'FREE RUNNING COUNTER CHECK',0106612,0	01 00982
003104	142705	A				
003105	120322	A				
003106	152716	A				
003107	147311	A				
003110	147307	A				
003111	120303	A				

003112 117725 A
003113 147324 A
003114 142722 A
003115 120303 A
003116 144305 A
003117 141713 A
003120 106612 A
003121 000000 A
003122 144716 A
003123 150325 A
003124 152240 A
003125 143322 A
003126 141640 A
003127 144716 A
003130 141722 A
003131 142715 A
003132 142716 A
003133 152323 A
003134 120320 A
003135 142722 A
003136 120323 A
003137 142703 A
003140 147716 A
003141 142240 A
003142 106612 A
003143 000000 A
003144 144716 A
003145 150325 A
003146 152240 A
003147 141501 A
003150 151711 A
003151 141640 A
003152 144716 A
003153 152305 A
003154 151322 A
003155 152720 A
003156 152323 A
003157 120320 A
003160 142722 A
003161 120323 A
003162 142703 A
003163 147716 A

986 MFS7 DATA INPUT FRC INCREMENTS PER SECOND 1,0106612,0

01 00983

987 MFS8 DATA INPUT BASIC INTERRUPTS PER SECOND 1,0106612,0

01 00984

003164	142240	A				
003165	106612	A				
003166	000000	A				
003167	151324	A	988 MSIS	DATA	IRTC TYPE = 1,0	01 00985
003170	141640	A				
003171	152331	A				
003172	150305	A				
003173	120275	A				
003174	000000	A				
003175	144716	A	989 IM1	DATA	INTERRUPT TIMING TEST 1,0106612,0	01 00986
003176	152305	A				
003177	151322	A				
003200	152720	A				
003201	152240	A				
003202	152311	A				
003203	146711	A				
003204	147307	A				
003205	120324	A				
003206	142723	A				
003207	152240	A				
003210	106612	A				
003211	000000	A				
003212	144716	A	990 IM3	DATA	INTERVAL TIMER = 1,0	01 00987
003213	152305	A				
003214	151326	A				
003215	140714	A				
003216	120324	A				
003217	144715	A				
003220	142722	A				
003221	136640	A				
003222	000000	A				
003223	153311	A	991 IM4	DATA	IVII SELECT COUNT = 1,0	01 00988
003224	144640	A				
003225	151705	A				
003226	146305	A				
003227	141724	A				
003230	120303	A				
003231	147725	A				
003232	147324	A				
003233	136640	A				
003234	000000	A				
003235	144716	A	992 IM5	DATA	INTERVAL DISPLAY PERIOD IN SEC. = 1,0	01 00989

003236	152305	A			
003237	151326	A			
003240	140714	A			
003241	120304	A			
003242	144723	A			
003243	150314	A			
003244	140731	A			
003245	120320	A			
003246	142722	A			
003247	144717	A			
003250	142240	A			
003251	144716	A			
003252	120323	A			
003253	142703	A			
003254	127275	A			
003255	000000	A			
003256	152716	A	993 IM6	DATA 'UNACCEPTABLE',0106612,0	01 00990
003257	140703	A			
003260	141705	A			
003261	150324	A			
003262	146702	A			
003263	146305	A			
003264	106612	A			
003265	000000	A			
003266	141305	A	994 IM7	DATA 'BEGIN TEST',0106612,0	01 00991
003267	143711	A			
003270	147240	A			
003271	152305	A			
003272	151724	A			
003273	106612	A			
003274	000000	A			
003275	143322	A	995 IM9	DATA 'ERC: ',0	01 00992
003276	141672	A			
003277	120240	A			
003300	000000	A			
003301	146711	A	996 IM10	DATA 'MIN',1,0	01 00993
003302	147254	A			
003303	000000	A			
003304	151705	A	997 IM11	DATA 'SEC ',0106612,0	01 00994
003305	141640	A			
003306	106612	A			
003307	000000	A			

PAGE 52 04/22/74

VORTEX DASR

1945 HOURS

003310	124326	A	998	I-12	DATA	INVALID!,0	
003311	124711	A					
003312	144672	A					
003313	000000	A					
003314	144716	A	999	MS15	DATA	INVALID!,0	
003315	153301	A					
003316	146311	A					
003317	142240	A					
003320	000000	A					

01 00995

01 00996

			1000		FJEC				501 00997
			1001 *						01 00998
003321	000000	A	1002	BCNG	ENTR	0		ADJUST INSTRS. TO BIT SIZE	01 00999
003322	005002	A	1003		TZR				01 01000
003323	005101	A	1004		INCR	1			01 01001
003324	004541	A	1005		LLSR	1			01 01002
003325	003455	A	1006		STR	XDSB			01 01003
003326	003465	A	1007		STR	XDS4+1			01 01004
003327	005311	A	1008		DAR				01 01005
003330	004341	A	1009		LSRA	1			01 01006
003331	003422	A	1010		STA	XDA2+1		SET ANAI INST	01 01007
003332	003470	A	1011		STA	XDS2+1			01 01008
003333	001660	A	1012		STA	XDAX+1			01 01009
003334	011156	A	1013		LDA	NBIT			01 01010
003335	005311	A	1014		DAR				01 01011
003336	005311	A	1015		DAR				01 01012
003337	003454	A	1016		STA	XDLC		SET LOOP COUNT FOR DIVIDE	01 01013
003340	001000	A	1017		JMP*	BCNG			01 01014
003341	103321	A							

		1018		FJFC			S01 01015
		1019	*				01 01016
		1020	*				*01 01017
		1021	*	DOUBLE PRECISION INTEGER MULTIPLY BY ADDITION			*01 01018
		1022	*	CALL XDTM, MULT WHERE MULTIPLIER MUST BE A SINGLE WORD +			*01 01019
003342	073411	A 1023	XDI1	STX	XDIS+4	SAVE VALUES	01 01020
003343	053405	A 1024		STA	XDIS		01 01021
003344	053407	A 1025		STB	XDIS+2		01 01022
003345	053405	A 1026		STR	XDIS+1		01 01023
003346	053410	A 1027		STR	XDIS+3		01 01024
003347	023402	A 1028		LDB	XDIM		01 01025
003350	036000	A 1029		LDX	0,2	SET NO. OF TIMES TO ADD.	01 01026
003351	035000	A 1030		LDX	0,1		01 01027
003352	043402	A 1031		JMP	XDIM		01 01028
003353	001040	A 1032		JXZ	XDIS	CHECK IF MULTIPLIER ZERO. ANS. ZERO	01 01029
003354	003371	A					
003355	005344	A 1033	XDI2	DXR			01 01030
003356	001040	A 1034		JXZ	XDI4		01 01031
003357	003376	A					
003360	013405	A 1035		LDA	XDIS		01 01032
003361	023405	A 1036		LDB	XDIS+1		01 01033
003362	002000	A 1037		CALL	XDAD, XDIS+2		01 01034
003363	003434	A					
003364	003407	A					
003365	053405	A 1038		STA	XDIS		01 01035
003366	063405	A 1039		STR	XDIS+1		01 01036
003367	001000	A 1040		JMP	XDI2		01 01037
003370	003355	A					
003371	005001	A 1041	XDI3	TZA			01 01038
003372	005002	A 1042		TZB			01 01039
003373	033411	A 1043		LDX	XDIS+4		01 01040
003374	001000	A 1044		JMP*	XDIM		01 01041
003375	103402	A					
003376	013405	A 1045	XDI4	LDA	XDIS		01 01042
003377	023405	A 1046		LDB	XDIS+1		01 01043
003400	033411	A 1047		LDX	XDIS+4		01 01044
003401	001000	A 1048		JMP	0		01 01045
003402	000000	A					
003402		1049	XDIM	BES	0		01 01046
003403	001000	A 1050		JMP	YDI1		01 01047
003404	003342	A					
003405	000000	A 1051	XDIS	DATA	0,0,0,0,0		01 01048

PAGE 55 04/22/74

VORTEX DASH

1945 HOURS

003406 000000 A
003407 000000 A
003410 000000 A
003411 000000 A

1076 EJEC
 1077 *
 1078 *
 1079 * XDCD
 1080 *

FIXED POINT DOUBLE PRECISION COMPLEMENT

003441 000000 A 1081 XDCD ENTR
 003442 005211 A 1082 CPA
 003443 001020 A 1083 J8Z **R
 003444 003453 A
 003445 005222 A 1084 CPB
 003446 005122 A 1085 IBR
 003447 004041 A 1086 LRLB 1
 003450 004141 A 1087 LSRB 1
 003451 001000 A 1088 JMP* XDCD

501 01073
 01 01074
 01 01075
 01 01076
 01 01077
 01 01078
 01 01079
 01 01080

003453 005111 A 1089 IAR
 003454 000016 A 1090 XDLC DATA 14
 003455 100000 A 1091 XDSD DATA 0100000

DIVIDE LOOP COUNT (ALTERED)
 SIGN (ALTERED)

01 01086
 01 01087
 01 01088
 01 01089

1092 *
 1093 * XDSU
 1094 *

FIXED POINT DOUBLE PRECISION SUBTRACT

003456 073505 A 1095 STX XDSU+3
 003457 007400 A 1096 R0F
 003460 033502 A 1097 LDX XDSU
 003461 035000 A 1098 LDX 0,1
 003462 053506 A 1099 STA XDSU+4
 003463 005021 A 1100 TBA
 003464 006110 A 1101 XDS4 DRAI 0100000
 003465 100000 A
 003466 145001 A 1102 SUB 1,1
 003467 006150 A 1103 XDS2 ANAI 077777
 003470 077777 A
 003471 005012 A 1104 TAB
 003472 005001 A 1105 TZA
 003473 005711 A 1106 SUFA
 003474 007400 A 1107 R0F
 003475 123506 A 1108 ADD XDSU+4
 003476 145000 A 1109 SUB 0,1
 003477 043502 A 1110 INW XDSU
 003500 033505 A 1111 LDX XDSU+3
 003501 001000 A 1112 JMP 0

SAVE XR
 RESET OF
 XR-ADDR OF HI B
 SAVE HI A
 SET SIGN FOR CARRY
 SUB LO B
 MASK SIGN
 SAVE RESULT
 GET CARRY
 RESET OF
 ADD HI A
 SUB HI B
 SET RETURN
 RESTORE XR
 RETURN

01 01090
 01 01091
 01 01092
 01 01093
 01 01094
 01 01095
 01 01096
 01 01097
 01 01098
 01 01099
 01 01100
 01 01101
 01 01102
 01 01103
 01 01104
 01 01105
 01 01106
 01 01107
 01 01108
 01 01109

003502		1113	ORG	*-1			
003502	000000	A 1114	XDSH	ENTR		ENTRY	01 01110
003503	001000	A 1115		JMP	*-21		01 01111
003504	003456	A					01 01112
003505	000000	A 1116	DATA	0,0		TEMP STORAGE	
003506	000000	A					01 01113

1117
000500 A 1118EJEC
END 0500ENTRY NAMES
EXTERNAL NAMES
SYMBOLS

000442 A \$CON	000471 A \$DCT	000440 A \$FLG	000422 A \$LWE
000441 A \$MEM	000424 A \$MSM	002335 A \$TTY	002717 A ADDR
003321 A BCNG	002624 A BUFC	002614 A BUFO	001163 A CNTL
002546 A CD11	001157 A COMP	002450 A CON1	002455 A CON2
002456 A CON3	002465 A CON4	002472 A CON5	002521 A CON6
002534 A CON7	002544 A CON8	002512 A CON9	002515 A CONL
002641 A CONT	002433 A CONV	002334 A D60	002426 A DPSM
002330 A EMFR	002332 A EMVI	001160 A ERRC	001203 A ERRP
001165 A ERRS	002331 A ESRP	002333 A ESVI	000423 A ESZC
002635 A FLGC	002306 A FRM	002336 A HDEF	002756 A HLF1
002745 A HLFS	002713 A HVAL	001471 A I1	001640 A I10
001671 A I101	001677 A I10T	001572 A I11	001614 A I14
001604 A I141	001736 A I15	001741 A I151	001626 A I161
001623 A I162	001631 A I17	001402 A I2	001460 A I3
002150 A I30	002170 A I301	001414 A I4	001423 A I5
001774 A I50	002055 A I51	002141 A I52	001425 A I6
001512 A I7	001546 A I70	001511 A I71	001437 A I8
001526 A I9	002215 A IC1	002225 A IC2	002232 A IC3
002242 A IC4	002256 A IC5	002266 A IC6	002273 A IC7
002303 A IC8	002176 A ICOM	002324 A IFM	002322 A IINT
002321 A ILNG	003175 A IM1	003301 A IM10	003304 A IM11
003310 A IM12	003212 A IM3	003223 A IM4	003235 A IM5
003256 A IM6	003266 A IM7	003275 A IM9	000410 A INPA
000411 A INPB	000412 A INPC	000413 A INPD	000414 A INPE
000415 A INPF	000416 A INPG	002323 A INTT	002320 A INXT
002343 A IPD1	002407 A IPD3	002413 A IPD4	002420 A IPD5
002337 A IPDC	001452 A ISCP	001353 A ISCR	001320 A ITT
001703 A IUFR	002326 A IVM	001557 A IX11	001571 A IX12
002317 A LFRC	001155 A LODP	002715 A LVAL	002315 A LVII
002767 A MES1	003003 A MES2	003026 A MES3	003035 A MES4
003061 A MESS	003103 A MES6	003122 A MES7	003144 A MES8
003042 A MESA	003167 A MS15	003314 A MS16	001156 A NBIT
000400 A OUTA	000401 A OUTB	000402 A OUTC	000403 A OUTD
000404 A OUTE	000405 A OUTF	000406 A OUTG	000407 A OUTH
001164 A PINT	000502 A PNTR	001217 A RT10	001265 A RT13
000047 A RTC	000557 A RTC1	000647 A RTC2	000677 A RTC3
000735 A RTC4	001013 A RTC5	001024 A RTC6	001144 A RTC9

PAGE 60 04/22/74

VORTEX DASM

1945 HOURS

000570	A	RTCK	000640	A	RTCL	000577	A	RTCM	000627	A	RTCN
000633	A	RTCN	000636	A	RTCP	000527	A	RTCT	001161	A	RTSA
001000	A	RTT4	001042	A	RTTC	002636	A	SAVN	002312	A	SELC
002710	A	SIXM	000421	A	SSWT	002704	A	SUMH	002642	A	TABT
002570	A	TBOC	000420	A	TDLY	002725	A	TDS1	002736	A	TDS2
002742	A	TDSA	002721	A	TDSC	002432	A	TEN	002640	A	TIME
001162	A	TMSV	000417	A	TDUT	002706	A	TWNT	002316	A	UFRC
002314	A	UVII	002431	A	VALU	002711	A	VAR	002310	A	VIIF
003421	A	XDA2	003434	A	XDAD	001657	A	XDAX	003441	A	XDCO
003342	A	XDI1	003355	A	XDI2	003371	A	XDI3	003376	A	XDI4
003402	A	XDIM	003405	A	XDIS	003454	A	XDLC	003467	A	XDS2
003464	A	XDS4	003455	A	XDSB	003502	A	XDSU			

0 ERRORS ASSEMBLY COMPLETE

PAGE

1 04/22/74

VORTEX CONC

99	SCON	134	139	166	220	289	317	364	415	482
		520	632							
101	SECT	*								
97	SFLG	*								
86	SLWE	*								
98	SMEM	*								
90	SMSM	*								
801	STTY	422								
941	ADDR	853	857	872	873	908	909			
1002	HCNG	117	1017							
929	BUFC	856	886	895	902	911				
926	BUFO	667	669	677	679	690	692	700	702	
332	CNTL	242	260	261						
903	CO11	913								
328	COMP	158	161	165	222	293	367	388	426	463
		534	609	659	729	746	762	966		
863	CON1	859	874	877	885					
865	CON2	868								
866	CON3	860	878							
869	CON4	861	879							
872	CON5	864								
891	CON6	899	901							
898	CON7	889								
902	CON8	896								
886	CON9	881								
888	CONL	897								
933	CONT	*								
852	CONV	668	678	691	701	915				
800	D60	376	384	396	405					
844	DPSM	812	813	828	829	832	833	841	842	
796	EMFR	554	556	666	731	774				
798	EMVI	689	725	755						
329	ERRC	175	198	203	232	240	254	265	268	273
		277	299	310	345	352				
349	ERRP	347	355							
340	ERRS	179	189	199	212	218	249	259	269	283
		309	316	343						
797	ESFR	676	733	743	766	780				
799	ESVI	699	727	761						
89	ESZC	*								
930	FLGC	*								
783	FRCH	372	373	394	395	459	460	776		
802	HDEF	437	495	536						

971	HLF1	977					
965	HLFS	955	971				
939	HVAL	*					
490	I1	416	483				
579	I10	518	504				
600	I101	598					
605	I10T	581	582	583	600	501	602
545	I11	635	537	646	719	723	
558	I14	551					
552	I141	549					
632	I15	559	561	575			
634	I151	420	423				
568	I161	*					
564	I162	*					
571	I17	568					
447	I2	427	486				
482	I3	461	472	507	510	512	
722	I30	633					
734	I301	730					
454	I4	501					
459	I5	455					
657	I50	640					
684	I51	660					
715	I52	713					
461	I6	458					
505	I7	464	466				
525	I70	521	644	737			
504	I71	469					
468	I8	473					
514	I8	*					
750	IC1	747	753				
754	IC2	751					
757	IC3	760					
761	IC4	758					
769	IC5	772					
773	IC6	770					
776	IC7	779					
780	IC8	777					
740	ICDM	657	724	763	781		
794	IFM	377	378	397	398	759	773
792	IINT	505	511	532	572	715	
791	ILNG	452	461	500			
989	M1	418					

995	IM10	672	595							
997	IM11	682	705							
998	IM12	685								
990	IM3	428								
991	IM4	432								
992	IM5	447								
993	IM6	476	484							
994	IM7	522								
995	IM9	662								
78	INPA	*								
79	INPB	143	636	814						
80	INPC	*								
81	INPD	*								
82	INPE	*								
83	INPF	*								
84	INPG	*								
793	INTT	425	431	454	465	494	548	712		
790	INXT	533	558	571	574	717				
814	IPD1	834								
835	IPD3	824	827							
837	IPD4	818								
840	IPD5	821								
810	IPDC	371	381	430	434	449	836	843		
476	ISCP	443	445							
432	ISCR	478								
415	ITT	387	408	647	736					
608	IUFR	546	610	613	627	629	661	664	671	674
		681	684	687	694	697	704	707	764	914
795	IVM	385	386	406	407	750	754			
534	IX11	*								
542	IX12	535								
789	LFRC	531	552	620	622	710				
326	LOOP	184	195	207	238	279	301	312	347	
940	LVAL	*								
787	LVII	530	580	593						
979	MES1	137								
980	MES2	168								
981	MES3	350								
982	MES4	224								
984	MES5	291								
985	MES6	319								
986	MES7	369								
987	MES8	379								

983	MFSA	226								
988	MS15	141								
999	MS16	153								
327	NRIT	113	116	1013						
70	OUTA	*								
71	OUTB	*								
72	OUTC	136	143	147	354	366	417	641	658	837
73	OUTD	138	142	154	169	225	227	292	320	351
		370	380	419	429	433	448	477	485	523
		653	670	673	680	683	686	693	696	703
		706								
74	OUTE	353								
75	OUTF	*								
76	OUTG	835								
77	OUTH	*								
333	PTNT	363								
107	PNTR	*								
362	RT10	294	318	321						
388	RT13	365								
103	RTC	119	135	186	196	208	209	217	245	246
		252	253	258	280	285	288	302	303	307
		313	314	341	525	539	540	541	542	555
		580	603	611	618	619	709	742		
134	RTC1	130								
174	RTC2	167								
193	RTC3	181								
216	RTC4	204								
251	RTC5	235								
258	RTC6	276								
317	RTC9	*								
139	RTCK	135	155							
166	RTCL	159	162	348						
143	RTCM	144								
157	RTCN	150								
161	RTCO	152								
164	RTCP	140								
119	RTCT	131	133	347	545	815				
330	RTSA	304	308							
243	RTT4	266								
268	RTTC	263								
931	SAVN	854	855	870	871	883	884			
785	SELC	441	468	499	538	748				
937	STXM	*								

87	SSWT	347																		
935	SUMH	*																		
934	TART	*																		
916	TRDC	858																		
86	TOLY	*																		
955	TDS1	960																		
961	TDS2	959																		
964	TUSA	952	953	954	956	958	961	962												
951	TDSC	188	202	211	248	272	287	306	963											
846	TEM	830																		
932	TIME	*																		
331	TMSV	*																		
85	TOUT	*																		
936	TENT	*																		
788	UFRC	528	623	625	767															
786	UVII	529	594	596	745															
845	VALII	825	831																	
938	VAR	*																		
784	VIIIF	382	383	403	404	456	457	757												
1063	XDA2	1010																		
1073	XDA4	745	754	767	773	831	869	1037	1056	1058										
		1060	1068	1070	1071															
592	XDA5	1012																		
1081	XDC0	1088																		
1023	XDI1	1050																		
1033	XDI2	1040																		
1041	XDI3	1032																		
1045	XDI4	1034																		
1049	XDIM	376	384	396	405	461	748	830	1028	1031										
		1044																		
1051	XDIS	1023	1024	1025	1026	1027	1035	1036	1037	1038										
		1039	1043	1045	1046	1047														
1090	XDLC	1016																		
1103	XDS2	1011																		
1101	XDS4	1007																		
1091	XDSB	1006																		
1114	XDSU	468	750	757	769	776	863	866	1095	1097										
		1099	1108	1110	1111															

/ASSIGN,BO,PT
 /ASSIGN,BI,GO
 /PFILE,RI,,GO
 /LOAD,MR2BA

DASMR TO HLD CONVERSION PROG

MU**
VIS,9200107-0350
MU**
PTR,142
MU**
TRAN

LITERALS

PDINTERS
0142 8400
0143 85CF
0144 8500

TRAN COMPLETE

MU**
EXIT
/FINI