

# CB11

LOGIC TEST  
MD-11-DZCBA-B

EP-DZCBA-B-DL-A

OCT 1976

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**digital**

FICHE 1 OF 1

Made in U.S.A.

This microfiche card contains a grid of frames, each displaying logic test data. The data is organized into columns and rows, with some frames containing headers such as 'TEST NO.', 'TEST NAME', and 'TEST RESULT'. The frames are arranged in a regular grid pattern, with some frames appearing to be blank or containing minimal data. The overall layout is typical of a microfiche card used for data storage and retrieval.

.REPT 0

IDENTIFICATION

PRODUCT CODE: MA:DEC-11-DZ024-9-D  
 PRODUCT NAME: CB: LOGIC TEST  
 DATE: MAY 1976  
 MAINTAINER: DIAGNOSTIC GROUP

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ABSTRACT

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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

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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

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

NOTES

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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

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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:

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0911 MACY11 27(732) 30-MAR-76 09:32 PAGE 4  
DZCBAB.P11

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ONE SCAN BOARD 2  
N SCAN BOARDS N(2)  
ONE DIST. BOARD 2  
M DIST. BOARDS M(2)  
ONE SCAN & ONE DIST. BOARD 2+2  
N SCAN & M DIST. BOARDS N(2)+M(2)

S & D ACCEPT/EXERCISE (SA1010) MODE:

ONE SCAN BOARD 10  
N SCAN BOARDS N(10)  
ONE DIST. BOARD 17  
M DIST. BOARDS M(17)  
ONE SCAN & ONE DIST. BOARD 10+17  
N SCAN & M DIST. BOARDS N(10)+M(17)

D JMPR S DIAG (SA1000) MODE:

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

D JMPR S ACLEPT/EXERCISE (SA1020) MODE:

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

POWER FAILURE  
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THIS PROGRAM MAY NOT RECOVER FROM A POWER FAILURE.  
THEREFORE, THIS DIAGNOSTIC SHOULD NOT BE USED WHEN VERIFYING  
THE SYSTEM CAPABILITY TO RECOVER FROM A POWER FAILURE.

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STARTING-OPERATION  
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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 JUMPERED 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 JUMPERED 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  
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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. DISTS 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 MCJES.

Q. USER DISCONNECTED?  
R. REPLY Y (YES) OR N (NO). THIS QUERY SERVES ONLY TO DOUBLE CHECK THAT THE USER INPUTS ARE DISCONNECTED. THE

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

COMPLETE EXAMPLES:

S &/OR D DIAG

LOSA? 164000  
HISA? 164006  
LODA? 164010  
HIDA? 164012  
TEL CO DISCONNECTED? Y  
THANKS! NOW TESTING

D JMPR S ACCEPT/EXERCISE

LOSA? 164000  
HISA? 164006  
LODA? 164010  
HIDA? 164016  
DATA? N  
DIST JUMPED TO SCAN? Y  
USER DISCONNECTED? Y  
THANKS! NOW TESTING

S &/OR D ACCEPT/EXERCISE

LOSA? N  
LODA? 164100  
HIDA? 164206  
USER DISCONNECTED? Y  
THANKS! NOW TESTING

D JMPR S DIAG

LOSA? 164000  
HISA? 164006  
LODA? 164010  
HIDA? 164016  
DATA? 123456  
DIST JUMPED TO SCAN? Y  
USER DISCONNECTED? Y  
THANKS! NOW TESTING

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

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405SWITCH REGISTER  
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FOR NORMAL OPERATION ALL SWITCHES ARE TO BE RESET.  
RESET MEANS DOWN OR A "0", SET MEANS UP OR A "1".

SWR15 RESET DO NOT HALT ON ERROR. MAKE A SINGLE TYPEOUT  
OF EACH ERROR THAT OCCURS AND GO ON TO THE  
NEXT TEST OR LOOP OF A TEST IN SEQUENCE.  
SET HALT ON ERROR. MAKE A TYPEOUT OF THE ERROR THEN HALT.

SWR14 RESET DO NOT SCOPE LOOP.  
SET SCOPE LOOP ON CURRENT TEST OR TEST LOOP.

SWR13 RESET DURING A SCOPE LOOP, MAKE SUBSEQUENT ERROR TYPEOUTS.  
SET DURING A SCOPE LOOP, MAKE NO SUBSEQUENT ERROR  
TYPEOUTS.

SWR12 RESET ALLOW TRACE TRAPPING AFTER EVERY INSTRUCTION.  
SET INHIBIT TRACE TRAPPING.

SWR11 RESET ALLOW ITERATIONS OF THE TESTS.  
SET INHIBIT ITERATIONS.

SWR10 NOT USED.

SWR09 NOT USED.

SWR08 NOT USED.

SWR07 NOT USED.

SWR06 RESET IN THE EVENT OF INTERMITTANT ERRORS DURING  
A SCOPE LOOP, A COUNT OF ERRORS AND OF "OK'S" WILL  
BE TYPED.  
SET INHIBIT THE ABOVE DESCRIBED TYPED.

SWR05 RESET THE TTY BELL WILL RING AT THE END OF EACH PASS.  
SET THE BELL WILL RING AND A PASS COUNT WILL BE TYPED  
AT THE END OF EACH PASS.

SWR04 RESET THE OPTION DESCRIBED AS FOLLOWS IS INHIBITED.  
SET REPORT ON THE STATUS OF THE PROGRAM AFTER EACH  
SUB-TEST OR TEST LOOP. THIS TYPEOUT WILL OCCUR  
EACH TIME THE PSEUDO-OP CONTROL IS EXECUTED.  
THE TYPEOUT IS THE SAME ONE USED FOR ERROR REPORTS.

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THE OCCURANCE OF AN ACTUAL ERROR WHILE THIS OPTION IS BEING UTILIZED WILL NOT AFFECT THE ERROR REPORTING MECHINISM, NOR WILL THE ERROR REPORTING MECHANISM EFFECT THIS OPTION. SWITCH SWRO0 IS APPLICABLE TO THIS TYPEOUT. THE OBVIOUS DETECTABLE DIFFERENCE BETWEEN THIS TYPEOUT AND AN ACTUAL ERROR TYPEOUT IS THAT BIT 0 OF FLAGS (SEE ERROR SECTION) WILL BE SET ONLY FOR AN ACTUAL ERROR TYPEOUT.

SWRO3	RESET	ALLOW FULL TTY QUERIES OF THE OPERATOR.
	SET	INHIBIT TTY QUERIES OF THE OPERATOR AND USE THE REPLIES GIVEN BY THE OPERATOR THE LAST TIME QUERIES WERE MADE.
SWRO2	RESET	THE OPTION DESCRIBED AS FOLLOWS IN INHIBITED.
	SET	SHORTEN ALL TIME DELAYS BY 10%.
SWRO1	RESET	THE OPTION DESCRIBED AS FOLLOWS IS INHIBITED.
	SET	LENGTHEN ALL TIME DELAYS BY 10%.
SWRO0	RESET	ALLOW FULL ERROR REPORT TO BE MADE.
	SET	SHORTEN THE ERROR REPORT TO THE CONTENTS OF THE PROGRAM COUNTER ONLY (PC/),

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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 TYPEOUT 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 GWD/XXXXXX GW2/XXXXXX GW4/XXXXXX GW6/XXXXXX SWR/XXXXXX  
TWD/XXXXXX TMF/XXXXXX TWD/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/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 JMPRO TO SCAN). THIS IS ALWAYS RELEVANT.
- F/ FLAGS. THESE ARE FLAG BITS USED BY THE PROGRAM FOR VARIOUS

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PURPOSES OF MAINTAINING PROGRAM STATUS. BECAUSE THEY MAY BE USEFUL IN GENERAL, THEY ARE TYPED OUT AND THEY MAY BE INTERPRETED AS FOLLOWS:

- BIT 0 AN ERROR CONDITION EXISTS THAT HAS NOT BEEN CLEARED (BY A RESTART OR A BYPASS ERROR)
- BIT 1 THE EXISTING ERROR CONDITION IS INTERMITTANT.
- BIT 2 THE LAST START/RESTART WAS FROM SA1030. (MODULE TEST MODE)
- BIT 3 THE LAST START/RESTART WAS FROM SA200. (S&ORD)
- BIT 4 THE LAST START/RESTART WAS FROM SA1000. (DJMPRS)
- BIT 5 THE LAST START/RESTART WAS FROM SA1010. (S&ORD/AC/EX)
- BIT 6 THE LAST START/RESTART WAS FROM SA1020. (DJMPRS/AC/EX)
- BIT 7 OPERATOR GIVEN DATA WAS BEING USED ON A DJS PASS.
- BIT 8 ERROR RELEVANCY FLAGS. (HOW THE PROG. DETERMINES THRU WHAT IS AND IS NOT RELEVANT TO BE TYPED IN)
- BIT 15 H. POOR TIMEOUT. THESE ARE SET AT THE BEGINNING OF EACH TEST.)

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

- GWD/ GOOD WORD. - RELEVANT ONLY TO DISTRIBUTE BOARDS.
- TWD/ TEST (BAD?) WORD.
- GMF/ GOOD MAINTENANCE FLOPS. - RELEVANT ONLY TO SCAN BOARDS IN MAINT. MODE.
- TMF/ TEST (BAD?) MAINT. FLOPS.
- GW0/ GOOD SCAN WORD 0 (OF THE SCAN BOARD INDICATED BY CA/).
- TW0/ TEST (BAD?) SCAN WORD 0.
- GW2/ GOOD SCAN WORD 2 (OF THE SCAN BOARD INDICATED BY CA/).
- TW2/ TEST (BAD?) SCAN WORD 2.
- GW4/ GOOD SCAN WORD 4 (OF THE SCAN BOARD INDICATED BY CA/).
- TW4/ TEST (BAD?) SCAN WORD 4.
- GW6/ GOOD SCAN WORD 6 (OF THE SCAN BOARD INDICATED BY CA/).
- TW6/ TEST (BAD?) SCAN WORD 6.
- SWR/ SWITCH REGISTER AS IT WAS AT THE TIME OF THE ERROR.
- AXSWR/ SIMULATED SWITCH REGISTER FOR ACCEPT/EXERCISE MODES. THE PROGRAM WAS RUNNING AS IF THE SWITCHES REPRESENTED HERE WERE ACTUALLY SET. SEE STARTING-OPERATION, MODES 3 AND 4. (NR IS TYPED WHEN THIS IS NOT RELEVANT.)

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580ERROR 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  
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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".

Vertical text on the left margin, possibly a page number or reference code, appearing as a series of small characters.

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 SWR05.
- 4. OTHER SWITCH CONTROLS FOR ERRORS, SCOPE LOOPS, ETC.

FORCED ERROR TYPEOUT  
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IN THE EVENT OF AN ILLEGAL TRAP THE PROGRAM WILL HALT. THE STATUS OF THE PROGRAM IN THE EVENT OF AN ILLEGAL TRAP CAN BE OBTAINED BY STOPPING THE PROGRAM. SWITCH SETTINGS ARE IMMATERIAL. THE TYPEOUT WILL BE "OC", "PC", "PS", AND "PC".

TRAP CATCHER  
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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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		.TITLE CB11	
		.ABS	
		:EQUATES	
686	000000	R0=%0	:REGISTER 0 GENERAL USE.
687	000001	R1=%1	:REGISTER 1 GENERAL USE.
688	000002	R2=%2	:REGISTER 2 SPECIAL USE.
689	000003	R3=%3	:REGISTER 3 SPECIAL USE.
690	000004	R4=%4	:REGISTER 4 SPECIAL USE.
691	000005	R5=%5	:REGISTER 5 SPECIAL USE.
692	000006	R6=%6	:REGISTER 6 SPECIAL USE.
693	000007	R7=%7	:REGISTER 7 SPECIAL USE.
694	000002	CADR=R2	:REGISTER 2 CONTROL ADDRESS POINTER.
695	000003	CADRX=R3	:REGISTER 3 AUXILIARY CONTROL ADDRESS POINTER.
696	000004	CWP=R4	:REGISTER 4 CONTROL WORD POINTER.
697	000005	\$=R5	:REGISTER 5 SUBROUTINE POINTER.
698	000006	STP=R6	:REGISTER 6 STACK POINTER.
699	000007	PC=R7	:REGISTER 7 PROGRAM COUNTER.
701	177510	TKS=177560	:TTY KEY BOARD STATUS.
702	177562	TKB=177562	:TTY KEYBOARD BUFFER.
703	177564	TPS=177564	:TTY PRINTER STATUS.
704	177566	TPB=177566	:TTY PRINTER BUFFER.
705	177546	KWLS=177546	:LINE CLOCK STATUS.
706	172540	KWPS=172540	:REAL TIME CLOCK STATUS.
707	172542	KWPB=172542	:REAL TIME CLOCK BUFFER.
708	172544	KWPC=172544	:REAL TIME CLOCK COUNTER.
709	177776	PS=177776	:PROCESSOR STATUS
710	001143	RFLGS=FLAGS+1	:ERROR TIMEOUT RELEVANCY FLAGS..
712	000240	NOP=240	:PSUEDO-OP NO OPERATION.
713	000006	RTT=6	:RETURN FROM "T" TRAP INTERRUPT.
714	104400	SCOPE=TRAP	:PSUEDO-OP TRAP.
715	104000	ERROR=EMT	:PSUEDO-OP EMT.
716	104777	CONTROL=104777	:PSEUDO-OP TRAP.
718	100000	HES=100000	:SWR15 HALT ON ERROR.
719	040000	SLS=40000	:SWR14 SCOPE LOOP.
720	020000	STS=20000	:SWR13 SUBSEQUENT ERROR TYPEOUTS.
721	010000	TTS=10000	:SWR12 TRACE TRAP.
722	004000	ITS=4000	:SWR11 ITERATE.
724	000100	IMS=100	:SWR06 INHIBIT INTERMITTANT TYPEOUTS.
725	000040	PCS=40	:SWR05 TYPE PASS COUNT AT END OF PASSES.
726	000020	TSS=20	:SWR04 TYPE PROGRAM STATUS.
727	000010	IQS=10	:SWR03 INHIBIT TTY QUERIES.
728	000004	SDS=4	:SWR02 SHORTEN TIME DELAYS BY -10%.
729	000002	LDS=2	:SWR01 LENGTHEN TIME DELAYS BY +10%.
730	000001	SES=1	:SWR00 SHORT ERROR MESSAGES (PC ONLY).
732	000001	ECF=1	:FLAG ERROR CONDITION.
733	000002	IMF=2	:FLAG ERROR CONDITION IS INTERMITTANT.
734	000004	MOD=4	:FLAG MODULE MODE START.
735	000010	BF=10	:FLAG S &OR D DIAG. START.

E02

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000301  
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000010  
000020  
000040  
000100  
000200  
000172  
000206  
000327  
000377

JF=20  
BXF=40  
JXF=100  
DATF=200  
AXF=1  
CWF=2  
WDF=4  
MFF=10  
WOF=20  
W26F=40  
SF=100  
DF=200  
SRF=172  
DRF=206  
DSRF=327  
ALRF=377

: FLAG DJMPRS DIAG. START.  
: FLAG S &JR D ACCEPT/EXERCISE START.  
: FLAG DJMPRS ACCEPT/EXERCISE START.  
: FLAG DATA IN USE ON DJMPRS/  
: FLAG CAX RELEVANT.  
: FLAG CWORD RELEVANT.  
: FLAG GWD & TWD RELEVANT.  
: FLAG GMF & TMF RELEVANT.  
: FLAG GWD & TWD RELEVANT.  
: FLAG GW2, GW4, GW6, TW2, TW4 & TW6 RELEVANT  
: FLAG "SCAN" RELEVANT.  
: FLAG "DIST" RELEVANT.  
: FLAGS ALL THAT IS RELEVANT TO SCAN BDS.  
: FLAGS ALL TYPEOUTS ARE RELEVANT TO DIST. BDS.  
: FLAGS ALL THAT IS RELEVANT TO DJS.  
: FLAGS ALL TYPEOUTS ARE RELEVANT.

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753
754
755      ;START - SA200
756      ;NORMAL PROGRAM START TO TEST SCAN BOARDS AND/OR DISTRIBUTE BOARDS
757      ;WHILE DISCONNECTED FROM ALL TELEPHONE CO. INPUTS.
758      000200 000200
759      000137 007462      S.ORD:  JMP      =200      DJINIT
760
761
762      ;START - SA1000
763      ;SPECIAL START FOR SUB-PROGRAM "DJMPRS" TO TEST "DISTRIBUTE BOARDS
764      ;JUMPERED TO SCAN BOARD" WHILE DISCONNECTED FROM ALL TELEPHONE INPUTS.
765
766      001000 001000
767      00100C 000167 006476      DJMPRS: JMP      =1000      INITA
768
769
770      ;START - SA1010
771      ;SPECIAL START TO RUN ACCEPTANCE/EXERCISE OF SCAN BOARDS AND/OR DISTRIBUTE
772      ;BOARDS WHILE DISCONNECTED FROM ALL TELEPHONE CO. INPUTS.
773
774      001010 001010
775      000167 006504      S.ORDAX:  =1010      JMP      INITA2
776
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      000167 006504      DJSAX:  JMP      =1020      INITA3
785
786
787      ;START - SA1030
788      ;SPECIAL START FOR MODULE TEST MODE.
789
790      001030 001030
791      000167 006436      MODMOD: JMP      =1030      INITA5
792
793
794      ;START - SA1040
795      ;SPECIAL START TO FORCE AN ERROR TYPEOUT AFTER AN ILLEGAL TRAP HAS OCCURRED.
796
797      001040
798      . =1040
799      001040 010667 000226      FORCER: MOV      STP,FESAV
800      001044 012706 001000      MOV      #1000,STP
801      001050 004567 011100      JSR      $,TYPEA
802      001054 043136 051117      .ASCII  "FORCED TYPEOUT."
803      001062 020104 054524      042503
804      001070 052517 027124      042520
805      001074 004567 005114      JSR      $,TYPERR
806      001100 016706 000166      MOV      FESAV,STP
807      001104 000000      FORCEA: HALT
808      001106 000776      BR      FORCEA

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G02

CB11 MACY11 27(732) 30-MAR-76 09:32 PAGE 19  
DZCBAB.P11

809  
810  
811 001110 000010  
812 001112 000001  
813 001114 000007

;CONSTANTS.

ITNO: 10  
DMS1: 1  
DMS2: 7

; ITERATION NUMBER.  
; NO. OF MS FOR DELAY.  
; NO. OF MS FOR DELAY.

# H02

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814                                     ;VARIABLES - NOT CLEARED ON START OR RESTART.
815
816 001116 000000 LOSA: 0 ;LOWEST SCAN ADDRESS (GIVEN BY OPERATOR).
817 001120 000000 HISA: 0 ;HIGHEST SCAN ADDRESS (GIVEN BY OPERATOR).
818 001122 000000 LODA: 0 ;LOWEST DISTRIBUTE ADDRESS (GIVEN BY OPERATOR).
819 001124 000000 HIDA: 0 ;HIGHEST DISTRIBUTE ADDRESS (GIVEN BY OPERATOR).
820 001126 000000 LOSAX: 0 ;LO SCAN ADRS. AUXILIARY.
821 001130 000000 HISAX: 0 ;HI SCAN ADRS. AUXILIARY.
822 001132 000000 LODAX: 0 ;LO DIST. ADRS. AUXILIARY.
823 001134 000000 HIDAX: 0 ;HI DIST. ADRS. AUXILIARY.
824 001136 000000 SWR: 0 ;SWITCH REGISTER POINTER.
825 001140 000000 DATAWD: 0 ;DATA WORD.
826 001142 000000 FLAGS: 0 ;PROGRAM FLAGS.
827 001144 000000 FX: 0 ;PROGRAM FLAGS AUXILIARY.
828
829                                     ;VARIABLES - CLEARED ON START OR RESTART.
830
831 001146 000000 BEGV: 0
832 001150 000000 PASCTR: 0 ;PASS COUNTER 0
833 001152 000000 ITCNT: 0 ;ITERATION COUNTER.
834 001154 000000 SCORTN: 0 ;SCOPE LOOP RETURN POINTER.
835 001156 000000 IMCNT: 0 ;INTERMITTANT ERROR COUNTER.
836 001160 000000 SAVPC: 0 ;SAVED PC.
837 001162 000000 SAVPS: 0 ;SAVED PS.
838 001164 000000 SAVSWR: 0 ;SAVED SWR.
839 001166 000000 SAVCAD: 0 ;SAVED CONTROL ADDRESS POINTER. (R2)
840 001170 000000 SAVCAX: 0 ;SAVED CONTROL ADDRESS AUXILIARY POINTER. (R3)
841 001172 000000 SAVCWP: 0 ;SAVED CONTROL WORD POINTER. (R4)
842 001174 000000 SAVITC: 0 ;SAVED ITERATION COUNTER.
843 001176 000000 SAVOKC: 0 ;SAVED INTERMITTENT ERROR "OK" COUNTER.
844 001200 000000 SAVRO: 0 ;SAVED R0.
845 001202 000000 SAVR1: 0 ;SAVED R1.
846 001204 000000 SAVSTP: 0 ;SAVED STACK POINTER.
847 001206 000000 SAVFLG: 0 ;SAVED FLAGS.
848 001210 000000 AXSWR: 0 ;SWITCH REG. USED WITH ACCEPT/EXERCISE.
849 001212 000000 AXRTN: 0 ;RETURN POINTER USED WITH ACCEPT/EXERCISE
850 001214 000000 GMF: 0 ;GOOD MAINT. FLAGS.
851 001216 000000 GWD: 0 ;GOOD WORD.
852 001220 000000 GW0: 0 ;GOOD WORD 0
853 001222 000000 GW2: 0 ;GOOD WORD 2.
854 001224 000000 GW4: 0 ;GOOD WORD 4.
855 001226 000000 GW6: 0 ;GOOD WORD 6.
856 001230 000000 TMF: 0 ;TEST MAINT. FLOP
857 001232 000000 TWD: 0 ;TEST WORD
858 001234 000000 TW0: 0 ;TEST WORD 0.
859 001236 000000 TW2: 0 ;TEST WORD 2.
860 001240 000000 TW4: 0 ;TEST WORD 4.
861 001242 000000 TW6: 0 ;TEST WORD 6.
862 001244 000000 TLMT: 0 ;TIME LIMIT FOR SUBR. TIME.
863 001246 000000 TYPsrc: 0 ;ORIG. TYPE CALL SOURCE.
864 001250 000000 QSRC: 0 ;QUERY SOURCE
865 001252 000000 KCTR: 0 ;KEY IN CHARACTER COUNTER.
866 001254 000000 DLAN01: 0 ;DELAY NUMBER TYPE 1.
867 001256 000000 DLAN02: 0 ;DELAY NUMBER TYPE 2.
868 001260 000000 DLAOF1: 0 ;DELAY OFFSET TYPE 1.
869 001262 000000 DLAOF2: 0 ;DELAY OFFSET TYPE 2.

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870 001264 000000  
871 001266 000000  
872 001270 000000  
873 001272 000000  
874 001274 000000  
875 001276 000000  
876 001300 000000

SAVERC: 0  
DLACTR: 0  
KCSR: 0  
FESAV: 0  
ERCTR: 0  
OKCTR: 0  
ENDV: 0

;SAVED INTERMITTENT ERROR "ER" COUNTER.  
;DELAY COUNTER.  
;CLOCK CSR (ACTUAL).  
;FORCED ERROR TIMEOUT STP STORAGE.  
;INTERMITTENT COUNTER - ERRORS.  
;INTERMITTENT COUNTER - OK'S.

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 881  
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 883  
 884  
 885  
 886 001302 000000  
 887 001304 000001  
 888 001306 000002  
 889 001310 000003  
 890 001312 000004  
 891 001314 000005  
 892 001316 000006  
 893 001320 000007  
 894 001322 000010  
 895 001324 000011  
 896 001326 000012  
 897 001330 000013  
 898 001332 000014  
 899 001334 000015  
 900 001336 000016  
 901 001340 000017  
 902 001342 000000  
 903 001344 000016  
 904 001346 000001  
 905 001350 000015  
 906 001352 000002  
 907 001354 000014  
 908 001356 000003  
 909 001360 000013  
 910 001362 000004  
 911 001364 000012  
 912 001366 000005  
 913 001370 000011  
 914 001372 000006  
 915 001374 000010  
 916 001376 000007  
 917 001400 000000  
 918 001402 000007  
 919 001404 000010  
 920 001406 000006  
 921 001410 000011  
 922 001412 000005  
 923 001414 000012  
 924 001416 000004  
 925 001420 000013  
 926 001422 000003  
 927 001424 000014  
 928 001426 000002  
 929 001430 000015  
 930 001432 000001  
 931 001434 000016  
 932 001436 000000

;SCAN CONTROL WORD TABLE.

;CONTROL WORDS USED TO SET AND CLEAR THE MAINTENANCE FLOPS AND SCAN WORDS.  
 ;THE MAINT. FLOPS AND SCAN WORDS SET OR CLEARED ARE GIVEN BELOW IN  
 ;REFERENCE TO WORD 0, WORD 2, WORD 4 & WORD 6 OF A SCAN MODULE.  
 ;THESE BITS, WHEN USED IN BYTE INSTRUCTIONS CORRESPOND TO BITS 8, 9, 10 & 11.

	; CLEARS:	SETS:
SCW00:	0	NONE
SCW01:	1	ALL
SCW02:	2	2,4,6
SCW03:	3	0,2,4,6
SCW04:	4	4,6,8
SCW05:	5	0,2,6
SCW06:	6	0,6
SCW07:	7	0,2,4
SCW10:	10	0,6,8
SCW11:	11	0,6
SCW12:	12	2,6,8
SCW13:	13	0,2,6
SCW14:	14	4,6,8
SCW15:	15	0,4,6
SCW16:	16	2,4,6
SCW17:	17	ALL
SCW20:	0	NONE
SCW21:	16	
SCW22:	1	
SCW23:	15	
SCW24:	2	
SCW25:	14	
SCW26:	3	
SCW27:	13	
SCW30:	4	
SCW31:	12	
SCW32:	5	
SCW33:	11	
SCW34:	6	
SCW35:	10	
SCW36:	7	
SCW37:	0	
SCW40:	7	
SCW41:	10	
SCW42:	6	
SCW43:	11	
SCW44:	5	
SCW45:	12	
SCW46:	4	
SCW47:	13	
SCW50:	3	
SCW51:	14	
SCW52:	2	
SCW53:	15	
SCW54:	1	
SCW55:	16	
SCW56:	0	

;SCW20 THRU SCW77 SETS & CLEARS WORDS AS  
 ;GIVEN ABOVE FOR THE SAME CONSTANTS. (SCW21 IS  
 ;THE SAME AS FOR SCW16.)

K02

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933	001440	000017	SCW57:	17
934	001442	000005	SCW60:	5
935	001444	000012	SCW61:	12
936	001446	000005	SCW62:	5
937	001450	000012	SCW63:	12
938	001452	000005	SCW64:	5
939	001454	000012	SCW65:	12
940	001456	000005	SCW66:	5
941	001460	000012	SCW67:	12
942	001462	000000	SCW70:	0
943	001464	000017	SCW71:	17
944	001466	000000	SCW72:	0
945	001470	000017	SCW73:	17
946	001472	000000	SCW74:	0
947	001474	000017	SCW75:	17
948	001476	000000	SCW76:	0
949	001500	000017	SCW77:	17
950				



951			
952			:DISTRIBUTE CONTROL WORD TABLE.
953			:WORDS USED TO DIRECTLY SET DISTRIBUTE BOARDS IN BOTH THE DISTRIBUTE
954			:TESTS AND IN THE DISTRIBUTE-JUMPERED-TO-SCAN-TEST.
955			
956	001502	000000	DCW00: 0
957	001504	000001	DCW01: 1
958	001506	000002	DCW02: 2
959	001510	000004	DCW03: 4
960	001512	000010	DCW04: 10
961	001514	000020	DCW05: 20
962	001516	000040	DCW06: 40
963	001520	000100	DCW07: 100
964	001522	000200	DCW10: 200
965	001524	000400	DCW11: 400
966	001526	001000	DCW12: 1000
967	001530	002000	DCW13: 2000
968	001532	004000	DCW14: 4000
969	001534	010000	DCW15: 10000
970	001536	020000	DCW16: 20000
971	001540	040000	DCW17: 40000
972	001542	100000	DCW20: 100000
973	001544	177776	DCW21: 177776
974	001546	177775	DCW22: 177775
975	001550	177773	DCW23: 177773
976	001552	177767	DCW24: 177767
977	001554	177757	DCW25: 177757
978	001556	177737	DCW26: 177737
979	001560	177677	DCW27: 177677
980	001562	177577	DCW30: 177577
981	001564	177377	DCW31: 177377
982	001566	176777	DCW32: 176777
983	001570	175777	DCW33: 175777
984	001572	173777	DCW34: 173777
985	001574	167777	DCW35: 167777
986	001576	157777	DCW36: 157777
987	001600	137777	DCW37: 137777
988	001602	077777	DCW40: 077777
989	001604	052525	DCW41: 052525
990	001606	125252	DCW42: 125252
991	001610	034163	DCW43: 034163
992	001612	146314	DCW44: 146314
993	001614	070707	DCW45: 070707
994	001616	107070	DCW46: 107070
995	001620	007417	DCW47: 007417
996	001622	170360	DCW50: 170360
997	001624	041045	DCW51: 041045
998	001626	136732	DCW52: 136732
999	001630	154321	DCW53: 154321
1000	001632	023456	DCW54: 023456
1001	001634	133333	DCW55: 133333
1002	001636	044444	DCW56: 044444
1003	001640	000000	DCW57: 000000
1004	001642	177777	DCW60: 177777
1005	001644	000000	DCW61: 000000
1006	001646	111111	DCW62: 111111

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1007	001650	022222	DCW63:	022222
1008	001652	133333	DCW64:	133333
1009	001654	044444	DCW65:	044444
1010	001656	155555	DCW66:	155555
1011	001660	066666	DCE67:	066666
1012	001662	177777	DCW70:	177777
1013	001664	101010	DCW71:	101010
1014	001666	111111	DCW72:	111111
1015	001670	121212	DCW73:	121212
1016	001672	131313	DCW74:	131313
1017	001674	141414	DCW75:	141414
1018	001676	151515	DCW76:	151515
1019	001700	177777	DCW77:	177777

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1020      ;SUBROUTINE TO INITIALIZE GOOD WORDS FOR SCAN CONTROL TESTS.
1021      ;(SIMULATE THE ACTION OF SCAN BOARDS IN MAINT. MODE.)
1022
1023 001702 011467 177306      IZGSW: MOV      (CWP),GMF      ;INIT: GOOD MAINT. FLOP.
1024 001706 005067 177306      CLR      GWO      ;INIT: GOOD WORD 0.
1025 001712 032767 000001 177274      BIT      #1,GMF
1026 001720 001002      BNE      IZGSWA
1027 001722 005167 177272      COM      GWO
1028 001726 005067 177270      IZGSWA: CLR      GW2      ;INIT: GOOD WORD 2.
1029 001732 032767 000002 177254      BIT      #2,GMF
1030 001740 001002      BNE      IZGSWB
1031 001742 005167 177254      COM      GW2
1032 001746 005067 177252      IZGSWB: CLR      GW4      ;INIT: GOOD WORD 4.
1033 001752 032767 000004 177234      BIT      #4,GMF
1034 001760 001002      BNE      IZGSWC
1035 001762 005167 177236      COM      GW4
1036 001766 005067 177234      IZGSWC: CLR      GW6      ;INIT: GOOD WORD 6.
1037 001772 032767 000010 177214      BIT      #10,GMF
1038 002000 001002      BNE      IZGSWD
1039 002002 005167 177220      COM      GW6
1040 002006 000205      IZGSWD: RTS      $
  
```

:SUBROUTINES TO DELAY

002010	016700	177240		DELAY1: MOV	DLA#01,RC	:TEMP. STORE DELAY NO. 1
002011	016701	177240		MOV	DLA#01,R	:TEMP. STORE DELAY OFFSET 1.
002012	000167	000010		JMP	DELAY	:BRANCH.
002022	016700	177226		DELAY2: MOV	DLA#02,RC	:TEMP. STORE DELAY NO. 2
002023	016701	177226		MOV	DLA#02,R	:TEMP. STORE DELAY OFFSET 2.
002024	010067	177226		DELAY: MOV	RC,DLACTR	:INIT. DELAY COUNTER
002025	002777	000004	177070	BIT	#505,DSMR	:CHECK FOR DELAY
002026	007402			BREQ	DLA#	:IF BRANCH
002027	060167	177212		SUB	R1,DLACTR	:SUBTRACT SHORTEN DELAY BY 1.
002028	002777	000002	177054	BIT	#505,DSMR	:CHECK FOR DELAY
002029	007402			BREQ	DLA#	:IF BRANCH
002030	060167			ROCC	R1,DLACTR	:RELOAD DELAY COUNTER
002031	005367			JMP	DLA#	:BRANCH TO DELAY COUNTER
002032	000295			END		

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1076:                                     :ARE THERE SCAN BOARDS TO BE TESTED AND/OR IS TESTING REQUESTED?
1077:
1078: 002100 032767 000120 177034 PREST: BIT      #JF+JXF,FLAGS :TEST DUMPS WHERE DATA HAS
1079: 002106 001406          :PRESTA          :BEEN EXECUTED?
1080: 002110 032767 000200 177034          :BNE            :
1081: 002116 001402          :BEG            :
1082: 002120 000167 002526          :JMP            :NO. - BRANCH.
1083: 002124 026727 176766 000116 PRESTA: CMP      LOSA,#N      :YES. - GO DIRECTLY TO DUMPS TESTS.
1084: 002132 001002          :PRESTB         :TEST SCAN BOARDS?
1085: 002134 000167 001570          :JMP            :YES. - BRANCH.
1086: 002140 032767 000004 176774 PRESTB: BIT      #MOC,FLAGS :NO. - BRANCH.
1087: 002146 001002          :BNE            :MODULE TEST MODE?
1088: 002150 000167 000074          :JMP            :YES. - BRANCH.
1089:                                     :NO. - BRANCH.
1090:
1091:                                     :SCAN TEST M
1092:                                     :CHECK THAT ALL SCAN BOARD ADDRESSES NOT GIVEN BY THE OPERATOR
1093:                                     :DO NOT RESPOND TO A TEST INST. AN ERROR INDICATES THAT
1094:                                     :THE BOARD IS RESPONDING TO ADDRESS(ES) OTHER THAN ITS OWN
1095:                                     :AND IS BAD.
1096:
1097: 002154 016702 176736          STMBEG: MOV     LOSA,CADR :INIT. CONTROL ADRS. POINTER.
1098: 002160 042702 003777          :BIC     #3777,CADR :FORCE IT TO 164000.
1099: 002164 012767 002214 175612 :MOV     #STMTS,4 :INIT. TIMEOUT-ERROR TRAP VECTOR.
1100: 002172 112767 000100 176743 :MOVB   #SF,RFLGS :INIT. ERROR RELEVANCY FLAGS.
1101: 002200 104400          :SCOPE          :SCOPE TRAP.
1102: 002202 020267 176710          STMLCP: CMP     CADR,LOSA :EXCLUDE TESTING THIS ADDRESS.
1103: 002206 001410          :BEQ     STMAOV :YES. - BRANCH. (IT'S WHERE THE BOARD IS.)
1104: 002210 005712          :TST    (CADR)  :TEST SCAN ADRS.
1105: 002212 000402          :BR     STMERR  :IF NO TRAP OCCURS, GO TO "STMERR" -
1106: 002214 022626          STMTS: CMP     (STP)+,(STP)+ :IF A TRAP OCCURS IT RETURNS HERE AS "OK".
1107: 002216 104777          STMOK: CONTROL :CONTROL TRAP.
1108: 002220 104000          STMERR: ERROR  :ERROR TRAP.
1109: 002222 020227 167770          :CMP     CADR,#167770 :ALL ADRS. CONFIGURATIONS TESTED?
1110: 002226 001403          :BEQ     STMEND :YES.
1111: 002230 062702 000010          STMAOV: ADD     #10,CADR :NO. - ADVANCE CONTROL ADRS. PTR.
1112: 002234 000762          :BR     STMLOP  :BRANCH.
1113: 002236 012767 000006 175540 STMEND: MOV     #6,4 :INIT. (CLOSE) TIMEOUT-ERROR TRAP VECTOR.
1114: 002244 000167 000000          :JMP    STOBEG  :BRANCH.

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1099						:SCAN TEST 0	
1100						:CHECK THAT ALL SCAN ADDRESSES GIVEN BY THE OPERATOR AT LEAST RESPOND	
1101						:TO A TST INST. AN ERROR (VIA TIME OUT-ERROR TRAP) INDICATES EITHER	
1102						:A BAD ADDRESS OR A NON-EXISTANT ADDRESS WAS GIVEN BY THE OPERATOR.	
1103							
1104	002250	016702	176642			STOBEG: MOV	LOS9,CADR
1105	002254	012767	002276	175522		MOV	#STJTS,4
1106	002262	112767	00C10C	176653		MOVVB	#SF,RFLGS
1107	002270	104400				SCOPE	
1108	002272	005712				STOLOP: TST	(CADR)
1109	002274	000402				BR	STOOK
1110	002276	022626				STOTS: CMP	(STP)+,(STP)+
1111	002300	000401				BR	STOERR
1112	002302	104777				STOOK: CONTROL	
1113	002304	104000				STOERR: ERROR	
1114	002306	020267	175506			CMP	CADR,HISA
1115	002312	001403				BEG	STOEND
1116	002314	062702	000002			ADD	#2,CADR
1117	002320	000764				SR	STOLOP
1118	002322	012767	000006	175454		STOEND: MOV	#6,4
1119	002330	000167	00000C			JMP	ST1BEG

:INIT. CONTROL ADRS. POINTER.  
 :INIT. TIME OUT-ERROR TRAP VECTOR.  
 :INIT. ERROR RELEVANCY FLAGS.  
 :SCOPE TRAP.  
 :TEST A SCAN ADDRESS.  
 :IF NO TRAP OCCURS, GO TO "STOOK".-  
 :IF A TRAP OCCURS, GO TO "STOERR" VIA-  
 :A TIME OUT-ERROR TRAP TO VECTOR 4.  
 :CONTROL TRAP.  
 :ERROR TRAP.  
 :ALL GIVEN ADDRESSES TESTED?  
 :YES. - BRANCH.  
 :NO. - ADVANCE CONTROL ADRS. PTR.  
 :BRANCH.  
 :INIT. (CLOSE) TIMEOUT-ERROR TRAP VECTOR.  
 :BRANCH.

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1120								
1121						:SCAN TEST 1		
1122						:CHECK THAT MAINTENANCE FLOP ACCESS OF ALL SCAN ADDRESSES GIVEN		
1123						:BY THE OPERATOR AT LEAST RESPOND PROPERLY TO A TST INST.		
1124								
1125	002334	016702	176556		ST1BEG:	MOV	LOSA,CADR	:INIT. CONTROL ADDRESS POINTER.
1126	002340	012767	002364	175436		MOV	#ST1TS,4	:INIT. TIME OUT-ERROR TRAP VECTOR.
1127	002346	112767	000100	176567		MOV	#SF,RFLGS	:INIT. ERROR RELEVANCY FLAGS.
1128	002354	104400				SCOPE		:SCOPE TRAP.
1129	002356	105762	000001		ST1LOP:	TSTB	+1(CADR)	:TEST ACCESS TO MAINT. FLOPS.
1130	002362	000402				BR	ST1OK	:IF NO TRAP OCCURS, GO TO "ST1OK".-
1131	002364	022626			ST1TS:	CMP	(STP)+,(STP)+	:IF A TRAP OCCURS, GO TO "ST1ERR" VIA-
1132	002366	000401				BR	ST1ERR	:A TIME OUT-ERROR TRAP TO VECTOR 4.
1133	002370	104777			ST1OK:	CONTROL		:CONTROL TRAP.
1134	002372	104000			ST1ERR:	ERROR		:ERROR TRAP.
1135	002374	020267	176530			CMP	CADR,HISAX	:ALL MAINT. FLOP ACCESSES TESTED?
1136	002400	001403				BEQ	ST1END	:YES. - BRANCH.
1137	002402	062702	000010			ADD	#10,CADR	:NO. - ADVANCE CONTROL ADRS. PTR.
1138	002406	000763				BR	ST1LOP	:BRANCH. (NEXT SJB-TEST LOOP,
1139	002410	012767	000006	175366	ST1END:	MOV	#6,4	:INIT. TIME OUT-ERROR TRAP VECTOR.
1140	002416	000167	000000			JMP	ST2BEG	:BRANCH.

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1141				:SCAN TEST 2		
1142				:CHECK THAT ALL MAINTENANCE FLOPS ARE RESET AND THAT ALL SCAN		
1143				:WORD BITS ARE SET BY THE ACTION OF THE RESET INSTRUCTION		
1144						
1145	002422	016702	176470	ST2BEG: MOV	LOSA, CADR	:INIT. CONTROL ADDRESS POINTER.
1146	002426	012704	001302	MOV	#SCW00, CWP	:INIT. CONTROL WORD POINTER.
1147	002432	004567	177244	JSR	\$, IZGSW	:INIT. "GOOD" WORDS.
1148	002436	112767	000172	MOV	#SRF, RFLGS	:INIT. ERROR RELEVANCY FLAGS.
1149	002444	104400		SCOPE		:SCOPE TRAP.
1150	002446	000005		ST2LOP: RESET		:CLEAR ALL MAINT. FLOPS. SET ALL SCAN BITS.
1151	002450	116267	000001	MOV	+1(CADR), TMF	:READ MAINT. FLOPS.
1152	002456	004567	177326	JSR	\$, DELAY1	:WAIT.
1153	002462	016267	000000	MOV	+0(CADR), TW0	:READ SCAN WORD 0.
1154	002470	016267	000002	MOV	+2(CADR), TW2	:READ SCAN WORD 2.
1155	002476	016267	000004	MOV	+4(CADR), TW4	:READ SCAN WORD 4.
1156	002504	016267	000006	MOV	+6(CADR), TW6	:READ SCAN WORD 6.
1157	002512	026767	176512	CMP	TMF, GMF	:MAINT. FLOPS CLEARED?
1158	002520	001021		BNE	ST2ERR	:NO. - BRANCH.
1159	002522	026767	176506	CMP	TW0, GW0	:YES. - SCAN WORD 0, ALL BITS SET?
1160	002530	001015		BNE	ST2ERR	:NO. - BRANCH.
1161	002532	026767	176500	CMP	TW2, GW2	:YES. - SCAN WORD 2, ALL BITS SET?
1162	002540	001011		BNE	ST2ERR	:NO. - BRANCH.
1163	002542	026767	176472	CMP	TW4, GW4	:YES. - SCAN WORD 4, ALL BITS SET?
1164	002550	001005		BNE	ST2ERR	:NO. - BRANCH.
1165	002552	026767	176464	CMP	TW6, GW6	:YES. - SCAN WORD 6, ALL BITS SET?
1166	002560	001001		BNE	ST2ERR	:NO. - BRANCH.
1167	002562	104777		ST2OK: CONTROL		:CONTROL TRAP.
1168	002564	104000		ST2ERR: ERROR		:ERROR TRAP.
1169	002566	020267	176336	CMP	CADR, HISAX	:ALL MAINT. FLOPS & SCAN WORDS TESTED?
1170	002572	001403		BEQ	ST2END	:YES. - BRANCH.
1171	002574	062702	000010	ADD	#10, CADR	:NO. - ADVANCE CONTROL ADRS. PTR.
1172	002600	000722		BR	ST2LOP	:BRANCH. (NEXT SUB-TEST LOOP)
1173	002602	000167	000000	ST2END: JMP	ST3BEG	:BRANCH



1174										
1175										
1176										
1177										
1178										
1179	002606	016702	176304							
1180	002612	012704	001340							
1181	002613	004567	177060							
1182	002622	112767	000172	176313						
1183	002630	104400								
1184	002632	111462	000001							
1185	002636	116267	000001	176364						
1186	002644	004567	177140							
1187	002650	016267	000000	176356						
1188	002656	016267	000002	176352						
1189	002664	016267	000004	176346						
1190	002672	016267	000006	176342						
1191	002700	026767	176324	176306						
1192	002706	001021								
1193	002710	026767	176320	176302						
1194	002716	001015								
1195	002720	026767	176312	176274						
1196	002726	001011								
1197	002730	026767	176304	176266						
1198	002736	001005								
1199	002740	026767	176276	176260						
1200	002746	001001								
1201	002750	104777								
1202	002752	104000								
1203	002754	020267	176150							
1204	002760	001403								
1205	002762	062702	00001C							
1206	002766	000721								
1207	002770	000167	000000							

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;SCAN TEST 3
;CHECK THAT ALL MAINTENANCE FLOPS CAN BE SET AND THAT ALL SCAN
;WORDS CAN BE CLEARED.

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ST3BEG: MOV      LOSA,CADR      ;INIT. CONTROL ADDRESS POINTER.
        MOV      #SCW17,CWP    ;INIT. CONTROL WORD POINTER.
        JSR      $,IZGSW       ;INIT. "GOOD" WORDS.
        MOV      #SRF,RFLGS    ;INIT. ERROR RELEVANCY FLAGS.
        SCOPE   SCOPE         ;SCOPE TRAP.
ST3LOP: MOV      (CWP),+1(CADR) ;SET ALL MAINT FLOPS, CLEAR ALL SCAN BITS.
        MOV      +1(CADR),TMF   ;READ MAINT. FLOPS
        JSR      $,DELAY1      ;WAIT
        MOV      +0(CADR),TW0   ;READ SCAN WORD 0.
        MOV      +2(CADR),TW2   ;READ SCAN WORD 2.
        MOV      +4(CADR),TW4   ;READ SCAN WORD 4.
        MOV      +6(CADR),TW6   ;READ SCAN WORD 6.
        CMP      TMF,GMF       ;MAINT. FLOPS SET?
        BNE     ST3ERR         ;NO. - BRANCH.
        CMP      TW0,GW0       ;YES. - SCAN WORD 0 CLEARED?
        BNE     ST3ERR         ;NO. - BRANCH.
        CMP      TW2,GW2       ;YES. - SCAN WORD 2 CLEARED?
        BNE     ST3ERR         ;NO. - BRANCH.
        CMP      TW4,GW4       ;YES. - SCAN WORD 4 CLEARED?
        BNE     ST3ERR         ;NO. - BRANCH.
        CMP      TW6,GW6       ;YES. - SCAN WORD 6 CLEARED?
        BNE     ST3ERR         ;NO. - BRANCH.
ST3OK:  CONTROL              ;YES. - CONTROL TRAP.
ST3ERR: ERROR                ;ERROR TRAP.
        CMP      CADR,HISAX    ;ALL GIVEN ADDRESSES TESTED?
        BEQ     ST3END        ;YES. - BRANCH.
        ADD     #10,CADR       ;NO. - ADVANCE CONTROL ADRS. PTR.
        BR      ST3LOP        ;BRANCH (NEXT SUB-TEST LOOP)
ST3END: JMP      ST4BEG       ;BRANCH.

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# H03

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1208				;SCAN TEST 4		
1209				;CHECK THAT ALL MAINTENANCE FLOPS ARE RESET AND THAT ALL SCAN		
1210				;WORD BITS ARE SET BY THE ACTION OF THE RESET INSTRUCTION.		
1211						
1212	002774	016702	176116	ST4BEG: MOV	LOSA,CADR	;INIT. CONTROL ADDRESS POINTER.
1213	003000	012704	001302	MOV	#SCW00,CWP	;INIT. CONTROL WORD POINTER.
1214	003004	004567	176672	JSR	\$,IZGSW	;INIT. "GOOD" WORDS.
1215	003010	112767	000172	MOV	#SRF,RFLGS	;INIT. ERROR RELEVANCY FLAGS.
1216	003016	104400		MOV	SCOPE	;SCOPE TRAP.
1217	003020	000005		ST4LOP: RESET		;CLEAR ALL MAINT. FLOPS, SET ALL SCAN BITS.
1218	003022	116267	000001	MOV	+1(CADR),TMF	;READ MAINT. FLOPS
1219	003030	004567	176754	JSR	\$,DELAY1	;WAIT
1220	003034	016267	000000	MOV	+0(CADR),TWO	;READ SCAN WORD 0.
1221	003042	016267	000002	MOV	+2(CADR),TW2	;READ SCAN WORD 2.
1222	003050	016267	000004	MOV	+4(CADR),TW4	;READ SCAN WORD 4.
1223	003056	016267	000006	MOV	+6(CADR),TW6	;READ SCAN WORD 6.
1224	003064	026767	176140	CMP	TMF,GMF	;MAINT. FLOPS CLEARED?
1225	003072	001021		BNE	ST4ERR	;NO. - BRANCH.
1226	003074	026767	176134	CMP	TWO,GW0	;YES. - SCAN WORD 0, ALL BITS SET?
1227	003102	001015		BNE	ST4ERR	;NO. - BRANCH.
1228	003104	026767	176126	CMP	TW2,GW2	;YES. - SCAN WORD 2, ALL BITS SET?
1229	003112	001011		BNE	ST4ERR	;NO. - BRANCH.
1230	003114	026767	176120	CMP	TW4,GW4	;YES. - SCAN WORD 4, ALL BITS SET?
1231	003122	001005		BNE	ST4ERR	;NO. - BRANCH.
1232	003124	026767	176112	CMP	TW6,GW6	;YES. - SCAN WORD 6, ALL BITS SET?
1233	003132	001001		BNE	ST4ERR	;NO. - BRANCH.
1234	003134	104777		ST4OK: CONTROL		;CONTROL TRAP.
1235	003136	104000		ST4ERR: ERROR		;ERROR TRAP.
1236	003140	020267	175764	CMP	CADR,HISAX	;ALL MAINT. FLOPS & SCAN WORDS TESTED
1237	003144	001403		BEQ	ST4END	;YES. - BRANCH.
1238	003146	062702	000010	ADD	#10,CADR	;NO. - ADVANCE CONTROL ADRS. PTR.
1239	003152	000722		BR	ST4LOP	;BRANCH. (NEXT SUB-TEST LOOP)
1240	003154	000167	000000	ST4END: JMP	ST5BEG	;BRANCH.

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1241                                     :SCAN TEST 5
1242                                     :CHECK THAT ALL MAINTENANCE FLOPS CAN BE SET AND THAT ALL SCAN
1243                                     :WORDS CAN BE CLEARED.
1244
1245 003160 016702 175732 STSBEG: MOV LOSA,CADR ;INIT. CONTROL ADDRESS POINTER.
1246 003164 012704 001340      MOV #SCW17,CWP ;INIT. CONTROL WORD POINTER.
1247 003170 004567 176506      JSR $,IZGSW ;INIT. "GOOD" WORDS.
1248 003174 112767 000172 175741  MOVB #SRF,RFLGS ;INIT. ERROR RELEVANCY FLAGS.
1249 003202 104400      SCOPE ;SCOPE TRAP.
1250 003204 111462 000001 STSLOP: MOVB (CWP),+1(CADR) ;SET ALL MAINT FLOPS, CLEAR ALL SCAN BITS.
1251
1252 003210 116267 000001 176012      MOVB +1(CADR),TMF ;READ MAINT. FLOPS
1253 003216 004567 176566      JSR $,DELAY1 ;WAIT
1254 003222 016267 000000 176004      MOV +0(CADR),TWO ;READ SCAN WORD 0.
1255 003230 016267 000002 176000      MOV +2(CADR),TW2 ;READ SCAN WORD 2.
1256 003236 016267 000004 175774      MOV +4(CADR),TW4 ;READ SCAN WORD 4.
1257 003244 016267 000006 175770      MOV +6(CADR),TW6 ;READ SCAN WORD 6.
1258 003252 026767 175752 175734      CMP TMF,GMF ;MAINT. FLOPS SET?
1259 003260 001021      BNE STSERR ;NO. - BRANCH.
1260 003262 026767 175746 175730      CMP TWO,GWO ;YES. - SCAN WORD 0 CLEARED?
1261 003270 001015      BNE STSERR ;NO. - BRANCH.
1262 003272 026767 175740 175722      CMP TW2,GW2 ;YES. - SCAN WORD 2 CLEARED?
1263 003300 001011      BNE STSERR ;NO. - BRANCH.
1264 003302 026767 175732 175714      CMP TW4,GW4 ;YES. - SCAN WORD 4 CLEARED?
1265 003310 001005      BNE STSERR ;NO. - BRANCH.
1266 003312 026767 175724 175706      CMP TW6,GW6 ;YES. - SCAN WORD 6 CLEARED?
1267 003320 001001      BNE STSERR ;NO. - BRANCH.
1268 003322 104777      STSOK: CONTROL ;YES. - CONTROL TRAP.
1269 003324 104000      STSERR: ERROR ;ERROR TRAP.
1270 003326 020267 175575      CMP CADR,HISAX ;ALL GIVEN ADDRESSES TESTED?
1271 003332 001403      BEQ STSEND ;YES. - BRANCH.
1272 003334 062702 000010      ADD #10,CADR ;NO. - ADVANCE CONTROL ADRS. PTR.
1273 003340 000721      BR STSLOP ;BRANCH (NEXT SUB-TEST LOOP)
1274 003342 000167 000000      STSEND: JMP STSBEG ;BRANCH.

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# K03

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1307
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1311
1312 003534 016702 175356 ST7BEG: MOV LOSA,CADR ;INIT. CONTROL ADDRESS POINTER.
1313 003540 112767 000172 175375 MOVB #SRF,RFLGS ;INIT. ERROR RELEVANCY FLAGS.
1314 003546 012704 001302 ST7L2: MOV #SCW00,CWP ;INIT. CONTROL WORD POINTER.
1315 003552 104400 SCOPE ;SCOPE TRAP.
1316 003554 004567 176122 ST7L1: JSR $,IZGSW ;INIT. "GOOD" WORDS.
1317 003560 111462 000001 MOVB (CWP),+1(CADR) ;SET MAINT. FLOPS AS PER CONTROL WORD PTR.
1318 003564 116267 000001 175436 MOVB +1(CADR),TMF ;READ MAINT. FLOPS
1319 003572 004567 176212 JSR $,DELAY1 ;WAIT.
1320 003576 016267 000000 175430 MOV +0(CADR),TWO ;READ SCAN WORD 0.
1321 003604 016267 000002 175424 MOV +2(CADR),TW2 ;READ SCAN WORD 2.
1322 003612 016267 000004 175420 MOV +4(CADR),TW4 ;READ SCAN WORD 4.
1323 003620 016267 000006 175414 MOV +6(CADR),TW6 ;READ SCAN WORD 6.
1324 003626 026767 175376 175360 CMP TMF,GMF ;MAINT. FLOPS OK?
1325 003634 001021 BNE ST7ERR ;NO. - BRANCH.
1326 003636 026767 175372 175354 CMP TWO,GW0 ;YES. - SCAN WORD 0 OK?
1327 003644 001015 BNE ST7ERR ;NO. - BRANCH.
1328 003646 026767 175364 175346 CMP TW2,GW2 ;YES. - SCAN WORD 2 OK?
1329 003654 001011 BNE ST7ERR ;NO. - BRANCH.
1330 003656 026767 175356 175340 CMP TW4,GW4 ;YES. - SCAN WORD 4 OK?
1331 003664 001005 BNE ST7ERR ;NO. - BRANCH.
1332 003666 026767 175350 175332 CMP TW6,GW6 ;YES. - SCAN WORD 6 OK?
1333 003674 001001 BNE ST7ERR ;NO. - BRANCH.
1334 003676 104777 ST7OK: CONTROL ;YES. - CONTROL TRAP.
1335 003700 104000 ST7ERR: ERROR ;ERROR TRAP.
1336 003702 022467 175572 CMP (CWP)+,SCW77 ;ALL CONTROL WORDS TESTED ON THIS WORD?
1337 003706 001322 BNE ST7L1 ;NO. - BRANCH.
1338 003710 020267 175214 CMP CADR,HISAX ;YES. - ALL SCAN BOARDS TESTED.
1339 003714 001403 BEQ ST7END ;YES. - BRANCH.
1340 003716 062702 000010 ADD #10,CADR ;NO. - ADVANCE CONTROL ADRS. PTR.
1341 003722 000711 BR ST7L2 ;BRANCH.
1342 003724 000167 000000 ST7END: JMP PREDT ;BRANCH.
  
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# L03

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1343
1344           ;ARE THERE DISTRIBUTE BOARDS TO BE TESTED AND/OR IS TESTING REQUESTED?
1345
1346 003730 026727 175166 000116 PREDT:  CMP      LODA,#'N:      ;TEST DISTRIBUTE BOARDS?
1347 003736 001002                BNE      PREDTA      ;YES. - BRANCH.
1348 003740 000167 006376                JMP      PEND       ;NO. - BRANCH.
1349 003744 032767 000004 175170 PREDTA: BIT      #MOD_FLAGS ;MODULE TEST MODE?
1350 003752 001002                BNE      DTMBEG     ;YES. - BRANCH.
1351 003754 000167 000074                JMP      DTOBEG     ;NO. - BRANCH.
1352
1353           ;DIST. TEST M
1354           ;CHECK THAT ALL DIST. BOARD ADDRESSES NOT GIVEN BY THE OPERATOR
1355           ;DO NOT RESPOND TO A TEST INST. AN ERROR INDICATES THAT
1356           ;THE DIST. BOARD IS RESPONDING TO ADDRESS(ES) OTHER THAN ITS OWN
1357           ;AND IS BAD.
1358
1359 003760 016702 175136                DTMBEG: MOV      LODA,CADR      ;INIT. CONTROL ADRS. POINTER.
1360 003764 042702 003777                BIC      #3777,CADR ;FORCE IT TO 164000.
1361 003770 012767 004020 174006                MOV      #DTMT$,4    ;INIT. TIMEOUT-ERROR TRAP VECTOR.
1362 003776 112767 000200 175137                MOV      #DF,RFLGS  ;INIT. ERROR RELEVANCY FLAGS.
1363 004004 104400                SCOPE                ;SCOPE TRAP.
1364 004006 020267 175110                DTMLOP: CMP      CADR,LODA    ;EXCLUDE TESTING THIS ADDRESS.
1365 004012 001410                BEQ      DTMADV      ;YES. - BRANCH. (IT'S WHERE THE BOARD IS.)
1366 004014 005712                TST     (CADR)       ;TEST DIST. ADRS.
1367 004016 000402                BR      DTMERR       ;IF NO TRAP OCCURS, GO TO "DTMERR" -
1368 004020 022626                DTMTS:  CMP      (STP)+,(STP)+ ;IF A TRAP OCCURS IT RETURNS HERE AS "OK".
1369 004022 104777                DTMOK:  CONTROL    ;CONTROL TRAP.
1370 004024 104000                DTMERR: ERROR      ;ERROR TRAP.
1371 004026 020227 167770                CMP      CADR,#167770 ;ALL ADRS. CONFIGURATIONS TESTED?
1372 004032 001403                BEQ      DTMEND     ;YES.
1373 004034 052702 000010                DTMADV: ADD     #10,CADR ;NO. - ADVANCE CONTROL ADRS. PTR.
1374 004040 030762                BR      DTMLOP     ;BRANCH.
1375 004042 012767 000006 173734 DTMEND: MOV     #6,4    ;INIT. (CLOSE) TIMEOUT-ERROR TRAP VECTOR.
1376 004050 000167 000000                JMP      DTOBEG     ;BRANCH.

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1377										
1378										
1379										
1380										
1381										
1382										
1383										
1384										
1385										
1386	004054	016702	175042			DTOBEG:	MOV	LODA,CADR		;INIT. CONTROL ADDRESS POINTER.
1387	004060	012767	004102	173716			MOV	#DTOTS,4		;INIT. TIMEOUT-ERROR TRAP VECTOR.
1388	004066	112767	000200	175047			MOVB	#DF,RFLGS		;INIT. ERROR RELEVANCY FLAGS.
1389	004074	104400					SCOPE			;SCOPE TRAP.
1390	004076	005712				DTOLOP:	TST	(CADR)		;TEST A DISTRIBUTE ADDRESS.
1391	004100	000402					BR	DTOOK		;IF NO TRAP OCCURS, GO TO "DTOOK".-
1392	004102	022626				DTOTS:	CMP	(STP)+,(STP)+		;IF A TRAP OCCURS, GO TO "DTOERR VIA-
1393	004104	000401					BR	DTOERR		;A TIMEOUT-ERROR TRAP TO VECTOR 4.
1394	004106	104777				DTOOK:	CONTROL			;CONTROL TRAP.
1395	004110	104000				DTOERR:	ERROR			;ERROR TRAP.
1396	004112	020267	175006				CMP	CADR,HIDA		;ALL GIVEN ADDRESSES TESTED?
1397	004116	001403					BEQ	DTOEND		;YES. - BRANCH.
1398	004120	062702	000002				ADD	#2,CADR		;NO. - ADVANCE CONTROL ADRS. PTR.
1399	004124	000764					BR	DTOLOP		;BRANCH.
1400	004126	C12767	000006	173650		DTOEND:	MOV	#6,4		;INIT. (CLOSE) TIMEOUT-ERROR TRAP VECTOR.
1401	004134	000167	000000				JMP	DTIBEG		;BRANCH.

1402					:DIST. TEST 1	
1403					:CHECK THAT ALL DISTRIBUTE WORDS ARE RESET BY THE ACTION OF THE	
1404					:RESET INSTRUCTION.	
1405						
1406	004140	016702	174756		DT1BEG: MOV LODA,CADR	:INIT. CONTROL ADDRESS POINTER.
1407	004144	012704	001502		MOV #DCW00,CWP	:INIT. CONTROL WORD POINTER.
1408	004150	011467	175042		MOV (CWP),GWD	:INIT "GOOD" WORD.
1409	004154	112767	000206	174761	MOVB #DRF,RFLGS	:INIT ERROR RELEVANCY FLAGS.
1410	004162	104400			SCOPE	:SCOPE TRAP.
1411	004164	000005			DT1LOP: RESET	:CLEAR ALL DISTRIBUTE WORDS.
1412	004166	011267	175040		MOV (CADR),TWD	:READ DIST. WORD. IS IT ZEROS?
1413	004172	001001			BNE DT1ERR	:NO. - BRANCH.
1414	004174	104777			DT1OK: CONTROL	:YES. - CONTROL TRAP.
1415	004176	104000			DT1ERR: ERROR	:ERROR TRAP.
1416	004200	020267	174720		CMP CADR,HIDA	:ALL DIST. WORDS TESTED?
1417	004204	001403			BEQ DT1END	:YES. - BRANCH.
1418	004206	062702	000002		ADD #2,CADR	:NO. - ADVANCE CONTROL ADRS. PTR.
1419	004212	000764			BR DT1LOP	:BRANCH.
1420	004214	000167	000000		DT1END: JMP DT2BEG	:BRANCH.











1501									
1502									:DIST. TEST 6
1503									:CHECK THAT ALL DISTRIBUTE WORDS CAN BE SET TO ALL CONFIGURATIONS
1504									:GIVEN IN THE DISTRIBUTE WORD TABLE OF CONSTANTS.
1505									
1506	004542	016702	174354			DT6BEG:	MOV	LODA,CADR	:INIT. CONTROL ADDRESS POINTER.
1507	004546	112767	000206	174367			MOV	#DRF,RFLGS	:INIT. ERROR RELEVANCY FLAGS.
1508	004554	012704	001502			DT6L2:	MOV	#DCW00,CWP	:INIT. CONTROL WORD POINTER.
1509	004560	011467	174432			DT6L1:	MOV	(CWP),GWD	:INIT. "GOOD" WORD.
1510	004564	104400					SCOPE		:SCOPE TRAP.
1511	004566	011412					MOV	(CWP),(CADR)	:WRITE DISTRIBUTE WORD.
1512	004570	011267	174436				MOV	(CADR),TWD	:READ DISTRIBUTE WORD.
1513	004574	026767	174432	174414			CMP	TWD,GWD	:DISTRIBUTE WORD OK?
1514	004602	001001					BNE	DT6ERR	:NO. - BRANCH.
1515	004604	104777				DT6OK:	CONTROL		:YES. - CONTROL TRAP.
1516	004606	104000				DT6ERR:	ERROR		:ERROR TRAP.
1517	004610	022467	175064				CMP	(CWP)+,DCW77	:ALL CONTROL WORDS TESTED ON THIS WORD?
1518	004614	001361					BNE	DT6L1	:NO. - BRANCH.
1519	004616	020267	174302				CMP	CADR,HIDA	:YES. ALL DISTRIBUTE WORDS TESTED?
1520	004622	001403					BEQ	DT6END	:YES. - BRANCH.
1521	004624	062702	000002				ADD	#2,CADR	:NO. - ADVANCE CONTROL ADRS. PTR.
1522	004630	000751					BR	DT6L2	:BRANCH.
1523	004632	000167	000000			DT6END:	JMP	PREDJS	:BRANCH.

G04

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1524  
1525  
1526  
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1529

004636 032767 000120 174276  
004644 001002  
004646 000167 005470

;ARE DISTRIBUTE BOARDS THAT ARE JUMPERED TO SCAN BOARDS BEING TESTED?

PREDJS: BIT #JF+JXF,FLAGS ;TEST DJS?  
BNE IDJ ;YES. - BRANCH.  
JMP PEND ;NO. - BRANCH.

# H04

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1530  
1531  
1532  
1533 004652 000005  
1534 004654 016702 174236  
1535 004660 012704 001340  
1536 004664 111462 000001  
1537 004670 020267 174234  
1538 004674 001403  
1539 004676 062702 000010  
1540 004702 000770  
1541 004704 000167 000000

; INITIALIZE THE DISTRIBUTE AND SCAN BOARDS.

IDJ: RESET ; CLEAR ALL DISTRIBUTE WORDS.  
MOV LOSA, CADR ; SET ALL MAINT. FLOPS AND  
MOV #SCW17, CWP ; CLEAR ALL SCAN WORDS.  
IDJA: MOVB (CWP), +1(CADR)  
CMP CADR, HISAX  
BEQ IDJB  
ADD #10, CADR  
BR IDJA  
IDJB: JMP DJS1BG

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1543
1544 ;TEST DJS1
1545 ;CHECK THAT SCAN WORDS CAN BE DRIVEN BY DISTRIBUTE WORDS.
1546 ;THE DATA WORDS USED ARE THOSE OF THE DISTRIBUTE CONTROL WORD TABLE,
1547 ;OR SOLELY THE DATA WORD GIVEN BY THE OPERATOR AT QUERY TIME, IF ANY.
1548
1549 004710 112767 000327 174225 DJS1BG: MOVB #DSRF,RFLGS ;INIT. ERROR RELEVANCY FLAGS.
1550 004716 016702 174200 MOV LODA,CADR ;INIT. CONTROL ADRS. PTR. (DIST.)
1551 004722 016703 174170 MOV LOSA,CADR ;INIT. CONTROL ADRS. PTR. AUX. (SCAN)
1552 004726 012704 001502 DJS1L2: MOV #DCW00,CWP ;INIT. CONTROL WORD POINTER.
1553 004732 032767 000200 174202 BIT #DATF,FLAGS ;USE OPERATOR GIVEN DATA?
1554 004740 001402 BEQ DJS1A ;NO. - BRANCH.
1555 004742 012704 001140 MOV #DATAWD,CWP ;YES - RE-INIT. CONTROL WORD PTR.
1556 004746 104400 DJS1A: SCOPE ;SCOPE TRAP
1557 004750 011467 174242 DJS1L1: MOV (CWP),GWD ;INIT "GOOD" DIST. WORD.
1558 004754 011467 174240 MOV (CWP),GWD ;INIT "GOOD" SCAN WORD.
1559 004760 011412 MOV (CWP),(CADR) ;WRITE DIST. WORD AND, VIA JUMPER, SCAN WORD.
1560 004762 011267 174244 MOV (CADR),TWD ;READ DIST. WORD.
1561 004766 004567 175032 JSR $,DELAY2 ;WAIT.
1562 004772 011367 174236 MOV (CADRX),TWO ;READ SCAN WORD.
1563 004776 026767 174230 174212 CMP TWD,GWD ;DIST. WORD OK?
1564 005004 001005 BNE DJS1ER ;NO. - BRANCH.
1565 005006 026767 174222 174204 CMP TWO,GWO ;YES. - SCAN WORD OK?
1566
1567 005014 001001 BNE DJS1ER ;NO. - BRANCH.
1568 005016 104777 DJS1OK: CONTROL ;YES. - CONTROL TRAP.
1569 005020 104000 DJS1ER: ERROR ;ERROR TRAP.
1570 005022 032767 000200 174112 BIT #DATF,FLAGS ;USING OPERATOR GIVEN DATA?
1571 005030 001003 BNE DJS1B ;YES. - BRANCH.
1572 005032 022467 174642 CMP (CWP)+,DCW77 ;NO. - ALL CONTROL WORDS USED?
1573 005036 001344 BNE DJS1L1 ;NO. - BRANCH.
1574 005040 020267 174060 DJS1B: CMP CADR,HIDA ;YES. - ALL ADDRESSES TESTED?
1575 005044 001405 BEQ DJS1ND ;YES. - BRANCH.
1576 005046 062702 000002 ADD #2,CADR ;NO. - ADVANCE CONTROL ADRS. PTR. (DIST.)
1577 005052 062703 000002 ADD #2,CADR ;ADVANCE CONTROL ADRS. PTR. AUX. (SCAN)
1578 005056 000723 BR DJS1L2 ;BRANCH.
1579 005060 000167 005256 DJS1ND: JMP PENC ;BRANCH.
1580

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# J04

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1581
1582           ;SUB-PROGRAM TO CONTROL ACCEPT/EXERCISE PASSES OF EITHER
1583           ;BTCL OR DJMPRS.
1584
1585 005064 012767 005104 174120 AXCTL: MOV   #AXCA,AXRTN   ;RUN ONE PASS WITH:
1586 005072 012767 014000 174110       MOV   #TTS+ITS,AXSWR ;NO OPTIONS.
1587 005100 000167 174774       JMP   PREST
1588
1589 005104 012767 005124 174100 AXCA:  MOV   #AXCB,AXRTN   ;RUN ONE PASS WITH:
1590 005112 012767 014002 174070       MOV   #TTS+ITS+LDS,AXSWR ;LONGER DELAYS.
1591 005120 000167 174754       JMP   PREST
1592
1593 005124 012767 005144 174060 AXCB:  MOV   #AXCC,AXRTN   ;RUN ONE PASS WITH:
1594 005132 012767 014004 174050       MOV   #TTS+ITS+SDS,AXSWR ;SHORTER DELAYS.
1595 005140 000167 174734       JMP   PREST
1596
1597 005144 012767 005164 174040 AXCC:  MOV   #AXCD,AXRTN
1598 005152 012767 010000 174030       MOV   #TTS,AXSWR
1599 005160 000167 174714       JMP   PREST
1600
1601 005164 012767 005204 174020 AXCD:  MOV   #AXCE,AXRTN   ;RUN ONE PASS WITH:
1602 005172 012767 010002 174010       MOV   #TTS+LDS,AXSWR   ;ITERATIONS & LONGER DELAYS
1603 005200 000167 174674       JMP   PREST
1604
1605 005204 012767 005224 174000 AXCE:  MOV   #AXCF,AXRTN   ;RUN ONE PASS WITH:
1606 005212 012767 010004 173770       MOV   #TTS+SDS,AXSWR  ;ITERATIONS & SHORTER DELAYS
1607 005220 000167 174654       JMP   PREST
1608
1609 005224 012767 005244 173760 AXCF:  MOV   #AXCG,AXRTN   ;RUN ONE PASS WITH:
1610 005232 012767 004000 173750       MOV   #ITS,AXSWR     ;TRACE TRAPS
1611 005240 000167 174634       JMP   PREST
1612
1613 005244 012767 005264 173740 AXCG:  MOV   #AXCH,AXRTN   ;RUN ONE PASS WITH:
1614 005252 012767 004002 173730       MOV   #ITS+LDS,AXSWR ;TRACE TRAPS & LONGER DELAYS.
1615 005260 000167 174614       JMP   PREST
1616
1617 005264 012767 005304 173720 AXCH:  MOV   #AXCI,AXRTN   ;RUN ONE PASS WITH:
1618 005272 012767 004004 173710       MOV   #ITS+SDS,AXSWR ;TRACE TRAPS & SHORTER DELAYS
1619 005300 000167 174574       JMP   PREST
1620
1621 005304 012767 005324 173700 AXCI:  MOV   #AXCJ,AXRTN   ;RUN ONE PASS WITH:
1622 005312 012767 000000 173670       MOV   #0,AXSWR      ;ITERATIONS & TRACE TRAPS
1623 005320 000167 174554       JMP   PREST
1624
1625 005324 012767 005344 173660 AXCJ:  MOV   #AXCK,AXRTN   ;RUN ONE PASS WITH:
1626 005332 012767 000002 173650       MOV   #LDS,AXSWR    ;ITERATIONS, TRACE TRAPS,
1627 005340 000167 174534       JMP   PREST         ;& LONGER DELAYS
1628
1629 005344 012767 005364 173640 AXCK:  MOV   #AXCL,AXRTN   ;RUN ONE PASS WITH:
1630 005352 012767 000004 173630       MOV   #SDS,AXSWR   ;ITERATIONS, TRACE TRAPS,
1631 005360 000167 174514       JMP   PREST         ;& SHORTER DELAYS
1632
1633 005364 000167 004766       AXCL:  JMP   PASSEND
  
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# K04

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1634
1635 ;SCOPE TRAP (TRAP) SERVICE ROUTINE TO RECORD THE PC FOR REFERENCE BY EITHER
1636 ;SCOPE LOOPS OR ITERATIONS, (BOTH SCOPE & CONTROL TRAPS ENTER HERE FIRST)
1637
1638 005370 011600 SCOSVC: MOV (STP),RO ;DETERMINE THE TYPE OF CALL MADE
1639 005372 105760 177776 TSTB -2(RO) ;(SCOPE OR CONTROL TRAP).
1640 005376 100403 BMI CTLSVC ;CONTROL. - BRANCH.
1641 005400 011667 173550 MOV (STP),SCORTN ;SCOPE. - RECORD THE PC.
1642 005404 000002 RTI ;RETURN.
1643
1644
1645
1646 ;CONTROL TRAP (IOT) SERVICE ROUTINE TO CONTROL INTERMITTANT ERROR CONDITIONS
1647 ;AND TRACE TRAP, NON-ERROR SCOPE LOOP, & ITERATE SWITCH OPTIONS.
1648
1649 005406 032767 000001 173526 CTLSVC: BIT #ECF,FLAGS ;DOES AN ERROR CONDITION EXIST?
1650 005414 001402 BEQ CTSVCA ;NO. - BRANCH.
1651 005416 004567 000346 JSR $,IMCTL ;YES. - GO TO INTERMITTANT CONTROL.
1652 005422 032767 000020 172140 CTSVCA: BIT #TSS,177570 ;TYPE PROGRAM STATUS?
1653 005430 001402 BEQ CSVCAI ;NO. - BRANCH.
1654 005432 004567 000556 JSR $,TYPERR ;YES. - GO TYPE PROGRAM STATUS.
1655 005436 004567 000054 CSVCAI: JSR $,TTCTL ;GO SEE ABOUT TRACE TRAPPING.
1656 005442 032767 040000 172120 BIT #SLS,177570 ;NON-ERROR SCOPE LOOP?
1657 005450 001403 BEQ CTSVCC ;NO. - BRANCH.
1658 005452 022626 CTSVCB: CMP (STP)+,(STP)+ ;YES. - POP STACK ONE TRAP.
1659 005454 000177 173474 JMP @SCORTN ;RETURN TO SCOPE LOOP (OR ITERATION).
1660 005460 032777 004000 173450 CTSVCC: BIT #ITS,@SWR ;ITERATE?
1661 005466 001006 BNE CTSVCD ;NO. - BRANCH.
1662 005470 005267 173456 INC ITCNT ;YES. - INCREMENT ITERATION COUNTER.
1663 005474 026767 173452 173406 CMP ITCNT,ITNO ;ITERATE THIS TEST OR TEST LOOP AGAIN?
1664 005502 001363 BNE CTSVCB ;YES. - BRANCH.
1665 005504 005067 173442 CTSVCD: CLR ITCNT ;NO. - CLEAR ITERATION COUNTER.
1666 005510 062716 000002 ADD #2,(STP) ;ADVANCE RETURN POINT (SKIP THE ERROR CALL).
1667 005514 000002 RTI ;RETURN TO NEXT TEST OR TEST LOOP.

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```

1668
1669 ;SUBROUTINE TO CONTROL THE TRACE TRAP SWITCH OPTION.
1670
1671 005516 016746 172254 TTCTL: MOV PS, -(STP) ;PUT PS ON STACK.
1672 005522 042716 000020 BIC #20, (STP) ;CLEAR "T" BIT (PROVISIONALLY).
1673 005526 032777 010000 173402 BIT #TTS, PSWR ;TRACE TRAPS?
1674 005534 001002 BNE TTCTLA ;NO. - BRANCH.
1675 005536 052716 000020 BIS #20, (STP) ;YES. - SET "T" BIT (FINALLY).
1676 005542 012746 005550 TTCTLA: MOV #TTCTLB, -(STP) ;PUT RETURN LOC. ON STACK.
1677 005546 000002 RTI ;RETURN (TO NEXT INST.) AND SET/CLEAR "T" BIT.
1678 005550 000205 TTCTLB: RTS $ ;RETURN.
1679
1680
1681 ;TRACE TRAP SERVICE ROUTINE
1682 ;IF THE PROCESSOR IS AN 11/45, PROGRAM INITIALIZATION HAS CHANGED
1683 ;THE FOLLOWING INSTRUCTION TO RTT (000006). OTHERWISE IT IS AS SHOWN.
1684
1685
1686 005552 000002 TTVC: RTI ;RETURN. (THIS INST. WILL BE RTT IF A 11/25 OR 11/45.)
1687
1688
1689 ;POWER DOWN SEQUENCE.
1690
1691 005554 010046 PDOWN: MOV R0, -(STP) ;PUSH R0-R5 ON STACK.
1692 005556 010146 MOV R1, -(STP)
1693 005560 010246 MOV R2, -(STP)
1694 005562 010346 MOV R3, -(STP)
1695 005564 010446 MOV R4, -(STP)
1696 005566 010546 MOV R5, -(STP)
1697 005570 010667 000026 MOV STP, PDSTP ;SAVE STACK PTR IN CORE.
1698 005574 012767 005624 172222 MOV #PUP, 24 ;INIT. POWER FAIL VECTOR FOR POWER UP.
1699 005602 016746 172170 MOV PS, -(STP) ;ENSURE THAT TRACE TRAP IS OFF.
1700 005606 042716 000020 BIC #20, (STP)
1701 005612 004567 177724 JSR $, TTCTLA
1702 005616 000240 PDOWNA: NOP ;WAIT FOR POWER UP INTERRUPT.
1703 005620 000776 BR PDOWNA
1704 005622 000000 PDSTP: 0
1705
1706 ;POWER UP SEQUENCE.
1707
1708 005624 016706 177772 PUP: MOV PDSTP, STP ;RESTORE STACK PTR.
1709 005630 012605 MOV (STP)+, R5 ;POP R0-R5 FROM STACK.
1710 005632 012604 MOV (STP)+, R4
1711 005634 012603 MOV (STP)+, R3
1712 005636 012602 MOV (STP)+, R2
1713 005640 012601 MOV (STP)+, R1
1714 005642 012600 MOV (STP)+, R0
1715 005644 012767 005554 172152 MOV #PDOWN, 24 ;INIT. POWER FAIL VECTOR FOR POWER DOWN.
1716 005652 005726 TST (STP)+ ;POP STACK.
1717 005654 000167 002724 JMP INITP ;RESTART.
1718

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1719
1720
1721 ;ERROR TRAP (EMT) SERVICE ROUTINE TO CONTROL ERROR HANDLING.
1722
1723 005660 032767 000001 173254 ERRSVC: BIT #ECF,FLAGS ;DOES AN ERROR CONDITION ALREADY EXIST?
1724 005666 001426 BEQ ERSVCD ;NO. - BRANCH. (UNCONDITIONAL TYPEOUT)
1725 005670 032767 000002 173244 BIT #IMF,FLAGS ;DOES AN INTERMITTENT ERROR EXIST?
1726 005676 001402 BEQ ESVCA1 ;NO. - BRANCH.
1727 005700 004567 000064 JSR $,IMCTL ;YES. - GO TO INTERMITTENT CONTROL.
1728 005704 032767 020000 171656 ESVCA1: BIT #STS,177570 ;YES. - SUBSEQUENT ERROR TYPEOUTS?
1729 005712 001417 BEQ ERSVCE ;YES. - BRANCH.
1730 005714 032767 100000 171646 ERSVCA: BIT #HES,177570 ;NO. - HALT?
1731 005722 001401 BEQ ERSVCB ;NO. - BRANCH.
1732 005724 000000 HALT ;YES. - HALT.
1733 005726 032767 040000 171634 ERSVCB: BIT #SLS,177570 ;ERROR SCOPE LOOP?
1734 005734 001411 BEQ ERSVCG ;NO. - BRANCH.
1735 005736 022626 ERSVCC: CMP (STP)+,(STP)+ ;YES. - POP STACK ONE TRAP.
1736 005740 000177 173210 JMP @SCORTN ;RETURN TO SCOPE LOOP
1737 005744 052767 000001 173170 ERSVCD: BIS #ECF,FLAGS ;SET ERROR CONDITION FLAG..
1738 005752 004567 000236 ERSVCE: JSR $,TYPEERR ;GO TYPE ERROR MESSAGE.
1739 005756 000756 BR ERSVCA ;BRANCH.
1740 005760 042767 000003 173154 ERSVCG: BIC #ECF+IMF,FLAGS ;CLEAR ERROR CONDITION FLAGS.
1741 005766 000002 RTI ;RETJRI.
  
```

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1742
1743
1744
1745 005770 032767 000002 173144 IMCTL: BIT #IMF,FLAGS ;DOES INTERMITTENT COND. ALREADY EXIST?
1746 005776 001015 BNE IMCTLA ;YES. - BRANCH.
1747 006000 052767 000002 173134 BIS #IMF,FLAGS ;NO. - SET INTERMITTENT FLAG.
1748 006006 004567 004142 JSR $,TYPEA ;NOTIFY OPERATOR OF INTERMITTENT.
1749 006012 044536 052116 051105 .ASCII "↑INTERMITTENT!."
1750 006020 044515 052124 047105
1751 006026 020524 020056
1752 006032 020527 005422 IMCTLA: CMP $,#CTSVCA ;DID THE TEST PASS THIS LOOP OK?
1753 006036 001016 BNE IMCTLB ;NO. - BRANCH.
1754 006040 005267 173232 INC OKCTR ;YES. - MC. OKCTR. HAS IT OVERFLOWED?
1755 006044 001030 BNE IMCTLC ;NO. - BRANCH.
1756 006046 004567 004102 JSR $,TYPEA ;YES. - NOTIFY OPERATOR.
1757 006052 047536 041513 047440 .ASCII "↑OKC OVERFLOW.↑"
1758 006060 042526 043122 047514
1759 006066 027127 020136
1760 006072 000415
1761 006074 005267 173174 IMCTLB: BR IMCTLC ;BRANCH.
1762 006100 001012 INC ERCTR ;INC. ERCTR. HAS IT OVERFLOWED?
1763 006102 004567 004046 BNE IMCTLC ;NO. - BRANCH.
1764 006106 042536 041522 047440 JSR $,TYPEA ;YES. - NOTIFY OPERATOR.
1765 006114 042526 043122 047514 .ASCII "↑ERC OVERFLOW.↑"
1766 006122 057127 020056
1767 006126 032767 000100 171434 IMCTLC: BIT #IMS,177570 ;TYPE "OK" AND "ERR" COUNTERS?
1768 006134 001020 BNE IMCTLD ;NO. - BRANCH.
1769 006136 004567 004012 JSR $,TYPEA ;YES. - TYPE THE COUNTERS.
1770 006142 042536 041522 027057 .ASCII "↑ERC/."
1771 006150 004567 004072 JSR $,TYPE0
1772 006154 001274 ERCTR
1773 006156 004567 003772 JSR $,TYPEA
1774 006162 047440 041513 027057 .ASCII "↑OKC/."
1775 006170 004567 004052 JSR $,TYPE0
1776 006174 001276 OKCTR
1777 006176 020527 005422 IMCTLD: CMP $,#CTSVCA ;DID THE TEST PASS THIS LOOP OK?
1778 006202 001401 BEQ IMCTLE ;YES. - BRANCH.
1779 006204 000205 RTS $ ;NO. - RETURN TO CONTINUE ERROR REPORTING.
1780 006206 005726 IMCTLE: TST (STP)+ ;POP STACK ONE JSR.
1781 006210 000167 177470 JMP ESVCA1 ;BRANCH TO CONTINUE ERROR REPORTING.

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:SUBROUTINE TO TYPE ERROR MESSAGES.

006204	004567	001122		TYPERR: JSR	S. SAVE
006205	004567	003730		TPC: JSR	S. TYPEA
006206	050136	027503	020056	.ASCII	S. TPC
006207	004567	034010		JSR	S. TYPEO
006208	001160			SAVPC	
006240	032767	000001	171322	B. T	BSES. 177570
006241	001402			BEU	TPST
006250	000167	001040		.M	TEX
006284	004567	003674		TPST: JSR	S. TYPEA
006285	050040	027523	020056	.ASCII	S. PS
006286	004567	003754		JSR	S. TYPEC
006287	001162			SAVPS	
006307	004567	003654		TCAC: JSR	S. TYPEA
006308	041440	042101	027057	.ASCII	S. TAC
006309	004567	003734		JSR	S. TYPEC
006310	001166			SAVCAC	
006314	004567	003634		TCAX: JSR	S. TYPEA
006320	041440	054101	027057	.ASCII	S. TAX
006326	132767	000001	172607	B. T	MAXF. REF. GS
006327	001002			BNE	TCAXA
006336	004567	000762		JSR	S. TYPEM
006342	004567	003700		TCAXA: JSR	S. TYPEC
006346	001170			SAVCAX	
006350	004567	003600		TCMP: JSR	S. TYPEA
006351	041440	050127	027057	.ASCII	S. CMP
006362	132767	000002	172553	B. T	CMF. REF. GS
006370	001002			BNE	TCMPA
006372	004567	000726		JSR	S. TYPEM
006376	004567	003644		TCMPA: JSR	S. TYPEC
006402	004567	003544		TBC: JSR	S. TYPEA
006410	041040	027524	020056	.ASCII	S. B
006420	132767	000100	172517	B. T	BOA. REF. GS
006428	132767			BNE	BOA
006438	000200	172507		B. T	BOF. REF. GS
006448	000104			BNE	BOB
006458	004567	003512		JSR	S. TYPEA
006459	047101	020056		.ASCII	S. SCRN.
006460	000102			B	TBC
006470	004567	003476		TBOA: JSR	S. TYPEA
006471	052123	020056		.ASCII	S. TBS
006472	000404			B	TBOB
006473	004567	003462		JSR	S. TYPEA
006474	027123			.ASCII	S. TBS
006476	000240			TBOB: JSR	S. TYPEA
006477				TBOC: JSR	S. TBS
006500	004567	003450		TFLGS: JSR	S. TYPEA
006501	027057			.ASCII	S. TBS

1852	006513	004567	003532		JSR	S,TYPEO	
1853	006514	001142			FLGGS		
1854	006516	004567	003432		JSR	S,TYPEA	
1855	006526	043536	042127	027057	.ASCII	"GWO/."	
1856	006537	132767	000004	172405	BITB	#WOF,RFLGS	
1857	006538	001002			BNE	TGWOA	
1858	006544	004567	000560		JSR	S,TYPENR	
1859	006550	001216	003476		JSR	S,TYPEO	
1860					GWO		
1861	006552	004567	003376		TGMF:	JSR	S,TYPEA
1862	006556	043447	043115	027057	.ASCII	"GMF/."	
1863	006564	132767	000010	172351	BITB	#MFF,RFLGS	
1864	006572	001002			BNE	TGMFA	
1865	006574	004567	000524		JSR	S,TYPENR	
1866	006600	004567	003442		JSR	S,TYPEO	
1867	006604	001214			GMF		
1868	006606	004567	003342		TGMN:	JSR	S,TYPEA
1869	006612	043440	030127	027057	.ASCII	"GWO/."	
1870	006620	132767	000020	172315	BITB	#WOF,RFLGS	
1871	006626	001002			BNE	TGWOA	
1872	006630	004567	000470		JSR	S,TYPENR	
1873	006634	004567	003406		JSR	S,TYPEO	
1874	006640	001220			GWO		
1875	006642	004567	003306		TGW2:	JSR	S,TYPEA
1876	006646	043440	031127	027057	.ASCII	"GW2/."	
1877	006654	132767	000040	172261	BITB	#W26F,RFLGS	
1878	006662	001002			BNE	TGW2A	
1879	006664	004567	000434		JSR	S,TYPENR	
1880	006670	004567	003352		JSR	S,TYPEO	
1881	006674	001222			GW2		
1882	006676	004567	003252		TGW4:	JSR	S,TYPEA
1883	006702	043440	032127	027057	.ASCII	"GW4/."	
1884	006710	132767	000040	172225	BITB	#W26F,RFLGS	
1885	006716	001002			BNE	TGW4A	
1886	006720	004567	000400		JSR	S,TYPENR	
1887	006724	004567	003316		JSR	S,TYPEO	
1888	006730	001224			GW4		
1889	006732	004567	003216		TGW6:	JSR	S,TYPEA
1890	006736	043440	033127	027057	.ASCII	"GW6/."	
1891	006744	132767	000040	172171	BITB	#W26F,RFLGS	
1892	006752	001002			BNE	TGW6A	
1893	006754	004567	000344		JSR	S,TYPENR	
1894	006760	004567	003262		JSR	S,TYPEO	
1895	006764	001226			GW6		

1890	006766	004567	003162		TSWR:	JSR	\$,TYPEA
1891	006772	05140	051127	027057		.ASCII	"SWB/."
1892	007000	004567	003242			JSR	\$,TYPE0
1893	007004	001164				SAVSWR	
1894	007006	004567	003142		TTWO:	JSR	\$,TYPEA
1895	007012	052136	046:27	027057		.ASCII	"TTWO/."
1896	007020	132767	000004	172115		BITB	#WDF,RFLGS
1897	007026	001002				BNE	TTWDA
1898	007030	004567	000270			JSR	\$,TYPENR
1899	007034	004567	003206		TTWDA:	JSR	\$,TYPE0
1900	007040	001232				TWO	
1901							
1902	007042	004567	003106		TTMF:	JSR	\$,TYPEA
1903	007046	052040	043115	027057		.ASCII	"TMF/."
1904	007054	132767	000010	172061		BITB	#MFF,RFLGS
1905	007062	001002				BNE	*TMFA
1906	007064	004567	000234			JSR	\$,TYPENR
1907	007070	004567	003152		*TMFA:	JSR	\$,TYPE0
1908	007074	001230				TMF	
1909							
1910	007076	004567	003052		TTWO:	JSR	\$,TYPEA
1911	007102	052040	030127	027057		.ASCII	"TWO/."
1912	007110	132767	000020	172025		BITB	#WDF,RFLGS
1913	007116	001002				BNE	TTWDA
1914	007120	004567	000070			JSR	\$,TYPENR
1915	007124	004567	003106		TTWDA:	JSR	\$,TYPE0
1916	007130	001234				TWO	
1917							
1918	007132	004567	003016		TTW2:	JSR	\$,TYPEA
1919	007136	052040	031127	027057		.ASCII	"TW2/."
1920	007144	132767	000040	171771		BITB	#W26F,RFLGS
1921	007152	001002				BNE	TTW2A
1922	007154	004567	000144			JSR	\$,TYPENR
1923	007160	004567	003062		TTW2A:	JSR	\$,TYPE0
1924	007164	001236				TW2	
1925							
1926	007166	004567	002762		TTW4:	JSR	\$,TYPEA
1927	007172	052040	032127	027057		.ASCII	"TW4/."
1928	007200	132767	000040	171735		BITB	#W26F,RFLGS
1929	007206	001002				BNE	TTW4A
1930	007210	004567	000110			JSR	\$,TYPENR
1931	007214	004567	003026		TTW4A:	JSR	\$,TYPE0
1932	007220	001240				TW4	
1933							
1934	007222	004567	002726		TTW6:	JSR	\$,TYPEA
1935	007226	052040	033127	027057		.ASCII	"TW6/."
1936	007234	132767	000040	171701		BITB	#W26F,RFLGS
1937	007242	001002				BNE	TTW6A
1938	007244	004567	000054			JSR	\$,TYPENR
1939	007250	004567	002772		TTW6A:	JSR	\$,TYPE0
1940	007254	001242				TW6	
1941							
1942	007256	004567	002672		TAXS:	JSR	\$,TYPEA
1943	007262	040440	051530	051127		.ASCII	"AXSWR/."
1944	007270	027057					
1945	007272	032767	000140	171642		BIT	#BXF+JXF,FLAGS



EOS

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1946	007300	001002			BNE	TAXSA
1947	007302	004567	000016		JSR	\$,TYPENR
1948	007306	004567	002734	TAXSA:	JSR	\$,TYPEO
1949	007312	001210			AXSWR	
1950						
1951	007314	004567	002634	TEX:	JSR	\$,TYPEA
1952	007320	027136			.ASCII	"1."
1953	007322	000205			RTS	\$

# F05

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007324	004567	002624	
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	171567	
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,SAVCA0
        MOV    CADRX,SAVCAX
        MOV    CWP,SAVCWP
        MOV    ITCNT,SAVITC
        MOV    OKCTR,SAVOKC
        MOV    ERCTR,SAVERC
        MOV    RO,SAVRO
        MOV    RI,SAVRI
        MOV    STP,SAVSTP
        ADD    #10,SAVSTP
        RTS   $
```

# G05

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1982
1983
1984
1985 007462 012767 000010 171452 INIT:  MOV    #BF, FLAGS      ;INIT. FOR S&ORD DIAG.
1986 007470 000407                BR          INITA1
1987 007472 012767 000004 171442 INITA5: MOV    #MOD, FLAGS   ;INIT. FOR MODULE TEST MODE.
1988 007500 000403                BR          INITA1
1989 007502 012767 000020 171432 INITA:  MOV    #JF, FLAGS      ;INIT. FOR DJMRS DIAG.
1990 007510 012767 177570 171420 INITA1: MOV    #177570, SWR
1991 007516 000412                BR          INITB
1992 007520 012767 00          171414 INITA2: MOV    #BXF, FLAGS   ;INIT. FOR BTEL ACCEPT/EXERCISE.
1993 007526 000403                BR          INITA4
1994 007530 012767 00          171404 INITA3: MOV    #JXF, FLAGS   ;INIT. FOR DJMPRS ACCEPT/EXERCISE.
1995 007536 012767 001210 171372 INITA4: MOV    #AXSWR, SWR
1996 007544 012706 001000                INITB:  MOV    #1000, STP
1997 007550 005067 171374                CLR     PASCTR
1998 007554 012700 000002                MOV     #2, R0
1999 007560 005001                CLR     R1
2000 007562 010021                INITB1: MOV    R0, (R1)+
2001 007564 005021                CLR     (R1)+
2002 007566 062700 000004                ADD     #4, R0
2003 007572 020127 001000                CMP     R1, #1000
2004 007576 001371                BNE     INITB1
2005 007600 012767 000137 170372                MOV     #137, 200
2006 007606 012767 007462 170366                MOV     #INIT, 202
2007 007614 012767 005552 170172                MOV     #TTSVC, 14
2008 007622 012767 005406 170170                MOV     #CTLSVC, 20
2009 007630 012767 005554 170166                MOV     #PDOWN, 24
2010 007636 012767 005660 170164                MOV     #ERRSVC, 30
2011 007644 012767 005370 170162                MOV     #SCOSVC, 34
2012 007652 012700 001146                MOV     #BEGV, R0
2013 007656 005020                INITB2: CLR     (R0)+
2014 007660 020027 001300                CMP     R0, #ENDV
2015 007664 001374                BNE     INITB2
2016 007666 005002                CLR     R2
2017 007670 005003                CLR     R3
2018 007672 005004                CLR     R4
2019 007674 012767 007714 170106                MOV     #INITC, 10
2020 007702 006700                SXT     R0
2021 007704 012767 000006 175640                MOV     #RTT, TTSVC
2022 007712 000401                BR      INITC1
2023 007714 022626                INITC:  CMP     (STP)+, (STP)+
2024 007716 012767 000012 170064                INITC1: MOV    #12, 10
2025 007724 012767 007754 170052                MOV     #INITD, 4
2026 007732 005767 167610                TST     KWLS
2027 007736 012767 177546 171324                MOV     #KWLS, KCSR
2028 007744 012767 010040 170126                MOV     #INITG, 100
2029 007752 000421                BR      INITE
2030 007754 012767 010012 170022 INITD:  MOV     #INITE, 4
2031 007762 005767 162552                TST     KWPS
2032 007766 012767 172540 171274                MOV     #KWPS, KCSR
2033 007774 012767 010040 170102                MOV     #INITG, 104
2034 010002 012767 000001 162532                MOV     #1, KWPB
2035 010010 000402                BR      INITE
2036 010012 000000                INITE:  HALT
2037 010014 000776                BR      INITE

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# H05

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2038	010016	012767	000006	167760	INITF:	MOV	#6,4	;INIT. (CLOSE OUT) TIMEOUT-ERROR TRAP VECTOR.
2039	010024	005067	171236			CLR	DLACTR	;INIT DELAY NUMBER.
2040	010030	012777	000115	171232		MOV	#115,2KCSR	;ENABLE INTERRUPT FROM CLOCK (EITHER ONE)
2041	010036	000001				WAIT		;WAIT FOR FIRST INTERRUPT
2042	010040	022626			INITG:	CMP	(STP)+,(STP)+	;POP STACK.
2043	010042	005767	171220			TST	DLACTR	;FIRST INTERRUPT?
2044	010046	001010				BNE	INITH	;NO. - BRANCH.
2045	010050	012767	000002	171210		MOV	#2,DLACTR	;YES. - ADJUST DELAY COUNTER.
2046	010056	005267	171204		INITG1:	INC	DLACTR	;COUNT UNTIL SECOND INTERRUPT.
2047	010062	001375				BNE	INITG1	
2048	010064	000000			INITG2:	HALT	***CATASTROPHIC ERROR. COUNTER SHOULD NOT OVER RUN.	
2049	010066	000776				BR	INITG2	
2050								
2051	010070	005077	171174		INITH:	CLR	2KCSR	;DISABLE CLOCK INTERRUPTS. (DLACTR=16.7MS)
2052	010074	012767	000102	167776		MOV	#102,100	;INIT (CLOSE OUT) CLOCK VECTOR.
2053	010102	012767	000106	167774		MOV	#106,104	;INIT (CLOSE OUT) CLOCK VECTOR.
2054	010110	005067	171140			CLR	DLAN01	;CALIBRATE FOR THIS PARTICULAR
2055	010114	162767	000021	171144	INITI:	SUB	#21,DLACTR	;PROCESSOR 2 DELAY NUMBERS AND
2056	010122	005267	171126			INC	DLAN01	;DELAY OFFSETS OF 10% OF THE
2057	010126	022767	000021	171132		CMP	#21,DLACTR	;DELAY NUMBERS.
2058	010134	101767				BLOS	INITI	
2059	010136	026727	171124	000011		CMP	DLACTR,#11	
2060	010144	103402				BLO	INITJ	
2061	010146	005267	171102			INC	DLAN01	
2062	010152	016767	171076	171106	INITJ:	MOV	DLAN01,DLACTR	;(DLAN01=1MS)
2063	010160	005067	171074			CLR	DLAOF1	
2064	010164	005067	171072			CLR	DLAOF2	
2065	010170	005067	171060			CLR	DLAN01	
2066	010174	005067	171056			CLR	DLAN02	
2067	010200	066767	171062	171046	INITJ1:	ADD	DLACTR,DLAN01	
2068	010206	005267	171046			INC	DLAOF1	
2069	010212	026767	171042	170672		CMP	DLAOF1,DMS1	
2070	010220	001367				BNE	INITJ1	
2071	010222	066767	171040	171026	INITJ2:	ADD	DLACTR,DLAN02	;(DLAN01=1MSXDMS1)
2072	010230	005267	171026			INC	DLAOF2	
2073	010234	026767	171022	170652		CMP	DLAOF2,DMS2	
2074	010242	001367				BNE	INITJ2	
2075	010244	005067	171010		INITK:	CLR	DLAOF1	;(DLAN02=1MSXDMS2)
2076	010250	005067	171006			CLR	DLAOF2	
2077	010254	016767	170774	171004		MOV	DLAN01,DLACTR	
2078	010262	162767	000012	170776	INITK1:	SUB	#12,DLACTR	
2079	010270	005267	170764			INC	DLAOF1	
2080	010274	022767	000012	170764		CMP	#12,DLACTR	
2081	010302	101767				BLOS	INITK1	
2082	010304	026727	170756	000007		CMP	DLACTR,#7	
2083	010312	103402				BLO	INITK2	
2084	010314	005267	170740			INC	DLAOF1	
2085	010320	016767	170732	170740	INITK2:	MOV	DLAN02,DLACTR	;(DLAOF1=10% DLAN01)
2086	010326	162767	000012	170732	INITK3:	SUB	#12,DLACTR	
2087	010334	005267	170722			INC	DLAOF2	
2088	010340	022767	000012	170720		CMP	#12,DLACTR	
2089	010346	101767				BLOS	INITK3	
2090	010350	026727	170712	000007		CMP	DLACTR,#7	
2091	010356	103402				BLO	INITK4	
2092	010360	005267	170676			INC	DLAOF2	
2093	010364	000240			INITK4:	NOP		;(DLAOF2=10% DLAN02)

2094	010366	000240				NOP		
2095	010370	032767	000004	170544		BIT	#MOD, FLAGS	
2096	010376	001416				BEQ	INITL	
2097	010400	004567	001550			JSR	\$, TYPEA	
2098	010404	020136	051536	047440		.ASCII	"↑ ↑S OR D MODULE TEST."	
2099	010412	020122	020104	047515				
2100	010420	052504	042514	052040				
2101	010426	051505	027124					
2102	010432	000425				BR	INITM	
2103	010434	032767	000050	170500	INITL:	BIT	#BF+BXF, FLAGS	
2104	010442	001411				BEQ	INITLI	
2105	010444	004567	001504			JSR	\$, TYPEA	
2106	010450	020136	051536	023040		.ASCII	"↑ ↑S &/OR D."	
2107	010456	047457	020122	027104				
2108	010464	000410				BR	INITM	
2109	010466	004567	001462		INITLI:	JSR	\$, TYPEA	
2110	010472	020136	042136	045040		.ASCII	"↑ ↑D JMPR S."	
2111	010500	050115	020122	027123				
2112	010506	032767	000034	170426	INITM:	BIT	#BF+JF+MOD, FLAGS	
2113	010514	001407				BEQ	INITM1	
2114	010516	004567	001432			JSR	\$, TYPEA	
2115	010522	042040	040511	057107		.ASCII	"DIAG↑."	
2116	010530	020056						
2117	010532	000413				BR	INITN	
2118	010534	004567	001414		INITM1:	JSR	\$, TYPEA	
2119	010540	040440	041503	050105		.ASCII	"ACCEPT/EXERCISE↑."	
2120	010546	027524	054105	051105				
2121	010554	044503	042523	027136				
2122								
2123	010562	005767	170330		INITN:	TST	LOSA	;HAVE TTY QUERIES EVER BEEN MADE?
2124	010566	001404				BEQ	INITO	;NO. - BRANCH.
2125	010570	032767	000010	166772		BIT	#IQS, 177570	;YES. - INHIBIT SUBSEQUENT TTY QUERIES?
2126	010576	001002				BNE	INITP	;YES. - BRANCH.
2127	010600	004567	000026		INITO:	JSR	\$, QBEG	;NO. - MAKE TTY QUERIES.
2128	010604	056767	170334	170330	INITP:	BIS	FX, FLAGS	;CARRY FLAGS FROM PREVIOUS PASS (IF ANY).
2129	010612	032767	000140	170322		BIT	#BXF+JXF, FLAGS	;ACCEPT/EXERCISE?
2130	010620	001002				BNE	INITR	;YES. - BRANCH
2131	010622	000167	171252		INITQ:	JMP	PREST	;NO. - BRANCH. (DIAG.)
2132	010626	000167	174232		INITR:	JMP	AXCTL	;BRANCH.
2133								

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2134
2135          ;SUBROUTINE TO MAKE INITIAL TTY INQUIRIES.
2136
2137 010632 000240 QBEG:  NOP
2138 010634 004567 001314 QLOSA: JSR  $,TYPEA
2139 010640 046136 051517 037501 .ASCII  "LOSA? ."
2140 010646 027040
2141 010650 004567 001032 QLOSAA: JSR  $,KADRS
2142 010654 010067 170236      MOV  RO,LOSA
2143 010660 010067 170234      MOV  RO,HISA
2144 010664 020027 000116      CMP  RO,#'N
2145 010670 001432      BEQ  QLODA
2146 010672 032700 000007      BIT  #7,RO
2147 010676 001142      BNE  QERA
2148
2149 010700 004567 001250 QHISA: JSR  $,TYPEA
2150 010704 044136 051511 037501 .ASCII  "HISA? ."
2151 010712 027040
2152 010714 004567 000766 QHISAA: JSR  $,KADRS
2153 010720 010067 170174      MOV  RO,HISA
2154 010724 020027 000116      CMP  RO,#'N
2155 010730 001525      BEQ  QERA
2156 010732 010067 170172      MOV  RO,HISAX
2157 010736 042767 000007 170164 BIC  #7,HISAX
2158 010744 042700 177770      BIC  #177770,RO
2159 010750 020027 000006      CMP  RO,#6
2160 010754 001113      BNE  QERA
2161
2162 010756 004567 001172 QLODA: JSR  $,TYPEA
2163 010762 046136 042117 037501 .ASCII  "LODA? ."
2164 010770 027040
2165 010772 004567 000710 QLODAA: JSR  $,KADRS
2166 010776 010067 170120      MOV  RO,LODA
2167 011002 010067 170116      MOV  RO,HIDA
2168 011006 020027 000116      CMP  RO,#'N
2169 011012 001426      BEQ  QADCK
2170 011014 032700 000007      BIT  #7,RO
2171 011020 001071      BNE  QERA
2172
2173 011022 004567 001126 QHIDA: JSR  $,TYPEA
2174 011026 044136 042111 037501 .ASCII  "HIDA? ."
2175 011034 027040
2176 011036 004567 000644 QHIDAA: JSR  $,KADRS
2177 011042 010067 170056      MOV  RO,HIDA
2178 011046 020027 000116      CMP  RO,#'N
2179 011052 001454      BEQ  QERA
2180 011054 042700 177770      BIC  #177770,RO
2181 011060 001451      BEQ  QERA
2182 011062 020027 000004      CMP  RO,#4
2183 011066 001446      BEQ  QERA
2184
2185 011070 026727 170022 000116 QADCK:  CMP  LOSA,#'N
2186 011076 001004      BNE  QADCKA
2187 011100 026727 170016 000116      CMP  LODA,#'N
2188 011106 001545      BEQ  QERD
2189 011110 026767 170002 170002 QADCKA: CMP  LOSA,HISA
  
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# K05

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2190	011116	101115			BHI	QERC
2191	011120	026767	167776	167776	CMP	LODA,HIDA
2192	011126	101111			BHI	QERC
2193	011130	016701	167762		MOV	LOSA,R1
2194	011134	020167	167762		QADCKB: CMP	R1,LODA
2195	011140	001461			BEQ	QERB
2196	011142	020167	167752		CMP	R1,HISA
2197	011146	001403			BEQ	QADCKC
2198	011150	062701	000002		ADD	#2,R1
2199	011154	000767			BR	QADCKB
2200	011156	016701	167740		QADCKC: MOV	LODA,R1
2201	011162	020167	167730		QADCKD: CMP	R1,LOSA
2202	011166	001446			BEQ	QERB
2203	011170	020167	167730		CMP	R1,HIDA
2204	011174	001531			BEQ	QADA
2205	011176	062701	000002		ADD	#2,R1
2206	011202	000767			BR	QADCKD
2207						
2208	011204	016767	170036	170036	QERA: MOV	TYP SRC,QSRC
2209	011212	004567	000736		JSR	\$,TYPEA
2210	011216	037477	044136	051511	.ASCII	"?HISA=XXXXX6 ONLY, HIDA=XXXXX2 OR XXXXX6 ONLY?."
2211	011224	036501	054130	054130		
2212	011232	033130	047440	046116		
2213	011240	026131	044040	042111		
2214	011246	036501	054130	054130		
2215	011254	031130	047440	020122		
2216	011262	054130	054130	033130		
2217	011270	047440	046116	057131		
2218	011276	020056				
2219	011300	000177	167744		JMP	QSRC
2220						
2221	011304	004567	000644		QERB: JSR	\$,TYPEA
2222	011310	037477	051536	046501	.ASCII	"?SAME SCAN & DIST ADDRESS?."
2223	011316	020105	041523	047101		
2224	011324	023040	042040	051511		
2225	011332	020124	042101	051104		
2226	011340	051505	037523	027136		
2227	011346	000167	177260		JMP	QBEG
2228						
2229	011352	004567	000576		QERC: JSR	\$,TYPEA
2230	011356	046136	020117	042101	.ASCII	"?LO ADRS HIGHER THAN HI ADRS?."
2231	011364	051522	044040	043511		
2232	011372	042510	020122	044124		
2233	011400	047101	044040	020111		
2234	011406	042101	051522	057077		
2235	011414	020056				
2236	011416	000167	177210		JMP	QBEG
2237						
2238						
2239	011422	004567	000526		QERD: JSR	\$,TYPEA
2240	011426	047136	020117	047502	.ASCII	"?NO BOARDS, NO TEST?."
2241	011434	051101	051504	020054		
2242	011442	047516	052040	051505		
2243	011450	057124	020056			
2244	011454	000167	177152		JMP	QBEG
2245						

# L05

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2246	011460	032767	000120	167454	QDATA:	BIT	#JF+JXF,FLAGS
2247	011466	001447				BEQ	QDCON
2248	011470	004567	000460			JSR	\$,TYPEA
2249	011474	042136	052101	037501		.ASCII	"↑DATA? ."
2250	011502	027040					
2251	011504	004567	000202			JSR	\$,KDATA
2252	011510	010067	167424			MOV	RO,DATAWD
2253	011514	042767	000200	167422		BIC	#DATF,FX
2254	011522	022767	000006	167522		CMP	#6,KCTR
2255	011530	001403				BEQ	QJMPD
2256	011532	052767	000200	167404		BIS	#DATF,FX
2257							
2258	011540	004567	000410		QJMPD:	JSR	\$,TYPEA
2259	011544	042136	051511	051524		.ASCII	"↑DISTS JUMPED TO SCAN? ."
2260	011552	045040	046525	042520			
2261	011560	020104	047524	051440			
2262	011566	040503	037516	027040			
2263	011574	004567	000116			JSR	\$,KYORN
2264	011600	020027	000116			CMP	RO,#'N
2265	011604	001755				BEQ	QJMPD
2266							
2267	011606	004567	000342		QDCON:	JSR	\$,TYPEA
2268	011612	052536	042523	020122		.ASCII	"↑USER DISCONNECTED? ."
2269	011620	044504	041523	047117			
2270	011626	042516	052103	042105			
2271	011634	020077	020056				
2272	011640	004567	000052			JSR	\$,KYORN
2273	011644	020027	000116			CMP	RO,#'N
2274	011650	001756				BEQ	QDCON
2275							
2276	011652	004567	000276		QTSTNG:	JSR	\$,TYPEA
2277	011656	052136	040510	045516		.ASCII	"↑THANKS! NOW TESTING↑."
2278	011664	020523	047040	053517			
2279	011672	052040	051505	044524			
2280	011700	043516	027136				
2281							
2282							
2283	011704	000205			QEND:	PTS	\$



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2284
2285
2286
2287
2288 ;SUBROUTINES TO KEY IN CORRECT OPERATOR REPLIES TO TTY QUERIES.
2289
2290 011706 004567 000010 KADRS: JSR $,KIN ;ENTRY TO KEY IN AN ADDRESS.
2291 011712 004567 000004 KDATA: JSR $,KIN ;ENTRY TO KEY IN DATA.
2292 011716 004567 000000 KYORN: JSR $,KIN ;ENTRY TO KEY IN A Y OR AN N.
2293 011722 005001 KIN: CLR R1 ;INIT. & PREPARE TO INPUT A
2294 011724 012767 000006 167320 MOV #6,KCTR ;MAXIMUM OF SIX CHARACTERS.
2295 011732 005267 165622 KINA: INC TKS ;ENABLE CHAR. READ.
2296 011736 105767 165616 KINB: TSTB TKS ;CHAR. READY?
2297 011742 100375 BPL KINB ;NO. - BRANCH.
2298 011744 116700 165612 MOVB TKB,RO ;YES. - READ CHAR.
2299 011750 042700 177600 BIC #177600,RO ;CONVERT CHAR. FROM 8 TO 7 BIT ASCII.
2300 011754 105767 165604 KINB1: TSTB TPS ;ECHO THE CHAR.
2301 011760 100375 BPL KINB1
2302 011762 010067 165600 MOV RO,TPB
2303 011766 020527 011722 CMP $,#KIN ;WAS REPLY TO BE Y OR N ONLY?
2304 011772 001436 BEQ KINC ;YES. - BRANCH
2305 011774 020027 000060 CMP RO,#'0 ;NO. - CHAR. LESS THAN A CHAR. 0?
2306 012000 103452 BLO KINE ;YES. - BRANCH.
2307 012002 020027 000067 CMP RO,#'7 ;NO. - CHAR. GREATER THAN A CHAR. 7?
2308 012006 101030 BHI KINC ;YES. - BRANCH.
2309 012010 042700 177770 BIC #177770,RO ;NO. - CONVERT ASCII TO OCTAL.
2310 012014 050001 BIS RO,R1 ;TRANSFER CHAR. TO R1.
2311 012016 005367 167230 DEC KCTR ;WAS THIS THE SIXTH CHARACTER?
2312 012022 001404 BEQ KINB2 ;YES. - BRANCH.
2313 012024 006301 ASL R1 ;NO. - POSITION CHARS.
2314 012026 006301 ASL R1 ;POSITION CHARS.
2315 012030 006301 ASL R1 ;POSITION CHARS.
2316 012032 006737 BR KINA ;BRANCH.
2317 012034 010100 KINB2: MOV R1,RO ;YES. - TRANSFER THE SIX CHARS. TO RO.
2318 012036 020527 011712 CMP $,#KDATA ;SHOULD THIS REPLY BE AN ADDRESS?
2319 012042 001027 BNE KINC ;NO. - BRANCH
2320 012044 032700 000001 BIT #1,RO ;YES. - IS ADRS. EVEN?
2321 012050 001026 BNE KINE ;NO. - BRANCH.
2322 012052 020027 164000 CMP RO,#164000 ;YES. - IS ADRS. LESS THAN 164000?
2323 012056 103423 BLO KINE ;YES. - BRANCH.
2324 012060 020027 167776 CMP RO,#167776 ;NO. - IS ADRS. GREATER THAN 167776?
2325 012064 101020 BHI KINE ;YES. - BRANCH.
2326 012066 000415 BR KINC ;NO. - BRANCH.
2327 012070 022767 000006 167154 KINC: CMP #6,KCTR ;IS THIS THE FIRST CHAR?
2328 012076 001013 BNE KINE ;NO. - BRANCH.
2329 012100 020027 000116 CMP RO,#'N ;YES. - IS CHAR. AN N?
2330 012104 001406 BEQ KINC ;YES. - BRANCH.
2331 012106 020527 011722 CMP $,#KIN ;NO. - WAS REPLY TO BE AN ADRS. OR DATA?
2332 012112 001005 BNE KINE ;YES. - BRANCH.
2333 012114 020027 000131 CMP RO,#'Y ;NO. - IS CHAR. A Y?
2334 012120 001002 BNE KINE ;NO. - BRANCH.
2335 012122 012605 KIND: MOV (STP)+,$ ;YES. - POP STACK ONE JSR.
2336 012124 000205 RTS $ ;RETURN. - REPLY IS IN RO.
2337 012126 016767 167114 167114 KINE: MOV TYPsrc,QSRC ;GET ANOTHER TRY AT IT.
2338 012134 004567 000014 JSR $,TYPEA
2339 012140 037477 .ASCII "??."

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# N05

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2340	012144	005726		TST	(STP)+		;POP STACK TWO JSR'S.
2341	012146	012605		MOV	(STP)+,S		
2342	012150	000177	167074	JMP	QSRC		;RETURN TO RE-QUERY

:SUBROUTINE TO TYPE ASCII CODE.

```

167060 TYPEA: MOV $, TYP SRC
SUB $4, TYP SRC
TYPEA: STB TP$
BR TYPEA
CMPB ($), #136
BNE TYPEAB
STB ($), TYPEA
JMP $, TYPEA
000015
000056 TYPEAB: CMPB ($), #56
BEQ TYPEAC
MOVB ($), TPB
BR TYPEAA
TYPEAC: STB ($),
BIT #1, $
BEQ TYPEAD
TYPEAD: NOP
RTS $

```

:SUBROUTINE TO TYPE A SIX DIGIT OCTAL NUMBER.

```

000056 TYPEOC: CLR TYPEOC
MOV ($), RO
MOV (RO), RO
ASL RO
ROL TYPEOC
INC RO
BR TYPEOB
000034 TYPEOA: CLR TYPEOC
ASL RO
ROL TYPEOC
ASL RO
ROL TYPEOC
ASL RO
ROL TYPEOC
000012 TYPEOB: BIS #27060, TYPEOC
027060 JSR $, TYPEA
177624 TYPEOC: .ASCII "0."
000000 CMP RO, #100000
BNE TYPEOA
RTS $

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012456	000167	176122	LOGICAL:	JMP	INITP
012457	000001			.END	
012458					
012459					
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DCW11	001524	965#					
DCW12	001526	966#					
DCW13	001530	967#					
DCW14	001532	968#					
DCW15	001534	969#					
DCW16	001536	970#					
DCW17	001540	971#					
DCW20	001542	972#					
DCW21	001544	973#					
DCW22	001546	974#					
DCW23	001550	975#					
DCW24	001552	976#					
DCW25	001554	977#					
DCW26	001556	978#					
DCW27	001560	979#					
DCW30	001562	980#					
DCW31	001564	981#					
DCW32	001566	982#					
DCW33	001570	983#					
DCW34	001572	984#					
DCW35	001574	985#					
DCW36	001576	986#					
DCW37	001600	987#					
DCW40	001602	988#					
DCW41	001604	989#					
DCW42	001606	990#					
DCW43	001610	991#					
DCW44	001612	992#					
DCW45	001614	993#					
DCW46	001616	994#					
DCW47	001620	995#					
DCW50	001622	996#					
DCW51	001624	997#					
DCW52	001626	998#					
DCW53	001630	999#					
DCW54	001632	1000#					
DCW55	001634	1001#					
DCW56	001636	1002#					
DCW57	001640	1003#					
DCW60	001642	1004#					
DCW61	001644	1005#					
DCW62	001646	1006#					
DCW63	001650	1007#					
DCW64	001652	1008#					
DCW65	001654	1009#					
DCW66	001656	1010#					
DCW70	001662	1012#					
DCW71	001664	1013#					
DCW72	001666	1014#					
DCW73	001670	1015#					
DCW74	001672	1016#					
DCW75	001674	1017#					
DCW76	001676	1018#					
DCW77	001700	1019#	1426	1465	1517	1572	
DELAY	002034	1045#	1050#				
DELAY1	002010	1043#	1152	1186	1219	1253	1285 1319







INIT	007462	759	1985#	2006					
INITA	007502	757	1989#						
INITA1	007510	1986	1988	1990#					
INITA2	007520	775	1992#						
INITA3	007530	784	1994#						
INITA4	007536	1993	1995#						
INITA5	007472	791	1987#						
INITB	007544	1991	1996#						
INITB1	007562	2000#	2004						
INITB2	007656	2013#	2015						
INITC	007714	2019	2023#						
INITC1	007716	2022	2024#						
INITD	007754	2025	2030#						
INITE	010012	2030	2036#	2037					
INITF	010016	2029	2035	2038#					
INITG	010047	2028	2033	2042#					
INITG1	010050	2046#	2047						
INITG2	010064	2048#	2049						
INITH	010070	2044	2051#						
INITI	010114	2055#	2058						
INITJ	010152	2060	2062#						
INITJ1	010200	2067#	2070						
INITJ2	010222	2071#	2074						
INITK	010244	2075#							
INITK1	010262	2078#	2081						
INITK2	010320	2083	2085#						
INITK3	010326	2086#	2089						
INITK4	010364	2091	2093#						
INITL	010434	2096	2103#						
INITL1	010466	2104	2109#						
INITM	010506	2102	2108	2112#					
INITM1	010534	2113	2118#						
INITN	010562	2117	2123#						
INITO	010600	2124	2127#						
INITP	010604	1717	2126	2128#	2417				
INITQ	010622	2131#							
INITR	010626	2130	2132#						
IQS =	000010	727#	2125						
ITCNT	001152	833#	1662*	1663	1665*	1974			
ITNO	001110	811#	1663						
ITS =	004000	722#	1586	1590	1594	1610	1614	1618	1660
IZGSW	001702	1023#	1147	1181	1214	1247	1280	1316	
IZGSWA	001726	1026	1028#						
IZGSWB	001746	1030	1032#						
IZGSWC	001766	1034	1036#						
IZGSWD	002006	1038	1040#						
JF =	000020	736#	1063	1527	1989	2112	2246	2394	
JXF =	000100	738#	1063	1527	1945	1994	2129	2246	
KADRS	011706	2141	2152	2165	2176	2290#			
KCSR	001270	872#	2027*	2032*	2040*	2051*			
KCTR	001252	865#	2254	2294*	2311*	2327			
KDATA	011712	2251	2291#	2318					
KIN	011722	2290	2291	2292	2293#	2303	2331		
KINA	011732	2295#	2316						
KINB	011736	2296#	2297						
KINB1	011754	2300#	2301						





SCW15	001334	899#				
SCW16	001336	900#				
SCW17	001340	901#	1180	1246	1535	
SCW20	001342	902#				
SCW21	001344	903#				
SCW22	001346	904#				
SCW23	001350	905#				
SCW24	001352	906#				
SCW25	001354	907#				
SCW26	001356	908#				
SCW27	001360	909#				
SCW30	001362	910#				
SCW31	001364	911#				
SCW32	001366	912#				
SCW33	001370	913#				
SCW34	001372	914#				
SCW35	001374	915#				
SCW36	001376	916#				
SCW37	001400	917#				
SCW40	001402	918#				
SCW41	001404	919#				
SCW42	001406	920#				
SCW43	001410	921#				
SCW44	001412	922#				
SCW45	001414	923#				
SCW46	001416	924#				
SCW47	001420	925#				
SCW50	001422	926#				
SCW51	001424	927#				
SCW52	001426	928#				
SCW53	001430	929#				
SCW54	001432	930#				
SCW55	001434	931#				
SCW56	001436	932#				
SCW57	001440	933#				
SCW60	001442	934#				
SCW61	001444	935#				
SCW62	001446	936#				
SCW63	001450	937#				
SCW64	001452	938#				
SCW65	001454	939#				
SCW66	001456	940#				
SCW67	001460	941#				
SCW70	001462	942#				
SCW71	001464	943#				
SCW72	001466	944#				
SCW73	001470	945#				
SCW74	001472	946#				
SCW75	001474	947#				
SCW76	001476	948#				
SCW77	001500	949#	1336			
SOS	= 000004	728#	1051	1594	1606	1618 1630
SFS	= 000001	730#	1790			
SF	= 000100	746#	1084	1106	1127	1822
SLS	= 040000	719#	1656	1733		
SXF	= 000172	748#	1148	1182	1215	1248 1281 1313



S.ORD	000200	759#																		
S.ORDA	001010	775#																		
TAXS	007256	1942#																		
TAXSA	007306	1946	1948#																	
TBD	006404	1820#																		
TBDA	006452	1823	1829#																	
TBDB	006466	1825	1832#																	
TCAD	006274	1799#																		
TCAX	006314	1804#																		
TCAXA	006342	1807	1809#																	
TCWP	006350	1812#																		
TCWPA	006376	1815	1817#																	
TDBC	006476	1828	1831	1934#																
TEX	007314	1792	1951#																	
TFLGS	006500	1836#																		
TGMF	006552	1851#																		
TGMFA	006600	1854	1856#																	
TGWD	006516	1843#																		
TGWDA	006544	1846	1848#																	
TGWO	006606	1859#																		
TGWDA	006634	1862	1864#																	
TGW2	006642	1867#																		
TGW2A	006670	1870	1872#																	
TGW4	006676	1875#																		
TGW4A	006724	1878	1880#																	
TGW6	006732	1883#																		
TGW6A	006760	1886	1888#																	
TKB =	177562	702#	2298																	
TKS =	177560	701#	2295*	2296																
TLMT	001244	862#																		
TMF	001230	856#	1151*	1157	1185*	1191	1218*	1224	1252*	1258	1284*	1290	1318*	1324						
		1908																		
TPB =	177566	704#	2302*	2359*																
TPC	006220	1785#																		
TPS =	177564	703#	2300	2349																
TPST	006254	1791	1794#																	
TSS =	000020	726#	1652																	
TSWR	006766	1890#																		
TTCTL	005516	1655	1671#																	
TTCTLA	005542	1674	1676#	1701																
TTCTLB	005550	1676	1678#																	
TTMF	007042	1902#																		
TTMFA	007070	1905	1907#																	
TTS =	010000	721#	1586	1590	1594	1598	1602	1606	1673											
TTSVC	005552	1686#	2007	2021*																
TTWO	007006	1894#																		
TTWDA	007034	1897	1899#																	
TTWO	007076	1910#																		
TTWOA	007124	1913	1915#																	
TTW2	007132	1918#																		
TTW2A	007160	1921	1923#																	
TTW4	007166	1926#																		
TTW4A	007214	1929	1931#																	
TTW6	007222	1934#																		
TTWEA	007250	1937	1939#																	
TWO	001232	857#	1412*	1431*	1432	1451*	1470*	1471	1491*	1492	1512*	1513	1560*	1563						

# N06

TWO	001234	1900												
		858*	1153*	1159	1187*	1193	1220*	1226	1254*	1260	1286*	1292	1320*	1326
TW2	001236	1562*	1565	1916										
		859*	1154*	1161	1188*	1195	1221*	1228	1255*	1262	1287*	1294	1321*	1328
TW4	001240	1924												
		860*	1155*	1163	1189*	1197	1222*	1230	1256*	1264	1288*	1296	1322*	1330
TW6	001242	1932												
		861*	1156*	1165	1190*	1199	1223*	1232	1257*	1266	1289*	1298	1323*	1332
TYPEA	012154	1940												
		801	1748	1756	1763	1769	1773	1785	1794	1799	1804	1812	1820	1826
		1829	1832	1836	1843	1851	1859	1867	1875	1883	1890	1894	1902	1910
		1918	1926	1934	1942	1951	1957	2097	2105	2109	2114	2118	2138	2149
		2162	2173	2209	2221	2229	2239	2248	2258	2267	2276	2338	2347*	2387
		2399	2403	2407	2413									
TYPEAA	012166	2349*	2350	2354	2360									
TYPEAB	012214	2352	2357*											
TYPEAC	012230	2358	2361*											
TYPEAD	012242	2363	2365*											
TYPEAR	007324	1808	1816	1847	1855	1863	1871	1879	1887	1898	1906	1914	1922	1930
		1938	1947	1957*										
TYPEO	012246	1771	1775	1787	1796	1801	1809	1817	1838	1848	1856	1864	1872	1880
		1888	1892	1899	1907	1915	1923	1931	1939	1948	2372*	2405		
TYPEOA	012270	2379*	2390											
TYPEOB	012316	2378	2386*											
TYPEOC	012330	2372*	2376*	2379*	2381*	2383*	2385*	2386*	2388*					
TYPEOR	006214	805	1654	1738	1784*									
TYPEOS	001246	863*	2208	2337	2347*	2348*								
WDF	= 000004	742*	1845	1896										
WDF	= 000020	744*	1861	1912										
W26F	= 000040	745*	1869	1877	1885	1920	1928	1936						
\$	=%000005	697*	801*	805*	1040*	1059*	1147*	1152*	1181*	1186*	1214*	1219*	1247*	1253*
		1280*	1285*	1316*	1319*	1561*	1651*	1654*	1655*	1678*	1701*	1727*	1738*	1748*
		1752	1756*	1763*	1769*	1771*	1773*	1775*	1777	1779*	1784*	1785*	1787*	1794*
		1796*	1799*	1801*	1804*	1808*	1809*	1812*	1816*	1817*	1820*	1826*	1829*	1832*
		1836*	1838*	1843*	1847*	1848*	1851*	1855*	1856*	1859*	1863*	1864*	1867*	1871*
		1872*	1875*	1879*	1880*	1883*	1887*	1888*	1890*	1892*	1894*	1898*	1899*	1902*
		1906*	1907*	1910*	1914*	1915*	1918*	1922*	1923*	1926*	1930*	1931*	1934*	1938*
		1939*	1942*	1947*	1948*	1951*	1953*	1957*	1959*	1960*	1981*	2097*	2105*	2109*
		2114*	2118*	2127*	2138*	2141*	2149*	2152*	2162*	2165*	2173*	2176*	2209*	2221*
		2229*	2239*	2248*	2251*	2258*	2263*	2267*	2272*	2276*	2283*	2290*	2291*	2332*
		2303	2318	2331	2335*	2336*	2338*	2341*	2347	2351	2353	2354*	2357	2359
		2361	2362	2364*	2366*	2373	2387*	2391*	2399*	2403*	2405*	2407*	2413*	
	= 012462	758*	766*	774*	783*	790*	797*							

200	1056	1095	1116	1137	1171	1205	1238	1272	1304	1340	1373	1398	1418	1438	1457
201	1477	1498	1521	1539	1576	1577	1666	1959	1980	2002	2067	2071	2198	2205	
202	2313	2314	2315	2375	2380	2382	2384								
203	1055	1055	1064	1066	1087	1094	1115	1136	1170	1204	1237	1271	1303	1339	1365
204	1397	1397	1417	1437	1456	1476	1497	1520	1538	1554	1575	1650	1653	1657	1724
205	1729	1729	1731	1734	1778	1791	1823	2096	2104	2113	2124	2145	2155	2169	2179
206	2181	2183	2188	2195	2197	2202	2204	2247	2255	2265	2274	2304	2312	2330	2358
207	2363	2402	2412												
208	1099	2192	2308	2325											
209	1088	1360	1672	1700	1740	2157	2158	2180	2253	2299	2309				
210	1675	1737	1747	2128	2256	2310	2386								
211	1023	1029	1033	1037	1051	1054	1063	1065	1071	1349	1527	1553	1570	1649	1652
212	1656	1660	1673	1723	1725	1728	1730	1733	1745	1767	1790	1945	2095	2103	2112
213	2129	2129	2146	2170	2246	2320	2367	2394	2401						
214	1808	1814	1822	1824	1845	1853	1861	1869	1877	1885	1896	1904	1912	1920	1928
215	1936														
216	2060	2083	2091	2306	2323										
217	2058	2081	2089												
218	1640														
219	1026	1030	1034	1038	1058	1069	1072	1158	1160	1162	1164	1166	1192	1194	1196
220	1198	1200	1225	1227	1229	1231	1233	1259	1261	1263	1265	1267	1291	1293	1295
221	1297	1299	1325	1327	1329	1331	1333	1337	1347	1350	1413	1433	1452	1472	1493
222	1514	1518	1528	1564	1567	1571	1573	1661	1664	1674	1746	1753	1755	1762	1758
223	1807	1815	1825	1846	1854	1862	1870	1878	1886	1897	1905	1913	1921	1929	1937
224	1946	2004	2015	2044	2047	2070	2074	2126	2130	2147	2160	2171	2186	2319	2321
225	2328	2332	2334	2352	2390	2395									
226	2297	2301	2350												
227	808	1089	1096	1109	1111	1117	1130	1132	1138	1170	1206	1239	1273	1305	1341
228	1367	1374	1391	1393	1399	1419	1439	1458	1478	1500	1522	1540	1578	1703	1739
229	1760	1828	1831	1986	1982	1991	1993	2022	2029	2070	2037	2049	2102	2108	2117
230	2199	2256	2316	2326	2360	2378									
231	1024	1028	1032	1036	1665	1997	1999	2001	2013	2016	2017	2019	2039	2051	2054
232	2063	2064	2065	2066	2075	2076	2293	2372	2379						
233	1068	1086	1090	1093	1110	1114	1131	1135	1157	1159	1161	1163	1165	1169	1191
234	1193	1195	1197	1199	1203	1224	1226	1228	1230	1232	1236	1258	1260	1262	1264
235	1266	1270	1290	1292	1294	1296	1298	1302	1324	1326	1328	1330	1332	1336	1338
236	1346	1364	1368	1371	1392	1396	1416	1432	1436	1455	1471	1475	1492	1496	1513
237	1517	1519	1537	1563	1565	1572	1574	1658	1663	1735	1752	1777	1792	1804	2023
238	2042	2057	2059	2069	2073	2080	2082	2088	2090	2144	2154	2159	2168	2178	2023
239	2185	2187	2189	2191	2194	2196	2201	2203	2254	2264	2273	2303	2305	2307	2318
240	2322	2324	2327	2329	2331	2333	2389	2411							
241	2351	2357													
242	1027	1031	1035	1039											
243	1057	2311													
244	715														
245	807	1732	2036	2048											
246	1662	1754	1761	2046	2056	2061	2066	2072	2079	2084	2087	2092	2295	2364	2377
247	2398														
248	759	767	775	784	791	1045	1067	1070	1073	1098	1119	1140	1173	1207	1240
249	1274	1306	1342	1348	1351	1376	1401	1420	1440	1459	1479	1500	1523	1529	1541
250	1579	1587	1591	1595	1599	1603	1607	1611	1615	1619	1623	1627	1631	1633	1659
251	1717	1736	1781	1792	2171	2132	2219	2227	2236	2244	2342	2396	2417	1633	1659
252	801	805	1147	1152	1181	1186	1214	1219	1247	1253	1280	1295	1316	1319	1561
253	1651	1654	1655	1701	1727	1738	1748	1756	1763	1769	1771	1773	1775	1794	1795
254	1787	1794	1796	1799	1801	1804	1808	1809	1812	1816	1817	1820	1826	1829	1832
255	1836	1838	1843	1847	1848	1851	1855	1856	1859	1867	1864	1867	1871	1872	1875



	1879	1880	1883	1887	1888	1890	1892	1894	1898	1899	1902	1906	1907	1910	1914
	1915	1918	1922	1923	1926	1930	1931	1934	1938	1939	1942	1947	1948	1951	1957
	2021	2105	2109	2114	2118	2127	2138	2141	2149	2152	2162	2165	2173	2176	2209
	2387	2229	2239	2248	2251	2258	2263	2267	2272	2276	2290	2291	2292	2338	2354
MOV	799	800	806	1023	1043	1044	1047	1048	1050	1081	1083	1097	1104	1105	1118
	1125	1126	1139	1145	1146	1153	1154	1155	1156	1179	1180	1187	1188	1189	1190
	1212	1213	1220	1221	1222	1223	1245	1246	1254	1255	1256	1257	1278	1279	1286
	1287	1288	1289	1312	1314	1320	1321	1322	1323	1359	1361	1375	1386	1387	1400
	1406	1407	1408	1412	1425	1426	1427	1430	1431	1445	1446	1447	1451	1464	1465
	1466	1469	1470	1485	1486	1487	1490	1491	1506	1508	1509	1511	1512	1534	1535
	1550	1551	1552	1555	1557	1558	1559	1560	1562	1585	1586	1589	1590	1593	1594
	1597	1598	1601	1602	1605	1606	1609	1610	1613	1614	1617	1618	1621	1622	1625
	1626	1629	1630	1638	1641	1671	1676	1691	1692	1693	1694	1695	1696	1697	1698
	1699	1708	1709	1710	1711	1712	1713	1714	1715	1966	1967	1969	1970	1971	1972
	1973	1974	1975	1976	1977	1978	1979	1985	1987	1989	1990	1992	1994	1995	1996
	1998	2000	2005	2006	2007	2008	2009	2010	2011	2012	2019	2021	2024	2025	2027
	2028	2030	2032	2033	2034	2038	2040	2045	2052	2053	2062	2077	2085	2142	2143
	2153	2156	2166	2167	2177	2193	2200	2208	2252	2294	2302	2317	2335	2337	2341
	2347	2373	2374												
MOV8	1084	1106	1127	1148	1151	1182	1184	1185	1215	1218	1248	1250	1252	1281	1283
	1284	1313	1317	1318	1362	1388	1409	1428	1448	1467	1488	1507	1536	1549	2298
	2359														
NOP	1702	1834	2093	2094	2137	2365	2415								
RESET	1150	1217	1411	1450	1533										
ROL	2376	2381	2383	2385											
RTI	1642	1667	1677	1686	1741										
RTS	1040	1059	1678	1779	1953	1960	1981	2283	2336	2366	2391				
SUB	1053	1968	2055	2078	2086	2348									
SXT	2020														
TRAP	714														
TST	1088	1108	1366	1390	1716	1780	2026	2031	2043	2123	2340				
TSTB	1129	1639	2296	2300	2349	2353	2361								
WAIT	41														
.ABS	882														
.ASCII	802	1749	1757	1764	1770	1774	1786	1795	1800	1805	1813	1821	1827	1830	1833
	1837	1844	1852	1860	1868	1876	1884	1891	1895	1903	1911	1919	1927	1935	1943
	1952	1958	2098	2106	2110	2115	2119	2139	2150	2163	2174	2210	2222	2230	2240
	2249	2259	2268	2277	2339	2388	2404	2408	2414						
.END	418														
.REPT	1														
.TITLE	681														

ERRORS DETECTED: 0  
 DEFAULT GLOBALS GENERATED: 0

\*DZCBAB.DZCBAB.SEQ/SOL/CRF=DZCBAB.P11  
 RUN-TIME: 7 14 4 SECONDS  
 RUN-TIME RATIO: 83/26=3.1  
 CORE USED: 13% (25 PAGES)



THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

5720 S. UNIVERSITY AVE.

CHICAGO, ILL. 60637

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