

KD11-Z

11/44 TRAPS
CKKABAO

AH-F623A-MC
COPYRIGHT 1980
FICHE 1 OF 1

JAN 1980
digital
MADE IN USA

The image shows a microfiche card. The left side contains a grid of frames, each containing a small image or data point. The right side is a large, dark, mostly blank area, possibly representing a large image or a specific data set that is not clearly visible due to the low resolution and lighting of the scan.

86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122

.REM %

IDENTIFICATION

PRODUCT CODE: AC-F621A-MC
PRODUCT NAME: CKKABAO 11/44 TRAPS
DATE CREATED: MARCH 1979
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: CHUCK ROBINSON

COPYRIGHT (C) 1979 DIGITAL EQUIPMENT CORP., MAYNARD, MASS.

THIS SOFTWARE IS FURNISHED TO PURCHASER UNDER A LICENSE FOR USE ON A SINGLE COMPUTER SYSTEM AND CAN BE COPIED (WITH INCLUSION OF DEC'S COPYRIGHT NOTICE) ONLY FOR USE IN SUCH SYSTEM, EXCEPT AS MAY OTHERWISE BE PROVIDED IN WRITING BY DEC.

THE INFORMATION IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY DIGITAL EQUIPMENT CORPORATION.

DEC ASSUMES NO RESPONSIBILITY FOR THE USE OR RELIABILITY OF ITS SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DEC.

124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163

- 1. ABSTRACT
THIS IS A TEST OF ALL OPERATIONS AND INSTRUCTIONS THAT CAUSE TRAPS. ALSO TESTED ARE TRAP OVERFLOW CONDITIONS, ODDITIES OF REGISTER 6, INTERRUPTS, THE RESET AND WAIT INSTRUCTIONS.
- 2. REQUIREMENTS
 - 2.1 EQUIPMENT
11/44 STANDARD COMPUTER
 - 2.2 STORAGE
 - 2.2.1 PROGRAM STORAGE - THE ROUTINE USES MEMORY FROM 0000 TO 17600.
- 3. LOADING PROCEDURE
 - 3.1 METHOD
PROCEDURE FOR NORMAL ABSOLUTE TAPES SHOULD BE FOLLOWED.
- 4. STARTING PROCEDURE
THE PROGRAM STARTS AT 200.
IF IT IS DESIRED TO RESET THE PASS COUNT BACK TO ZERO ; THEN START THIS PROGRAM AT LOCATION 2'0
- 4.2 PROGRAM AND/OR OPERATOR ACTION
LOAD PROGRAM INTO MEMORY. (BOTTOM 4K)
LOAD ADDRESS.
START.
THE PROGRAM WILL LOOP.
IT WILL PRINT "CKKABAO 11/44 TRAPS" AFTER THE FIRST ITERATION AND THEN PRINTS IT EVERY 15 TIMES (APPROXIMATELY EVERY 15 SECONDS)

165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211

5. OPERATION

5.2 SUBROUTINE ABSTRACTS

5.2.1 BEGIN AT 200

5.2.2 SCOPE

IF A SCOPE LOOP IS NEEDED INSERT A BRANCH AS THE
COMMENT TO THE HALT EXPLAINS.

5.2.3 TRAPCATCHER

THIS IS A SERIES OF INSTRUCTIONS DESIGNED TO DETECT AND
ISOLATE UNEXPECTED TRAPS AND INTERRUPTS, THAT OCCUR IN THE
TRAP AND INTERRUPT VECTOR AREA OF MEMORY.

THE PRINCIPLE OF THIS ROUTINE IS: THE VECTOR ENTRANCE
ADDRESS POINTS TO THE NEXT SEQUENTIAL WORD WHICH WILL CON-
TAIN A HALT (00000) (THIS LOCATION IS ALSO THE STATUS
WORD FOR THAT VECTOR ENTRANCE. BUT THIS WILL HAVE NO EFFECT
ON IT ALSO BEING THE NEXT INSTRUCTION).

IF A HALT OCCURS IN THE TRAP OR INTERRUPT VECTOR AREA,
REGISTER SIX SHOULD BE EXAMINED TO DETERMINE ITS CONTENTS,
THEN USE REGISTER SIX CONTENTS AS AN ADDRESS TO DETERMINE
WHERE THE PROGRAM WAS. WHEN THE INTERRUPT OR
TRAP OCCURRED; MEMORY AS SPECIFIED BY R6 CONTAINS THE
PC OF THE INSTRUCTION FOLLOWING THE INSTRUCTION WHERE THE
TRAP OCCURRED.
THE CONTENTS OF LOCATION '\$TESTN'(304) CONTAINS
THE TEST NUMBER THAT IT WAS DOING BEFORE IT
TRAPPED.

5.3 PROGRAM AND/OR OPERATOR ACTION

5.3.1 LOADING AND STARTING AT 200 STARTS THE TEST. IF
AN ERROR IS DETECTED, THERE WILL BE A HALT.
NOTE:IF A SCOPE LOOP IS NEEDED
THE COMMENT SECTION OF THE HALT EXPLAINS
HOW TO UTILIZE THIS LOOP.

213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258

6. ERRORS

6.1 ALL ERRORS WILL CAUSE A HALT.

6.1.1 THE PROGRAM CHECKS TO SEE THAT THE P.C. DOESN'T JUMP
WITHIN THE TESTS, BY A SEQUENCE COUNT CALLED '\$STSN'
THIS TEST IS A SEQUENTIAL INCREMENT AND COMPARE COUNT.

EXAMPLE

```

TSTA:  INC    @#STSNM      ; INCREMENT THE TEST NUMBER
        CMP    #A,@#STSNM  ; COMPARE FOR THE RIGHT TEST
        BNE   TSTA+1-12    ; IF NOT CORRECT BRANCH TO A HALT
        ----
        CODE

```

IMPORTANT

IF AN ERROR IS DETECTED ; IT COULD BE BECAUSE OF TWO REASONS.

- A) WRONG TEST NUMBER
- B) ERROR IN THE PRESENT TEST

////////////////////////////////////
 THE TEST SEQUENCE LOCATION 'TESTN' SHOULD BE CHECKED FIRST
 TO SEE IF IT MATCHES THE PRESENT TEST.
 IF IT DOESN'T MATCH ; THEN THE CONTENTS OF THIS LOCATION
 TELL YOU WHICH TEST IT WAS DOING BEFORE IT HALTED.
 //////////////////////////////////////

6.2 ERROR RECOVERY

ON TRAP ERRORS - RESTART AT STARTING ADDRESS

7. RESTRICTIONS

7.1 STARTING RESTRICTION

NONE

7.2 OPERATIONAL RESTRICTION

NONE

260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316

8. MISCELLANEOUS

8.1 EXECUTION TIME

2ST PASS APPROX. 2 SEC., THEREAFTER EVERY 15 SEC

9. PROGRAM DESCRIPTION

THIS PROGRAM CHECKS THAT ON ALL TRAP OPERATIONS REGISTER 6 IS DECREMENTED THE CORRECT AMOUNT, THAT THE CORRECT PC IS SAVED ON THE STACK, THAT THE OLD CONDITION CODES AND PRIORITY ARE PLACED ON THE STACK AND THAT THE NEW STATUS AND CONDITION CODES ARE CORRECT. BOTH THE 'TRAP' AND 'EMT' TRAP INSTRUCTIONS ARE TESTED TO SEE THAT ALL COMBINATIONS WILL TRAP. CHECKED ALSO IS THAT ALL RESERVED INSTRUCTIONS WILL TRAP. VERIFICATION OF THE 'TRT' INSTRUCTION (00003) WHICH IS USED FOR SOFTWARE DEBUG ROUTINES: ODT,DDT, IS DONE. ALSO, THE TRACE BIT IS CHECKED TO SEE IF IT CAUSES A TRAP. THE RTI AND RTT INSTRUCTIONS ARE CHECKED. STACK OVERFLOW IS ALSO CHECKED FOR ALL THE TRAP INSTRUCTIONS. SPECIAL CHECKS ARE MADE TO SEE IF BUS ERROR TRAPS OCCUR ON NON-EXISTENT MEMORY. PIRQ TRAPS ARE CHECKED AT ALL LEVELS

10.0 RUNNING UNDER APT

THE EXECUTION TIMES PROVIDED IN THE APT SCRIPT THAT FOLLOWS ARE FOR EXECUTION WITH A 11/44 PROCESSOR, CACHE, 16K CORE MEMORY, AND 300 BAUD.

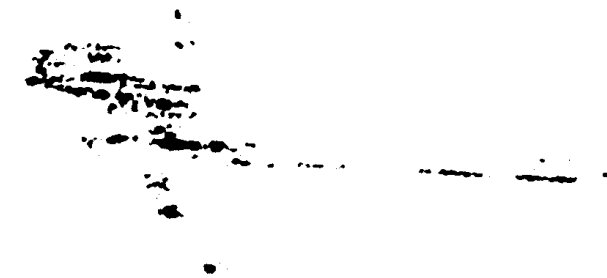
THE FOLLOWING IS A PROGRAM LOAD FILE USED BY APT:

- 1. E TABLE 'A' IS USED FOR APT DUMP MODE.
- 2. E TABLE 'B' IS USED FOR APT QV AND RUN TIME MODES. \$ENVM-040 INDICATES THAT TYPEOUTS WILL BE SUPPRESSED.

	1ST PASS RUN TIME	LONGEST TEST TIME	ADDITIONAL RUN TIME
	5	5	0
.....		E TABLES
		A	B
E-MODE/S-MODE (\$ENVM/\$ENV)		000/000	040/001
SWITCH REGISTER 1 (\$SWREG)		000000	000000
SWITCH REGISTER 2 (PU TYPE/OPTIONS)		000000 00/0000	000000 00/0000

317
318
319

2



```

323      ;ALL INSTRUCTIONS THAT ARE RESERVED
324      ;SHOULD TRAP TO LOCATION 10, AND THE
325      ;PC THAT POINTS TO THE TRAPPING INSTRUCTION
326      ;SHOULD BE PLACED ON THE STACK
327
328
329
330
331
332
333

```

:LISTING

```

334      .LIST ME
335      .NLIST MC,MD,CND
336      .ENABLE ABS
337      SP=%6
338      R6 %6
339      TAB=%3
340      LAST=%1
341      FIRST=%5
342      R2=%2
343      HLT=HALT
344      TRT=3
345      RTRAP5=4
346      RTRAP4=14
347      RTRAP3=30
348      RTRAP2=20
349      RTRAP1=34
350      TTCSR=177564
351      TRCSR=177560
352      TPS=177564
353      TPB=177566
354      BELL=240
355      NOP=240
356      STATUS=177776
357      TRAPA=10
358      RTRAP=10
359      ILLA=004700
360      ILLB=100
361      CC=177776
362      CPUERR=177766
363      CERMSK=177413
364      PSW=177776
365      .MCALL .$APTHDR
366      .MCALL .$APTBL5
367      .MCALL .$ACT11

```

```

;ILLEGAL ADDRESSES
;FOR TRACE TRAP
;FOR EMULATOR TRAP
;FOR IOT TRAP
;FOR TRAP INST

```


438 000200 000200
 439 000200 000167 000416
 440 000210 000210
 441 000210 005037 000306
 442 000214 000167 000402
 443 000300
 444

.-200
 JMP BEGIN
 .=210
 CLR @PASS
 JMP BEGIN
 .=300

.SBTTL ACT11 HOOKS

:HOOKS REQUIRED BY ACT11

000300
 000046 000046
 017172
 000052 000052
 000000
 000300

\$SVPC= . ;SAVE PC
 .=46
 \$ENDAD ;:1)SET LOC.46 TO ADDRESS OF \$ENDAD IN .SEOP
 .=52
 .WORD 0 ;:2)SET LOC.52 TO ZERO
 .= \$SVPC ;: RESTORE PC

445

.SBTTL APT MAILBOX-ETABLE

.EVEN

000300
 000300 000000
 000302 000000
 000304 000000
 000306 000000
 000310 000000
 000312 000000
 000314 000000
 000316 000000
 000320
 000320 000
 000321 000
 000322 000000
 000324 000000
 000326 000000

\$MAIL: ;: APT MAILBOX
 \$MSGTY: .WORD AMSGTY ;: MESSAGE TYPE CODE
 \$FATAL: .WORD AFATAL ;: FATAL ERROR NUMBER
 \$TESTN: .WORD ATESTN ;: TEST NUMBER
 \$PASS: .WORD APASS ;: PASS COUNT
 \$DEVCT: .WORD ADEVCT ;: DEVICE COUNT
 \$UNIT: .WORD AUNIT ;: I/O UNIT NUMBER
 \$MSGAD: .WORD AMSGAD ;: MESSAGE ADDRESS
 \$MSGLG: .WORD AMSGLG ;: MESSAGE LENGTH
 \$ETABLE: ;: APT ENVIRONMENT TABLE
 \$ENV: .BYTE AENV ;: ENVIRONMENT BYTE
 \$ENVM: .BYTE AENVM ;: ENVIRONMENT MODE BITS
 \$SWREG: .WORD ASWREG ;: APT SWITCH REGISTER
 \$USWR: .WORD AUSWR ;: USER SWITCHES
 \$CPUOP: .WORD ACPUOP ;: CPU TYPE, OPTIONS
 ;*
 ;* BITS 15-11=CPU TYPE
 ;* 11/04=01,11/05-02,11/20=03,11/40 04,11/45-05
 ;* 11/70=06,PDQ 07,Q=10
 ;*
 ;* BIT 10-REAL TIME CLOCK
 ;* BIT 9-FLOATING POINT PROCESSOR
 ;* BIT 8-MEMORY MANAGEMENT

000330

\$ETEND:

446

.MEXIT
.SBTTL APT PARAMETER BLOCK

:SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT

000330
 000024 000024
 000200
 000044
 000044 000330
 000330

.\$X- . ;:SAVE CURRENT LOCATION
 . 24 ;:SET POWER FAIL TO POINT TO START OF PROGRAM
 200 ;:FOR APT START UP
 .=44 ;:POINT TO APT INDIRECT ADDRESS PNTR.
 \$APTHDR ;:POINT TO APT HEADER BLOCK
 .=.\$X ;:RESET LOCATION COUNTER

:SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTI
:INTERFACE SPEC.

000330		\$APTHD:		
000330	000000	\$HIBTS: .WORD	0	::TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
000332	000300	\$MBADR: .WORD	\$MAIL	::ADDRESS OF APT MAILBOX (BITS 0-15)
000334	000005	\$STMT: .WORD	5	::RUN TIM OF LONGEST TEST
000336	000005	\$PASTM: .WORD	5	::RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
000340	000000	\$UNITM: .WORD	0	::ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
000342	000014		\$ETEND-\$MAIL/2	::LENGTH MAILBOX-ETABLE(WORDS)
447	000304	\$STNM=\$TESTN		
448	000302	\$ERROR=\$FATAL		
449				
450	000500		.-500	
451	000500	000000	BUFF: 0	
452	000502	000000	RCPUER: .WORD 0	
453	000504	177572	SRO: 177572	
454	000506	177573	SROH: 177573	
455	000510	177574	SR1: 177574	
456	000512	177576	SR2: 177576	
457	000514	000250	KTVEC: 250	
458	000516	000252	KTSTA: 252	
459	000520		ADRTAB:	
460	000520	177600	UPDR0: 177600	;USER PAGE DESCRIPTOR REGISTERS
461	000522	177602	UPDR1: 177602	
462	000524	177604	UPDR2: 177604	
463	000526	177606	UPDR3: 177606	
464	000530	177610	UPDR4: 177610	
465	000532	177612	UPDR5: 177612	
466	000534	177614	UPDR6: 177614	
467	000536	177616	UPDR7: 177616	
468			:	
469	000540	177640	UPAR0: 177640	;USER PAGE ADDRESS REGISTERS
470	000542	177642	UPAR1: 177642	
471	000544	177644	UPAR2: 177644	
472	000546	177646	UPAR3: 177646	
473	000550	177650	UPAR4: 177650	
474	000552	177652	UPAR5: 177652	
475	000554	177654	UPAR6: 177654	
476	000556	177656	UPAR7: 177656	
477			:	
478	000560	172300	KPDR0: 172300	;KERNEL PAGE DESCRIPTOR REGISTERS
479	000562	172302	KPDR1: 172302	
480	000564	172304	KPDR2: 172304	
481	000566	172306	KPDR3: 172306	
482	000570	172310	KPDR4: 172310	
483	000572	172312	KPDR5: 172312	
484	000574	172314	KPDR6: 172314	
485	000576	172316	KPDR7: 172316	
486			:	
487	000600	172340	KPAR0: 172340	;KERNEL PAGE ADDRESS REGISTERS
488	000602	172342	KPAR1: 172342	
489	000604	172344	KPAR2: 172344	
490	000606	172346	KPAR3: 172346	
491	000610	172350	KPAR4: 172350	
492	000612	172352	KPAR5: 172352	
493	000614	172354	KPAR6: 172354	
494	000616	172356	KPAR7: 172356	
495	000620	000616	ADREND: .-2	

496
497
498

```
500
501
502 000622 012706 000500 BEGIN: MOV #500,%6 ;SET UP SACK BUFF
503 000626 012737 177777 017220 MOV #-1,%PASSPT ;CLEAR THE ITERATION COUNTER
504 000634 023767 000042 016330 CMP @#42,%SENDAD
505 000642 001404 BEQ RESTR1
506 000644 012700 017305 MOV #TITLE,R0
507 000650 004767 016644 JSR PC,PRMSG
508 000654 005067 177420 RESTR1: CLR $MSGTY
509 000660 012706 000500 MOV #500,%6
510 000664 012767 017432 177132 MOV #PWRDWN,24 ;SET UP THE POWER DOWN VECTOR
511 000672 012767 000340 177126 MOV #340,26 ;SET UP POWER DOWN PRIORITY
512 000700 012767 000006 177076 MOV #6,4 ;SET UP TRAP VECTORS 4 & 6.
513 000706 005067 177074 CLR 6
514 000712 012767 000012 177070 MOV #12,10
515 000720 005067 177066 CLR 12
516 000724 005067 177354 CLR $TSTNM
517 000730 005067 177346 CLR $ERROR
518 000734 012702 000300 MOV #MSGTY,%R2
519
520 ;SPECIAL CASE OF ODD;.EVEN .BYTE AND REGISTER 6
521 000000 HERE=0
522
523 000740 000167 000024 JMP TSTT
524 000744 000000
525 000746 000000
526 000750 000000
527 000752 000000
528 000754 000000
529 000756 000000
530 000760 052525
531 000762 052400
532 000764 000000
533 000766 000000
534
535
;SBTTL TEST AUTO INC AND DEC OF R6 FOR WORD AND BYTES
;*****
;TEST 1 TEST AUTO INC AND DEC OF R6 FOR WORD AND BYTES
;*****
000770 005237 000304 TST1: INC @%TSTN ;UPDATE TEST NUMBER
000774 022737 000001 000304 CMP #1,%TSTN ;SEQUENCE ERROR?
001002 001137 BNE TST2-12 ;BR TO ERROR HALT ON SEQ ERROR
536 001004 005006 CLR %6
537 001006 112667 176766 MOVB (6)+,HERE ;SIX SHOULD INCREMENT BY TWO
538 001012 020627 000002 CMP %6,%#2
539 001016 001405 BEQ BR1
001020 012737 000001 000302 MOV #1,%SFATAL ;MOVE TO MAILBOX # ***** 1 *****
001026 005212 INC (R2) ;SET MSGTYP TO FATAL ERROR
001030 000000 HALT ;R6 DID NOT AUTO INCREMENT BY TWO
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 764
540
541 001032 012706 001000 BR1: MOV #1000,%6
542 001036 114627 000000 MOVB -(6),%HERE ;SHOULD DECREMENT BY TWO
543 001042 020627 000776 CMP %6,%#776
544 001046 001405 BEQ BR2
001050 012737 000002 000302 MOV #2,%SFATAL ;MOVE TO MAILBOX # ***** 2 *****
001056 005212 INC (R2) ;SET MSGTYP TO FATAL ERROR
```



```

574 001236 005006          BR7:  CLR    %6
575 001240 005004          CLR    %4
576 001242 122426          CMPB   (4)+,(6)+      ;TEST INCREMENT OF R4
577 001244 020427 000001  CMP    %4,#1
578 001250 001405          BEQ    BR10
    001252 012737 000010 000302  MOV    #10,@$FATAL   ;MOVE TO MAILBOX # ***** 10 *****
    001260 005212          INC    (R2)          ;SET MSGTYP TO FATAL ERROR
    001262 000000          HALT                ;WRONG INCREMENT OF R4
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 647

```

```

579
580 001264 012706 001000  BR10:  MOV    #1000,%6
581 001270 124627 000000  CMPB   -(6),#HERE    ;TEST DECREMENT OF R6
582 001274 022706 000776  CMP    #776,%6
583 001300 001405          BEQ    TST2
    001302 012737 000011 000302  MOV    #11,@$FATAL   ;MOVE TO MAILBOX # ***** 11 *****
    001310 005212          INC    (R2)          ;SET MSGTYP TO FATAL ERROR
    001312 000000          HALT                ;WRONG DECREMENT OF R6,OR WRONG $STNM
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 633

```

```

584                                     .SBTTL TEST TRANSFER OF .BYTE USING R6
585                                     ;*****
                                     ;TEST 2 TEST TRANSFER OF .BYTE USING R6
                                     ;*****

```

```

    001314 005237 000304          TST2:  INC    @$STESTN   ;UPDATE TEST NUMBER
    001320 022737 000002 000304  CMP    #2,@$STESTN   ;SEQUENCE ERROR?
    001326 001137          BNE    TST3-12 ;BR TO ERROR HALT ON SEQ ERROR
586 001330 012767 123456 177416  MOV    #123456,K5
587 001336 012767 050505 177400  MOV    #050505,K1
588 001344 012705 000744          MOV    #K1,%5        ;%5=(050505)K1
589 001350 012706 000754          MOV    #K5,%6        ;%6=(123456)K5
590 001354 112625          MOVB   (6)+,(5)+    ;LOW .BYTE OF R6 TO R5
591 001356 022767 050456 177360  CMP    #050456,K1
592 001364 001405          BEQ    BR11
    001366 012737 000012 000302  MOV    #12,@$FATAL   ;MOVE TO MAILBOX # ***** 12 *****
    001374 005212          INC    (R2)          ;SET MSGTYP TO FATAL ERROR
    001376 000000          HALT                ;FALSE TRANSFER OF .BYTE
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 753

```

```

593
594 001400 012767 123456 177346  BR11:  MOV    #123456,K5
595 001406 012767 050505 177330  MOV    #050505,K1
596 001414 012705 000744          MOV    #K1,%5        ;%5(050505)K1
597 001420 012706 000756          MOV    #K6,%6        ;%6(123456)K5
598 001424 114625          MOVB   -(6),(5)+    ;LOW .BYTE OF R6 TO R5 (DECREMENT)
599 001426 026727 177312 050456  CMP    K1,#050456
600 001434 001405          BEQ    BR12
    001436 012737 000013 000302  MOV    #13,@$FATAL   ;MOVE TO MAILBOX # ***** 13 *****
    001444 005212          INC    (R2)          ;SET MSGTYP TO FATAL ERROR
    001446 000000          HALT                ;FALSE R6 .BYTE TRANSFER
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 727

```

```

601
602 001450 012767 123456 177266  BR12:  MOV    #123456,K1
603 001456 012767 050505 177270  MOV    #050505,K5
604 001464 012705 000744          MOV    #K1,%5        ;(123456)
605 001470 012706 000754          MOV    #K5,%6        ;(050505)

```

```

606 001474 112526          MOV      (5)+,(6)+      ;LOW OF R5 TO LOW OF R6
607 001476 022767 050456 177250    CMP      #050456,K5
608 001504 001405          BEQ      BR13
      001506 012737 000014 000302    MOV      #14,@$FATAL    ;MOVE TO MAILBOX # ***** 14 *****
      001514 005212          INC      (R2)           ;SET MSGTYP TO FATAL ERROR
      001516 000000          HALT                    ;FALSE R6 .BYTE TRANSFER
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 703

609
610 001520 012767 123456 177216    BR13:  MOV      #123456,K1
611 001526 012767 050505 177220    MOV      #050505,K5
612 001534 012705 000745          MOV      #K1+1,%5      ;123456
613 001540 012706 000754          MOV      #K5,%6        ;050505
614 001544 112526          MOV      (5)+,(6)+      ;HIGH OF R5 TO LOW OF R6
615 001546 026727 177202 050647    CMP      K5,#050647
616 001554 001405          BEQ      BR14
      001556 012737 000015 000302    MOV      #15,@$FATAL    ;MOVE TO MAILBOX # ***** 15 *****
      001564 005212          INC      (R2)           ;SET MSGTYP TO FATAL ERROR
      001566 000000          HALT                    ;FALSE R6 .BYTE TRANSFER
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 657

617
618 001570 012767 123456 177146    BR14:  MOV      #123456,K1
619 001576 012767 050505 177150    MOV      #050505,K5
620 001604 012705 000745          MOV      #K1+1,%5      ;R5-123456-ODD ADDRESS
621 001610 012706 000754          MOV      #K5,%6        ;R6-050505-- .EVEN ADDRESS
622 001614 112625          MOV      (6)+,(5)+      ;LOW OF R6 TO HIGH OF R5
623 001616 022767 042456 177120    CMP      #042456,K1
624 001624 001405          BEQ      TST3
      001626 012737 000016 000302    MOV      #16,@$FATAL    ;MOVE TO MAILBOX # ***** 16 *****
      001634 005212          INC      (R2)           ;SET MSGTYP TO FATAL ERROR
      001636 000000          HALT                    ;FAILED LOW OF 6 TO HIGH OF 5,OR WRONG $STNM
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 633

625
626
                                .SBTTL TEST SEQ ODD-EVEN ADDRESS
                                ;*****
                                ;TEST 3 TEST BYTE OPERATION WITH SEQ ODD-EVEN ADDRESS
                                ;*****
      001640 005237 000304          TST3:  INC      @$TESTN    ;UPDATE TEST NUMBER
      001644 022737 000003 000304    CMP      #3,@$TESTN    ;SEQUENCE ERROR?
      001652 001103          BNE     TST4-12 ;BR TO ERROR HALT ON SEQ ERROR
627 001654 126767 177100 177077    CMPB    K7,K7+1        ;SAME .WORD LOW TO HIGH
628 001662 001405          BEQ      BR15
      001664 012737 000017 000302    MOV      #17,@$FATAL    ;MOVE TO MAILBOX # ***** 17 *****
      001672 005212          INC      (R2)           ;SET MSGTYP TO FATAL ERROR
      001674 000000          HALT                    ;SHOULD COMPARE LOW TO HIGH
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 766

629
630 001676 126767 177057 177054    BR15:  CMPB    K7+1,K7        ;COMPARE ODD TO .EVEN SAME .WORD
631 001704 001405          BEQ      BR16
      001706 012737 000020 000302    MOV      #20,@$FATAL    ;MOVE TO MAILBOX # ***** 20 *****
      001714 005212          INC      (R2)           ;SET MSGTYP TO FATAL ERROR
      001716 000000          HALT                    ;ODD TO .EVEN .BYTE FAILURE
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 755

```

.MAIN. MACRO M1111 27-SEP-79 16:56 PAGE 68-4
T3 TEST BYTE OPERATION WITH SEQ ODD-EVEN ADDRESS

SEQ 0015

```

633 001720 126767 177037 177032 BR16:  CMPB  K10+1,K7      ;SEQUENTIAL .BYTES
634 001726 001405          BR17
    001730 012737 000021 000302      BEQ   BR17
    001736 005212          MOV   #21,@#SFATAL ;MOVE TO MAILBOX # ***** 21 *****
    001740 000000          INC   (R2)          ;SET MSGTYP TO FATAL ERROR
                                          ;ODD TO .EVEN FAILED
                                          ; TO SCOPE REPLACE HALT W/ 240
                                          ; AND REPLACE NEXT INST W/ 744

635 001742 126767 177014 177006 BR17:  CMPB  K10,K6
636 001750 001405          BR20
637 001752 012737 000022 000302      BEQ   BR20
    001760 005212          MOV   #22,@#SFATAL ;MOVE TO MAILBOX # ***** 22 *****
    001762 000000          INC   (R2)          ;SET MSGTYP TO FATAL ERROR
                                          ;.EVEN TO EVEN FAILED
                                          ; TO SCOPE REPLACE HALT W/ 240
                                          ; AND REPLACE NEXT INST W/ 733

638 001764 126767 176771 176771 BR20:  CMPB  K7+1,K10+1
639 001772 001405          BR21
    001774 012737 000023 000302      BEQ   BR21
    002002 005212          MOV   #23,@#SFATAL ;MOVE TO MAILBOX # ***** 23 *****
    002004 000000          INC   (R2)          ;SET MSGTYP TO FATAL ERROR
                                          ;ODD TO ODD FAILED
                                          ; TO SCOPE REPLACE HALT W/ 240
                                          ; AND REPLACE NEXT INST W/ 722

640 002006 126767 176750 176747 BR21:  CMPB  K10,K10+1
641 002014 001095          BR22
642 002016 012737 000024 000302      BNE  BR22
    002024 005212          MOV   #24,@#SFATAL ;MOVE TO MAILBOX # ***** 24 *****
    002026 000000          INC   (R2)          ;SET MSGTYP TO FATAL ERROR
                                          ;LOW TO HIGH IN SAME .WORD FAILED
                                          ; TO SCOPE REPLACE HALT W/ 240
                                          ; AND REPLACE NEXT INST W/ 711

643 002030 126767 176727 176725 BR22:  CMPB  K10+1,K10+1
644 002036 001405          BR23
645 002040 012737 000025 000302      BEQ   BR23
    002046 005212          MOV   #25,@#SFATAL ;MOVE TO MAILBOX # ***** 25 *****
    002050 000000          INC   (R2)          ;SET MSGTYP TO FATAL ERROR
                                          ;HIGH TO LOW IN SAME .WORD FAILED
                                          ; TO SCOPE REPLACE HALT W/ 240
                                          ; AND REPLACE NEXT INST W/ 700

646 002052 126767 176704 176701 BR23:  CMPB  K10,K7+1
647 002060 001005          BNE  TST4
648 002062 012737 000026 000302      MOV   #26,@#SFATAL ;MOVE TO MAILBOX # ***** 26 *****
    002070 005212          INC   (R2)          ;SET MSGTYP TO FATAL ERROR
    002072 000000          HALT ;.EVEN TO ODD FAILED,OR WRONG $STNM
                                          ; TO SCOPE REPLACE HALT W/ 240
                                          ; AND REPLACE NEXT INST W/ 667

```

649
650 .SBTTL TEST THE CC BITS
651
652

;TEST 4 TEST THE CC BITS

```

    002074 005237 000304          TST4:  INC   @#STESTN ;UPDATE TEST NUMBER
    002100 022737 000004 000304      CMP   #4,@#STESTN ;SEQUENCE ERROR?
    002106 001062          BNE  TST5-12 ;BR TO ERROR HALT ON SEQ ERROR
653 002110 000277          SCC   ;SET STATUS
654 002112 005067 175660          CLR   STATUS      ;CLEAR STATJS

```


655	002116	103005			BCC	BR33			
	002120	012737	000027	000302	MOV	#27,@#FATAL	:MOVE TO MAILBOX # ***** 27 *****		
	002126	005212			INC	(R2)	:SET MSGTYP TO FATAL ERROR		
	002130	000000			HALT		:C NOT CLEAR		
							: TO SCOPE REPLACE HALT W/ 240		
							: AND REPLACE NEXT INST W/ 766		
656	002132				BR33:				
	002132	102005			BVC	BR34			
	002134	012737	000030	000302	MOV	#30,@#FATAL	:MOVE TO MAILBOX # ***** 30 *****		
	002142	005212			INC	(R2)	:SET MSGTYP TO FATAL ERROR		
	002144	000000			HALT		:V NOT CLEAR		
							: TO SCOPE REPLACE HALT W/ 240		
							: AND REPLACE NEXT INST W/ 760		
657	002146				BR34:				
	002146	001005			BNE	BR35			
	002150	012737	000031	000302	MOV	#31,@#FATAL	:MOVE TO MAILBOX # ***** 31 *****		
	002156	005212			INC	(R2)	:SET MSGTYP TO FATAL ERROR		
	002160	000000			HALT		:Z NOT CLEAR		
							: TO SCOPE REPLACE HALT W/ 240		
							: AND REPLACE NEXT INST W/ 752		
658	002162				BR35:				
	002162	100005			BPL	BR36			
	002164	012737	000032	000302	MOV	#32,@#FATAL	:MOVE TO MAILBOX # ***** 32 *****		
	002172	005212			INC	(R2)	:SET MSGTYP TO FATAL ERROR		
	002174	000000			HALT		:N NOT CLEAR		
							: TO SCOPE REPLACE HALT W/ 240		
							: AND REPLACE NEXT INST W/ 744		
659	002176	000257			BR36:				
660	002200	052767	000017	175570	CCC	#17,STATUS	:CLEAR CONDITION CODES		
661					BIS		:SET STATUS TO ONES		
662	002206	103405			BR37:				
	002210	012737	000033	000302	BCS	BR37			
	002216	005212			MOV	#33,@#FATAL	:MOVE TO MAILBOX # ***** 33 *****		
	002220	000000			INC	(R2)	:SET MSGTYP TO FATAL ERROR		
					HALT		:C NOT SET		
							: TO SCOPE REPLACE HALT W/ 240		
							: AND REPLACE NEXT INST W/ 732		
663	002222				BR37:				
	002222	102405			BVS	BR40			
	002224	012737	000034	000302	MOV	#34,@#FATAL	:MOVE TO MAILBOX # ***** 34 *****		
	002232	005212			INC	(R2)	:SET MSGTYP TO FATAL ERROR		
	002234	000000			HALT		:V NOT SET		
							: TO SCOPE REPLACE HALT W/ 240		
							: AND REPLACE NEXT INST W/ 724		
664	002236				BR40:				
	002236	001405			BEQ	BR41			
	002240	012737	000035	000302	MOV	#35,@#FATAL	:MOVE TO MAILBOX # ***** 35 *****		
	002246	005212			INC	(R2)	:SET MSGTYP TO FATAL ERROR		
	002250	000000			HALT		:Z NOT SET		
							: TO SCOPE REPLACE HALT W/ 240		
							: AND REPLACE NEXT INST W/ 716		
665	002252				BR41:				
	002252	100405			BMI	TST5			
	002254	012737	000036	000302	MOV	#36,@#FATAL	:MOVE TO MAILBOX # ***** 36 *****		
	002262	005212			INC	(R2)	:SET MSGTYP TO FATAL ERROR		
	002264	000000			HALT		:N NOT SET,OR WRONG \$TSTNM		
							: TO SCOPE REPLACE HALT W/ 240		
							: AND REPLACE NEXT INST W/ 710		

666

;TEST 5 TEST THAT A TRAP OCCURS ON A RESERVED INS

002266 005237 000304
002272 022737 000005 000304
002300 001006
667 002302 012706 000500
668 002306 012767 002330 175474
669 002314 000010
670 002316
002316 012737 000037 000302
002324 005212
002326 000000

TST5: INC @%STESTN ;UPDATE TEST NUMBER
CMP #5,@%STESTN ;SEQUENCE ERROR?
BNE RETA ;BR TO ERROR HALT ON SEQ ERROR
MOV #BUFF,SP ;STACK POINTER SETUP
MOV #RETAH,RTRAP ;RETURN LOCATION
TRAPA ;RESERVED INSTRUCTION, SHOULD TRAP

RETA: MOV #37,@%SFATAL ;MOVE TO MAILBOX # ***** 37 *****
INC (R2) ;SET MSGTYP TO FATAL ERROR
HALT ;RESERVE INSTRUCTION DIDN'T TRAP,OR WRONG \$STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 764

671 002330
672
673

RETAH: .SBTTL TEST DEC OF STACK POINTER ON A TRAP OPERATION

002330 005237 000304
002334 022737 000006 000304
002342 001011
674 002344 012706 000500
675 002350 012767 002360 175432
676 002356 000010
677 002360 020627 000474
678 002364 001405
002366 012737 000040 000302
002374 005212
002376 000000

;TEST 6 TEST DEC OF STACK POINTER ON A TRAP OPERATION

TST6: INC @%STESTN ;UPDATE TEST NUMBER
CMP #6,@%STESTN ;SEQUENCE ERROR?
BNE TST7-12 ;BR TO ERROR HALT ON SEQ ERROR
MOV #BUFF,SP ;STACK POINTER SETUP
MOV #RETB,RTRAP ;RETURN POINTER
TRAPA ;RESERVED INSTRUCTION
RETB: CMP SP,#BUFF-4 ;TEST DECREMENT OF SP
BEQ TST7
MOV #40,@%SFATAL ;MOVE TO MAILBOX # ***** 40 *****
INC (R2) ;SET MSGTYP TO FATAL ERROR
HALT ;NOT DECREMENTED TWO WORDS,OR WRONG \$STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 761

679
680

.SBTTL TEST THAT PROPER PC IS SAVED

;TEST 7 TEST THAT PROPER P.C. IS SAVED

002400 005237 000304
002404 022737 000007 000304
002412 001012
681 002414 012706 000500
682 002420 012767 002430 175362
683 002426 000010
684 002430 022767 002430 176036
685 002436 001405
002440 012737 000041 000302
002446 005212
002450 000000

TST7: INC @%STESTN ;UPDATE TEST NUMBER
CMP #7,@%STESTN ;SEQUENCE ERROR?
BNE TST10-12 ;BR TO ERROR HALT ON SEQ ERROR
MOV #BUFF,SP ;STACK POINTER SETUP
MOV #RETC,RTRAP ;RETURN FROM TRAP POINTER
INSTC: TRAPA ;TRAP ON THIS INSTRUCTION
RETC: CMP #,BUFF-4 ;CHECK FOR INCREMENTED P.C.
BEQ TST10
MOV #41,@%SFATAL ;MOVE TO MAILBOX # ***** 41 *****
INC (R2) ;SET MSGTYP TO FATAL ERROR
HALT ;INCORRECT P.C.,OR WRONG \$STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 760

686
687

.SBTTL TEST THAT 'OLD' CC AND PRI ARE PLACED ON STACK

;TEST 10 TEST THAT 'OLD' CC AND PRI ARE PLACED ON STACK

002452 005237 000304
002456 022737 000010 000304
002464 001040

TST10: INC @%STESTN ;UPDATE TEST NUMBER
CMP #10,@%STESTN ;SEQUENCE ERROR?
BNE TST11-12 ;BR TO ERROR HALT ON SEQ ERROR

```

688 002466 012706 000500      MOV    #BUFF,SP      ;SET UP
689 002472 012767 002510 175310  MOV    #RETD,RTRAP   ;SET UP
690 002500 005067 175272      CLR    CC            ;CLEAR CC AND PRIORITY
691 002504 000257      CCC
692 002506 000010      TRAPA                ;TRAP
693 002510 026727 175762 000000 RETD:  CMP    BUFF-2,#0    ;TEST THAT OLD STATUS WENT TO STACK
694 002516 001405      BEQ    1$
      002520 012737 000042 000302  MOV    #42,@$FATAL   ;MOVE TO MAILBOX # ***** 42 *****
      002526 005212      INC    (R2)          ;SET MSGTYP TO FATAL ERROR
      002530 000000      HALT                ;INCORRECT STATUS
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 755

```

```

695 002532 012706 000500      1$:  MOV    #BUFF,SP      ;SET UP
696 002536 012767 002556 175244  MOV    #RETE,RTRAP   ;SET UP
697 002544 012767 000357 175224  MOV    #357,CC       ;SET PRIORITY
698 002552 000277      SCC
699 002554 000010      TRAPA                ;TRAP
700 002556 026727 175714 000357 RETE:  CMP    BUFF-2,#357   ;COMPARES STATUS ON STACK
701 002564 001405      BEQ    TST11
      002566 012737 000043 000302  MOV    #43,@$FATAL   ;MOVE TO MAILBOX # ***** 43 *****
      002574 005212      INC    (R2)          ;SET MSGTYP TO FATAL ERROR
      002576 000000      HALT                ;INCORRECT STATUS ON STACK,OR WRONG $TSTNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 732

```

```

702 .SBTTL TEST THAT 'NEW' STATUS IS CORRECT
703 :*****

```

```

:TEST 11 TEST THAT 'NEW' STATUS IS CORRECT
:*****

```

```

      002600 005237 000304      TST11: INC    @$TSTN    ;UPDATE TEST NUMBER
      002604 022737 000011 000304  CMP    #11,@$TSTN   ;SEQUENCE ERROR?
      002612 001121      BNE    STPP          ;BR TO ERROR HALT ON SEQ ERROR
704 002614 012706 000500      MOV    #BUFF,SP
705 002620 012767 002634 175162  MOV    #RETF,RTRAP
706 002626 005067 175160      CLR    RTRAP+2      ;CLEAR FUTURE PRIORITY AND CC
707 002632 000010      TRAPA
708 002634      RETF:                ;TEST FOR 'C' CLEARED
709 002634 100005      BPL    1$
      002636 012737 000044 000302  MOV    #44,@$FATAL   ;MOVE TO MAILBOX # ***** 44 *****
      002644 005212      INC    (R2)          ;SET MSGTYP TO FATAL ERROR
      002646 000000      HALT                ;N NOT CLEARED
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 761

```

```

710 002650      1$:
      002650 001005      BNE    2$
      002652 012737 000045 000302  MOV    #45,@$FATAL   ;MOVE TO MAILBOX # ***** 45 *****
      002660 005212      INC    (R2)          ;SET MSGTYP TO FATAL ERROR
      002662 000000      HALT                ;Z NOT CLEARED
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 753

```

```

711 002664      2$:
      002664 102005      BVC    3$
      002666 012737 000046 000302  MOV    #46,@$FATAL   ;MOVE TO MAILBOX # ***** 46 *****
      002674 005212      INC    (R2)          ;SET MSGTYP TO FATAL ERROR
      002676 000000      HALT                ;V NOT CLEARED
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 745

```

```

712 002700      3$:

```

```

002700 103005      BCC      4$
002702 012737 000047 000302  MOV      #47,@#FATAL ;MOVE TO MAILBOX # ***** 47 *****
002710 005212      INC      (R2)    ;SET MSGTYP TO FATAL ERROR
002712 000000      HALT                    ;C NOT CLEARED
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 737
                                ;TEST PRIORITY
713 002714 032767 000340 175054 4$:  BIT      #340,CC
714 002722 001405      BEQ      5$
002724 012737 000050 000302  MOV      #50,@#FATAL ;MOVE TO MAILBOX # ***** 50 *****
002732 005212      INC      (R2)    ;SET MSGTYP TO FATAL ERROR
002734 000000      HALT                    ;PRIORITY NOT ZERO
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 726
715 002736 012706 000500      5$:  MOV      #BUFF,SP
716 002742 012767 002760 175040  MOV      #RETG,RTRAP
717 002750 012767 000357 175034  MOV      #357,RTRAP+2 ;SET NEW 'CC' AND PRIORITY
718 002756 000010      TRAPA                    ;TRAP HERE
719 002760      RETG:
720 002760 100405      BMI      1$
002762 012737 000051 000302  MOV      #51,@#FATAL ;MOVE TO MAILBOX # ***** 51 *****
002770 005212      INC      (R2)    ;SET MSGTYP TO FATAL ERROR
002772 000000      HALT                    ;N NOT SET
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 707
721 002774      1$:
002774 001405      BEQ      2$
002776 012737 000052 000302  MOV      #52,@#FATAL ;MOVE TO MAILBOX # ***** 52 *****
003004 005212      INC      (R2)    ;SET MSGTYP TO FATAL ERROR
003006 000000      HALT                    ;Z NOT SET
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 701
722 003010      2$:
003010 102405      BVS      3$
003012 012737 000053 000302  MOV      #53,@#FATAL ;MOVE TO MAILBOX # ***** 53 *****
003020 005212      INC      (R2)    ;SET MSGTYP TO FATAL ERROR
003022 000000      HALT                    ;V NOT SET
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 673
723 003024      3$:
003024 103405      BCS      4$
003026 012737 000054 000302  MOV      #54,@#FATAL ;MOVE TO MAILBOX # ***** 54 *****
003034 005212      INC      (R2)    ;SET MSGTYP TO FATAL ERROR
003036 000000      HALT                    ;C NOT SET
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 665
724 003040      4$:  MOV      CC,SP
725 003044 042706 000017      BIC      #17,SP
726 003050 022706 000340      CMP      #340,SP
727 003054 001405      BEQ      STPPA
003056      STPP:
003056 012737 000055 000302  MOV      #55,@#FATAL ;MOVE TO MAILBOX # ***** 55 *****
003064 005212      INC      (R2)    ;SET MSGTYP TO FATAL ERROR
003066 000000      HALT                    ;PRIORITY WAS CHANGED,OR WRONG $:STNM
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 651
728 003070 012767 000012 174712 STPPA: MOV      #12,10
729 003076 005067 174710      CLR      12

```

730
731

.SBTTL TEST THAT A TRAP OCCURS FOR A 'TRAP' INSTRUCTION

:TEST 12 TEST THAT A TRAP OCCURS FOR A 'TRAP' INSTRUCTION

003102 005237 000304
003106 022737 000012 000304
003114 001013
732 003116 012767 000012 174664
733 003124 005067 174662
734 003130 012706 000500
735 003134 012767 003156 174672
736 003142 104400
737 003144 012737 000056 000302
003152 005212
003154 000000

TST12: INC @%STESTN ;UPDATE TEST NUMBER
CMP #12,@%STESTN ;SEQUENCE ERROR?
BNE TST13-12 ;BR TO ERROR HALT ON SEQ ERROR
MOV #12,10
CLR 12
MOV #BUFF,SP ;STACK POINTER SETUP
MOV #RETA1,RTRAP1 ;RETURN LOCATION
TRAP ;RESERVED INSTRUCTION, SHOULD TRAP
MOV #56,@%SFATAL ;MOVE TO MAILBOX # ***** 56 *****
INC (R2) ;SET MSGTYP TO FATAL ERROR
HALT ;TRAP DIDN'T TRAP,OR WRONG \$STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 757

738 003*56
739

RETA1:

:TEST 13 TEST DEC OF STACK POINTER ON A TRAP OPERATION

003156 005237 000304
003162 022737 000013 000304
003170 001011
740 003172 012706 000500
741 003176 012767 003206 174630
742 003204 104400
743 003206 020627 000474
744 003212 001405
003214 012737 000057 000302
003222 005212
003224 000000

TST13: INC @%STESTN ;UPDATE TEST NUMBER
CMP #13,@%STESTN ;SEQUENCE ERROR?
BNE TST14-12 ;BR TO ERROR HALT ON SEQ ERROR
MOV #BUFF,SP ;STACK POINTER SETUP
MOV #RETB1,RTRAP1 ;RETURN POINTER
TRAP ;RESERVED INSTRUCTION
RETB1: CMP SP,#BUFF-4 ;TEST DECREMENT OF SP
BEQ TST14
MOV #57,@%SFATAL ;MOVE TO MAILBOX # ***** 57 *****
INC (R2) ;SET MSGTYP TO FATAL ERROR
HALT ;NOT DECREMENTED TWO WORDS,OR WRONG \$STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 761

745
746

.SBTTL TEST THAT PROPER P.C IS SAVED

:TEST 14 TEST THAT PROPER P.C. IS SAVED

003226 005237 000304
003232 022737 000014 000304
003240 001012
747 003242 012706 000500
748 003246 012767 003256 174560
749 003254 104400
750 003256 022767 003256 175210
751 003264 001405
003266 012737 000060 000302
003274 005212
003276 000000

TST14: INC @%STESTN ;UPDATE TEST NUMBER
CMP #14,@%STESTN ;SEQUENCE ERROR?
BNE TST15-12 ;BR TO ERROR HALT ON SEQ ERROR
MOV #BUFF,SP ;STACK POINTER SETUP
MOV #RETC1,RTRAP1 ;RETURN FROM TRAP POINTER
TRAP ;TRAP ON THIS INSTRUCTION
RETC1: CMP #,BUFF-4 ;CHECK INCREMENTED P.C.
BEQ TST15
MOV #60,@%SFATAL ;MOVE TO MAILBOX # ***** 60 *****
INC (R2) ;SET MSGTYP TO FATAL ERROR
HALT ;INCORRECT P.C.,OR WRONG \$STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 760

752
753

.SBTTL TEST THAT 'OLD' CC AND PIR ARE PLACED ON THE STACK

:TEST 15 TEST THAT 'OLD' CC AND PRI ARE PLACED ON STACK

003300 005237 000304
003304 022737 000015 000304

TST15: INC @%STESTN ;UPDATE TEST NUMBER
CMP #15,@%STESTN ;SEQUENCE ERROR?

```

003312 001037      BNE      TST16-12      ;BR TO ERROR HALT ON SEQ ERROR
754 003314 012706 000500      MOV      #BUFF,SP      ;SET UP
755 003320 012767 003336 174506      MOV      #RETD1,RTRAP1 ;SET UP
756 003326 005067 174444      CLR      CC            ;CLEAR CC AND PRIORITY
757 003332 000257      CCC
758 003334 104400      TRAP
759 003336 026727 175134 000000      RETD1:  CMP      BUFF-2,#0      ;TEST THAT OLD STATUS WENT TO STACK
760 003344 001405      BEQ      1$
      003346 012737 000061 000302      MOV      #61,@#SFATAL ;MOVE TO MAILBOX # ***** 61 *****
      003354 005212      INC      (R2)          ;SET MSGTYP TO FATAL ERROR
      003356 000000      HALT                 ;INCORRECT STATUS
                          ; TO SCOPE REPLACE HALT W/ 240
                          ; AND REPLACE NEXT INST W/ 755
761 003360 012706 000500      1$:      MOV      #BUFF,SP      ;SET UP
762 003364 012767 003402 174442      MCV      #RETE1,RTRAP1 ;SET UP
763 003372 012767 000357 174376      MOV      #357,CC      ;SET PRIORITY
764 003400 104400      TRAP
765 003402 026727 175070 000357      RETE1:  CMP      BUFF-2,#357 ;COMPARES STATUS ON STACK
766 003410 001405      BEQ      TST16
      003412 012737 000062 000302      MOV      #62,@#SFATAL ;MOVE TO MAILBOX # ***** 62 *****
      003420 005212      INC      (R2)          ;SET MSGTYP TO FATAL ERROR
      003422 000000      HALT                 ;INCORRECT STATUS ON STACK,OR WRONG $STNM
                          ; TO SCOPE REPLACE HALT W/ 240
                          ; AND REPLACE NEXT INST W/ 733
767                                     .SBTTL TSET THAT 'NEW' STATUS IS CORRECT
768                                     :*****
:TEST 16      TEST THAT 'NEW' STATUS IS CORRECT
:*****
003424 005237 000304      TST16:  INC      @#STESTN ;UPDATE TEST NUMBER
003430 022737 000016 000304      CMP      #16,@#STESTN ;SEQUENCE ERROR?
003436 001121      BNE      TST17-12      ;BR TO ERROR HALT ON SEQ ERROR
769 003440 012706 000500      MOV      #BUFF,SP
770 003444 012767 003460 174362      MOV      #RETF1,RTRAP1
771 003452 005067 174360      CLR      RTRAP1+2     ;CLEAR FUTURE PRIORITY AND CC
772 003456 104400      TRAP
773 003460      RETF1:
774 003460 100005      BPL      1$           ;TEST FOR 'C' CLEARED
      003462 012737 000063 000302      MOV      #63,@#SFATAL ;MOVE TO MAILBOX # ***** 63 *****
      003470 005212      INC      (R2)          ;SET MSGTYP TO FATAL ERROR
      003472 000000      HALT                 ;C NOT CLEARED
                          ; TO SCOPE REPLACE HALT W/ 240
                          ; AND REPLACE NEXT INST W/ 761
775 003474      1$:
      003474 001005      BNE      2$
      003476 012737 000064 000302      MOV      #64,@#SFATAL ;MOVE TO MAILBOX # ***** 64 *****
      003504 005212      INC      (R2)          ;SET MSGTYP TO FATAL ERROR
      003506 000000      HALT                 ;Z NOT CLEARED
                          ; TO SCOPE REPLACE HALT W/ 240
                          ; AND REPLACE NEXT INST W/ 753
776 003510      2$:
      003510 102005      BVC      3$
      003512 012737 000065 000302      MOV      #65,@#SFATAL ;MOVE TO MAILBOX # ***** 65 *****
      003520 005212      INC      (R2)          ;SET MSGTYP TO FATAL ERROR
      003522 000000      HALT                 ;V NOT CLEARED
                          ; TO SCOPE REPLACE HALT W/ 240
                          ; AND REPLACE NEXT INST W/ 745
777 003524      3$:

```

```

003524 103005      BCC      4$
003526 012737 000066 000302  MOV      #66,@#SFATAL ;MOVE TO MAILBOX # ***** 66 *****
003534 005212      INC      (R2)          ;SET MSGTYP TO FATAL ERROR
003536 000000      HALT                    ;C NOT CLEARED
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 737
                                ;TEST PRIORITY
778 003540 032767 000340 174230 4$:  BIT      #340,CC
779 003546 001405      BEQ      5$
003550 012737 000067 000302  MOV      #67,@#SFATAL ;MOVE TO MAILBOX # ***** 67 *****
003556 005212      INC      (R2)          ;SET MSGTYP TO FATAL ERROR
003560 000000      HALT                    ;PRIORITY NOT ZERO
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 726
780 003562 012706 000500      MOV      #BUFF,SP
781 003566 012767 003604 174240      MOV      #RBTG1,RTRAP1
782 003574 012767 000357 174234      MOV      #357,RTRAP1+2 ;SET NEW 'CC' AND PRIORITY
783 003602 104400      TRAP
784 003604      RBTG1:
785 003604 100405      BMI      1$
003606 012737 000070 000302  MOV      #70,@#SFATAL ;MOVE TO MAILBOX # ***** 70 *****
003614 005212      INC      (R2)          ;SET MSGTYP TO FATAL ERROR
003616 000000      HALT                    ;N NOT SET
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 707
786 003620      1$:
003620 001405      BEQ      2$
003622 012737 000071 000302  MOV      #71,@#SFATAL ;MOVE TO MAILBOX # ***** 71 *****
003630 005212      INC      (R2)          ;SET MSGTYP TO FATAL ERROR
003632 000000      HALT                    ;Z NOT SET
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 701
787 003634      2$:
003634 102405      BVS      3$
003636 012737 000072 000302  MOV      #72,@#SFATAL ;MOVE TO MAILBOX # ***** 72 *****
003644 005212      INC      (R2)          ;SET MSGTYP TO FATAL ERROR
003646 000000      HALT                    ;V NOT SET
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 673
788 003650      3$:
003650 103405      BCS      4$
003652 012737 000073 000302  MOV      #73,@#SFATAL ;MOVE TO MAILBOX # ***** 73 *****
003660 005212      INC      (R2)          ;SET MSGTYP TO FATAL ERROR
003662 000000      HALT                    ;C NOT SET
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 665
789 003664 016706 174106      MOV      CC,SP
790 003670 042706 000017      BIC      #17,SP
791 003674 022706 000340      CMP      #340,SP
792 003700 001405      BEQ      TST17
003702 012737 000074 000302  MOV      #74,@#SFATAL ;MOVE TO MAILBOX # ***** 74 *****
003710 005212      INC      (R2)          ;SET MSGTYP TO FATAL ERROR
003712 000000      HALT                    ;PRIORITY WAS CHANGED,OR WRONG $T$INM
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 651

```

793
794

```

.SBTTL TEST THAT ALL COMB 'TRAP' WILL CAUSE A TRAP ON BR45
*****
;TEST 17 TEST THAT ALL COMB 'TRAP' WILL CAUSE A TRAP

```

```

*****
003714 005237 000304          TST17: INC      @%STESTN      ;UPDATE TEST NUMBER
003720 022737 000017 '000304  CMP      #17,@%STESTN      ;SEQUENCE ERROR?
003726 001011                   BNE      BR45              ;BR TO ERROR HALT ON SEQ ERROR
795 003730 012767 104400 000012  MOV      #TRAP,RB1         ;INITIALIZE BASE TRAP INSTRUCTION
796 003736 012767 003764 174070  MOV      #RA1,34           ;RETURN FROM TRAP TO RA1
797 003744 012706 000500          RC1:  MOV      #BUFF,SP      ;SET UP STACK POINTER
798 003750 104400          RB1:  TRAP                    ;TRAP INST WILL BE MODIFIED TO TRAP+377
799 003752          BR45:
003752 012737 000075 000302  MOV      #75,@%SFATAL      ;MOVE TO MAILBOX # ***** 75 *****
003760 005212          INC      (R2)             ;SET MSGTYP TO FATAL ERROR
003762 000000          HALT                    ;PREVIOUS INST FAILED TO TRAP,OR WRONG $STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 761
800 003764 005267 177760          RA1:  INC      RB1          ;INCREMENT TRAP INSTRUCTION
801 003770 022767 104777 177752  CMP      #104777,RB1       ;TRAP+377 TO UPPER LIMIT
802 003776 103362          BHIS   RC1                ;HAVE WE TESTED ALL
803 004000 012767 000036 174026  MOV      #36,34
804 004006 005067 174024          CLR     36
805

```

;TEST 20 TEST THAT A TRAP OCCURES ON AN 'IOT' INSTRUCTION

```

004012 005237 000304          TST20: INC      @%STESTN      ;UPDATE TEST NUMBER
004016 022737 000020 000304  CMP      #20,@%STESTN      ;SEQUENCE ERROR?
004024 001006                   BNE      TST21-12         ;BR TO ERROR HALT ON SEQ ERROR
806 004026 012706 000500          MOV      #BUFF,SP         ;STACK POINTER SETUP
807 004032 012767 004054 173760  MOV      #RETA2,RTRAP2     ;RETURN LOCATION
808 004040 000004          IOT                    ;RESERVE INSTRUCTION, SHOULD TRAP
809 004042 012737 000076 000302  MOV      #76,@%SFATAL      ;MOVE TO MAILBOX # ***** 76 *****
004050 005212          INC      (R2)             ;SET MSGTYP TO FATAL ERROR
004052 000000          HALT                    ;IOT DIDN'T TRAP,OR WRONG $STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 764
810 004054          RETA2:
811

```

;TEST 21 TEST DEC OF STACK POINTER ON A TRAP OPERATION

```

004054 005237 000304          TST21: INC      @%STESTN      ;UPDATE TEST NUMBER
004060 022737 000021 000304  CMP      #21,@%STESTN      ;SEQUENCE ERROR?
004066 001011                   BNE      TST22-12         ;BR TO ERROR HALT ON SEQ ERROR
812 004070 012706 000500          MOV      #BUFF,SP         ;STACK POINTER SETUP
813 004074 012767 004104 173716  MOV      #RETB2,RTRAP2     ;RETURN POINTER
814 004102 000004          IOT                    ;RESERVED INSTRUCTION
815 004104 020627 000474          RETB2: CMP      SP,#BUFF-4   ;TEST DECREMENT OF SP
816 004110 001405          BEQ     TST22
004112 012737 000077 000302  MOV      #77,@%SFATAL      ;MOVE TO MAILBOX # ***** 77 *****
004120 005212          INC      (R2)             ;SET MSGTYP TO FATAL ERROR
004122 000000          HALT                    ;NOT DECREMENTED TWO WORDS,OR WRONG $STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 761
817

```

;TEST 22 TEST THAT PROPER P.C. IS SAVED

```

004124 005237 000304          TST22: INC      @%STESTN      ;UPDATE TEST NUMBER
004130 022737 000022 000304  CMP      #22,@%STESTN      ;SEQUENCE ERROR?
004136 001012                   BNE      TST23-12         ;BR TO ERROR HALT ON SEQ ERROR
818 004140 012706 000500          MOV      #BUFF,SP         ;STACK POINTER SETUP

```


TEST THAT PROPER P.C. IS SAVED

```

819 004144 012767 004154 173646      MOV      #RETC2,RTRAP2      ;RETURN FROM TRAP POINTER
820 004152 000004                      IOT                      ;TRAP ON THIS INSTRUCTION
821 004154 022767 004154 174312  RETC2:  CMP      #,BUFF-4      ;CHECK FOR INCREMENTED P.C.
822 004162 001405                      BEQ      TST23
      004164 012737 000100 000302      MOV      #100,@$FATAL      ;MOVE TO MAILBOX # ***** 100 *****
      004172 005212                      INC      (R2)              ;SET MSGTYP TO FATAL ERROR
      004174 000000                      HALT                     ;INCORRECT P.C.,OR WRONG $STNM
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 760
    
```

```

823      ;*****
      ;TEST 23      TEST THAT 'OLD' CC AND PRI ARE PLACED ON STACK
      ;*****
    
```

```

      004176 005237 000304          TST23:  INC      @$TESTN      ;UPDATE TEST NUMBER
      004202 022737 000023 000304      CMP      #23,@$TESTN      ;SEQUENCE ERROR?
      004210 001040                      BNE      TST24-12         ;BR TO ERROR HALT ON SEQ ERROR
824 004212 012706 000500          MOV      #BUFF,SP         ;SET UP
825 004216 012767 004234 173574      MOV      #RETD2,RTRAP2    ;SET UP
826 004224 005067 173546          CLR      CC               ;CLEAR CC AND PRIORITY
827 004230 000257                      CCC
828 004232 000004                      IOT                      ;TRAP
829 004234 026727 174236 000000  RETD2:  CMP      BUFF-2,#0    ;TEST THAT OLD STATUS WENT TO STACK
830 004242 001405                      BEQ      1$
      004244 012737 000101 000302      MOV      #101,@$FATAL     ;MOVE TO MAILBOX # ***** 101 *****
      004252 005212                      INC      (R2)              ;SET MSGTYP TO FATAL ERROR
      004254 000000                      HALT                     ;INCORRECT STATUS
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 755
    
```

```

831 004256 012706 000500          1$:      MOV      #BUFF,SP         ;SET UP
832 004262 012767 004302 173530      MOV      #RETE2,RTRAP2    ;SET UP
833 004270 012767 000357 173500      MOV      #357,CC          ;SET PRIORITY
834 004276 000277                      SCC                       ;SET CC
835 004300 000004                      IOT                      ;TRAP
836 004302 026727 174170 000357  RETE2:  CMP      BUFF-2,#357   ;COMPARES STATUS ON STACK
837 004310 001405                      BEQ      TST24
      004312 012737 000102 000302      MOV      #102,@$FATAL     ;MOVE TO MAILBOX # ***** 102 *****
      004320 005212                      INC      (R2)              ;SET MSGTYP TO FATAL ERROR
      004322 000000                      HALT                     ;INCORRECT STATUS ON STACK,OR WRONG $STNM
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 732
    
```

```

838      ;*****
      ;TEST 24      TEST THAT 'NEW' STATUS IS CORRECT
      ;*****
    
```

```

      004324 005237 000304          TST24:  INC      @$TESTN      ;UPDATE TEST NUMBER
      004330 022737 000024 000304      CMP      #24,@$TESTN      ;SEQUENCE ERROR?
      004336 001121                      BNE      BR46             ;BR TO ERROR HALT ON SEQ ERROR
839 004340 012706 000500          MOV      #BUFF,SP
840 004344 012767 004360 173446      MOV      #RETF2,RTRAP2
841 004352 005067 173444          CLR      RTRAP2+2         ;CLEAR FUTURE PRIORITY AND CC
842 004356 000004                      IOT
843 004360          RETF2:  ;TEST FOR 'C' CLEARED
844 004360 100005                      BPL      1$
      004362 012737 000103 000302      MOV      #103,@$FATAL     ;MOVE TO MAILBOX # ***** 103 *****
      004370 005212                      INC      (R2)              ;SET MSGTYP TO FATAL ERROR
      004372 000000                      HALT                     ;N NOT CLEARED
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 761
    
```

```

845 004374          1$:
    
```

MAIN. MACRO M1111 27-SEP-79 16:56 PAGE 68-14
 T24 TEST THAT 'NEW' STATUS IS CORRECT

SEQ 0025

	004374	001005				BNE	2\$			
	004376	012737	000104	000302		MOV	#104,@\$FATAL	:	MOVE TO MAILBOX # ***** 104 *****	
	004404	005212				INC	(R2)	:	SET MSGTYP TO FATAL ERROR	
	004406	000000				HALT		:	Z NOT CLEARED	
								:	TO SCOPE REPLACE HALT W/ 240	
								:	AND REPLACE NEXT INST W/ 753	
846	004410				2\$:					
	004410	102005				BVC	3\$			
	004412	012737	000105	000302		MOV	#105,@\$FATAL	:	MOVE TO MAILBOX # ***** 105 *****	
	004420	005212				INC	(R2)	:	SET MSGTYP TO FATAL ERROR	
	004422	000000				HALT		:	V NOT CLEARED	
								:	TO SCOPE REPLACE HALT W/ 240	
								:	AND REPLACE NEXT INST W/ 745	
847	004424				3\$:					
	004424	103005				BCC	4\$			
	004426	012737	000106	000302		MOV	#106,@\$FATAL	:	MOVE TO MAILBOX # *** ** 106 *****	
	004434	005212				INC	(R2)	:	SET MSGTYP TO FATAL ERROR	
	004436	000000				HALT		:	C NOT CLEARED	
								:	TO SCOPE REPLACE HALT W/ 240	
								:	AND REPLACE NEXT INST W/ 737	
								:	TEST PRIORITY	
848	004440	032767	000340	173330	4\$:	BIT	#340,CC			
849	004446	001405				BEQ	5\$			
	004450	012737	000107	000302		MOV	#107,@\$FATAL	:	MOVE TO MAILBOX # ***** 107 *****	
	004456	005212				INC	(R2)	:	SET MSGTYP TO FATAL ERROR	
	004460	000000				HALT		:	PRIORITY NOT ZERO	
								:	TO SCOPE REPLACE HALT W/ 240	
								:	AND REPLACE NEXT INST W/ 726	
850	004462	012706	000500		5\$:	MOV	#BUFF,SP			
851	004466	012767	004504	173324		MOV	#RETG2,RTRAP2			
852	004474	012767	000357	173320		MOV	#357,RTRAP2+2	:	SET NEW 'CC' AND PRIORITY	
853	004502	000004				IOT		:	TRAP HERE	
854	004504				RETG2:					
855	004504	100405				BMI	1\$			
	004506	012737	000110	000302		MOV	#110,@\$FATAL	:	MOVE TO MAILBOX # ***** 110 *****	
	004514	005212				INC	(R2)	:	SET MSGTYP TO FATAL ERROR	
	004516	000000				HALT		:	N NOT SET	
								:	TO SCOPE REPLACE HALT W/ 240	
								:	AND REPLACE NEXT INST W/ 707	
856	004520				1\$:					
	004520	001405				BFQ	2\$			
	004522	012737	000111	000302		MOV	#111,@\$FATAL	:	MOVE TO MAILBOX # ***** 111 *****	
	004530	005212				INC	(R2)	:	SET MSGTYP TO FATAL ERROR	
	004532	000000				HALT		:	Z NOT SET	
								:	TO SCOPE REPLACE HALT W/ 240	
								:	AND REPLACE NEXT INST W/ 701	
857	004534				2\$:					
	004534	102405				BVS	3\$			
	004536	012737	000112	000302		MOV	#112,@\$FATAL	:	MOVE TO MAILBOX # ***** 112 *****	
	004544	005212				INC	(R2)	:	SET MSGTYP TO FATAL ERROR	
	004546	000000				HALT		:	V NOT SET	
								:	TO SCOPE REPLACE HALT W/ 240	
								:	AND REPLACE NEXT INST W/ 673	
858	004550				3\$:					
	004550	103405				BCS	4\$			
	004552	012737	000113	000302		MOV	#113,@\$FATAL	:	MOVE TO MAILBOX # ***** 113 *****	
	004560	005212				INC	(R2)	:	SET MSGTYP TO FATAL ERROR	
	004562	000000				HALT		:	C NOT SET	

```

; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 665

859 004564 016706 173206 4S: MOV CC,SP
860 004570 042706 000C17 BIC #17,SP
861 004574 022706 000340 CMP #340,SP
862 004600 001405 BEQ BR46A

BR46: MOV #114,@$FATAL ;MOVE TO MAILBOX # ***** 114 *****
      INC (R2) ;SET MSGTYP TO FATAL ERROR
      HALT ;PRIORITY WAS CHANGED,OR WRONG $STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 651

863 004614 012767 000022 173176 BR46A: MOV #22,20
864 004622 005067 173174 CLR 22 ;HALT
865

;*****
;TEST 25 TEST THAT A TRAP OCCURS ON AN EMT INS
;*****
004626 005237 000304 TST25: INC @$TESTN ;UPDATE TEST NUMBER
004632 022737 000025 000304 CMP #25,@$TESTN ;SEQUENCE ERROR?
004640 001006 BNE TST26-12 ;BR TO ERROR HALT ON SEQ ERROR
866 004642 012706 000500 MOV #BUFF,SP ;STACK POINTER SETUP
867 004646 012767 004670 173154 MOV #RETA3,RTRAP3 ;RETURN LOCATION
868 004654 104000 EMT ;RESERVE INSTRUCTION, SHOULD TRAP
869 004656 012737 000115 000302 MOV #115,@$FATAL ;MOVE TO MAILBOX # ***** 115 *****
      INC (R2) ;SET MSGTYP TO FATAL ERROR
      HALT ;EMT DIDN'T TRAP,OR WRONG $STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 764

870 004670 RETA3:
871

;*****
;TEST 26 TEST DEC OF STACK POINTER ON A TRAP OPER
;*****
004670 005237 000304 TST26: INC @$TESTN ;UPDATE TEST NUMBER
004674 022737 000026 000304 CMP #26,@$TESTN ;SEQUENCE ERROR?
004702 001011 BNE TST27-12 ;BR TO ERROR HALT ON SEQ ERROR
872 004704 012706 000500 MOV #BUFF,SP ;STACK POINTER SETUP
873 004710 012767 004720 173112 MOV #RETB3,RTRAP3 ;RETURN POINTER
874 004716 104000 EMT ;RESERVED INSTRUCTION
875 004720 020627 000474 RETB3: CMP SP,#BUFF-4 ;TEST DECREMENT OF SP
876 004724 001405 BEQ TST27
      MOV #116,@$FATAL ;MOVE TO MAILBOX # ***** 116 *****
      INC (R2) ;SET MSGTYP TO FATAL ERROR
      HALT ;NOT DECREMENTED TWO WORDS,OR WRONG $STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 761

877

;*****
;TEST 27 TEST THAT PROPER P.C. IS SAVED
;*****
004740 005237 000304 TST27: INC @$TESTN ;UPDATE TEST NUMBER
004744 022737 000027 000304 CMP #27,@$TESTN ;SEQUENCE ERROR?
004752 001012 BNE TST30-12 ;BR TO ERROR HALT ON SEQ ERROR
878 004754 012706 000500 MOV #BUFF,SP ;STACK POINTER SETUP
879 004760 012767 004770 173042 MOV #RETC3,RTRAP3 ;RTURN FROM TRAP POINTER
880 004766 104000 EMT ;TRAP ON THIS INSTRUCTION
881 004770 022767 004770 173476 RETC3: CMP #,BUFF-4 ;CHECK FOR INCREMENTED P.C.
882 004776 001405 BEQ TST30
      MOV #117,@$FATAL ;MOVE TO MAILBOX # ***** 117 *****
005000 012737 000117 000302

```

```

005006 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
005010 000000          HALT          ;INCORRECT P.C.,OR WRONG $STNM
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 760
883  ;*****
      ;TEST 30      TEST THAT 'OLD' CC AND PRI ARE PLACED ON STACK
      ;*****
005012 005237 000304  TST30:  INC      @W$TESTN      ;UPDATE TEST NUMBER
005016 022737 000030 000304  CMP      #30,@W$TESTN      ;SEQUENCE ERROR?
005024 001040          BNE      TST31-12      ;BR TO ERROR HALT ON SEQ ERROR
884 005026 012706 000500  MOV      #BUFF,SP          ;SET UP
885 005032 012767 005050 172770  MOV      #RETD3,RTRAP3      ;SET UP
886 005040 005067 172732  CLR      CC                ;CLEAR CC AND PRIORITY
887 005044 000257          CCC
888 005046 104000          EMT          ;TRAP
889 005050 026727 173422 000090  RETD3:  CMP      BUFF-2,#0      ;TEST THAT OLD STATUS WENT TO STACK
890 005056 001405          BEQ      1$
      005060 012737 000120 000302  MOV      #120,@W$FATAL      ;MOVE TO MAILBOX # ***** 120 *****
      005066 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
      005070 000000          HALT          ;INCORRECT STATUS
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 755
891 005072 012706 000500 1$:  MOV      #BUFF,SP          ;SET UP
892 005076 012767 005116 172724  MOV      #RETE3,RTRAP3      ;SET UP
893 005104 012767 000357 172664  MOV      #357,CC            ;SET PRIORITY
894 005112 000277          SCC
895 005114 104000          EMT          ;TRAP
896 005116 026727 173354 000357  RETE3:  CMP      BUFF-2,#357      ;COMPARES STATUS ON STACK
897 005124 001405          BEQ      TST31
      005126 012737 000121 000302  MOV      #121,@W$FATAL      ;MOVE TO MAILBOX # ***** 121 *****
      005134 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
      005136 000000          HALT          ;INCORRECT STATUS ON STACK,OR WRONG $STNM
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 732
898  ;*****
      ;TEST 31      TEST THAT 'NEW' STATUS IS CORRECT
      ;*****
005140 005237 000304  TST31:  INC      @W$TESTN      ;UPDATE TEST NUMBER
005144 022737 000031 000304  CMP      #31,@W$TESTN      ;SEQUENCE ERROR?
005152 001117          BNE      TST32-12      ;BR TO ERROR HALT ON SEQ ERROR
899 005154 012706 000500  MOV      #BUFF,SP          ;SET UP
900 005160 012767 005174 172642  MOV      #RETF3,RTRAP3      ;SET UP
901 005166 005067 172640  CLR      RTRAP3+2          ;CLEAR FUTURE PRIORITY AND CC
902 005172 104000          EMT
903 005174          RETF3:  ;TEST FOR 'C' CLEARED
904 005174 100005          BPL      1$
      005176 012737 000122 000302  MOV      #122,@W$FATAL      ;MOVE TO MAILBOX # ***** 122 *****
      005204 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
      005206 000000          HALT          ;C NOT CLEARED
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 761
905 005210          1$:  BNE      2$
005210 001005          MOV      #123,@W$FATAL      ;MOVE TO MAILBOX # ***** 123 *****
005212 012737 000123 000302  INC      (R2)          ;SET MSGTYP TO FATAL ERROR
005220 005212          HALT          ;Z NOT CLEARED
005222 000000          ; TO SCOPE REPLACE HALT W/ 240

```

```

; AND REPLACE NEXT INST W/ 753
906 005224          2$:
    005224 102005          BVC      3$
    005226 012737 000124 000302  MOV      #124,@#SFATAL
    005234 005212          INC      (R2)
    005236 000000          HALT
; MOVE TO MAILBOX # ***** 124 *****
; SET MSGTYP TO FATAL ERROR
; V NOT CLEARED
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 745

907 005240          3$:
    005240 103005          BCC      4$
    005242 012737 000125 000302  MOV      #125,@#SFATAL
    005250 005212          INC      (R2)
    005252 000000          HALT
; MOVE TO MAILBOX # ***** 125 *****
; SET MSGTYP TO FATAL ERROR
; C NOT CLEARED
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 737
; TEST PRIORITY

908 005254 032767 000340 172514 4$: BIT      #340,CC
909 005262 001405          BEQ      5$
    005264 012737 000126 000302  MOV      #126,@#SFATAL
    005272 005212          INC      (R2)
    005274 000000          HALT
; MOVE TO MAILBOX # ***** 126 *****
; SET MSGTYP TO FATAL ERROR
; PRIORITY NOT ZERO
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 726

910 005276 012706 000500          5$: MOV      #BUFF,SP
911 005302 012767 005320 172520  MOV      #RETG3,RTRAP3
912 005310 012767 000357 172514  MOV      #357,RTRAP3+2
913 005316 104000          EMT
; SET NEW 'CC' AND PRIORITY
; TRAP HERE
914 005320          RETG3:
915 005320 100405          BMI      1$
    005322 012737 000127 000302  MOV      #127,@#SFATAL
    005330 005212          INC      (R2)
    005332 000000          HALT
; MOVE TO MAILBOX # ***** 127 *****
; SET MSGTYP TO FATAL ERROR
; N NOT SET
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 707

916 005334          1$:
    005334 001405          BEQ      2$
    005336 012737 000130 000302  MOV      #130,@#SFATAL
    005344 005212          INC      (R2)
    005346 000000          HALT
; MOVE TO MAILBOX # ***** 130 *****
; SET MSGTYP TO FATAL ERROR
; Z NOT SET
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 701

917 005350          2$:
    005350 102405          BVS      3$
    005352 012737 000131 000302  MOV      #131,@#SFATAL
    005360 005212          INC      (R2)
    005362 000000          HALT
; MOVE TO MAILBOX # ***** 131 *****
; SET MSGTYP TO FATAL ERROR
; V NOT SET
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 673

918 005364          3$:
    005364 103405          BCS      4$
    005366 012737 000132 000302  MOV      #132,@#SFATAL
    005374 005212          INC      (R2)
    005376 000000          HALT
; MOVE TO MAILBOX # ***** 132 *****
; SET MSGTYP TO FATAL ERROR
; C NOT SET
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 665

919 005400 000257          4$: CCC
920 005402 022767 000340 172366  CMP      #340,CC
921 005410 001405          BEQ      TST32
    
```



```

; AND REPLACE NEXT INST W/ 761
946 :*****
:TEST 35 TEST THAT PROPER P.C. IS SAVED
:*****
005634 005237 000304 TST35: INC @%STESTN ;UPDATE TEST NUMBER
005640 022737 000035 000304 CMP #35,@%STESTN ;SEQUENCE ERROR?
005646 001012 BNE TST36-12 ;BR TO ERROR HALT ON SEQ ERROR
947 005650 012706 000500 MOV #BUFF,SP ;STACK POINTER SETUP
948 005654 012767 005664 172132 MOV #RETC4,RTRAP4 ;RETURN FROM TRAP POINTER
949 005662 000003 TRT ;TRAP ON THIS INSTRUCTION
950 005664 022767 005664 172602 RETC4: CMP #,BUFF-4 ;CHECK FOR INCREMENTED P.C.
951 005672 001405 BEQ TST36
005674 012737 000137 000302 MOV #137,@%SFATAL ;MOVE TO MAILBOX # ***** 137 *****
005702 005212 INC (R2) ;SET MSGTYP TO FATAL ERROR
005704 000000 HALT ;INCORRECT P.C.,OR WRONG $STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 760

```

```

952 :*****
:TEST 36 TEST THAT 'OLD' CC AND PRI ARE PLACED ON STACK
:*****
005706 005237 000304 TST36: INC @%STESTN ;UPDATE TEST NUMBER
005712 022737 000036 000304 CMP #36,@%STESTN ;SEQUENCE ERROR?
005720 001040 BNE TST37-12 ;BR TO ERROR HALT ON SEQ ERROR
953 005722 012706 000500 MOV #BUFF,SP ;SET UP
954 005726 012767 005744 172060 MOV #RETD4,RTRAP4 ;SET UP
955 005734 005067 172036 CLR CC ;CLEAR CC AND PRIORITY
956 005740 000257 CCC
957 005742 000003 TRT ;TRAP
958 005744 026727 172526 000000 RETD4: CMP BUFF-2,#0 ;TEST THAT OLD STATUS WENT TO STACK
959 BEQ 1$ ;TEST FOR ALL ZEROS
960 005752 001405 BEQ 1$
005754 012737 000140 000302 MOV #140,@%SFATAL ;MOVE TO MAILBOX # ***** 140 *****
005762 005212 INC (R2) ;SET MSGTYP TO FATAL ERROR
005764 000000 HALT ;INCORRECT STATUS
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 755
961 005766 012706 000500 1$: MOV #BUFF,SP ;SET UP
962 005772 012767 006012 172014 MOV #RETE4,RTRAP4 ;SET UP
963 006000 012767 000357 171770 MOV #357,CC ;SET PRIORITY
964 006006 000277 SCC ;SET-SET CC
965 006010 000003 TRT ;TRAP
966 006012 026727 172460 000357 RETE4: CMP BUFF-2,#357 ;COMPARES STATUS ON STACK
967 006020 001405 BEQ TST37
006022 012737 000141 000302 MOV #141,@%SFATAL ;MOVE TO MAILBOX # ***** 141 *****
006030 005212 INC (R2) ;SET MSGTYP TO FATAL ERROR
006032 000000 HALT ;INCORRECT STATUS ON STACK,OR WRONG $STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 732

```

```

968 :*****
:TEST 37 TEST THAT 'NEW' STATUS IS CORRECT
:*****
006034 005237 000304 TST37: INC @%STESTN ;UPDATE TEST NUMBER
006040 022737 000037 000304 CMP #37,@%STESTN ;SEQUENCE ERROR?
006046 001121 BNE BR51 ;BR TO ERROR HALT ON SEQ ERROR
969 006050 012706 000500 MOV #BUFF,SP
970 006054 012767 006070 171732 MOV #RETF4,RTRAP4
971 006062 005067 171730 CLR RTRAP4+2 ;CLEAR FUTURE PRIORITY AND CC

```

972	006066	000003				TRT					
973	006070						RETF4:			:TEST FOR 'C' CLEARED	
974	006070	100005				BPL		1\$			
	006072	012737	000142	000302		MOV		#142,@#SFATAL		:MOVE TO MAILBOX # ***** 142 *****	
	006100	005212				INC		(R2)		:SET MSGTYP TO FATAL ERROR	
	006102	000000				HALT				:C NOT CLEARED	
										: TO SCOPE REPLACE HALT W/ 240	
										: AND REPLACE NEXT INST W/ 761	
975	006104						1\$:				
	006104	001005				BNE		2\$			
	006106	012737	000143	000302		MOV		#143,@#SFATAL		:MOVE TO MAILBOX # ***** 143 *****	
	006114	005212				INC		(R2)		:SET MSGTYP TO FATAL ERROR	
	006116	000000				HALT				:Z NOT CLEARED	
										: TO SCOPE REPLACE HALT W/ 240	
										: AND REPLACE NEXT INST W/ 753	
976	006120						2\$:				
	006120	102005				BVC		3\$			
	006122	012737	000144	000302		MOV		#144,@#SFATAL		:MOVE TO MAILBOX # ***** 144 *****	
	006130	005212				INC		(R2)		:SET MSGTYP TO FATAL ERROR	
	006132	000000				HALT				:V NOT CLEARED	
										: TO SCOPE REPLACE HALT W/ 240	
										: AND REPLACE NEXT INST W/ 745	
977	006134						3\$:				
	006134	103005				BCC		4\$			
	006136	012737	000145	000302		MOV		#145,@#SFATAL		:MOVE TO MAILBOX # ***** 145 *****	
	006144	005212				INC		(R2)		:SET MSGTYP TO FATAL ERROR	
	006146	000000				HALT				:C NOT CLEARED	
										: TO SCOPE REPLACE HALT W/ 240	
										: AND REPLACE NEXT INST W/ 737	
978	006150	032767	000340	171620		BIT		#340,CC		:TEST PRIORITY	
979	006156	001405				BEQ		5\$			
	006160	012737	000146	000302		MOV		#146,@#SFATAL		:MOVE TO MAILBOX # ***** 146 *****	
	006166	005212				INC		(R2)		:SET MSGTYP TO FATAL ERROR	
	006170	000000				HALT				:PRIORITY NOT ZERO	
										: TO SCOPE REPLACE HALT W/ 240	
										: AND REPLACE NEXT INST W/ 726	
980	006172	012706	000500			MOV		#BUFF,SP			
981	006176	012767	006214	171610		MOV		#RETF4,RTRAP4			
982	006204	012767	000357	171604		MOV		#357,RTRAP4+2		:SET NEW 'CC' AND PRIORITY	
983	006212	000003				TRT				:TRAP HERE	
984	006214						RETF4:				
985	006214	100405				BMI		1\$			
	006216	012737	000147	000302		MOV		#147,@#SFATAL		:MOVE TO MAILBOX # ***** 147 *****	
	006224	005212				INC		(R2)		:SET MSGTYP TO FATAL ERROR	
	006226	000000				HALT				:N NOT SET	
										: TO SCOPE REPLACE HALT W/ 240	
										: AND REPLACE NEXT INST W/ 707	
986	006230						1\$:				
	006230	001405				BEQ		2\$			
	006232	012737	000150	000302		MOV		#150,@#SFATAL		:MOVE TO MAILBOX # ***** 150 *****	
	006240	005212				INC		(R2)		:SET MSGTYP TO FATAL ERROR	
	006242	000000				HALT				:Z NOT SET	
										: TO SCOPE REPLACE HALT W/ 240	
										: AND REPLACE NEXT INST W/ 701	
987	006244						2\$:				
	006244	102405				BVS		3\$			
	006246	012737	000151	000302		MOV		#151,@#SFATAL		:MOVE TO MAILBOX # ***** 151 *****	


```

006254 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
006256 000000          HALT                    ;V NOT SET
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 673

988 006260          3$:
006260 103405          BCS      4$
006262 012737 000152 000302  MOV      #152,@#SFATAL ;MOVE TO MAILBOX # ***** 152 *****
006270 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
006272 000000          HALT                    ;C NOT SET
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 665

989 006274 016706 171476 4$:  MOV      CC,SP
990 006300 042706 000017  BIC      #17,SP
991 006304 022706 000340  CMP      #340,SP
992 006310 001405          BEQ      BR51A

006312          BR51:
006312 012737 000153 000302  MOV      #153,@#SFATAL ;MOVE TO MAILBOX # ***** 153 *****
006320 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
006322 000000          HALT                    ;PRIORITY WAS CHANGED,OR WRONG $TSTNM
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 651

993 006324 012767 000016 171462 BR51A: MOV      #16,14
994 006332 005067 171460  CLR      16
995
996          ;PDP-11 ILLEGAL AND ADDRESS INSTRUCTION TEST
997          ;ALL INSTRUCTIONS THAT ARE ILLEGAL
998          ;SHOULD TRAP TO LOCATION 10, AND THE
999          ;PC THAT POINTS TO THE TRAPPING INSTRUCTION
1000         ;SHOULD BE PLACED ON THE STACK
1001
1002         ;*****
1002         ;TEST 40          TEST THAT A TRAP OCCURS ON AN ILLEGAL INS
1002         ;*****
006336 005237 000304          TST40: INC      @#STESTN      ;UPDATE TEST NUMBER
006342 022737 000040 000304  CMP      #40,@#STESTN ;SEQUENCE ERROR?
006350 001006          BNE      TST41-12      ;BR TO ERROR HALT ON SEQ ERROR
1003 006352 012706 000500  MOV      #BUFF,SP      ;STACK POINTER SETUP
1004 006356 012767 006400 171424  MOV      #RETA5,RTRAP ;RETURN LOCATION
1005 006364 000100          JMP      %0            ;ILLEGAL INSTRUCTION, SHOULD TRAP
1006 006366 012737 000154 000302  MOV      #154,@#SFATAL ;MOVE TO MAILBOX # ***** 154 *****
006374 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
006376 000000          HALT                    ;ILLEGAL INSTRUCTION DIDN'T TRAP,OR WRONG $TSTNM
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 764

1007 006400          RETA5:
1008
1008         ;*****
1008         ;TEST 41          TEST DEC OF STACK POINTER ON A TRAP OPERATION
1008         ;*****
006400 005237 000304          TST41: INC      @#STESTN      ;UPDATE TEST NUMBER
006404 022737 000041 000304  CMP      #41,@#STESTN ;SEQUENCE ERROR?
006412 001011          BNE      TST42-12      ;BR TO ERROR HALT ON SEQ ERROR
1009 006414 012706 000500  MOV      #BUFF,SP      ;STACK POINTER SETUP
1010 006420 012767 006430 171362  MOV      #RETB5,RTRAP ;RETURN POINTER
1011 006426 000100          JMP      %0            ;RESERVED INSTRUCTION
1012 006430 020627 000474          RETB5: CMP      SP,#BUFF-4 ;TEST DECREMENT OF SP
1013 006434 001405          BEQ      TST42
006436 012737 000155 000302  MOV      #155,@#SFATAL ;MOVE TO MAILBOX # ***** 155 *****

```

```

006444 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
006446 000000          HALT           ;NOT DECREMENTED TWO WORDS,OR WRONG $STNM
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 761

```

```

1014 *****
:TEST 42      TEST THAT PROPER P.C. IS SAVED
*****

```

```

006450 005237 000304          TST42: INC      @#$TESTN          ;UPDATE TEST NUMBER
006454 022737 000042 000304  CMP      #42,@#$TESTN          ;SEQUENCE ERROR?
006462 001012                   BNE     TST43-12              ;BR TO ERROR HALT ON SEQ ERROR
1015 006464 012706 000500          MOV     #BUFF,SP              ;STACK POINTER SETUP
1016 006470 012767 006500 171312  MOV     #RETC5,RTRAP          ;RETURN FROM TRAP POINTER
1017 006476 000100                   JMP     %0                     ;TRAP ON THIS INSTRUCTION
1018 006500 022767 006500 171766  RETC5:  CMP     #,BUFF-4          ;CHECK FOR INCREMENTED P.C.
1019 006506 001405                   BEQ     TST43
006510 012737 000156 000302  MOV     #156,@#$FATAL          ;MOVE TO MAILBOX # ***** 156 *****
006516 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
006520 000000          HALT           ;INCORRECT P.C.,OR WRONG $STNM
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 760

```

```

1020 *****
:TEST 43      TEST THAT 'OLD' CC AND PRI ARE PLACED ON STACK
*****

```

```

006522 005237 000304          TST43: INC      @#$TESTN          ;UPDATE TEST NUMBER
006526 022737 000043 000304  CMP     #43,@#$TESTN          ;SEQUENCE ERROR?
006534 001040                   BNE     TST44-12              ;BR TO ERROR HALT ON SEQ ERROR
1021 006536 012706 000500          MOV     #BUFF,SP              ;SET UP
1022 006542 012767 006560 171240  MOV     #RETD5,RTRAP          ;SET UP
1023 006550 005067 171222          CLR     CC                     ;CLEAR CC AND PRIORITY
1024 006554 000257          CCC
1025 006556 000100          JMP     %0                     ;TRAP
1026 006560 026727 171712 000000  RETD5:  CMP     BUFF-2,#0          ;TEST THAT OLD STATUS WENT TO STACK
1027 006566 001405                   BEQ     1$
006570 012737 000157 000302  MOV     #157,@#$FATAL          ;MOVE TO MAILBOX # ***** 157 *****
006576 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
006600 000000          HALT           ;INCORRECT STATUS
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 755

```

```

1028 006602 012706 000500 1$:      MOV     #BUFF,SP              ;SET UP
1029 006606 012767 006626 171174  MOV     #RETE5,RTRAP          ;SET UP
1030 006614 012767 000357 171154  MOV     #357,CC               ;SET PRIORITY
1031 006622 000277          SCC
1032 006624 000100          JMP     %0                     ;TRAP
1033 006626 026727 171644 000357  RETE5:  CMP     BUFF-2,#357          ;COMPARES STATUS ON STACK
1034 006634 001405                   BEQ     TST44
006636 012737 000160 000302  MOV     #160,@#$FATAL          ;MOVE TO MAILBOX # ***** 160 *****
006644 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
006646 000000          HALT           ;INCORRECT STATUS ON STACK,OR WRONG $STNM
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 732

```

```

1035 *****
:TEST 44      TEST THAT 'NEW' STATUS IS CORRECT
*****

```

```

006650 005237 000304          TST44: INC      @#$TESTN          ;UPDATE TEST NUMBER
006654 022737 000044 000304  CMP     #44,@#$TESTN          ;SEQUENCE ERROR?
006662 001117                   BNE     TST45-12              ;BR TO ERROR HALT ON SEQ ERROR
1036 006664 012706 000500          MOV     #BUFF,SP

```

```

1037 006670 012767 006704 171112      MOV      #RETF5,RTRAP
1038 006676 005067 171110      CLR      RTRAP+2 ;CLEAR FUTURE PRIORITY AND CC
1039 006702 000100      JMP      %0
1040 006704      RETF5:      ;TEST FOR 'C' CLEARED
1041 006704 100005      BPL      1$
      006706 012737 000161 000302      MOV      #161,@%SFATAL ;MOVE TO MAILBOX # ***** 161 *****
      006714 005212      INC      (R2) ;SET MSGTYP TO FATAL ERROR
      006716 000000      HALT     ;C NOT CLEARED
      ; TO SCOPE REPLACE HALT W/ 240
      ; AND RFLACE NEXT INST W/ 761

1042 006720      1$:
      006720 001005      BNE      2$
      006722 012737 000162 000302      MOV      #162,@%SFATAL ;MOVE TO MAILBOX # ***** 162 *****
      006730 005212      INC      (R2) ;SET MSGTYP TO FATAL ERROR
      006732 000000      HALT     ;Z NOT CLEARED
      ; TO SCOPE REPLACE HALT W/ 240
      ; AND REPLACE NEXT INST W/ 753

1043 006734      2$:
      006734 102005      BVC      3$
      006736 012737 000163 000302      MOV      #163,@%SFATAL ;MOVE TO MAILBOX # ***** 163 *****
      006744 005212      INC      (R2) ;SET MSGTYP TO FATAL ERROR
      006746 000000      HALT     ;V NOT CLEARED
      ; TO SCOPE REPLACE HALT W/ 240
      ; AND REPLACE NEXT INST W/ 745

1044 006750      3$:
      006750 103005      BCC      4$
      006752 012737 000164 000302      MOV      #164,@%SFATAL ;MOVE TO MAILBOX # ***** 164 *****
      006760 005212      INC      (R2) ;SET MSGTYP TO FATAL ERROR
      006762 000000      HALT     ;C NOT CLEARED
      ; TO SCOPE REPLACE HALT W/ 240
      ; AND REPLACE NEXT INST W/ 737

1045 006764 032767 000357 171004      4$:      BIT      #357,CC
1046 006772 001405      BEQ      5$
      006774 012737 000165 000302      MOV      #165,@%SFATAL ;MOVE TO MAILBOX # ***** 165 *****
      007002 005212      INC      (R2) ;SET MSGTYP TO FATAL ERROR
      007004 000000      HALT     ;PRIORITY NOT ZERO
      ; TO SCOPE REPLACE HALT W/ 240
      ; AND REPLACE NEXT INST W/ 726

1047 007006 012706 000500      5$:      MOV      #BUFF,SP
1048 007012 012767 007030 170770      MOV      #RETF5,RTRAP
1049 007020 012767 000357 170764      MOV      #357,RTRAP+2 ;SET NEW 'CC' AND PRIORITY
1050 007026 000100      JMP      %0 ;TRAP HERE
1051 007030      RETG5:
1052 007030 100405      BMI      1$
      007032 012737 000166 000302      MOV      #166,@%SFATAL ;MOVE TO MAILBOX # ***** 166 *****
      007040 005212      INC      (R2) ;SET MSGTYP TO FATAL ERROR
      007042 000000      HALT     ;N NOT SET
      ; TO SCOPE REPLACE HALT W/ 240
      ; AND REPLACE NEXT INST W/ 707

1053 007044      1$:
      007044 001405      BEQ      2$
      007046 012737 000167 000302      MOV      #167,@%SFATAL ;MOVE TO MAILBOX # ***** 167 *****
      007054 005212      INC      (R2) ;SET MSGTYP TO FATAL ERROR
      007056 000000      HALT     ;Z NOT SET
      ; TO SCOPE REPLACE HALT W/ 240
      ; AND REPLACE NEXT INST W/ 707

1054 007060      2$:

```

```

007060 102405      BVS      3$
007062 012737 000170 000302  MOV      #170,@$FATAL ;MOVE TO MAILBOX # ***** 170 *****
007070 005212      INC      (R2)        ;SET MSGTYP TO FATAL ERROR
007072 000000      HALT                    ;V NOT SET
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 673

```

```

1055 007074      3$:
007074 103405      BCS      4$
007076 012737 000171 000302  MOV      #171,@$FATAL ;MOVE TO MAILBOX # ***** 171 *****
007104 005212      INC      (R2)        ;SET MSGTYP TO FATAL ERROR
007106 000000      HALT                    ;C NOT SET
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 665

```

```

1056 007110 016706 170662      4$:  MOV      CC,SP
1057 007114 022706 000357      CMP      #357,SP
1058 007120 001405      BEQ      TST45
007122 012737 000172 000302  MOV      #172,@$FATA ;MOVE TO MAILBOX # ***** 172 *****
007130 005212      INC      (R2)        ;SET MSGTYP TO FATAL ERROR
007132 000000      HALT                    ;PRIORITY WAS CHANGED,OR WRONG $STNM
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 653

```

```

1059 :*****
:TEST 45      TEST THAT A TRAP OCCURES ON ALL ILLEGAL INS
:*****

```

```

007134 005237 000304      TST45: INC      @$TESTN ;UPDATE TEST NUMBER
007140 022737 000045 000304  CMP      #45,@$TESTN ;SEQUENCE ERROR?
007146 001006      BNE      TST46-12 ;BR TO ERROR HALT ON SEQ ERROR
1060 007150 012706 000500      MOV      #BUFF,SP ;STACK POINTER SETUP
1061 007154 012767 007176 170626  MOV      #RETH5,RTRAP ;RETURN LOCATION
1062 007162 004000      JSR      %0,%0 ;RESERVED INS, SHOULD TRAP
1063 007164 012737 000173 000302  MOV      #173,@$FATAL ;MOVE TO MAILBOX # ***** 173 *****
007172 005212      INC      (R2)        ;SET MSGTYP TO FATAL ERROR
007174 000000      HALT                    ;DIDN'T TRAP,OR WRONG $STNM
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 764

```

```

1064 007176      RETH5:
1065 :*****
:TEST 46      TEST DEC OF STACK POINTER ON A TRAP OPERATION
:*****

```

```

007176 005237 000304      TST46: INC      @$TESTN ;UPDATE TEST NUMBER
007202 022737 000046 000304  CMP      #46,@$TESTN ;SEQUENCE ERROR?
007210 001011      BNE      TST47-12 ;BR TO ERROR HALT ON SEQ ERROR
1066 007212 012706 000500      MOV      #BUFF,SP ;STACK POINTER SFTUP
1067 007216 012767 007226 170564  MOV      #RETJ,RTRAP ;RETURN POINTER
1068 007224 004000      JSR      %0,%0 ;RESERVED INS
1069 007226 020627 000474      RETJ:  CMP      SP,#BUFF-4 ;TEST DECREMENT OF SP
1070 007232 001405      BEQ      TST47
007234 012737 000174 000302  MOV      #174,@$FATAL ;MOVE TO MAILBOX # ***** 174 *****
007242 005212      INC      (R2)        ;SET MSGTYP TO FATAL ERROR
007244 000000      HALT                    ;NOT DECREMENTED TWO WORDS,OR WRONG $STNM
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 761

```

```

1071 :*****
:TEST 47      TEST THAT PROPER P.C. IS SAVED
:*****

```

```

007246 005237 000304      TST47: INC      @$TESTN ;UPDATE TEST NUMBER
007252 022737 000047 000304  CMP      #47,@$TESTN ;SEQUENCE ERROR?

```

```

1072 007260 001012          BNE    TST50-12      ;BR TO ERROR HALT ON SEQ ERROR
1073 007262 012706 000500    MOV    #BUFF,SP      ;STACK POINTER SETUP
1074 007266 012767 007276 170514  MOV    #RETK,RTRAP   ;RETURN FROM TRAP POINTER
1075 007274 004000          JSR    %0,%0         ;TRAP ON THIS INS
1076 007276 022767 007276 171170  RETK:  CMP    #INSTK+2,BUFF-4 ;CHECK FOR INCREMENTED P.C.
1077 007304 001405          BEQ    TST50
1078 007306 012737 000175 000302  MOV    #175,@$FATAL ;MOVE TO MAILBOX # ***** 175 *****
1079 007314 005212          INC    (R2)          ;SET MSGTYP TO FATAL ERROR
1080 007316 000000          HALT                ;INCORRECT P.C.,OR WRONG $STNM
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 760

```

1077
1073

```

:*****
:TEST 50          TEST THAT 'OLD' CC AND PRI ARE PLACED ON STACK
:*****

```

```

1079 007320 005237 000304          TST50: INC    @$TESTN      ;UPDATE TEST NUMBER
1080 007324 022737 000050 000304  CMP    #50,@$TESTN   ;SEQUENCE ERROR?
1081 007332 001040          BNE    TST51-12      ;BR TO ERROR HALT ON SEQ ERROR
1082 007334 012706 000500          MOV    #BUFF,SP      ;SET UP
1083 007340 012767 007356 170442  MOV    #RETL,RTRAP   ;SET UP
1084 007346 005067 170424          CLR    CC            ;CLEAR CC AND PRIORITY
1085 007352 000257          CCC
1086 007354 004000          JSR    %0,%0         ;TRAP
1087 007356 026727 171114 000000  RETL:  CMP    BUFF-2,#0 ;TEST THAT OLD STATUS WENT TO STACK
1088 007364 001405          BEQ    1$
1089 007366 012737 000176 000302  MOV    #176,@$FATAL ;MOVE TO MAILBOX # ***** 176 *****
1090 007374 005212          INC    (R2)          ;SET MSGTYP TO FATAL ERROR
1091 007376 000000          HALT                ;INCORRECT STATUS
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 755
1092 007400 012706 000500          1$:  MOV    #BUFF,SP      ;SET UP
1093 007404 012767 007424 170376  MOV    #RETM,RTRAP   ;SET UP
1094 007412 012767 000357 170356  MOV    #357,CC       ;SET PRIORITY
1095 007420 000277          SCC
1096 007422 004000          JSR    %0,%0         ;TRAP

```

```

1092 007424 026727 171046 000357 RETM:  CMP      BUFF-2,#357      ;COMPARES STATUS ON STACK
1093 007432 001405          BEQ      TST51
      007434 012737 000177 000302      MOV      #177,@#SFATAL ;MOVE TO MAILBOX # ***** 177 *****
      007442 005212          INC      (R2)           ;SET MSGTYP TO FATAL ERROR
      007444 000000          HALT                    ;INCORRECT STATUS ON STACK,OR WRONG $STNM
                                   ; TO SCOPE REPLACE HALT W/ 240
                                   ; AND REPLACE NEXT INST W/ 732

```

```

1094                                     ;*****
      :TEST 51      TEST THAT 'NEW' STATUS IS CORRECT
      :*****

```

```

      007446 005237 000304          TST51:  INC      @#STESTN      ;UPDATE TEST NUMBER
      007452 022737 000051 000304      CMP      #51,@#STESTN    ;SEQUENCE ERROR?
      007460 001116          BNE      TST52-12        ;BR TO ERROR HALT ON SEQ ERROR
1095 007462 012706 000500          MOV      #BUFF,SP
1096 007466 012767 007502 170314      MOV      #RETN,RTRAP
1097 007474 005067 170312          CLR      RTRAP+2 ;CLEAR FUTURE PRIORITY AND CC
1098 007500 004000          JSR      %0,%0
1099 007502          RETN:                                     ;TEST FOR 'C' CLEARED
1100 007502 100005          BPL      1$
      007504 012737 000200 000302      MOV      #200,@#SFATAL ;MOVE TO MAILBOX # ***** 200 *****
      007512 005212          INC      (R2)           ;SET MSGTYP TO FATAL ERROR
      007514 000000          HALT                    ;C NOT CLEARED
                                   ; TO SCOPE REPLACE HALT W/ 240
                                   ; AND REPLACE NEXT INST W/ 761

```

```

1101 007516          1$:
      007516 001005          BNE      2$
      007520 012737 000201 000302      MOV      #201,@#SFATAL ;MOVE TO MAILBOX # ***** 201 *****
      007526 005212          INC      (R2)           ;SET MSGTYP TO FATAL ERROR
      007530 000000          HALT                    ;Z NOT CLEARED
                                   ; TO SCOPE REPLACE HALT W/ 240
                                   ; AND REPLACE NEXT INST W/ 753

```

```

1102 007532          2$:
      007532 102005          BVC      3$
      007534 012737 000202 000302      MOV      #202,@#SFATAL ;MOVE TO MAILBOX # ***** 202 *****
      007542 005212          INC      (R2)           ;SET MSGTYP TO FATAL ERROR
      007544 000000          HALT                    ;V NOT CLEARED
                                   ; TO SCOPE REPLACE HALT W/ 240
                                   ; AND REPLACE NEXT INST W/ 745

```

```

1103 007546          3$:
      007546 103005          BCC      4$
      007550 012737 000203 000302      MOV      #203,@#SFATAL ;MOVE TO MAILBOX # ***** 203 *****
      007556 005212          INC      (R2)           ;SET MSGTYP TO FATAL ERROR
      007560 000000          HALT                    ;C NOT CLEARED
                                   ; TO SCOPE REPLACE HALT W/ 240
                                   ; AND REPLACE NEXT INST W/ 737

```

```

1104 007562 016700 170210          4$:  MOV      CC,%0          ;TEMP STORAGE
1105 007566 001405          BEQ      5$
      007570 012737 000204 000302      MOV      #204,@#SFATAL ;MOVE TO MAILBOX # ***** 204 *****
      007576 005212          INC      (R2)           ;SET MSGTYP TO FATAL ERROR
      007600 000000          HALT                    ;PRIORITY NOT ZERO
                                   ; TO SCOPE REPLACE HALT W/ 240
                                   ; AND REPLACE NEXT INST W/ 727

```

```

1106 007602 012706 000500          5$:  MOV      #BUFF,SP
1107 007606 012767 007624 170174      MOV      #RETO,RTRAP
1108 007614 012767 000357 170170      MOV      #357,RTRAP+2 ;SET NEW 'CC' AND PRIORITY
1109 007622 004000          JSR      %0,%0          ;TRAP HERE
1110 007624          RETO:

```



```

1127 010020 RETP:
1128 010020 013767 177766 170454 MOV @RCPUERR,RCPUER ;READ AND SAVE CPU ERROR REGISTER
1129 010026 042767 177413 170446 BIC #CERMSK,RCPUER ;MASK OFF UNUSED BITS OF CPU ERROR REG
1130 010034 022767 000100 170440 CMP #100,RCPUER ;ODD ADDRESS BIT SET?
1131 010042 001405 BEQ CERR1
010044 ERRP1:
010044 012737 000214 000302 MOV #214,@$FATAL ;MOVE TO MAILBOX # ***** 214 *****
010052 005212 INC (R2) ;SET MSGTYP TO FATAL ERROR
010054 000000 HALT ;INCORRECT CPU ERROR REG CONTENTS, OR WRONG $STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 732
1132 010056 005037 177766 CERR1: CLR @RCPUERR ;CLEAR ODD ADDRESS BIT
1133
1134

```

```

:*****
:TEST 53 TEST DEC OF STACK POINTER ON A TRAP OPERATION
:*****

```

```

010062 005237 000304 000304 TS153: INC @$TESTN ;UPDATE TEST NUMBER
010066 022737 000053 000304 CMP #53,@$TESTN ;SEQUENCE ERROR?
010074 001012 BNE TST54-12 ;BR TO ERROR HALT ON SEQ ERROR
1135 010076 012706 000500 MOV #BUFF,SP ;STACK POINTER SETUP
1136 010102 012767 010114 167674 MOV #RETR,RTRAP5 ;RETURN POINTER
1137 010110 005767 167665 TST 1 ;RESERVED INS
1138 010114 020627 000474 RETQ: CMP SP,#BUFF-4 ;TEST DECREMENT OF SP
1139 010120 001405 BEQ TST54
010122 012737 000215 000302 MOV #215,@$FATAL ;MOVE TO MAILBOX # ***** 215 *****
010130 005212 INC (R2) ;SET MSGTYP TO FATAL ERROR
010132 000000 HALT ;NOT DECREMENTED TWO WORDS,OR WRONG $STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 760

```

```

:*****
:TEST 54 TEST THAT PROPER P.C. IS SAVED
:*****

```

```

010134 005237 000304 000304 TS154: INC @$TESTN ;UPDATE TEST NUMBER
010140 022737 000054 000304 CMP #54,@$TESTN ;SEQUENCE ERROR?
010146 001013 BNE TST55-12 ;BR TO ERROR HALT ON SEQ ERROR
1141 010150 012706 000500 MOV #BUFF,SP ;STACK POINTER SETUP
1142 010154 012767 010166 167622 MOV #RETR,RTRAP5 ;RETURN FROM TRAP POINTER
1143 010162 005767 167613 TST 1 ;TRAP ON THIS INSTRUCTION
1144 010166 022767 010166 170300 RETR: CMP #,BUFF-4 ;CHECK FOR INCREMENTED P.C.
1145 010174 001405 BEQ TST55
010176 012737 000216 000302 MOV #216,@$FATAL ;MOVE TO MAILBOX # ***** 216 *****
010204 005212 INC (R2) ;SET MSGTYP TO FATAL ERROR
010206 000000 HALT ;INCORRECT P.C.,OR WRONG $STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 757

```

```

:*****
:TEST 55 TEST THAT 'OLD' CC AND PRI ARE PLACED ON STACK
:*****

```

```

010210 005237 000304 000304 TS155: INC @$TESTN ;UPDATE TEST NUMBER
010214 022737 000055 000304 CMP #55,@$TESTN ;SEQUENCE ERROR?
010222 001042 BNE TST56-12 ;BR TO ERROR HALT ON SEQ ERROR
1147 010224 012706 000500 MOV #BUFF,SP ;SET UP
1148 010230 012767 010250 167546 MOV #RETS,RTRAP5 ;SET UP
1149 010236 005067 167534 CLR CC ;CLEAR CC AND PRIORITY
1150 010242 000257 CCC
1151 010244 005767 167531 TST 1 ;TRAP

```


MAIN. MACRO M1111 27-SEP-79 16:56 PAGE 69-3
T55 TEST THAT 'OLD' CC AND PRI ARE PLACED ON STACK

SEQ 0040

1152	010250	026727	170222	000000	RETS:	CMP	BUFF-2,#0	:TEST THAT OLD STATUS WENT TO STACK
1153	010256	001405				BEQ	1\$	
	010260	012737	000217	000302		MOV	#217,@\$FATAL	:MOVE TO MAILBOX # ***** 217 *****
	010266	005212				INC	(R2)	:SET MSGTYP TO FATAL ERROR
	010270	000000				HALT		:INCORRECT STATUS

1154	010272	012706	000500		1\$:	MOV	#BUFF,SP	:SET UP
1155	010276	012767	010320	167500		MOV	#RETT,RTRAP5	:SET UP
1156	010304	012767	000357	167464		MOV	#357,CC	:SET PRIORITY
1157	010317	000277				SCC		:SET CC
1158	010314	005767	167461			TST	1	:TRAP
1159	010310	026727	170152	000357	RETT:	CMP	BUFF-2,#357	:COMPARES STATUS ON STACK
1160	010316	001405				BEQ	TST56	
	010330	012737	000220	000302		MOV	#220,@\$FATAL	:MOVE TO MAILBOX # ***** 220 *****
	010336	005212				INC	(R2)	:SET MSGTYP TO FATAL ERROR
	010340	000000				HALT		:INCORRECT STATUS ON STACK,OR WRONG \$STNM

1161 :*****
:TEST 56 TEST THAT 'NEW' STATUS IS CORRECT
:*****

	010342	005237	000304		TST56:	INC	@\$TESTN	:UPDATE TEST NUMBER
	010346	022737	000056	000304		CMP	#56,@\$TESTN	:SEQUENCE ERROR?
	010354	001121				BNE	TST57-12	:BR TO ERROR HALT ON SEQ ERROR
1162	010356	012706	000500			MOV	#BUFF,SP	
1163	010362	012767	010400	167414		MOV	#RETT,RTRAP5	
1164	010370	005067	167412			CLR	RTRAP5+2	:CLEAR FUTURE PRIORITY AND CC
1165	010374	005767	167401			TST	1	:TRAP HERE
1166	010400				RETT:			:TEST FOR 'C' CLEARED
1167	010400	100005				BPL	1\$	
	010402	012737	000221	000302		MOV	#221,@\$FATAL	:MOVE TO MAILBOX # ***** 221 *****
	010410	005212				INC	(R2)	:SET MSGTYP TO FATAL ERROR
	010412	000000				HALT		:C NOT CLEARED

1168	010414				1\$:			
	010414	001005				BNE	2\$	
	010416	012737	000222	000302		MOV	#222,@\$FATAL	:MOVE TO MAILBOX # ***** 222 *****
	010424	005212				INC	(R2)	:SET MSGTYP TO FATAL ERROR
	010426	000000				HALT		:Z NOT CLEARED

1169	010430				2\$:			
	010430	102005				BVC	3\$	
	010432	012737	000223	000302		MOV	#223,@\$FATAL	:MOVE TO MAILBOX # ***** 223 *****
	010440	005212				INC	(R2)	:SET MSGTYP TO FATAL ERROR
	010442	000000				HALT		:V NOT CLEARED

1170	010444				3\$:			
	010444	103005				BCC	4\$	
	010446	012737	000224	000302		MOV	#224,@\$FATAL	:MOVE TO MAILBOX # ***** 224 *****
	010454	005212				INC	(R2)	:SET MSGTYP TO FATAL ERROR
	010456	000000				HALT		:C NOT CLEARED

```

1171 010460 032767 000357 167310 4$: BIT #357,CC ;TEST PRIORITY FOR ZERO
1172 010466 001405 BEQ 5$
010470 012737 000225 000302 MOV #225,@#SFATAL ;MOVE TO MAILBOX # ***** 225 *****
010476 005212 INC (R2) ;SET MSGTYP TO FATAL ERROR
010500 000000 HALT ;PRIORITY NOT ZERO
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 725

1173 010502 012706 000500 5$: MOV #BUFF,SP
1174 010506 012767 010526 167270 MOV #RETV,RTRAP5
1175 010514 012767 000357 167264 MOV #357,RTRAP5+2 ;SET NEW 'CC' AND PRIORITY
1176 010522 005767 167253 TST 1 ;TRACE HERE
1177 010526 RETV:
1178 010526 100405 BMI 1$
010530 012737 000226 000302 MOV #226,@#SFATAL ;MOVE TO MAILBOX # ***** 226 *****
010536 005212 INC (R2) ;SET MSGTYP TO FATAL ERROR
010540 000000 HALT ;N NOT SET
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 705

1179 010542 1$: BEQ 2$
010542 001405 MOV #227,@#SFATAL ;MOVE TO MAILBOX # ***** 227 *****
010544 012737 000227 000302 INC (R2) ;SET MSGTYP TO FATAL ERROR
010552 005212 HALT ;Z NOT SET
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 677

1180 010556 2$: BVS 3$
010556 102405 MOV #230,@#SFATAL ;MOVE TO MAILBOX # ***** 230 *****
010560 012737 000230 000302 INC (R2) ;SET MSGTYP TO FATAL ERROR
010566 005212 HALT ;V NOT SET
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 671

1181 010572 3$: BCS 4$
010572 103405 MOV #231,@#SFATAL ;MOVE TO MAILBOX # ***** 231 *****
010574 012737 000231 000302 INC (R2) ;SET MSGTYP TO FATAL ERROR
010602 005212 HALT ;C NOT SET
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 663

1182 010606 016700 167164 4$: MOV CC,%0
1183 010612 022700 000357 CMP #357,%0
1184 010616 001405 BEQ TST57
010620 012737 000232 000302 MOV #232,@#SFATAL ;MOVE TO MAILBOX # ***** 232 *****
010626 005212 INC (R2) ;SET MSGTYP TO FATAL ERROR
010630 000000 HALT ;PRIORITY WAS CHANGED,OR WRONG $TSTNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 651

```

```

1185 :*****
:TEST 57 TEST THAT DEC R6 TO A VALUE LESS 400 TRAPS
:*****
010632 005237 000304 TST57: INC @#STESTN ;UPDATE TEST NUMBER
010636 022737 000057 000304 CMP #57,@#STESTN ;SEQUENCE ERROR?
010644 001027 BNE ERRP2 ;BR TO ERROR HALT ON SEQ ERROR
1186 010646 005037 177766 CLR @#CPUERR ;CLEAR CPU ERROR REGISTER
1187 010652 012706 000150 MOV #150,%6 ;R6 = 150
1188 010656 012767 010700 167120 MOV #TDEC1,4 ;STACK OVERFLOW TRAP POINTER
1189 010664 005746 TST -(6) ;WITH R6 - 150 SHOULD TRAP

```

.MAIN. MACRO M1111 27-SEP-79 16:56 PAGE 69-5
T57 TEST THAT DEC R6 TO A VALUE LESS 400 TRAPS

SEQ 0042

```

1190 010666 012737 000233 000302      MOV    #233,@#SFATAL ;MOVE TO MAILBOX # ***** 233 *****
      010674 005212      INC    (R2)           ;SET MSGTYP TO FATAL ERROR
      010676 000000      HALT                ;SHOULD HAVE TRAPPED,OR WRONG $STNM
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 762

1191 010700      TDEC1:
1192 010700 013767 177766 167574      MOV @#CPUERR,RCPUER ;SAVE CPU ERROR REGISTER
1193 010706 042767 177413 167566      BIC #CERMSK,RCPUER ;MASK OFF UNUSED CPU ERROR REG BITS
1194 010714 022767 000004 167560      CMP   #4,RCPUER    ;IS YELLOW ZONE BIT SET?
1195 010722 001405      BEQ   CERR2
      010724      ERRP2:
      010724 012737 000234 000302      MOV    #234,@#SFATAL ;MOVE TO MAILBOX # ***** 234 *****
      010732 005212      INC    (R2)           ;SET MSGTYP TO FATAL ERROR
      010734 000000      HALT                ;INCORRECT CPU ERROR REGISTER CONTENTS, OR WRONG $STNM
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 743

1196 010736 005037 177766      CERR2: CLR @#CPUERR ;CLEAR YELLOW ZONE BIT
1197
1198      ;*****
      ;TEST 60      TEST FOR DEC OF R6 ON OVERFLOW TRAP
      ;*****
      010742 005237 000304      TST60: INC @#STESTN ;UPDATE TEST NUMBER
      010746 022737 000060 000304      CMP   #60,@#STESTN ;SEQUENCE ERROR?
      010754 001011      BNE   TST61-12     ;BR TO ERROR HALT ON SEQ ERROR
1199 010756 012706 000150      MOV   #150,%6      ;R6 = 150
1200 010762 012767 010772 167014      MOV   #TDEC2,4     ;TRAP POINTER
1201 010770 005746      TST   -(6)         ;WITH R6 = 150 SHOULD TRAP
1202 010772 020627 000142      TDEC2: CMP %6,#142 ;DID R6 DECREMENT
1203 010776 001405      BEQ   TST61
      C11000 012737 000235 000302      MOV    #235,@#SFATAL ;MOVE TO MAILBOX # ***** 235 *****
      011006 005212      INC    (R2)           ;SET MSGTYP TO FATAL ERROR
      011010 000000      HALT                ;R6 NOT = 142,OR WRONG $STNM
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 761

```

1204

1206

;TEST 61 TEST DIFFERENT TYPES OF OVERFLOW

011012	005237	000304		TST61:	INC	@\$STESTN	;UPDATE TEST NUMBER
011016	022737	000061	000304		CMP	#61,@\$STESTN	;SEQUENCE ERROR?
011024	001043				BNE	TST62-12	;BR TO ERROR HALT ON SEQ FRROF
1207 011026	012706	000150			MOV	#150,%6	
1208 011032	005067	167110			CLR	146	;STATUS WORD OF LOC 10
1209 011036	012767	011046	166740		MOV	#TDEC3,4	;RETURN TO LOC 4
1210 011044	005246				INC	-(6)	
1211 011046	005767	167074		TDEC3:	TST	146	
1212 011052	001005				BNE	1\$	
011054	012737	000236	000302		MOV	#236,@\$FATAL	;MOVE TO MAILBOX # ***** 236 *****
011062	005212				INC	(R2)	;SET MSGTYP TO FATAL ERROR
011064	000000				HALT		;INCREMENT OPERATION NOT INHIBITED

1213 011066	012705	001000		1\$:	MOV	#1000,%5	
1214 011072	012706	000400			MOV	#400,%6	
1215 011076	012767	011120	166700		MOV	#TDEC4,4	
1216 011104	124645				CMPB	-(6),-(5)	
1217 011106	012737	000237	000302		MOV	#237,@\$FATAL	;MOVE TO MAILBOX # ***** 237 *****
011114	005212				INC	(R2)	;SET MSGTYP TO FATAL ERROR
011116	000000				HALT		;STACK = 400 AND DECREMENTED, SHOULD TRAP

1218 011120	012706	000400		TDEC4:	MOV	#400,%6	
1219 011124	012767	011146	166652		MOV	#TDEC7,4	
1220 011132	134546				BITB	-(5),-(6)	
1221 011134				TDEC6:			
011134	012737	000240	000302		MOV	#240,@\$FATAL	;MOVE TO MAILBOX # ***** 240 *****
011142	005212				INC	(R2)	;SET MSGTYP TO FATAL ERROR
011144	000000				HALT		;NO STACK OVERFLOW,OR WRONG \$STNM

1222 011146				TDEC7:			; AND REPLACE NEXT INST W/ 727
-------------	--	--	--	--------	--	--	--------------------------------

1232
1233

;TEST 62 TEST THAT AN I0 CAUSES AN OVERFLOW TRAP

011146	005237	000304		TST62:	INC	@\$STESTN	;UPDATE TEST NUMBER
011152	022737	000062	000304		CMP	#62,@\$STESTN	;SEQUENCE ERROR?
011160	001011				BNE	VDEC2	;BR TO ERROR HALT ON SEQ FRROF
011162	012706	000400			MOV	#400,%6	;SET UP STACK TO OVERFLOW
011166	012767	011204	166614		MOV	#VDEC2,10	;SET UP I0 VECTOR
011174	012767	011216	166602		MOV	#VDEC1,4	;SET UP OVERFLOW VECTOR
011202	000010				10		;THIS TRAP SHOULD CAUSE OVERFLOW
011204				VDEC2:			
011204	012737	000241	000302		MOV	#241,@\$FATAL	;MOVE TO MAILBOX # ***** 241 *****
011212	005212				INC	(R2)	;SET MSGTYP TO FATAL ERROR
011214	000000				HALT		;TRAP FLAG OVERFLOW DID NOT OCCUR,OR WRONG \$STNM

1234

011216	012767	000012	166564	VDEC1:	MOV	#10+2,10	
--------	--------	--------	--------	--------	-----	----------	--

;TEST 63 TEST THAT AN I0T CAUSES AN OVERFLOW TRAP

```

011224 005237 000304          TST63: INC @#STESTN      ;UPDATE TEST NUMBER
011230 022737 000063 000304      CMP #63,@#STESTN    ;SEQUENCE ERROR?
011236 001011                BNE VDEC4           ;BR TO ERROR HALT ON SEQ ERROR
011240 012706 000400          MOV #400,%6        ;SET UP STACK TO OVERFLOW
011244 012767 011262 166546      MOV #VDEC4,20      ;SET UP IOT VECTOR
011252 012767 011274 166524      MOV #VDEC3,4       ;SET UP OVERFLOW VECTOR
011260 000004                IOT                ;THIS TRAP SHOULD CAUSE OVERFLOW
011262
011262 012737 000242 000302      VDEC4: MOV #242,@#SFATAL ;MOVE TO MAILBOX # ***** 242 *****
011270 005212                INC (R2)           ;SET MSGTYP TO FATAL ERROR
011272 000000                HALT              ;TRAP FLAG OVERFLOW DID NOT OCCUR,OR WRONG $TSTNM
; IO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 761

```

1235

```

011274 012767 000022 166516      VDEC3: MOV #20+2,20
;*****
;TEST 64 TEST THAT AN EMT CAUSES AN OVERFLOW TRAP
;*****
011302 005237 000304          TST64: INC @#STESTN      ;UPDATE TEST NUMBER
011306 022737 000064 000304      CMP #64,@#STESTN    ;SEQUENCE ERROR?
011314 001011                BNE VDEC6           ;BR TO ERROR HALT ON SEQ ERROR
011316 012706 000400          MOV #400,%6        ;SET UP STACK TO OVERFLOW
011322 012767 011340 166500      MOV #VDEC6,30      ;SET UP EMT VECTOR
011330 012767 011352 166446      MOV #VDEC5,4       ;SET UP OVERFLOW VECTOR
011336 104000                EMT                ;THIS TRAP SHOULD CAUSE OVERFLOW
011340
011340 012737 000243 000302      VDEC6: MOV #243,@#SFATAL ;MOVE TO MAILBOX # ***** 243 *****
011346 005212                INC (R2)           ;SET MSGTYP TO FATAL ERROR
011350 000000                HALT              ;TRAP FLAG OVERFLOW DID NOT OCCUR,OR WRONG $TSTNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 761

```

1236

```

011352 012767 000032 166450      VDEC5: MOV #30+2,30
;*****
;TEST 65 TEST THAT AN TRAP CAUSES AN OVERFLOW TRAP
;*****
011360 005237 000304          TST65: INC @#STESTN      ;UPDATE TEST NUMBER
011364 022737 000065 000304      CMP #65,@#STESTN    ;SEQUENCE ERROR?
011372 001011                BNE VDEC8           ;BR TO ERROR HALT ON SEQ ERROR
011374 012706 000400          MOV #400,%6        ;SET UP STACK TO OVERFLOW
011400 012767 011416 166426      MOV #VDEC8,34      ;SET UP TRAP VECTOR
011406 012767 011430 166370      MOV #VDEC7,4       ;SET UP OVERFLOW VECTOR
011414 104400                TRAP              ;THIS TRAP SHOULD CAUSE OVERFLOW
011416
011416 012737 000244 000302      VDEC8: MOV #244,@#SFATAL ;MOVE TO MAILBOX # ***** 244 *****
011424 005212                INC (R2)           ;SET MSGTYP TO FATAL ERROR
011426 000000                HALT              ;TRAP FLAG OVERFLOW DID NOT OCCUR,OR WRONG $TSTNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 761

```

1237

```

011430 012767 000036 166376      VDEC7: MOV #34+2,34
;*****
;TEST 66 TEST THAT AN TRT CAUSES AN OVERFLOW TRAP
;*****
011436 005237 000304          TST66: INC @#STESTN      ;UPDATE TEST NUMBER
011442 022737 000066 000304      CMP #66,@#STESTN    ;SEQUENCE ERROR?
011450 001011                BNE VDEC10          ;BR TO ERROR HALT ON SEQ ERROR
011452 012706 000400          MOV #400,%6        ;SET UP STACK TO OVERFLOW
011456 012767 011474 166330      MOV #VDEC10,14     ;SET UP TRT VECTOR
011464 012767 011506 166312      MOV #VDEC9,4       ;SET UP OVERFLOW VECTOR

```

```

011472 000003 TRT ;THIS TRAP SHOULD CAUSE OVERFLOW
011474 VDEC10: MOV #245,@#SFATAL ;MOVE TO MAILBOX # ***** 245 *****
011474 012737 000245 000302 INC (R2) ;SET MSGTYP TO FATAL ERROR
011502 005212 HALT ;TRAP FLAG OVERFLOW DID NOT OCCUR,OR WRONG $STNM
011504 000000 ; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 761

1238 011506 012767 000016 166300 VDEC9: MOV #14+2,14
;*****
;TEST 67 TEST THAT AN ILLA CAUSES AN OVERFLOW TRAP
;*****
011514 005237 000304 TST67: INC @#STESTN ;UPDATE TEST NUMBER
011520 022737 000067 000304 CMP #67,@#STESTN ;SEQUENCE ERROR?
011526 001011 BNE VDEC11 ;BR TO ERROR HALT ON SEQ ERROR
011530 012706 000400 MOV #400,%6 ;SET UP STACK TO OVERFLOW
011534 012767 011552 166246 MOV #VDEC11,10 ;SET UP ILLA VECTOR
011542 012767 011564 166234 MOV #VDEC12,4 ;SET UP OVERFLOW VECTOR
011550 004700 ILLA ;THIS TRAP SHOULD CAUSE OVERFLOW
011552 VDEC11: MOV #246,@#SFATAL ;MOVE TO MAILBOX # ***** 246 *****
011552 012737 000246 000302 INC (R2) ;SET MSGTYP TO FATAL ERROR
011560 005212 HALT ;TRAP FLAG OVERFLOW DID NOT OCCUR,OR WRONG $STNM
011562 000000 ; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 761

1239 011564 012767 000012 166216 VDEC12: MOV #10+2,10
1240 011572 020627 000370 CMP %6,#370 ;STACK PUSHED FOUR WORDS?
011576 001405 BEQ TST70
011600 012737 000247 000302 MOV #247,@#SFATAL ;MOVE TO MAILBOX # ***** 247 *****
011606 005212 INC (R2) ;SET MSGTYP TO FATAL ERROR
011610 000000 HALT ;CORRECT # (4) OF WORDS WERE NOT PUSHED ONTO STACK
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 746

1241 ;*****
;TEST 70 TEST THAT AN ILLB CAUSES AN OVERFLOW TRAP
;*****
011612 005237 000304 TST70: INC @#STESTN ;UPDATE TEST NUMBER
011616 022737 000070 000304 CMP #70,@#STESTN ;SEQUENCE ERROR?
011624 001011 BNE VDEC13 ;BR TO ERROR HALT ON SEQ ERROR
011626 012706 000400 MOV #400,%6 ;SET UP STACK TO OVERFLOW
011632 012767 011650 166150 MOV #VDEC13,10 ;SET UP ILLB VECTOR
011640 012767 011662 166136 MOV #VDEC14,4 ;SET UP OVERFLOW VECTOR
011646 000100 ILLB ;THIS TRAP SHOULD CAUSE OVERFLOW
011650 VDEC13: MOV #250,@#SFATAL ;MOVE TO MAILBOX # ***** 250 *****
011650 012737 000250 000302 INC (R2) ;SET MSGTYP TO FATAL ERROR
011656 005212 HALT ;TRAP FLAG OVERFLOW DID NOT OCCUR,OR WRONG $STNM
011660 000000 ; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 761

1242 011662 012767 000012 166120 VDEC14: MOV #10+2,10
1243 ;*****
;TEST 71 TEST FOR FALSE OVERFLOW TRAP
;*****
011670 005237 000304 TST71: INC @#STESTN ;UPDATE TEST NUMBER
011674 022737 000071 000304 CMP #71,@#STESTN ;SEQUENCE ERROR?
011702 001023 BNE FOVER ;BR TO ERROR HALT ON SEQ ERROR

```

```
1245 011704 012767 011752 166072      MOV      #FOVER,4      ;SET UP OVERFLOW PCINTER
1246 011712 012706 001002      MOV      #1002,%6
1247 011716 005746      TST      -(6)          ;SHOULD NOT OVERFLOW
1248 011720 012706 002002      MOV      #2002,%6
1249 011724 005746      TST      -(6)          ;SHOULD NOT OVERFLOW
1250 011726 012706 004002      MOV      #4002,%6
1251 011732 005746      TST      -(6)          ;SHOULD NOT OVERFLOW
1252 011734 012706 010002      MOV      #10002,%6
1253 011740 005746      TST      -(6)
1254 011742 012706 020000      MOV      #20000,%6    ;SHOULD NOT OVERFLOW
1255 011746 005746      TST      -(6)
1256 011750 000405      BR       STP
```

```
FOVER:
011752 012737 000251 000302      MOV      #251,@%SFATAL ;MOVE TO MAILBOX # ***** 251 *****
011760 005212      INC      (R2)          ;SET MSGTYP TO FATAL ERROR
011762 000000      HALT                ;IT OVERFLOWED,OR WRONG $STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 747
```

```
1257 011764 012767 000006 166012      STP:     MOV      #6,4
1258 011772 005067 166010      CLR      6
1259
```

:TEST 72 TEST THAT BIT 4 PSW WILL CAUSE A TRAP TO 14

```
TST72: 011776 005237 000304      INC      @%STESTN      ;UPDATE TEST NUMBER
012002 022737 000072 000304      CMP      #72,@%STESTN ;SEQUENCE ERROR?
012010 001013      BNE      TST73-12     ;BR TO ERROR HALT ON SEQ ERROR
1260 012012 012706 000500      MOV      #BUFF,SP
1261 012016 012767 012052 165770      MOV      #RETAT,RTRAP4 ;SET UP TO TRAP TO 14
1262 012024 012746 000020      MOV      #20,-(SP)    ;PUSH T BIT
1263 012030 012746 012036      MOV      #.+6,-(SP)   ;PUSH PC
1264 012034 000002      RTI                ;SET T BIT
1265 012036 000240      NOP                ;TRAP HERE
1266 012040 012737 000252 000302      MOV      #252,@%SFATAL ;MOVE TO MAILBOX # ***** 252 *****
012046 005212      INC      (R2)          ;SET MSGTYP TO FATAL ERROR
012050 000000      HALT                ;TRACE BIT DID NOT TRAP.,OR WRONG $TESTN
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 757
```

```
1267 012052      RETAT:
1268
```

:TEST 73 TEST STACK POINTER DECREMENTS

```
TST73: 012052 005237 000304      INC      @%STESTN      ;UPDATE TEST NUMBER
012056 022737 000073 000304      CMP      #73,@%STESTN ;SEQUENCE ERROR?
012064 001023      BNE      TST74-12     ;BR TO ERROR HALT ON SEQ ERROR
1269 012066 012706 000500      MOV      #BUFF,SP
1270 012072 012767 012126 165714      MOV      #RETBT,RTRAP4 ;PUSH T BIT
1271 012100 012746 000020      MOV      #20,-(SP)    ;PUSH PC
1272 012104 012746 012112      MOV      #.+6,-(SP)   ;SET T BIT
1273 012110 000002      RTI                ;TRAP HERE
1274 012112 000240      NOP
1275 012114 012737 000253 000302      MOV      #253,@%SFATAL ;MOVE TO MAILBOX # ***** 253 *****
012122 005212      INC      (R2)          ;SET MSGTYP TO FATAL ERROR
012124 000000      HALT                ;TRACE BIT DID NOT TRAP.
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 757
```

```
1276 012126 020627 000474      RETBT:  CMP      SP,#BUFF-4
1277 012132 001405      BEQ      TST74
```

```

012134 012737 000254 000302      MOV    #254,@$FATAL ;MOVE TO MAILBOX # ***** 254 *****
012142 005212                      INC    (R2)          ;SET MSGTYP TO FATAL ERROR
012144 000000                      HALT                ;STACK POINTER WAS NOT PUSHED BY TRAP,OR WRONG $TESTN
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 747

```

1278

```

:*****
:TEST 74      TEST FOR PROPER PC ON STACK
:*****

```

```

012146 005237 000304      TST74: INC    @$TESTN ;UPDATE TEST NUMBER
012152 022737 000074 000304  CMP    #74,@$TESTN ;SEQUENCE ERROR?
012160 001016                      BNE    TST75-12    ;BR TO ERROR HALT ON SEQ ERROR
1279 012162 012706 000500      MOV    #BUFF,SP
1280 012166 012767 012206 165620  MOV    #RETCT,RTRAP4
1281 012174 012746 000020      MOV    #20,-(SP) ;PUSH T BIT
1282 012200 012746 012206      MOV    #.+6,-(SP) ;PUSH PC
1283 012204 000002                      RTI                ;SET T BIT
1284                                     ;TRAP HERE

```

1285

```

1285 012206 022767 012206 166260  RETCT: CMP    #.BUFF-4
1286 012214 001405                      BEQ    TST75
012216 012737 000255 000302      MOV    #255,@$FATAL ;MOVE TO MAILBOX # ***** 255 *****
012224 005212                      INC    (R2)          ;SET MSGTYP TO FATAL ERROR
012226 000000                      HALT                ;CORRECT PC WAS NOT SAVED ON STACK,OR WRONG $TESTN
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 754

```

1287

1288

1289

```

:*****
:TEST 75      TEST THAT RTT POPS T- BIT
:*****

```

```

012230 005237 000304      TST75: INC    @$TESTN ;UPDATE TEST NUMBER
012234 022737 000075 000304  CMP    #75,@$TESTN ;SEQUENCE ERROR?
012242 001015                      BNE    TST76-12    ;BR TO ERROR HALT ON SEQ ERROR
1290                                     ;
1291 012244 012706 000500      MOV    #BUFF,SP
1292 012250 005001                      CLR    R1           ;CLEAR R1
1293 012252 012746 000020      MOV    #20,-(SP)
1294 012256 012746 012272      MOV    #RTT1,-(SP)
1295 012262 012767 012310 165524  MOV    #RTT2,14
1296 012270 000006                      RTT
1297 012272 000240      RTT1: NOP
1298 012274 001405                      BEQ    TST76
012276 012737 000256 000302      MOV    #256,@$FATAL ;MOVE TO MAILBOX # ***** 256 *****
012304 005212                      INC    (R2)          ;SET MSGTYP TO FATAL ERROR
012306 000000                      HALT                ;T-BIT DID NOT TRAP,OR WRONG $TESTN
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 755

```

1299

1300 012310

1301

```

RTT2:
:*****
:TEST 76      TEST THAT RTT ALLOWS ONE IN.T. BEFORE TRAP
:*****

```

```

012310 005237 000304      TST76: INC    @$TESTN ;UPDATE TEST NUMBER
012314 022737 000076 000304  CMP    #76,@$TESTN ;SEQUENCE ERROR?
012322 001031                      BNE    TST77-12    ;BR TO ERROR HALT ON SEQ ERROR
1302 012324 012705 177777      MOV    #177777,%5
1303 012330 012706 000500      RTT5: MOV    #BUFF,SP
1304 012334 012746 000020      MOV    #20,-(SP)

```



```

1305 012340 012746 012356      MOV    #RTT3,-(SP)
1306 012344 012767 012376 165442  MOV    #RTT4,14
1307 012352 005001             CLR    R1                ;CLEAR RC
1308 012354 000006             RTT                    ;SET T-BIT
1309 012356 005201             RTT3: INC    R1
1310 012360 005205             INC    %5
1311 012362 001762             BEQ    RTT5              ;DO THIS TEST NO MORE THAN 2 TIMES
1312 012364 012737 000257 000302  MOV    #257,@%SFATAL    ;MOVE TO MAILBOX # ***** 257 *****
                                INC    (R2)                    ;SET MSGTYP TO FATAL ERROR
                                HALT                          ;DID NOT TRAP
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 752
                                ;SEE IF RTT ALLOWS 1 INST.

```

```

1313 012376 005301             RTT4: DEC    R1
1314 012400 001407             BEQ    RTT6
1315 012402 005205             INC    %5                ;DO THIS TEST NO MORE THAN TWO TIMES
1316 012404 001751             BEQ    RTT5
                                MOV    #260,@%SFATAL    ;MOVE TO MAILBOX # ***** 260 *****
                                INC    (R2)                    ;SET MSGTYP TO FATAL ERROR
                                HALT                          ;RTT DID NOT ALLOW 1 INST.,OR WRONG $TESTN
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 741

```

```

1317 012420             RTT6:
1318                                     ;*****
                                     ;TEST 77      TEST THAT RTI DOES NOT ALLOW 1 INST.
                                     ;*****

```

```

                                TST77: INC    @%$TESTN      ;UPDATE TEST NUMBER
                                (MP    #77,@%$TESTN    ;SEQUENCE ERROR?
                                BNE    TST100-12      ;BR TO ERROR HALT ON SEQ ERROR
1319 012434 012706 000500             MOV    #BUFF,SP
1320 012440 012746 000020             MOV    #20,-(SP)
1321 012444 012746 012462             MOV    #RTI1,-(SP)
1322 012450 012767 012476 165336     MOV    #RTI2,14
1323 012456 005001             CLR    R1
1324 012460 000002             RTI                    ;SET T-BIT
1325 012462 005201             RTI1: INC    R1          ;RTI SHOULD NOT ALLOW THIS
1326 012464 012737 000261 000302     MOV    #261,@%SFATAL    ;MOVE TO MAILBOX # ***** 261 *****
                                INC    (R2)                    ;SET MSGTYP TO FATAL ERROR
                                HALT                          ;T- BIT DID NOT CAUSE TRAP
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 756

```

```

1327 012476 005701             RTI2: TST    R1
1328                                     ;RTI SHOULD NOT ALLOW 1 INST. BEFORE TRAP
1329 012500 001405             BEQ    TST100
                                MOV    #262,@%SFATAL    ;MOVE TO MAILBOX # ***** 262 *****
                                INC    (R2)                    ;SET MSGTYP TO FATAL ERROR
                                HALT                          ;RTI DID ALLOW 1 INST. BEFORE TRAP,OR WRONG $TESTN
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 747

```

```

1330                                     ;*****
1331                                     ;TEST 100     DOES THE PROCESSOR TRAP WHEN %7 IS ODD?
                                     ;*****

```

```

                                TST100: INC    @%$TESTN      ;UPDATE TEST NUMBER
                                (MP    #100,@%$TESTN    ;SEQUENCE ERROR?
                                BNE    TST101-12      ;BR TO ERROR HALT ON SEQ ERROR
1332 012514 005237 000304             MOV    #BUFF,%6
                                MOV    #R7TR1,4          ;SET UP STACK POINTER
1333 012534 012767 012560 165242     MOV    #R7TR1,4          ;RETURN FROM TRAP

```

```

1334 012542 012707 000001          MOV      #1,%7          ;PC EQUALS ONE
1335 012546 012737 000263 000302  MOV      #263,@%$FATAL ;MOVE TO MAILBOX # ***** 263 *****
      012554 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
      012556 000000          HALT                    ;ODD ADDRESS SHOULD HAVE TRAPPED
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 763

1336 012560 022767 000001 165706 R7TR1:  CMP      #1,BUFF-4
1337 012566 001405          BEQ
      012570 012737 000264 000302  MOV      #264,@%$FATAL ;MOVE TO MAILBOX # ***** 264 *****
      012576 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
      012600 000000          HALT                    ;CORRECT PC WAS NOT SAVED ON STACK
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 752

1338
1339 012602 012706 000500          1$:     MOV      #BUFF,%6      ;STACK POINTER
1340 012606 012767 012630 165170  MOV      #R7TR2,4
1341 012614 005207          INC
1342 012616          R7TR2A: MOV      #265,@%$FATAL ;MOVE TO MAILBOX # ***** 265 *****
      012616 012737 000265 000302  INC      (R2)          ;SET MSGTYP TO FATAL ERROR
      012624 005212          HALT                    ;
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 737

1343 012630 022767 012617 165636 R7TR2:  CMP      #R7TR2A+1,BUFF-4
1344 012636 001405          BEQ
      012640 012737 000266 000302  MOV      #266,@%$FATAL ;MOVE TO MAILBOX # ***** 266 *****
      012646 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
      012650 000000          HALT                    ;CORRECT PC NOT ON STACK
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 726

1345 012652 012706 000500          1$:     MOV      #BUFF,%6
1346 012656 012767 012700 165120  MOV      #R7TR3,4
1347 012664 005307          BR60:   DEC      %7          ;MAKE PC ODD
1348 012666 012737 000267 000302  MOV      #267,@%$FATAL ;MOVE TO MAILBOX # ***** 267 *****
      012674 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
      012676 000000          HALT                    ;SHOULD TRAP
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 713

1349 012700 022767 012665 165566 R7TR3:  CMP      #BR60+1,BUFF-4
1350 012706 001405          BEQ
      012710 012737 000270 000302  MOV      #270,@%$FATAL ;MOVE TO MAILBOX # ***** 270 *****
      012716 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
      012720 000000          HALT                    ;WRONG VALUE ON STACK
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 702

1351
1352 012722 012706 000500          1$:     MOV      #BUFF,%6
1353 012726 012767 012752 165050  MOV      #R7TR4,4
1354 012734 000261          SEC
1355 012736 006107          ROL      %7          ;CARRY EQUALS A 1
1356 012740          TR4A:   ROL      %7          ;PC BECOMES ODD
      012740 012737 000271 000302  MOV      #271,@%$FATAL ;MOVE TO MAILBOX # ***** 271 *****
      012746 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
      012750 000000          HALT                    ;ODD ADDRESS DIDN'T TRAP
                                ; TO SCOPE REPLACE HALT W/ 240
                                ; AND REPLACE NEXT INST W/ 666

1357 012752 012767 000006 165024 R7TR4:  MOV      #6,4          ;RESET UP A HALT FOR TRAP

```

```

1358 012760 022767 025701 165506      CMP      #<2*TR4A+1>,BUFF-4 ;CHECK FOR VALUE ON STACK
1359 012766 001405      BEQ      TST101
      012770 012737 000272 000302      MOV      #272,@$FATAL ;MOVE TO MAILBOX # ***** 272 *****
      012776 005212      INC      (R2) ;SET MSGTYP TO FATAL ERROR
      013000 000000      HALT    ;WRONG VALUF ON STACK,OR WRONG $TSTNM
      ; TO SCOPE REPLACE HALT W/ 240
      ; AND REPLACE NEXT INST W/ 652

```

```

1360 :*****
      :TEST 101      TEST THAT TRACE BIT TRAPS INHIB ON TRAP INST
      :*****

```

```

      013002 005237 000304      TST101: INC    @$TSTN ;UPDATE TEST NUMBER
      013006 022737 000101 000304      CMP      #101,@$TSTN ;SEQUENCE ERROR?
      013014 001027      BNE     BR70 ;BR TO ERROR HALT ON SEQ ERROR

```

```

1361
1362 013016 012706 000500      MOV      #BUFF,%6
1363 013022 012767 013062 164764      MOV      #TRACE,14 ;TRACE TRAP
1364 013030 005027 000016      CLR      #16
1365 013034 005027 000022      CLR      #22
1366 013040 012767 013106 164752      MOV      #TONT1,20 ;IOT TRAP
1367 013046 012746 000020      MOV      #20,-(SP) ;PUSH T BIT
1368 013052 012746 013060      MOV      #.+6,-(SP) ;PUSH PC

```

```

1369 013056 000006      RTT
1370 013060 000004      IOT ;TRAP, NEW CC HAVE TRACE RESET

```

```

1371 013062      TRACE:
      013062 012737 000273 000302      MOV      #273,@$FATAL ;MOVE TO MAILBOX # ***** 273 *****
      013070 005212      INC      (R2) ;SET MSGTYP TO FATAL ERROR
      013072 000000      HALT    ;TRACE TRAP WAS NOT INHIBITED
      ; TO SCOPE REPLACE HALT W/ 240
      ; AND REPLACE NEXT INST W/ 750

```

```

1372 013074      BR70:
      013074 012737 000274 000302      MOV      #274,@$FATAL ;MOVE TO MAILBOX # ***** 274 *****
      013102 005212      INC      (R2) ;SET MSGTYP TO FATAL ERROR
      013104 000000      HALT    ;WRONG TSTNM,OR WRONG $TSTNM
      ; TO SCOPE REPLACE HALT W/ 240
      ; AND REPLACE NEXT INST W/ 743

```

```

1373 013106 012767 000016 164700      TONT1: MOV      #16,14
1374 013114 012767 000022 164676      MOV      #22,20
1375

```

```

      :*****
      :TEST 102      TEST THAT THE TRACE BIT IS SAVED IN THE STACK
      :*****

```

```

      013122 005237 000304      TST102: INC    @$TSTN ;UPDATE TEST NUMBER
      013126 022737 000102 000304      CMP      #102,@$TSTN ;SEQUENCE ERROR?
      013134 001020      BNE     STP3 ;BR TO ERROR HALT ON SEQ ERROR

```

```

1376 013136 012706 000500      MOV      #BUFF,%6 ;SET UP STACK POINTER
1377 013142 012767 013166 164644      MOV      #TRC1,14 ;TRACE TRAP RETURN
1378 013150 005067 164642      CLR      16
1379 013154 012746 000020      MOV      #20,-(SP) ;SET THE T BIT
1380 013160 012746 013166      MOV      #TRC1,-(SP)

```

```

1381 013164 000002      RTI
1382 013166 036727 165304 000020      TRC1: BIT      BUFF-2,#20 ;CHECK FOR T BIT ON STACK
1383 013174 001005      BNE     STP3

```

```

      013176 012737 000275 000302      STP3: MOV      #275,@$FATAL ;MOVE TO MAILBOX # ***** 275 *****
      013204 005212      INC      (R2) ;SET MSGTYP TO FATAL ERROR
      013206 000000      HALT    ;T BIT NOT SAVED ON THE STACK,OR WRONG $TSTNM
      ; TO SCOPE REPLACE HALT W/ 240
      ; AND REPLACE NEXT INST W/ 752

```

1384 013210 012767 000016 164576 STP3D: MOV #16,14
1385
1386
1387
1388
1389

;THIS ROUTINE TEST THAT NO LEGAL ADDRESS TRAPS.
;AND THAT AN ILLEGAL ADDRESS TRAPS TO LOCATION 4
;*****
;TEST 103 TEST NON-EXISTENT ADDRESS TRAPS
;*****

013216 005237 000304
013222 022737 000103 000304
013230 001160

TST103: INC @RSTESTN ;UPDATE TEST NUMBER
CMP #103,@RSTESTN ;SEQUENCE ERROR?
BNE AUTO1 ;BR TO ERROR HALT ON SEQ ERROR

1390
1391

;THIS ROUTINE TESTS MEMORY UNTIL IT DOES A NXM TRAP

1392 013232 000402
1393 013234 000000
1394 013236 000000
1395 013240 005000
1396 013242 005037 177766
1397 013246 005067 164534
1398 013252 012767 013306 164524
1399 013260 012706 000500
1400 013264 105720
1401 013266 020027 160000
1402 013272 101772
1403 013274
013274 012737 000276 000302
013302 005212
013304 000000

BR ADALL
TSL: 0
CORH: 0
ADALL: CLR %0
CLR @RCPUERR ;CLEAR CPU ERROR REGISTER
CLR 6
MOV #ATRAP,4 ;SET UP ADDRESS TRAP ENTRANCE
NOR: MOV #BUFF,SP
TSTB (0)+ ;IF OUTSIDE OF CORE, TRAP TO 4
CMP %0,#160000 ;IS POINTER IN SIDE CORE
BLOS NOR ;TEST THE REST OF CORE
AUTO: MOV #276,@R\$FATAL ;MOVE TO MAILBOX # ***** 276 *****
INC (R2) ;SET MSGTYP TO FATAL ERROR
HALT ;SHOULD HAVE TRAPED
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 751

1404

;RETURN HERE ON AN ADDRESS TRAP

1405 013306 010067 177724
1406 013312 013767 177766 165162
1407 013320 042767 177413 165154
1408 013326 020027 160000
1409
1410
1411 013332 103012
1412 013334 022767 000040 165140
1413 013342 001417
013344 012737 000277 000302
013352 005212
013354 000000

ATRAP: MOV R0,CORH ;MOVE THE FIRST NXM LOCATION IN CORH
MOV @RCPUERR,RCPUER ;SAVE CPU ERROR REGISTER
BIC #CERMSK,RCPUER ;MASK OFF UNUSED ERROR REG BITS
CMP %0,#160000 ;WHICH CPU ERROR REG BIT SHOULD BE
; SET - NON EXISTANT MEMORY (BIT 5)
; OR UNIBUS TIMEOUT (BIT 4)
BHS 1\$;BRANCH IF UNIBUS TIMEOUT BIT SHOULD BE SET
CMP #40,RCPUER ;IS NON-EXISTANT MEMORY BIT SET?
BEQ 2\$
MOV #277,@R\$FATAL ;MOVE TO MAILBOX # ***** 277 *****
INC (R2) ;SET MSGTYP TO FATAL ERROR
HALT ;INCORRECT CPU ERROR REG CONTENTS
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 725

1414 013356 000411
1415 013360 022767 000020 165114 1\$:
1416 013366 001405
013370 012737 000300 000302
013376 005212
013400 000000

BR 2\$
CMP #20,RCPUER ;IS UNIBUS TIMEOUT BIT SET?
BEQ 2\$
MOV #300,@R\$FATAL ;MOVE TO MAILBOX # ***** 300 *****
INC (R2) ;SET MSGTYP TO FATAL ERROR
HALT ;INCORRECT CPU ERROR REG CONTENTS
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 713

1417

;THIS ROUTINE DOES NXM TRAPS UNTIL IT FINDS AN EXISTANT MEMORY LOCATION

1418 013402 012700 160001
1419 013406 005037 177766
1420 013412 012767 013452 164364

2\$: MOV #160001,R0 ;SET UP THE HIGHEST MEM LOCATION
CTRAP: CLR @RCPUERR ;CLEAR CPU ERROR REGISTER
MOV #BTRAP,4 ;SET UP THE VECTOR

```

1421 013420 012706 000500      MOV      #BUFF,SP
1422 013424 105740              TSTB    -(R0)      ;DOES IT EXIST?
1423 013426 005200              DTRAP:  INC    R0      ;IF YES INCREMENT IT
1424 013430 020067 177602      CMP     R0,CORH    ;IS IT THE SAME LOCATION?
1425 013434 001463              BEQ     TRAPB
      013436 012737 000301 000302  MOV     #301,@#FATAL ;MOVE TO MAILBOX # ***** 301 *****
      013444 005212              INC     (R2)      ;SET MSGTYP TO FATAL ERROR
      013446 000000              HALT            ;CONTENTS OF R0 AND CORH SHOULD HAVE BEEN EQUAL
                                   ; TO SCOPE REPLACE HALT W/ 240
                                   ; AND REPLACE NEXT INST W/ 670
1426                                ;IF THIS COMPARISON FAILS IT MEANS
1427                                ;THAT SOME LEGAL ADDRESS TRAPPED OR
1428                                ;THAT AN ILLEGAL ADDRESS DID NOT TRAP
1429 013450 000455              BR     TRAPB
1430
1431 013452 005767 164320      BTRAP:  TST  STATUS
1432 013455 001405              BEQ     3$
      013460 012737 000302 000302  MOV     #302,@#FATAL ;MOVE TO MAILBOX # ***** 302 *****
      013466 005212              INC     (R2)      ;SET MSGTYP TO FATAL ERROR
      013470 000000              HALT            ;NEW PSW SHOULD HAVE BEEN ZERO
                                   ; TO SCOPE REPLACE HALT W/ 240
                                   ; AND REPLACE NEXT INST W/ 657
1433
1434 013472 013767 177766 165002 3$:  MOV     @#CPUERR,RCPUER ;SAVE CPU ERROR REGISTER
1435 013500 042767 177413 164774  BIC     #CERMSK,RCPUER ;MASK OFF UNUSED ERROR REG BITS
1436 013506 020027 160000      CMP     %0,#160000 ;WHICH CPU ERROR REG BIT SHOULD BE
1437                                ; SET - NON EXISTANT MEMORY (BIT 5)
1438                                ; OR UNIBUS TIMEOUT (BIT 4)
1439 013512 103012              BHIS    1$      ;BRANCH IF UNIBUS TIMEOUT BIT SHOULD BE SET
1440 013514 022767 000040 164760  CMP     #40,RCPUER ;IS NON-EXISTANT MEMORY BIT SET?
1441 013522 001417              BEQ     2$
      013524 012737 000303 000302  MOV     #303,@#FATAL ;MOVE TO MAILBOX # ***** 303 *****
      013532 005212              INC     (R2)      ;SET MSGTYP TO FATAL ERROR
      013534 000000              HALT            ;INCORRECT CPU ERROR REG CONTENTS
                                   ; TO SCOPE REPLACE HALT W/ 240
                                   ; AND REPLACE NEXT INST W/ 635
1442 013536 000411              BR     2$
1443 013540 022767 000020 164734 1$:  CMP     #20,RCPUER ;IS UNIBUS TIMEOUT BIT SET?
1444 013546 001405              BEQ     2$
      013550 012737 000304 000302  MOV     #304,@#FATAL ;MOVE TO MAILBOX # ***** 304 *****
      013556 005212              INC     (R2)      ;SET MSGTYP TO FATAL ERROR
      013560 000000              HALT            ;INCORRECT CPU ERROR REG CONTENTS
                                   ; TO SCOPE REPLACE HALT W/ 240
                                   ; AND REPLACE NEXT INST W/ 623
1445 013562 026727 164706 013426 2$:  CMP     BUFF-4,#DTRAP
1446 013570 001706              BEQ     CTRAP
      013572                                ;
      013572 012737 000305 000302  AUTO1:  MOV     #305,@#FATAL ;MOVE TO MAILBOX # ***** 305 *****
      013600 005212              INC     (R2)      ;SET MSGTYP TO FATAL ERROR
      013602 000000              HALT            ;OLD PC WAS NOT SAVED OR WRONG $TESTN
                                   ; TO SCOPE REPLACE HALT W/ 240
                                   ; AND REPLACE NEXT INST W/ 612
1447 013604 012767 000006 164172  TRAPB:  MOV     #6,4
1448 013612 005067 164170      CLR     6
1449                                ;THIS ROUTINE WILL FIGURE OUT IF YOU HAVE A DL11W
1450
1451 013616 005067 000020      CLR     PROFTE

```

.MAIN. MACRO M1111 27-SEP-79 16:56 PAGE 70-10
 T103 TEST NON-EXISTENT ADDRESS TRAPS

SEG 0053

```

1452 013622 012706 000500          MOV    #BUFF,SP      ;SET UP THE STACK POINTER
1453 013626 012767 013644 164150    MOV    #DL11W,4      ;SET UP THE TRAP VECTOR
1454 013634 005767 163724          TST    TPS           ;TEST THE PUNCH STATUS REGISTER
1455 013640 000403                    BR     DL11W1        ;BRANCH IF IT EXISTS
1456 013642 000000          PROFTE: 000000
1457 013644 005267 177772          DL11W: INC    PROFTE ;INCREMENT IF NO DL11W
1458 013650 012767 000006 164126    DL11W1: MOV   #6,4
1459
1460
;*****
;TEST 104      TEST THAT A TTY INRUP CAUSES AN OVERFLOW TRAP
;*****
          013656 005237 000304          TST104: INC    @#STESTN ;UPDATE TEST NUMBER
          013662 022737 000104 000304    CMP    #104,@#STESTN ;SEQUENCE ERROR?
          013670 001031                    BNE    TDEC8        ;BR TO ERROR HALT ON SEQ ERROR
1461 013672 005767 177744          TST    PROFTE
1462 013676 001042                    BNE    R7TRX
1463 013700 000005          RESET
1464 013702 012767 000340 164066    MOV    #340,STATUS ;LOCK OUT INTERRUPT
1465 013710 012706 000400          MOV    #400,%6      ;SET UP STACK TO OVERFLOW
1466 013714 012767 013766 164062    MOV    #TDEC77,4    ;SET UP OVERFLOW TRAP
1467 013722 012767 013754 164134    MOV    #TDEC8,64    ;SET UP INTERRUPT VECTOR
1468 013730 012767 000100 163626    MOV    #100,TTCSR   ;SET INTERRUPT ENABLE
1469 013736 005067 164034          CLR    STATUS       ;ALLOW INTERRUPT TO OCCUR
1470 013742 012737 000306 000302    MOV    #306,@#SFATAL ;MOVE TO MAILBOX # ***** 306 *****
          013750 005212          INC    (R2)         ;SET MSGTYP TO FATAL ERROR
          013752 000000          HALT                ;NO INTERRUPT OCCURRED
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 746

1471 013754                    TDEC8:
          013754 012737 000307 000302    MOV    #307,@#SFATAL ;MOVE TO MAILBOX # ***** 307 *****
          013762 005212          INC    (R2)         ;SET MSGTYP TO FATAL ERROR
          013764 000000          HALT                ;OVERFLOW TRAP DID NOT OCCUR OR WRONG $STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 741

1472 013766 005067 163572          TDEC77: CLR    TTCSR ;CLEAR INTERRUPT ENABLE
1473 013772 012767 000006 164004    MOV    #6,4
1474 014000 005067 164002          CLR    6
1475 014004          R7TRX:
1476
;*****
;TEST 105      TEST THAT A TRAP OCCURS BEFORE INRUP
;*****
          014004 005237 000304          TST105: INC    @#STESTN ;UPDATE TEST NUMBER
          014010 022737 000105 000304    CMP    #105,@#STESTN ;SEQUENCE ERROR?
          014016 001031                    BNE    TR2         ;BR TO ERROR HALT ON SEQ ERROR
1477 014020 005767 177616          TST    PROFTE
1478 014024 001046                    BNE    NDDL
1479 014026 012706 000500          MOV    #BUFF,%6    ;SET TO A HIGH PRIORITY LEVEL
1480 014032 012767 000340 163736    MOV    #340,STATUS
1481 014040 012767 014104 164016    MOV    #TR0,64
1482 014046 012767 000100 163510    MOV    #100,TTCSR   ;INTERRUPT FOR TTY PUNCH/PRINTER
1483 014054 012767 014130 163752    MOV    #BR71,34    ;TRAP VECTOR
1484 014062 012767 014116 163774    MOV    #TR2,64     ;TTY VECTOR
1485 014070 012767 000340 163740    MOV    #340,36     ;IF TRAP TRAPS, MOVE 340 TO PRIORITY
1486 014076 005067 163674          CLR    STATUS       ;SHOULD INTERRUPT AT END OF CLR INST
1487 014102 104400          TRAP                ;TTY INTERRUPT SHOULD OVERRIDE TRAP
1488 014104                    TR0:
          014104 012737 000310 000302    MOV    #310,@#SFATAL ;MOVE TO MAILBOX # ***** 310 *****

```

```

014112 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR
014114 000000          HALT                    ;NEITHER TRAP NOR INRUPT OCCURED
                                           ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 740

1489 014116          TR2:  MOV      #311,@#SFATAL ;MOVE TO MAILBOX # ***** 311 *****
014116 012737 000311 000302      INC      (R2)          ;SET MSGTYP TO FATAL ERROR
014124 005212          HALT                    ;INRUPT OCCURRED FIRST,OR WRONG $STNM
014126 000000          ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXXT INST W/ 733

1490 014130 005067 163702      BR71:  CLR      36
1491 014134 042767 000100 163422      BIC      #100,TTCSR
1492 014142
1493

```

NODL:

;TEST 106 TEST THAT A PENDING INRUP, INRUP BETWEEN TRAPS

```

014142 005237 000304          TST106: INC      @#STESTN ;UPDATE TEST NUMBER
014146 022737 000106 000304      CMP      #106,@#STESTN ;SEQUENCE ERROR?
014154 001031          BNE      TR5          ;BR TO ERROR HALT ON SEQ ERROR

1494 014156 005767 177460          TST      PROFTE
1495 014162 001046          BNE      NODL1
1496 014164 012706 000500          MOV      #BUFF,%6
1497 014170 012767 000340 163600      MOV      #340,STATUS
1498 014176 012767 000100 163360      MOV      #100,TTCSR
1499 014204 012767 014236 163622      MOV      #TR3,34          ;TRAP
1500 014212 012767 014252 163644      MOV      #TR4,64          ;TTY OUTPUT
1501 014220 012767 014240 163572      MOV      #TR5,20          ;IOT
1502 014226 012767 000340 163566      MOV      #340,22          ;IOT PRIORITY
1503 014234 104400          TRAP                    ;THE ACT OF TRAPPING LOWER PRIORITY
1504 014236 000004          TR3:  IOT              ;INTERRUPT SHOULD OCCUR IN PLACE OF IOT TRAP
1505 014240          TR5:  MOV      #312,@#SFATAL ;MOVE TO MAILBOX # ***** 312 *****
014240 012737 000312 000302      INC      (R2)          ;SET MSGTYP TO FATAL ERROR
014246 005212          HALT                    ;NO INTERRUPT BETWEEN TRAPS,OR WRONG $STNM
014250 000000          ; TO SCOPE REPLACE HALT W/ 240
                                           ; AND REPLACE NEXT INST W/ 741
                                           ; CLR IOT PRIORITY

1506 014252 005067 163544          TR4:  CLR      22
1507 014256 012767 000036 163550      MOV      #36,34
1508 014264 012767 000066 163572      MOV      #66,64
1509 014272 012767 000022 163520      MOV      #22,20
1510 014300          NODL1:
1511
1512

```

;TEST 107 TEST THAT 'RESET' GOES TO OUTSIDE WORLD

```

014300 005237 000304          TST107: INC      @#STESTN ;UPDATE TEST NUMBER
014304 022737 000107 000304      CMP      #107,@#STESTN ;SEQUENCE ERROR?
014312 001027          BNE      TST110-12 ;BR TO ERROR HALT ON SEQ ERROR

1513 014314 005767 177322          TST      PROFTE
1514 014320 001031          BNE      NODL2
1515 014322 012767 000100 163234      MOV      #100,TTCSR ;SET INTERRUPT ENABLE
1516 014330 012767 000100 163222      MOV      #100,TRCSR ;SET INTERRUPT ENABLE
1517 014336 000005          RESET ;SHOULD CLEAR INTERRUPT ENABLE
1518 014340 032767 000100 163216      BIT      #100,TTCSR ;TEST FOR CLEAR
1519 014346 001405          BEQ      1$
014350 012737 000313 000302      MOV      #313,@#SFATAL ;MOVE TO MAILBOX # ***** 313 *****
014356 005212          INC      (R2)          ;SET MSGTYP TO FATAL ERROR

```

```

014360 000000          HALT          ;RESET FAILED TO CLEAR TTCR
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 754
;TEST FOR CLEAR
1520 014362 032767 000100 163170 1$: BIT #100,TTCR
1521 014370 001405      BEQ TST110
014372 012737 000314 000302      MOV #314,@$FATAL ;MOVE TO MAILBOX # ***** 314 *****
014400 005212          INC (R2) ;SET MSGTYP TO FATAL ERROR
014402 000000          HALT ;RESET FAILED TO CLEAR TTCR,OR WRONG $STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 743

```

```

1522 014404          NODL2:
1523 ;*****
;TEST 110 TEST THAT RESET HAS NO EFFECT ON TRACE TRAP
;*****

```

```

014404 005237 000304          TST110: INC @$TESTN ;UPDATE TEST NUMBER
014410 022737 000110 000304      CMP #110,@$TESTN ;SEQUENCE ERROR?
014416 001014          BNE RESET3 ;BR TO ERROR HALT ON SEQ ERROR
1524 014420 012706 000500      MOV #BUFF,%6 ;SET STACK
1525 014424 012767 014462 163362      MOV #RESET2,14 ;SET UP TRACE VECTOR
1526 014432 012746 000020      MOV #20,-(R6) ;SET THE T-BIT ON STACK
1527 014436 012746 014444      MOV #1$,-(R6) ;MOVE NEW PC ON STACK
1528 014442 000006          RTT
1529 014444 000005          1$: RESET ;SHOULD HAVE NO EFFECT
1530 014446 000005          RESET ;NO EFFECT

```

```

1531 014450          RESET3:
014450 012737 000315 000302      MOV #315,@$FATAL ;MOVE TO MAILBOX # ***** 315 *****
014456 005212          INC (R2) ;SET MSGTYP TO FATAL ERROR
014460 000000          HALT ;TRACE TRAP FAILED,OR WRONG $STNM
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 756

```

```

1532 014462 005067 163310      RESET2: CLR STATUS ;CLEAR TRACK
1533 014466 005067 163324      CLR 16 ;TRACE STATUS
1534 014472 012767 000016 163314      MOV #16,14
1535
1536

```

```

;*****
;TEST 111 TEST THAT WHEN TTY INRUPTS IT POPS NEW STATUS
;*****

```

```

014500 005237 000304          TST111: INC @$TESTN ;UPDATE TEST NUMBER
014504 022737 000111 000304      CMP #111,@$TESTN ;SEQUENCE ERROR?
014512 001051          BNE TTY11 ;BR TO ERROR HALT ON SEQ ERROR
1537 014514 005767 177122      TST PROFTE
1538 014520 001055          BNE NODL3
1539 014522 000005          RESET
1540 014524 012706 000500      MOV #BUFF,%6 ;SET UP STACK
1541 014530 012767 014554 163326      MOV #TTY3,64 ;INTERRUPT VECTOR
1542 014536 005067 163234      CLR STATUS ;DROP PROCESSOR PRIORITY
1543 014542 012767 000357 163316      MOV #357,66 ;HIGH PRIORITY ON INTERRUPT
1544 014550 005167 163010      COM TTCR ;SHOULD SET INTERRUPT ENABLE & INTERRUPT
1545 014554 026727 163216 000357 TTY3: CMP STATUS,#357
1546 014562 001405          BEQ 1$

```

```

014564 012737 000316 000302      MOV #316,@$FATAL ;MOVE TO MAILBOX # ***** 316 *****
014572 005212          INC (R2) ;SET MSGTYP TO FATAL ERROR
014574 000000          HALT ;INTERRUPT DID NOT POP CORRECT STATUS
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 746
1547 014576 000005          1$: RESEI ;CLR INTERRUPT ENABLE
1548 014600 012706 000500      MOV #BUFF,%6 ;STACK SET UP

```



```

1549 014604 012767 014630 163252      MOV    #TTY4,64      ;INTERRUPT VECTOR
1550 014612 005067 163250      CLR    66            ;CLR NEW STATUS
1551 014616 012767 000157 163152      MOV    #157,STATUS  ;PROCESSOR STATUS
1552 014624 005167 162734      COM    TTCSR         ;SET INTERRUPT ENABLE
1553 014630 005767 163142      TTY4:  TST    STATUS
1554 014634 001405      BEQ    TTT37
      014636      TTY11:
      014636 012737 000317 000302      MOV    #317,@#SFATAL ;MOVE TO MAILBOX # ***** 317 *****
      014644 005212      INC    (R2)          ;SET MSGTYP TO FATAL ERROR
      014646 000000      HALT                ;INCORRECT STATUS,OR WRONG $TSTNM
                        ; TO SCOPE REPLACE HALT W/ 240
                        ; AND REPLACE NEXT INST W/ 721

```

```

1555 014650 005067 162710      TTT37: CLR    TTCSR
1556 014654      NODL3:
1557
1558

```

```

:*****
:TEST 112      TEST THE 'WAIT' INSTRUCTION
:*****

```

```

      014654 005237 000304      TST112: INC    @#STESTN ;UPDATE TEST NUMBER
      014660 022737 000112 000304      CMP    #112,@#STESTN ;SEQUENCE ERROR?
      014666 001060      BNE    WATE5         ;BR TO ERROR HALT ON SEQ ERROR
1559 014670 005767 176746      TST    PROFTE
1560 014674 001064      BNE    NODL4
1561 014676 042767 000100 162660      BIC    #100,TPS      ;CLEAR INTERRUPT ENABLE
1562 014704 012706 000500      MOV    #BUFF,SP     ;SET UP THE STACK
1563 014710 012767 015000 163146      MOV    #WATE,64     ;SET UP THE INTERRUPT VECTOR
1564 014716 005067 163144      CLR    66
1565 014722 105767 162636      WATE1: TSTB    TPS   ;WAIT FOR READY
      014726 100375      BPL    WATE1        ;TO BE UP
1567 014730 012767 000015 162630      MOV    #15,TPB      ;DO A CARRIAGE RETURN
1568 014736 105767 162622      WATE2: TSTB    TPS   ;WAIT FOR READY TO COME UP
      014742 100375      BPL    WATE2
1570 014744 012767 000015 162614      MOV    #15,TPB      ;DO ANOTHER CARRIAGE RETURN
1571 014752 052767 000100 162604      BIS    #100,TPS     ;SET THE INTERRUPT ENABLE
1572 014760 005067 163012      CLR    STATUS       ;CLEAR THE PSW
1573 014764 000001      WATE3: WAIT                ;WAIT FOR THE INTERRUPT
1574 014766 012737 000320 000302      MOV    #320,@#SFATAL ;MOVE TO MAILBOX # ***** 320 *****
      014774 005212      INC    (R2)          ;SET MSGTYP TO FATAL ERROR
      014776 000000      HALT                ;WAIT INSTRUCTION DID NOT LOOP
                        ; TO SCOPE REPLACE HALT W/ 240
                        ; AND REPLACE NEXT INST W/ 733

```

```

1575 015000 005767 162772      WATE:  TST    STATUS ;IS THE PSW CORRECT?
1576 015004 001405      BEQ    1$
      015006 012737 000321 000302      MOV    #321,@#SFATAL ;MOVE TO MAILBOX # ***** 321 *****
      015014 005212      INC    (R2)          ;SET MSGTYP TO FATAL ERROR
      015016 000000      HALT                ;NEW PSW SHOULD HAVE BEEN ZERO
                        ; TO SCOPE REPLACE HALT W/ 240
                        ; AND REPLACE NEXT INST W/ 723

```

```

1577 015020 026727 163450 014766 1$:  CMP    BUFF-4,#WATE3+2 ;IS THE OLD PC SAVED
1578 015026 001405      BEQ    WATE4
      015030      WATE5:
      015030 012737 000322 000302      MOV    #322,@#SFATAL ;MOVE TO MAILBOX # ***** 322 *****
      015036 005212      INC    (R2)          ;SET MSGTYP TO FATAL ERROR
      015040 000000      HALT                ;OLD PC WAS NOT SAVED OR WRONG $TESTN
                        ; TO SCOPE REPLACE HALT W/ 240
                        ; AND REPLACE NEXT INST W/ 712

```

```

1579 015042 005067 162516      WATE4: CLR    TPS      ;CLEAR INTERRUPT ENABLE

```

1580 015046
 1581
 1582
 015046 005237 000304
 015052 022737 000113 000304
 015060 001140
 1583 015062 012737 015110 000244
 1584 015070 013767 000010 000042
 1585 015076 012737 015120 000010
 1586 015104 170007
 1587 015106 000415
 1588 015110
 1589 015110 013767 015512 000400
 1590 015116 000002
 1591 015120
 1592 015120 005737 000306
 1593 015124 001004
 1594 015126 012700 017335
 1595 015132 004767 002362
 1596 015136 000002
 1597 015140 000000
 1598 015142
 1599 015142 012737 015220 000004
 1600
 1601 015150 012737 015170 000010
 1602 015156 012700 160000
 1603 015162 076020
 1604 015164 000000
 1605 015166 000421
 1606 015170
 1607
 1608 015170 005737 000306
 1609 015174 001004
 1610 015176 012700 017400
 1611 015202 004767 002312
 1612 015206 012703 015406
 1613 015212 062716 000002
 1614 015216 000002
 1615 015220 012703 015436
 1616 015224 062716 000002
 1617 015230 000002
 1618 015232 012737 000246 000244
 1619 015240 016737 177674 000010
 1620 015246 012305
 1621 015250 012301
 1622 015252 020567 000240
 1623 015256 001525
 1624 015260 010567 000234
 1625 015264 005267 000230
 1626 015270 012767 015312 162512
 1627 015276 012706 000500
 1628 015302 005067 162470
 1629 015306 000167 000206
 1630
 1631

```

NODL4:
:*****
:TEST 113      TEST THAT ALL RESERVED INS TRAP
:*****
TST113: INC      @#STESTN      ;UPDATE TEST NUMBER
        CMP      #113,@#STESTN ;SEQUENCE ERROR?
        BNE     RET4          ;BR TO ERROR HALT ON SEQ ERROR
        MOV     #TRAP244,@#244 ; SET UP TO SEE IF
        MOV     @#10,TENSAVE   ; THIS PROCESSOR HAS THE
        MOV     #TRAP10,@#10   ; FLOATING POINT OPTION
        .WORD   170007        ; AN ILLEGAL FPP INSTRUCTION
        BR     TSFCIS

TRAP244: MOV     @#FPP,FINISH   ; IF FPP IN--
        RTI

TRAP10:  TST     @#SPASS        ;FIRST PASS??
        BNF     1$            ;BRANCH IF NO
        MOV     #MSGNFP,R0
        JSR     PC,PRMSG      ;PRINT MESSAGE POINTED TO BY R0
1$:      RTI                  ; RETURN
TENSAVE: .WORD   0            ; A PLACE TO STORE CONTENTS OF 10
TSFCIS:  MOV     #AROUND,@#4   ;SEE IF PROCESSOR HAS CIS OPTION
        ;SET TIME OUT TRAP VECTOR

        MOV     #TNCIS,@#10   ;SET UP RESERVE INST TRAP VECTOR
        MOV     #160000,R0    ;POINT R0 TO NON-EXISTED MEMORY LOC.
        .WORD   76020        ;CIS INST = L2DR (DESTROYS CONTENTS OF R0,R1,R2,R3)
        HALT                ;CIS INST FAILED TO TRAP
        BR     ADJNC

TNCIS:  ;NO CIS OPTION,EXPECTED TRAP EITHER TO 4 OR 10 DID NOT HAPPEN

        TST     @#SPASS        ;FIRST PASS
        BNE     1$
        MOV     #MSGNCIS,R0
        JSR     PC,PRMSG      ;PRINT MESSAGE POINTED TO BY R0
1$:      MOV     #TABLE1,TAB
        ADD#2,(SP)
        RTI

AROUND: MOV     #TABLE,TAB    ;CIS OPTION PRESENT
        ADD#2,(SP)
        RTI

ADJNC:  MOV     #246,@#244     ; RESTORE THE TRAP VECTOR
        MOV     TENSAVE,@#10  ; RESTORE THE ILLEGAL INST. VECTOR
GIN1:   MOV     (TAB)+,FIRST   ;FIRST OR CURRENT INSTRUCTION
        MOV     (TAB)+,LAST   ;LAST INSTRUCTION OR GROUP
        CMP     FIRST,FINISH  ;TESTED ALL
        BEQ     GIN3          ;YES BRANCH
        MOV     FIRST,INST    ;SET UP INST
GIN2:   INC     INST
        MOV     #RET,10       ;SET UP RETURN FROM TRAP
        MOV     #BUFF,SP      ;SET UP STACK POINTER
        CLR     CC            ;CLEAR PRIORITY
        JMP     INST          ;EXECUTE RESERVED INSTRUCTION

;TRAPPING SHOULD SEND YOU HERE

```

```

1632 015312 020627 000474      RET:  CMP      SP,#BUFF-4      ;TEST DECREMENT OF SP
1633 015316 001405              BEQ      RET1
1634 015320 012737 000323 000302  MOV      #323,#FATAL      ;MOVE TO MAILBOX # ***** 323 *****
      015326 005212              INC      (R2)              ;SET MSGTYP TO FATAL ERROR
      015330 000000              HALT     ;WRONG DECREMENT
      ; TO SCOPE REPLACE HALT W/ 240
      ; AND REPLACE NEXT INST W/ 653
      ; LOC OF INST UNINCREMENTED

1635 015332 026727 163136 015522  RET1:  CMP      BUFF-4,#INST+2
1636 015340 001405              BEQ      RET2
1637 015342 012737 000324 000302  MOV      #324,#FATAL      ;MOVE TO MAILBOX # ***** 324 *****
      015350 005212              INC      (R2)              ;SET MSGTYP TO FATAL ERROR
      015352 000000              HALT     ;INST INC ON TRAP
      ; TO SCOPE REPLACE HALT W/ 240
      ; AND REPLACE NEXT INST W/ 642

1638 015354 005767 163116      RET2:  TST      BUFF-2
1639 015360 001405              BEQ      RET3
      RET4:
      015362 012737 000325 000302  MOV      #325,#FATAL      ;MOVE TO MAILBOX # ***** 325 *****
      015370 005212              INC      (R2)              ;SET MSGTYP TO FATAL ERROR
      015372 000000              HALT     ;CONDITION CODES SET ON TRAP OR WRONG $TSTNM
      ; TO SCOPE REPLACE HALT W/ 240
      ; AND REPLACE NEXT INST W/ 632

1640 015374 026701 000120      RET3:  CMP      INST, LAST
1641 015400 001722              BEQ      GIN1              ;SET UP NEW GROUP
1642 015402 000167 177656      JMP      GIN2              ;FINISH OLD GROUP
1643
      TABLE1: 76017          ;CIS INSTRUCTIONS
      76032
      76037
      76045
      76047
      76077
      76117
      76132
      76137
      76145
      76147
      76177
      TABLE: 7
      77
      207          ;RTS,RT1,JMP
      227
      7077
      7777
      075037
      76017
      76032
      76037
      76045
      76047
      76132
      76137
      76145
      76147
      76077
      76117
      106377

```

1675 015504 106477
 1676 015506 106677
 1677 015510 107777
 1678 015512 167777
 1679 015514 177777
 1680 015516 015516
 1681 015520 000000
 1682 015522 000000
 1683 015524 000000
 1684 015526 000000
 1685 015530 000000
 1686
 1687 015532
 1688

FPP: 106477
 106677
 107777
 167777
 177777
 FINISH: .
 INST: HALT
 HALT
 HALT
 HALT

; START OF THE FPP INSTRUCTIONS
 ; END FLAG
 ; WILL CONTINUE RESERVED INST
 ; SHOULD TRAP TO LOC 10
 ; LOC 10 SHOULD SEND YOU TO
 ; RET

GIN3.

 ; TEST 114 TEST ILLEGAL HALT

015532 005237 000304
 015536 022737 000114 000304
 015544 001073
 1689 015546 012706 000500
 1690 015552 005037 177766
 1691 015556 012767 015612 162220
 1692 015564 052737 040000 177776
 1693 015572 000000
 1694
 1695 015574 105037 177777
 1696 015600 012737 000326 000302
 015606 005212
 015610 000000

TST114: INC @RSTESTN ; UPDATE TEST NUMBER
 CMP #114,@RSTESTN ; SEQUENCE ERROR?
 BNF CERIH ; BR TO ERROR HALT ON SEQ ERROR
 MOV #BUFF,SP ; STACK POINTER SETUP
 CLR @RCPUERR ; CLEAR CPU ERROR REGISTER
 MOV #1\$,RTRAPS ; SETUP TRAP RETURN
 BIS #040000,@RPSW ; GO TO SUPER MODE
 HALT ; EXECUTE INST UNDER TEST
 ; FAILURE, NO TRAP
 CLRB @RPSW+1 ; GO BACK TO KERNEL
 MOV #326,@R\$FATAL ; MOVE TO MAILBOX # ***** 326 *****
 INC (R2) ; SET MSGTYP TO FATAL ERROR
 HALT ; HALT IN SUPER MODE FAILED TO TRAP
 ; TO SCOPE REPLACE HALT W/ 240
 ; AND REPLACE NEXT INST W/ 755

1697 015612
 1698 015612 013767 177766 162562
 1699 015620 042767 177413 162554
 1700 015626 022767 000200 162646
 1701 015634 001405
 015636 012737 000327 000302
 015644 005212
 015646 000000

1\$: MOV @RCPUERR,RCPUER ; READ AND SAVE CPU ERROR REGISTER
 BIC #CERMSK,RCPUER ; MASK OFF UNUSED CPU ERR REG BITS
 CMP #200,RCPUER ; IS ILLEGAL HALT BIT SET?
 BEQ 2\$
 MOV #327,@R\$FATAL ; MOVE TO MAILBOX # ***** 327 *****
 INC (R2) ; SET MSGTYP TO FATAL ERROR
 HALT ; INCORRECT CPU ERR REG CONTENTS
 ; TO SCOPE REPLACE HALT W/ 240
 ; AND REPLACE NEXT INST W/ 736

1702 015650 005037 177766
 1703 015654 012767 015710 162122
 1704 015662 052737 140000 177776
 1705 015670 000000
 1706
 1707 015672 105037 177777
 1708 015676 012737 000330 000302
 015704 005212
 015706 000000

2\$: CLR @RCPUERR ; CLEAR CPU ERR REG
 MOV #3\$,RTRAPS ; SETUP TRAP RETURN
 BIS #140000,@RPSW ; GO TO USER MODE
 HALT
 ; FAILURE, NO TRAP
 CLRB @RPSW+1 ; GO BACK TO KERNEL
 MOV #330,@R\$FATAL ; MOVE TO MAILBOX # ***** 330 *****
 INC (R2) ; SET MSGTYP TO FATAL ERROR
 HALT ; HALT IN USER MODE FAILED TO TRAP
 ; TO SCOPE REPLACE HALT W/ 240
 ; AND REPLACE NEXT INST W/ 716

1709 015710
 1710 015710 013767 177766 162564
 1711 015716 042767 177413 162556
 1712 015724 022767 000200 162550
 *1713 015732 001405

3\$: MOV @RCPUERR,RCPUER ; SAVE CPU ERROR REGISTER
 BIC #CERMSK,RCPUER ; MASK OFF UNUSED CPU ERR REG BITS
 CMP #200,RCPUER ; IS ILLEGAL HALT BIT SET?
 BEQ DONE

```

015734 012737 000331 000302 CERIM: MOV #331,@$FATAL ;MOVE TO MAILBOX # ***** 331 *****
015734 012737 000331 000302 INC (R2) ;SET MSGTYP TO FATAL ERROR
015742 005212 HALT ;INCORRECT CPU ERR REG CONTENTS
015744 000000 ; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 677

1714 015746 DONE: CLR @CPUERR
1715 015746 005037 177766 CLR @PSW+1 ;GO BACK TO KERNEL MODE
1716 015752 105037 177777
1717
;*****
;TEST 115 TEST SPL INST. FOR NOP IN USER/SUPER MODES
;*****
015756 005237 000304 TEST115: INC @STESTN ;UPDATE TEST NUMBER
015762 022737 000115 000304 CMP #115,@STESTN ;SEQUENCE ERROR?
015770 001125 BNE SEQ ;BR TO ERROR HALT ON SEQ ERROR
1718 015772 012706 000500 MOV #BUFF,SP ;SETUP STACK
1719 015776 052737 040000 177776 BIS #040000,@PSW ;GO TO SUPER MODE
1720 016004 000277 SCC ;SET CC
1721 016006 000231 SPL 1 ;SPL SHOULD=NOP IN USER/SUPER MODES
1722 016010 000232 SPL 2
1723 016012 000233 SPL 3
1724 016014 000234 SPL 4
1725 016016 000235 SPL 5
1726 016020 000236 SPL 6
1727 016022 000237 SPL 7
1728 016024 013767 177776 000654 MOV @PSW,SPSW ;SAVE PSW
1729 016032 026727 000650 040017 CMP SPSW,#040017 ;VERIFY THAT PSW HAS NOT CHANGED
1730 016040 001407 BEQ 1$
1731 016042 105037 177777 CLR @PSW+1 ;GO BACK TO KERNEL
1732 016046 012737 000332 000302 MOV #332,@$FATAL ;MOVE TO MAILBOX # ***** 332 *****
016054 005212 INC (R2) ;SET MSGTYP TO FATAL ERROR
016056 000000 HALT ;PRIORITY LEVELS CHANGE
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 744
1733 016060 012737 040340 177776 1$: MOV #040340,@PSW ;SET PRIORITY TO 7
1734 016066 000257 CCC ;CLEAR CONDITION CODES
1735 016070 000230 SPL 0 ;SPL SHOULD=NOP IN SUPERVISOR MODE
1736 016072 013767 177776 000606 MOV @PSW,SPSW ;SAVE PSW
1737 016100 026727 000602 040340 CMP SPSW,#040340 ;VERIFY THAT PSW PRIORITY AND CONDITION CODES HAVE NOT CHANGE
1738 016106 001407 BEQ 2$
1739 016110 105037 177777 CLR @PSW+1 ;GO BACK TO KERNEL
1740 016114 012737 000333 000302 MOV #333,@$FATAL ;MOVE TO MAILBOX # ***** 333 *****
016122 005212 INC (R2) ;SET MSGTYP TO FATAL ERROR
016124 000000 HALT ;SPL INSTRUCTION CHANGED PSW SHOULD BE NOP
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 721
1741 016126 012737 140000 177776 2$: MOV #140000,@PSW ;GO TO USER MODE
1742 016134 000277 SCC ;SET CC
1743 016136 000231 SPL 1 ;SPL SHOULD=NOP IN USER MODE
1744 016140 000232 SPL 2
1745 016142 000233 SPL 3
1746 016144 000234 SPL 4
1747 016146 000235 SPL 5
1748 016150 000236 SPL 6
1749 016152 000237 SPL 7
1750 016154 013767 177776 000524 MOV @PSW,SPSW ;SAVE PSW
1751 016162 026727 000520 140017 CMP SPSW,#140017 ;VERIFY THAT PSW HAS NOT CHANGED
  
```

```

1752 016170 001407          BEQ      3$
1753 016172 105037 177777    CLRB    @PSW+1          ;GO BACK TO KERNEL
1754 016176 012737 000334 000302  MOV     #334,@SFATAL   ;MOVE TO MAILBOX # ***** 334 *****
                                INC      (R2)                ;SET MSGTYP TO FATAL ERROR
                                HALT                    ;PRIORITY LEVELS HAS CHANGED
                                                ; TO SCOPE REPLACE HALT W/ 240
                                                ; AND REPLACE NEXT INST W/ 670
1755 016210 012737 140340 177776 3$:   MOV     #140340,@PSW    ;SET PRIORITY TO 7
1756 016216 000257          CCC
1757 016220 000230          SPL     0                ;CLEAR CONDITION CODES
1758 016222 013767 177776 000456  MOV     @PSW,SPSW       ;SPL SHOULD=NOP IN USER MODE
1759 016230 026727 000452 140340  CMP     SPSW,#140340    ;SAVE PSW
1760 016236 001407          BEQ     FSPL            ;VARIIFY THAT PSW PRIORITY AND CONDITION CODES HAVE NOT CHANGE
1761 016240 105037 177777    (LRB   @PSW+1          ;GO BACK TO KERNEL
1762 016244          SEQ:   MOV     #335,@SFATAL   ;MOVE TO MAILBOX # ***** 335 *****
                                INC      (R2)                ;SET MSGTYP TO FATAL ERROR
                                HALT                    ;SPL INST.CHANGED PSW OR WRONG TEST#
                                                ; TO SCOPE REPLACE HALT W/ 240
                                                ; AND REPLACE NEXT INST W/ 645
1763 016256          FSPL:  CLRB    @PSW+1          ;GO BACK TO KERNEL
1764 016256 105037 177777
1765
1766          .SBTTL TEST PIRQ LEVELS
1767          ;THIS TEST VARIIFIES FOR ALL COMBINATIONS OF PIR AND PROCESSOR
1768          ;PRIORITY LEVELS THAT REQUESTS ARE GRANTED (TRAP TO 240 OCCURS
1769          ;BY THE PROCESSOR,ONLY WHEN THE PIR IS AT A HIGHER LEVEL THAN
1770          ;THE PROCESSOR.
1771          ;THE CONTENTS OF SPIR,SPSW AND TRP240 SHOULD BE EXAMINED ON ERROR.
1772          ;SPIR BITS 2-0 CONTAINS ONE LESS THAN THE PIR REQUEST LEVEL AT
1773          ;THE TIME OF ERROR.SPSW BITS 2-0 CONTAINS THE PROCESSOR PRIORITY
1774          ;AT THE TIME OF ERROR.TRP240 INDICATES WHETHER OR NOT A TRAP WAS
1775          ;EXPECTED (1= EXPECTING TRAP TO 240)
1776          ;THE SPL INSTRUCTION IS USED TO SETUP PROCESSOR PRIORITY.
1777          ;NOTE: THIS IS THE FIRST REAL TEST OF THE SPL INST.
1778          ;ON ERROR,IF EXPECTED PIRQ TRAP DID NOT OCCURE VARIIFY SPL
1779          ;OPERATION BY COMPARING SPSW BITS<2-0> WITH PSW PRIORITY
1780          ;BITS<7-5>.ON ERROR IF AN UNSPECTED PIRQ TRAP OCCURED
1781          ;VARIIFY SPL OPERATION BY COMPARING SPSW BITS<2-0> WITH
1782          ;PROCESSOR PSW<7-5> ON STACK.
1783
1784          ;*****
          ;TEST 116          TEST PIRQ LEVELS AND SPL INSTRUCTION
          ;*****
016262 005237 000304          TST116: INC     @STESTN    ;UPDATE TEST NUMBER
016266 022737 000116 000304  CMP     #116,@STESTN   ;SEQUENCE ERROR?
016274 001154          BNE     PTRP          ;BR TO ERROR HALT ON SEQ ERROR
1785 016276 005067 000406    CLR     PIRPSW
1786 016302 012737 016642 000000  MOV     #ZTRP,@#0      ;SET LOCATION ZERO TRAP VEC
1787 016310 012737 000340 000002  MOV     #340,@#2
1788 016316 012737 016656 000004  MOV     #T4TRP,@#4     ;SET UP FAILURE TRAP VEC
1789 016324 012737 000340 000006  MOV     #340,@#6
1790 016332 012737 016672 000024  MOV     #T24TRP,@#24   ;SETUP POWER FAIL VEC
1791 016340 012737 000340 000026  MOV     #340,@#26
1792 016346 012737 016604 000240  MOV     #PQTRP,@PIRVC1 ;SETUP PIRQ VEC
1793 016354 012737 000340 000242  MOV     #340,@PIRVC2  ;SET 242 TO PRIORITY 7
1799 016362 012706 000500  MLOOP: MOV     #BUFF,SP  ;SETUP STACK

```

```

1800 016366 052737 000340 177776      BIS      #340,@#PSW      ;SET PROCESSOR PRIORITY TO 7
      801      ;COMPUTE EXPECTED RESULT
1802 016374 016700 000310      MOV      PIRPSW,R0
1803 016400 042700 177707      BIC      #177707,R0      ;SETUP SPIR
1804 016404 006200      ASR      R0
1805 016406 006200      ASR      R0
1806 016410 006200      ASR      R0
1807 016412 010067 000266      MOV      R0,SPIR      ;SAVE R0 IN SPIR
1808 016416 016700 000266      MOV      PIRPSW,R0
1809 016422 042700 177770      BIC      #177770,R0      ;SETUP SPSW
1810 016426 010067 000254      MOV      R0,SPSW
1811 016432 026767 000246 000246      CMP      SPIR,SPSW
1812 016440 002003      BGE      2$      ;BRANCH IF PIR > PSW
1813 016442 005067 000244      CLR      TRP240      ;CLEAR FLAG
1814 016446 000403      BR      3$
1815 016450 012767 177777 000234 2$:      MOV      #177777,TRP240 ;SET FLAG
1816 016456 004767 000232 3$:      JSR      PC,SETPIRQ    ;SETUP PIRQ BASE ON THE # IN SPIR
1817      ;SET PSW PRIORITY BASE ON THE # IN SPSW
1818 016462 042767 000007 000006      BIC      #7,1$      ;CLEAR LSB 3 BITS OF SPL INST.AT 1$
1819 016470 056767 000212 000000      BIS      SPSW,1$      ;SET LSB 3 BITS OF SPL INST.TO DESIDED PROC. PRI.
1820 016476 000230 1$:      SPL      0      ;THE ACTUAL PRIORITY SET INTO THE PSW IS CONTROLLED BY
1821      ;THE PREVIOUS TWO INSTRUCTION.
1822 016500 000240      NOP
1823 016502 005767 000204      TST      TRP240
1824 016506 001405      BEQ      NXTST
      016510 012737 000336 000302      MOV      #336,@#FATAL ;MOVE TO MAILBOX # ***** 336 *****
      016516 005212      INC      (R2)      ;SET MSGTYP TO FATAL ERROR
      016520 000000      HALT      ;EXPECTED PIRQ TRAP BUT DID NOT GET IT
      ; TO SCOPE REPLACE HALT W/ 240
      ; AND REPLACE NEXT INST W/ 717
      ;SET UP FOR PASS COUNT
1825 016522 000240      NXTST:  NOP
1826
1827
1828 016524 005267 000160      INC      PIRPSW      ;SETUP FOR NEXT PASS THROUGH LOOP
1829 016530 026727 000154 000070      CMP      PIRPSW,#70
1830 016536 002711      BLT      MLOOP      ;BRANCH TO MLOOP IF COUNT IS LESS THAN 70
1831 016540 005037 177772      CLR      @#PIRQ      ;DONE WITH LOOPING PIRQ REQUESTS
1832 016544 012737 000006 000004      MOV      #6,@#4      ;RESTORE RETURNS
1833 016552 005037 000006      CLR      @#6
1834 016556 005037 000000      CLR      @#0
1835 016562 012737 017432 000024      MOV      #PWRDWN,@#24
1836 016570 012737 000242 000240      MOV      #242,@#240
1837 016576 005037 000242      CLR      @#242
1838 016602 000542      BR      END
1839 016604 005767 000102      PQTRP:  TST      TRP240      ;PRIORITY TRAP SERVICE
1840 016610 001344      BNE      NXTST
      016612 012737 000337 000302      MOV      #337,@#FATAL ;MOVE TO MAILBOX # ***** 337 *****
      016620 005212      INC      (R2)      ;SET MSGTYP TO FATAL ERROR
      016622 000000      HALT      ;EXPECTED NO PIRQ TRAP,BUT GOT ONE
      ; TO SCOPE REPLACE HALT W/ 240
      ; AND REPLACE NEXT INST W/ 656
1841 016624 000736      BR      NXTST
1845 016626 000340 000302      PTRP:   MOV      #340,@#FATAL ;MOVE TO MAILBOX # ***** 340 *****
      016626 012737      INC      (R2)      ;SET MSGTYP TO FATAL ERROR
      016634 005212      HALT      ;WRONG TEST NUMBER
      016636 000000      ; TO SCOPE REPLACE HALT W/ 240
  
```

```

1849 016640 000523          BR      END          ; AND REPLACE NEXT INST W/ 616
1850 016642                ZTRP:
1851 016642 012737 000341 000302  MOV    #341,@#SFATAL ;MOVE TO MAILBOX # ***** 341 *****
      016650 005212          INC    (R2)          ;SET MSGTYP TO FATAL ERROR
      016652 000000          HALT           ;UNSPECTED TRAP TO ZERO OCCURED DURING PIRQ TST
                                   ; TO SCOPE REPLACE HALT W/ 240
                                   ; AND REPLACE NEXT INST W/ 642

1852 016654 000722          BR      NXTST
1853 016656                T4TRP:
1854 016656 012737 000342 000302  MOV    #342,@#SFATAL ;MOVE TO MAILBOX # ***** 342 *****
      016664 005212          INC    (R2)          ;SET MSGTYP TO FATAL ERROR
      016666 000000          HALT           ;UNSPECTED TRAP TO 4 DURING PIRQ TESTING
                                   ; TO SCOPE REPLACE HALT W/ 240
                                   ; AND REPLACE NEXT INST W/ 634

1855 016670 000714          BR      NXTST
1856 016672                T24TRP:
1857 016672 012737 000343 000302  MOV    #343,@#SFATAL ;MOVE TO MAILBOX # ***** 343 *****
      016700 005212          INC    (R2)          ;SET MSGTYP TO FATAL ERROR
      016702 000000          HALT           ;UNSPECTED POWER FAIL TRAP DURING PIRQ TESTING
                                   ; TO SCOPE REPLACE HALT W/ 240
                                   ; AND REPLACE NEXT INST W/ 626

1858 016704 000000          SPIR:   .WORD  0
1859 016706 000000          SPSW:   .WORD  0
1860 016710 000000          PIRPSW: .WORD  0

```



```

1862          177772          PIRQ=177772
1863          000240          PIRVC1=240
1864          000242          PIRVC2=242
1865 016712  000000          TRP240: .WORD  C
1866
1867

```

```

1868 016714          SETPIRQ:
1869 016714  026727  177764  000000  CMP      SPIR,#0
1870 016722  001435          BEQ      1$
1871 016724  026727  177754  000001  CMP      SPIR,#1
1872 016732  001435          BEQ      2$
1873 016734  026727  177744  000002  CMP      SPIR,#2
1874 016742  001435          BEQ      3$
1875 016744  026727  177734  000003  CMP      SPIR,#3
1876 016752  001435          BEQ      4$
1877 016754  026727  177724  000004  CMP      SPIR,#4
1878 016762  001435          BEQ      5$
1879 016764  026727  177714  000005  CMP      SPIR,#5
1880 016772  001435          BEQ      6$
1881 016774  026727  177704  000006  CMP      SPIR,#6
1882 017002  001435          BEQ      7$
1883 017004  012737  000344  000302  MOV      #344,@$FATAL
          017012  005212          INC      (R2)
          017014  000000          HALT

```

```

;MOVE TO MAILBOX # ***** 344 *****
;SET MSGTYP TO FATAL ERROR
;# IN SPIR DOES NOT MAKE SENSE OR SPIR NOT 0-6
; TO SCOPE REPLACE HALT W/ 240
; AND REPLACE NEXT INST W/ 561

```

```

1884 017016  012737  001000  177772  1$:  MOV      #1000,@$PIRQ
1885 017024  000430          BR       10$
1886 017026  012737  002000  177772  2$:  MOV      #2000,@$PIRQ
1887 017034  000424          BR       10$
1888 017036  012737  004000  177772  3$:  MOV      #4000,@$PIRQ
1889 017044  000420          BR       10$
1890 017046  012737  010000  177772  4$:  MOV      #10000,@$PIRQ
1891 017054  000414          BR       10$
1892 017056  012737  020000  177772  5$:  MOV      #20000,@$PIRQ
1893 017064  000410          BR       10$
1894 017066  012737  040000  177772  6$:  MOV      #40000,@$PIRQ
1895 017074  000404          BR       10$
1896 017076  012737  100000  177772  7$:  MOV      #100000,@$PIRQ
1897 017104  000400          BR       10$
1898 017106  000207          10$:  RTS      PC
1899
1900

```

```

1901          ;TABLE FOR PIRQ SETUP
1902          ;SPIR  PIR LEVEL  SETPIRQ  # LOADED INTO PIRQ REG RO
1903          :0000      1          BIT9      1000
1904          :0001      2          BIT10     2000
1905          :0002      3          BIT11     4000
1906          :0003      4          BIT12     10000
1907          :0004      5          BIT13     20000
1908          :0005      6          BIT14     40000
1909          :0006      7          BIT15     100000

```

```

1910 017110          END:
1911 017110  005237  000306          INC      @$PASS
1912 017114  105267  000100          INCB    PASSPT          ;SHOULD PRINT THIS PASS?
1913 017120  001020          BNE     ACT              ;NO
1914 017122  132767  000040  161171  BITB    #40,$ENVM       ;WILL APT ALLOW PRINTING?

```

1915	017130	001014			BNE	ACT		:NO
1916	017132	023727	000042	017172	CMF	2#42,#SENDAD		
1917	017140	001410			BEQ	ACT		
1918	017142	012700	017222		MOV	#MSG,R0		:GET MSG ADDR.
1919	017146	004767	000346		JSR	PC,PRMSG		:PRINT MESSAGE POINTED TO BY R0
1920	017152	000005			RESET			
1921	017154	012767	177761	000036	MOV	#177761,PASSPT		:DO IT ABOUT 15 DECIMAL TIMES
1922	017162	013700	000042		ACT:	MOV 2#42,R0		:CHECK ACT
1923	017166	001405			BEQ	GOAGIN		:KEEP GOING
1924	017170	000005			RESET			
1925	017172	004710			SENDAD:	JSR PC,(R0)		:ACT HOOKS
1926	017174	000240			NOP			
1927	017176	000240			NOP			
1928	017200	000240			NOP			
1929	017202	012767	000012	160600	GOAGIN:	MOV #12,10		
1930	017210	005067	160576		CLR	12		
1931	017214	000167	161434		JMP	RESTR		:DO NEXT PASS
1932	017220	177777			PASSPT:	-1		
1933	017222	015	012	105	MSG:	.ASCIZ <15><12>.END OF CKKABAO 11/44 TRAPS.		
	017225	116	104	040				
	017230	117	106	040				
	017233	103	113	113				
	017236	101	102	101				
	017241	060	040	061				
	017244	061	057	064				
	017247	064	040	124				
	017252	122	101	120				
	017255	123	000					
1934	017257	015	012	103	PNAME:	.ASCIZ <15><12>+CKKABAO 11/44 TRAPS+		
	017262	113	113	101				
	017265	102	101	060				
	017270	040	061	061				
	017273	057	064	064				
	017276	040	124	122				
	017301	101	120	123				
	017304	000						
1935	017305	015	012	103	TITLE:	.ASCIZ <15><12>+CKKABAO 11/44 TRAPS+<15><12>		
	017310	113	113	101				
	017313	102	101	060				
	017316	040	061	061				
	017321	057	064	064				
	017324	040	124	122				
	017327	101	120	123				
	017332	015	012	000				
1936	017335	015	012	116	MSGNFP:	.ASCIZ <15><12>.NO FLOATING POINT OPTION PRESENT.		
	017340	117	040	106				
	017343	114	117	101				
	017346	124	111	116				
	017351	107	040	120				
	017354	117	111	116				
	017357	124	040	117				
	017362	120	124	111				
	017365	117	116	040				
	017370	120	122	105				
	017373	123	105	116				
	017376	124	000					
1937	017400	- 015	012	116	MSGNCIS:	.ASCIZ <15><12>.NO CIS OPTION PRESENT .		

```

017403 117 040 103
017406 111 123 040
017411 117 120 124
017414 111 117 116
017417 040 120 122
017422 105 123 105
017425 116 124 040
017430 000

1938
1939 017432 012767 017442 160364 PWRDWN: .EVEN MOV #PWRUP,24
1940 017440 000000 HALT
1941
1942 017442 012767 017432 160354 PWRUP: MOV #PWRDWN,24
1943 017450 012706 000500 MOV #BUFF,SP
1944 017454 132767 000040 160637 BITB #40,$ENVM ;WILL APT ALLOW PRINTING?
1945 017462 001004 BNE PFRES ;NO
1946 017464 012700 017500 MOV #MSGPWF,R0 ;GET MSG ADDR.
1947 017470 004767 000024 JSR PC,PRTMSG ;PRINT MESSAGE POINTED TO BY R0
1948 017474 000167 161154 PFRES: JMP RESTRT
1949 017500 015 012 120 MSGPWF: .ASCIZ <15><12>.POWER FAILED..
017503 117 127 105
017506 122 040 106
017511 101 111 114
017514 105 104 041
017517 000

1950
1951 ;SUBROUTINE TO PRINT MESSAGE
1952 ;
1953 017520 132767 000040 160573 PRTMSG: BITB #40,$ENVM ;WILL APT ALLOW PRINTING?
1954 017526 001011 BNE 1$ ;BRANCH IF NO
1955 017530 105737 177564 2$: TSTB @#TPS ;TTY READY
1956 017534 100375 BPL 2$ ;NO WAIT
1957 017536 112037 177566 MOVB (R0)+,@#TPB ;PRINT CHARACTER
1958 017542 001372 BNE 2$ ;NEXT IF NOT DONE.
1959 017544 105737 177564 3$: TSTB @#TPS
1960 017550 100375 BPL 3$
1961 017552 000207 1$: RTS PC
1962 000001 .END
  
```

SYMBOL TABLE

ABASE = 000000	BEGIN = 000622	FPP = 015512	PIRPSW = 016710	RETF = 002634
ACDW1 = 000000	BELL = 000240	FSPL = 016256	PIRQ = 177772	RETF1 = 003460
ACDW2 = 000000	BR1 = 001032	GIN1 = 015246	PIRVC1= 000240	RETF2 = 004360
ACPUOP= 000000	BR10 = 001264	GIN2 = 015264	PIRVC2= 000242	RETF3 = 005174
ACT = 017162	BR11 = 001400	GIN3 = 015532	PNAME = 017257	RETF4 = 006070
ADALL = 013240	BR12 = 001450	GOAGIN = 017202	PQTRP = 016604	RETF5 = 006704
ADDW0 = 000000	BR13 = 001520	HERE = 000000	PROFTE = 013642	RETG = 002760
ADDW1 = 000000	BR14 = 001570	HLT = 000000	PRTMSG = 017520	RETG1 = 003604
ADDW10= 000000	BR15 = 001676	ILLA = 004700	PSW = 177776	RETG2 = 004504
ADDW11= 000000	BR16 = 001720	ILLB = 000100	PTRP = 016626	RETG3 = 005320
ADDW12= 000000	BR17 = 001742	INST = 015520	PWRDWN = 017432	RETG4 = 006214
ADDW13= 000000	BR2 = 001062	INSTC = 002426	PWRUP = 017442	RETG5 = 007030
ADDW14= 000000	BR20 = 001764	INSTK = 007274	RA = 005474	RETH5 = 007176
ADDW15= 000000	BR21 = 002006	KPAR0 = 000600	RA1 = 003764	RETJ = 007226
ADDW2 = 000000	BR22 = 002030	KPAR1 = 000602	RB = 005460	RETK = 007276
ADDW3 = 000000	BR23 = 002052	KPAR2 = 000604	RB1 = 003750	RETL = 007356
ADDW4 = 000000	BR3 = 001106	KPAR3 = 000606	RC = 005454	RETM = 007424
ADDW5 = 000000	BR33 = 002132	KPAR4 = 000610	RCPUER = 000502	RETN = 007502
ADDW6 = 000000	BR34 = 002146	KPAR5 = 000612	RC1 = 003744	RETO = 007624
ADDW7 = 000000	BR35 = 002162	KPAR6 = 000614	RESET2 = 014462	RETP = 010020
ADDW8 = 000000	BR36 = 002176	KPAR7 = 000616	RESET3 = 014450	RETR = 010114
ADDW9 = 000000	BR37 = 002222	KPDR0 = 000560	RESTRT = 000654	RETRQ = 010114
ADEVCT= 000000	BR4 = 001134	KPDR1 = 000562	RET = 015312	RETR = 010166
ADEVVM = 000000	BR40 = 002236	KPDR2 = 000564	RETA = 002316	RETS = 010250
ADJNC = 015232	BR41 = 002252	KPDR3 = 000566	RETAH = 002330	RETT = 010320
ADREND = 000620	BR45 = 003752	KPDR4 = 000570	RETAT = 012052	RETU = 010400
ADRTAB = 000520	BR46 = 004602	KPDR5 = 000572	RETA1 = 003156	RETV = 010526
AENV = 000000	BR46A = 004614	KPDR6 = 000574	RETA2 = 004054	RET1 = 015332
AENVVM = 000000	BR47 = 005462	KPDR7 = 000576	RETA3 = 004670	RET2 = 015354
AFATAL = 000000	BR5 = 001162	KTSTA = 000516	RETA4 = 005564	RET3 = 015374
AMADR1= 000000	BR51 = 006312	KTVEC = 000514	RETA5 = 006400	RET4 = 015362
AMADR2= 000000	BR51A = 006324	K1 = 000744	RETB = 002360	RTI1 = 012462
AMADR3= 000000	BR6 = 001210	K10 = 000762	RETB1 = 012126	RTI2 = 012476
AMADR4= 000000	BR60 = 012664	K11 = 000764	RETB2 = 003206	RTRAP = 000010
AMAMS1= 000000	BR7 = 001236	K12 = 000766	RETB3 = 004104	RTRAP1= 000034
AMAMS2= 000000	BR70 = 013074	K2 = 000746	RETB4 = 004720	RTRAP2= 000020
AMAMS3= 000000	BR71 = 014130	K3 = 000750	RETB5 = 005614	RTRAP3= 000030
AMAMS4= 000000	BTRAP = 013452	K4 = 000752	RETB5 = 006430	RTRAP4= 000014
AMSGAD= 000000	BUFF = 000500	K5 = 000754	RETC = 002430	RTRAP5= 000004
AMSGLG= 000000	CC = 177776	K6 = 000756	RETC1 = 012206	RTT1 = 012272
AMSGTY= 000000	CERIH = 015734	K7 = 000760	RETC1 = 003256	RTT2 = 012310
AMTYP1= 000000	CERMSK= 177413	LAST = %000001	RETC2 = 004154	RTT3 = 012356
AMTYP2= 000000	CERR1 = 010056	MLOOP = 016362	RETC3 = 004770	RTT4 = 012376
AMTYP3= 000000	CERR2 = 010736	MSG = 017222	RETC4 = 005664	RTT5 = 012330
AMTYP4= 000000	CORH = 013236	MSGNCI = 017400	RETC5 = 006500	RTT6 = 012420
APASS = 000000	CPUERR= 177766	MSGNFP = 017335	RETD = 002510	R6 = %000006
APRIOR= 000000	CTRAP = 013406	MSGPWF = 017500	RETD1 = 003336	R7TRX = 014004
AROUND = 015220	DL11W = 013644	NODL = 014142	RETD2 = 004234	R7TR1 = 012560
ASWREG= 000000	DL11W1 = 013650	NODL1 = 014300	RETD3 = 005050	R7TR2 = 012630
ATESTN= 000000	DONF = 015746	NODL2 = 014404	RETD4 = 005744	R7TR2A = 012616
ATRAP = 013306	DTRAP = 013426	NODL3 = 014654	RETD5 = 006560	R7TR3 = 012700
AUNIT = 000000	ENL = 017110	NODL4 = 015046	RETE = 002556	R7TR4 = 012752
AUSWR = 000000	ERR1 = 010044	NOP = 000240	RETE1 = 003402	SEQ = 016244
AUTO = 013274	ERRP2 = 010724	NOR = 013260	RETE2 = 004302	SETPIR = 016714
AUTO1 = 013572	FINISH = 015516	NXTST = 016522	RETE3 = 005116	SPSW = 016704
AVECT1 = 000000	FIRST = %000005	PASSPT = 017220	RETE4 = 006012	SPSW = 016706
AVECT2= 000000	FOVER = 011752	PFRES = 017474	RETE5 = 006626	SRO = 000504
				SROH = 000506

SR1	000510	TSFCIS	015142	TST34	005564	TTCR -	177564	WATE3	014764
SR2	000512	TSL	013234	*ST35	005634	TTT37	014650	WATE4	015042
STATUS=	177776	TST1	000770	TST36	005706	TTY11	014636	WATE5	015030
STP	011764	TST10	002452	TST37	006034	TY3	014554	ZTRP	016642
STPP	003056	TST100	012514	TST4	002074	TTY4	014630	\$APTHD	000330
STPPA	003070	TST101	013002	TST40	006336	T24TRP	016672	\$CPUOP	000326
STP3	013176	TST102	013122	TST41	006400	T4TRP	016656	\$DEVCT	000310
STP3D	013210	TST103	013216	TST42	006450	UPAR0	000540	\$ENDAD	017172
TAB	=%000003	TST104	013656	TST43	006522	UPAR1	000542	\$ENV	000320
TABLE	015436	TST105	014004	TST44	006650	UPAR2	000544	\$ENVM	000321
TABLE1	015406	TST106	014142	TST45	007134	UPAR3	000546	\$ERN =	000345
TDEC1	010700	TST107	014300	TST46	007176	UPAR4	000550	\$ERROR=	000302
TDEC2	010772	TST11	002600	TST47	007246	UPAR5	000552	\$ETABL	000320
TDEC3	011046	TST110	014404	TST5	002266	UPAR6	000554	\$ETEND	000330
TDEC4	011120	TST111	014500	TST50	007320	UPAR7	000556	\$FATAL	000302
TDEC6	011134	TST112	014654	TST51	007446	UPDR0	000520	\$HIBTS	000330
TDEC7	011146	TST113	015046	TST52	007730	UPDR1	000522	\$MAIL	000300
TDEC77	013766	TST114	015532	TST53	010062	UPDR2	000524	\$MBADR	000332
TDEC8	013754	TST115	015756	TST54	010134	UPDR3	000526	\$MSGAD	000314
TENSAV	015140	TST116	016262	TST55	010210	JPDR4	000530	\$MSGLG	000316
TITLE	017305	TST12	003102	TST56	010342	UPDR5	000532	\$MSGTY	000300
TNCIS	015170	TST13	003156	TST57	010632	UPDR6	000534	\$PASS	000306
TONT1	013106	TST14	003226	TST6	002330	UPDR7	000536	\$PASTM	000336
TPB	- 177566	TST15	003300	TST60	010742	VDEC1	011216	\$SVPC =	000300
TPS	= 177564	TST16	003424	TST61	011012	VDEC10	011474	\$SWR =	000000
TRACE	013062	TST17	003714	TST62	011146	VDEC11	011552	\$SWREG	000322
TRAPA	= 000010	TST2	001314	TST63	011224	VDEC12	011564	\$TESTN	000304
TRAPB	013604	TST20	004012	TST64	011302	VDEC13	011650	\$TN =	000117
TRAP10	015120	TST21	004054	TST65	011360	VDEC14	011662	\$TSTM	000334
TRAP24	015110	TST22	004124	*ST66	011436	VDEC2	011204	\$TSTNM=	000304
TRCSR	= 177560	TST23	004176	TST67	011514	VDEC3	011274	\$UNIT	000312
TRC1	013166	TST24	004324	TST7	002400	VDEC4	011262	\$UNITM	000340
TRP240	016712	TST25	004626	TST70	011612	VDEC5	011352	\$USWR	000324
TRT	= 000003	TST26	004670	TST71	011670	VDEC6	011340	\$X =	016362
TR0	014104	TST27	004740	TST72	011776	VDEC7	011430	\$XX =	177562
TR2	014116	TST3	001640	TST73	012052	VDEC8	011416	\$XXX =	000561
TR3	014236	*ST30	005012	TST74	012146	VDEC9	011506	\$Y =	016276
TR4	014252	TST31	005140	TST75	012230	WATE	015000	\$YY -	016362
TR4A	012740	TST32	005424	TST76	012310	WATE1	014722	.\$X =	000330
TR5	014240	*ST33	005522	TST77	012420	WATE2	014736		

. ABS. 017554 000
000000 001

ERRORS DETECTED: 0

VIRTUAL MEMORY USED: 58289 WORDS (228 PAGES)
DYNAMIC MEMORY: 20434 WORDS (78 PAGES)
ELAPSED TIME: 00:05:03
CKKABAO,CKKABAO/NL:TOC/-SP/CRF CKKABAC.SML,CKKABAO.P11

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES
ABASE	=	000000	67-445
ACDW1	=	000000	67-445
ACDW2	=	000000	67-445
ACPUOP	=	000000	67-445 67-445
ACT		017162	71-1913 71-1915 71-1917 #71-1922
ADALL		013240	70-1392 #70-1395
ADDW0	=	000000	67-445
ADDW1	=	000000	67-445
ADDW10	=	000000	67-445
ADDW11	=	000000	67-445
ADDW12	=	000000	67-445
ADDW13	=	000000	67-445
ADDW14	=	000000	67-445
ADDW15	=	000000	67-445
ADDW2	=	000000	67-445
ADDW3	=	000000	67-445
ADDW4	=	000000	67-445
ADDW5	=	000000	67-445
ADDW6	=	000000	67-445
ADDW7	=	000000	67-445
ADDW8	=	000000	67-445
ADDW9	=	000000	67-445
ADEVCT		000000	67-445 67-445
ADEVM		000000	67-445
ADJNC		015232	70-1605 #70-1618
ADREND		000620	#67-495
ADRTAB		000520	#67-459
AENV	=	000000	67-445 67-445
AENVM	=	000000	67-445 67-445
AFATAL		000000	67-445 67-445
AMADR1		000000	67-445
AMADR2		000000	67-445
AMADR3		000000	67-445
AMADR4	=	000000	67-445
AMAMS1	=	000000	67-445
AMAMS2	=	000000	67-445
AMAMS3	=	000000	67-445
AMAMS4	=	000000	67-445
AMSGAD	=	000000	67-445 67-445
AMSGLG	=	000000	67-445 67-445
AMSGTY	=	000000	67-445 67-445
AMTYP1		000000	67-445
AMTYP2		000000	67-445
AMTYP3		000000	67-445
AMTYP4	=	000000	67-445
APASS	=	000000	67-445 67-445
APRIOR		000000	67-445
AROUND		015220	70-1599 #70-1615
ASWREG	=	000000	67-445 67-445
ATESTN		000000	67-445 67-445
ATRAP		013306	70-1398 #70-1405
AUNIT	=	000000	67-445 67-445

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES								
AUSWR	=	000000	67-445	67-445							
AUTO		013274	#70-1403								
AUTO1		013572	70-1389	#70-1446							
AVECT1	=	000000	67-445								
AVECT2	=	000000	67-445								
BEGIN		000622	67-439	67-442	#68-502						
BELL	=	000240	#66-353								
BR1		001032	68-539	#68-541							
BR10		001264	68-578	#68-580							
BR11		001400	68-592	#68-594							
BR12		001450	68-600	#68-602							
BR13		001520	68-608	#68-610							
BR14		001570	68-616	#68-618							
BR15		001676	68-628	#68-630							
BR16		001720	68-631	#68-633							
BR17		001742	68-634	#68-636							
BR2		001062	68-544	#68-546							
BR20		001764	68-637	#68-638							
BR21		002006	68-639	#68-641							
BR22		002030	68-642	#68-644							
BR23		002052	68-645	#68-647							
BR3		001106	68-549	#68-551							
BR33		002132	68-655	#68-656							
BR34		002146	68-656	#68-657							
BR35		002162	68-657	#68-658							
BR36		002176	68-658	#68-659							
BR37		002222	68-662	#68-663							
BR4		001134	68-555	#68-557							
BR40		002236	68-663	#68-664							
BR41		002252	68-664	#68-665							
BR45		003752	68-794	#68-799							
BR46		004602	68-838	#68-862							
BR46A		004614	68-862	#68-863							
BR47		005462	68-922	#68-927							
BR5		001162	68-561	#68-563							
BR51		006312	68-968	#68-992							
BR51A		006324	68-992	#68-993							
BR6		001210	68-567	#68-568							
BR60		012664	#70-1347	70-1349							
BR7		001236	68-572	#68-574							
BR70		0-3074	70-1360	#70-1372							
BR71		014130	70-1483	#70-1490							
BTRAP		013452	70-1420	#70-1431							
BLFF		000500	#67-451	68-667	68-674	68-677	68-681	68-684	68-688	68-693	68-695
			68-700	68-704	68-715	68-734	68-740	68-743	68-747	68-750	68-754
			68-759	68-761	68-765	68-769	68-780	68-797	68-806	68-812	68-815
			68-818	68-821	68-824	68-829	68-831	68-836	68-839	68-850	68-866
			68-872	68-875	68-878	68-881	68-884	68-889	68-891	68-896	68-899
			68-910	68-925	68-935	68-941	68-944	68-947	68-950	68-953	68-958
			68-961	68-966	68-969	68-980	68-1003	68-1009	68-1012	68-1015	68-1018
			68-1021	68-1026	68-1028	68-1033	68-1036	68-1047	68-1060	68-1066	68-1069
			68-1072	68-1075	68-1079	68-1084	68-1086	69-1092	69-1095	69-1106	69-1123

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES
KPDR3		000566	#67-481
KPDR4		000570	#67-482
KPDR5		000572	#67-483
KPDR6		000574	#67-484
KPDR7		000576	#67-485
KTSTA		000516	#67-458
KTVEC		000514	#67-457
K1		000744	#68-524 *68-587 68-588 68-591 *68-595 68-596 68-599 *68-602 68-604 *68-610 68-612 *68-618 68-620 68-623 #68-531 68-633 68-636 68-638 68-641 68-644 68-644 *68-644 68-647
K10		000762	#68-531
K11		000764	#68-532
K12		000766	#68-533
K2		000746	#68-525
K3		000750	#68-526
K4		000752	#68-527
K5		000754	#68-528 *68-586 68-589 *68-594 *68-603 68-605 68-607 *68-611 68-613 68-615 *68-619 68-621 #68-529 68-597 68-636
K6		000756	#68-529
K7		000760	#68-530 68-627 68-627 68-630 68-630 68-633 68-638 68-647
LAST	-	0000001	#66-339 *70-1621 70-1640
MLOCP		016362	#70-1799 70-1830
MSG		017222	71-1918 #71-1933
MSGNCI		017400	70-1610 #71-1937
MSGNFP		017335	70-1594 #71-1936
MSGPWF		017500	71-1946 #71-1949
NODL		014142	70-1478 #70-1492
NODL1		014300	70-1495 #70-1510
NODL2		014404	70-1514 #70-1522
NODL3		014654	70-1538 #70-1556
NODL4		015046	70-1560 #70-1580
NOP	-	000240	#66-354
NOR		013260	#70-1399 70-1402
NXTST		016522	70-1824 #70-1825 70-1840 70-1841 70-1852 70-1855
PASSPT		017220	68-503 *71-1912 *71-1921 #71-1932
PFRES		017474	71-1945 #71-1948
PIRPSW		016710	*70-1785 70-1802 70-1808 *70-1828 70-1829 #70-1860
PIRQ	-	177772	70-1831 #71-1862 71-1884 71-1888 71-1890 71-1892 71-1894 71-1896
PIRVC1	=	000240	70-1792 #71-1863
PIRVC2	=	000242	70-1793 #71-1864
PNAME		017257	#71-1934
PQTRP		016604	70-1792 #70-1839
PROFTE		013642	*70-1451 #70-1456 *70-1457 70-1461 70-1477 70-1494 70-1513 70-1537 70-1559
PRTMSG		017520	68-507 70-1595 70-1611 71-1919 71-1947 #71-1953
PSW	-	177776	#66-363 70-1692 70-1695 70-1704 70-1707 70-1716 70-1719 70-1728 70-1731 70-1733 70-1736 70-1739 70-1741 70-1750 70-1753 70-1755 70-1758 70-1761 70-1764 70-1800
PTRP		016626	70-1784 #70-1845
PWRDWN		017432	68-510 70-1835 #71-1939 71-1942
PWRUP		017442	71-1939 #71-1942
RA		005474	68-924 #68-928
RA1		003764	68-796 #68-800
RB		005460	*68-923 #68-926 *68-928 68-929

SYMBOL	VALUE	REFERENCES
RB1	003750	*68-795 #68-798 *68-800 68-801
RC	005454	#68-925 68-930
RCPUER	000502	#67-452 *69-1128 *69-1129 69-1130 *69-1192 *69-1193 69-1194 *70-1406 *70-1407 70-1412 . -1415 *70-1434 *70-1435 70-1440 70-1443 *70-1698 *70-1699 70-1700 *70-1710 *70-1711 70-1712
RC1	003744	#68-797 68-802
RESET2	014462	70-1525 #70-1532
RESET3	014450	70-1523 #70-1531
RESTR1	000654	68-505 #68-508 71-1931 71-1948
RET	015312	70-1626 #70-1632
RETA	002316	68-666 #68-670
RETAH	002330	68-668 #68-671
RETAT	012052	70-1261 #70-1267
RETA1	003156	68-735 #68-738
RETA2	004054	68-807 #68-810
RETA3	004670	68-867 #68-870
RETA4	005564	68-936 #68-939
RETA5	006400	68-1004 #68-1007
RETB	002360	68-675 #68-677
RETB1	012126	70-1270 #70-1276
RETB2	003206	68-741 #68-743
RETB3	004104	68-813 #68-815
RETB4	004720	68-873 #68-875
RETB5	005614	68-942 #68-944
RETB6	006430	68-1010 #68-1012
RETC	002430	68-682 #68-684
RETC1	012206	70-1280 #70-1285
RETC2	003256	68-748 #68-750
RETC3	004154	68-819 #68-821
RETC4	004770	68-879 #68-881
RETC5	005664	68-948 #68-950
RETC6	006500	68-1016 #68-1018
RETD	002510	68-689 #68-693
RETD1	003336	68-755 #68-759
RETD2	004234	68-825 #68-829
RETD3	005050	68-885 #68-889
RETD4	005744	68-954 #68-958
RETD5	006560	68-1022 #68-1026
RETE	002556	68-696 #68-700
RETE1	003402	68-762 #68-765
RETE2	004302	68-832 #68-836
RETE3	005116	68-892 #68-896
RETE4	006012	68-962 #68-966
RETE5	006626	68-1029 #68-1033
RETF	002634	68-705 #68-708
RETF1	003460	68-770 #68-773
RETF2	004360	68-840 #68-843
RETF3	005174	68-900 #68-903
RETF4	006070	68-970 #68-973
RETF5	006704	68-1037 #68-1040
RETG	002760	68-716 #68-719
RETC1	003604	68-781 #68-784

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES
RE TG2	004504	68-851 #68-854
RE TG3	005320	68-911 #68-914
RE TG4	006214	68-981 #68-984
RE TG5	007030	68-1048 #68-1051
RE TH5	007176	68-1061 #68-1064
RE TJ	007226	68-1067 #68-1069
RE TK	007276	68-1073 #68-1075
RE TL	007356	68-1080 #68-1084
RE TM	007424	68-1087 #69-1092
RE TN	007502	69-1096 #69-1099
RE TO	007624	69-1107 #69-1110
RE TP	010020	69-1124 #69-1127
RE TQ	010114	69-1136 #69-1138
RE TR	010166	69-1142 #69-1144
RE TS	010250	69-1148 #69-1152
RE TT	010320	69-1155 #69-1159
RE TU	010400	69-1163 #69-1166
RE TV	010526	69-1174 #69-1177
RE T1	015332	70-1633 #70-1635
RE T2	015354	70-1636 #70-1638
RE T3	015374	70-1639 #70-1640
RE T4	015362	70-1582 #70-1639
RT I1	012462	70-1321 #70-1325
RT I2	012476	70-1322 #70-1327
RTRAP	= 000010	#66-357 *68-668 *68-675 *68-682 *68-689 *68-696 *68-705 *68-706 *68-716 *68-717 *68-1004 *68-1010 *68-1016 *68-1022 *68-1029 *68-1037 *68-1038 *68-1048 *68-1049 *68-1061 *68-1067 *68-1073 *68-1080 *68-1087 *69-1096 *69-1097 *69-1107 *69-1108
RTRAP1	= 000034	#66-348 *68-735 *68-741 *68-748 *68-755 *68-762 *68-770 *68-771 *68-781 *68-782
RTRAP2	= 000020	#66-347 *68-807 *68-813 *68-819 *68-825 *68-832 *68-840 *68-841 *68-851 *68-852
RTRAP3	000030	#66-346 *68-867 *68-873 *68-879 *68-885 *68-892 *68-900 *68-901 *68-911 *68-912
RTRAP4	= 000014	#66-345 *68-936 *68-942 *68-948 *68-954 *68-962 *68-970 *68-971 *68-981 *68-982 *70-1261 *70-1270 *70-1280
RTRAP5	000004	#66-344 *69-1124 *69-1136 *69-1142 *69-1148 *69-1155 *69-1163 *69-1164 *69-1174 *69-1175 *70-1691 *70-1703
RTT1	012272	70-1294 #70-1297
RTT2	012310	70-1295 #70-1300
RTT3	012356	70-1305 #70-1309
RTT4	012376	70-1306 #70-1313
RTT5	012330	#70-1303 70-1311 70-1316
RTT6	012420	70-1314 #70-1317
R6	%000006	#66-337 *70-1526 *70-1527
R7TRX	014004	70-1462 #70-1475
R7TR1	012560	70-1333 #70-1336
R7TR2	012630	70-1340 #70-1343
R7TR2A	012616	#70-1342 70-1343
R7TR3	012700	70-1346 #70-1349
R7TR4	012752	70-1353 #70-1357
SEQ	016244	70-1717 #70-1762

SYMBOL	CROSS REFERENCE	VALUE	REFERENCES							
SETPIR		016714	70-1816	#71-1868						
SPIR		016704	*70-1807	70-1811	#70-1858	71-1869	71-1871	71-1873	71-1875	71-1877 71-1879
			71-1881							
SPSW		016706	*70-1728	70-1729	*70-1736	70-1737	*70-1750	70-1751	*70-1758	70-1759 *70-1810
			70-1811	70-1819	#70-1859					
SRO		000504	#67-453							
SROH		000506	#67-454							
SR1		000510	#67-455							
SR2		000512	#67-456							
STATUS	=	177776	#66-355	*68-654	*68-660	70-1431	*70-1464	*70-1469	*70-1480	*70-1486 *70-1497
			*70-1532	*70-1542	70-1545	*70-1551	70-1553	*70-1572	70-1575	
STP		011764	70-1256	#70-1257						
STPP		003056	68-703	#68-727						
STPPA		003070	68-727	#68-728						
STP3		013176	70-1375	#70-1383						
STP3D		013210	70-1383	#70-1384						
TAB	-%	000003	#66-338	*70-1612	*70-1615	*70-1620	*70-1621			
TABLE		015436	70-1615	#70-1656						
TABLE1		015406	70-1612	#70-1644						
TDEC1		010700	69-1188	#69-1191						
TDEC2		010772	69-1200	#69-1202						
TDEC3		011046	70-1209	#70-1211						
TDEC4		011120	70-1215	#70-1218						
TDEC6		011134	#70-1221							
TDEC7		011146	70-1219	#70-1222						
TDEC77		013766	70-1466	#70-1472						
TDEC8		013754	70-1460	70-1467	#70-1471					
TENSAV		015140	*70-1584	#70-1597	70-1619					
TITLE		017305	68-506	#71-1935						
TNCIS		015170	70-1601	#70-1606						
TONT1		013106	70-1366	#70-1373						
TPB		177566	#66-352	*70-1567	*70-1570	71-1957				
TPS	-	177564	#66-351	70-1454	*70-1561	70-1565	70-1568	*70-1571	*70-1579	71-1955 71-1959
TRACE		013062	70-1363	#70-1371						
TRAPA	=	000010	#66-356	68-669	68-676	68-683	68-692	68-699	68-707	68-718
TRAPB		013604	70-1425	70-1429	#70-1447					
TRAP10		015120	70-1585	#70-1591						
TRAP24		015110	70-1583	#70-1588						
TRCSR	=	177560	#66-350	*70-1516	70-1520					
TRC1		013166	70-1377	70-1380	#70-1382					
TRP240		016712	*70-1813	*70-1815	70-1823	70-1839	#71-1865			
TRT		000003	#66-343	68-937	68-943	68-949	68-957	68-965	68-972	68-983 70-1237
TR0		014104	70-1481	#70-1488						
TR2		014116	70-1476	70-1484	#70-1489					
TR3		014236	70-1499	#70-1504						
TR4		014252	70-1500	#70-1506						
TR4A		012740	#70-1356	70-1358						
TR5		014240	70-1493	70-1501	#70-1505					
TSFCIS		015142	70-1587	#70-1598						
TSL		013234	#70-1393							
TST1		000770	68-523	#68-535						
TST10		002452	68-680	68-685	#68-687					

SYMBOL	VALUE	REFERENCES		
TST100	012514	70-1318	70-1329	#70-1331
TST101	013002	70-1331	70-1359	#70-1360
TST102	013122	#70-1375		
TST103	013216	#70-1389		
TST104	013656	#70-1460		
TST105	014004	#70-1476		
TST106	014142	#70-1493		
TST107	014300	#70-1512		
TST11	002600	68-687	68-701	#68-703
TST110	014404	70-1512	70-1521	#70-1523
TST111	014500	#70-1536		
TST112	014654	#70-1558		
TST113	015046	#70-1582		
TST114	015532	#70-1688		
TST115	015756	#70-1717		
TST116	016262	#70-1784		
TST12	003102	#68-731		
TST13	003156	68-751	#68-739	
TST14	003226	68-739	68-744	#68-746
TST15	003300	68-746	68-751	#68-753
TST16	003424	68-753	68-766	#68-768
TST17	003714	68-768	68-792	#68-794
TST2	001314	68-535	68-583	#68-585
TST20	004012	#68-805		
TST21	004054	68-805	#68-811	
TST22	004124	68-811	68-816	#68-817
TST23	004176	68-817	68-822	#68-823
TST24	004324	68-823	68-837	#68-838
TST25	004626	#68-865		
TST26	004670	68-865	#68-871	
TST27	004740	68-871	68-876	#68-877
TST3	001640	68-585	68-624	#68-626
TST30	005012	68-877	68-882	#68-883
TST31	005140	68-883	68-897	#68-898
TST32	005424	68-898	68-921	#68-922
TST33	005522	#68-934		
TST34	005564	68-934	#68-940	
TST35	005634	68-940	68-945	#68-946
TST36	005706	68-946	68-951	#68-952
TST37	006034	68-952	68-967	#68-968
TST4	002074	68-626	68-648	#68-652
TST40	006336	#68-1002		
TST41	006400	68-1002	#68-1008	
TST42	006450	68-1008	68-1013	#68-1014
TST43	006522	68-1014	68-1019	#68-1020
TST44	006650	68-1020	68-1034	#68-1035
TST45	007134	68-1035	68-1058	#68-1059
TST46	007176	68-1059	#68-1065	
TST47	007246	68-1065	68-1070	#68-1071
TST5	002266	68-652	68-665	#68-666
TST50	007320	68-1071	68-1076	#68-1078
TST51	007446	68-1078	69-1093	#69-1094

SYMBOL	VALUE	REFERENCES								
TST52	007730	69-1094	69-1117	#69-1119						
TST53	010062	#69-1134								
TST54	010134	69-1134	69-1139	#69-1140						
TST55	010210	69-1140	69-1145	#69-1146						
TST56	010342	69-1146	69-1160	#69-1161						
TST57	010632	69-1161	69-1184	#69-1185						
TST6	002330	#68-673								
TST60	010742	#69-1198								
TST61	011012	69-1198	69-1203	#70-1206						
TST62	011146	70-1206	#70-1233							
TST63	011224	#70-1234								
TST64	011302	#70-1235								
TST65	011360	#70-1236								
TST66	011436	#70-1237								
TST67	011514	#70-1238								
TST7	002400	68-673	68-678	#68-680						
TST70	011612	70-1240	#70-1241							
TST71	011670	#70-1243								
TST72	011776	#70-1259								
TST73	C:2052	70-1259	#70-1268							
TST74	012146	70-1268	70-1277	#70-1278						
TST75	012230	70-1278	70-1286	#70-1289						
TST76	012310	70-1289	70-1298	#70-1301						
TST77	012420	70-1301	#70-1318							
TTCSR	177564	#66-349	*70-1468	*70-1472	*70-1482	*70-1491	*70-1498	*70-1515	70-1518	*70-1544
		*70-1552	*70-1555							
TTT37	014650	70-1554	#70-1555							
TTY11	014636	70-1536	#70-1554							
TTY3	014554	70-1541	#70-1545							
TTY4	014630	70-1549	#70-1553							
T24TRP	016672	70-1790	#70-1856							
T4TRP	016656	70-1788	#70-1853							
UPAR0	000540	#67-469								
UPAR1	000542	#67-470								
UPAR2	000544	#67-471								
UPAR3	000546	#67-472								
UPAR4	000550	#67-473								
UPAR5	000552	#67-474								
UPAR6	000554	#67-475								
UPAR7	000556	#67-476								
UPDR0	000520	#67-460								
UPDR1	000522	#67-461								
UPDR2	000524	#67-462								
UPDR3	000526	#67-463								
UPDR4	000530	#67-464								
UPDR5	000532	#67-465								
UPDR6	000534	#67-466								
UPDR7	000536	#67-467								
VDEC1	011216	70-1233	#70-1233							
VDEC10	011474	70-1237	70-1237	#70-1237						
VDFC11	011552	70-1238	70-1238	#70-1238						
VDEC12	011564	70-1238	#70-1238							

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
VDEC13	011650	70-1241	70-1241	#70-1241					
VDEC14	011662	70-1241	#70-1241						
VDEC2	011204	70-1233	70-1233	#70-1233					
VDEC3	011274	70-1234	#70-1234						
VDEC4	011262	70-1234	70-1234	#70-1234					
VDEC5	011352	70-1235	#70-1235						
VDEC6	011340	70-1235	70-1235	#70-1235					
VDEC7	011430	70-1236	#70-1236						
VDEC8	011416	70-1236	70-1236	#70-1236					
VDEC9	011506	70-1237	#70-1237						
WATE	015000	70-1563	#70-1575						
WATE1	014722	#70-1565	70-1566						
WATE2	014736	#70-1568	70-1569						
WATE3	014764	#70-1573	70-1577						
WATE4	015042	70-1578	#70-1579						
WATE5	015030	70-1558	#70-1578						
ZTRP	016642	70-1786	#70-1850						
\$APTHD	000330	67-446	#67-446						
\$CPUOP	000326	#67-445							
\$DEVCT	000310	#67-445							
\$ENDAD	017172	67-444	68-504	71-1916	#71-1925				
\$ENV	000320	#67-445							
\$ENVM	000321	#67-445	71-1914	71-1944	71-1953				
\$ERN	- 000345	#59-40	68-539	68-539	#68-539	68-544	68-544	#68-544	68-549
		#68-549	68-555	68-555	#68-555	68-561	68-561	#68-561	68-567
		#68-567	68-572	68-572	#68-572	68-578	68-578	#68-578	68-583
		#68-583	68-592	68-592	#68-592	68-600	68-600	#68-600	68-608
		#68-608	68-616	68-616	#68-616	68-624	68-624	#68-624	68-628
		#68-628	68-631	68-631	#68-631	68-634	68-634	#68-634	68-637
		#68-637	68-639	68-639	#68-639	68-642	68-642	#68-642	68-645
		#68-645	68-648	68-648	#68-648	68-655	68-655	#68-655	68-656
		#68-656	68-657	68-657	#68-657	68-658	68-658	#68-658	68-662
		#68-662	68-663	68-663	#68-663	68-664	68-664	#68-664	68-665
		#68-665	68-670	68-670	#68-670	68-678	68-678	#68-678	68-685
		#68-685	68-694	68-694	#68-694	68-701	68-701	#68-701	68-709
		#68-709	68-710	68-710	#68-710	68-711	68-711	#68-711	68-712
		#68-712	68-714	68-714	#68-714	68-720	68-720	#68-720	68-721
		#68-721	68-722	68-722	#68-722	68-723	68-723	#68-723	68-727
		#68-727	68-737	68-737	#68-737	68-744	68-744	#68-744	68-751
		#68-751	68-760	68-760	#68-760	68-766	68-766	#68-766	68-774
		#68-774	68-775	68-775	#68-775	68-776	68-776	#68-776	68-777
		#68-777	68-779	68-779	#68-779	68-785	68-785	#68-785	68-786
		#68-786	68-787	68-787	#68-787	68-788	68-788	#68-788	68-792
		#68-792	68-799	68-799	#68-799	68-809	68-809	#68-809	68-816
		#68-816	68-822	68-822	#68-822	68-830	68-830	#68-830	68-837
		#68-837	68-844	68-844	#68-844	68-845	68-845	#68-845	68-846
		#68-846	68-847	68-847	#68-847	68-849	68-849	#68-849	68-855
		#68-855	68-856	68-856	#68-856	68-857	68-857	#68-857	68-858
		#68-858	68-862	68-862	#68-862	68-869	68-869	#68-869	68-876
		#68-876	68-882	68-882	#68-882	68-890	68-890	#68-890	68-897
		#68-897	68-904	68-904	#68-904	68-905	68-905	#68-905	68-906
		#68-906	68-907	68-907	#68-907	68-909	68-909	#68-909	68-915

SYMBOL CROSS REFERENCE
SYMBOL VALJE

REFERENCES

#68-915	68-916	68-916	#68-916	68-917	68-917	#68-917	68-918	68-918
#68-918	68-921	68-921	#68-921	68-927	68-927	#68-927	68-938	68-938
#68-938	68-945	68-945	#68-945	68-951	68-951	#68-951	68-960	68-960
#68-960	68-967	68-967	#68-967	68-974	68-974	#68-974	68-975	68-975
#68-975	68-976	68-976	#68-976	68-977	68-977	#68-977	68-979	68-979
#68-979	68-985	68-985	#68-985	68-986	68-986	#68-986	68-987	68-987
#68-987	68-988	68-988	#68-988	68-992	68-992	#68-992	68-1006	68-1006
#68-1006	68-1013	68-1013	#68-1013	68-1019	68-1019	#68-1019	68-1027	68-1027
#68-1027	68-1034	68-1034	#68-1034	68-1041	68-1041	#68-1041	68-1042	68-1042
#68-1042	68-1043	68-1043	#68-1043	68-1044	68-1044	#68-1044	68-1046	68-1046
#68-1046	68-1052	68-1052	#68-1052	68-1053	68-1053	#68-1053	68-1054	68-1054
#68-1054	68-1055	68-1055	#68-1055	68-1058	68-1058	#68-1058	68-1063	68-1063
#68-1063	68-1070	68-1070	#68-1070	68-1076	68-1076	#68-1076	68-1085	68-1085
#68-1085	69-1093	69-1093	#69-1093	69-1100	69-1100	#69-1100	69-1101	69-1101
#69-1101	69-1102	69-1102	#69-1102	69-1103	69-1103	#69-1103	69-1105	69-1105
#69-1105	69-1111	69-1111	#69-1111	69-1112	69-1112	#69-1112	69-1113	69-1113
#69-1113	69-1114	69-1114	#69-1114	69-1117	69-1117	#69-1117	69-1122	69-1122
#69-1122	69-1126	69-1126	#69-1126	69-1131	69-1131	#69-1131	69-1139	69-1139
#69-1139	69-1145	69-1145	#69-1145	69-1153	69-1153	#69-1153	69-1160	69-1160
#69-1160	69-1167	69-1167	#69-1167	69-1168	69-1168	#69-1168	69-1169	69-1169
#69-1169	69-1170	69-1170	#69-1170	69-1172	69-1172	#69-1172	69-1178	69-1178
#69-1178	69-1179	69-1179	#69-1179	69-1180	69-1180	#69-1180	69-1181	69-1181
#69-1181	69-1184	69-1184	#69-1184	69-1190	69-1190	#69-1190	69-1195	69-1195
#69-1195	69-1203	69-1203	#69-1203	70-1212	70-1212	#70-1212	70-1217	70-1217
#70-1217	70-1221	70-1221	#70-1221	70-1233	70-1233	#70-1233	70-1234	70-1234
#70-1234	70-1235	70-1235	#70-1235	70-1236	70-1236	#70-1236	70-1237	70-1237
#70-1237	70-1238	70-1238	#70-1238	70-1240	70-1240	#70-1240	70-1241	70-1241
#70-1241	70-1256	70-1256	#70-1256	70-1266	70-1266	#70-1266	70-1275	70-1275
#70-1275	70-1277	70-1277	#70-1277	70-1286	70-1286	#70-1286	70-1298	70-1298
#70-1298	70-1312	70-1312	#70-1312	70-1316	70-1316	#70-1316	70-1326	70-1326
#70-1326	70-1329	70-1329	#70-1329	70-1335	70-1335	#70-1335	70-1337	70-1337
#70-1337	70-1342	70-1342	#70-1342	70-1344	70-1344	#70-1344	70-1348	70-1348
#70-1348	70-1350	70-1350	#70-1350	70-1356	70-1356	#70-1356	70-1359	70-1359
#70-1359	70-1371	70-1371	#70-1371	70-1372	70-1372	#70-1372	70-1383	70-1383
#70-1383	70-1403	70-1403	#70-1403	70-1413	70-1413	#70-1413	70-1416	70-1416
#70-1416	70-1425	70-1425	#70-1425	70-1432	70-1432	#70-1432	70-1441	70-1441
#70-1441	70-1444	70-1444	#70-1444	70-1446	70-1446	#70-1446	70-1470	70-1470
#70-1470	70-1471	70-1471	#70-1471	70-1488	70-1488	#70-1488	70-1489	70-1489
#70-1489	70-1505	70-1505	#70-1505	70-1519	70-1519	#70-1519	70-1521	70-1521
#70-1521	70-1531	70-1531	#70-1531	70-1546	70-1546	#70-1546	70-1554	70-1554
#70-1554	70-1574	70-1574	#70-1574	70-1576	70-1576	#70-1576	70-1578	70-1578
#70-1578	70-1634	70-1634	#70-1634	70-1637	70-1637	#70-1637	70-1639	70-1639
#70-1639	70-1696	70-1696	#70-1696	70-1701	70-1701	#70-1701	70-1708	70-1708
#70-1708	70-1713	70-1713	#70-1713	70-1732	70-1732	#70-1732	70-1740	70-1740
#70-1740	70-1754	70-1754	#70-1754	70-1762	70-1762	#70-1762	70-1824	70-1824
#70-1824	70-1840	70-1840	#70-1840	70-1845	70-1845	#70-1845	70-1851	70-1851
#70-1851	70-1854	70-1854	#70-1854	70-1857	70-1857	#70-1857	71-1883	71-1883
#71-1883								

SE ERROR 000302
SE TABL 000320
SE TEND 000330
SE FATAL 000302

#67-448	*68-517							
#67-445								
#67-445	67-446							
#67-445	67-448	68-539	68-544	68-549	68-555	68-561	68-567	68-572

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES
		70-1523 70-1523 70-1536 70-1536 70-1558 70-1558 70-1582 70-1582 70-1688
\$TN	- 000117	70-1688 70-1717 70-1717 70-1784 70-1784
		#59-39 68-535 68-535 68-535 #68-535 68-583 68-585 68-585 68-585
		#68-585 68-624 68-626 68-626 68-626 #68-626 68-648 68-652 68-652
		68-652 #68-652 68-665 68-666 68-666 #68-666 68-673 68-673 68-673
		68-673 #68-673 68-678 68-680 68-680 #68-680 68-685 68-687 68-687
		68-687 68-687 #68-687 68-701 68-703 68-703 #68-703 68-703 68-731
		68-731 68-731 #68-731 68-739 68-739 68-739 #68-739 68-744 68-746 68-746
		68-746 68-746 #68-746 68-751 68-753 68-753 #68-753 68-753 68-766
		68-768 68-768 68-768 #68-768 68-792 68-794 68-794 #68-794 68-794 #68-794
		68-805 68-805 68-805 #68-805 68-811 68-811 68-811 #68-811 68-811 68-816
		68-817 68-817 68-817 #68-817 58-822 68-823 68-823 #68-823 68-823 #68-823
		68-837 68-838 68-838 68-838 #68-838 68-865 68-865 #68-865 68-865 #68-865
		68-871 68-871 68-871 #68-871 68-876 68-877 68-877 #68-877 68-877 #68-877
		68-882 68-883 68-883 68-883 #68-883 68-897 68-898 68-898 68-898 68-898
		#68-898 68-921 68-922 68-922 68-922 #68-922 68-934 68-934 68-934 68-934
		#68-934 68-940 68-940 68-940 #68-940 68-945 68-946 68-946 68-946 68-946
		#68-946 68-951 68-952 68-952 68-952 #68-952 68-967 68-968 68-968 68-968
		68-968 #68-968 68-1002 68-1002 68-1002 #68-1002 68-1008 68-1008 68-1008 68-1008
		#68-1008 68-1013 68-1014 68-1014 68-1014 #68-1014 68-1019 68-1020 68-1020 68-1020
		68-1020 #68-1020 68-1034 68-1035 68-1035 68-1035 #68-1035 68-1058 68-1059 68-1059
		68-1059 68-1059 #68-1059 68-1065 68-1065 68-1065 #68-1065 68-1070 68-1071 68-1071
		68-1071 68-1071 #68-1071 68-1076 68-1078 68-1078 #68-1078 68-1078 #68-1078 69-1093
		69-1094 69-1094 69-1094 #69-1094 69-1117 69-1119 69-1119 69-1119 #69-1119 69-1119
		69-1134 69-1134 69-1134 #69-1134 69-1139 69-1140 69-1140 69-1140 #69-1140 69-1140
		69-1145 69-1146 69-1146 69-1146 #69-1146 69-1160 69-1161 69-1161 69-1161 69-1161
		#69-1161 69-1184 69-1185 69-1185 69-1185 #69-1185 69-1198 69-1198 69-1198 69-1198
		#69-1198 69-1203 70-1206 70-1206 70-1206 #70-1206 70-1233 70-1233 70-1233 70-1233
		#70-1233 70-1234 70-1234 70-1234 #70-1234 70-1235 70-1235 70-1235 #70-1235 70-1235
		70-1236 70-1236 70-1236 #70-1236 70-1237 70-1237 70-1237 #70-1237 70-1237 70-1238
		70-1238 70-1238 #70-1238 70-1240 70-1241 70-1241 #70-1241 70-1241 70-1243 70-1243
		70-1243 70-1243 #70-1243 70-1259 70-1259 70-1259 #70-1259 70-1268 70-1268 70-1268
		70-1268 #70-1268 70-1277 70-1278 70-1278 #70-1278 70-1286 70-1286 70-1289 70-1289
		70-1289 70-1289 #70-1289 70-1298 70-1301 70-1301 #70-1301 70-1301 70-1318 70-1318
		70-1318 70-1318 #70-1318 70-1329 70-1331 70-1331 #70-1331 70-1331 70-1359 70-1359
		70-1360 70-1360 70-1360 #70-1360 70-1375 70-1375 70-1375 #70-1375 70-1375 70-1389
		70-1389 70-1389 #70-1389 70-1460 70-1460 70-1460 #70-1460 70-1476 70-1476 70-1476
		70-1476 #70-1476 70-1493 70-1493 70-1493 #70-1493 70-1512 70-1512 70-1512 70-1512
		#70-1512 70-1521 70-1523 70-1523 70-1523 #70-1523 70-1536 70-1536 70-1536 70-1536
		#70-1536 70-1558 70-1558 70-1558 #70-1558 70-1582 70-1582 70-1582 #70-1582 70-1582
		70-1688 70-1688 70-1688 #70-1688 70-1717 70-1717 70-1717 #70-1717 70-1717 70-1784
		70-1784 70-1784 #70-1784
\$TSTM	000334	#67-446
\$TSTM	= 000304	#67-447 *68-516
\$UNIT	000312	#67-445
\$UNITM	000340	#67-446
\$JSWR	000324	#67-445
\$X	= 016362	#68-535 68-539 68-544 68-549 68-555 68-561 68-567 68-572 68-578
		68-583 #68-585 68-592 68-600 68-608 68-616 68-624 #68-626 68-628
		68-631 68-634 68-637 68-639 68-642 68-645 68-648 #68-652 68-655
		68-656 68-657 68-658 68-662 68-663 68-664 68-665 #68-666 68-670
		#68-673 68-678 #68-680 68-685 #68-687 68-694 68-701 #68-703 68-709

REFERENCES

68-710	68-711	68-712	68-714	68-720	68-721	68-722	68-723	68-727
#68-731	68-737	#68-739	68-744	#68-746	68-751	#68-753	68-760	68-766
#68-768	68-774	68-775	68-776	68-777	68-779	68-785	68-786	68-787
68-788	68-792	#68-794	68-799	#68-805	68-809	#68-811	68-816	#68-817
68-822	#68-823	68-830	68-837	#68-838	68-844	68-845	68-846	68-847
68-849	68-855	68-856	68-857	68-858	68-862	#68-865	68-869	#68-871
68-876	#68-877	68-882	#68-883	68-890	68-897	#68-898	68-904	68-905
68-906	68-907	68-909	68-915	68-916	68-917	68-918	68-921	#68-922
68-927	#68-934	68-938	#68-940	68-945	#68-946	68-951	#68-952	68-960
68-967	#68-968	68-974	68-975	68-976	68-977	68-979	68-985	68-986
68-987	68-988	68-992	#68-1002	68-1006	#68-1008	68-1013	#68-1014	68-1019
#68-1020	68-1027	68-1034	#68-1035	68-1041	68-1042	68-1043	68-1044	68-1046
68-1052	68-1053	68-1054	68-1055	68-1058	#68-1059	68-1063	#68-1065	68-1070
#68-1071	68-1076	#68-1078	68-1085	69-1093	#69-1094	69-1100	69-1101	69-1102
69-1103	69-1105	69-1111	69-1112	69-1113	69-1114	69-1117	#69-1119	69-1122
69-1126	69-1131	#69-1134	69-1139	#69-1140	69-1145	#69-1146	69-1153	69-1160
#69-1161	69-1167	69-1168	69-1169	69-1170	69-1172	69-1178	69-1179	69-1180
69-1181	69-1184	#69-1185	69-1190	69-1195	#69-1198	69-1203	#70-1206	70-1212
70-1217	70-1221	#70-1233	70-1233	#70-1234	70-1234	#70-1235	70-1235	#70-1236
70-1236	#70-1237	70-1237	#70-1238	70-1238	70-1240	#70-1241	70-1241	#70-1243
70-1256	#70-1259	70-1266	#70-1268	70-1275	70-1277	#70-1278	70-1286	#70-1289
70-1298	#70-1301	70-1312	70-1316	#70-1318	70-1326	70-1329	#70-1331	70-1335
70-1337	70-1342	70-1344	70-1348	70-1350	70-1356	70-1359	#70-1360	70-1371
70-1372	#70-1375	70-1383	#70-1389	70-1403	70-1413	70-1416	70-1425	70-1432
70-1441	70-1444	70-1446	#70-1460	70-1470	70-1471	#70-1476	70-1488	70-1489
#70-1493	70-1505	#70-1512	70-1519	70-1521	#70-1523	70-1531	#70-1536	70-1546
70-1554	#70-1558	70-1574	70-1576	70-1578	#70-1582	70-1634	70-1637	70-1639
#70-1688	70-1696	70-1701	70-1708	70-1713	#70-1717	70-1732	70-1740	70-1754
70-1762	#70-1784	70-1795	#70-1797	70-1824	70-1840	#70-1843	70-1845	#70-1847
70-1851	70-1854	70-1857	71-1883					
#68-539	68-539	#68-544	68-544	#68-549	68-549	#68-555	68-555	#68-561
68-561	#68-567	68-567	#68-572	68-572	#68-578	68-578	#68-583	68-583
#68-592	68-592	#68-600	68-600	#68-608	68-608	#68-616	68-616	#68-624
68-624	#68-628	68-628	#68-631	68-631	#68-634	68-634	#68-637	68-637
#68-639	68-639	#68-642	68-642	#68-645	68-645	#68-648	68-648	#68-655
68-655	#68-656	68-656	#68-657	68-657	#68-658	68-658	#68-662	68-662
#68-663	68-663	#68-664	68-664	#68-665	68-665	#68-670	68-670	#68-678
68-678	#68-685	68-685	#68-694	68-694	#68-701	68-701	#68-709	68-709
#68-710	68-710	#68-711	68-711	#68-712	68-712	#68-714	68-714	#68-720
68-720	#68-721	68-721	#68-722	68-722	#68-723	68-723	#68-727	68-727
#68-737	68-737	#68-744	68-744	#68-751	68-751	#68-760	68-760	#68-766
68-766	#68-774	68-774	#68-775	68-775	#68-776	68-776	#68-777	68-777
#68-779	68-779	#68-785	68-785	#68-786	68-786	#68-787	68-787	#68-788
68-788	#68-792	68-792	#68-799	68-799	#68-809	68-809	#68-816	68-816
#68-822	68-822	#68-830	68-830	#68-837	68-837	#68-844	68-844	#68-845
68-845	#68-846	68-846	#68-847	68-847	#68-849	68-849	#68-855	68-855
#68-856	68-856	#68-857	68-857	#68-858	68-858	#68-862	68-862	#68-869
68-869	#68-876	68-876	#68-882	68-882	#68-890	68-890	#68-897	68-897
#68-904	68-904	#68-905	68-905	#68-906	68-906	#68-907	68-907	#68-909
68-909	#68-915	68-915	#68-916	68-916	#68-917	68-917	#68-918	68-918
#68-921	68-921	#68-927	68-927	#68-938	68-938	#68-945	68-945	#68-951
68-951	#68-960	68-960	#68-967	68-967	#68-974	68-974	#68-975	68-975

5XX = 177562

REFERENCES

#68-976	68-976	#68-977	68-977	#68-979	68-979	#68-985	68-985	#68-986
68-986	#68-987	68-987	#68-988	68-988	#68-992	68-992	#68-1006	68-1006
#68-1013	68-1013	#68-1019	68-1019	#68-1027	68-1027	#68-1034	68-1034	#68-1041
68-1041	#68-1042	68-1042	#68-1043	68-1043	#68-1044	68-1044	#68-1046	68-1046
#68-1052	68-1052	#68-1053	68-1053	#68-1054	68-1054	#68-1055	68-1055	#68-1058
68-1058	#68-1063	68-1063	#68-1070	68-1070	#68-1076	68-1076	#68-1085	68-1085
#69-1093	69-1093	#69-1100	69-1100	#69-1101	69-1101	#69-1102	69-1102	#69-1103
69-1103	#69-1105	69-1105	#69-1111	69-1111	#69-1112	69-1112	#69-1113	69-1113
#69-1114	69-1114	#69-1117	69-1117	#69-1122	69-1122	#69-1126	69-1126	#69-1131
69-1131	#69-1139	69-1139	#69-1145	69-1145	#69-1153	69-1153	#69-1160	69-1160
#69-1167	69-1167	#69-1168	69-1168	#69-1169	69-1169	#69-1170	69-1170	#69-1172
69-1172	#69-1178	69-1178	#69-1179	69-1179	#69-1180	69-1180	#69-1181	69-1181
#69-1184	69-1184	#69-1190	69-1190	#69-1195	69-1195	#69-1203	69-1203	#70-1212
70-1212	#70-1217	70-1217	#70-1221	70-1221	#70-1233	70-1233	#70-1234	70-1234
#70-1235	70-1235	#70-1236	70-1236	#70-1237	70-1237	#70-1238	70-1238	#70-1240
70-1240	#70-1241	70-1241	#70-1256	70-1256	#70-1266	70-1266	#70-1275	70-1275
#70-1277	70-1277	#70-1286	70-1286	#70-1298	70-1298	#70-1312	70-1312	#70-1316
70-1316	#70-1326	70-1326	#70-1329	70-1329	#70-1335	70-1335	#70-1337	70-1337
#70-1342	70-1342	#70-1344	70-1344	#70-1348	70-1348	#70-1350	70-1350	#70-1356
70-1356	#70-1359	70-1359	#70-1371	70-1371	#70-1372	70-1372	#70-1383	70-1383
#70-1403	70-1403	#70-1413	70-1413	#70-1416	70-1416	#70-1425	70-1425	#70-1432
70-1432	#70-1441	70-1441	#70-1444	70-1444	#70-1446	70-1446	#70-1470	70-1470
#70-1471	70-1471	#70-1488	70-1488	#70-1489	70-1489	#70-1505	70-1505	#70-1519
70-1519	#70-1521	70-1521	#70-1531	70-1531	#70-1546	70-1546	#70-1554	70-1554
#70-1574	70-1574	#70-1576	70-1576	#70-1578	70-1578	#70-1634	70-1634	#70-1637
70-1637	#70-1639	70-1639	#70-1696	70-1696	#70-1701	70-1701	#70-1708	70-1708
#70-1713	70-1713	#70-1732	70-1732	#70-1740	70-1740	#70-1754	70-1754	#70-1762
70-1762	#70-1824	70-1824	#70-1840	70-1840	#70-1845	70-1845	#70-1851	70-1851
#70-1854	70-1854	#70-1857	70-1857	#71-1883	71-1883			