

CB11

LOGIC TEST
CZCBAC0

AH-8395C-MC

JUL 1978

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MADE IN USA

This section contains a grid of 60 small, illegible panels, likely test results or data tables, arranged in 10 rows and 6 columns. The panels are too small and faded to read, but they appear to contain text and possibly numerical data.



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IDENTIFICATION

PRODUCT CODE: AC-8394C-MC
PRODUCT NAME: CZCBACO CB11 LOGIC TEST
DATE: 15-MAR-78
MAINTAINER: DIAGNOSTIC GROUP
MODIFIED BY: BILL SCHLITZKUS

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ABSTRACT

THIS PROGRAM TESTS THE CB11 SYSTEM. SCAN MODULES ARE EXPLICITLY TESTED VIA MAINTENANCE MODE, (WHICH IS THEREFORE ALSO EXPLICITLY TESTED.) DISTRIBUTE MODULES ARE EXPLICITLY TESTED IN A DIRECT READ/WRITE MANNER.

IN ADDITION, BOTH SCAN AND DISTRIBUTE BOARDS MAY BE IMPLICITLY TESTED WHENEVER TWO DISTRIBUTE BOARDS ARE JUMPED IN SUCH A WAY AS TO DRIVE ONE SCAN BOARD AND WHEN THE PROGRAM IS CALLED TO RUN THIS TYPE OF TESTING.

REQUIREMENTS

1. ANY PDP-11 WITH 4K MEMORY, A TTY, AND A LINE CLOCK OR A REAL TIME CLOCK, ALL IN PROPER WORKING ORDER.
2. A CB11 DEVICE.
3. THE USER INPUTS TO SCAN AND DISTRIBUTE MODULES MUST BE DISCONNECTED.***
IF ITEM 3 IS NOT STRICTLY ADHERED TO, THE RESULTS TO THE PROGRAM OR TO THE HARDWARE IS UNSPECIFIED.

LOADING-STORAGE

LOADING PROCEDURE FOR NORMAL BINARY TAPES SHOULD BE FOLLOWED. MEMORY IS STORED AND UTILIZED FROM LOCATIONS 0 THRU 17776.

NOTES

1. WITH THE EXCEPTION OF LISTING PAGE NUMBERS, ALL OTHER NUMERICAL REFERENCES ARE STRICTLY IN OCTAL.
2. THE PROGRAM CAN BE HALTED AND STARTED, OR RESTARTED AT ANY TIME.
3. USER INPUTS TO THE SCAN AND DISTRIBUTE MODULES MUST BE DISCONNECTED BEFORE RUNNING THIS PROGRAM.

RUN TIMES

THE APPROXIMATE RUN TIMES GIVEN BELOW ARE FOR ONE PASS (BELL TO BELL) WITH ALL SWITCHES DOWN. TIMES GIVEN ARE IN SECONDS.

S & OR D DIAG (SA0200) MODE:

162 ONE SCAN BOARD 2
163 N SCAN BOARDS N(2)
164 ONE DIST. BOARD 2
165 M DIST. BOARDS M(2)
166 ONE SCAN & ONE DIST. BOARD 2+2
167 N SCAN & M DIST. BOARDS N(2)+M(2)
168

169 S & D ACCEPT/EXERCISE (SA1010) MODE:
170

171 ONE SCAN BOARD 10
172 N SCAN BOARDS N(10)
173 ONE DIST. BOARD 17
174 M DIST. BOARDS M(17)
175 ONE SCAN & ONE DIST. BOARD 10+17
176 N SCAN & M DIST. BOARDS N(10)+M(17)
177

178 D JMPR S DIAG (SA1000) MODE:
179

180 TWO DIST. BOARDS JUMPED TO ONE SCAN BOARD 55
181 N GROUPS OF TWO DIST. JUMPED TO ONE SCAN N(55)
182

183 D JMPR S ACCEPT/EXERCISE (SA1020) MODE:
184

185 TWO DIST. BOARDS JUMPED TO ONE SCAN BOARD 225 (3MIN 45SECS)
186 N GROUPS OF TWO DIST. JUMPED TO ONE SCAN N(225)
187

188 POWER FAILURE
189 -----
190

191
192 THIS PROGRAM MAY NOT RECOVER FROM A POWER FAILURE.
193 THEREFORE, THIS DIAGNOSTIC SHOULD NOT BE USED WHEN VERIFYING
194 THE SYSTEM CAPABILITY TO RECOVER FROM A POWER FAILURE.
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STARTING-OPERATION

THERE ARE FIVE MODES OF OPERATION IN THIS PROGRAM:

1. S &/OR D DIAG. (SA200 - W/ALL SWITCHES RESET.)
TEST SCAN AND/OR DISTRIBUTE BOARDS. THE SWITCH REGISTER IS CONTROLLED ENTIRELY BY THE OPERATOR.
2. D JMPR S DIAG. (SA1000 - W/ALL SWITCHES RESET.)
TEST ONE SCAN & TWO DISTRIBUTE BOARDS THAT ARE SPECIALLY JUMPED TOGETHER. THE SWITCH REGISTER IS CONTROLLED ENTIRELY BY THE OPERATOR.
3. S &/OR D ACCEPT/EXERCISE (SA1010 - W/ALL SWITCHES RESET.)
ACCEPT/EXERCISE SCAN AND/OR DISTRIBUTE BOARDS. SWITCHES SWR12, SWR11, SWR2 & SWR1 ARE CONTROLLED BY THE PROGRAM. TWELVE PASSES OF THE PROGRAM ARE MADE, EACH WITH THE FOUR SWITCHES (ABOVE) SET TO A DIFFERENT CONFIGURATION.
4. D JMPR S ACCEPT/EXERCISE (SA1020 - W/ALL SWITCHES RESET.)
ACCEPT/EXERCISE ONE SCAN AND TWO DISTRIBUTE BOARDS THAT ARE SPECIALLY JUMPED TOGETHER. SWITCHES SWR12, SWR11, SWR2 & SWR1 ARE CONTROLLED BY THE PROGRAM. TWELVE PASSES OF THE PROGRAM ARE MADE, EACH WITH THE FOUR SWITCHES (ABOVE) SET TO A DIFFERENT CONFIGURATION.
5. MODULE TEST. (SA1030 - W/ALL SWITCHES RESET.)
REQUIREMENTS: ONLY ONE MODULE CAN BE ON THE BACKBOARD AT A TIME (EITHER SCAN OR DIST.)
TESTS:
 - A. THAT THE BOARD RESPONDS ONLY TO ITS GIVEN ADDRESS.
 - B. SAME AS MODE 1 (ABOVE) FOR THIS ONE BOARD.

WHEN THE PROGRAM HAS BEEN STARTED, (IN ANY OF THE FIVE MODES ABOVE) THE ACTION IS AS FOLLOWS:

1. THE PROGRAM (MODE) WILL IDENTIFY ITSELF ON THE TTY.
2. THE PROGRAM WILL MAKE QUERIES OF THE OPERATOR VIA THE TTY. (OPTION AVAILABLE - SEE SWR03)
3. THE PROGRAM WILL RUN IN THE MODE SELECTED ACCORDING TO THE REPLIES GIVEN TO THE TTY QUERIES.
4. AT THE END OF EACH PASS THE TTY BELL WILL RING (OPTION AVAILABLE - SEE SWR05) AND ANOTHER PASS IS BEGUN (AT STEP 3 ABOVE).

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TTY QUERIES

THE PROGRAM WILL QUERY THE OPERATOR FOR INFORMATION NECESSARY TO THE OPERATION OF THE PROGRAM. THE ONLY LEGAL CHARACTERS FOR ANY OF THE QUERIES ARE: 0 1 2 3 4 5 6 7 Y N

ANY ERRONEOUS REPLIES WILL RESULT IN A RE-QUERY FOR THAT PARTICULAR INFORMATION OR IN SOME CASES OF ALL INFORMATION. THE PROGRAM CAN ALWAYS BE RESTARTED. THE PROGRAM WILL NOT ALLOW ANY ERRORS IN ADDRESSES EXCEPT WHEN IT IS BEING TOLD IT HAS A SCAN (OR DIST.) BOARD AT AN ADDRESS WHICH IN FACT IS NOT PHYSICALLY THERE. ALLOWABLE ADDRESSES ARE IN THE RANGE 164000 THRU 167776.

THE FOLLOWING IS A LIST OF THE QUERIES (Q) AND DESCRIPTION OF THE REPLIES TO BE GIVEN (R).

- Q. LOSA? EXAMPLES: LOSA?164000 LOSA?N
R. THE LOWEST SCAN ADDRESS TO BE TESTED. THE LAST DIGIT OF THIS ADDRESS MUST ALWAYS BE 0. IF NO SCAN ADDRESSES ARE TO BE TESTED, TYPE N (NO).
- Q. HISA? EXAMPLE: HISA?164006
R. THE HIGHEST SCAN ADDRESS TO BE TESTED. THE LAST DIGIT OF THIS ADDRESS MUST ALWAYS BE 6. IF THE REPLY TO LOSA (ABOVE) WAS N (NO) THEN THIS QUERY WILL NOT BE MADE.
- Q. LODA? EXAMPLES: LODA?164010 LODA?N
R. THE LOWEST DISTRIBUTE ADDRESS TO BE TESTED. THE LAST DIGIT OF THIS ADDRESS MUST ALWAYS BE 0. IF NO DISTRIBUTE ADDRESS ARE TO BE TESTED, TYPE N (NO).
- Q. HIDA? EXAMPLES: HIDA?164012 HIDA?164016
R. THE HIGHEST DISTRIBUTE ADDRESS TO BE TESTED. THE LAST DIGIT OF THIS ADDRESS MUST ALWAYS BE EITHER 2 OR 6. IF THE REPLY TO LODA (ABOVE) WAS N (NO) THEN THIS QUERY WILL NOT BE MADE.
- Q. DATA? EXAMPLES: DATA?N DATA?123456
R. THIS QUERY IS MADE ONLY WHEN RUNNING THE PROGRAM IN DJMPRS MODES. NORMALLY REPLY N (NO). IF IT IS DESIRED TO RUN THIS TEST ON ONE, OPERATOR CHOSEN DATA WORD, AND NO OTHERS, THEN TYPE THE DATA WORD DESIRED.
- Q. DIST S JUMPED TO SCAN?
R. REPLY Y (YES) OR N (NO). THIS QUERY SERVES ONLY TO DOUBLE CHECK THAT THE PROPER JUMPERS ARE IN. THE PROGRAM WILL NOT EVEN TRY TO CONTINUE UNTIL THE REPLY IS Y. THIS QUERY IS ONLY MADE WHEN RUNNING DJMPRS MODES.
- Q. USER DISCONNECTED?
R. REPLY Y (YES) OR N (NO). THIS QUERY SERVES ONLY TO DOUBLE CHECK THAT THE USER INPUTS ARE DISCONNECTED. THE

301 PROGRAM WILL NOT EVEN TRY TO RUN UNTIL THE REPLY IS Y.

302
303
304 COMPLETE EXAMPLES:

305
306 S &/OR D DIAG

307
308 LOSA? 164000
309 HISA? 164006
310 LODA? 164010
311 HIDA? 164012
312 TEL CO DISCONNECTED? Y
313 THANKS! NOW TESTING

314
315 D JMPR S ACCEPT/EXERCISE

316
317 LOSA? 164000
318 HISA? 164006
319 LODA? 164010
320 HIDA? 164016
321 DATA? N
322 DIST JUMPED TO SCAN? Y
323 USER DISCONNECTED? Y
324 THANKS! NOW TESTING

325
326 S &/OR D ACCEPT/EXERCISE

327
328 LOSA? N
329 LODA? 164100
330 HIDA? 164206
331 USER DISCONNECTED? Y
332 THANKS! NOW TESTING

333
334 D JMPR S DIAG

335
336 LOSA? 164000
337 HISA? 164006
338 LODA? 164010
339 HIDA? 164016
340 DATA? 123456
341 DIST JUMPED TO SCAN? Y
342 USER DISCONNECTED? Y
343 THANKS! NOW TESTING

344
345 THERE ARE TOO MANY POSSIBILITIES TO GIVE USEFUL ERRONEOUS EXAMPLES.
346 THE MORE OBVIOUS ERRORS ONLY CAUSE A RE-QUERY. LESS OBVIOUS
347 ERRORS WILL CAUSE A SHORT EXPLANATORY TYPEOUT AS TO WHY THE
348 REPLY IS NOT ACCEPTABLE. THE PROGRAM WILL NOT RUN UNTIL
349 ALL REPLIES ARE SATISFACTORY. THE PROGRAM HAS NO WAY OF TELLING
350 DURING THE QUERIES WHETHER OR NOT A BOARD ACTUALLY EXISTS AS
351 INDICATED. ERRORS OF THIS TYPE WILL CAUSE AN ERROR IN THE TESTS.
352

353
354 SWITCH REGISTER
355 -----
356
357 FOR NORMAL OPERATION ALL SWITCHES ARE TO BE RESET.
358 RESET MEANS DOWN OR A '0', SET MEANS UP OR A '1'.
359
360 SWR15 RESET DO NOT HALT ON ERROR. MAKE A SINGLE TYPEOUT
361 OF EACH ERROR THAT OCCURS AND GO ON TO THE
362 NEXT TEST OR LOOP OF A TEST IN SEQUENCE.
363
364 SET HALT ON ERROR. MAKE A TYPEOUT OF THE ERROR THEN HALT.
365
366 SWR14 RESET DO NOT SCOPE LOOP.
367
368 SET SCOPE LOOP ON CURRENT TEST OR TEST LOOP.
369
370 SWR13 RESET DURING A SCOPE LOOP, MAKE SUBSEQUENT ERROR TYPEOUTS.
371
372 SET DURING A SCOPE LOOP, MAKE NO SUBSEQUENT ERROR
373 TYPEOUTS.
374
375 SWR12 RESET ALLOW TRACE TRAPPING AFTER EVERY INSTRUCTION.
376
377 SET INHIBIT TRACE TRAPPING.
378
379 SWR11 RESET ALLOW ITERATIONS OF THE TESTS.
380
381 SET INHIBIT ITERATIONS.
382
383 SWR10 NOT USED.
384
385 SWR09 NOT USED.
386
387 SWR08 NOT USED.
388
389 SWR07 NOT USED.
390
391 SWR06 RESET IN THE EVENT OF INTERMITTANT ERRORS DURING
392 A SCOPE LOOP, A COUNT OF ERRORS AND OF 'OK'S' WILL
393 BE TYPED.
394
395 SET INHIBIT THE ABOVE DESCRIBED TYPOUT.
396
397
398 SWR05 RESET THE TTY BELL WILL RING AT THE END OF EACH PASS.
399
400 SET THE BELL WILL RING AND A PASS COUNT WILL BE TYPED
401 AT THE END OF EACH PASS.
402
403 SWR04 RESET THE OPTION DESCRIBED AS FOLLOWS IS INHIBITED.
404
405 SET REPORT ON THE STATUS OF THE PROGRAM AFTER EACH
406 SUB-TEST OR TEST LOOP. THIS TYPEOUT WILL OCCUR
407 EACH TIME THE PSUEDO-OP CONTROL IS EXECUTED.
408 THE TYPEOUT IS THE SAME ONE USED FOR ERROR REPORTS.

409 THE OCCURANCE OF AN ACTUAL ERROR WHILE THIS
410 OPTION IS BEING UTILIZED WILL NOT AFFECT THE
411 ERROR REPORTING MECHINISM, NOR WILL THE ERROR
412 REPORTING MECHANISM EFFECT THIS OPTION. SWITCH
413 SWR00 IS APPLICABLE TO THIS TYPEOUT. THE OBVIOUS DETECTABLE
414 DIFFERENCE BETWEEN THIS TYPEOUT AND AN ACTUAL ERROR TYPEOUT
415 IS THAT BIT 0 OF FLAGS (SEE ERROR SECTION) WILL BE SET ONLY FOR
416 AN ACTUAL ERROR TYPEOUT.
417
418 SWR03 RESET ALLOW FULL TTY QUERIES OF THE OPERATOR.
419
420 SET INHIBIT TTY QUERIES OF THE OPERATOR AND USE
421 THE REPLIES GIVEN BY THE OPERATOR THE LAST TIME
422 QUERIES WERE MADE.
423
424 SWR02 RESET THE OPTION DESCRIBED AS FOLLOWS IN INHIBITED.
425
426 SET SHORTEN ALL TIME DELAYS BY 10%.
427
428 SWR01 RESET THE OPTION DESCRIBED AS FOLLOWS IS INHIBITED.
429
430 SET LENGTHEN ALL TIME DELAYS BY 10%.
431
432 SWR00 RESET ALLOW FULL ERROR REPORT TO BE MADE.
433
434 SET SHORTEN THE ERROR REPORT TO THE CONTENTS OF THE
435 PROGRAM COUNTER ONLY (PC/),

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ERRORS

WHEN AN ERROR IS DETECTED THE ERROR MESSAGE DESCRIBED BELOW WILL BE TYPED. THEN, IF SWR15 IS RESET, TESTING WILL RESUME WITH THE NEXT ITERATION, TEST LOOP, OR TEST IN SEQUENCE. IF SWR15 IS SET THE PROGRAM WILL HALT AND AWAIT OPERATOR INTERVENTION. (SEE ERROR OPTIONS.) THE DECISION TO HALT ON ERROR CAN BE MADE AND SWR15 CAN BE SET AT ANY TIME BEFORE THE ERROR TIMEOUT IS COMPLETED.

THE FOLLOWING REPRESENTS THE ERROR MESSAGE:

PC/XXXXXX PS/XXXXXX CA/XXXXXX CX/XXXXXX CW/XXXXXX BT/XXXX F/XXXXXX
GWD/XXXXXX GMF/XXXXXX GWO/XXXXXX GW2/XXXXXX GW4/XXXXXX GW6/XXXXXX SWR/XXXXXX
TWD/XXXXXX TMF/XXXXXX TWO/XXXXXX TW2/XXXXXX TW4/XXXXXX TW6/XXXXXX AXSWR/XXXXXX

- - AND IT IS INTERPRETED AS FOLLOWS:

- PC/ PROGRAM COUNTER. THIS IS THE ADDRESS OF THE CALL (PSUEDO-OP ERROR) THAT CAUSED THE TRAP TO THE ERROR HANDLING ROUTINE AND WILL, INDICATE IN THE PROGRAM LISTING, THE ERROR THAT OCCURRED. THIS IS ALWAYS RELEVANT.
- PS/ PROCESSOR STATUS WORD AT THE TIME OF THE ERROR. THIS IS ALWAYS RELEVANT.
- CA/ CONTROL ADDRESS. THIS IS THE ADDRESS OF THE BOARD IN ERROR. IT IS ALWAYS RELEVANT. THIS IS THE CONTENTS OF R2. IF THE BOARD UNDER TEST WAS A SCAN BOARD, THIS WILL BE THE CONTROL ADDRESS (MAINT. MODE CONTROL-WORD 0 ADRS.) OF THE BOARD IN ERROR. IF THE BOARD UNDER TEST WAS A DISTRIBUTE BOARD, THIS WILL BE THE ACTUAL WORD ADDRESS OF THE FAILING DISTRIBUTE WORD.
- CX/ CONTROL ADDRESS AUXILIARY. THIS IS RELEVANT ONLY WHEN BOTH SCAN AND DISTRIBUTE BOARDS ARE BEING TESTED TOGETHER (DJMPRS). AT ALL OTHER TIMES THIS WILL BE: CX/NR (NOT RELEVANT). WHEN BOTH TYPES OF BOARDS ARE BEING TESTED TOGETHER, THIS WILL CONTAIN THE ADDRESS OF THE SCAN BOARD AND THE CA/ (ABOVE) WILL CONTAIN THE ADDRESS OF THE DISTRIBUTE BOARD. IN SHORT, THE DIST. BOARD AT ADRS. (CA/) WAS DRIVING THE SCAN BOARD AT ADRS. (CX/). THIS IS THE CONTENTS OF R3.
- CW/ CONTROL WORD POINTER. THIS IS ALWAYS RELEVANT. IT IS THE ADDRESS OF THE SCAN CONTROL WORD OR THE DISTRIBUTE CONTROL WORD, DEPENDING ON THE TYPE OF BOARD UNDER TEST. THE WORD THIS ADDRESS POINTS AT (FOR THIS IS THE CONTENTS OF R4) IS THE WORD USED TO SET SET/CLEAR MAINT. FLOPS IN SCAN BOARDS OR SET/CLEAR THE DISTRIBUTE BOARD WORD DIRECTLY.
- BT/ BOARD TYPE. THIS IS THE TYPE OF BOARD THAT WAS UNDER TEST AT THE TIME OF THE ERROR. IT WILL ALWAYS BE: BT/SCAN; BT/DIST; OR BT/DJS (DIST JMPRD TO SCAN). THIS IS ALWAYS RELEVANT.
- F/ FLAGS. THESE ARE FLAG BITS USED BY THE PROGRAM FOR VARIOUS

492 PURPOSES OF MAINTAINING PROGRAM STATUS. BECAUSE THEY MAY
493 BE USEFUL IN GENERAL, THEY ARE TYPED OUT AND THEY MAY BE
494 INTERPRETED AS FOLLOWS:
495
496 BIT 0 AN ERROR CONDITION EXISTS THAT HAS NOT BEEN
497 CLEARED (BY A RESTART OR A BYPASS ERROR)
498
499 BIT 1 THE EXISTING ERROR CONDITION IS INTERMITTANT.
500
501 BIT 2 THE LAST START/RESTART WAS FROM SA1030. (MODULE TEST MODE)
502
503 BIT 3 THE LAST START/RESTART WAS FROM SA200. (S&ORD)
504
505 BIT 4 THE LAST START/RESTART WAS FROM SA1000. (DJMPRS)
506
507 BIT 5 THE LAST START/RESTART WAS FROM SA1010. (S&ORD/AC/EX)
508
509 BIT 6 THE LAST START/RESTART WAS FROM SA1020. (DJMPRS/AC/EX)
510
511 BIT 7 OPERATOR GIVEN DATA WAS BEING USED ON A DJS PASS.
512
513 BIT 8 ERROR RELEVANCY FLAGS. (HOW THE PROG. DETERMINES
514 THRU WHAT IS AND IS NOT RELEVANT TO BE TYPED IN
515 BIT 15 AN ERROR TYPEOUT. THESE ARE SET AT THE
516 BEGINNING OF EACH TEST.)
517

518 THE FOLLOWING ERROR DATA IS NOT ALWAYS RELEVANT. THAT WHICH IS
519 NOT RELEVANT WILL BE GIVEN AS NR (NOT RELEVANT). THAT WHICH IS
520 RELEVANT WILL BE GIVEN A SIX DIGIT OCTAL VALUE. IN THE DEFINITIONS
521 GIVEN BELOW "GOOD" IS WHAT SHOULD HAVE BEEN AND "TEST" IS
522 WHAT ACTUALLY WAS. IF "TEST" DIFFERS FROM "GOOD", THEN "TEST" IS BAD.
523

524 GWD/ GOOD WORD. - RELEVANT ONLY TO DISTRIBUTE BOARDS.
525 TWD/ TEST (BAD?) WORD.
526
527 GMF/ GOOD MAINTENANCE FLOPS. - RELEVANT ONLY TO SCAN BOARDS IN MAINT. MODE.
528 TMF/ TEST (BAD?) MAINT. FLOPS.
529
530 GW0/ GOOD SCAN WORD 0 (OF THE SCAN BOARD INDICATED BY CA/).
531 TW0/ TEST (BAD?) SCAN WORD 0.
532
533 GW2/ GOOD SCAN WORD 2 (OF THE SCAN BOARD INDICATED BY CA/).
534 TW2/ TEST (BAD?) SCAN WORD 2.
535
536 GW4/ GOOD SCAN WORD 4 (OF THE SCAN BOARD INDICATED BY CA/).
537 TW4/ TEST (BAD?) SCAN WORD 4.
538
539 GW6/ GOOD SCAN WORD 6 (OF THE SCAN BOARD INDICATED BY CA/).
540 TW6/ TEST (BAD?) SCAN WORD 6.
541
542 SWR/ SWITCH REGISTER AS IT WAS AT THE TIME OF THE ERROR.
543
544 AXSWR/ SIMULATED SWITCH REGISTER FOR ACCEPT/EXERCISE MODES.
545 THE PROGRAM WAS RUNNING AS IF THE SWITCHES REPRESENTED
546 HERE WERE ACTUALLY SET. SEE STARTING-OPERATION, MODES
547 3 AND 4. (NR IS TYPED WHEN THIS IS NOT RELEVANT.)

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ERROR OPTIONS

WHEN AN ERROR OCCURS, IF SWR15 IS RESET, THE PROGRAM WILL CONTINUE TO THE NEXT ITERATION, SUB-TEST LOOP OR TEST IN SEQUENCE.

IF SWR15 IS SET AT THE TIME OF THE ERROR (SWR15 CAN BE SET DURING THE ERROR TYPEOUT) THE PROGRAM WILL HALT AFTER THE ERROR TYPEOUT IS COMPLETE, AT WHICH TIME THE OPERATOR HAS THE FOLLOWING OPTIONS.

1. DO NOT SCOPE LOOP, BUT CONTINUE AS IF SWR15 WAS NOT SET
 - A. DECIDE IF HALT IS DESIRED ON OCCURANCE OF ANOTHER ERROR AND SET SWR15 ACCORDINGLY.
 - B. PRESS CONTINUE.
2. SCOPE LOOP ON THIS ERROR CONDITION.
 - A. RESET SWR15.
 - B. SET SWR14
 - C. PRESS CONTINUE.
 - D. SEE SCOPE LOOPS SECTION
3. EXAMINE MEMORY LOCATIONS, SPECIAL REGISTERS, ETC., WHICH IS USUALLY NOT NECESSARY BECAUSE OF THE DETAIL GIVEN IN THE ERROR TYPEOUT. IF HOWEVER THE OPERATOR CHOOSES TO EXAMINE MEMORY ET. AL. THEN ALL OTHER OPTIONS ARE INVALIDATED AND A PROGRAM RESTART IS NECESSARY.

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SCOPE LOOPS

SCOPE LOOP ON AN ERROR CONDITION IS EFFECTED AS DESCRIBED IN THE ERROR OPTIONS SECTION.

ONCE A SCOPE LOOP HAS BEEN EFFECTED IT WILL REMAIN IN EFFECT FOR AS LONG AS SWR15 IS RESET AND SWR14 IS SET.

THIS SCOPE LOOP IS LOCKED, THAT IS IT WILL LOOP ON THE FAILING TEST EVEN THOUGH IT IS NO LONGER FAILING. SEE INTERMITTANT ERRORS SECTION.

A SCOPE LOOP ON ANY GIVEN TEST CONSISTS OF A LOOP FROM THE PSUEDO-OP "ERROR" BACK TO THE LOCATION FOLLOWING THE PSUEDO-OP "SCOPE".

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INTERMITTENT ERRORS

AN INTERMITTENT ERROR IS DEFINED FOR THIS PROGRAM AS FOLLOWS:

1. AN ERROR HAS OCCURRED AND MADE A TYPEOUT.
2. THE OPERATOR HAS SET A SCOPE LOOP (THE PROGRAM'S, NOT HIS OWN)
3. THE SCOPE LOOP IS LOOPING ON ERRORS.
4. THE ERROR CONDITION FAILS, THAT IS, THE TEST PASSED OK, AND WANTS TO CONTINUE TO THE NEXT TEST.

THE PROGRAM KNOWS THAT AN ERROR CONDITION EXISTS AND THAT A SCOPE LOOP WAS IN EFFECT. IT WILL THEREFORE DO THE FOLLOWING:

1. ON THE FIRST OCCURANCE OF THE INTERMITTENT THE WORD "INTERMITTENT" WILL BE TYPED ON THE TTY.
2. ON EACH LOOP, EITHER AN ERROR OR AN "OK" THE COUNTS OF BOTH ERROR LOOPS AND "OK" LOOPS WILL BE TYPED. THE VALUE OF THESE COUNTS IS TO GIVE THE OPERATOR SOME IDEA OF THE FREQUENCY OF THE INTERMITTENT, THAT IS, HOW MANY TIMES IS THE ERROR CONDITION LOST? THESE COUNTS ARE IN EFFECT ONLY IN A SCOPE LOOP THAT HAS DETECTED AN INTERMITTENT AND THEY BEGIN COUNTING WHEN THE INTERMITTENT IS FIRST DETECTED. THE COUNTERS ARE WRAP AROUND. THE FORMAT OF THESE COUNT TYPEOUTS IS:

ERC/XXXXXX OKC/XXXXXX

THE OPERATOR WILL BE UNCONDITIONALLY NOTIFIED ON THE TTY WHENEVER EITHER OF THESE COUNTERS OVERFLOW. THE COUNT CONTINUES, STARTING AT COUNT 0 AGAIN. NOTHING ELSE HAS CHANGED.

3. THE ABOVE TYPEOUT CAN BE INHIBITED BY SETTING SWR06. THE COUNT GOES ON HOWEVER AND CAN BE OBTAINED AT ANY TIME BY MOMENTARILY RESETTING SWR06.
4. ALL OTHER SWITCH CONTROLS FOR ERRORS, SCOPE LOOPS, ETC. ARE STILL VALID.

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FORCED ERROR TYPEOUT

IN THE EVENT OF AN ILLEGAL TRAP TO THE TRAP CATCHER, AN ERROR TYPEOUT THAT WILL REFLECT THE STATUS OF THE PROGRAM AT THE TIME OF THE ILLEGAL TRAP CAN BE OBTAINED BY STARTING THE PROGRAM AT SA1040. SWITCH SETTINGS ARE IMMATERIAL. THE TYPEOUT WILL BE MADE, IN FULL, AND THE PROGRAM WILL HALT.

TRAP CATCHER

ANY ILLEGAL TRAPS THAT OCCUR WILL CAUSE A HALT SOMEWHERE BETWEEN LOCATIONS 000000 AND 000776. THE INITIALIZATION OF THE PROGRAM SET UP THESE LOCATIONS SUCH THAT ALL ILLEGAL TRAP VECTORS ('NEW' PC) POINT TO THE NEXT LOCATION ('NEW' PS) WHICH IS SET TO 000000, OR A HALT INSTRUCTION.

IN THE EVENT OF THIS TYPE OF HALT:

1. AN ILLEGAL TRAP OCCURRED TO THE LOCATION PRECEDING THE HALT LOC.
2. EXAMINE LOCATION 177706 (STACK POINTER - R6). THIS IS AN ADDRESS.
3. EXAMINE THE LOCATION THAT WAS SPECIFIED BY THE CONTENTS OF R6. THIS IS AN ADDRESS.
4. SUBTRACT 2 FROM THE ADDRESS OBTAINED BY STEP 3 ABOVE. THIS IS THE ADDRESS OF THE INSTRUCTION THAT CAUSED, OR THAT WAS IN PROGRESS AT THE TIME OF, THE ILLEGAL TRAP.
5. EXAMINE THE NEXT LOCATION (CONTENTS OF R6 + 2). THIS IS THE PROCESSOR STATUS WORD AS IT WAS AT THE TIME OF THE ILLEGAL TRAP.
6. SEE SECTION FORCED ERROR TYPEOUT.
.ENDR


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683  
684 .TITLE CB11  
685 .ABS  
686  
687 :EQUATES  
688  
689 000000 R0=%0 ;REGISTER 0 GENERAL USE.  
690 000001 R1=%1 ;REGISTER 1 GENERAL USE.  
691 000002 R2=%2 ;REGISTER 2 SPECIAL USE.  
692 000003 R3=%3 ;REGISTER 3 SPECIAL USE.  
693 000004 R4=%4 ;REGISTER 4 SPECIAL USE.  
694 000005 R5=%5 ;REGISTER 5 SPECIAL USE.  
695 000006 R6=%6 ;REGISTER 6 SPECIAL USE.  
696 000007 R7=%7 ;REGISTER 7 SPECIAL USE.  
697 000002 CADR=R2 ;REGISTER 2 CONTROL ADDRESS POINTER.  
698 000003 CADRX=R3 ;REGISTER 3 AUXILIARY CONTROL ADDRESS POINTER.  
699 000004 CWP=R4 ;REGISTER 4 CONTROL WORD POINTER.  
700 000005 $=R5 ;REGISTER 5 SUBROUTINE POINTER.  
701 000006 STP=R6 ;REGISTER 6 STACK POINTER.  
702 000007 PC=R7 ;REGISTER 7 PROGRAM COUNTER.  
703  
704 177560 TKS=177560 ;TTY KEY BOARD STATUS.  
705 177562 TKB=177562 ;TTY KEYBOARD BUFFER.  
706 177564 TPS=177564 ;TTY PRINTER STATUS.  
707 177566 TPB=177566 ;TTY PRINTER BUFFER.  
708 177546 KWLS=177546 ;LINE CLOCK STATUS.  
709 172540 KWPS=172540 ;REAL TIME CLOCK STATUS.  
710 172542 KWPB=172542 ;REAL TIME CLOCK BUFFER.  
711 172544 KWPC=172544 ;REAL TIME CLOCK COUNTER.  
712 177776 PS=177776 ;PROCESSOR STATUS  
713 001143 RFLGS=FLAGS+1 ;ERROR TYPEOUT RELEVANCY FLAGS..  
714  
715 000240 NOP=240 ;PSUEDO-OP NO OPERATION.  
716 000006 RTT=6 ;RETURN FROM 'T' TRAP INTERRUPT.  
717 104400 SCOPE=TRAP ;PSUEDO-OP TRAP.  
718 104000 ERROR=EMT ;PSUEDO-OP EMT.  
719 104777 CONTROL=104777 ;PSEUDO-OP TRAP.  
720  
721 100000 HES=100000 ;SWR15 HALT ON ERROR.  
722 040000 SLS=40000 ;SWR14 SCOPE LOOP.  
723 020000 STS=20000 ;SWR13 SUBSEQUENT ERROR TYPEOUTS.  
724 010000 TTS=10000 ;SWR12 TRACE TRAP.  
725 004000 ITS=4000 ;SWR11 ITERATE.  
726  
727 000100 IMS=100 ;SWR06 INHIBIT INTERMITTANT TYPEOUTS.  
728 000040 PCS=40 ;SWR05 TYPE PASS COUNT AT END OF PASSES.  
729 000020 TSS=20 ;SWR04 TYPE PROGRAM STATUS.  
730 000010 IQS=10 ;SWR03 INHIBIT TTY QUERIES.  
731 000004 SDS=4 ;SWR02 SHORTEN TIME DELAYS BY -10%  
732 000002 LDS=2 ;SWR01 LENGTHEN TIME DELAYS BY +10%  
733 000001 SES=1 ;SWR00 SHORT ERROR MESSAGES (PC ONLY).  
734  
735 000001 ECF=1 ;FLAG ERROR CONDITION.  
736 000002 IMF=2 ;FLAG ERROR CONDITION IS INTERMITTANT.  
737 000004 MOD=4 ;FLAG MODULE MODE START.  
738 000010 BF=10 ;FLAG S &OR D DIAG. START.
```

739	000020	JF=20	;FLAG DJMPRS DIAG. START.
740	000040	BXF=40	;FLAG S &OR D ACCEPT/EXERCISE START.
741	000100	JXF=100	;FLAG DJMPRS ACCEPT/EXERCISE START.
742	000200	DATF=200	;FLAG DATA IN USE ON DJMPRS/
743	000001	AXF=1	;FLAG CAX RELEVANT.
744	000002	CWF=2	;FLAG CWORD RELEVANT.
745	000004	WDF=4	;FLAG GWD & TWD RELEVANT.
746	000010	MFF=10	;FLAG GMF & TMF RELEVANT.
747	000020	WOF=20	;FLAG GWO & TWO RELEVANT.
748	000040	W26F=40	;FLAG GW2,GW4,GW6,TW2,TW4 & TW6 RELEVANT
749	000100	SF=100	;FLAG "SCAN" RELEVANT.
750	000200	DF=200	;FLAG "DIST" RELEVANT.
751	000172	SRF=172	;FLAGS ALL THAT IS RELEVANT TO SCAN BDS.
752	000206	DRF=206	;FLAGS ALL TYPEOUTS ARE RELEVANT TO DIST. BDS.
753	000327	DSRF=327	;FLAGS ALL THAT IS RELEVANT TO DJS.
754	000377	ALRF=377	;FLAGS ALL TYPEOUTS ARE RELEVANT.
755			

```
756
757      ;START - SA200
758      ;NORMAL PROGRAM START TO TEST SCAN BOARDS AND/OR DISTRIBUTE BOARDS
759      ;WHILE DISCONNECTED FROM ALL TELEPHONE CO. INPUTS.
760
761      000200 000200
762 000200 000137 007462      S.ORD:  .=200
763      ;
764      ;START - SA1000
765      ;SPECIAL START FOR SUB-PROGRAM "DJMPRS" TO TEST "DISTRIBUTE BOARDS
766      ;JUMPERED TO SCAN BOARD" WHILE DISCONNECTED FROM ALL TELEPHONE INPUTS.
767
768      001000 001000
769 001000 000167 006476      DJMPRS: .=1000
770      ;
771      ;START - SA1010
772      ;SPECIAL START TO RUN ACCEPTANCE/EXERCISE OF SCAN BOARDS AND/OR DISTRIBUTE
773      ;BOARDS WHILE DISCONNECTED FROM ALL TELEPHONE CO. INPUTS.
774
775      001010 001010
776 001010 000167 006504      S.ORDAX: .=1010
777      ;
778      ;START - SA1020
779      ;SPECIAL START TO RUN ACCEPTANCE/EXERCISE OF SUB-PROGRAM "DJMPRS" TO
780      ;TEST TWO CONTIGUOUS DISTRIBUTE BOARDS WHOSE OUTPUTS ARE JUMPERED TO
781      ;THE INPUTS OF ONE SCAN BOARD WHILE DISCONNECTED FROM ALL TELEPHONE CO. INPUTS.
782
783      001020 001020
784 001020 000167 006504      DJSAX:  .=1020
785      ;
786      ;START - SA1030
787      ;SPECIAL START FOR MODULE TEST MODE.
788
789      001030 001030
790 001030 000167 006436      MODMOD: .=1030
791      ;
792      ;START - SA1040
793      ;SPECIAL START TO FORCE AN ERROR TYPEOUT AFTER AN ILLEGAL TRAP HAS OCCURRED.
794
795      001040
796      ;
797      001040 010667 000226      FORCER: MOV      STP,FESAV
798      001044 012706 001000      MOV      #1000,STP
799      001050 004567 011120      JSR      $,TYPEA
800      001054 043136 051117 042503      .ASCII  " FORCED TYPEOUT."
801      001062 020104 054524 042520
802      001070 052517 027124
803      001074 004567 005114      JSR      $,TYPERR
804      001100 016706 000166      MOV      FESAV,STP
805      001104 000000      FORCEA: HALT
806      001106 000776      BR      FORCEA
```

812			:CONSTANTS.		
813					
814	001110	000010	ITNO:	10	: ITERATION NUMBER.
815	001112	000001	DMS1:	1	: NO. OF MS FOR DELAY.
816	001114	000007	DMS2:	7	: NO. OF MS FOR DELAY.

```
817 ;VARIABLES - NOT CLEARED ON START OR RESTART.
818
819 001116 000000 LOSA: 0 ;LOWEST SCAN ADDRESS (GIVEN BY OPERATOR).
820 001120 000000 HISA: 0 ;HIGHEST SCAN ADDRESS (GIVEN BY OPERATOR).
821 001122 000000 LODA: 0 ;LOWEST DISTRIBUTE ADDRESS (GIVEN BY OPERATOR).
822 001124 000000 HIDA: 0 ;HIGHEST DISTRIBUTE ADDRESS (GIVEN BY OPERATOR).
823 001126 000000 LOSAX: 0 ;LO SCAN ADRS. AUXILIARY.
824 001130 000000 HISAX: 0 ;HI SCAN ADRS. AUXILIARY.
825 001132 000000 LODAX: 0 ;LO DIST. ADRS. AUXILIARY.
826 001134 000000 HIDAX: 0 ;HI DIST. ADRS. AUXILIARY.
827 001136 000000 SWR: 0 ;SWITCH REGISTER POINTER.
828 001140 000000 DATAWD: 0 ;DATA WORD.
829 001142 000000 FLAGS: 0 ;PROGRAM FLAGS.
830 001144 000000 FX: 0 ;PROGRAM FLAGS AUXILIARY.
831
832 ;VARIABLES - CLEARED ON START OR RESTART.
833
834 001146 000000 BEGV: 0
835 001150 000000 PASCTR: 0 ;PASS COUNTER 0
836 001152 000000 ITCNT: 0 ;ITERATION COUNTER.
837 001154 000000 SCORTN: 0 ;SCOPE LOOP RETURN POINTER.
838 001156 000000 IMCNT: 0 ;INTERMITTANT ERROR COUNTER.
839 001160 000000 SAVPC: 0 ;SAVED PC.
840 001162 000000 SAVPS: 0 ;SAVED PS.
841 001164 000000 SAVSWR: 0 ;SAVED SWR.
842 001166 000000 SAVCAD: 0 ;SAVED CONTROL ADDRESS POINTER. (R2)
843 001170 000000 SAVCAX: 0 ;SAVED CONTROL ADDRESS AUXILIARY POINTER. (R3)
844 001172 000000 SAVCWP: 0 ;SAVED CONTROL WORD POINTER. (R4)
845 001174 000000 SAVITC: 0 ;SAVED ITERATION COUNTER.
846 001176 000000 SAVOKC: 0 ;SAVED INTERMITTENT ERROR 'OK' COUNTER.
847 001200 000000 SAVRO: 0 ;SAVED R0.
848 001202 000000 SAVR1: 0 ;SAVED R1.
849 001204 000000 SAVSTP: 0 ;SAVED STACK POINTER.
850 001206 000000 SAVFLG: 0 ;SAVED FLAGS.
851 001210 000000 AXSWR: 0 ;SWITCH REG. USED WITH ACCEPT/EXERCISE.
852 001212 000000 AXRTN: 0 ;RETURN POINTER USED WITH ACCEPT/EXERCISE
853 001214 000000 GMF: 0 ;GOOD MAINT. FLAGS.
854 001216 000000 GWD: 0 ;GOOD WORD.
855 001220 000000 GW0: 0 ;GOOD WORD 0
856 001222 000000 GW2: 0 ;GOOD WORD 2.
857 001224 000000 GW4: 0 ;GOOD WORD 4.
858 001226 000000 GW6: 0 ;GOOD WORD 6.
859 001230 000000 TMF: 0 ;TEST MAINT. FLOP
860 001232 000000 TWD: 0 ;TEST WORD
861 001234 000000 TWO: 0 ;TEST WORD 0.
862 001236 000000 TW2: 0 ;TEST WORD 2.
863 001240 000000 TW4: 0 ;TEST WORD 4.
864 001242 000000 TW6: 0 ;TEST WORD 6.
865 001244 000000 TLMT: 0 ;TIME LIMIT FOR SUBR. TIME.
866 001246 000000 TYP SRC: 0 ;ORIG. TYPE CALL SOURCE.
867 001250 000000 QSRC: 0 ;QUERY SOURCE
868 001252 000000 KCTR: 0 ;KEY IN CHARACTER COUNTER.
869 001254 000000 DLANO1: 0 ;DELAY NUMBER TYPE 1.
870 001256 000000 DLANO2: 0 ;DELAY NUMBER TYPE 2.
871 001260 000000 DLAOF1: 0 ;DELAY OFFSET TYPE 1.
872 001262 000000 DLAOF2: 0 ;DELAY OFFSET TYPE 2.
```

873	001264	000000	SAVERC: 0	;SAVED INTERMITTENT ERROR 'ER' COUNTER.
874	001266	000000	DLACTR: 0	;DELAY COUNTER.
875	001270	000000	KCSR: 0	;CLOCK CSR (ACTUAL).
876	001272	000000	FESAV: 0	;FORCED ERROR TYPEOUT STP STORAGE.
877	001274	000000	ERCTR: 0	;INTERMITTENT COUNTER - ERRORS.
878	001276	000000	OKCTR: 0	;INTERMITTENT COUNTER - OK'S.
879	001300	000000	ENDV: 0	

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880 ;SCAN CONTROL WORD TABLE.
881
882 ;CONTROL WORDS USED TO SET AND CLEAR THE MAINTENANCE FLOPS AND SCAN WORDS.
883 ;THE MAINT. FLOPS AND SCAN WORDS SET OR CLEARED ARE GIVEN BELOW IN
884 ;REFERENCE TO WORD 0, WORD 2, WORD 4 & WORD 6 OF A SCAN MODULE.
885 ;THESE BITS, WHEN USED IN BYTE INSTRUCTIONS CORRESPOND TO BITS 8, 9, 10 & 11.
886
887 ; CLEARS:          SETS:
888
889 001302 000000      SCW00: 0      ; NONE          ALL
890 001304 000001      SCW01: 1      ; 0             2,4,6
891 001306 000002      SCW02: 2      ; 2             0,4,6
892 001310 000003      SCW03: 3      ; 0,2           4,6
893 001312 000004      SCW04: 4      ; 4             0,2,6
894 001314 000005      SCW05: 5      ; 0,4           2,6
895 001316 000006      SCW06: 6      ; 2,4           0,6
896 001320 000007      SCW07: 7      ; 0,2,4         6
897 001322 000010      SCW10: 10     ; 6             0,2,4
898 001324 000011      SCW11: 11     ; 0,6           2,4
899 001326 000012      SCW12: 12     ; 2,6           0,4
900 001330 000013      SCW13: 13     ; 0,2,6         4
901 001332 000014      SCW14: 14     ; 4,6           0,2
902 001334 000015      SCW15: 15     ; 0,4,6         2
903 001336 000016      SCW16: 16     ; 2,4,6         0
904 001340 000017      SCW17: 17     ; ALL           NONE
905 001342 000000      SCW20: 0      ;SCW20 THRU SCW77 SETS & CLEARS WORDS AS
906 001344 000016      SCW21: 16     ;GIVEN ABOVE FOR THE SAME CONSTANTS. (SCW21 IS
907 001346 000001      SCW22: 1      ;THE SAME AS FOR SCW16.)
908 001350 000015      SCW23: 15
909 001352 000002      SCW24: 2
910 001354 000014      SCW25: 14
911 001356 000003      SCW26: 3
912 001360 000013      SCW27: 13
913 001362 000004      SCW30: 4
914 001364 000012      SCW31: 12
915 001366 000005      SCW32: 5
916 001370 000011      SCW33: 11
917 001372 000006      SCW34: 6
918 001374 000010      SCW35: 10
919 001376 000007      SCW36: 7
920 001400 000000      SCW37: 0
921 001402 000007      SCW40: 7
922 001404 000010      SCW41: 10
923 001406 000006      SCW42: 6
924 001410 000011      SCW43: 11
925 001412 000005      SCW44: 5
926 001414 000012      SCW45: 12
927 001416 000004      SCW46: 4
928 001420 000013      SCW47: 13
929 001422 000003      SCW50: 3
930 001424 000014      SCW51: 14
931 001426 000002      SCW52: 2
932 001430 000015      SCW53: 15
933 001432 000001      SCW54: 1
934 001434 000016      SCW55: 16
935 001436 000000      SCW56: 0
```

936	001440	000017	SCW57:	17
937	001442	000005	SCW60:	5
938	001444	000012	SCW61:	12
939	001446	000005	SCW62:	5
940	001450	000012	SCW63:	12
941	001452	000005	SCW64:	5
942	001454	000012	SCW65:	12
943	001456	000005	SCW66:	5
944	001460	000012	SCW67:	12
945	001462	000000	SCW70:	0
946	001464	000017	SCW71:	17
947	001466	000000	SCW72:	0
948	001470	000017	SCW73:	17
949	001472	000000	SCW74:	0
950	001474	000017	SCW75:	17
951	001476	000000	SCW76:	0
952	001500	000017	SCW77:	17
953				

954
955 :DISTRIBUTE CONTROL WORD TABLE.
956 :WORDS USED TO DIRECTLY SET DISTRIBUTE BOARDS IN BOTH THE DISTRIBUTE
957 :TESTS AND IN THE DISTRIBUTE-JUMPERED-TO-SCAN-TEST.
958

959	001502	000000	DCW00:	0
960	001504	000001	DCW01:	1
961	001506	000002	DCW02:	2
962	001510	000004	DCW03:	4
963	001512	000010	DCW04:	10
964	001514	000020	DCW05:	20
965	001516	000040	DCW06:	40
966	001520	000100	DCW07:	100
967	001522	000200	DCW10:	200
968	001524	000400	DCW11:	400
969	001526	001000	DCW12:	1000
970	001530	002000	DCW13:	2000
971	001532	004000	DCW14:	4000
972	001534	010000	DCW15:	10000
973	001536	020000	DCW16:	20000
974	001540	040000	DCW17:	40000
975	001542	100000	DCW20:	100000
976	001544	177776	DCW21:	177776
977	001546	177775	DCW22:	177775
978	001550	177773	DCW23:	177773
979	001552	177767	DCW24:	177767
980	001554	177757	DCW25:	177757
981	001556	177737	DCW26:	177737
982	001560	177677	DCW27:	177677
983	001562	177577	DCW30:	177577
984	001564	177377	DCW31:	177377
985	001566	176777	DCW32:	176777
986	001570	175777	DCW33:	175777
987	001572	173777	DCW34:	173777
988	001574	167777	DCW35:	167777
989	001576	157777	DCW36:	157777
990	001600	137777	DCW37:	137777
991	001602	077777	DCW40:	077777
992	001604	052525	DCW41:	052525
993	001606	125252	DCW42:	125252
994	001610	034163	DCW43:	034163
995	001612	146314	DCW44:	146314
996	001614	070707	DCW45:	070707
997	001616	107070	DCW46:	107070
998	001620	007417	DCW47:	007417
999	001622	170360	DCW50:	170360
1000	001624	041045	DCW51:	041045
1001	001626	136732	DCW52:	136732
1002	001630	154321	DCW53:	154321
1003	001632	023456	DCW54:	023456
1004	001634	133333	DCW55:	133333
1005	001636	044444	DCW56:	044444
1006	001640	000000	DCW57:	000000
1007	001642	177777	DCW60:	177777
1008	001644	000000	DCW61:	000000
1009	001646	111111	DCW62:	111111

1010	001650	022222	DCW63:	022222
1011	001652	133333	DCW64:	133333
1012	001654	044444	DCW65:	044444
1013	001656	155555	DCW66:	155555
1014	001660	066666	DCE67:	066666
1015	001662	177777	DCW70:	177777
1016	001664	101010	DCW71:	101010
1017	001666	111111	DCW72:	111111
1018	001670	121212	DCW73:	121212
1019	001672	131313	DCW74:	131313
1020	001674	141414	DCW75:	141414
1021	001676	151515	DCW76:	151515
1022	001700	177777	DCW77:	177777

```
1023 ;SUBROUTINE TO INITIALIZE GOOD WORDS FOR SCAN CONTROL TESTS.  
1024 ;(SIMULATE THE ACTION OF SCAN BOARDS IN MAINT. MODE.)  
1025  
1026 001702 011467 177306 IZGSW: MOV (CWP),GMF ;INIT. GOOD MAINT. FLOP.  
1027 001706 005067 177306 CLR GW0 ;INIT. GOOD WORD 0.  
1028 001712 032767 000001 177274 BIT #1,GMF  
1029 001720 001002 BNE IZGSWA  
1030 001722 005167 177272 COM GW0  
1031 001726 005067 177270 IZGSWA: CLR GW2 ;INIT. GOOD WORD 2.  
1032 001732 032767 000002 177254 BIT #2,GMF  
1033 001740 001002 BNE IZGSWB  
1034 001742 005167 177254 COM GW2  
1035 001746 005067 177252 IZGSWB: CLR GW4 ;INIT. GOOD WORD 4.  
1036 001752 032767 000004 177234 BIT #4,GMF  
1037 001760 001002 BNE IZGSWC  
1038 001762 005167 177236 COM GW4  
1039 001766 005067 177234 IZGSWC: CLR GW6 ;INIT. GOOD WORD 6.  
1040 001772 032767 000010 177214 BIT #10,GMF  
1041 002000 001002 BNE IZGSWD  
1042 002002 005167 177220 COM GW6  
1043 002006 000205 IZGSWD: RTS $
```

```
1044 ;SUBROUTINES TO DELAY
1045
1046 002010 016700 177240 DELAY1: MOV DLANO1,R0 ;TEMP. STORE DELAY NO. 1.
1047 002014 016701 177240 MOV DLAOF1,R1 ;TEMP. STORE DELAY OFFSET 1.
1048 002020 000167 000010 JMP DELAY ;BRANCH.
1049
1050 002024 016700 177226 DELAY2: MOV DLANO2,R0 ;TEMP. STORE DELAY NO. 2.
1051 002030 016701 177226 MOV DLAOF2,R1 ;TEMP. STORE DELAY OFFSET 2.
1052
1053 002034 010067 177226 DELAY: MOV R0,DLACTR ;INIT. DELAY COUNTER
1054 002040 032777 000004 177070 BIT #SDS,@SWR ;SHORTEN DELAY?
1055 002046 001402 BEQ DLAA ;NO. - BRANCH.
1056 002050 160167 177212 SUB R1,DLACTR ;YES. - SHORTEN DELAY BY 10%.
1057 002054 032777 000002 177054 DLAA: BIT #LDS,@SWR ;LENGTHEN DELAY?
1058 002062 001402 BEQ DLAB ;NO. - BRANCH.
1059 002064 060167 177176 ADD R1,DLACTR ;YES. - LENGTH DELAY BY 10%.
1060 002070 005367 177172 DLAB: DEC DLACTR ;DECREMENT DELAY COUNTER. IS IT ZERO?
1061 002074 001375 BNE DLAB ;NO. - BRANCH.
1062 002076 000205 RTS DLAB ;YES. - RETURN.
1063
```

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1064                                     ;ARE THERE SCAN BOARDS TO BE TESTED AND/OR IS TESTING REQUESTED?
1065
1066 002100 032767 000120 177034 PREST: BIT #JF+JXF,FLAGS ;TEST DJMPRS WHERE DATA HAS
1067 002106 001406 BEQ PRESTA ;BEEN SPECIFIED?
1068 002110 032767 000200 177024 BIT #DATF,FLAGS
1069 002116 001402 BEQ PRESTA ;NO. - BRANCH.
1070 002120 000167 002526 JMP IDJ ;YES. - GO DIRECTLY TO DJMPRS TESTS.
1071 002124 026727 176766 000116 PRESTA: CMP LOSA,#'N ;TEST SCAN BOARDS?
1072 002132 001002 BNE PRESTB ;YES. - BRANCH.
1073 002134 000167 001570 JMP PREDT ;NO. - BRANCH.
1074 002140 032767 000004 176774 PRESTB: BIT #MOD,FLAGS ;MODULE TEST MODE?
1075 002146 001002 BNE STMBEG ;YES. - BRANCH.
1076 002150 000167 000074 JMP STOBEG ;NO. - BRANCH.
1077
1078 ;SCAN TEST M
1079 ;CHECK THAT ALL SCAN BOARD ADDRESSES NOT GIVEN BY THE OPERATOR
1080 ;DO NOT RESPOND TO A TEST INST. AN ERROR INDICATES THAT
1081 ;THE BOARD IS RESPONDING TO ADDRESS(ES) OTHER THAN ITS OWN
1082 ;AND IS BAD.
1083
1084 002154 016702 176736 STMBEG: MOV LOSA,CADR ;INIT. CONTROL ADRS. POINTER.
1085 002160 042702 003777 BIC #3777,CADR ;FORCE IT TO 164000.
1086 002164 012767 002214 175612 MOV #STMTS,4 ;INIT. TIMEOUT-ERROR TRAP VECTOR.
1087 002172 112767 000100 176743 MOVB #SF,RFLGS ;INIT. ERROR RELEVANCY FLAGS.
1088 002200 104400 SCOPE ;SCOPE TRAP.
1089 002202 020267 176710 STMLOP: CMP CADR,LOSA ;EXCLUDE TESTING THIS ADDRESS.
1090 002206 001410 BEQ STMADV ;YES. - BRANCH. (IT'S WHERE THE BOARD IS.)
1091 002210 005712 TST (CADR) ;TEST SCAN ADRS.
1092 002212 000402 BR STMERR ;IF NO TRAP OCCURS, GO TO 'STMERR' -
1093 002214 022626 STMTS: CMP (STP)+,(STP)+ ;IF A TRAP OCCURS IT RETURNS HERE AS 'OK'.
1094 002216 104777 STMOK: CONTROL ;CONTROL TRAP.
1095 002220 104000 STMERR: ERROR ;ERROR TRAP.
1096 002222 020227 167770 CMP CADR,#167770 ;ALL ADRS. CONFIGURATIONS TESTED?
1097 002226 001403 BEQ STMEND ;YES.
1098 002230 062702 000010 STMADV: ADD #10,CADR ;NO. - ADVANCE CONTROL ADRS. PTR.
1099 002234 000762 BR STMLOP ;BRANCH.
1100 002236 012767 000006 175540 STMEND: MOV #6,4 ;INIT. (CLOSE) TIMEOUT-ERROR TRAP VECTOR.
1101 002244 000167 000000 JMP STOBEG ;BRANCH.

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1102          ;SCAN TEST 0
1103          ;CHECK THAT ALL SCAN ADDRESSES GIVEN BY THE OPERATOR AT LEAST RESPOND
1104          ;TO A TST INST.  AN ERROR (VIA TIME OUT-ERROR TRAP) INDICATES EITHER
1105          ;A BAD ADDRESS OR A NON-EXISTANT ADDRESS WAS GIVEN BY THE OPERATOR.
1106
1107 002250 016702 176642  STOBEG: MOV      LOSA,CADR      ;INIT. CONTROL ADRS. POINTER.
1108 002254 012767 002276 175522  MOV      #STOTS,4      ;INIT. TIME OUT-ERROR TRAP VECTOR.
1109 002262 112767 000100 176653  MOVB     #SF,RFLGS     ;INIT. ERROR RELEVANCY FLAGS.
1110 002270 104400          SCOPE          ;SCOPE TRAP.
1111 002272 005712  STOLOP: TST     (CADR)    ;TEST A SCAN ADDRESS.
1112 002274 000402          BR      STOOK        ;IF NO TRAP OCCURS, GO TO 'STOOK'.-
1113 002276 022626  STOTS:  CMP     (STP)+,(STP)+ ;IF A TRAP OCCURS, GO TO 'STOERR' VIA-
1114 002300 000401          BR      STOERR       ;A TIME OUT-ERROR TRAP TO VECTOR 4.
1115 002302 104777  STOOK:  CONTROL ;CONTROL TRAP.
1116 002304 104000  STOERR: ERROR    ;ERROR TRAP.
1117 002306 020267 176606          CMP     CADR,HISA     ;ALL GIVEN ADDRESSES TESTED?
1118 002312 001403          BEQ     STOEND       ;YES. - BRANCH.
1119 002314 062702 000002          ADD     #2,CADR      ;NO. - ADVANCE CONTROL ADRS. PTR.
1120 002320 000764          BR      STOLOP      ;BRANCH.
1121 002322 012767 000006 175454  STOEND: MOV     #6,4    ;INIT. (CLOSE) TIMEOUT-ERROR TRAP VECTOR.
1122 002330 000167 000000          JMP     ST1BEG      ;BRANCH.
```

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1123
1124
1125      ;SCAN TEST 1
1126      ;CHECK THAT MAINTENANCE FLOP ACCESS OF ALL SCAN ADDRESSES GIVEN
1127      ;BY THE OPERATOR AT LEAST RESPOND PROPERLY TO A TST INST.
1128 002334 016702 176556      ST1BEG: MOV      LOSA,CADR      ;INIT. CONTROL ADDRESS POINTER.
1129 002340 012767 002364 175436      MOV      #ST1TS,4      ;INIT. TIME OUT-ERROR TRAP VECTOR.
1130 002346 112767 000100 176567      MOV      #SF,RFLGS     ;INIT. ERROR RELEVANCY FLAGS.
1131 002354 104400      SCOPE      ;SCOPE TRAP.
1132 002356 105762 000001      ST1LOP: TSTB     +1(CADR) ;TEST ACCESS TO MAINT. FLOPS.
1133 002362 000402      BR          ST1OK      ;IF NO TRAP OCCURS, GO TO 'ST1OK'.-
1134 002364 022626      ST1TS:  CMP      (STP)+,(STP)+ ;IF A TRAP OCCURS, GO TO 'ST1ERR' VIA-
1135 002366 000401      BR          ST1ERR     ;A TIME OUT-ERROR TRAP TO VECTOR 4.
1136 002370 104777      ST1OK:  CONTROL   ;CONTROL TRAP.
1137 002372 104000      ST1ERR: ERROR    ;ERROR TRAP.
1138 002374 020267 176530      CMP      CADR,HISAX   ;ALL MAINT. FLOP ACCESSES TESTED?
1139 002400 001403      BEQ      ST1END     ;YES. - BRANCH.
1140 002402 062702 000010      ADD      #10,CADR    ;NO. - ADVANCE CONTROL ADRS. PTR.
1141 002406 000763      BR          ST1LOP    ;BRANCH. (NEXT SUB-TEST LOOP)
1142 002410 012767 000006 175366      ST1END: MOV      #6,4   ;INIT. TIME OUT-ERROR TRAP VECTOR.
1143 002416 000167 000000      JMP      ST2BEG     ;BRANCH.
```

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1144 ;SCAN TEST 2
1145 ;CHECK THAT ALL MAINTENANCE FLOPS ARE RESET AND THAT ALL SCAN
1146 ;WORD BITS ARE SET BY THE ACTION OF THE RESET INSTRUCTION
1147
1148 002422 016702 176470 ST2BEG: MOV LOSA,CADR ;INIT. CONTROL ADDRESS POINTER.
1149 002426 012704 001302 MOV #SCW00,CWP ;INIT. CONTROL WORD POINTER.
1150 002432 0045.7 177244 JSR $,IZGSW ;INIT. "GOOD" WORDS.
1151 002436 112767 000172 176477 MOV #SRF,RFLGS ;INIT. ERROR RELEVANCY FLAGS.
1152 002444 104400 SCOPE ;SCOPE TRAP.
1153 002446 000005 ST2LOP: RESET ;CLEAR ALL MAINT. FLOPS, SET ALL SCAN BITS.
1154 002450 116267 000001 176552 MOV +1(CADR),TMF ;READ MAINT. FLOPS.
1155 002456 004567 177326 JSR $,DELAY1 ;WAIT.
1156 002462 016267 000000 176544 MOV +0(CADR),TW0 ;READ SCAN WORD 0.
1157 002470 016267 000002 176540 MOV +2(CADR),TW2 ;READ SCAN WORD 2.
1158 002476 016267 000004 176534 MOV +4(CADR),TW4 ;READ SCAN WORD 4.
1159 002504 016267 000006 176530 MOV +6(CADR),TW6 ;READ SCAN WORD 6.
1160 002512 026767 176512 176474 CMP TMF,GMF ;MAINT. FLOPS CLEARED?
1161 002520 001021 BNE ST2ERR ;NO. - BRANCH.
1162 002522 026767 176506 176470 CMP TW0,GW0 ;YES. - SCAN WORD 0, ALL BITS SET?
1163 002530 001015 BNE ST2ERR ;NO. - BRANCH.
1164 002532 026767 176500 176462 CMP TW2,GW2 ;YES. - SCAN WORD 2, ALL BITS SET?
1165 002540 001011 BNE ST2ERR ;NO. - BRANCH.
1166 002542 026767 176472 176454 CMP TW4,GW4 ;YES. - SCAN WORD 4, ALL BITS SET?
1167 002550 001005 BNE ST2ERR ;NO. - BRANCH.
1168 002552 026767 176464 176446 CMP TW6,GW6 ;YES. - SCAN WORD 6, ALL BITS SET?
1169 002560 001001 BNE ST2ERR ;NO. - BRANCH.
1170 002562 104777 ST2OK: CONTROL ;CONTROL TRAP.
1171 002564 104000 ST2ERR: ERROR ;ERROR TRAP.
1172 002566 020267 176336 CMP CADR,HISAX ;ALL MAINT. FLOPS & SCAN WORDS TESTED?
1173 002572 001403 BEQ ST2END ;YES. - BRANCH.
1174 002574 062702 000010 ADD #10,CADR ;NO. - ADVANCE CONTROL ADRS. PTR.
1175 002600 000722 BR ST2LOP ;BRANCH. (NEXT SUB-TEST LOOP)
1176 002602 000167 000000 ST2END: JMP ST3BEG ;BRANCH
  
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1177
1178
1179 ;SCAN TEST 3
1180 ;CHECK THAT ALL MAINTENANCE FLOPS CAN BE SET AND THAT ALL SCAN
1181 ;WORDS CAN BE CLEARED.
1182 002606 016702 176304 ST3BEG: MOV LOSA,CADR ;INIT. CONTROL ADDRESS POINTER.
1183 002612 012704 001340 MOV #SCW17,CWP ;INIT. CONTROL WORD POINTER.
1184 002616 004567 177060 JSR $,IZGSW ;INIT. 'GOOD' WORDS.
1185 002622 112767 000172 176313 MOVB #SRF,RFLGS ;INIT. ERROR RELEVANCY FLAGS.
1186 002630 104400 SCOPE ;SCOPE TRAP.
1187 002632 111462 000001 ST3LOP: MOVB (CWP),+1(CADR) ;SET ALL MAINT FLOPS, CLEAR ALL SCAN BITS.
1188 002636 116267 000001 176364 MOVB +1(CADR),TMF ;READ MAINT. FLOPS
1189 002644 004567 177140 JSR $,DELAY1 ;WAIT
1190 002650 016267 000000 176356 MOV +0(CADR),TW0 ;READ SCAN WORD 0.
1191 002656 016267 000002 176352 MOV +2(CADR),TW2 ;READ SCAN WORD 2.
1192 002664 016267 000004 176346 MOV +4(CADR),TW4 ;READ SCAN WORD 4.
1193 002672 016267 000006 176342 MOV +6(CADR),TW6 ;READ SCAN WORD 6.
1194 002700 026767 176324 176306 CMP TMF,GMF ;MAINT. FLOPS SET?
1195 002706 001021 BNE ST3ERR ;NO. - BRANCH.
1196 002710 026767 176320 176302 CMP TW0,GW0 ;YES. - SCAN WORD 0 CLEARED?
1197 002716 001015 BNE ST3ERR ;NO. - BRANCH.
1198 002720 026767 176312 176274 CMP TW2,GW2 ;YES. - SCAN WORD 2 CLEARED?
1199 002726 001011 BNE ST3ERR ;NO. - BRANCH.
1200 002730 026767 176304 176266 CMP TW4,GW4 ;YES. - SCAN WORD 4 CLEARED?
1201 002736 001005 BNE ST3ERR ;NO. - BRANCH.
1202 002740 026767 176276 176260 CMP TW6,GW6 ;YES. - SCAN WORD 6 CLEARED?
1203 002746 001001 BNE ST3ERR ;NO. - BRANCH.
1204 002750 104777 ST3OK: CONTROL ;YES. - CONTROL TRAP.
1205 002752 104000 ST3ERR: ERROR ;ERROR TRAP.
1206 002754 020267 176150 CMP CADR,HISAX ;ALL GIVEN ADDRESSES TESTED?
1207 002760 001403 BEQ ST3END ;YES. - BRANCH.
1208 002762 062702 000010 ADD #10,CADR ;NO. - ADVANCE CONTROL ADRS. PTR.
1209 002766 000721 BR ST3LOP ;BRANCH (NEXT SUB-TEST LOOP)
1210 002770 000167 000000 ST3END: JMP ST4BEG ;BRANCH.

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1211          ;SCAN TEST 4
1212          ;CHECK THAT ALL MAINTENANCE FLOPS ARE RESET AND THAT ALL SCAN
1213          ;WORD BITS ARE SET BY THE ACTION OF THE RESET INSTRUCTION.
1214
1215 002774 016702 176116 ST4BEG: MOV LOSA,CADR ;INIT. CONTROL ADDRESS POINTER.
1216 003000 012704 001302      MOV #SCW00,CWP ;INIT. CONTROL WORD POINTER.
1217 003004 004567 176672      JSR $,IZGSW ;INIT. "GOOD" WORDS.
1218 003010 112767 000172 176125      MOV #SRF,RFLGS ;INIT. ERROR RELEVANCY FLAGS.
1219 003016 104400          SCOPE ;SCOPE TRAP.
1220 003020 000005          ST4LOP: RESET ;CLEAR ALL MAINT. FLOPS, SET ALL SCAN BITS.
1221 003022 116267 000001 176200      MOV +1(CADR),TMF ;READ MAINT. FLOPS
1222 003030 004567 176754          JSR $,DELAY1 ;WAIT
1223 003034 016267 000000 176172      MOV +0(CADR),TW0 ;READ SCAN WORD 0.
1224 003042 016267 000002 176166      MOV +2(CADR),TW2 ;READ SCAN WORD 2.
1225 003050 016267 000004 176162      MOV +4(CADR),TW4 ;READ SCAN WORD 4.
1226 003056 016267 000006 176156      MOV +6(CADR),TW6 ;READ SCAN WORD 6.
1227 003064 026767 176140 176122      CMP TMF,GMF ;MAINT. FLOPS CLEARED?
1228 003072 001021          BNE ST4ERR ;NO. - BRANCH.
1229 003074 026767 176134 176116      CMP TW0,GW0 ;YES. - SCAN WORD 0, ALL BITS SET?
1230 003102 001015          BNE ST4ERR ;NO. - BRANCH.
1231 003104 026767 176126 176110      CMP TW2,GW2 ;YES. - SCAN WORD 2, ALL BITS SET?
1232 003112 001011          BNE ST4ERR ;NO. - BRANCH.
1233 003114 026767 176120 176102      CMP TW4,GW4 ;YES. - SCAN WORD 4, ALL BITS SET?
1234 003122 001005          BNE ST4ERR ;NO. - BRANCH.
1235 003124 026767 176112 176074      CMP TW6,GW6 ;YES. - SCAN WORD 6, ALL BITS SET?
1236 003132 001001          BNE ST4ERR ;NO. - BRANCH.
1237 003134 104777          ST4OK: CONTROL ;CONTROL TRAP.
1238 003136 104000          ST4ERR: ERROR ;ERROR TRAP.
1239 003140 020267 175764          CMP CADR,HISAX ;ALL MAINT. FLOPS & SCAN WORDS TESTED
1240 003144 001403          BEQ ST4END ;YES. - BRANCH.
1241 003146 062702 000010          ADD #10,CADR ;NO. - ADVANCE CONTROL ADRS. PTR.
1242 003152 000722          BR ST4LOP ;BRANCH. (NEXT SUB-TEST LOOP)
1243 003154 000167 000000          ST4END: JMP ST5BEG ;BRANCH.

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1244 ;SCAN TEST 5
1245 ;CHECK THAT ALL MAINTENANCE FLOPS CAN BE SET AND THAT ALL SCAN
1246 ;WORDS CAN BE CLEARED.
1247
1248 003160 016702 175732 ST5BEG: MOV LOSA,CADR ;INIT. CONTROL ADDRESS POINTER.
1249 003164 012704 001340 MOV #SCW17,CWP ;INIT. CONTROL WORD POINTER.
1250 003170 004567 176506 JSR $,IZGSW ;INIT. "GOOD" WORDS.
1251 003174 112767 000172 175741 MOVB #SRF,RFLGS ;INIT. ERROR RELEVANCY FLAGS.
1252 003202 104400 SCOPE ;SCOPE TRAP.
1253 003204 111462 000001 ST5LOP: MOVB (CWP),+1(CADR) ;SET ALL MAINT FLOPS, CLEAR ALL SCAN BITS.
1254
1255 003210 116267 000001 176012 MOVB +1(CADR),TMF ;READ MAINT. FLOPS
1256 003216 004567 176566 JSR $,DELAY1 ;WAIT
1257 003222 016267 000000 176004 MOV +0(CADR),TWO ;READ SCAN WORD 0.
1258 003230 016267 000002 176000 MOV +2(CADR),TW2 ;READ SCAN WORD 2.
1259 003236 016267 000004 175774 MOV +4(CADR),TW4 ;READ SCAN WORD 4.
1260 003244 016267 000006 175770 MOV +6(CADR),TW6 ;READ SCAN WORD 6.
1261 003252 026767 175752 175734 CMP TMF,GMF ;MAINT. FLOPS SET?
1262 003260 001021 BNE ST5ERR ;NO. - BRANCH.
1263 003262 026767 175746 175730 CMP TWO,GW0 ;YES. - SCAN WORD 0 CLEARED?
1264 003270 001015 BNE ST5ERR ;NO. - BRANCH.
1265 003272 026767 175740 175722 CMP TW2,GW2 ;YES. - SCAN WORD 2 CLEARED?
1266 003300 001011 BNE ST5ERR ;NO. - BRANCH.
1267 003302 026767 175732 175714 CMP TW4,GW4 ;YES. - SCAN WORD 4 CLEARED?
1268 003310 001005 BNE ST5ERR ;NO. - BRANCH.
1269 003312 026767 175724 175706 CMP TW6,GW6 ;YES. - SCAN WORD 6 CLEARED?
1270 003320 001001 BNE ST5ERR ;NO. - BRANCH.
1271 003322 104777 ST5OK: CONTROL ;YES. - CONTROL TRAP.
1272 003324 104000 ST5ERR: ERROR ;ERROR TRAP.
1273 003326 020267 175576 CMP CADR,HISAX ;ALL GIVEN ADDRESSES TESTED?
1274 003332 001403 BEQ ST5END ;YES. - BRANCH.
1275 003334 062702 000010 ADD #10,CADR ;NO. - ADVANCE CONTROL ADRS. PTR.
1276 003340 000721 BR ST5LOP ;BRANCH (NEXT SUB-TEST LOOP)
1277 003342 000167 000000 ST5END: JMP ST6BEG ;BRANCH.

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1278 ;SCAN TEST 6
1279 ;CHECK THAT ALL MAINTENCE FLOPS CAN BE RESET AND THAT ALL SCAN
1280 ;WORD BITS CAN BE SET.
1281 003346 016702 175544 ST6BEG: MOV LOSA,CADR ;INIT. CONTROL ADDRESS POINTER.
1282 003352 012704 001302 MOV #SCW00,CWP ;INIT. CONTROL WORD POINTER.
1283 003356 004567 176320 JSR $,IZGSW ;INIT. "GOOD" WORDS.
1284 003362 112767 000172 175553 MOVB #SRF,RFLGS ;INIT. ERROR RELEVANCY FLAGS.
1285 003370 104400 SCOPE ;SCOPE TRAP.
1286 003372 111462 000001 ST6LOP: MOVB (CWP),+1(CADR) ;CLEAR ALL MAINT. FLOPS, SET ALL SCAN BIT
1287 003376 116267 000001 175624 MOVB +1(CADR),TMF ;READ MAINT. FLOPS
1288 003404 004567 176400 JSR $,DELAY1 ;WAIT
1289 003410 016267 000000 175616 MOV +0(CADR),TWO ;READ SCAN WORD 0.
1290 003416 016267 000002 175612 MOV +2(CADR),TW2 ;READ SCAN WORD 2.
1291 003424 016267 000004 175606 MOV +4(CADR),TW4 ;READ SCAN WORD 4.
1292 003432 016267 000006 175602 MOV +6(CADR),TW6 ;READ SCAN WORD 6.
1293 003440 026767 175564 175546 CMP TMF,GMF ;MAINT. FLOPS CLEARED?
1294 003446 001021 BNE ST6ERR ;NO. - BRANCH.
1295 003450 026767 175560 175542 CMP TWO,GW0 ;YES. - SCAN WORD 0, ALL BITS SET?
1296 003456 001015 BNE ST6ERR ;NO. - BRANCH.
1297 003460 026767 175552 175534 CMP TW2,GW2 ;YES. - SCAN WORD 2, ALL BITS SET?
1298 003466 001011 BNE ST6ERR ;NO. - BRANCH.
1299 003470 026767 175544 175526 CMP TW4,GW4 ;YES. - SCAN WORD 4, ALL BITS SET?
1300 003476 001005 BNE ST6ERR ;NO. - BRANCH.
1301 003500 026767 175536 175520 CMP TW6,GW6 ;YES. - SCAN WORD 6, ALL BITS SET?
1302 003506 001001 BNE ST6ERR ;NO. - BRANCH.
1303 003510 104777 ST6OK: CONTROL ;CONTROL TRAP.
1304 003512 104000 ST6ERR: ERROR ;ERROR TRAP.
1305 003514 020267 175410 CMP CADR,HISAX ;ALL MAINT. FLOPS & SCAN WORDS TEST.
1306 003520 001403 BEQ ST6END ;YES. - BRANCH.
1307 003522 062702 000010 ADD #10,CADR ;NO. - ADVANCE CONTROL ADRS. PTR.
1308 003526 000721 BR ST6LOP ;BRANCH. (NEXT SUB-TEST LOOP).
1309 003530 000167 000000 ST6END: JMP ST7BEG ;BRANCH.
  
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1310
1311
1312           ;SCAN TEST 7
1313           ;CHECK THAT ALL MAINTENANCE FLOPS AND SCAN WORDS WILL SET TO ALL POSSIBLE CONFIGURATIONS
1314
1315 003534 016702 175356 ST7BEG: MOV      LOSA,CADR      ;INIT. CONTROL ADDRESS POINTER.
1316 003540 112767 000172 175375      MOVB     #SRF,RFLGS    ;INIT. ERROR RELEVANCY FLAGS.
1317 003546 012704 001302      ST7L2:  MOV     #SCW00,CWP  ;INIT. CONTROL WORD POINTER.
1318 003552 104400          SCOPE     ;SCOPE TRAP.
1319 003554 004567 176122      ST7L1:  JSR     $,IZGSW    ;INIT. 'GOOD' WORDS.
1320 003560 111462 000001          MOVB     (CWP),+1(CADR) ;SET MAINT. FLOPS AS PER CONTROL WORD PTR.
1321 003564 116267 000001 175436      MOVB     +1(CADR),TMF    ;READ MAINT. FLOPS
1322 003572 004567 176212          JSR     $,DELAY1        ;WAIT.
1323 003576 016267 000000 175430      MOV     +0(CADR),TW0    ;READ SCAN WORD 0.
1324 003604 016267 000002 175424      MOV     +2(CADR),TW2    ;READ SCAN WORD 2.
1325 003612 016267 000004 175420      MOV     +4(CADR),TW4    ;READ SCAN WORD 4.
1326 003620 016267 000006 175414      MOV     +6(CADR),TW6    ;READ SCAN WORD 6.
1327 003626 026767 175376 175360      CMP     TMF,GMF         ;MAINT. FLOPS OK?
1328 003634 001021          BNE     ST7ERR          ;NO. - BRANCH.
1329 003636 026767 175372 175354      CMP     TW0,GW0         ;YES. - SCAN WORD 0 OK?
1330 003644 001015          BNE     ST7ERR          ;NO. - BRANCH.
1331 003646 026767 175364 175346      CMP     TW2,GW2         ;YES. - SCAN WORD 2 OK?
1332 003654 001011          BNE     ST7ERR          ;NO. - BRANCH.
1333 003656 026767 175356 175340      CMP     TW4,GW4         ;YES. - SCAN WORD 4 OK?
1334 003664 001005          BNE     ST7ERR          ;NO. - BRANCH.
1335 003666 026767 175350 175332      CMP     TW6,GW6         ;YES. - SCAN WORD 6 OK?
1336 003674 001001          BNE     ST7ERR          ;NO. - BRANCH
1337 003676 104777          ST7OK:  CONTROL        ;YES. - CONTROL TRAP.
1338 003700 104000          ST7ERR: ERROR          ;ERROR TRAP.
1339 003702 022467 175572          CMP     (CWP)+,SCW77    ;ALL CONTROL WORDS TESTED ON THIS WORD?
1340 003706 001322          BNE     ST7L1           ;NO. - BRANCH.
1341 003710 020267 175214          CMP     CADR,HISAX      ;YES.- ALL SCAN BOARDS TESTED.
1342 003714 001403          BEQ     ST7END          ;YES. - BRANCH.
1343 003716 062702 000010          ADD     #10,CADR        ;NO. - ADVANCE CONTROL ADRS. PTR.
1344 003722 000711          BR     ST7L2            ;BRANCH.
1345 003724 000167 000000          ST7END: JMP     PREDT    ;BRANCH.

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1346
1347 ;ARE THERE DISTRIBUTE BOARDS TO BE TESTED AND/OR IS TESTING REQUESTED?
1348
1349 003730 026727 175166 000116 PREDT: CMP LODA,#'N ;TEST DISTRIBUTE BOARDS?
1350 003736 001002 BNE PREDTA ;YES. - BRANCH.
1351 003740 000167 006416 JMP PEND ;NO. - BRANCH.
1352 003744 032767 000004 175170 PREDTA: BIT #MOD,FLAGS ;MODULE TEST MODE?
1353 003752 001002 BNE DTMBEG ;YES. - BRANCH.
1354 003754 000167 000074 JMP DTMBEG ;NO. - BRANCH.
1355
1356 ;DIST. TEST M
1357 ;CHECK THAT ALL DIST. BOARD ADDRESSES NOT GIVEN BY THE OPERATOR
1358 ;DO NOT RESPOND TO A TEST INST. AN ERROR INDICATES THAT
1359 ;THE DIST. BOARD IS RESPONDING TO ADDRESS(ES) OTHER THAN ITS OWN
1360 ;AND IS BAD.
1361
1362 003760 016702 175136 DTMBEG: MOV LODA,CADR ;INIT. CONTROL ADRS. POINTER.
1363 003764 042702 003777 BIC #3777,CADR ;FORCE IT TO 164000.
1364 003770 012767 004020 174006 MOV #DTMTS,4 ;INIT. TIMEOUT-ERROR TRAP VECTOR.
1365 003776 112767 000200 175137 MOV #DF,RFLGS ;INIT. ERROR RELEVANCY FLAGS.
1366 004004 104400 SCOPE ;SCOPE TRAP.
1367 004006 020267 175110 DTMLOP: CMP CADR,LODA ;EXCLUDE TESTING THIS ADDRESS.
1368 004012 001410 BEQ DTMADV ;YES. - BRANCH. (IT'S WHERE THE BOARD IS.)
1369 004014 005712 TST (CADR) ;TEST DIST. ADRS.
1370 004016 000402 BR DTMERR ;IF NO TRAP OCCURS, GO TO 'DTMERR' -
1371 004020 022626 DTMTS: CMP (STP)+,(STP)+ ;IF A TRAP OCCURS IT RETURNS HERE AS 'OK'.
1372 004022 104777 DTMOK: CONTROL ;CONTROL TRAP.
1373 004024 104000 DTMERR: ERROR ;ERROR TRAP.
1374 004026 020227 167770 CMP CADR,#167770 ;ALL ADRS. CONFIGURATIONS TESTED?
1375 004032 001403 BEQ DTMEND ;YES.
1376 004034 062702 000010 DTMADV: ADD #10,CADR ;NO. - ADVANCE CONTROL ADRS. PTR.
1377 004040 000762 BR DTMLOP ;BRANCH.
1378 004042 012767 000006 173734 DTMEND: MOV #6,4 ;INIT. (CLOSE) TIMEOUT-ERROR TRAP VECTOR.
1379 004050 000167 000000 JMP DTMBEG ;BRANCH.
```

```
1380
1381
1382
1383      ;DIST. TEST 0
1384      ;CHECK THAT ALL DISTRIBUTE ADDRESSES GIVEN BY THE OPERATOR AT LEAST
1385      ;RESPOND TO A TST INST. AN ERROR (VIA TIMEOUT-ERROR TRA) INDICATES
1386      ;EITHER A BAD ADDRESS OR A NON-EXISTENT ADDRESS WAS GIVEN BY THE
1387      ;OPERATOR.
1388
1389 004054 016702 175042      DTOBEG: MOV      LODA,CADR      ;INIT. CONTROL ADDRESS POINTER.
1390 004060 012767 004102 173716      MOV      #DTOTS,4      ;INIT. TIMEOUT-ERROR TRAP VECTOR.
1391 004066 112767 000200 175047      MOV      #DF,RFLGS     ;INIT. ERROR RELEVANCY FLAGS.
1392 004074 104400      SCOPE      ;SCOPE TRAP.
1393 004076 005712      DTOLOP: TST      (CADR)      ;TEST A DISTRIBUTE ADDRESS.
1394 004100 000402      BR      DTOOK      ;IF NO TRAP OCCURS, GO TO 'DTOOK'.-
1395 004102 022626      DTOTS:  CMP      (STP)+,(STP)+ ;IF A TRAP OCCURS, GO TO 'DTEERR VIA-
1396 004104 000401      BR      DTEERR     ;A TIMEOUT-ERROR TRAP TO VECTOR 4.
1397 004106 104777      DTOOK:  CONTROL    ;CONTROL TRAP.
1398 004110 104000      DTEERR: ERROR      ;ERROR TRAP.
1399 004112 020267 175006      CMP      CADR,HIDA     ;ALL GIVEN ADDRESSES TESTED?
1400 004116 001403      BEQ      DTOEND      ;YES. - BRANCH.
1401 004120 062702 000002      ADD      #2,CADR      ;NO. - ADVANCE CONTROL ADRS. PTR.
1402 004124 000764      BR      DTOLOP      ;BRANCH.
1403 004126 012767 000006 173650      DTOEND: MOV      #6,4      ;INIT. (CLOSE) TIMEOUT-ERROR TRAP VECTOR.
1404 004134 000167 000000      JMP      DT1BEG      ;BRANCH.
```

```
1405 ;DIST. TEST 1
1406 ;CHECK THAT ALL DISTRIBUTE WORDS ARE RESET BY THE ACTION OF THE
1407 ;RESET INSTRUCTION.
1408
1409 004140 016702 174756 DT1BEG: MOV LODA,CADR ;INIT. CONTROL ADDRESS POINTER.
1410 004144 012704 001502 MOV #DCW00,CWP ;INIT. CONTROL WORD POINTER.
1411 004150 011467 175042 MOV (CWP),GWD ;INIT "GOOD" WORD.
1412 004154 112767 000206 174761 MOVB #DRF,RFLGS ;INIT ERROR RELEVANCY FLAGS.
1413 004162 104400 SCOPE ;SCOPE TRAP.
1414 004164 000005 DT1LOP: RESET ;CLEAR ALL DISTRIBUTE WORDS.
1415 004166 011267 175040 MOV (CADR),TWD ;READ DIST. WORD. IS IT ZEROS?
1416 004172 001001 BNE DT1ERR ;NO. - BRANCH.
1417 004174 104777 DT1OK: CONTROL ;YES. - CONTROL TRAP.
1418 004176 104000 DT1ERR: ERROR ;ERROR TRAP.
1419 004200 020267 174720 CMP CADR,HIDA ;ALL DIST. WORDS TESTED?
1420 004204 001403 BEQ DT1END ;YES. - BRANCH.
1421 004206 062702 000002 ADD #2,CADR ;NO. - ADVANCE CONTROL ADRS. PTR.
1422 004212 000764 BR DT1LOP ;BRANCH.
1423 004214 000167 000000 DT1END: JMP DT2BEG ;BRANCH.
```



```
1424
1425          ;DIST. TEST 2
1426          ;CHECK THAT ALL DISTRIBUTE WORDS CAN BE SET TO ALL ONES.
1427
1428 004220 016702 174676 DT2BEG: MOV LODA,CADR ;INIT. CONTROL ADDRESS POINTER.
1429 004224 012704 001700      MOV #DCW77,CWP ;INIT. CONTROL WORD POINTER.
1430 004230 011467 174762      MOV (CWP),GWD ;INIT. 'GOOD' WORD.
1431 004234 112767 000206 174701  MOVB #DRF,RFLGS ;INIT. ERROR RELEVANCY FLAGS.
1432 004242 104400          SCOPE ;SCOPE TRAP.
1433 004244 011412 DT2LOP: MOV (CWP),(CADR) ;SET DISTRIBUTE WORD TO ALL ONES.
1434 004246 011267 174760      MOV (CADR),TWD ;READ DIST. WORD.
1435 004252 026767 174754 174736  CMP TWD,GWD ;IS DIST. WORD ALL ONES?
1436 004260 001001          BNE DT2ERR ;NO. - BRANCH.
1437 004262 104777 DT2OK: CONTROL ;YES. - CONTROL TRAP.
1438 004264 104000 DT2ERR: ERROR ;ERROR TRAP.
1439 004266 020267 174632      CMP CADR,HIDA ;ALL DISTRIBUTE WORDS TESTED?
1440 004272 001403          BEQ DT2END ;YES. - BRANCH.
1441 004274 062702 000002      ADD #2,CADR ;NO. - ADVANCE CONTROL ADRS. PTR.
1442 004300 000761          BR DT2LOP ;BRANCH.
1443 004302 000167 000000 DT2END: JMP DT3BEG ;BRANCH.
```

```
1444
1445 ;DIST. TEST 3
1446 ;CHECK THAT ALL DISTRIBUTE WORDS ARE RESET BY THE ACTION OF THE RESET INSTRUCTION.
1447
1448 004306 016702 174610 DT3BEG: MOV LODA,CADR ;INIT. CONTROL ADDRESS POINTER.
1449 004312 012704 001502 MOV #DCW00,CWP ;INIT. CONTROL WORD POINTER.
1450 004316 011467 174674 MOV (CWP),GWD ;INIT. 'GOOD' WORD.
1451 004322 112767 000206 174613 MOVB #DRF,RFLGS ;INIT. ERROR RELEVANCY FLAGS.
1452 004330 104400 SCOPE ;SCOPE TRAP.
1453 004332 000005 DT3LOP: RESET ;CLEAR ALL DISTRIBUTE WORDS.
1454 004334 011267 174672 MOV (CADR),TWD ;READ DIST. WORD. IS IT ZEROS?
1455 004340 001001 BNE DT3ERR ;NO. - BRANCH.
1456 004342 104777 DT3OK: CONTROL ;YES. - CONTROL TRAP.
1457 004344 104000 DT3ERR: ERROR ;ERROR TRAP.
1458 004346 020267 174552 CMP CADR,HIDA ;ALL DIST. WORD TESTED?
1459 004352 001403 BEQ DT3END ;YES. - BRANCH.
1460 004354 062702 000002 ADD #2,CADR ;NO. - ADVANCE CONTROL ADRS. PTR.
1461 004360 000764 BR DT3LOP ;BRANCH.
1462 004362 000167 000000 DT3END: JMP DT4BEG ;BRANCH.
```

```
1463
1464
1465      :DIST. TEST 4
1466      :CHECK THAT ALL DISTRIBUTE WORDS CAN BE SET TO ALL ONES.
1467 004366 016702 174530 DT4BEG: MOV LODA,CADR ;INIT. CONTROL ADDRESS POINTER.
1468 004372 012704 001700      MOV #DCW77,CWP ;INIT. CONTROL WORD POINTER.
1469 004376 011467 174614      MOV (CWP),GWD ;INIT. 'GOOD' WORD.
1470 004402 112767 000206 174533      MOVB #DRF,RFLGS ;INIT. ERROR RELEVANCY FLAGS.
1471 004410 104400      SCOPE ;SCOPE TRAP.
1472 004412 011412 DT4LOP: MOV (CWP),(CADR) ;SET DISTRIBUTE WORD TO ALL ONES.
1473 004414 011267 174612      MOV (CADR),TWD ;READ DIST. WORD.
1474 004420 026767 174606 174570      CMP TWD,GWD ;IS DIST. WORD ALL ONES?
1475 004426 001001      BNE DT4ERR ;NO. - BRANCH.
1476 004430 104777 DT4OK: CONTROL ;YES. - CONTROL TRAP.
1477 004432 104000 DT4ERR: ERROR ;ERROR TRAP.
1478 004434 020267 174464      CMP CADR,HIDA ;ALL DISTRIBUTE WORDS TESTED?
1479 004440 001403      BEQ DT4END ;YES. - BRANCH.
1480 004442 062702 000002      ADD #2,CADR ;NO. - ADVANCE CONTROL ADRS. PTR.
1481 004446 000761      BR DT4LOP ;BRANCH.
1482 004450 000167 000000 DT4END: JMP DT5BEG ;BRANCH.
```

```
1483
1484
1485           ;DIST. TEST 5
1486           ;CHECK THAT ALL DISTRIBUTE WORDS CAN BE CLEARED TO ALL ZEROS.
1487
1488 004454 016702 174442 DT5BEG: MOV LODA,CADR           ;INIT. CONTROL ADDRESS POINTER.
1489 004460 012704 001502      MOV #DCW00,CWP       ;INIT. CONTROL WORD POINTER.
1490 004464 011467 174526      MOV (CWP),GWD        ;INIT. "GOOD" WORD.
1491 004470 112767 000206 174445  MOVB #DRF,RFLGS     ;INIT. ERROR RELEVANCY FLAGS.
1492 004476 104400      SCOPE          ;SCOPE TRAP.
1493 004500 011412 DT5LOP: MOV (CWP),(CADR)      ;CLEAR DISTRIBUTE WORD TO ALL ZEROS?
1494 004502 011267 174524      MOV (CADR),TWD       ;READ DIST. WORD.
1495 004506 026767 174520 174502  CMP TWD,GWD         ;IS DIST. WORD ALL ZEROS?
1496 004514 001001      BNE DT5ERR          ;NO. - BRANCH.
1497 004516 104777 DT5OK: CONTROL      ;YES. - CONTROL TRAP.
1498 004520 104000 DT5ERR: ERROR        ;ERROR TRAP.
1499 004522 020267 174376      CMP CADR,HIDA       ;ALL DISTRIBUTE WORDS TESTED?
1500 004526 001403      BEQ DT5END          ;YES. - BRANCH.
1501 004530 062702 000002      ADD #2,CADR         ;NO. - ADVANCE CONTROL ADRS. PTR.
1502 004534 000761      BR DT5LOP           ;BRANCH.
1503 004536 000167 000000 DT5END: JMP DT6BEG   ;BRANCH.
```

```

1504
1505           ;DIST. TEST 6
1506           ;CHECK THAT ALL DISTRIBUTE WORDS CAN BE SET TO ALL CONFIGURATIONS
1507           ;GIVEN IN THE DISTRIBUTE WORD TABLE OF CONSTANTS.
1508
1509 004542 016702 174354 DT6BEG: MOV LODA,CADR ;INIT. CONTROL ADDRESS POINTER.
1510 004546 112767 000206 174367      MOVB #DRF,RFLGS ;INIT. ERROR RELEVANCY FLAGS.
1511 004554 012704 001502      MOV #DCW00,CWP ;INIT. CONTROL WORD POINTER.
1512 004560 011467 174432 DT6L1: MOV (CWP),GWD ;INIT. "GOOD" WORD.
1513 004564 104400      SCOPE ;SCOPE TRAP.
1514 004566 011412      MOV (CWP),(CADR) ;WRITE DISTRIBUTE WORD.
1515 004570 011267 174436      MOV (CADR),TWD ;READ DISTRIBUTE WORD.
1516 004574 026767 174432 174414      CMP TWD,GWD ;DISTRIBUTE WORD OK?
1517 004602 001001      BNE DT6ERR ;NO. - BRANCH.
1518 004604 104777      DT6OK: CONTROL ;YES. - CONTROL TRAP.
1519 004606 104000      DT6ERR: ERROR ;ERROR TRAP.
1520 004610 022467 175064      CMP (CWP)+,DCW77 ;ALL CONTROL WORDS TESTED ON THIS WORD?
1521 004614 001361      BNE DT6L1 ;NO. - BRANCH.
1522 004616 020267 174302      CMP CADR,HIDA ;YES. ALL DISTRIBUTE WORDS TESTED?
1523 004622 001403      BEQ DT6END ;YES. - BRANCH.
1524 004624 062702 000002      ADD #2,CADR ;NO. - ADVANCE CONTROL ADRS. PTR.
1525 004630 000751      BR DT6L2 ;BRANCH.
1526 004632 000167 000000      DT6END: JMP PREDJS ;BRANCH.
  
```

```
1527  
1528 ;ARE DISTRIBUTE BOARDS THAT ARE JUMPERED TO SCAN BOARDS BEING TESTED?  
1529  
1530 004636 032767 000120 174276 PREDJS: BIT #JF+JXF,FLAGS ;TEST DJS?  
1531 004644 001002 BNE IDJ ;YES. - BRANCH.  
1532 004646 000167 005510 JMP PEND ;NO. - BRANCH.
```

```
1533
1534           ;INITIALIZE THE DISTRIBUTE AND SCAN BOARDS.
1535
1536 004652 000005 IDJ·   RESET           ;CLEAR ALL DISTRIBUTE WORDS.
1537 004654 016702 174236 MOV     LOSA,CADR       ;SET ALL MAINT. FLOPS AND
1538 004660 012704 001340 MOV     #SCW17,CWP      ;CLEAR ALL SCAN WORDS.
1539 004664 111462 000001 IDJA:  MOVB   (CWP),+1(CADR)
1540 004670 020267 174234      CMP     CADR,HISAX
1541 004674 001403      BEQ     IDJB
1542 004676 062702 000010      ADD     #10,CADR
1543 004702 000770      BR      IDJA
1544 004704 000167 000000 IDJB:  JMP     DJS1BG
1545
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1546
1547      ;TEST DJS1
1548      ;CHECK THAT SCAN WORDS CAN BE DRIVEN BY DISTRIBUTE WORDS.
1549      ;THE DATA WORDS USED ARE THOSE OF THE DISTRIBUTE CONTROL WORD TABLE,
1550      ;OR SOLELY THE DATA WORD GIVEN BY THE OPERATOR AT QUERY TIME, IF ANY.
1551
1552 004710 112767 000327 174225 DJS1BG: MOVB   #DSRF,RFLGS      ;INIT. ERROR RELEVANCY FLAGS.
1553 004716 016702 174200          MOV    LODA,CADR      ;INIT. CONTROL ADRS. PTR. (DIST.)
1554 004722 016703 174170          MOV    LOSA,CADR    ;INIT. CONTROL ADRS. PTR. AUX. (SCAN)
1555 004726 012704 001502          DJS1L2: MOV   #DCW00,CWP ;INIT. CONTROL WORD POINTER.
1556 004732 032767 000200 174202  BIT    #DATF,FLAGS  ;USE OPERATOR GIVEN DATA?
1557 004740 001402          BEQ    DJS1A        ;NO. - BRANCH.
1558 004742 012704 001140          MOV    #DATAWD,CWP ;YES - RE-INIT. CONTROL WORD PTR.
1559 004746 104400          DJS1A: SCOPE      ;SCOPE TRAP
1560 004750 011467 174242          DJS1L1: MOV   (CWP),GWD ;INIT 'GOOD' DIST. WORD.
1561 004754 011467 174240          MOV   (CWP),GWO     ;INIT 'GOOD' SCAN WORD.
1562 004760 011412          MOV   (CWP),(CADR)  ;WRITE DIST. WORD AND, VIA JUMPER, SCAN WORD.
1563 004762 011267 174244          MOV   (CADR),TWD    ;READ DIST. WORD.
1564 004766 004567 175032          JSR   $,DELAY2     ;WAIT.
1565 004772 011367 174236          MOV   (CADRX),TWO   ;READ SCAN WORD.
1566 004776 026767 174230 174212  CMP   TWD,GWD       ;DIST. WORD OK?
1567 005004 001005          BNE   DJS1ER        ;NO. - BRANCH.
1568 005006 026767 174222 174204  CMP   TWO,GWO       ;YES. - SCAN WORD OK?
1569
1570 005014 001001          BNE   DJS1ER        ;NO. - BRANCH.
1571 005016 104777          DJS1OK: CONTROL   ;YES. - CONTROL TRAP.
1572 005020 104000          DJS1ER: ERROR     ;ERROR TRAP.
1573 005022 032767 000200 174112  BIT   #DATF,FLAGS  ;USING OPERATOR GIVEN DATA?
1574 005030 001003          BNE   DJS1B        ;YES. - BRANCH.
1575 005032 022467 174642          CMP   (CWP)+,DCW77 ;NO. - ALL CONTROL WORDS USED?
1576 005036 001344          BNE   DJS1L1       ;NO. - BRANCH.
1577 005040 020267 174060          DJS1B: CMP   CADR,HIDA ;YES. - ALL ADDRESSES TESTED?
1578 005044 001405          BEQ   DJS1ND       ;YES. - BRANCH.
1579 005046 062702 000002          ADD   #2,CADR      ;NO. - ADVANCE CONTROL ADRS. PTR. (DIST.)
1580 005052 062703 000002          ADD   #2,CADR    ;ADVANCE CONTROL ADRS. PTR. AUX. (SCAN)
1581 005056 000723          BR    DJS1L2       ;BRANCH.
1582 005060 000167 005276          DJS1ND: JMP   PEND  ;BRANCH.
1583

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1584
1585           ;SUB-PROGRAM TO CONTROL ACCEPT/EXERCISE PASSES OF EITHER
1586           ;BTCL OR DJMPRS.
1587
1588 005064 012767 005104 174120 AXCTL: MOV #AXCA,AXRTN ;RUN ONE PASS WITH:
1589 005072 012767 014000 174110      MOV #TTS+ITS,AXSWR ;NO OPTIONS.
1590 005100 000167 174774      JMP PREST
1591
1592 005104 012767 005124 174100 AXCA:  MOV #AXCB,AXRTN ;RUN ONE PASS WITH:
1593 005112 012767 014002 174070      MOV #TTS+ITS+LDS,AXSWR ;LONGER DELAYS.
1594 005120 000167 174754      JMP PREST
1595
1596 005124 012767 005144 174060 AXCB:  MOV #AXCC,AXRTN ;RUN ONE PASS WITH:
1597 005132 012767 014004 174050      MOV #TTS+ITS+SDS,AXSWR ;SHORTER DELAYS.
1598 005140 000167 174734      JMP PREST
1599
1600 005144 012767 005164 174040 AXCC:  MOV #AXCD,AXRTN
1601 005152 012767 010000 174030      MOV #TTS,AXSWR
1602 005160 000167 174714      JMP PREST
1603
1604 005164 012767 005204 174020 AXCD:  MOV #AXCE,AXRTN ;RUN ONE PASS WITH:
1605 005172 012767 010002 174010      MOV #TTS+LDS,AXSWR ;ITERATIONS & LONGER DELAYS
1606 005200 000167 174674      JMP PREST
1607
1608 005204 012767 005224 174000 AXCE:  MOV #AXCF,AXRTN ;RUN ONE PASS WITH:
1609 005212 012767 010004 173770      MOV #TTS+SDS,AXSWR ;ITERATIONS & SHORTER DELAYS
1610 005220 000167 174654      JMP PREST
1611
1612 005224 012767 005244 173760 AXCF:  MOV #AXCG,AXRTN ;RUN ONE PASS WITH:
1613 005232 012767 004000 173750      MOV #ITS,AXSWR ;TRACE TRAPS
1614 005240 000167 174634      JMP PREST
1615
1616 005244 012767 005264 173740 AXCG:  MOV #AXCH,AXRTN ;RUN ONE PASS WITH:
1617 005252 012767 004002 173730      MOV #ITS+LDS,AXSWR ;TRACE TRAPS & LONGER DELAYS.
1618 005260 000167 174614      JMP PREST
1619
1620 005264 012767 005304 173720 AXCH:  MOV #AXCI,AXRTN ;RUN ONE PASS WITH:
1621 005272 012767 004004 173710      MOV #ITS+SDS,AXSWR ;TRACE TRAPS & SHORTER DELAYS
1622 005300 000167 174574      JMP PREST
1623
1624 005304 012767 005324 173700 AXCI:  MOV #AXCJ,AXRTN ;RUN ONE PASS WITH:
1625 005312 012767 000000 173670      MOV #0,AXSWR ;ITERATIONS & TRACE TRAPS
1626 005320 000167 174554      JMP PREST
1627
1628 005324 012767 005344 173660 AXCJ:  MOV #AXCK,AXRTN ;RUN ONE PASS WITH:
1629 005332 012767 000002 173650      MOV #LDS,AXSWR ;ITERATIONS, TRACE TRAPS,
1630 005340 000167 174534      JMP PREST ;& LONGER DELAYS
1631
1632 005344 012767 005364 173640 AXCK:  MOV #AXCL,AXRTN ;RUN ONE PASS WITH:
1633 005352 012767 000004 173630      MOV #SDS,AXSWR ;ITERATIONS, TRACE TRAPS,
1634 005360 000167 174514      JMP PREST ;& SHORTER DELAYS
1635
1636 005364 000167 005006      AXCL:  JMP PASEND
  
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1637
1638 ;SCOPE TRAP (TRAP) SERVICE ROUTINE TO RECORD THE PC FOR REFERENCE BY EITHER
1639 ;SCOPE LOOPS OR ITERATIONS, (BOTH SCOPE & CONTROL TRAPS ENTER HERE FIRST)
1640
1641 005370 011600 SCOSVC: MOV (STP),R0 ;DETERMINE THE TYPE OF CALL MADE
1642 005372 105760 177776 TSTB -2(R0) ;(SCOPE OR CONTROL TRAP).
1643 005376 100403 BMI CTLSVC ;CONTROL. - BRANCH.
1644 005400 011667 173550 MOV (STP),SCORTN ;SCOPE. - RECORD THE PC.
1645 005404 000002 RTI ;RETURN.
1646
1647
1648
1649 ;CONTROL TRAP (IOT) SERVICE ROUTINE TO CONTROL INTERMITTANT ERROR CONDITIONS
1650 ;AND TRACE TRAP, NON-ERROR SCOPE LOOP, & ITERATE SWITCH OPTIONS.
1651
1652 005406 032767 000001 173526 CTLSVC: BIT #ECF,FLAGS ;DOES AN ERROR CONDITION EXIST?
1653 005414 001402 BEQ CTSVCA ;NO. - BRANCH.
1654 005416 004567 000346 JSR $,IMCTL ;YES. - GO TO INTERMITTANT CONTROL.
1655 005422 032767 000020 172140 CTSVCA: BIT #TSS,177570 ;TYPE PROGRAM STATUS?
1656 005430 001402 BEQ CSVCA1 ;NO. - BRANCH.
1657 005432 004567 000556 JSR $,TYPERR ;YES. - GO TYPE PROGRAM STATUS.
1658 005436 004567 000054 CSVCA1: JSR $,TTCTL ;GO SEE ABOUT TRACE TRAPPING.
1659 005442 032767 040000 172120 BIT #SLS,177570 ;NON-ERROR SCOPE LOOP?
1660 005450 001403 BEQ CTSVCC ;NO. - BRANCH.
1661 005452 022626 CTSVCB: CMP (STP)+,(STP)+ ;YES. - POP STACK ONE TRAP.
1662 005454 000177 173474 JMP @SCORTN ;RETURN TO SCOPE LOOP (OR ITERATION).
1663 005460 032777 004000 173450 CTSVCC: BIT #ITS,@SWR ;ITERATE?
1664 005466 001006 BNE CTSVCD ;NO. - BRANCH.
1665 005470 005267 173456 INC ITCNT ;YES. - INCREMENT ITERATION COUNTER.
1666 005474 026767 173452 173406 CMP ITCNT,ITNO ;ITERATE THIS TEST OR TEST LOOP AGAIN?
1667 005502 001363 BNE CTSVCB ;YES. - BRANCH.
1668 005504 005067 173442 CTSVCD: CLR ITCNT ;NO. - CLEAR ITERATION COUNTER.
1669 005510 062716 000002 ADD #2,(STP) ;ADVANCE RETURN POINT (SKIP THE ERROR CALL).
1670 005514 000002 RTI ;RETURN TO NEXT TEST OR TEST LOOP.

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1671
1672           ;SUBROUTINE TO CONTROL THE TRACE TRAP SWITCH OPTION.
1673
1674 005516 016746 172254      TTCTL:  MOV    PS,-(STP)      ;PUT PS ON STACK.
1675 005522 042716 000020      BIC    #20,(STP)      ;CLEAR 'T' BIT (PROVISIONALLY).
1676 005526 032777 010000 173402  BIT    #TTS,@SWR      ;TRACE TRAPS?
1677 005534 001002              BNE    TTCTLA         ;NO. - BRANCH.
1678 005536 052716 000020      BIS    #20,(STP)      ;YES. - SET 'T' BIT (FINALLY).
1679 005542 012746 005550      TTCTLA: MOV   #TTCTLB,-(STP) ;PUT RETURN LOC. ON STACK.
1680 005546 000002              RTI                     ;RETURN (TO NEXT INST.) AND SET/CLEAR 'T' BIT.
1681 005550 000205              TTCTLB: RTS    $                     ;RETURN.
1682
1683
1684
1685           ;TRACE TRAP SERVICE ROUTINE
1686           ;IF THE PROCESSOR IS AN 11/45, PROGRAM INITIALIZATION HAS CHANGED
1687           ;THE FOLLOWING INSTRUCTION TO RTT (000006). OTHERWISE IT IS AS SHOWN.
1688
1689 005552 000002      TTVC:   RTI                     ;RETURN. (THIS INST. WILL BE RTT IF A 11/25 OR 11/45.)
1690
1691
1692           ;POWER DOWN SEQUENCE.
1693
1694 005554 010046      PDOWN:  MOV    R0,-(STP)      ;PUSH R0-R5 ON STACK.
1695 005556 010146      MOV    R1,-(STP)
1696 005560 010246      MOV    R2,-(STP)
1697 005562 010346      MOV    R3,-(STP)
1698 005564 010446      MOV    R4,-(STP)
1699 005566 010546      MOV    R5,-(STP)
1700 005570 010667 000026      MOV    STP,PDSTP      ;SAVE STACK PTR IN CORE.
1701 005574 012767 005624 172222  MOV    #PUP,24        ;INIT. POWER FAIL VECTOR FOR POWER UP.
1702 005602 016746 172170      MOV    PS,-(STP)      ;ENSURE THAT TRACE TRAP IS OFF.
1703 005606 042716 000020      BIC    #20,(STP)
1704 005612 004567 177724      JSR    $,TTCTLA
1705 005616 000240      PDOWNA: NOP          ;WAIT FOR POWER UP INTERRUPT.
1706 005620 000776      BR    PDOWNA
1707 005622 000000      PDSTP: 0
1708
1709           ;POWER UP SEQUENCE.
1710
1711 005624 016706 177772      PUP:   MOV    PDSTP,STP ;RESTORE STACK PTR.
1712 005630 012605      MOV    (STP)+,R5      ;POP R0-R5 FROM STACK.
1713 005632 012604      MOV    (STP)+,R4
1714 005634 012603      MOV    (STP)+,R3
1715 005636 012602      MOV    (STP)+,R2
1716 005640 012601      MOV    (STP)+,R1
1717 005642 012600      MOV    (STP)+,R0
1718 005644 012767 005554 172152  MOV    #PDOWN,24      ;INIT. POWER FAIL VECTOR FOR POWER DOWN.
1719 005652 005726      TST    (STP)+
1720 005654 000167 002744      JMP    INITP          ;RESTART.
1721

```

```
1722
1723
1724 ;ERROR TRAP (EMT) SERVICE ROUTINE TO CONTROL ERROR HANDLING.
1725
1726 005660 032767 000001 173254 ERRSVC: BIT #ECF,FLAGS ;DOES AN ERROR CONDITION ALREADY EXIST?
1727 005666 001426 BEQ ERSVCD ;NO. - BRANCH. (UNCONDITIONAL TYPEOUT)
1728 005670 032767 000002 173244 BIT #IMF,FLAGS ;DOES AN INTERMITTENT ERROR EXIST?
1729 005676 001402 BEQ ESVCA1 ;NO. - BRANCH.
1730 005700 004567 000064 JSR $,IMCTL ;YES. - GO TO INTERMITTENT CONTROL.
1731 005704 032767 020000 171656 ESVCA1: BIT #STS,177570 ;YES. - SUBSEQUENT ERROR TYPEOUTS?
1732 005712 001417 BEQ ERSVCE ;YES. - BRANCH.
1733 005714 032767 100000 171646 ERSVCA: BIT #HES,177570 ;NO. - HALT?
1734 005722 001401 BEQ ERSVCB ;NO. - BRANCH.
1735 005724 000000 HALT ;YES. - HALT.
1736 005726 032767 040000 171634 ERSVCB: BIT #SLS,177570 ;ERROR SCOPE LOOP?
1737 005734 001411 BEQ ERSVCG ;NO. - BRANCH.
1738 005736 022626 ERSVCC: CMP (STP)+,(STP)+ ;YES. - POP STACK ONE TRAP.
1739 005740 000177 173210 JMP @SCORTN ;RETURN TO SCOPE LOOP
1740 005744 052767 000001 173170 ERSVCD: BIS #ECF,FLAGS ;SET ERROR CONDITION FLAG..
1741 005752 004567 000236 ERSVCE: JSR $,TYPERR ;GO TYPE ERROR MESSAGE.
1742 005756 000756 BR ERSVCA ;BRANCH.
1743 005760 042767 000003 173154 ERSVCG: BIC #ECF+IMF,FLAGS ;CLEAR ERROR CONDITION FLAGS.
1744 005766 000002 RTI ;RETURN.
```

```

1745
1746           ;SUBROUTINE TO HANDLE INTERMITTENT ERROR CONTROL
1747
1748 005770 032767 000002 173144 IMCTL: BIT    #IMF,FLAGS    ;DOES INTERMITTENT COND. ALREADY EXIST?
1749 005776 001015                BNE    IMCTLA      ;YES. - BRANCH.
1750 006000 052767 000002 173134 BIS    #IMF,FLAGS    ;NO. - SET INTERMITTENT FLAG.
1751 006006 004567 004162        JSR    $,TYPEA      ;NOTIFY OPERATOR OF INTERMITTENT.
1752 006012 044536 052116 051105 .ASCII " INTERMITTENT!. "
1753 006020 044515 052124 047105
1754 006026 020524 020056
1755 006032 020527 005422        IMCTLA: CMP    $,#CTSVCA    ;DID THE TEST PASS THIS LOOP OK?
1756 006036 001016                BNE    IMCTLB      ;NO. - BRANCH.
1757 006040 005267 173232        INC    OKCTR       ;YES. - MC. OKCTR. HAS IT OVERFLOWED?
1758 006044 001030                BNE    IMCTLC      ;NO. - BRANCH.
1759 006046 004567 004122        JSR    $,TYPEA      ;YES. - NOTIFY OPERATOR.
1760 006052 047536 041513 047440 .ASCII " OKC OVERFLOW. "
1761 006060 042526 043122 047514
1762 006066 027127 020136
1763 006072 000415                BR     IMCTLC      ;BRANCH.
1764 006074 005267 173174        IMCTLB: INC    ERCTR    ;INC. ERCTR. HAS IT OVERFLOWED?
1765 006100 001012                BNE    IMCTLC      ;NO. - BRANCH.
1766 006102 004567 004066        JSR    $,TYPEA      ;YES. - NOTIFY OPERATOR.
1767 006106 042536 041522 047440 .ASCII " ERC OVERFLOW. "
1768 006114 042526 043122 047514
1769 006122 057127 020056
1770 006126 032767 000100 171434 IMCTLC: BIT    #IMS,177570 ;TYPE "OK" AND "ERR" COUNTERS?
1771 006134 001020                BNE    IMCTLD      ;NO. - BRANCH.
1772 006136 004567 004032        JSR    $,TYPEA      ;YES. - TYPE THE COUNTERS.
1773 006142 042536 041522 027057 .ASCII " ERC/."
1774 006150 004567 004112        JSR    $,TYPEO
1775 006154 001274                ERCTR
1776 006156 004567 004012        JSR    $,TYPEA
1777 006162 047440 041513 027057 .ASCII " OKC/."
1778 006170 004567 004072        JSR    $,TYPEO
1779 006174 001276                OKCTR
1780 006176 020527 005422        IMCTLD: CMP    $,#CTSVCA    ;DID THE TEST PASS THIS LOOP OK?
1781 006202 001401                BEQ    IMCTLE      ;YES. - BRANCH.
1782 006204 000205                RTS    $           ;NO. - RETURN TO CONTINUE ERROR REPORTING.
1783 006206 005726                IMCTLE: TST    (STP)+    ;POP STACK ONE JSR.
1784 006210 000167 177470        JMP    ESVCA1      ;BRANCH TO CONTINUE ERROR REPORTING.

```

```

1785 ;SUBROUTINE TO TYPE ERROR MESSAGES.
1786
1787 006214 004567 001122 TYPERR: JSR $,SAVE
1788 006220 004567 003750 TPC: JSR $,TYPEA
1789 006224 050136 027503 020056 .ASCII " PC/."
1790 006232 004567 004030 JSR $,TYPEO
1791 006236 001160 SAVPC
1792
1793 006240 032767 000001 171322 BIT #SES,177570
1794 006246 001402 BEQ TPST
1795 006250 000167 001040 JMP TEX
1796
1797 006254 004567 003714 TPST: JSR $,TYPEA
1798 006260 050040 027523 020056 .ASCII " PS/."
1799 006266 004567 003774 JSR $,TYPEO
1800 006272 001162 SAVPS
1801
1802 006274 004567 003674 TCAD: JSR $,TYPEA
1803 006300 041440 042101 027057 .ASCII " CAD/."
1804 006306 004567 003754 JSR $,TYPEO
1805 006312 001166 SAVCAD
1806
1807 006314 004567 003654 TCAX: JSR $,TYPEA
1808 006320 041440 054101 027057 .ASCII " CAX/."
1809 006326 132767 000001 172607 BITB #AXF,RFLGS
1810 006334 001002 BNE TCAXA
1811 006336 004567 000762 JSR $,TYPEENR
1812 006342 004567 003720 TCAXA: JSR $,TYPEO
1813 006346 001170 SAVCAX
1814
1815 006350 004567 003620 TCWP: JSR $,TYPEA
1816 006354 041440 050127 027057 .ASCII " CWP/."
1817 006362 132767 000002 172553 BITB #CWF,RFLGS
1818 006370 001002 BNE TCWPA
1819 006372 004567 000726 JSR $,TYPEENR
1820 006376 004567 003664 TCWPA: JSR $,TYPEO
1821 006402 001172 SAVCWP
1822
1823 006404 004567 003564 TBD: JSR $,TYPEA
1824 006410 041040 027524 020056 .ASCII " BT/."
1825 006416 132767 000100 172517 BITB #SF,RFLGS
1826 006424 001412 BEQ TBDA
1827 006426 132767 000200 172507 BITB #DF,RFLGS
1828 006434 001014 BNE TBDB
1829 006436 004567 003532 JSR $,TYPEA
1830 006442 041523 047101 020056 .ASCII "SCAN."
1831 006450 000412 BR TDBC
1832 006452 004567 003516 TBDA: JSR $,TYPEA
1833 006456 044504 052123 020056 .ASCII "DIST."
1834 006464 000404 BR TDBC
1835 006466 004567 003502 TBDB: JSR $,TYPEA
1836 006472 045104 027123 .ASCII "DJS."
1837 006476 000240 TDBC: NOP
1838
1839 006500 004567 003470 TFLGS: JSR $,TYPEA
1840 006504 043040 027057 .ASCII " F/."
  
```

1841	006510	004567	003552		JSR	\$,TYPEO
1842	006514	001142			FLAGS	
1843						
1844						
1845						
1846	006516	004567	003452		TGWD:	JSR \$,TYPEA
1847	006522	043536	042127	027057	.ASCII	" GW0/."
1848	006530	132767	000004	172405	BITB	#WDF,RFLGS
1849	006536	001002			BNE	TGWDA
1850	006540	004567	000560		JSR	\$,TYPEENR
1851	006544	004567	003516		TGWDA:	JSR \$,TYPEO
1852	006550	001216			GW0	
1853						
1854	006552	004567	003416		TGMF:	JSR \$,TYPEA
1855	006556	043440	043115	027057	.ASCII	" GMF/."
1856	006564	132767	000010	172351	BITB	#MFF,RFLGS
1857	006572	001002			BNE	TGMFA
1858	006574	004567	000524		JSR	\$,TYPEENR
1859	006600	004567	003462		TGMFA:	JSR \$,TYPEO
1860	006604	001214			GMF	
1861						
1862	006606	004567	003362		TGW0:	JSR \$,TYPEA
1863	006612	043440	030127	027057	.ASCII	" GW0/."
1864	006620	132767	000020	172315	BITB	#W0F,RFLGS
1865	006626	001002			BNE	TGW0A
1866	006630	004567	000470		JSR	\$,TYPEENR
1867	006634	004567	003426		TGW0A:	JSR \$,TYPEO
1868	006640	001220			GW0	
1869						
1870	006642	004567	003326		TGW2:	JSR \$,TYPEA
1871	006646	043440	031127	027057	.ASCII	" GW2/."
1872	006654	132767	000040	172261	BITB	#W26F,RFLGS
1873	006662	001002			BNE	TGW2A
1874	006664	004567	000434		JSR	\$,TYPEENR
1875	006670	004567	003372		TGW2A:	JSR \$,TYPEO
1876	006674	001222			GW2	
1877						
1878	006676	004567	003272		TGW4:	JSR \$,TYPEA
1879	006702	043440	032127	027057	.ASCII	" GW4/."
1880	006710	132767	000040	172225	BITB	#W26F,RFLGS
1881	006716	001002			BNE	TGW4A
1882	006720	004567	000400		JSR	\$,TYPEENR
1883	006724	004567	003336		TGW4A:	JSR \$,TYPEO
1884	006730	001224			GW4	
1885						
1886	006732	004567	003236		TGW6:	JSR \$,TYPEA
1887	006736	043440	033127	027057	.ASCII	" GW6/."
1888	006744	132767	000040	172171	BITB	#W26F,RFLGS
1889	006752	001002			BNE	TGW6A
1890	006754	004567	000344		JSR	\$,TYPEENR
1891	006760	004567	003302		TGW6A:	JSR \$,TYPEO
1892	006764	001226			GW6	

1949	007300	001002			BNE	TAXSA
1950	007302	004567	000016		JSR	\$.TYPE NR
1951	007306	004567	002754	TAXSA:	JSR	\$.TYPE O
1952	007312	001210			AXSWR	
1953						
1954	007314	004567	002654	TEX:	JSR	\$.TYPE A
1955	007320	027136			.ASCII	" ."
1956	007322	000205			RTS	\$

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007324	004567	002644	
007330	051116	020056	
007334	062705	000006	
007340	000205		
007342	016767	171574	171636
007350	016667	000004	171602
007356	162767	000002	171574
007364	016667	000006	171570
007372	016767	170172	171564
007400	010267	171562	
007404	010367	171560	
007410	010467	171556	
007414	016767	171532	171552
007422	016767	171650	171546
007430	016767	171640	171626
007436	010067	171536	
007442	010167	171534	
007446	010667	171532	
007452	062767	000010	171524
007460	000205		

;SUBROUTINE TO TYPE 'NR' (NOT RELEVANT).

```
TYPENR: JSR    $,TYPEA
          .ASCII 'NR.'
          ADD    #6,$
          RTS    $
```

;SUBROUTINE TO SAVE PERTINENT DATA AS IT WAS AT THE TIME OF THE ERROR CALL.

```
SAVE:    MOV    FLAGS,SAVFLG
          MOV    +4(STP),SAVPC
          SUB    #2,SAVPC
          MOV    +6(STP),SAVPS
          MOV    177570,SAVSWR
          MOV    CADR,SAVCAD
          MOV    CADRX,SAVCAX
          MOV    CWP,SAVCWP
          MOV    ITCNT,SAVITC
          MOV    OKCTR,SAVOKC
          MOV    ERCTR,SAVERC
          MOV    RO,SAVRO
          MOV    R1,SAVR1
          MOV    STP,SAVSTP
          ADD    #10,SAVSTP
          RTS    $
```

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1985
1986           ;INITIALIZATION.
1987
1988 007462 012767 000010 171452 INIT:  MOV   #BF,FLAGS      ;INIT. FOR S&ORD DIAG.
1989 007470 000407                BR     INITA1
1990 007472 012767 000004 171442 INITA5: MOV   #MOD,FLAGS    ;INIT. FOR MODULE TEST MODE.
1991 007500 000403                BR     INITA1
1992 007502 012767 000020 171432 INITA:  MOV   #JF,FLAGS      ;INIT. FOR DJMRS DIAG.
1993 007510 012767 177570 171420 INITA1: MOV   #177570,SWR
1994 007516 000412                BR     INITB
1995 007520 012767 000040 171414 INITA2: MOV   #BXF,FLAGS    ;INIT. FOR BTEL ACCEPT/EXERCISE.
1996 007526 000403                BR     INITA4
1997 007530 012767 000100 171404 INITA3: MOV   #JXF,FLAGS    ;INIT. FOR DJMPRS ACCEPT/EXERCISE.
1998 007536 012767 001210 171372 INITA4: MOV   #AXSWR,SWR
1999 007544 012706 001000        INITB:  MOV   #1000,STP
2000 007550 005067 171374        CLR   PASCTR
2001 007554 012700 000002        MOV   #2,RO
2002 007560 005001                CLR   R1
2003 007562 010021        INITB1: MOV   RO,(R1)+
2004 007564 005021                CLR   (R1)+
2005 007566 062700 000004        ADD   #4,RO
2006 007572 020127 001000        CMP   R1,#1000
2007 007576 001371                BNE   INITB1
2008 007600 012767 000137 170372        MOV   #137,200
2009 007606 012767 007462 170366        MOV   #INIT,202
2010 007614 012767 005552 170172        MOV   #TTSVC,14      ;INIT. TRACE TRAP VECTOR.
2011 007622 012767 005406 170170        MOV   #CTLSVC,20     ;INIT CONTROL TRAP VECTOR.
2012 007630 012767 005554 170166        MOV   #PDOWN,24     ;INIT POWER FAIL TRAP VECTOR.
2013 007636 012767 005660 170164        MOV   #ERRSVC,30    ;INIT. ERROR TRAP VECTOR.
2014 007644 012767 005370 170162        MOV   #SCOSVC,34    ;INIT. SCOPE TRAP VECTOR.
2015 007652 012700 001146        MOV   #BEGV,RO
2016 007656 004767 002620        JSR   X7, TYPE
2017 007662 012542                MSG
2018 007664 005020        INITB2: CLR   (RO)+
2019 007666 020027 001300        CMP   RO,#ENDV
2020 007672 001374                BNE   INITB2
2021 007674 005002                CLR   R2
2022 007676 005003                CLR   R3
2023 007700 005004                CLR   R4
2024 007702 012767 007722 170100        MOV   #INITC,10
2025 007710 006700                SXT   RO
2026 007712 012767 000006 175632        MOV   #RTT,TTSVC
2027 007720 000401                BR    INITC1
2028 007722 022626        INITC:  CMP   (STP)+,(STP)+
2029 007724 012767 000012 170056        INITC1: MOV   #12,10
2030 007732 012767 007762 170044        MOV   #INITD,4
2031 007740 005767 167602                TST   KWLS
2032 007744 012767 177546 171316        MOV   #KWLS,KCSR
2033 007752 012767 010060 170120        MOV   #INITG,100
2034 007760 000421                BR    INITF
2035 007762 012767 010020 170014        INITD: MOV   #INITE,4
2036 007770 005767 162544                TST   KWPS
2037 007774 012767 172540 171266        MOV   #KWPS,KCSR
2038 010002 012767 010060 170074        MOV   #INITG,104
2039 010010 012767 000001 162524        MOV   #1,KWPB
2040 010016 000402                BR    INITF
```

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2041 010020 000000          INITE: HALT      ;***CATASTROPHIC ERROR. THERE IS NO CLOCK, AS REQUIRED.
2042 010022 000776          BR          INITE
2043 010024 012767 000006 167752 INITF: MOV      #6,4      ;INIT. (CLOSE OUT) TIMEOUT-ERROR TRAP VECTOR.
2044 010032 005067 171230          CLR      DLACTR    ;INIT DELAY NUMBER.
2045 010036 012746 000000          MOV      #0,      -(STP) ;SET PROCESSOR PRIORITY TO 0
2046 010042 012746 010050          MOV      #1$,    -(STP)
2047 010046 000002          RTI
2048 010050 012777 000115 171212 1$: MOV      #115,@KCSR ;ENABLE INTERRUPT FROM CLOCK (EITHER ONE)
2049 010056 000001          WAIT      ;WAIT FOR FIRST INTERRUPT
2050 010060 022626          INITG: CMP      (STP)+,(STP)+ ;POP STACK.
2051 010062 005767 171200          TST      DLACTR    ;FIRST INTERRUPT?
2052 010066 001010          BNE      INITH     ;NO. - BRANCH.
2053 010070 012767 000002 171170          MOV      #2,DLACTR ;YES. - ADJUST DELAY COUNTER.
2054 010076 005267 171164          INITG1: INC     DLACTR    ;COUNT UNTIL SECOND INTERRUPT.
2055 010102 001375          BNE      INITG1
2056 010104 000000          INITG2: HALT
2057 010106 000776          BR          INITG2
2058
2059 010110 005077 171154          INITH: CLR      @KCSR   ;DISABLE CLOCK INTERRUPTS. (DLACTR=16.7MS)
2060 010114 012767 000102 167756          MOV      #102,100 ;INIT (CLOSE OUT) CLOCK VECTOR.
2061 010122 012767 000106 167754          MOV      #106,104 ;INIT (CLOSE OUT) CLOCK VECTOR.
2062 010130 005067 171120          CLR      DLANO1   ;CALIBRATE FOR THIS PARTICULAR
2063 010134 162767 000021 171124          INITI: SUB     #21,DLACTR ;PROCESSOR 2 DELAY NUMBERS AND
2064 010142 005267 171106          INC     DLANO1   ;DELAY OFFSETS OF 10% OF THE
2065 010146 022767 000021 171112          CMP     #21,DLACTR ;DELAY NUMBERS.
2066 010154 101767          BLOS    INITI
2067 010156 026727 171104 000011          CMP     DLACTR,#11
2068 010164 103402          BLO     INITJ
2069 010166 005267 171062          INC     DLANO1
2070 010172 016767 171056 171066          INITJ: MOV     DLANO1,DLACTR ;(DLANO1=1MS)
2071 010200 005067 171054          CLR     DLAOF1
2072 010204 005067 171052          CLR     DLAOF2
2073 010210 005067 171040          CLR     DLANO1
2074 010214 005067 171036          CLR     DLANO2
2075 010220 066767 171042 171026          INITJ1: ADD    DLACTR,DLANO1
2076 010226 005267 171026          INC     DLAOF1
2077 010232 026767 171022 170652          CMP     DLAOF1,DMS1
2078 010240 001367          BNE     INITJ1
2079 010242 066767 171020 171006          INITJ2: ADD    DLACTR,DLANO2 ;(DLANO1=1MSXDMS1)
2080 010250 005267 171006          INC     DLAOF2
2081 010254 026767 171002 170632          CMP     DLAOF2,DMS2
2082 010262 001367          BNE     INITJ2
2083 010264 005067 170770          INITK: CLR     DLAOF1 ;(DLANO2=1MSXDMS2)
2084 010270 005067 170766          CLR     DLAOF2
2085 010274 016767 170754 170764          MOV     DLANO1,DLACTR
2086 010302 162767 000012 170756          INITK1: SUB     #12,DLACTR
2087 010310 005267 170744          INC     DLAOF1
2088 010314 022767 000012 170744          CMP     #12,DLACTR
2089 010322 101767          BLOS    INITK1
2090 010324 026727 170736 000007          CMP     DLACTR,#7
2091 010332 103402          BLO     INITK2
2092 010334 005267 170720          INC     DLAOF1
2093 010340 016767 170712 170720          INITK2: MOV     DLANO2,DLACTR ;(DLAOF1=10% DLANO1)
2094 010346 162767 000012 170712          INITK3: SUB     #12,DLACTR
2095 010354 005267 170702          INC     DLAOF2
2096 010360 022767 000012 170700          CMP     #12,DLACTR
  
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2097	010366	101767				BLOS	INITK3	
2098	010370	026727	170672	000007		CMP	DLACTR,#7	
2099	010376	103402				BLO	INITK4	
2100	010400	005267	170656			INC	DLAOF2	
2101	010404	000240			INITK4:	NOP		;(DLAOF2=10% DLANO2)
2102	010406	000240				NOP		
2103	010410	032767	000004	170524		BIT	#MOD,FLAGS	
2104	010416	001416				BEQ	INITL	
2105	010420	004567	001550			JSR	\$.TYPEA	
2106	010424	020136	051536	047440		.ASCII	" S OR D MODULE TEST."	
2107	010432	020122	020104	047515				
2108	010440	052504	042514	052040				
2109	010446	051505	027124					
2110	010452	000425				BR	INITM	
2111	010454	032767	000050	170460	INITL:	BIT	#BF+BXF,FLAGS	
2112	010462	001411				BEQ	INITL1	
2113	010464	004567	001504			JSR	\$.TYPEA	
2114	010470	020136	051536	023040		.ASCII	" S &/OR D."	
2115	010476	047457	020122	027104				
2116	010504	000410				BR	INITM	
2117	010506	004567	001462		INITL1:	JSR	\$.TYPEA	
2118	010512	020136	042136	045040		.ASCII	" D JMPR S."	
2119	010520	050115	020122	027123				
2120	010526	032767	000034	170406	INITM:	BIT	#BF+JF+MOD,FLAGS	
2121	010534	001407				BEQ	INITM1	
2122	010536	004567	001432			JSR	\$.TYPEA	
2123	010542	042040	040511	057107		.ASCII	" DIAG . "	
2124	010550	020056						
2125	010552	000413				BR	INITN	
2126	010554	004567	001414		INITM1:	JSR	\$.TYPEA	
2127	010560	040440	041503	050105		.ASCII	" ACCEPT/EXERCISE ."	
2128	010566	027524	054105	051105				
2129	010574	044503	042523	027136				
2130								
2131	010602	005767	170310		INITN:	TST	LOSA	;HAVE TTY QUERIES EVER BEEN MADE?
2132	010606	001404				BEQ	INITO	;NO. - BRANCH.
2133	010610	032767	000010	166752		BIT	#IQS,177570	;YES. - INHIBIT SUBSEQUENT TTY QUERIES?
2134	010616	001002				BNE	INITP	;YES. - BRANCH.
2135	010620	004567	000026		INITO:	JSR	\$.QBEG	;NO. - MAKE TTY QUERIES.
2136	010624	056767	170314	170310	INITP:	BIS	FX,FLAGS	;CARRY FLAGS FROM PREVIOUS PASS (IF ANY).
2137	010632	032767	000140	170302		BIT	#BXF+JXF,FLAGS	;ACCEPT/EXERCISE?
2138	010640	001002				BNE	INITR	;YES. - BRANCH
2139	010642	000167	171232		INITQ:	JMP	PREST	;NO. - BRANCH. (DIAG.)
2140	010646	000167	174212		INITR:	JMP	AXCTL	;BRANCH.
2141								

2198	011136	101115			BHI	QERC
2199	011140	026767	167756	167756	CMP	LODA,HIDA
2200	011146	101111			BHI	QERC
2201	011150	016701	167742		MOV	LOSA,R1
2202	011154	020167	167742		QADCKB: CMP	R1,LODA
2203	011160	001461			BEQ	QERR
2204	011162	020167	167732		CMP	R1,HISA
2205	011166	001403			BEQ	QADCKC
2206	011170	062701	000002		ADD	#2,R1
2207	011174	000767			BR	QADCKB
2208	011176	016701	167720		QADCKC: MOV	LODA,R1
2209	011202	020167	167710		QADCKD: CMP	R1,LOSA
2210	011206	001446			BEQ	QERR
2211	011210	020167	167710		CMP	R1,HIDA
2212	011214	001531			BEQ	QDATA
2213	011216	062701	000002		ADD	#2,R1
2214	011222	000767			BR	QADCKD
2215						
2216	011224	016767	170016	170016	QERA: MOV	TYPSRC,QSRC
2217	011232	004567	000736		JSR	\$.TYPEA
2218	011236	037477	044136	051511	.ASCII	"?? HISA=XXXXX6 ONLY, HIDA=XXXXX2 OR XXXXX6 ONLY ."
2219	011244	036501	054130	054130		
2220	011252	033130	047440	046116		
2221	011260	026131	044040	042111		
2222	011266	036501	054130	054130		
2223	011274	031130	047440	020122		
2224	011302	054130	054130	033130		
2225	011310	047440	046116	057131		
2226	011316	020056				
2227	011320	000177	167724		JMP	@QSRC
2228						
2229	011324	004567	000644		QERB: JSR	\$.TYPEA
2230	011330	037477	051536	046501	.ASCII	"?? SAME SCAN & DIST ADDRESS? ."
2231	011336	020105	041523	047101		
2232	011344	023040	042040	051511		
2233	011352	020124	042101	051104		
2234	011360	051505	037523	027136		
2235	011366	000167	177260		JMP	QBEG
2236						
2237	011372	004567	000576		QERC: JSR	\$.TYPEA
2238	011376	046136	020117	042101	.ASCII	" LO ADRS HIGHER THAN HI ADRS? ."
2239	011404	051522	044040	043511		
2240	011412	042510	020122	044124		
2241	011420	047101	044040	020111		
2242	011426	042101	051522	057077		
2243	011434	020056				
2244	011436	000167	177210		JMP	QBEG
2245						
2246						
2247	011442	004567	000526		QERD: JSR	\$.TYPEA
2248	011446	047136	020117	047502	.ASCII	" NO BOARDS. NO TEST ."
2249	011454	051101	051504	020054		
2250	011462	047516	052040	051505		
2251	011470	057124	020056			
2252	011474	000167	177152		JMP	QBEG
2253						

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2254 011500 032767 000120 167434 QDATA: BIT #JF+JXF,FLAGS
2255 011506 001447 BEQ QDCON
2256 011510 004567 000460 JSR $,TYPEA
2257 011514 042136 052101 037501 .ASCII "" DATA? ."
2258 011522 027040
2259 011524 004567 000202 JSR $,KDATA
2260 011530 010067 167404 MOV RO,DATAWD
2261 011534 042767 000200 167402 BIC #DATF,FX
2262 011542 022767 000006 167502 CMP #6,KCTR
2263 011550 001403 BEQ QJMPD
2264 011552 052767 000200 167364 BIS #DATF,FX
2265
2266 011560 004567 000410 QJMPD: JSR $,TYPEA
2267 011564 042136 051511 051524 .ASCII "" DISTJUMPED TO SCAN? ."
2268 011572 045040 046525 042520
2269 011600 020104 047524 051440
2270 011606 040503 037516 027040
2271 011614 004567 000116 JSR $,KYORN
2272 011620 020027 000116 CMP RO,#'N
2273 011624 001755 BEQ QJMPD
2274
2275 011626 004567 000342 QDCON: JSR $,TYPEA
2276 011632 052536 042523 020122 .ASCII "" USER DISCONNECTED? ."
2277 011640 044504 041523 047117
2278 011646 042516 052103 042105
2279 011654 020077 020056
2280 011660 004567 000052 JSR $,KYORN
2281 011664 020027 000116 CMP RO,#'N
2282 011670 001756 BEQ QDCON
2283
2284 011672 004567 000276 QTSTNG: JSR $,TYPEA
2285 011676 052136 040510 045516 .ASCII "" THANKS! NOW TESTING ."
2286 011704 020523 047040 053517
2287 011712 052040 051505 044524
2288 011720 043516 027136
2289
2290
2291 011724 000205 QEND: RTS $

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011726 004567 000010
 011732 004567 000004
 011736 004567 000000
 011742 005001
 011744 012767 000006 167300
 011752 005267 165602
 011756 105767 165576
 011762 100375
 011764 116700 165572
 011770 042700 177600
 011774 105767 165564
 012000 100375
 012002 010067 165560
 012006 020527 011742
 012012 001436
 012014 020027 000060
 012020 103452
 012022 020027 000067
 012026 101030
 012030 042700 177770
 012034 050001
 012036 005367 167210
 012042 001404
 012044 006301
 012046 006301
 012050 006301
 012052 000737
 012054 010100
 012056 020527 011732
 012062 001027
 012064 032700 000001
 012070 001026
 012072 020027 164000
 012076 103423
 012100 020027 167776
 012104 101020
 012106 000415
 012110 022767 000006 167134
 012116 001013
 012120 020027 000116
 012124 001406
 012126 020527 011742
 012132 001005
 012134 020027 000131
 012140 001002
 012142 012605
 012144 000205
 012146 016767 167074 167074
 012154 004567 000014
 012160 037477 020056

```

;SUBROUTINES TO KEY IN CORRECT OPERATOR REPLIES TO TTY QUERIES.

KADRS: JSR $,KIN ;ENTRY TO KEY IN AN ADDRESS.
KDATA: JSR $,KIN ;ENTRY TO KEY IN DATA.
KYORN: JSR $,KIN ;ENTRY TO KEY IN A Y OR AN N.
KIN: CLR R1 ;INIT. & PREPARE TO INPUT A
;MAXIMUM OF SIX CHARACTERS.
MOV #6,KCTR
KINA: INC TKS ;ENABLE CHAR. READ.
KINB: TSTB TKS ;CHAR. READY?
;NO. - BRANCH.
BPL KINB ;YES. - READ CHAR.
MOVB TKB,R0 ;CONVERT CHAR. FROM 8 TO 7 BIT ASCII.
BIC #177600,R0 ;ECHO THE CHAR.
KINB1: TSTB TPS
BPL KINB1
MOV R0,TPB
CMP $,#KIN ;WAS REPLY TO BE Y OR N ONLY?
BEQ KINC ;YES. - BRANCH
CMP RO,#'0 ;NO. - CHAR. LESS THAN A CHAR. 0?
BLO KINE ;YES. - BRANCH.
CMP RO,#'7 ;NO. - CHAR. GREATER THAN A CHAR. 7?
BHI KINC ;YES. - BRANCH.
BIC #177770,R0 ;NO. - CONVERT ASCII TO OCTAL.
BIS RO,R1 ;TRANSFER CHAR. TO R1.
DEC KCTR ;WAS THIS THE SIXTH CHARACTER?
BEQ KINB2 ;YES. - BRANCH.
ASL R1 ;NO. - POSITION CHARS.
ASL R1 ;POSITION CHARS.
ASL R1 ;POSITION CHARS.
BR KINA ;BRANCH.
KINB2: MOV R1,R0 ;YES. - TRANSFER THE SIX CHARS. TO RO.
CMP $,#KDATA ;SHOULD THIS REPLY BE AN ADDRESS?
BNE KIND ;NO. - BRANCH
BIT #1,R0 ;YES. - IS ADRS. EVEN?
BNE KINE ;NO. - BRANCH.
CMP RO,#164000 ;YES. - IS ADRS. LESS THAN 164000?
BLO KINE ;YES. - BRANCH.
CMP RO,#167776 ;NO. - IS ADRS. GREATER THAN 167776?
BHI KINE ;YES. - BRANCH.
BR KIND ;NO. - BRANCH.
KINC: CMP #6,KCTR ;IS THIS THE FIRST CHAR?
BNE KINE ;NO. - BRANCH.
CMP RO,#'N ;YES. - IS CHAR. AN N?
BEQ KIND ;YES. - BRANCH.
CMP $,#KIN ;NO. - WAS REPLY TO BE AN ADRS. OR DATA?
BNE KINE ;YES. - BRANCH.
CMP RO,#'Y ;NO. - IS CHAR. A Y?
BNE KINE ;NO. - BRANCH.
KIND: MOV (STP)+,$ ;YES. - POP STACK ONE JSR.
RTS $ ;RETURN. - REPLY IS IN RO.
KINE: MOV TYPsrc,QSRC ;GET ANOTHER TRY AT IT.
JSR $,TYPEA
.ASCII "??."
  
```

2348	012164	005726	TST	(STP)+	;POP STACK TWO JSR'S.
2349	012166	012605	MOV	(STP)+,S	
2350	012170	000177 167054	JMP	@QSRC	;RETURN TO RE-QUERY

```
2351
2352
2353           ;SUBROUTINE TO TYPE ASCII CODE.
2354
2355 012174 010567 167046 TYPEA: MOV $, TYP SRC
2356 012200 162767 000004 167040 TYPEA: SUB #4, TYP SRC
2357 012206 105767 165352 TYPEAA: TSTJ TPS
2358 012212 100375 BPL TYPEAA
2359 012214 121527 000136 CMPB ($), #136
2360 012220 001005 BNE TYPEAB
2361 012222 105725 TSTB ($)+
2362 012224 004567 177756 JSR $, TYPEAA
2363 012230 005015 005015
2364 012232 000056 000056
2365 012234 121527 000056 TYPEAB: CMPB ($), #56
2366 012240 001403 BEQ TYPEAC
2367 012242 112567 165320 MOVB ($)+, TPB
2368 012246 000757 BR TYPEAA
2369 012250 105725 TYPEAC: TSTB ($)+
2370 012252 032705 000001 BIT #1, $
2371 012256 001401 BEQ TYPEAD
2372 012260 005205 INC $
2373 012262 000240 TYPEAD: NOP
2374 012264 000205 RTS $
2375
2376
2377
2378           ;SUBROUTINE TO TYPE A SIX DIGIT OCTAL NUMBER.
2379
2380 012266 005067 000056 TYPEO: CLR TYPEOC
2381 012272 012500 MOV ($)+, RO
2382 012274 011000 MOV (RO), RO
2383 012276 006300 ASL RO
2384 012300 006167 000044 ROL TYPEOC
2385 012304 005200 INC RO
2386 012306 000413 BR TYPEOB
2387 012310 005067 000034 TYPEOA: CLR TYPEOC
2388 012314 006300 ASL RO
2389 012316 006167 000026 ROL TYPEOC
2390 012322 006300 ASL RO
2391 012324 006167 000020 ROL TYPEOC
2392 012330 006300 ASL RO
2393 012332 006167 000012 ROL TYPEOC
2394 012336 052767 027060 000004 TYPEOB: BIS #27060, TYPEOC
2395 012344 004567 177624 JSR $, TYPEA
2396 012350 027060 TYPEOC: .ASCII '0.'
2397 012352 020027 100000 CMP RO, #100000
2398 012356 001354 BNE TYPEOA
2399 012360 000205 RTS $
```

```
2400
2401
2402 012362 032767 000034 166552 PEND: BIT #BF+JF+MOD,FLAGS
2403 012370 001002 BNE PASEND
2404 012372 000177 166614 JMP @AXRTN
2405
2406 012376 005267 166546 PASEND: INC PASCTR
2407 012402 004567 177566 JSR $,TYPEA
2408 012406 027007 27007
2409 012410 032767 000040 165152 BIT #PCS,177570
2410 012416 001426 BEQ PEA
2411 012420 004567 177550 JSR $,TYPEA
2412 012424 027136 .ASCII ""
2413 012426 004567 177634 JSR $,TYPEO
2414 012432 001150 PASCTR
2415 012434 004567 177534 JSR $,TYPEA
2416 012440 051040 047111 054507 .ASCII " RINGY DINGY. "
2417 012446 042040 047111 054507
2418 012454 020056
2419 012456 022767 000001 166464 CMP #1,PASCTR
2420 012464 001403 BEQ PEA
2421 012466 004567 177502 JSR $,TYPEA
2422 012472 027123 .ASCII "S."
2423 012474 000240 PEA: NOP
2424
2425 012476 000167 176122 LOGICAL: JMP INITP
2426 ;ROUTINE TO OUTPUT TITLE
2427
2428 012502 011601 TYPE: MOV (%6), %1
2429 012504 011101 MOV (%1), %1
2430 012506 062716 000002 ADD #2, (%6)
2431 012512 112167 000022 LOOP: MOVB (%1)+, CHAR
2432 012516 001001 BNE 1$
2433 012520 000207 RTS %7
2434 012522 105737 177564 1$: TSTB @#177564
2435 012526 100375 BPL 1$
2436 012530 116737 000004 177566 MOVB CHAR, @#177566
2437 012536 000765 BR LOOP
2438 012540 000000 CHAR: 0
2439 012542 006412 055103 041103 MSG: .ASCIZ<12><15>/CZCBAC CB11 LOGIC TEST/<12><15>
2440 012550 041501 041440 030502
2441 012556 020061 047514 044507
2442 012564 020103 042524 052123
2443 012572 006412 000
2444 000001 .END
```


DCW25	001554	980#					
DCW26	001556	981#					
DCW27	001560	982#					
DCW30	001562	983#					
DCW31	001564	984#					
DCW32	001566	985#					
DCW33	001570	986#					
DCW34	001572	987#					
DCW35	001574	988#					
DCW36	001576	989#					
DCW37	001600	990#					
DCW40	001602	991#					
DCW41	001604	992#					
DCW42	001606	993#					
DCW43	001610	994#					
DCW44	001612	995#					
DCW45	001614	996#					
DCW46	001616	997#					
DCW47	001620	998#					
DCW50	001622	999#					
DCW51	001624	1000#					
DCW52	001626	1001#					
DCW53	001630	1002#					
DCW54	001632	1003#					
DCW55	001634	1004#					
DCW56	001636	1005#					
DCW57	001640	1006#					
DCW60	001642	1007#					
DCW61	001644	1008#					
DCW62	001646	1009#					
DCW63	001650	1010#					
DCW64	001652	1011#					
DCW65	001654	1012#					
DCW66	001656	1013#					
DCW70	001662	1015#					
DCW71	001664	1016#					
DCW72	001666	1017#					
DCW73	001670	1018#					
DCW74	001672	1019#					
DCW75	001674	1020#					
DCW76	001676	1021#					
DCW77	001700	1022#	1429	1468	1520	1575	
DELAY	002034	1048	1053#				
DELAY1	002010	1046#	1155	1189	1222	1256	1288 1322
DELAY2	002024	1050#	1564				
DF =	000200	750#	1365	1391	1827		
DJMPRS	001000	770#					
DJSAX	001020	787#					
DJS1A	004746	1557	1559#				
DJS1B	005040	1574	1577#				
DJS1BG	004710	1544	1552#				
DJS1ER	005020	1567	1570	1572#			
DJS1L1	004750	1560#	1576				
DJS1L2	004726	1555#	1581				
DJS1ND	005060	1578	1582#				
DJS1OK	005016	1571#					

LODAX	001132	825#												
LOGICA	012476	2425#												
LOOP	012512	2431#	2437											
LOSA	001116	819#	1071	1084	1089	1107	1128	1148	1182	1215	1248	1281	1315	1537
		1554	2131	2150*	2193	2197	2201	2209						
LOSAX	001126	823#												
MFF =	000010	746#	1856	1907										
MOD =	000004	737#	1074	1352	1990	2103	2120	2402						
MODMOD	001030	794#												
MSG	012542	2017	2439#											
NOP =	000240	715#												
OKCTR	001276	878#	1757*	1779	1978									
PASCTR	001150	835#	2000*	2406*	2414	2419								
PASEND	012376	1636	2403	2406#										
PCS =	000040	728#	2409											
PDOWN	005554	1694#	1718	2012										
PDOWNA	005616	1705#	1706											
PDSTP	005622	1700*	1707#	1711										
PEA	012474	2410	2420	2423#										
PEND	012362	1351	1532	1582	2402#									
PREDJS	004636	1526	1530#											
PREDT	003730	1073	1345	1349#										
PREDTA	003744	1350	1352#											
PREST	002100	1066#	1590	1594	1598	1602	1606	1610	1614	1618	1622	1626	1630	1634
		2139												
PRESTA	002124	1067	1069	1071#										
PRESTB	002140	1072	1074#											
PS =	177776	712#	1674	1702										
PUP	005624	1701	1711#											
QADCK	011110	2177	2193#											
QADCKA	011130	2194	2197#											
QADCKB	011154	2202#	2207											
QADCKC	011176	2205	2208#											
QADCKD	011202	2209#	2214											
QBEG	010652	2135	2145#	2235	2244	2252								
QDATA	011500	2212	2254#											
QDCON	011626	2255	2275#	2282										
QEND	011724	2291#												
QERA	011224	2155	2163	2168	2179	2187	2189	2191	2216#					
QERB	011324	2203	2210	2229#										
QERC	011372	2198	2200	2237#										
QERD	011442	2196	2247#											
QHIDA	011042	2181#												
QHIDAA	011056	2184#												
QHISA	010720	2157#												
QHISAA	010734	2160#												
QJMPD	011560	2263	2266#	2273										
QLODA	010776	2153	2170#											
QLODAA	011012	2173#												
QLOSA	010654	2146#												
QLOSAA	010670	2149#												
QSRC	001250	867#	2216*	2227	2345*	2350								
QTSTNG	011672	2284#												
RFLGS =	001143	713#	1087*	1109*	1130*	1151*	1185*	1218*	1251*	1284*	1316*	1365*	1391*	1412*
		1431*	1451*	1470*	1491*	1510*	1552*	1809	1817	1825	1827	1848	1856	1864
		1872	1880	1888	1899	1907	1915	1923	1931	1939				

SCW45	001414	926#							
SCW46	001416	927#							
SCW47	001420	928#							
SCW50	001422	929#							
SCW51	001424	930#							
SCW52	001426	931#							
SCW53	001430	932#							
SCW54	001432	933#							
SCW55	001434	934#							
SCW56	001436	935#							
SCW57	001440	936#							
SCW60	001442	937#							
SCW61	001444	938#							
SCW62	001446	939#							
SCW63	001450	940#							
SCW64	001452	941#							
SCW65	001454	942#							
SCW66	001456	943#							
SCW67	001460	944#							
SCW70	001462	945#							
SCW71	001464	946#							
SCW72	001466	947#							
SCW73	001470	948#							
SCW74	001472	949#							
SCW75	001474	950#							
SCW76	001476	951#							
SCW77	001500	952#	1339						
SDS =	000004	731#	1054	1597	1609	1621	1633		
SES =	000001	733#	1793						
SF =	000100	749#	1087	1109	1130	1825			
SLS =	040000	722#	1659	1736					
SRF =	000172	751#	1151	1185	1218	1251	1284	1316	
STMADV	002230	1090	1098#						
STMBEG	002154	1075	1084#						
STMEND	002236	1097	1100#						
STMERR	002220	1092	1095#						
STMLOP	002202	1089#	1099						
STMOK	002216	1094#							
STMTS	002214	1086	1093#						
STS =	020000	723#	1731						
STOBEG	002250	1076	1101	1107#					
STOEND	002322	1118	1121#						
STOERR	002304	1114	1116#						
STOLOP	002272	1111#	1120						
STOOK	002302	1112	1115#						
STOTS	002276	1108	1113#						
ST1BEG	002334	1122	1128#						
ST1END	002410	1139	1142#						
ST1ERR	002372	1135	1137#						
ST1LOP	002356	1132#	1141						
ST1OK	002370	1133	1136#						
ST1TS	002364	1129	1134#						
ST2BEG	002422	1143	1148#						
ST2END	002602	1173	1176#						
ST2ERR	002564	1161	1163	1165	1167	1169	1171#		
ST2LOP	002446	1153#	1175						

ST2OK	002562	1170#						
ST3BEG	002606	1176	1182#					
ST3END	002770	1207	1210#					
ST3ERR	002752	1195	1197	1199	1201	1203	1205#	
ST3LOP	002632	1187#	1209					
ST3OK	002750	1204#						
ST4BEG	002774	1210	1215#					
ST4END	003154	1240	1243#					
ST4ERR	003136	1228	1230	1232	1234	1236	1238#	
ST4LOP	003020	1220#	1242					
ST4OK	003134	1237#						
ST5BEG	003160	1243	1248#					
ST5END	003342	1274	1277#					
ST5ERR	003324	1262	1264	1266	1268	1270	1272#	
ST5LOP	003204	1253#	1276					
ST5OK	003322	1271#						
ST6BEG	003346	1277	1281#					
ST6END	003530	1306	1309#					
ST6ERR	003512	1294	1296	1298	1300	1302	1304#	
ST6LOP	003372	1286#	1308					
ST6OK	003510	1303#						
ST7BEG	003534	1309	1315#					
ST7END	003724	1342	1345#					
ST7ERR	003700	1328	1330	1332	1334	1336	1338#	
ST7L1	003554	1319#	1340					
ST7L2	003546	1317#	1344					
ST7OK	003676	1337#						
SWR	001136	827#	1054	1057	1663	1676	1993*	1998*
S.ORD	000200	762#						
S.ORDA	001010	778#						
TAXS	007256	1945#						
TAXSA	007306	1949	1951#					
TBD	006404	1823#						
TBDA	006452	1826	1832#					
TBDB	006466	1828	1835#					
TCAD	006274	1802#						
TCAX	006314	1807#						
TCAXA	006342	1810	1812#					
TCWP	006350	1815#						
TCWPA	006376	1818	1820#					
TDBC	006476	1831	1834	1837#				
TEX	007314	1795	1954#					
TFLGS	006500	1839#						
TGMF	006552	1854#						
TGMFA	006600	1857	1859#					
TGWD	006516	1846#						
TGWDA	006544	1849	1851#					
TGWO	006606	1862#						
TGWOA	006634	1865	1867#					
TGW2	006642	1870#						
TGW2A	006670	1873	1875#					
TGW4	006676	1878#						
TGW4A	006724	1881	1883#					
TGW6	006732	1886#						
TGW6A	006760	1889	1891#					
TKB	= 177562	705#	2306					

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CZCBAC.P11 03-MAR-78 09:19 CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0078

WDF	=	000004	745#	1848	1899				
WOF	=	000020	747#	1864	1915				
W26F	=	000040	748#	1872	1880	1888	1923	1931	1939
.	=	012575	761#	769#	777#	786#	793#	800#	

. ABS. 012575 000

ERRORS DETECTED: 0

CZCBAC.BIN,CZCBAC.LST/CRF/SOL/NL:TOC=CZCBAC.P11

RUN-TIME: 3 5 1 SECONDS

RUN-TIME RATIO: 140/10=13.8

CORE USED: 11K (21 PAGES)