

PDP 11

T17-4K SYSTEM EXERCISER
CZQKBHO

AH-9032H-MC
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IDENTIFICATION

PRODUCT CODE: AC-9031H-MC
 PRODUCT NAME: CZQKBH0 T17-4K SYSTEM EXERCISER
 THIS VERSION TEST DECTAPE UNIT 1 (NOT UNIT 0)
 DATE: 01-FEBRUARY-1978
 MAINTAINER: DIAGNOSTIC GROUP
 AUTHOR: JOHN HITTELL
 REVISED BY: W.F. KELICKER 25-FEB-74
 AL LOSCHAK 21-DEC-75
 BARRY SUSSMAN 01-OCT-77
 BILL SCHLITZKUS 01-FEB-78

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1. ABSTRACT

THIS PROGRAM IS A MEMORY EXPANDABLE INTERACTIVE BUS EXERCISER FOR A PAPER TAPE ORIENTED PDP-11. IT PERFORMS A TEST OF INSTRUCTIONS AND CONCURRENT OPERATIONS OF I/O EQUIPMENT SIMULTANEOUSLY. IT MAY ALSO PERFORM THE SAME OPERATION INDEPENDENTLY. THIS PROGRAM IS NOT TO BE CONSIDERED A TOTAL CHECK OF THE SYSTEM. IF AN ERROR IS DETECTED IN AN I/O DEVICE, IT WILL PROBABLY BE NECESSARY TO CORRECT THE MALFUNCTION WITH THE RESPECTIVE DIAGNOSTIC FOR THAT DEVICE.

IN THIS VERSION THE INTERRUPT SERVICE ROUTINE FOR THE DISKS, KW11L, PLUS THE STACK AND THE NPR DATA BUFFERS ARE RELOCATED TO THE CURRENT BANK.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP-11 STANDARD COMPUTER

2.1.1 OPTIONAL HARDWARE THAT THE PROGRAM WILL EXERCISE

MM11	UP TO 28KW OF MEMORY
RC11	DISK
RK11	DISK
RP11	DISK
RF11	DISK (256K)
TC11	DECTAPE-TRANSPORT ONE
KE11A	EXTENDED ARITHMETIC UNIT
KW11L	LINE CLOCK
PC11	HIGH SPEED READER/PUNCH
BL11	ASR33 OR ASR35 TELEPRINTER-LC11, VT05
LP11	LINE PRINTER
LS11	LINE PRINTER...SEE 5.2.11

2.2 STORAGE

2.2.1 PROGRAM STORAGE - THE ROUTINE USES
4K OF MEMORY

3. LOADING PROCEDURE

3.1 METHOD

PROCEDURE FOR NORMAL ABSOLUTE TAPES SHOULD BE FOLLOWED.

4. STARTING PROCEDURE

THIS PROGRAM HAS BEEN MODIFIED TO RUN WITH OR WITHOUT A CONSOLE PROCESSOR.

IF A CONSOLE MACHINE IS USED; THEN THE PROGRAM LOOKS AT THE HARDWARE SWITCH REGISTER.

IF A CONSOLE-LESS MACHINE IS USED; THEN THE PROGRAM AUTOMATICALLY LOOKS AT THE CONTENTS OF LOCATION SOFTSR (176) AS A SWITCH REGISTER.

IT'S THE RESPONSIBILITY OF THE OPERATOR TO SET UP THIS LOCATION PRIOR TO STARTING THE PROGRAM.

THE PROGRAM REQUIRES TWO BELLS ON THE TTY TO MAKE ONE TRUE PASS OF THE PROGRAM. THE FIRST BELL OCCURS AFTER ONE PASS OF THE INSTRUCTION TEST WITH THE TRACE BIT CLEARED. THE SECOND BELL MARKS THE END OF AN INSTRUCTION TEST PASS WITH THE TRACE BIT SET.

4.1 CONTROL SWITCH SETTING

STARTING AT SA 200 ALL SWITCHES SHOULD BE SET AS INDICATED.

4.2 STARTING ADDRESS OR ADDRESSES

(A) 200 = SR = 000777 TEST PROCESSOR ONLY-WITH CORE EXPANSION

(B) 200 = SR = 001777 TEST PROCESSOR ONLY-4K-INHIBIT
CORE EXPANSION

(C) 200 = SR = 002XXX TEST I/O ONLY

(D) 200 = SR = 000000 -CORE EXPAND AND TEST ALL AVAILABLE
I/O DEVICES

SW0 = 1 INHIBIT TTY OUTPUT

SW1 = 1 INHIBIT TTY INPUT

SW2 = 1 INHIBIT HSP

SW3 = 1 INHIBIT HSR

SW4 = 1 INHIBIT LINE CLOCK

SW5 = 1 INHIBIT RF11, RK11, RC11 AND RP11 DISK(S)

SW6 = 1 INHIBIT TC11 DECTAPE

SW7 = 1 INHIBIT LINE PRINTER --- IF LINE PRINTER IS USED,
MUST RESTART AT 502

IF EAE EXIST IT WILL BE AUTOMATICALLY SELECTED

4.3 PROGRAM AND/OR OPERATOR ACTION

LOAD PROGRAM INTO MEMORY.
SET SWITCH REGISTER TO STARTING ADDRESS.
LOAD ADDRESS.
SET SWITCHES TO INHIBIT NON EXISTANT DEVICES
PRESS START.
THE PROGRAM WILL LOOP AND
BELL WILL RING ONCE PER PASS OF THE PROGRAM.
A MINIMUM OF TWO PASSES SHOULD
ALWAYS BE RUN.

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

5.1.1 AT SA 200 ... THE INSTRUCTION AND LOGIC TEST. WITH ALL SWITCHES
DOWN THE PROGRAM WILL TEST ALL DEVICES AND PRINT OUT ON ERRORS
AND CONTINUE IN TEST. (BELL WILL RING AT COMPLETION OF A PASS)

5.1.2 SWITCH SETTINGS ARE

SW15 = 1 OR UP ... HALT ON ERROR
SW14 = 1 OR UP ... SCOPE LOOP
SW13 = 1 OR UP ... INHIBIT PRINTOUT
SW12 = 1 OR UP ... INHIBIT TRACE TRAPPING
SW11 = 1 OR UP ... INHIBIT ITERATION LOOP
SW10 = 1 OR UP ... INHIBIT PROCESSOR TEST
SW09 = 1 OR UP ... INHIBIT VARIABLE CORE EXPANSION
SW08 = 1 OR UP ... RESTART ON ERROR

5.1.3

5.2. SUBROUTINE ABSTRACTS

5.2.1 BEGIN SA 200

5.2.2 SCOPE

THIS SUBROUTINE CALL IS PLACED BETWEEN EACH SUBTEST IN THE
INSTRUCTION SECTION. IT RECORDS THE STARTING ADDRESS OF EACH
SUB-TEST AS IT IS BEING ENTERED.
IF A SCOPE LOOP IS REQUESTED WITH SW14=1; THEN
IT WILL JUMP TO THE START OF THE SUBTEST THAT THE SCOPE LOOP
IS REQUESTED FOR. IF SCOPE LOOP IS NOT REQUESTED, THERE WILL
BE EITHER A FIXED OR RANDOM NUMBER OF ITERATIONS ON THAT SUB-
TEST BEFORE THE NEXT SUBTEST IS ENTERED. SWITCH 11 ON A 1
INHIBITS ITERATION OF SUBTESTS.

5.2.3 HLT

IS A ROUTINE THAT PRINTS-OUT AN ADDRESS THAT TAGS THE FAILING TEST, THE STATUS REGISTER AT THE TIME OF THE FAILURE, AND THE PROCESSOR TEST BEING EXECUTED AT THE TIME OF FAILURE.

5.2.4 TRTRAP

THIS ROUTINE WILL ALLOW THE TRACE BIT TRAP TO BE SET AFTER FIRST LOOP OF THE PROGRAM. UNDER NORMAL TESTING THE TRACE BIT WILL BE SET ON ALTERNATE LOOPS OF THE PROGRAM. WHEN SET IT CAUSES A TRAP AFTER EACH INSTRUCTION. THE FIRST INSTRUCTION EXECUTED UPON TRAPPING IS AN "RTI" WHICH RETURNS TO THE INTERRUPTED SEQUENCE OF INSTRUCTION.

5.2.5 TRAPCATCHER

THIS IS A SERIES OF INSTRUCTIONS STARTING AT LOCATION 0, DESIGNED TO DETECT AND ISOLATE UNEXPECTED TRAPS AND INTERRUPTS TO THE TRAP AND INTERRUPT VECTOR AREA OF MEMORY.

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

IF A HALT OCCURS IN THE TRAP OR INTERRUPT VECTOR AREA, REGISTER SIX SHOULD BE EXAMINED TO DETERMINE ITS CONTENTS, THEN USE REGISTER SIX CONTENTS AS AN ADDRESS TO DETERMINE THE LOCATION WHERE THE PROGRAM WAS AT, WHEN THE INTERRUPT OR TRAP OCCURRED. (MEMORY AS SPECIFIED BY R6 CONTAINS THE PC OF THE INSTRUCTION FOLLOWING THE INSTRUCTION WHERE THE TRAP OCCURRED).

5.2.6 TTYINI (TTY INPUT)

THIS ROUTINE OPERATES IN THE INTERRUPT MODE AND CHECKS FOR A COUNT PATTERN IN THE READER OF THE TTY. THE ROUTINE WILL ACCEPT AN INFINITE NUMBER OF ZERO BYTES (BLANK TAPE). BUT THE FIRST BYTE THAT IS NOT A ZERO MUST BE A ONE AND ALL SEQUENTIAL BYTES MUST BE ONE GREATER. IF THE ROUTINE DETECTS AN ERROR IN THE COUNT PATTERN, IT CHECKS TO SEE IF IT IS A 207 (BELL). IF SO IT IS IGNORED, IF NOT A COMPARISON ERROR IS FLAGED.
WHEN TESTING THE TTY READER THE TAPE MUST HAVE A COUNT PATTERN AND BE LOCATED ON THE LEADER PORTION WHEN STARTING TEST.

5.2.7 TYOUT (TTY OUTPUT)

THIS IS A ROUTINE THAT OUTPUTS A COUNT PATTERN IN THE INTERRUPT MODE TO THE TELEPRINTER. IF A PAPER TAPE IS PUNCHED IT MAY HAVE 207'S (BELLS) IN IT. PUNCHED WHEN THE BELL FOR PASS COMPLETE RINGS.

5.2.8 RFSTART (RF-11 DISK)

THIS ROUTINE PERFORMS A WRITE AND A WRITE CHECK OF THE DISK. THE DATA THAT IS WRITTEN ON THE DISK IS PART OF TEST PROGRAM CODE THAT IS NEVER MODIFIED. THIS SEGMENT OF CORE IS WRITTEN IN CONTIGUOUS BLOCK THRU THE DISK MEMORY. AFTER THE TOTAL DISK(S) HAS BEEN WRITTEN, A WRITE CHECK IS USED TO VERIFY THAT THE DATA HAS BEEN WRITTEN CORRECTLY ON THE DISK. NOTE THAT NO "DATA" ARE USED IN EXERCISING THE DISK (DATA IS NOT TRANSFERRED INTO CORE). THE INTERRUPT SERVICE ROUTINE AND DATA BUFFER IS TRANSFERRED TO THE CURRENT BANK THAT INSTRUCTIONS ARE BEING EXECUTED IN.

5.2.9 FENDZ (TC11 FORWARD END ZONE)

FENDZ IS THE FIRST ADDRESS IN THE DECTAPE INTERRUPT VECTOR (214). THIS ROUTINE WILL READ, IN REVERSE, BLOCK NUMBERS UNTIL THE REVERSE END ZONE IS FOUND. AT THIS POINT THE INTERRUPT VECTOR AND COMMAND REGISTER ARE MODIFIED TO READ ALL BLOCK NUMBERS IN THE FORWARD DIRECTION. EACH BLOCK NUMBER READ IS COMPARED WITH THE EXPECTED BLOCK NUMBER COUNT AND MISCOMPARISONS REPORTED. WHEN EACH BLOCK IS FOUND (WITH THE EXCEPTION OF BLOCK 0) A BLOCK (400 WORDS) OF TEST DATA IS WRITTEN ONTO TAPE. AFTER ALL BLOCK NUMBERS HAVE BEEN READ THE TAPE IS DRIVEN INTO THE FORWARD END ZONE. HERE THE DIRECTION IS REVERSED AND ALL BLOCK NUMBERS ARE READ IN REVERSE, STARTING WITH BLOCK 1100(8) THROUGH BLOCK 1. THE DATA IS READ FROM TAPE. THE SAME BUFFER IS USED FOR BOTH READ AND WRITE OPERATIONS. IF THE DATA-BUFFER IS DESTROYED DURING A READ OPERATION IT MAY BE NECESSARY TO RELOAD THE PROGRAM.

5.2.10 LCLK (LINE CLOCK)

THIS TEST OF THE LINE CLOCK IS IN THE INTERRUPT MODE. IF OPERATING CORRECTLY THE SYSTEM I/O WILL RUN A FULL SPEED FOR 55 SECONDS THEN ALL I/O AT LEVEL SIX OR LESS WILL STALL FOR 5 SECONDS. THIS IS BASED ON 60 CYCLES AS THE LINE FREQUENCY.

5.2.11 LP1 (LINE PRINTER)

THIS ROUTINE OUTPUTS TO THE LINE PRINTER IN THE FLAG MODE WHILE FILLING THE BUFFER IN THE INTERRUPT MODE WHILE THE BUFFER IS BEING PRINTED. FOR 132 COLUMN PRINTER CHANGE LOCATION LP80 FROM 117 TO 203.

5.2.12 HSRINI (PC11 INPUT)

THIS ROUTINE OPERATES IN THE INTERRUPT MODE AND CHECKS FOR A COUNT PATTERN IN THE PC11 READER. THE ROUTINE WILL ACCEPT AN INFINITE NUMBER OF ZERO BYTES (BLANK TAPE). BUT THE FIRST BYTE THAT IS NOT A ZERO MUST BE A ONE AND ALL SEQUENTIAL BYTES MUST BE ONE GREATER. IF THE ROUTINE DETECTS AN ERROR IN THE COUNT PATTERN, A DATA ERROR IS FLAGED.
WHEN TESTING THE HSR READER THE TAPE MUST HAVE A COUNT PATTERN AND BE LOCATED ON THE LEADER PORTION WHEN STARTING TEST.

5.2.13 HPOUT (PC11 OUTPUT)

THIS IS A ROUTINE THAT OUTPUTS A COUNT PATTERN II. THE INTERRUPT MODE TO THE HIGH SPEED PUNCH.

5.2.14 RKSTART (RK-11 DISK)

THIS ROUTINE PERFORMS A WRITE AND A WRITE CHECK OF THE DISK. THE DATA THAT IS WRITTEN ON THE DISK IS PART OF TEST PROGRAM CODE THAT IS NEVER MODIFIED. THIS SEGMENT OF CORE IS WRITTEN IN CONTIGUOUS BLOCK THRU THE DISK MEMORY. AFTER THE TOTAL DISK HAS BEEN WRITTEN, A WRITE CHECK IS USED TO VERIFY THAT THE DATA HAS BEEN WRITTEN CORRECTLY ON THE DISK. NOTE THAT NO "DATI" ARE USED IN EXERCISING THE DISK (DATA IS NOT TRANSFERRED INTO CORE). THE INTERRUPT SERVICE ROUTINE AND DATA BUFFER ARE TRANSFERRED TO THE CURRENT BANK THAT INSTRUCTIONS ARE BEING EXECUTED IN.

5.2.15 RCSTART (RC-11 DISK)

THIS ROUTINE PERFORMS A WRITE AND A WRITE CHECK OF THE DISK. THE DATA THAT IS WRITTEN ON THE DISK IS PART OF TEST PROGRAM CODE THAT IS NEVER MODIFIED. THIS SEGMENT OF CORE IS WRITTEN IN CONTIGUOUS BLOCK THRU THE DISK MEMORY. AFTER THE TOTAL DISK(S) HAS BEEN WRITTEN, A WRITE CHECK IS USED TO VERIFY THAT THE DATA HAS BEEN WRITTEN CORRECTLY ON THE DISK. NOTE THAT NO "DATI" ARE USED IN EXERCISING THE DISK (DATA IS NOT TRANSFERRED INTO CORE). THE INTERRUPT SERVICE ROUTINE AND DATA BUFFER IS TRANSFERRED TO THE CURRENT BANK THAT INSTRUCTIONS ARE BEING EXECUTED IN.

5.2.16 RPSTART (RP-11 DISK)

THIS ROUTINE PERFORMS A WRITE AND A WRITE CHECK OF THE DISK. THE DATA THAT IS WRITTEN ON THE DISK IS PART OF TEST PROGRAM CODE THAT IS NEVER MODIFIED. THIS SEGMENT OF CORE IS WRITTEN IN CONTIGUOUS BLOCK THRU THE DISK MEMORY. AFTER THE TOTAL DISK(S) HAS BEEN WRITTEN, A WRITE CHECK IS USED TO VERIFY THAT THE DATA HAS BEEN WRITTEN CORRECTLY ON THE DISK. NOTE THAT NO "DATI" ARE USED IN EXERCISING THE DISK (DATA IS NOT TRANSFERRED INTO CORE). THE INTERRUPT SERVICE ROUTINE AND DATA BUFFER IS TRANSFERRED TO THE CURRENT BANK THAT INSTRUCTIONS ARE BEING EXECUTED IN. (FOR THE RPO3 THE ISR MUST BE MOTIFIED TO TEST THE FULL SURFACE)

5.2.17 CORE EXPANSION (DET1)

THIS ROUTINE IS CONTROLLED BY SWITCH 9. THE PROCESSOR MAINLINE CODE WILL BE EITHER 4KW OR EXPANDS TO THE MAXIMUM CORE THAT IS AVAILABLE. THE ROUTINE DETERMINES THE MAXIMUM CORE SIZE BY DOING A "DATO" TO A LOCATION IN EACH BANK. IF THE BANK DOES NOT EXIST, A TIME OUT WILL OCCUR. WHEN CORE SIZE IS DETERMINED AN IMAGE OF BANK 0 IS TRANSFERRED TO EACH EXISTING BANK. THEN THE CODE IN EACH BANK IS MODIFIED SO THAT, WHEN THE LAST SUB TEST IN A MEMORY BANK IS EXECUTED THERE IS A JUMP INSERTED TO THE FIRST SUB TEST OF THE NEXT BANK. WHEN IN THE LAST BANK THE MODIFIED INSTRUCTION WILL TRANSFER YOU TO BANK 0.

THE LISTING SHOWS ONLY THE CODE OF BANK ZERO. WHEN AN ERROR OCCURS THAT IS NOT IN BANK ZERO, IGNORE THE BANK BITS OF THE PRINT OUT AND USE THE LISTING FOR BANK ZERO.

5.3 PROGRAM AND/OR OPERATOR ACTION

- 5.3.1 LOADING AND STARTING AT 200 WITH ALL SWITCHES DOWN IS WORSE CASE TESTING. IF AN ERROR IS DETECTED HERE, THERE WILL BE A PRINTOUT. WHEN AN ERROR IS DETECTED AND IT IS NECESSARY TO SCOPE ON IT, SET SW15 TO HALT ON ERROR, THEN SW14 TO LOOP ON ERROR, THEN SW13 TO DELETE PRINTOUTS. THEN THE MACHINE MUST BE CONTINUED.

6. ERRORS

6.1 ERROR PRINTOUT

ARE IN A THREE WORD FORMAT, THE 1ST IS PC+2 OF THE DETECTED ERROR, THE 2ND, IS THE STATUS REGISTER. THE 3RD IS THE PROCESSOR TEST AT THE TIME OF THE ERROR (CONTENTS OF RETURN). REFER TO THE LISTING FOR DETAILED INFORMATION.

6.2 ERROR RECOVERY

FOR TTY READER AND HSR, TAPE MUST BE REPOSITIONED TO LEADER BEFORE RESTARTING TEST. IF YOU DESIRE TO HAVE THE PROGRAM RESTART ON AN ERROR MAKE SWITCH REGISTER BIT8 AN ONE.

7. RESTRICTIONS

7.1 STARTING RESTRICTION

IF LINE PRINTER IS USED RESTART ADDRESS MUST BE 400 FOR HSR AND TTY READER, TAPE MUST BE ON LEADER.

7.2 OPERATIONAL RESTRICTION

IF OPERATION UNDER MONITORS, THE CONSOLE DEVICE, LINE PRINTERS
AND THE SYSTEM DEVICE ARE NOT TESTED.

8.

MISCELLANEOUS

TRACKING DOWN UNUSUAL FAILURES

FAILURES THAT MAY OCCUR BECAUSE OF A FALSE ENTRY INTO A SUBTEST, OR A FAILURE IN A CONTROL ROUTINE RATHER THAN A SUBTEST. DETECTION OF THESE MAY BE ACCOMPLISHED BY SEVERAL PROCEDURES. THERE IS A LOCATION CALLED "RETURN" THAT RECORDS THE LAST SUCCESSFUL SUBTEST COMPLETED. THERE IS ANOTHER LOCATION CALLED "SCOPE" THAT SHOWS HOW MANY TIMES THE SUBTEST HAS BEEN EXECUTED. THERE IS ANOTHER LOCATION CALLED "ICOUNT" THAT CONTAINS THE ITERATION COMPARISON VALUE. THE STACK "R6" SHOULD BE EQUAL TO "BUFF" WHEN THE FIRST INSTRUCTION OF THE SUBTEST IS ENTERED. TO REDUCE INSTRUCTION EXECUTION IN CONFUSING SITUATION, THE "SCOPE" LOCATION FOLLOWING THE SUBTEST SHOULD BE CHANGED TO A BRANCH TO THE FIRST INSTRUCTION OF THE SUBTEST (THE FIRST LOCATION FOLLOWING THE PREVIOUS SCOPE LOCATION) AND THE "HLT" LOCATION MAY BE REPLACED WITH A "NOP".

A USER MAY ADD A UNIQUE ROUTINE TO THIS TEST TO EXERCISE A NON DEC OPTION, FOR CHECKING BUS INTERACTION WITH HIS EXISTING DEC OPTIONS.

FOR TROUBLE FREE INTERACTION THERE ARE A FEW GROUND RULES THAT SHOULD BE FOLLOWED.

1. USE NO REGISTERS.
2. THE ROUTINE SHOULD BE STAND ALONE.
3. THE EXISTING "HLT" SHOULD BE USED FOR ERROR DETECTION.
4. CODE IN THE PRIMING AREA SHOULD SET INTERRUPT ENABLE, INITIALIZE DATA AND RAISE A FLAG IF NECESSARY.
5. THE INTERRUPT VECTOR STATUS WORD SHOULD CONTAIN THE PRIORITY LEVEL OF THE DEVICE.
6. THE INTERRUPT VECTOR SHOULD POINT TO YOUR STAND ALONE ROUTINE.
7. THE STAND ALONE ROUTINE WHEN COMPLETING ALL HOUSE KEEPING OPERATION AND DATA COMPARISONS SHOULD THEN EXECUTE A "RTI" TO RETURN TO MAINLINE CODE.

INSERTION OF USER I/O ROUTINES

1. MAY BE INSERTED IN BANK ZERO WHERE I/O ROUTINES EXIST. FOR DEVICES THAT THE USER DOES NOT HAVE, IF CORE EXPANSION

IS TO BE INHIBITED, THE USER MAY OVERLAY THE EXPANSION CODE.

2. IF THE USER HAS MORE THAN 4KW OF CORE, THE ROUTINE MAY BE PLACED IN ANY OF THE EXTRA BANKS AND CORE EXPANSION BE INHIBITED.
3. IN THE PRIMING CODE SEVERAL INSTRUCTIONS BEFORE THE TAG "MAINLINE" THERE IS AN INSTRUCTION JSR %7,3#USER. THE SECOND WORD OF THAT INSTRUCTION IS AN ABSOLUTE ADDRESS THAT THE USER MAY CHANGE TO POINT TO HIS ROUTINE. THE USER SHOULD EXIT HIS PRIMING ROUTINE WITH A RTS %7 INSTRUCTION.

8.1 EXECUTION TIME

EXECUTION VARIES WITH NUMBER OF DEVICES, FOR 4KW SYSTEMS WITH TTY AND HSR ONLY, ABOUT 1 MINUTE WITH THE TRACE BIT CLEARED ABOUT 1.5 MINUTES WITH THE TRACE BIT SET.

9. PROGRAM DESCRIPTION

THE DESIGN OF THIS SYSTEM EXERCISER IS PREDICATED UPON IT BEING PRIMARILY INTENDED FOR A PAPER TAPE SYSTEM WITH FOUR KW OF CORE, AND THAT IT BE EASY TO RUN AND UNDERSTAND. ALSO, THAT IT MAY BE MODIFIED EASILY TO EXERCISE A WIDE MULTITUDE OF PERIPHERALS, INCLUDING THOSE OF THE CUSTOMER'S OWN DESIGN. THE CONCEPT IS TO HAVE ALL DESIRED I/O RUNNING CONCURRENTLY WITH THE PROCESSOR TEST FOR BACKGROUND. THE DECISION WHICH I/O DEVICES TO BE USED IS MADE AT START UP TIME. THE DATA PATTERNS USED IN THE EXERCISER ARE FIXED. FOR MECHANICAL DEVICES, SUCH AS THE TTY READER, THERE IS NO AUTOMATIC RE-SYNCHRONIZATION IF IT'S TAPE BECOMES OUT OF PHASE WITH THE DATA. IT WILL BECOME NECESSARY TO STOP THE EXERCISER AND MANUALLY RESYNCHRONIZE THE TAPE AND RESTART THE EXERCISER.

THERE IS NO MONITOR IN THE CONVENTIONAL SENSE. EACH DEVICE THAT IS TO BE EXERCISED HAS IT'S OWN STAND ALONE ROUTINE THAT OPERATES IN THE INTERRUPT MODE. THESE ROUTINES NEED NO SUPERVISION OR MONITORING AFTER THEY ARE INITIATED. THERE IS A PRIMER AREA THAT CHECKS THE SWITCH REGISTER TO SEE WHAT DEVICES ARE TO BE INITIATED. THE PRIMER AREA SETS THE INTERRUPT ENABLE BIT IN THE DEVICE STATUS REGISTER, INITIALIZES THE DATA PATTERN AND INITIATES AN OPERATION TO RAISE DATA FLAGS ON DEVICES THAT CAN NOT INITIATE THEM THEMSELVES. THEN, THE PRIMER JUMPS TO THE PROCESSOR TEST WHERE THE INDIVIDUAL DEVICES ARE SERVICED AT THE INTERRUPT RATE.

THE INSTRUCTION EXERCISER IS A STRAIGHT LINE TEST OF INSTRUCTIONS. THE SEQUENCE IN WHICH THEY ARE EXECUTED IS THE SAME SEQUENCE IN WHICH THEY ARE

SHOWN IN THE LISTING. EACH AREA OF CODE FROM "SCOPE TO SCOPE" IS AN INDIVIDUAL SUB-TEST. WITH SWITCH 11 UP THE SUB-TEST IS EXECUTED ONE TIME AND THEN THE NEXT SUB-TEST IS EXECUTED, AND SO ON TILL ALL SUB-TESTS ARE EXECUTED. HOWEVER IF SWITCH 11 IS DOWN THE SUB-TEST WILL BE EXECUTED SOME "N" NUMBER OF TIMES BEFORE ENTERING THE NEXT SUB-TEST. IF SWITCH 14 IS UP YOU WILL NEVER LEAVE THE CURRENT SUB-TEST YOU ARE IN. THIS USE IS INTENDED FOR TROUBLE SHOOTING A MALFUNCTION IN A SUB-TEST. THE FIRST GROUP OF SUB-TESTS ARE THE BINARYS AND UNARYS. THOSE INSTRUCTIONS ARE TESTED IN THE INDEX MODE: SOURCE ONLY, DESTINATION ONLY, THEN BOTH SOURCE AND DESTINATION. THE SAME INSTRUCTIONS ARE THEN TESTED USING THE IMMEDIATE MODE INDIRECT. THESE MODES ARE TESTED AGAINST OTHER MODES: WHICH MAY USE A REGISTER OR MEMORY LOCATION. THESE WILL BE SWAPPED BETWEEN SOURCE AND DESTINATION.

AFTER THE MODES AND INSTRUCTION HAVE BEEN PROVEN IN THE WORD MODE, THEY ARE THEN TESTED IN THE BYTE MODE. OTHER TESTING IS ALSO DONE WHERE THE "JSR" INSTRUCTION IS TESTED IN NESTED COMBINATIONS. ALL COMBINATIONS OF NUMBERS ARE TESTED USING THE COMPARE, ROTATE, ADD AND COMPLIMENT INSTRUCTIONS. THERE IS ALSO A MINIMUM TEST OF POWER FAIL AND AUTO RECOVERY, WHICH IS NOT ENABLED UNTIL AFTER THE FIRST PASS OF THE PROGRAM. THE REASON FOR EXECUTING ALL INSTRUCTIONS WITH THE TRACE BIT SET IS TO TAKE US INTO SERVICE AT THE END OF EACH INSTRUCTION.

THE CORE LAYOUT IS BROKEN INTO FIVE DISTINCT PARTS:

- (1) THE TRAP CATCHER,
- (2) THE SET UP AND I/O PRIMER AREA AND I/O TEST ROUTINES
- (3) THE PROCESSOR TESTS AND
- (4) CONTROL AND UTILITY ROUTINES.
- (5) CORE DETECTOR AND EXPANSION ROUTINE.

10. LISTING

11. FLOW CHART(S)
.ENDR
.ENABLE ABS

;PDP11 PRELIMINARY SYSTEM TEST --- TTY-PC11-LP11,RF11,TC11,KW11,RK11,RC11,RP11 AND KE11
;TEST SIMULTANEOUS RUNNING OF I/O, WITH PROCESSOR INSTRUCTION TEST AND WITH
;WITH TRACE BIT ENABLED TO BE CONSIDER MAINLINE CODE
NOP=242 ;SYSTEM NULL OPERATION
HLT=EMT ;TRAP USED FOR ERROR PRINTOUT
SCOPE=TRAP ;TRAP USED SCOPE LOOP AND ITERATION OF SUB PROBLEMS
CC=177776

000240
104000
104400
177776

MO1

SEQ 0012

601		016104	TDSR=ICSR	
602		017004	BUFF=FIN	
603	000014	000000	R100=%0	
604	000016	000001	R101=%1	
605		000002	RSR=%2	
606	000024	176000	RKWORDCT=-2000	
607	000026	176000	RPWORDCT=-2000	
608		176040	RCWORDCT=-2000+40	
609	000030	176040	RFWORDCT=-2000+40	
610	000032	000000	XX=0	
611		000000	.=0	
612	000034	000100	.REPT 100	
613			.+2	:TRAP ENTRANCE
614			HALT	:TRAPPED TO PREVIOUS LOCATION
615	000046		.ENDR	
616			.LIST SEQ,ME	
617	000052		.=14	
618			.+2	
619			HALT	:FALSE TRACE TRAP
620			.=24	
621			PFAIL	
622			340	
623			.=30	
624			PRINT	:FOR HALT TRAPS
625			340	:HIGHEST PRIORITY
626			.=34	
627			SCOPEC	:USER TRAP
628			0	
629			.=46	
630			LOGICA	:RETURN TO MONITOR ADDRESS
631			.=52	
632			040000	:EXECUTION TIME IS MEMORY SIZE DEPENDENT

```

; (R6) IS THE STACK POINTER
; ((R6)) IS THE PC+2 OF LOCATION WHERE THE TRAP ORIGINATED
; FOR NORMAL OPERATION RUN WITH ALL SWITCHES DOWN
; SR 15=1 OR UP---HALT ON ERROR
; SR 14=1 OR UP---SCOPE LOOP
; SR 13=1 OR UP---INHIBIT PRINT OUT
; SR 12=1 OR UP---INHIBIT TRACE TRAPPING
; SR 11=1 OR UP---INHIBIT SUB-PROBLEM ITERATION
; SR 10=1 OR UP---INHIBIT PROCESSOR TEST
; SR 09=1 OR UP INHIBIT VARIABLE CORE EXPANSION
; SR 08=1 OR UP RESTART ON ERROR
; SPECIAL DELETE SWITCHES-SET RESPECTIVE SWITCH TO A 1 TO INHIBIT INITIATION OF DEVICE
; SW 0=1 INHIBIT TTY OUTPUT
; SW 1=1 INHIBIT TTY INPUT
; SW 2=1 INHIBIT HSP
; SW 3=1 INHIBIT HSR
; SW 4=1 INHIBIT LINE CLOCK
; SW 5=1 INHIBIT RC, RF, RK, RP DISKS
; SW 6=1 INHIBIT TC11 DECTAPE
; SW 7=1 INHIBIT LINE PRINTER --- IF LINE PRINTER IS USED, MUST RESTART AT 502
; IF EAE EXIST IT WILL BE AUTOMATICALLY SELECTED.

```



```

642      ;PDP11 SIMULTANEOUS I/O
643      . = 60
644      000060 001544      ITYINR      ;TTY IN INTERRUPT VECTOR
645      000062 000200      200
646      000064 001620      TYOUTR      ;TTY OUT INTERRUPT VECTOR
647      000066 000200      200
648      000070 001646      HSRINR      ;HSR INTERRUPT VECTOR
649      000072 000200      200
650      000074 001740      HPOUTR      ;HSP INTERRUPT VECTOR
651      000076 000200      200
652      000100 000100      . = 100
653      000102 002044      LK3
654      000102 000300      300      ;INTERRUPT VECTOR LINE CLOCK
655      000004 000004      . = 4      ;LEVEL SIX PRIORITY
656      000006 017500      .PARSRV
657      000006 000340      340      ;MEMORY PARITY
658
659      000174 000174      . = 174
660      000174 177570      SRPTR: 177570
661      000176 000000      SOFTSR: 000000
662      000200 000200      . = 200
663      000200 000137      JMP          J#START
664      000204 000204      . = 204
665      000204 002632      IRF
666      000206 000240      240      ;RF11 DISK
667      000210 002534      IRC
668      000212 000240      240      ;LEVEL 5
669
670      000214 000214      . = 214
671      000214 002716      FENDZ
672      000216 000300      300      ;DEC TAPE
673      000220 000220      . = 220      ;LEVEL 6
674      000220 002344      IRK
675      000222 000240      240      ;RK DISK
676
677      000254 000254      . = 254
678      000254 002450      IRP
679      000256 000240      240      ;RP DISK
680
681      STATUS=177776
682      000260 177560      TRCSR: 177560
683      000262 177562      TRDR: 177562
684      000264 177564      TTCSR: 177564
685      000266 177566      TTDBR: 177566
686      000270 177550      HRCR: 177550
687      000272 177552      HRDBR: 177552
688      000274 177554      HPCR: 177554
689      000276 177556      HPDBR: 177556
690      000300 177546      LKCSR: 177546
691      000302 177514      LPCSR: 177514
692      000304 177516      LPDBR: 177516
693      000306 177470      RFDAR: 177470
694      000310 177466      RFDAR: 177466
695      000312 177462      RFWC: 177462
696      000314 177464      RFCAR: 177464
697      000316 177460      RFCR: 177460

```

```

;DISK ADDRESS AND ERROR
;DISK ADDRESS REGISTER
;WORD COUNT REGISTER
;CURRENT ADDRESS REGISTER
;STATUS REGISTER

```

698	000320	177461	RFCSRH:	177461					
699	000322	177442	RCDAR:	177442					:HIGH BYTE ADDRESS OR CSR
700	000324	177450	RCWC:	177450					:DISK ADDRESS REGISTER
701	000326	177452	RCBAR:	177452					:WORD COUNT REGISTER
702	000330	177446	RCCSR:	177446					:CURRENT ADDRESS REGISTER
703	000332	177447	RCCSRH:	177447					:STATUS REGISTER
704	000334	177413	RKDAH:	177413					:HIGH BYTE ADDRESS OR CSR
705	000336	177412	RKDAE:	177412					:HIGH BYTE OF DISK ADDRESS
706	000340	177406	RKWC:	177406					:DISK ADDRESS REGISTER
707	000342	177410	RKBAR:	177410					:WORD COUNT REGISTER
708	000344	177404	RKCSR:	177404					:CURRENT ADDRESS REGISTER
709	000346	177405	RKCSRH:	177405					:STATUS REGISTER
710	000350	177304	MQ:	177304					:HIGH BYTE ADDRESS OR CSR
711	000352	177302	AC:	177302					:EAE LOCATIONS
712	000354	177310	SC:	177310					
713	000356	177311	SRE:	177311					
714	000360	177306	MUL:	177306					
715	000362	177300	DIV:	177300					
716	000364	177312	NOR:	177312					
717	000366	177314	LSH:	177314					
718	000370	177316	ASH:	177316					
719									
720									
721		177340	:DECTAPE ADDRESSES						
722	000372	177342	TC=177340						
723	000374	177340	TCCM:	TC+2					:CONTROL AND FUNCTION
724	000376	177350	TCST:	TC					:GENERAL STATUS
725	000400	000440	TCDT:	TC+10					
726	000402	177344		BR	START				:DATA
727	000404	177346	TCWC:	TC+4					:WORD COUNT
728	000406	000214	TCBA:	TC+6					:BUS ADDRESS
729	000410	176722	TCIV:	214					:DECTAPE INTERRUPT VECTOR
730	000412	176725	RPCA:	176722					:CYLINDER ADDRESS RP11 DISK
731	000414	176724	RPDAH:	176725					:HIGH BYTE OF DISK ADDRESS
732	000416	176710	RPDAE:	176724					:DISK ADDRESS
733	000420	176724	RPDSR:	176710					:DRIVE STATUS REGISTER
734	000422	176716	RPDAR:	176724					:DISK ADDRESS REGISTER
735	000424	176720	RPWC:	176716					:WORD COUNT REGISTER
736	000426	176714	RPBAR:	176720					:CURRENT ADDRESS REGISTER
737	000430	176715	RPCSR:	176714					:STATUS REGISTER
738	000432	000000	RPCSRH:	176715					:HIGH BYTE ADDRESS OR CSR
739			RPFUNCTION:	0					:DISK COMMAND
740			:THIS ROUTINE CHECKS THE READ DATA BUFFER TC11						
741	000434	010146	:BY DOING A CHECK SUM ON THE DATA						
742	000436	010346	TC1:	MOV	%1,-(6)				:SAVE THESE ON THE STACK
743	000440	005003		MOV	%3,-(6)				
744	000442	012701		CLR	%3				:SUM OF DATA
745	000446	062103		MOV	#TCRBUF,%1				:ADDRESS OF READ BUFFER
746	000450	062103	TC2:	ADD	(1)+,%3				:EVEN ADD
747	000452	001775		ADD	(1)+,%3				:ODD ADD -2'S COMPLIMENT
748	000454	020127		BEG	TC2				
749	000460	101001		CMP	%1,#TCRBUF+1000				:AT END OF BUFFER?
750	000462	104000		BHI	.+4				:YES BRANCH
751	000464	012603		HLT					:DATA ERROR
752	000466	012601		MOV	(6)+,%3				:RESTORE THE REGISTERS
753	000470	000207		MOV	(6)+,%1				
				RTS	%7				:EXIT


```

754 000472 012767 000240 014254 NOEAE: MOV      #240,EAESRT      ;BRANCH AROUND EAE ROUTINE
755 000500 000002                      RTI                      ;JUMP OVER EAE SECTION
756
757      ;START UP FOR MINI MONITOR
758      ;RESTART HERE IF LINE PRINTER WAS ENABLED
759
760 000502 012767 016526 177314 START:  MOV      #PFHIL,24      ;SET POWER FAIL VECTOR
761 000510 012706 017004          MOV      #BUFF,%6      ;SET UP STACK
762 000514 012767 000546 177262          MOV      #15,4      ;SET UP TIME OUT VECTOR
763 000522 023737 000042 000046          CMP      @#42, @#46      ;UNDER ACT11 AUTO MODE?
764 000530 001403          BEQ      3$      ;YES-SKIP TITLE PRINT-OUT
765 000532 004767 016750          JSR      %7, TYPE      ;PRINT TITLE
766 000536 017546          MSG
767 000540 005777 177430          3$:   TST      @SRPTR      ;TRY TO REFERENCE THE
768                                ;HARDWARE SWITCH REGISTER
769 000544 000404          BR      2$      ;BRANCH IF NO TII- OUT TRAP OCCURS
770 000546 012767 000176 177420 1$:   MOV      #SOFTSR,SRPTR      ;CHANGE THE SWITCH REGISTER POINTER
771                                ;TO POINT TO A SOFTWARE SWITCH REGISTER
772 000554 022626          CMP      (6)+,(6)+      ;RESTORE THE STACK
773 000556 012767 000006 177220 2$:   MOV      #6,4      ;RESTORE TIME OUT VECTOR
774 000564 017767 177404 000746          MOV      @SRPTR,REG1      ;MOV SR TO REGISTER
775 000572 005737 016612          TST      @SAVR6      ;SET ON POWER FAIL
776 000576 001403          BEQ      ESTART
777 000600 005037 016612          CLR      @SAVR6
778 000604 104000          HLT
779 000606 005067 015650          ESTART: CLR      ICOUNT      ;A POWER FAIL OCCURRED
780 000612 012706 017004          MOV      #BUFF,%6      ;SET UP STACK
781 000616 012767 000660 015642          MOV      #START2,RETURN
782 000624 005067 015634          CLR      SCOPEF
783 000630 012767 000340 177140          MOV      #340,STATUS      ;LOCK OUT INTERRUPTS
784 000636 005067 014742          CLR      PRFLAG      ;PRINT ROUTINE BUSY
785 000642 016702 000672          MOV      REG1,RSR      ;SAVE SWITCHES
786 000646 012700 000100          MOV      #100,R100      ;INTERRUPT ENABLE
787 000652 012701 000101          MOV      #101,R101      ;INTERRUPT ENABLE AND GO
788 000656 104400          SCOPE
789 000660 050077 177374          START2: BIS      R100,@TRCSR
790 000664 000005          RESET
791 000666 030077 177366          BIT      R100,@TRCSR      ;INTERRUPT ENABLE
792 000672 001401          BEQ      .+4
793 000674 104000          HLT      ;RESET DID NOT CLEAR INTERRUPT ENABLE
794 000676 104400          SCOPE
795      ;DOES "RESET" ON THE BUS LAST TOO LONG
796 000700 012706 017004          MOV      #BUFF,%6      ;SET UP STACK
797 000704 000005          RESET
798 000706 050077 177352          BIS      R100,@TTCSR      ;SET A BIT
799 000712 030077 177346          BIT      R100,@TTCSR      ;IS IT SET
800 000716 001001          BNE      .+4
801 000720 104000          HLT      ;RESET IS ON BUS TOO LONG
802 000722 005077 177336          CLR      @TTCSR
803 000726 104400          SCOPE
804 000730 050077 177330          BIS      R100,@TTCSR
805 000734 005077 177324          CLR      @TTCSR      ;IF BUS HANG, CHECK NO SACK TIMEOUT
806 000740 104400          SCOPE
807 000742 000005          RESET
808 000744 012767 004440 015514          MOV      #BEGIN,RETURN
809 000752 012737 000472 000004          MOV      #NOEAE,@#4      ;TEST FOR EAE

```


810	000760	005777	177364		TST	3M0			
811	000764	012767	001542	177012	MOV	RTIA,4			:TRAP IF NONEXISTANT
812	000772	012767	000340		MOV	340,6			:SET UP FOR NON-EXISTANT I/O
813	001000	012767	000001	000610	MOV	RTIA,6			:KEEP NEW PSW AT 340
814	001006	005067	000632		CLR	DATA1			:BASE DATA FOR TTY READER OR KEYBOARD
815	001012	012767	000001	000700	MOV	DATA2			:BASE DATA FOR TTY PUNCH OR TELEPRINTER
816	001020	005067	000770		CLR	DATA3			:BASE DATA FOR HSR
817	001024	012706	017004		CLR	DATA4			:BASE DATA FOR HSP
818	001030	005067	000764		MOV	BUFF,%6			
819	001034	012767	000340	176734	CLR	DELAY			:FOR READER STALL - HSR -
820	001042	030227	000001		MOV	340,STATUS			:LOCK OUT INTERRUPTS
821	001046	001002			BIT	RSR,#1			
822	001050	050077	177210		BNE	ST1			
823	001054	030227	000002		BIS	R100,RTTCSR			:TTY OUT
824	001060	001002		ST1:	BIT	RSR,#2			
825	001062	050177	177172		BNE	ST2			
826	001066	005777	177202		BIS	R101,RTTCSR			:TTY IN
827	001072	100405		ST2:	TST	3HPCSR			:TEST FOR OUT OF TAPE
828	001074	030227	000004		BMI	ST3			
829	001100	001002			BIT	RSR,#4			
830	001102	050077	177166		BNE	ST3			
831	001106	005777	177156		BIS	R100,3HPCSR			:HSP
832	001112	100412		ST3:	TST	3HRCR			:TEST FOR OUT OF TAPE
833	001114	000402			BMI	ST4			
834	001116	017440			BR	ST3A			:RESERVED FOR OVERLAYS
835	001120	017440			DET3				:1020 GTP OVER LAY
836	001122	030227	000010		DET3				:1022 GTP OVER LAY
837	001126	001004		ST3A:	BIT	RSR,#10			
838	001130	010067	000664		BNE	ST4			
839	001134	050177	177130		MOV	R100,DELAY			:FOR STALL HSR
840	001140	030227	000020		BIS	R101,3HRCR			:HSR
841	001144	001004		ST4:	BIT	RSR,#20			
842	001146	005067	000766		BNE	ST5			
843	001152	050077	177122		CLR	TIME			
844	001156	030227	000040		BIS	R100,3LKCSR			:LINE CLOCK 50 OR 60 CYCLES
845	001162	001053		ST5:	BIT	RSR,#40			
846	001164	012767	001226	176612	BNE	ST6			
847	001172	105777	177230		MOV	STSA,4			
848	001176	100375			TSTB	3RPCR			:WAIT FOR CONTROLLER READY
849	001200	012777	000015	177220	BPL	-4			
850	001206	105777	177214		MOV	15,3RPCR			:RESET DRIVE
851	001212	100375			TSTB	3RPCR			:WAIT FOR CONTROLLER READY
852	001214	005777	177176		BPL	-4			
853	001220	100375			TST	3RPDSR			:WAIT FOR ACCESS READY
854	001222	005077	177170		BPL	-4			
855	001226	012767	001542	176550	CLR	3RPDSR			:CLR ATTENTION
856	001234	012777	000037	177060	MOV	RTIA,4			
857	001242	012767	043503	001432	MOV	37,3RCDAR			
858	001250	012767	043503	001314	MOV	43503,RFFUNCTION			:WRITE CHECK/WRITE RF
859	001256	012767	043503	001122	MOV	43503,RCFUNCTION			
860	001264	012767	043503	177140	MOV	43503,RKFUNCTION			
861	001272	110077	177020		MOV	43503,RPFUNCTION			
862	001276	110077	177042		MOVB	R100,3AFCSR			:TELL DISK TO READ OR WRITE
863	001302	110077	177022		MOVB	R100,3AKCSR			
864	001306	110077	177114		MOVB	R100,3ACCSR			
865	001312	030200		ST6:	MOVB	R100,3RPCR			
					BIT	RSR,R100			:TEST FOR DECTAPE

```

866 001314 001011 BNE ST7
867 001316 012767 002706 001370 MOV #TCFIRST,TCXPE ;FIRST BLOCK SHOULD BE ZERO
868 001324 012777 002716 177054 MOV #FENDZ,TCIV ;GO TO END ZONE ON INTERRUPT
869 001332 012777 004503 177032 MOV #R+IE+AB+DO,ATCCM ;MOVE REVERSE
870 001340 105702 ST7: TSTB RSR ;LINE PRINTER
871 001342 100427 BMI STB ;DON'T CHANGE 200
872 001344 012767 001422 176432 MOV #STB.4 ;RESET FOR START OF LINE PATTERN
873 001352 012767 000137 000730 MOV #137,SOLPAT ;LINE COUNT
874 001360 016767 000616 000724 MOV LP6+4,CLINCT
875 001366 012767 000040 000712 MOV #40,CURPAT ;LINE FEED TO POSITION BUFFER
876 001374 012777 000014 176702 MOV #14,ALPOBR ;INTERRUPT VECTOR
877 001402 012737 002166 000200 MOV #LPINTR,200 ;PROCESSOR LEVEL 4
878 001410 012737 000200 000202 MOV #200,202 ;INTERRUPT ENABLE
879 001416 010077 176660 MOV R100,ALPCSR ;NO "T" BIT FIRST PASS
880 001422 005037 015572 STB: CLR #TRPB
881 001426 005767 176410 ;IF OPERATION WITH DIAGNOSTIC PACKAGE OR ACT11
882 001432 001417 TST 42
883 001434 012767 001542 176342 BEQ STBA ;BRANCH IF NO MONITOR
884 001442 005077 176634 MOV #RTIA.4
885 001446 005077 176606 CLR ALPCSR ;NO LINE PRINTER WITH MONITOR
886 001452 005077 176606 CLR ATRCR ;NO LSR WITH MONITOR
887 001456 122767 000002 176355 CLR ATTCR ;NO CONSOLE TEST WITH MONITOR
888 001464 001002 CMPB #2 41 ;IS IT RKDP
889 001466 005077 176652 BNE STBA
890 001472 004737 017006 STBA: JSR #RKCSR ;YES DON'T TEST RK DISK
891 001476 004767 015306 JSR %7,200USER ;FOR USER I/O PROGRAM
892 001502 005067 176300 CLR %7,DET1 ;CHECK FOR CORE EXPANSION
893 001506 012767 000006 176270 MOV #6.4 ;HALT FOR BUS ERROR
894 001514 005067 176256 CLR STATUS ;FOR USER I/O PROGRAM
895 001520 000401 BR .+4 ;ALLOW INTERRUPTS
896 001522 000001 MAINLINE: WAIT ;WAIT HERE FOR INTERRUPTS
897 001524 037727 176444 002000 BIT #SRPTR,2000 ;INHIBIT PROCESSOR TEST
898 001532 001373 BNE MAINLINE
899 001534 000167 002700 JMP BEGIN
900 001540 000000 REG1: 0 ;STATUS OF SELECTED DEVICES
901 001542 000002 RTIA: RTI ;AN RTI FOR NON EXISTANT I/O
902
903
904
905
906
907
908 ;TTY RECEIVER VALUES 0 TO 377
909 001544 105777 176510 TTYINR: TSTB ATRCR ;IS DONE SET
910 001550 100401 BMI .+4
911 001552 104000 HLT ;FALSE RETURN FROM MAINLINE
912 001554 105777 176502 TSTB ATDR ;TEST DATA FOR LEADER
913 001560 001413 BEQ TTYIN2 ;IF LEADER GO BACK
914 001562 127767 176474 000026 CMPB ATDR,DATA1 ;NOT LEADER TEST FOR DATA
915 001570 001401 BEQ TTYIN3 ;DATA COMPARISON ERROR
916 001572 104000 HLT ;INCREMENT DATA
917 001574 105267 000016 TTYIN3: INCB DATA1
918 001600 001003 TTYIN4: BNE TTYIN2
919 001602 012767 000001 000006 TTYIN1: MOV #1,DATA1 ;BASE DATA
920 001610 005277 176444 TTYIN2: INC ATRCR ;START READER
921 001614 000002 RTI ;RETURN TO MAINLINE

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922 001616 000000 DATA1: XX ;EXPECTED DATA
923
924 ;TTY TRANSMITTER PRINT VALUES 0 TO 377
925
926 001620 105777 176440 TYOUTR: TSTB 2TTCSR ;TEST FOR DONE
927 001624 100401 BMI .+4 ;BRANCH IF FLAG FOUND
928 001626 104000 HLT ;FALSE INTERRUPT RETURN
929 001630 105267 000010 INCB DATA2 ;INCREMENT DATA
930 001634 016777 000004 176424 TYOUT1: MOV DATA2,2TTDBR ;OUTPUT TO DEVICE
931 001642 000002 RTI ;RETURN TO MAINLINE
932
933 001644 000000 DATA2: XX ;TRANSMITTED DATA
934
935 ;HSR SECTION VALUES 0 TO 377
936
937 001646 105777 176416 HSRINR: TSTB 2HRCR ;IS DONE SET
938 001652 100401 BMI .+4
939 001654 104000 HLT ;FALSE RETURN FROM MAINLINE
940 001656 105777 176410 TSTB 2HRDBR ;TEST DATA FOR LEADER
941 001662 001413 BEQ HSRIN2 ;IF LEADER GO BACK
942 001664 127767 176402 000026 CMPB 2HRDBR,DATA3 ;NOT LEADER TEST FOR DATA
943 001672 001401 BEQ .+4
944 001674 104000 HLT ;DATA COMPARISON ERROR
945 001676 105267 000016 INCB DATA3 ;INCREMENT DATA
946 001702 001003 BNE HSRIN2
947 001704 012767 000001 000006 HSRIN1: MOV 21 DATA3 ;BASE DATA
948 001712 005277 176352 HSRIN2: INC 2HRCR ;START READER
949 001716 000002 RTI ;RETURN TO MAINLINE
950
951 001720 000000 DATA3: XX ;EXPECTED DATA
952
953 ;HS PUNCH SECTION, VALUES 0 TO 377
954 ;ENABLE READER ON FIX COUNT OF PUNCH ONLY (14 TIMES)
955 001722 012767 000000 000064 HPOUT: MOV 20 DATA4 ;INITIAL DATA
956 001730 016777 000060 176340 HPOUT1: MOV DATA4,2HPDBR ;OUTPUT TO DEVICE
957 001736 000002 RTI ;RETURN TO MAINLINE
958 001740 105777 176330 HPOUTR: TSTB 2HPCSR ;TEST FOR DONE
959 001744 100401 BMI .+4 ;BRANCH IF FLAG FOUND
960 001746 104000 HLT ;FALSE INTERRUPT RETURN
961 001750 046777 000044 176312 BIC DELAY,2HRCR ;CLEAR HSR INTERRUPT ENABLE
962 001756 005267 000034 INC INTCNT ;COUNT INTERRUPTS
963 001762 026727 000030 000014 CMP INTCNT,214 ;SAVE TO TURN READER ON?
964 001770 001005 BNE HPOUT2 ;NO-NEED MORE TIME
965 001772 005067 000020 CLR INTCNT ;YES RESET COUNTER
966 001776 056777 000016 176264 BIS DELAY,2HRCR ;SET READER INT ENABLE
967 002004 105267 000004 HPOUT2: INCB DATA4 ;INCREMENT DATA
968 002010 001744 BEQ HPOUT ;AT UPPER LIMIT START OVER
969 002012 000746 BR HPOUT1 ;FINISH REST OF DATA
970
971 002014 000000 DATA4: XX
972 002016 000000 INTCNT: 0
973 002020 000000 DELAY: 0 ;EQUAL 100 IF HSR RUNNING
974
975 ;TEST OF LINE CLOCK, INTERRUPT FOR 55 SECONDS THEN STALL FOR 5 SECONDS.
976 002022 005037 002140 LK1: CLR 2TIME ;CLEAR LINE CLOCK TIMER
977 002026 052777 000100 176244 BIS 2100,2LKCSR

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978 002034 052737 000100 177776 BIS #100, @STATUS
979 002042 000002 LK2: RTI ; RETURN TO MAINLINE
980 002044 105777 176230 LK3: TSTB @LKCSR ; TEST FOR DONE
981 002050 100401 BMI .+4
982 002052 104000 HLT ; FALSE INTERRUPT
983 002054 042777 000200 176216 BIC #200, @LKCSR
984 002062 005237 002140 LK4: INC @TIME ; ON INTERRUPTS ENTER HERE
985 002066 022737 006344 002140 CMP #3300., @TIME ; A LAPS OF 55 SECONDS
986 002074 103362 BHIS LK2 ; BRANCH IF TIME LESS THAN 55 SECONDS
987 002076 042777 000100 176174 BIC #100, @LKCSR
988 002104 042737 000100 177776 BIC #100, @STATUS
989 002112 022737 007020 002140 CMP #3600., @TIME ; LOWER PRIORITY
990 002120 001740 BEQ LK1 ; ONE MINUTE UP
991 002122 105777 176152 TSTB @LKCSR ; YES-RESET TIMER
992 002126 100375 BPL .-4 ; NO-SKIP ON FLAG TILL IT IS.
993 002130 042777 000200 176142 BIC #200, @LKCSR ; CLEARS THE FLAG
994 002136 000751 BR LK4 ; FOUND FLAG GO INCREMENT COUNTER
995 002140 000000 TIME: 0
996
997 ; LINE PRINTER SHOULD RAISE PROCESSOR PRIORITY TO LEVEL OF LINE PRINTER
998 ; INTERRUPT VECTOR IS 200
999 002202 LPB0=LP6+4
1000
1001 002142 016767 000142 000136 LP1: MOV SOLPAT, CURPAT ; START OF LINE TO CURRENT
1002 002150 016777 000132 176126 LP2: MOV CURPAT, @LPDDBR ; CURRENT PATTERN TO LINE PRINTER
1003 002156 105777 176120 TSTB @LPCSR
1004 002162 100405 BMI LP6
1005 002164 000002 RTI ; RETURN TO MAIN LINE
1006 002166 105777 176110 LPINTR: TSTB @LPCSR ; TEST FOR FLAG
1007 002172 100401 BMI .+4
1008 002174 104000 HLT
1009 002176 026727 000110 000117 LP6: CMP CLINCT, #79. ; FALSE RETURN FROM MAIN LINE
1010 ; TEST FOR END OF LINE
1011 002204 001415 BEQ LP4 ; CHANGE THIS VALUE FOR 132 COLUMN PRINTER
1012 002206 005267 000100 INC CLINCT ; GO GENERATE CR/LF
1013 002212 026727 000070 000137 CMP CURPAT, #137 ; INCREMENT LINE POSITION COUNT
1014 002220 001403 BEQ LP3 ; TEST FOR MAXIMUM PATTERN
1015 002222 005267 000060 INC CURPAT ; YES - GO TO LP3 AND RESET
1016 002226 000750 BR LP2 ; NO - INCREMENT TO NEXT PATTERN
1017 002230 012767 000040 000050 LP3: MOV #40, CURPAT ; GO SEND IT TO LINE PRINTER
1018 002236 000744 BR LP2 ; RESET PATTERN AND SEND TO PRINTER
1019 002240 005067 000046 LP4: CLR CLINCT ; SENT TO LINE PRINTER
1020 002244 012777 000012 176032 MOV #12, @LPDDBR ; RESET LINE COUNT
1021 002252 105777 176024 TSTB @LPCSR ; LINE FEED
1022 002256 100375 BPL .-4
1023 002260 026727 000024 000137 CMP SOLPAT, #137 ; START OF LINE PATTERN
1024 002266 001403 BEQ LP5 ; INCREMENT START OF LINE
1025 002270 005267 000014 INC SOLPAT
1026 002274 000722 BR LP1
1027 002276 012767 000040 000004 LP5: MOV #40, SOLPAT ; RESET START OF LINE
1028 002304 000716 BR LP1 ; PRINT
1029 002306 000000 CURPAT: 0 ; CURRENT CHARACTER BEING PRINTED
1030 002310 000000 SOLPAT: 0 ; START OF LINE CHARACTER
1031 002312 000000 CLINCT: 0 ; POSITION OF LINE
1032
1033 ; RK11 DISK TEST INTERRUPT LEVEL 5, 2000 WORD TRANSFERS

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H02

SEQ 0020

1034	002314	005077	176016		RKSTART:	CLR	ARKDAE		: INITIALIZE DISK - DAR-DAE
1035	002320	016777	00C360	176014	RK1:	MOV	LLIMIT,ARKBAR		: CORE BASE
1036	002326	012777	176000	176004		MOV	ARKWORDCT,ARKWC		: LENGTH OF TRANSFER
1037	002334	113777	002406	176002		MOVB	ARKFUNCTION,ARKCSR		: WRITE OR WRITE CHECK TO DISK
1038	002342	000002				RTI			: RETURN TO MAINLINE CODE
1039	002344	032777	100200	175772	IRK:	BIT	#100200,ARKCSR		: INTERRUPT VECTOR POINTS HERE
1040	002352	003002				BGT	.+6		
1041	002354	104000				HLT			: RK-11 ERROR FLAG UP OR READY NOT UP
1042	002356	000756				BR	RKSTART		: DISK AT UPPER LIMIT
1043	002360	032777	000037	175750		BIT	#37,ARKDAE		
1044	002366	001354				BNE	RK1	: NO	
1045	002370	122777	000031	175736		CMPB	#31,ARKDAH		
1046	002376	001350				BNE	RK1	: NO	
1047	002400	000337	002406			SWAB	ARKFUNCTION		: CHANGE COMMAND
1048	002404	000743				BR	RKSTART		: RESTART NEW TRANSFER OF DISK
1049									
1050	002406	000000			RKFUNCTION:	0			: DISK COMMAND
1051					: RP11 DISK SERVICE ROUTINE				
1052	002410	112777	000001	176010	RPSTART:	MOVB	#1,ARPCSR		: INITIALIZE DISK - DAR-DAE
1053	002416	105777	176004			TSTB	ARPCSR		
1054	002422	100375				BPL	.-4		
1055	002424	016777	000254	175772	RP1:	MOV	LLIMIT,RPBAR		: INITIAL CORE ADDRESS
1056	002432	012777	176000	175762		MOV	RPWORDCT,RPWC		: LENGTH OF TRANSFER
1057	002440	113777	000432	175760		MOVB	ARPFUNCTION,ARPCSR		: WRITE OR WRITE CHECK TO DISK
1058	002446	000002				RTI			: RETURN TO MAINLINE CODE
1059	002450	032777	100200	175750	IRP:	BIT	#100200,ARPCSR		: INTERRUPT VECTOR POINTS HERE
1060	002456	003002				BGT	.+6		
1061	002460	104000				HLT			: RP11 READY NOT UP OR ERROR
1062	002462	000752				BR	RPSTART		
1063	002464	122777	000312	175716		CMPB	#312,ARPCA		: CYLINDER NO. 312, 624 FOR RPO3
1064	002472	001354				BNE	RP1	: NO	
1065	002474	000337	000432			SWAB	ARPFUNCTION		: CHANGE COMMAND
1066	002500	000743				BR	RPSTART		: RESTART NEW TRANSFER OF DISK
1067					: RC11 DISK SERVICE ROUTINE				
1068	002502	012777	000040	175612	RCSTART:	MOV	#40,RCDDAR		: INITIALIZE DISK - DAR-DAE
1069	002510	016777	000170	175610	RC2:	MOV	LLIMIT,RCBAR		: CORE BASE
1070	002516	012777	176040	175600		MOV	RCWORDCT,RCWC		: LENGTH OF TRANSFER
1071	002524	113777	002572	175576		MOVB	RCFUNCTION,RCCSR		: WRITE OR WRITE CHECK TO DISK
1072	002532	000002				RTI			: RETURN TO MAINLINE CODE
1073	002534	037727	175570	100200	IRC:	BIT	ARCCSR,#100200		: INTERRUPT VECTOR POINTS HERE
1074	002542	003002				BGT	.+6		
1075	002544	104000				HLT			: RC11 READY NOT UP OR ERROR IS UP
1076	002546	000755				BR	RCSTART		
1077	002550	005277	175546			INC	RCDDAR		: TO INCREASE XFER RATE
1078	002554	022777	002000	175540		CMP	#2000,RCDDAR		: DISK AT UPPER LIMIT, 4000=2, 6000=3, 10000=4
1079	002562	001352				BNE	RC2	: NO	
1080	002564	000337	002572			SWAB	RCFUNCTION		: CHANGE COMMAND
1081	002570	000744				BR	RCSTART		: RESTART NEW TRANSFER OF DISK
1082	002572	000000					0		: DISK COMMAND
1083					RCFUNCTION:				
1084	002574	105277	175520		: RF11 DISK				
1085	002600	062777	000040	175502	RFSTART:	INCB	ARFCSRH		: INITIALIZE DISK - DAR-DAE
1086	002606	016777	000072	175500		ADD	#40,ARFDDAR		: INCREASE DUTY CYCLE
1087	002614	012777	176040	175470	RF1:	MOV	LLIMIT,ARFCAR		: CORE BASE
1088	002622	113777	002702	175466		MOV	ARFWORDCT,ARFWC		: LENGTH OF TRANSFER
1089	002630	000002				MOVB	ARFFUNCTION,ARFCSR		: WRITE OR WRITE CHECK TO DISK
						RTI			: RETURN TO MAINLINE CODE


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1090 002632 037727 175460 100200 IRF: BIT @RFCR, #100200 ; INTERRUPT VECTOR POINTS HERE
1091 002640 003002 BGT .+6 ;
1092 002642 104000 HLT ; RF11 READY NOT UP OR ERROR UP
1093 002644 000753 BR RFSTART ; INCREASE DUTY CYCLE
1094 002646 062777 000040 175434 ADD #40, @RFDAR ; DISK AT UPPER LIMIT? 7=2, 17=4, 37=8
1095 002654 122777 000003 175424 CMPB #3, @RFDAR ; NO
1096 002662 001351 BNE RF1 ; AS FAR ON DISK AS WE CAN GO
1097 002664 027727 175420 174000 CMP @RFDAR, #174000 ; NO
1098 002672 101745 BLOS RF1 ; CHANGE COMMAND
1099 002674 000337 002702 SWAB @RFFUNCTION ; RESTART NEW TRANSFER OF DISK
1100 002700 000735 BR RFSTART ; DISK COMMAND
1101 002702 000000 RFFUNCTION: ; FIRST CORE ADDRESS OF TRANSFER
1102 002704 004440 LLIMIT: BEGIN
1103 ; DT11 DEC TAPE
1104 000004 RD=4 ; READ DATA
1105 000014 WD=14 ; WRITE DATA
1106 000002 RB=2 ;
1107 000002 BR=2 ; READ BLOCK
1108 000000 F=0 ; FORWARD
1109 000500 IE=500 ; INTERRUPT ENABLE AND UNIT - UNIT #1
1110 000011 DO=1 ; DO - THE FUNCTION
1111 004000 R=4000 ; REVERSE
1112
1113 002706 000000 TCFIRST: 0 ; FIRST BLOCK TO BE SEARCHED FOR
1114 002710 001101 TCLAST: 577. ; LAST BLOCK TO BE SEARCHED FOR
1115 002712 000000 TCBLK: 0 ; CURRENT BLOCK FOUND
1116 002714 000000 TCXPE: 0 ; THE BLOCK THAT IS EXPECTED
1117
1118 ; GO TO FORWARD END ZONE
1119 002716 012777 002716 175462 FENDZ: MOV @FENDZ, @TCIV ; END ZONE VECTOR SETUP
1120 002724 005777 175444 TST @TCST ; TEST FOR END ZONE
1121 002730 100403 BMI FEND1 ; AT END ZONE?
1122 002732 105277 175434 INCB @TCCM ; SET DO - NO DELAY
1123 002736 000002 RTI ; NO - WAIT SOME MORE
1124 002740 012777 002770 175440 FEND1: MOV @TCF1, @TCIV ; YES - NEW VECTOR
1125 002746 042777 104000 175416 BIC #104000, @TCCM ; SEARCH BLOCK FOWARD
1126 002754 016767 177726 177732 MOV TCFIRST, TCXPE ; COUNT WHEN THIS BLOCK IS FOUND
1127 002762 105277 175404 TCF1A: INCB @TCCM ; SET DO
1128 002766 000002 RTI ; RETURN ON NEXT BLOCK
1129 002770 032777 100200 175374 TCF1: BIT #100200, @TCCM ; ANY ERROR ON READ?
1130 002776 003001 BGT .+4 ;
1131 003000 104000 HLT ; TC ERROR SET - FORWARD READ BLOCK
1132 003002 027767 175370 177704 CMP @TCDT, TCXPE ; IS THIS OUR BLOCK FOR SYNC
1133 003010 002764 BLT TCF1A ; NO-READ SOME MORE BLOCKS
1134 003012 001401 BEQ TCF2 ; YES
1135 003014 104000 HLT ; WE PASSED THE BLOCK
1136
1137 003016 012777 003032 175362 TCF2: MOV @TCF3, @TCIV ; VECTOR FOR SEQUENTIAL READS
1138 003024 105277 175342 INCB @TCCM ; SET DO
1139 003030 000002 RTI ; RETURN AND TEST SEQUENTIAL BLOCKS
1140
1141 ; FIND SEQUENTIAL BLOCK AT FOWARD DIRECTION
1142 003032 032777 100200 175332 TCF3: BIT #100200, @TCCM ; TEST ERROR AND READY
1143 003040 003001 BGT .+4 ;
1144 003042 104000 HLT ; FALSE INTERRUPT ON TC-11
1145 003044 027767 175326 177636 CMP @TCDT, TCLAST ; HAVE WE TESTED ALL BLOCKS

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1146 003052 001414 BEQ RENNZ :YES DRIVE UNIT IN END ZONE TO START OVER
1147 003054 005267 177634 INC TCXPE :NO-INCREMENT EXPECTED COUNT
1148 003060 027767 175312 177626 CMP @TCDT,TCXPE :IS CURRENT BLOCK CORRECT
1149 003066 001401 BEQ .+4
1150 003070 104000 HLT :FAILED IN FOWARD READ TO FIND NEXT BLOCK
1151 003072 000427 BR TCWBK :THIS ROUTINE WRITES A BLOCK
1152 003074 105277 175272 TCF4: INCB @TCLM :SET DO
1153 003100 000002 RTI
1154 003102 000705 XFENDZ: BR FENDZ :INDIRECT LINK
1155
1156 :MOVE TAPE TO REVERSE END ZONE
1157 003104 012777 003104 175274 RENNZ: MOV @RENDZ,@TCIV :END ZONE VECTOR SETUP
1158 003112 016767 177572 177574 MOV TCLAST,TCXPE :SET UP FOR REVERSE SEARCH
1159 003120 005777 175250 TST @TCST :IN END ZONE
1160 003124 100403 BMI REND1 :YES - START TO TURN UNIT AROUND
1161 003126 105277 175240 INCB @TCCM :SET DO
1162 003132 000002 RTI :NO - WAIT TILL WE ARE
1163 003134 012777 004503 175230 REND1: MOV @R+IE+RB+DO,@TCCM :FUNCTION = READ BLOCK, REVERSE AND GO
1164 003142 012777 003232 175236 MOV @TCR1,@TCIV :SET UP NEW INTERRUPT VECTOR
1165 003150 000002 RTI
1166 :WRITE FORWARD ALL BLOCKS EXCEPT 0
1167
1168 003152 012777 003204 175226 TCWBK: MOV @TCWB1,@TCIV :INTERRUPT VECTOR FOR WRITE
1169 003160 012777 177400 175214 MOV #-400,@TCWC :ONE BLOCK
1170 003166 012777 003440 175210 MOV @TCWB1,@TCBA :THE WRITE BUFFER ADDRESS
1171 003174 112777 000515 175170 MOV @IE+WD+DO,@TCCM :WRITE THE BLOCK
1172 003202 000002 RTI :RETURN WHEN BLOCK IS WRITTEN
1173 003204 005777 175162 TCWB1: TST @TCCM :ANY ERRORS
1174 003210 100001 BPL .+4
1175 003212 104000 HLT
1176 003214 012777 003032 175164 MOV @TCF3,@TCIV :SEARCH BLOCK VECTOR
1177 003222 112777 000502 175142 MOV @IE+RB,@TCCM :READ BLOCK
1178 003230 000721 BR TCF4 :FIND THE NEXT BLOCK
1179
1180 003232 032777 100200 175132 TCR1: BIT #100200,@TCCM :TEST FOR ERROR AND READY
1181 003240 003001 BGT .+4
1182 003242 104000 HLT
1183 003244 027767 175126 177442 CMP @TCDT,TCXPE :DECTAPE ERROR ON READ BLOCK REVERSE
1184 003252 001406 BEQ TCR2 :IS IT OUR FIRST BLOCK
1185 003254 002002 BGE TCR1A :YES - GO TEST THE REST
1186 003256 104000 HLT :NO - HAVE WE PASSED THE BLOCK
1187 003260 000711 BR :WE PASS OUR BLOCK
1188 003262 105277 175104 TCR1A: INCB RENNZ :GO TO END ZONE AND TRY AGAIN
1189 003266 000002 RTI :SET DO
1190 003270 012777 003304 175110 TCR2: MOV @TCR3,@TCIV :WE FOUND OUR FIRST BLOCK
1191 003276 105277 175070 INCB @TCCM :SET UP INTERRUPT TO TEST ALL BLOCKS
1192 003302 000002 RTI :SET DO
1193 :WAIT FOR NEXT BLOCK TO INTERRUPT
1194 :FIND SEQUENTIAL BLOCK IN REVERSE DIRECTION

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K02

MAIN. MACY11 30A(1052) 20-JAN-78 11:05 PAGE 23
CZOKBA.F11 20-JAN-78 11:05

SEQ 0023

1195 003304 032777 100200 175060 TCR3: BIT
1196 003312 003001 BGT

#100200.2TCOM ;TEST FOR READ AND ERROR
. +4

L02

MAIN. MACY11 30A(1052) 20-JAN-78 11:05 PAGE 24
CZQKBM.F11 20-JAN-78 11:05

1197 003314 104000

HLT

:ERROR READING SEQUENTIAL BLOCK IN REVERSE

SEQ 0024


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1198 003316 026777 177364 175052      CMP      TCFIRST, @TCDT      :DID WE DO ALL THE BLOCKS
1199 003324 001666                      BEQ      XFENDZ              :YES - GO TO END ZONE TO RESTART
1200 003326 005367 177362                      DEC      TCXPE              :NO - DECREMENT BLOCK NUMBER
1201 003332 027767 175040 177354      CMP      @TCDT, TCXPE      :TEST SEQUENTIAL BLOCK IN REVERSE
1202 003340 001401                      BEQ      .+4
1203 003342 104000                      HLT
1204 003344 000403                      BR      TCR6K              :TEST SEQUENTIAL READ BLOCK IN REVERSE FAILED
1205 003346 105277 175020      TCR4: INCB      @TCCM              :THIS ROUTINE READ A BLOCK
1206 003352 000002                      RTI                      :SET DO
                                           :LETS TRY A NEW BLOCK
1207
1208
1209 003354 012777 003412 175024      :READ REVERSE ALL BLOCK EXCEPT BLOCK 1101
1210 003362 012777 177400 175012      TCRBK: MOV      @TCRB1, @TCIV      :SET UP INTERRUPT VECTOR
1211 003370 012777 003440 175006      MOV      #-400, @TCWC      :READ ONE BLOCK
1212 003376 112777 000505 174766      MOV      @TCRB1, @TCBA      :WHERE BUFFER IS
1213 003404 004767 175024      MOV      @IE+RD+DO, @TCCM      :READ THE BLOCK
1214 003410 000002                      JSR      %7, TC1              :CHECK DATA BUFFER
1215 003412 005777 174754      TCRB1: RTI                      :EXIT - RETURN WHEN BLOCK IS READ
1216 003416 100001                      BPL      .+4              :AND ERRORS
1217 003420 104000                      HLT
1218 003422 012777 003304 174756      MOV      @TCR3, @TCIV      :DECTAPE ERROR
1219 003430 112777 000502 174734      MOV      @IE+RB, @TCCM      :NEW VECTOR FOR BLOCK SEARCH
1220 003436 000743                      BR      TCR4              :READ BLOCK FUNCTION
                                           :RETURN TO BLOCK SEARCH
1221
1222
1223 003440      :THIS WRITE BUFFER LOOK THE SAME FORWARD OR REVERSE
1224 003440      TCRBUF:
1225      000001
1226      000100
1227      N=1
1228      .REPT      100
1229      N
1230      -N
1231      N=N+1
1232      .ENDR
1233      N
1234      -N
1235      N=N+1
1236      N
1237      -N
1238      N=N+1
1239      N
1240      -N
1241      N=N+1
1242      N
1243      -N
1244      N=N+1
1245      N
1246      -N
1247      N=N+1
1248      N
1249      -N
1250      N=N+1
1251      N
1252      -N
1253      N=N+1
1254      N
1255      -N
1256      N=N+1
1257      N
1258      -N
1259      N=N+1
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1262      N=N+1
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1271      N=N+1
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1274      N=N+1
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1281      N
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1283      N=N+1
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1286      N=N+1
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1292      N=N+1
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1296      N
1297      -N
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1299      N
1300      -N
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1303      -N
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1306      -N
1307      N=N+1
1308      N
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1370      N=N+1
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1372      -N
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1397      N=N+1
1398      N
1399      -N
1400      N=N+1
1401      N
1402      -N
1403      N=N+1
1404      N
1405      -N
1406      N=N+1
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1418      N=N+1
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1469      N=N+1
1470      N
1471      -N
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1494      N
1495      -N
1496      N=N+1
1497      N
1498      -N
1499      N=N+1
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1501      -N
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2288      N=N+1
2289      N
2290      -N
2291      N=N+1
2292      N
2293      -N
2294      N=N+1
2295      N
2296      -N
2297      N=N+1
2298      N
2299      -N
2300      N=N+1
2301      N
2302      -N
2303      N=N+1
2304      N
2305      -N
2306      N=N+1
2307      N
2308      -N
2309      N=N+1
2310      N
2311      -N
2312      N=N+1
2313      N
2314      -N
2315      N=N+1
2316      N
2317      -N
2318      N=N+1
2319      N
2320      -N
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2322      N
2323      -N
2324      N=N+1
2325      N
2326      -N
2327      N=N+1
2328      N
2329      -N
2330      N=N+1
2331      N
2332      -N
2333      N=N+1
2334      N
2335      -N
2336      N=N+1
2337      N
2338      -N
2339      N=N+1
2340      N
2341      -N
2342      N=N+1
2343      N
2344      -N
2345      N=N+1
2346      N
2347      -N
2348      N=N+1
2349      N
2350      -N
2351      N=N+1
2352      N
2353      -N
2354      N=N+1
2355      N
2356      -N
2357      N=N+1
2358      N
2359      -N
2360      N=N+1
2361      N
2362      -N
2363      N=N+1
2364      N
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2366      N=N+1
2367      N
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2370      N
2371      -N
2372      N=N+1
2373      N
2374      -N
2375      N=N+1
2376      N
2377      -N
2378      N=N+1
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2381      N=N+1
2382      N
2383      -N
2384      N=N+1
2385      N
2386      -N
2387      N=N+1
2388      N
2389      -N
2390      N=N+1
2391      N
2392      -N
2393      N=N+1
2394      N
2395      -N
2396      N=N+1
2397      N
2398      -N
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2401      -N
2402      N=N+1
2403      N
2404      -N
2405      N=N+1
2406      N
2407      -N
2408      N=N+1
2409      N
2410      -N
2411      N=N+1
2412      N
2413      -N
2414      N=N+1
2415      N
2416      -N
2417      N=N+1
2418      N
2419      -N
2420      N=N+1
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2424      N
2425      -N
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2427      N
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2434      -N
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2442      N
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2444      N=N+1
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2451      N
2452      -N
2453      N=N+1
2454      N
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2456      N=N+1
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2459      N=N+1
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2465      N=N+1
2466      N
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2470      -N
2471      N=N+1
2472      N
2473      -N
2474      N=N+1
2475      N
2476      -N
2477      N=N+1
2478      N
2479      -N
2480      N=N+1
2481      N
2482      -N
2483      N=N+1
2484      N
2485      -N
2486      N=N+1
2487      N
2488      -N
2489      N=N+1
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2491      -N
2492      N=N+1
2493      N
2494      -N
2495      N=N+1
2496      N
2497      -N
2498      N=N+1
2499      N
2500      -N
2501      N=N+1
2502      N
2503      -N
2504      N=N+1
2505      N
2506      -N
2507      N=N+1
2508      N
2509      -N
2510      N=N+1
2511      N
2512      -N
2513      N=N+1
2514      N
2515      -N
2516      N=N+1
2517      N
2518      -N
2519      N=N+1
2520      N
2521      -N
2522      N=N+1
2523      N
2524      -N
2525      N=N+1
2526      N
2527      -N
2528      N=N+1
2529      N
2530      -N
2531      N=N+1
2532      N
2533      -N
2534      N=N+1
2535      N
2536      -N
2537      N=N+1
2538      N
2539      -N
2540      N=N+1
2541      N
2542      -N
2543      N=N+1
2544      N
2545      -N
2546      N=N+1
2547      N
2548      -N
2549      N=N+1
2550      N
2551      -N
2552      N=N+1
2553      N
2554      -N
2555      N=N+1
2556      N
2557      -N
2558      N=N+1
2559      N
2560      -N
2561      N=N+1
2562      N
2563      -N
2564      N=N+1
2565      N
2566      -N
2567      N=N+1
2568      N
2569      -N
2570      N=N+1
2571      N
2572      -N
2573      N=N+1
2574      N
2575      -N
2576
```

1254		000011	N=N+1	
1255	003500	000011	N	; DECTAPE READ/WRITE BUFFER
1256	003502	177767	-N	
1257		000012	N=N+1	
1258	003504	000012	N	; DECTAPE READ/WRITE BUFFER
1259	003506	177766	-N	
1260		000013	N=N+1	
1261	003510	000013	N	; DECTAPE READ/WRITE BUFFER
1262	003512	177765	-N	
1263		000014	N=N+1	
1264	003514	000014	N	; DECTAPE READ/WRITE BUFFER
1265	003516	177764	-N	
1266		000015	N=N+1	
1267	003520	000015	N	; DECTAPE READ/WRITE BUFFER
1268	003522	177763	-N	
1269		000016	N=N+1	
1270	003524	000016	N	; DECTAPE READ/WRITE BUFFER
1271	003526	177762	-N	
1272		000017	N=N+1	
1273	003530	000017	N	; DECTAPE READ/WRITE BUFFER
1274	003532	177761	-N	
1275		000020	N=N+1	
1276	003534	000020	N	; DECTAPE READ/WRITE BUFFER
1277	003536	177760	-N	
1278		000021	N=N+1	
1279	003540	000021	N	; DECTAPE READ/WRITE BUFFER
1280	003542	177757	-N	
1281		000022	N=N+1	
1282	003544	000022	N	; DECTAPE READ/WRITE BUFFER
1283	003546	177756	-N	
1284		000023	N=N+1	
1285	003550	000023	N	; DECTAPE READ/WRITE BUFFER
1286	003552	177755	-N	
1287		000024	N=N+1	
1288	003554	000024	N	; DECTAPE READ/WRITE BUFFER
1289	003556	177754	-N	
1290		000025	N=N+1	
1291	003560	000025	N	; DECTAPE READ/WRITE BUFFER
1292	003562	177753	-N	
1293		000026	N=N+1	
1294	003564	000026	N	; DECTAPE READ/WRITE BUFFER
1295	003566	177752	-N	
1296		000027	N=N+1	
1297	003570	000027	N	; DECTAPE READ/WRITE BUFFER
1298	003572	177751	-N	
1299		000030	N=N+1	
1300	003574	000030	N	; DECTAPE READ/WRITE BUFFER
1301	003576	177750	-N	
1302		000031	N=N+1	
1303	003600	000031	N	; DECTAPE READ/WRITE BUFFER
1304	003602	177747	-N	
1305		000032	N=N+1	
1306	003604	000032	N	; DECTAPE READ/WRITE BUFFER
1307	003606	177746	-N	
1308		000033	N=N+1	
1309	003610	000033	N	; DECTAPE READ/WRITE BUFFER

1310	003612	177745	-N	
1311		000034	N=N+1	
1312	003614	000034	N	;DECTAPE READ/WRITE BUFFER
1313	003616	177744	-N	
1314		000035	N=N+1	
1315	003620	000035	N	;DECTAPE READ/WRITE BUFFER
1316	003622	177743	-N	
1317		000036	N=N+1	
1318	003624	000036	N	;DECTAPE READ/WRITE BUFFER
1319	003626	177742	-N	
1320		000037	N=N+1	
1321	003630	000037	N	;DECTAPE READ/WRITE BUFFER
1322	003632	177741	-N	
1323		000040	N=N+1	
1324	003634	000040	N	;DECTAPE READ/WRITE BUFFER
1325	003636	177740	-N	
1326		000041	N=N+1	
1327	003640	000041	N	;DECTAPE READ/WRITE BUFFER
1328	003642	177737	-N	
1329		000042	N=N+1	
1330	003644	000042	N	;DECTAPE READ/WRITE BUFFER
1331	003646	177736	-N	
1332		000043	N=N+1	
1333	003650	000043	N	;DECTAPE READ/WRITE BUFFER
1334	003652	177735	-N	
1335		000044	N=N+1	
1336	003654	000044	N	;DECTAPE READ/WRITE BUFFER
1337	003656	177734	-N	
1338		000045	N=N+1	
1339	003660	000045	N	;DECTAPE READ/WRITE BUFFER
1340	003662	177733	-N	
1341		000046	N=N+1	
1342	003664	000046	N	;DECTAPE READ/WRITE BUFFER
1343	003666	177732	-N	
1344		000047	N=N+1	
1345	003670	000047	N	;DECTAPE READ/WRITE BUFFER
1346	003672	177731	-N	
1347		000050	N=N+1	
1348	003674	000050	N	;DECTAPE READ/WRITE BUFFER
1349	003676	177730	-N	
1350		000051	N=N+1	
1351	003700	000051	N	;DECTAPE READ/WRITE BUFFER
1352	003702	177727	-N	
1353		000052	N=N+1	
1354	003704	000052	N	;DECTAPE READ/WRITE BUFFER
1355	003706	177726	-N	
1356		000053	N=N+1	
1357	003710	000053	N	;DECTAPE READ/WRITE BUFFER
1358	003712	177725	-N	
1359		000054	N=N+1	
1360	003714	000054	N	;DECTAPE READ/WRITE BUFFER
1361	003716	177724	-N	
1362		000055	N=N+1	
1363	003720	000055	N	;DECTAPE READ/WRITE BUFFER
1364	003722	177723	-N	
1365		000056	N=N+1	

1366	003724	000056	N	;DECTAPE READ/WRITE BUFFER
1367	003726	177722	-N	
1368		000057	N=N+1	
1369	003730	000057	N	;DECTAPE READ/WRITE BUFFER
1370	003732	177721	-N	
1371		000060	N=N+1	
1372	003734	000060	N	;DECTAPE READ/WRITE BUFFER
1373	003736	177720	-N	
1374		000061	N=N+1	
1375	003740	000061	N	;DECTAPE READ/WRITE BUFFER
1376	003742	177717	-N	
1377		000062	N=N+1	
1378	003744	000062	N	;DECTAPE READ/WRITE BUFFER
1379	003746	177716	-N	
1380		000063	N=N+1	
1381	003750	000063	N	;DECTAPE READ/WRITE BUFFER
1382	003752	177715	-N	
1383		000064	N=N+1	
1384	003754	000064	N	;DECTAPE READ/WRITE BUFFER
1385	003756	177714	-N	
1386		000065	N=N+1	
1387	003760	000065	N	;DECTAPE READ/WRITE BUFFER
1388	003762	177713	-N	
1389		000066	N=N+1	
1390	003764	000066	N	;DECTAPE READ/WRITE BUFFER
1391	003766	177712	-N	
1392		000067	N=N+1	
1393	003770	000067	N	;DECTAPE READ/WRITE BUFFER
1394	003772	177711	-N	
1395		000070	N=N+1	
1396	003774	000070	N	;DECTAPE READ/WRITE BUFFER
1397	003776	177710	-N	
1398		000071	N=N+1	
1399	004000	000071	N	;DECTAPE READ/WRITE BUFFER
1400	004002	177707	-N	
1401		000072	N=N+1	
1402	004004	000072	N	;DECTAPE READ/WRITE BUFFER
1403	004006	177706	-N	
1404		000073	N=N+1	
1405	004010	000073	N	;DECTAPE READ/WRITE BUFFER
1406	004012	177705	-N	
1407		000074	N=N+1	
1408	004014	000074	N	;DECTAPE READ/WRITE BUFFER
1409	004016	177704	-N	
1410		000075	N=N+1	
1411	004020	000075	N	;DECTAPE READ/WRITE BUFFER
1412	004022	177703	-N	
1413		000076	N=N+1	
1414	004024	000076	N	;DECTAPE READ/WRITE BUFFER
1415	004026	177702	-N	
1416		000077	N=N+1	
1417	004030	000077	N	;DECTAPE READ/WRITE BUFFER
1418	004032	177701	-N	
1419		000100	N=N+1	
1420	004034	000100	N	;DECTAPE READ/WRITE BUFFER
1421	004036	177700	-N	

1422		000101	N=N+1	
1423		000100	REPT	100
1424			N=N-1	
1425			-N	
1426			N	
1427			ENDR	
1428		000100	N=N-1	
1429	004040	177700	-N	
1430	004042	000100	N	
1431		000077	N=N-1	
1432	004044	177701	-N	
1433	004046	000077	N	
1434		000076	N=N-1	
1435	004050	177702	-N	
1436	004052	000076	N	
1437		000075	N=N-1	
1438	004054	177703	-N	
1439	004056	000075	N	
1440		000074	N=N-1	
1441	004060	177704	-N	
1442	004062	000074	N	
1443		000073	N=N-1	
1444	004064	177705	-N	
1445	004066	000073	N	
1446		000072	N=N-1	
1447	004070	177706	-N	
1448	004072	000072	N	
1449		000071	N=N-1	
1450	004074	177707	-N	
1451	004076	000071	N	
1452		000070	N=N-1	
1453	004100	177710	-N	
1454	004102	000070	N	
1455		000067	N=N-1	
1456	004104	177711	-N	
1457	004106	000067	N	
1458		000066	N=N-1	
1459	004110	177712	-N	
1460	004112	000066	N	
1461		000065	N=N-1	
1462	004114	177713	-N	
1463	004116	000065	N	
1464		000064	N=N-1	
1465	004120	177714	-N	
1466	004122	000064	N	
1467		000063	N=N-1	
1468	004124	177715	-N	
1469	004126	000063	N	
1470		000062	N=N-1	
1471	004130	177716	-N	
1472	004132	000062	N	
1473		000061	N=N-1	
1474	004134	177717	-N	
1475	004136	000061	N	
1476		000060	N=N-1	
1477	004140	177720	-N	

;DEC TAPE READ/WRITE BUFFER

;DEC TAPE READ/WRITE BUFFER

;DEC TAPE READ/WRITE BUFFER

;DEC TAPE READ/WRITE BUFFER

;DEC TAPE READ/WRITE BUFFER

;DEC TAPE READ/WRITE BUFFER

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;DEC TAPE READ/WRITE BUFFER

;DEC TAPE READ/WRITE BUFFER

;DEC TAPE READ/WRITE BUFFER

;DEC TAPE READ/WRITE BUFFER

;DEC TAPE READ/WRITE BUFFER

1478	004142	000060	N	
1479		000057	N=N-1	;DEC TAPE READ/WRITE BUFFER
1480	004144	177721	-N	
1481	004146	000057	N	
1482		000056	N=N-1	;DEC TAPE READ/WRITE BUFFER
1483	004150	177722	-N	
1484	004152	000056	N	
1485		000055	N=N-1	;DEC TAPE READ/WRITE BUFFER
1486	004154	177723	-N	
1487	004156	000055	N	
1488		000054	N=N-1	;DEC TAPE READ/WRITE BUFFER
1489	004160	177724	-N	
1490	004162	000054	N	
1491		000053	N=N-1	;DEC TAPE READ/WRITE BUFFER
1492	004164	177725	-N	
1493	004166	000053	N	
1494		000052	N=N-1	;DEC TAPE READ/WRITE BUFFER
1495	004170	177726	-N	
1496	004172	000052	N	
1497		000051	N=N-1	;DEC TAPE READ/WRITE BUFFER
1498	004174	177727	-N	
1499	004176	000051	N	
1500		000050	N=N-1	;DEC TAPE READ/WRITE BUFFER
1501	004200	177730	-N	
1502	004202	000050	N	
1503		000047	N=N-1	;DEC TAPE READ/WRITE BUFFER
1504	004204	177731	-N	
1505	004206	000047	N	
1506		000046	N=N-1	;DEC TAPE READ/WRITE BUFFER
1507	004210	177732	-N	
1508	004212	000046	N	
1509		000045	N=N-1	;DEC TAPE READ/WRITE BUFFER
1510	004214	177733	-N	
1511	004216	000045	N	
1512		000044	N=N-1	;DEC TAPE READ/WRITE BUFFER
1513	004220	177734	-N	
1514	004222	000044	N	
1515		000043	N=N-1	;DEC TAPE READ/WRITE BUFFER
1516	004224	177735	-N	
1517	004226	000043	N	
1518		000042	N=N-1	;DEC TAPE READ/WRITE BUFFER
1519	004230	177736	-N	
1520	004232	000042	N	
1521		000041	N=N-1	;DEC TAPE READ/WRITE BUFFER
1522	004234	177737	-N	
1523	004236	000041	N	
1524		000040	N=N-1	;DEC TAPE READ/WRITE BUFFER
1525	004240	177740	-N	
1526	004242	000040	N	
1527		000037	N=N-1	;DEC TAPE READ/WRITE BUFFER
1528	004244	177741	-N	
1529	004246	000037	N	
1530		000036	N=N-1	;DEC TAPE READ/WRITE BUFFER
1531	004250	177742	-N	
1532	004252	000036	N	
1533		000035	N=N-1	;DEC TAPE READ/WRITE BUFFER

1534	004254	177743	-N	
1535	004256	000035	N	:DEC TAPE READ/WRITE BUFFER
1536		000034	N=N-1	
1537	004260	177744	-N	
1538	004262	000034	N	:DEC TAPE READ/WRITE BUFFER
1539		000033	N=N-1	
1540	004264	177745	-N	
1541	004266	000033	N	:DEC TAPE READ/WRITE BUFFER
1542		000032	N=N-1	
1543	004270	177746	-N	
1544	004272	000032	N	:DEC TAPE READ/WRITE BUFFER
1545		000031	N=N-1	
1546	004274	177747	-N	
1547	004276	000031	N	:DEC TAPE READ/WRITE BUFFER
1548		000030	N=N-1	
1549	004300	177750	-N	
1550	004302	000030	N	:DEC TAPE READ/WRITE BUFFER
1551		000027	N=N-1	
1552	004304	177751	-N	
1553	004306	000027	N	:DEC TAPE READ/WRITE BUFFER
1554		000026	N=N-1	
1555	004310	177752	-N	
1556	004312	000026	N	:DEC TAPE READ/WRITE BUFFER
1557		000025	N=N-1	
1558	004314	177753	-N	
1559	004316	000025	N	:DEC TAPE READ/WRITE BUFFER
1560		000024	N=N-1	
1561	004320	177754	-N	
1562	004322	000024	N	:DEC TAPE READ/WRITE BUFFER
1563		000023	N=N-1	
1564	004324	177755	-N	
1565	004326	000023	N	:DEC TAPE READ/WRITE BUFFER
1566		000022	N=N-1	
1567	004330	177756	-N	
1568	004332	000022	N	:DEC TAPE READ/WRITE BUFFER
1569		000021	N=N-1	
1570	004334	177757	-N	
1571	004336	000021	N	:DEC TAPE READ/WRITE BUFFER
1572		000020	N=N-1	
1573	004340	177760	-N	
1574	004342	000020	N	:DEC TAPE READ/WRITE BUFFER
1575		000017	N=N-1	
1576	004344	177761	-N	
1577	004346	000017	N	:DEC TAPE READ/WRITE BUFFER
1578		000016	N=N-1	
1579	004350	177762	-N	
1580	004352	000016	N	:DEC TAPE READ/WRITE BUFFER
1581		000015	N=N-1	
1582	004354	177763	-N	
1583	004356	000015	N	:DEC TAPE READ/WRITE BUFFER
1584		000014	N=N-1	
1585	004360	177764	-N	
1586	004362	000014	N	:DEC TAPE READ/WRITE BUFFER
1587		000013	N=N-1	
1588	004364	177765	-N	
1589	004366	000013	N	:DEC TAPE READ/WRITE BUFFER

1646	004560	042700	007777		BIC	#007777,%0	
1647	004564	062700	002344		ADD	#IRK,%0	
1648	004570	010037	000220		MOV	%0,%0220	;RK11 ISR
1649	004574	042700	007777		BIC	#7777,%0	
1650	004600	062700	002450		ADD	#IRP,%0	
1651	004604	010037	000254		MOV	%0,%0254	;RP11 ISR
1652	004610	042700	007777		BIC	#007777,%0	
1653	004614	063700	002704		ADD	#LLIMIT,%0	
1654	004620	010067	176060		MOV	%0,LLIMIT	;CHANGE DISK NPR BUFFER
1655	004624	042700	007777		BIC	#007777,%0	
1656	004630	062700	017004		ADD	#BUFF,%0	
1657	004634	010006			MOV	%0,%6	;CHANGE STACK TO EXISTING BANK
1658							
1659	004636	012700	000010		MOV	#10,%0	;INDEX
1660	004642	026027	016710	052525	CMP	A(0),#052525	
1661	004650	001401			BEQ	+.4	
1662	004652	104000			HLT		;COMPARE FAILED
1663	004654	104400			SCOPE		
1664							
1665							
1666	004656	022760	052525	016710	CMP	#052525,A(0)	;REGISTER 0 CONTAINS 000010
1667	004664	001401			BEQ	+.4	
1668	004666	104000			HLT		;COMPARE FAILED
1669	004670	104400			SCOPE		
1670							
1671							
1672	004672	026060	016710	016710	CMP	A(0),A(0)	;REGISTER 0 CONTAINS 000010
1673	004700	001401			BEQ	+.4	
1674	004702	104000			HLT		;COMPARE FAILED
1675	004704	104400			SCOPE		
1676							
1677	004706	012700	177770		MOV	#-10,%0	
1678	004712	026060	016710	016710	CMP	A(0),A(0)	
1679	004720	001401			BEQ	+.4	
1680	004722	104000			HLT		;COMPARE FAILED
1681	004724	104400			SCOPE		
1682							
1683							
1684	004726	012701	000004		MOV	#+4,%1	;REGISTER 0 CONTAINS 177770 (-10)
1685	004732	026061	016710	016710	CMP	A(0),A(1)	
1686	004740	001401			BEQ	+.4	
1687	004742	104000			HLT		;COMPARE FAILED
1688	004744	104400			SCOPE		
1689							
1690	004746	026160	016710	016710	CMP	A(1),A(0)	
1691	004754	001401			BEQ	+.4	
1692	004756	104000			HLT		;COMPARE FAILED
1693	004760	104400			SCOPE		
1694							
1695	004762	012700	177774		MOV	#-4,%0	
1696	004766	012701	000010		MOV	#+10,%1	
1697	004772	026061	016710	016710	CMP	A(0),A(1)	
1698	005000	001401			BEQ	+.4	
1699	005002	104000			HLT		;CMP FAILED
1700	005004	104400			SCOPE		
1701							;REGISTER 0 CONTAINS 177774 (-4)

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1702      005006 026160 016710 016710      CMP      A(1),A(0)      ;REGISTER 1 CONTAINS 000010
1703      005014 001401      BEQ      .+4
1704      005016 104000      HLT
1705      005020 104400      SCOPE      ;COMPARE FAILED
1706      :TEST MOVE ODD BYTE TO REGISTER
1707      :PROBLEM 1150237-7-NAR-72
1708      005022 116700 011677      MOV      C+3,%0
1709      005026 022700 000035      CMP      #35,%0
1710      005032 001401      BEQ      .+4
1711      005034 104000      HLT
1712      005036 104400      SCOPE
1713      :TEST MOVE INSTRUCTION FOR INDEX
1714
1715      005040 012700 177770      MOV      #-10,%0
1716      005044 016067 016710 011660      MOV      A(0),TEMP
1717      005052 026727 011654 125252      CMP      TEMP,#125252
1718      005060 001401      BEQ      .+4
1719      005062 104000      HLT
1720      005064 104400      SCOPE      ;COMPARE FAILED
1721
1722      005066 012700 000010      MOV      #+10,%0
1723      005072 016067 016710 011632      MOV      A(0),TEMP
1724      005100 026727 011626 052525      CMP      TEMP,#052525
1725      005106 001401      BEQ      .+4
1726      005110 104000      HLT
1727      005112 104400      SCOPE      ;MOV FAILED
1728
1729      005114 012700 177770      MOV      #-10,%0
1730      005120 012760 125252 016732      MOV      #125252,TEMP(0)
1731      005126 023727 016722 125252      CMP      @#C,#125252
1732      005134 001401      BEQ      .+4
1733      005136 104000      HLT
1734      005140 104400      SCOPE      ;MOV FAILED
1735
1736      005142 012700 000010      MOV      #+10,%0
1737      005146 012760 052525 016732      MOV      #052525,TEMP(0)
1738      005154 023727 016742 052525      CMP      @#TEMP+10,#052525
1739      005162 001401      BEQ      .+4
1740      005164 104000      HLT
1741      005166 104400      SCOPE      ;MOV FAILED
1742
1743      :TEST BIC INSTRUCTION FOR INDEXING
1744
1745      005170 012767 177777 011534      MOV      #-1,TEMP
1746      005176 012700 177770      MOV      #-10,%0
1747      005202 046067 016710 011522      BIC      A(0),TEMP
1748      005210 026727 011516 052525      CMP      TEMP,#052525
1749      005216 001401      BEQ      .+4
1750      005220 104000      HLT
1751      005222 104400      SCOPE      ;BIC FAILED
1752
1753      005224 012767 177777 011500      MOV      #-1,TEMP
1754      005232 012700 000010      MOV      #10,%0
1755      005236 046067 016710 011466      BIC      A(0),TEMP
1756      005244 026727 011462 125252      CMP      TEMP,#125252
1757      005252 001401      BEQ      .+4

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1758	005254	104000			HLT						
1759	005256	104400			SCOPE					;BIC FAILED	
1760											
1761	005260	012737	177777	016742	MOV	#-1, @TEMP+10					
1762	005266	012700	000010		MOV	#10, %0					
1763	005272	042760	125252	016732	BIC	#125252, TEMP(0)					
1764	005300	023727	016742	052525	CMP	@TEMP+10, #52525					
1765	005306	001401			BEQ	+.4					
1766	005310	104000			HLT						
1767	005312	104400			SCOPE					;BIC FAILED	
1768											
1769	005314	012700	177770		MOV	#-10, %0					
1770	005320	012767	177777	011374	MOV	#-1, TEMP-10					
1771	005326	042767	052525	011366	BIC	#052525, TEMP-10					
1772	005334	026727	011362	125252	CMP	TEMP-10, #125252					
1773	005342	001401			BEQ	+.4					
1774	005344	104000			HLT						
1775	005346	104400			SCOPE					;BIC FAILED	
1776											
1777	005350	012767	125252	011354	;TEST SUBTRACT INSTRUCTION FOR INDEXING						
1778	005356	012700	177770		MOV	#125252, TEMP					
1779	005362	166067	016710	011342	MOV	#-10, %0					
1780	005370	001401			SUB	A(0), TEMP					
1781	005372	104000			BEQ	+.4					
1782	005374	104400			HLT						
1783					SCOPE					;SUB FAILED	
1784	005376	012737	125252	016732	MOV	#125252, @TEMP					
1785	005404	012700	177770		MOV	#-10, %0					
1786	005410	166760	011264	016742	SUB	B, TEMP+10(0)					
1787	005416	001401			BEQ	+.4					
1788	005420	104000			HLT						
1789	005422	104400			SCOPE					;SUB FAILED	
1790											
1791	005424	012767	052525	011300	MOV	#052525, TEMP					
1792	005432	012700	000010		MOV	#10, %0					
1793	005436	166067	016710	011266	SUB	A(0), TEMP					
1794	005444	001401			BEQ	+.4					
1795	005446	104000			HLT						
1796	005450	104400			SCOPE					;SUB FAILED	
1797											
1798	005452	012737	052525	016732	MOV	#052525, @TEMP					
1799	005460	012700	000010		MOV	#10, %0					
1800	005464	166760	011230	016722	SUB	A+10, C(0)					
1801	005472	001401			BEQ	+.4					
1802	005474	104000			HLT						
1803	005476	104400			SCOPE					;SUB FAILED	
1804											
1805											
1806	005500	012737	177777	016732	;TEST UNARYS INDEXED						
1807	005506	012700	177770		MOV	#-1, @TEMP					
1808	005512	005060	016742		MOV	#-10, %0					
1809	005516	005737	016732		CLR	D(0)					
1810	005522	001401			TST	@TEMP					
1811	005524	104000			BEQ	+.4					
1812	005526	104400			HLT						
1813					SCOPE					;CLR FAILED	

1814	005530	012737	177777	016732	MOV	#-1, @TEMP	
1815	005536	012700	000010		MOV	#+10, %0	
1816	005542	005060	016722		CLR	C(0)	
1817	005546	005737	016732		TST	@TEMP	
1818	005552	001401			BEQ	.+4	
1819	005554	104000			HLT		
1820	005556	104400			SCOPE		; CLR FAILED
1821							
1822	005560	012737	177777	016732	MOV	#-1, @TEMP	
1823	005566	012700	177770		MOV	#-10, %0	
1824	005572	005160	016742		COM	D(0)	
1825	005576	005737	016732		TST	@TEMP	
1826	005602	001401			BEQ	.+4	
1827	005604	104000			HLT		
1828	005606	104400			SCOPE		; COM FAILED
1829							
1830	005610	012737	177777	016732	MOV	#-1, @TEMP	
1831	005616	012700	000010		MOV	#10, %0	
1832	005622	005160	016722		COM	C(0)	
1833	005626	005737	016732		TST	@TEMP	
1834	005632	001401			BEQ	.+4	
1835	005634	104000			HLT		
1836	005636	104400			SCOPE		; COM FAILED
1837	005640	012737	177777	016732	MOV	#-1, @TEMP	
1838	005646	012700	177770		MOV	#-10, %0	
1839	005652	005260	016742		INC	D(0)	
1840	005656	005737	016732		TST	@TEMP	
1841	005662	001401			BEQ	.+4	
1842	005664	104000			HLT		
1843	005666	104400			SCOPE		; INC FAILED
1844							
1845	005670	012737	177777	016732	MOV	#-1, @TEMP	
1846	005676	012700	000010		MOV	#+10, %0	
1847	005702	005260	016722		INC	C(0)	
1848	005706	005737	016732		TST	@TEMP	
1849	005712	001401			BEQ	.+4	
1850	005714	104000			HLT		
1851	005716	104400			SCOPE		; INC FAILED
1852							
1853	005720	012737	000001	016732	MOV	#1, @TEMP	
1854	005726	012700	177770		MOV	#-10, %0	
1855	005732	005360	016742		DEC	D(0)	
1856	005736	005737	016732		TST	@TEMP	
1857	005742	001401			BEQ	.+4	
1858	005744	104000			HLT		
1859	005746	104400			SCOPE		; DEC FAILED
1860							
1861	005750	012737	000001	016732	MOV	#1, @TEMP	
1862	005756	012700	000010		MOV	#10, %0	
1863	005762	005360	016722		DEC	C(0)	
1864	005766	005737	016732		TST	@TEMP	
1865	005772	001401			BEQ	.+4	
1866	005774	104000			HLT		
1867	005776	104400			SCOPE		; DEC FAILED
1868							
1869	006000	012737	000001	016732	MOV	#1, @TEMP	

1870	006006	012700	177770		MOV	#-10,%0	
1871	006012	005460	016742		NEG	D(0)	
1872	006016	022737	177777	016732	CMP	#-1,%TEMP	
1873	006024	001401			BEQ	.+4	
1874	006026	104000			HLT		
1875	006030	104400			SCOPE		;NEG FAILED
1876							
1877	006032	012737	000001	016732	MOV	#1,%TEMP	
1878	006040	012700	000010		MOV	#+10,%0	
1879	006044	005460	016722		NEG	C(0)	
1880	006050	022737	177777	016732	CMP	#-1,%TEMP	
1881	006056	001401			BEQ	.+4	
1882	006060	104000			HLT		
1883	006062	104400			SCOPE		;NEG FAILED
1884							
1885	006064	012737	177777	016732	MOV	#-1,%TEMP	
1886	006072	012700	177770		MOV	#-10,%0	
1887	006076	000261			SEC		
1888	006100	005560	016742		ADC	D(0)	
1889	006104	005737	016732		TST	%TEMP	
1890	006110	001401			BEQ	.+4	
1891	006112	104000			HLT		
1892	006114	104400			SCOPE		;ADC FAILED
1893							
1894	006116	012737	177777	016732	MOV	#-1,%TEMP	
1895	006124	012700	000010		MOV	#+10,%0	
1896	006130	000261			SEC		
1897	006132	005560	016722		ADC	C(0)	
1898	006136	005737	016732		TST	%TEMP	
1899	006142	001401			BEQ	.+4	
1900	006144	104000			HLT		
1901	006146	104400			SCOPE		;ADC FAILED
1902							
1903	006150	012737	000001	016732	MOV	#1,%TEMP	
1904	006156	012700	177770		MOV	#-10,%0	
1905	006162	000261			SEC		
1906	006164	005560	016742		SBC	D(0)	
1907	006170	005737	016732		TST	%TEMP	
1908	006174	001401			BEQ	.+4	
1909	006176	104000			HLT		
1910	006200	104400			SCOPE		;SBC FAILED
1911							
1912	006202	012737	000001	016732	MOV	#1,%TEMP	
1913	006210	012700	000010		MOV	#+10,%0	
1914	006214	000261			SEC		
1915	006216	005560	016722		SBC	C(0)	
1916	006222	005737	016732		TST	%TEMP	
1917	006226	001401			BEQ	.+4	
1918	006230	104000			HLT		
1919	006232	104400			SCOPE		;SBC FAILED
1920							
1921							
1922	006234	010700			;TEST JMP INDIRECT		
1923	006236	062700	000010		MOV	%7,%0	
1924	006242	000110			ADD	#10,%0	
1925	006244	104000			JMP	%0	
					HLT		;JMP FAILED

1926	006246	000240			NOP		
1927	006250	104400			SCOPE		
1928							
1929	006252	010600			MOV	%6,%0	
1930	006254	010001			MOV	%0,%1	
1931	006256	010102			MOV	%1,%2	
1932	006260	010203			MOV	%2,%3	
1933	006262	010304			MOV	%3,%4	
1934	006264	010405			MOV	%4,%5	
1935	006266	020605			CMP	%6,%5	
1936	006270	001401			BEQ	.+4	
1937	006272	104000			HLT		
1938	006274	104400			SCOPE		;MOV REGISTOR FAILED
1939							
1940					;TEST INDIRECT ADDRESSING		
1941	006276	023727	016700	125252	;TEST COMPARE INSTRUCTION		
1942	006304	001401			CMP	2#B,2#125252	
1943	006306	104000			BEQ	.+4	
1944	006310	104400			HLT		
1945					SCOPE		;CMP FAILED
1946	006312	022737	125252	016700	CMP	2#125252,2#B	
1947	006320	001401			BEQ	.+4	
1948	006322	104000			HLT		
1949	006324	104400			SCOPE		;CMP FAILED
1950							
1951	006326	023737	016700	016700	CMP	2#B,2#B	
1952	006334	001401			BEQ	.+4	
1953	006336	104000			HLT		
1954	006340	104400			SCOPE		;CMP FAILED
1955							
1956					;TEST MOVE INSTRUCTIONS		
1957	006342	013700	016700		MOV	2#B,%0	
1958	006346	022700	125252		CMP	2#125252,%0	

1959	006352	001401			BEQ	+.4	
1960	006354	104000			HLT		;MOV FAILED
1961	006356	104400			SCOPE		
1962							
1963	006360	012737	125252	016732	MOV	#125252, @TEMP	
1964	006366	023737	016700	016732	CMP	@B, @TEMP	
1965	006374	001401			BEQ	+.4	
1966	006376	104000			HLT		;MOV FAILED
1967	006400	104400			SCOPE		
1968							
1969	006402	013737	016700	016722	MOV	@B, @C	
1970	006410	023737	016700	016722	CMP	@B, @C	
1971	006416	001401			BEQ	+.4	
1972	006420	104000			HLT		;MOV FAILED
1973	006422	104400			SCOPE		
1974							
1975	006424	012700	177777		;TEST BIC INSTRUCTION INDIRECT		
1976	006430	043700	016700		MOV	#-1, %0	
1977	006434	020027	052525		BIC	@B, %0	
1978	006440	001401			CMP	%0, #052525	
1979	006442	104000			BEQ	+.4	
1980	006444	104400			HLT		;BIC FAILED
1981					SCOPE		
1982	006446	012737	177777	016732	MOV	#-1, @TEMP	
1983	006454	042737	125252	016732	BIC	#125252, @TEMP	
1984	006462	022737	052525	016732	CMP	#052525, @TEMP	
1985	006470	001401			BEQ	+.4	
1986	006472	104000			HLT		;BIC FAILED
1987	006474	104400			SCOPE		
1988							
1989	006476	012737	177777	016722	MOV	#-1, @C	
1990	006504	043737	016700	016722	BIC	@B, @C	
1991	006512	023727	016722	052525	CMP	@C, #52525	
1992	006520	001401			BEQ	+.4	
1993	006522	104000			HLT		;BIC FAILED
1994	006524	104400			SCOPE		
1995							
1996							
1997	006526	012700	125252		;TEST SUBTRACT INSTRUCTION		
1998	006532	163700	016700		MOV	#125252, %0	
1999	006536	020027	000000		SUB	@B, %0	
2000	006542	001401			CMP	%0, #0	
2001	006544	104000			BEQ	+.4	
2002	006546	104400			HLT		;SUB FAILED
2003					SCOPE		
2004	006550	012737	125252	016732	MOV	#125252, @TEMP	
2005	006556	166737	010116	016732	SUB	B, @TEMP	
2006	006564	001401			BEQ	+.4	
2007	006566	104000			HLT		;SUB FAILED
2008	006570	104400			SCOPE		
2009							
2010	006572	012767	125252	010132	MOV	#125252, TEMP	
2011	006600	163767	016700	010124	SUB	@B, TEMP	
2012	006606	005767	010120		TST	TEMP	
2013	006612	001401			BEQ	+.4	
2014	006614	104000			HLT		;SUB FAILED

2015	006616	104400			SCOPE	
2016					:TEST UNARYS INDIRECT	
2017	006620	012737	177777	016732	MOV	#-1, @TEMP
2018	006626	005037	016732		CLR	@TEMP
2019	006632	005737	016732		TST	@TEMP
2020	006636	001401			BEQ	.+4
2021	006640	104000			HLT	
2022	006642	104400			SCOPE	;TST FAILED
2023						
2024	006644	012737	125252	016732	MOV	#125252, @TEMP
2025	006652	005137	016732		COM	@TEMP
2026	006656	022737	052525	016732	CMP	#052525, @TEMP
2027	006664	001401			BEQ	.+4
2028	006666	104000			HLT	
2029	006670	104400			SCOPE	;COM FAILED
2030						
2031	006672	005037	016732		CLR	@TEMP
2032	006676	005237	016732		INC	@TEMP
2033	006702	022737	000001	016732	CMP	#1, @TEMP
2034	006710	001401			BEQ	.+4
2035	006712	104000			HLT	
2036	006714	104400			SCOPE	;INC FAILED
2037						
2038	006716	005037	016732		CLR	@TEMP
2039	006722	005377	010006		DEC	@TEMP+2
2040	006726	023727	016732	177777	CMP	@TEMP, #-1
2041	006734	001401			BEQ	.+4
2042	006736	104000			HLT	
2043	006740	104400			SCOPE	;DEC FAILED
2044						
2045	006742	012737	000001	016732	MOV	#1, @TEMP
2046	006750	005437	016732		NEG	@TEMP
2047	006754	022737	177777	016732	CMP	#-1, @TEMP
2048	006762	001401			BEQ	.+4
2049	006764	104000			HLT	
2050	006766	104400			SCOPE	;NEG FAILED
2051						
2052					:TEST INDIRECT ADDRESSING WITH INDEXING	
2053					:TEST COMPARE INSTRUCTION	
2054	006770	027727	007706	125252	CMP	@B+2, #125252
2055	006776	001401			BEQ	.+4
2056	007000	104000			HLT	
2057	007002	104400			SCOPE	;CMP FAILED
2058						
2059	007004	022777	125252	007670	CMP	#125252, @B+2
2060	007012	001401			BEQ	.+4
2061	007014	104000			HLT	
2062	007016	104400			SCOPE	;CMP FAILED
2063						
2064	007020	027777	007656	007654	CMP	@B+2, @B+2
2065	007026	001401			BEQ	.+4
2066	007030	104000			HLT	
2067	007032	104400			SCOPE	;CMP FAILED
2068						
2069					:TEST MOVE INSTRUCTIONS	
2070	007034	017700	007642		MOV	@B+2, %0

2071	007040	022700	125252		CMP	#125252,%0	
2072	007044	001401			BEQ	.+4	
2073	007046	104000			HLT		;MOV FAILED
2074	007050	104400			SCOPE		
2075							
2076	007052	012777	125252	007654	MOV	#125252,@TEMP+2	
2077	007060	023737	016700	016732	CMP	@B,@TEMP	
2078	007066	001401			BEQ	.+4	
2079	007070	104000			HLT		;MOV FAILED
2080	007072	104400			SCOPE		
2081							
2082	007074	017777	007602	007622	MOV	@B+2,@C+2	
2083	007102	023737	016700	016722	CMP	@B,@C	
2084	007110	001401			BEQ	.+4	
2085	007112	104000			HLT		
2086	007114	104400			SCOPE		
2087							
2088							
2089	007116	012700	177777		MOV	#-1,%0	
2090	007122	047700	007554		BIC	@B+2,%0	
2091	007126	020027	052525		CMP	%0,#52525	
2092	007132	001401			BEQ	.+4	
2093	007134	104000			HLT		;BIC FAILED
2094	007136	104400			SCOPE		
2095							
2096	007140	012737	177777	016732	MOV	#-1,@TEMP	
2097	007146	042777	125252	007560	BIC	#125252,@TEMP+2	
2098	007154	022737	052525	016732	CMP	#52525,@TEMP	
2099	007162	001401			BEQ	.+4	
2100	007164	104000			HLT		;BIC FAILED
2101	007166	104400			SCOPE		
2102							
2103	007170	012737	177777	016722	MOV	#-1,@C	
2104	007176	047777	007500	007520	BIC	@B+2,@C+2	
2105	007204	026737	007510	016722	CMP	A+10,@C	
2106	007212	001401			BEQ	.+4	
2107	007214	104000			HLT		;BIC FAILED
2108	007216	104400			SCOPE		
2109							
2110	007220	012700	125252		MOV	#125252,%0	
2111	007224	167700	007452		SUB	@B+2,%0	
2112	007230	020027	000000		CMP	%0,%0	
2113	007234	001401			BEQ	.+4	
2114	007236	104000			HLT		;SUB FAILED
2115	007240	104400			SCOPE		
2116							
2117	007242	012737	125252	016732	MOV	#125252,@TEMP	
2118	007250	166777	007424	007456	SUB	B,@TEMP+2	
2119	007256	001401			BEQ	.+4	
2120	007260	104000			HLT		;SUB FAILED
2121	007262	104400			SCOPE		
2122							
2123	007264	012737	125252	016732	MOV	#125252,@TEMP	
2124	007272	167777	007404	007434	SUB	@B+2,@TEMP+2	
2125	007300	005737	016732		TST	@TEMP	
2126	007304	001401			BEQ	.+4	

;TEST BIC INSTRUCTION INDIRECT WITH INDEXING

2127	007306	104000		HLT					
2128	007310	104400		SCOPE					:SUB FAILED
2129									
2130									
2131	007312	005000			:TEST ADD INDIRECT WITH INDEXING				
2132	007314	067700	007362	CLR	%0				
2133	007320	022700	125252	ADD	2B+2,%0				
2134	007324	001401		CMP	#125252,%0				
2135	007326	104000		BEQ	.+4				
2136	007330	104400		HLT					:ADD FAILED
2137				SCOPE					
2138	007332	005037	016732	CLR	2#TEMP				
2139	007336	062777	125252	ADD	#125252,2#TEMP+2				
2140	007344	022737	125252	CMP	#125252,2#TEMP				
2141	007352	001401		BEQ	.+4				
2142	007354	104000		HLT					:ADD FAILED
2143	007356	104400		SCOPE					
2144	007360	012737	125252	MOV	#125252,2#TEMP				
2145	007366	067777	007324	ADD	2A+6,2#TEMP+2				
2146	007374	023727	016732	CMP	2#TEMP,#-1				
2147	007402	001401		BEQ	.+4				
2148	007404	104000		HLT					:ADD FAILED
2149	007406	104400		SCOPE					
2150									
2151					:TEST UNARYS INDIRECT WITH INDEXING				
2152	007410	012737	177777	MOV	#-1,2#TEMP				
2153	007416	005077	007312	CLR	2#TEMP+2				
2154	007422	005737	016732	TST	2#TEMP				
2155	007426	001401		BEQ	.+4				
2156	007430	104000		HLT					:TST FAILED
2157	007432	104400		SCOPE					
2158									
2159	007434	012737	125252	MOV	#125252,2#TEMP				
2160	007442	005177	007266	COM	2#TEMP+2				
2161	007446	022737	052525	CMP	#052525,2#TEMP				
2162	007454	001401		BEQ	.+4				
2163	007456	104000		HLT					:COM FAILED
2164	007460	104400		SCOPE					
2165									
2166	007462	005037	016732	CLR	2#TEMP				
2167	007466	005277	007242	INC	2#TEMP+2				
2168	007472	022737	000001	CMP	#1,2#TEMP				
2169	007500	001401		BEQ	.+4				
2170	007502	104000		HLT					:INC FAILED
2171	007504	104400		SCOPE					
2172									
2173	007506	005037	016732	CLR	2#TEMP				
2174	007512	005377	007216	DEC	2#TEMP+2				
2175	007516	023727	016732	CMP	2#TEMP,#-1				
2176	007524	001401		BEQ	.+4				
2177	007526	104000		HLT					:DEC FAILED
2178	007530	104400		SCOPE					
2179									
2180	007532	012737	000001	MOV	#1,2#TEMP				
2181	007540	005477	007170	NEG	2#TEMP+2				
2182	007544	022737	177777	CMP	#-1,2#TEMP				

2183	007552	001401			BEQ	.+4	
2184	007554	104000			HLT		
2185	007556	104400			SCOPE		:NEG FAILED
2186							
2187	007560	012737	177777	016732	MOV	#-1, @TEMP	
2188	007566	000261			SEC		
2189	007570	005577	007140		ADC	@TEMP+2	
2190	007574	005737	016732		TST	@TEMP	
2191	007600	001401			BEQ	.+4	
2192	007602	104000			HLT		
2193	007604	104400			SCOPE		:ADC FAILED
2194							
2195	007606	012737	000001	016732	MOV	#1, @TEMP	
2196	007614	000261			SEC		
2197	007616	005677	007112		SBC	@TEMP+2	
2198	007622	005737	016732		TST	@TEMP	
2199	007626	001401			BEQ	.+4	
2200	007630	104000			HLT		
2201	007632	104400			SCOPE		:SBC FAILED
2202							
2203							
2204	007634	012700	177772				:TEST OF COMBINED INDEXING AND INDIRECT
2205	007640	027027	016710	125252	MOV	#-6, %0	
2206	007646	001401			CMP	@A(0), #125252	
2207	007650	104000			BEQ	.+4	
2208	007652	104400			HLT		
2209					SCOPE		:CMP FAILED
2210	007654	012700	177772		MOV	#-6, %0	
2211	007660	022770	125252	016710	CMP	#125252, @A(0)	
2212	007666	001401			BEQ	.+4	
2213	007670	104000			HLT		
2214	007672	104400			SCOPE		:CMP FAILED
2215							
2216	007674	012700	177772		MOV	#-6, %0	
2217	007700	012701	000002		MOV	#+2, %1	
2218	007704	027071	016710	016710	CMP	@A(0), @A(1)	
2219	007712	001401			BEQ	.+4	
2220	007714	104000			HLT		
2221	007716	104400			SCOPE		:CMP FAILED
2222							
2223							
2224	007720	012700	000006				:TEST BIC INSTRUCTION
2225	007724	012767	177777	007000	MOV	#+6, %0	
2226	007732	047067	016710	006772	MOV	#-1, TEMP	
2227	007740	022767	125252	006764	BIC	@A(0), TEMP	
2228	007746	001401			CMP	#125252, TEMP	
2229	007750	104000			BEQ	.+4	
2230	007752	104400			HLT		
2231					SCOPE		:BIC FAILED
2232	007754	012700	177772		MOV	#-6, %0	
2233	007760	012737	177777	016722	MOV	#-1, @C	
2234	007766	042770	125252	016732	BIC	#125252, @TEMP(0)	
2235	007774	023727	016722	052525	CMP	@C, #052525	
2236	010002	001401			BEQ	.+4	
2237	010004	104000			HLT		
2238	010006	104400			SCOPE		:BIC FAILED

2239	010010	012737	177777	016722	MOV	#-1,%0	
2240	010016	012700	177772		MOV	#-6,%0	
2241	010022	012701	177772		MOV	#-6,%1	
2242	010026	047071	016710	016732	BIC	3A(0),3TEMP(1)	
2243	010034	022737	052525	016722	CMP	#052525,%0	
2244	010042	001401			BEQ	.+4	
2245	010044	104000			HLT		
2246	010046	104400			SCOPE		;BIC FAILED
2247							
2248	010050	122727	000000	000001	CMPB	#0,%1	;T7 FIX
2249	010056	002401			BLT	.+4	
2250	010060	104000			HLT		
2251	010062	104400			SCOPE		;CMPB FAILED
2252							
2253	010064	012700	177770		;TEST COMPARE INSTRUCTION INDEXED		
2254	010070	126027	016710	000252	MOV	#-10,%0	;MINUS 10 TO REG 0
2255	010076	001401			CMPB	A(0),#000252	; (A INDEX BY MINUS 10) TO #125252
2256	010100	104000			BEQ	.+4	
2257	010102	104400			HLT		;COMPARE WITH INDEX FAILED
2258					SCOPE		
2259	010104	012700	177770		MOV	#-10,%0	;FOR INDEX
2260	010110	122760	000252	016710	CMPB	#000252,A(0)	;A INDEXED
2261	010116	001401			BEQ	.+4	
2262	010120	104000			HLT		;CMPB FAILED
2263	010122	104400			SCOPE		
2264							
2265	010124	012700	000010		MOV	#10,%0	;INDEX
2266	010130	126027	016710	000125	CMPB	A(0),#000125	
2267	010136	001401			BEQ	.+4	
2268	010140	104000			HLT		;CMPB FAILED
2269	010142	104400			SCOPE		
2270							
2271	010144	012700	000010		MOV	#10,%0	
2272	010150	122760	000125	016710	CMPB	#000125,A(0)	
2273	010156	001401			BEQ	.+4	
2274	010160	104000			HLT		;CMPB FAILED
2275	010162	104400			SCOPE		
2276							
2277	010164	012700	177770		MOV	#-10,%0	
2278	010170	126060	016710	016710	CMPB	A(0),A(0)	
2279	010176	001401			BEQ	.+4	
2280	010200	104000			HLT		;CMPB FAILED
2281	010202	104400			SCOPE		
2282							
2283	010204	012700	000010		MOV	#+10,%0	
2284	010210	126060	016710	016710	CMPB	A(0),A(0)	
2285	010216	001401			BEQ	.+4	
2286	010220	104000			HLT		;CMPB FAILED
2287	010222	104400			SCOPE		
2288							
2289	010224	012700	177770		MOV	#-10,%0	
2290	010230	012701	000004		MOV	#+4,%1	
2291	010234	126061	016710	016710	CMPB	A(0),A(1)	
2292	010242	001401			BEQ	.+4	
2293	010244	104000			HLT		;CMPB FAILED
2294	010246	104400			SCOPE		

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2295 010250 126160 016710 016710      CMPB  A(1),A(0)
2296 010256 001401      BEQ    .+4
2297 010260 104000      HLT
2298 010262 104400      SCOPE      ;CMPB FAILED
2300
2301 010264 012700 177774      MOV    #-4,%0
2302 010270 012701 000010      MOV    #+10,%1
2303 010274 126061 016710 016710  CMPB  A(0),A(1)
2304 010302 001401      BEQ    .+4
2305 010304 104000      HLT
2306 010306 104400      SCOPE      ;CMPB FAILED
2307
2308 010310 012700 177774      MOV    #-4,%0
2309 010314 012701 000010      MOV    #+10,%1
2310 010320 126160 016710 016710  CMPB  A(1),A(0)
2311 010326 001401      BEQ    .+4
2312 010330 104000      HLT
2313 010332 104400      SCOPE      ;CMPB FAILED
2314
2315      ;TEST MOVE INSTRUCTION FOR INDEX
2316 010334 012700 177770      MOV    #-10,%0
2317 010340 116067 016710 006364  MOVB  A(0),TEMP
2318 010346 126727 006360 000252  CMPB  TEMP,#000252
2319 010354 001401      BEQ    .+4
2320 010356 104000      HLT
2321 010360 104400      SCOPE      ;MOVB FAILED
2322
2323 010362 012700 000010      MOV    #+10,%0
2324 010366 116067 016710 006336  MOVB  A(0),TEMP
2325 010374 126727 006332 000125  CMPB  TEMP,#000125
2326 010402 001401      BEQ    .+4
2327 010404 104000      HLT
2328 010406 104400      SCOPE      ;MOVB FAILED
2329
2330 010410 012700 177770      MOV    #-10,%0
2331 010414 112760 125252 016732  MOVB  #125252,TEMP(0)
2332 010422 123727 016722 125252  CMPB  3(C,#125252)
2333 010430 001401      BEQ    .+4
2334 010432 104000      HLT
2335 010434 104400      SCOPE      ;MOVB FAILED
2336
2337 010436 012700 000010      MOV    #+10,%0
2338 010442 112760 052525 016732  MOVB  #052525,TEMP(0)
2339 010450 123727 016742 052525  CMPB  3(TEMP+10,#052525)
2340 010456 001401      BEQ    .+4
2341 010460 104000      HLT
2342 010462 104400      SCOPE      ;MOVB FAILED
2343
2344      ;TEST BIC INSTRUCTION FOR INDEXING
2345 010464 012767 177777 006240  MOV    #-1,TEMP
2346 010472 012700 177770      MOV    #-10,%0
2347 010476 146067 016710 006226  BICB  A(0),TEMP
2348 010504 126727 006222 177525  CMPB  TEMP,#177525
2349 010512 001401      BEQ    .+4
2350 010514 104000      HLT
2351      ;BICB FAILED

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2351	010516	104400		SCOPE	
2352					
2353	010520	012767	177777	006204	MOV # -1, TEMP
2354	010526	012700	000010		MOV #10, %0
2355	010532	146067	016710	006172	BICB A(0), TEMP
2356	010540	126727	006166	007652	CMPB TEMP, #007652
2357	010546	001401			BEQ .+4
2358	010550	104000			HLT
2359	010552	104400			SCOPE ;BICB FAILED
2360					
2361	010554	012737	177777	016742	MOV # -1, 2*TEMP+10
2362	010562	012700	000010		MOV #10, %0
2363	010566	142760	125252	016732	BICB #125252, TEMP(0)
2364	010574	123727	016742	002525	CMPB 2*TEMP+10, #2525
2365	010602	001401			BEQ .+4
2366	010604	104000			HLT
2367	010606	104400			SCOPE ;BICB FAILED
2368					
2369	010610	012700	177770		MOV # -10, %0
2370	010614	012767	177777	006100	MOV # -1, TEMP-10
2371	010622	142767	052525	006072	BICB #052525, TEMP-10
2372	010630	126727	006066	125252	CMPB TEMP-10, #125252
2373	010636	001401			BEQ .+4
2374	010640	104000			HLT
2375	010642	104400			SCOPE ;BICB FAILED
2376					
2377					
2378	010644	012737	177777	016732	;TEST UNARYS INDEXED
2379	010652	012700	177770		MOV # -1, 2*TEMP
2380	010656	105060	016742		MOV # -10, %0
2381	010662	105737	016732		CLRB D(0)
2382	010666	001401			TSTB 2*TEMP
2383	010670	104000			BEQ .+4
2384	010672	104400			HLT
2385					SCOPE ;CLRB FAILED
2386	010674	012737	177777	016732	MOV # -1, 2*TEMP
2387	010702	012700	177770		MOV # -10, %0
2388	010706	105060	016742		CLRB D(0)
2389	010712	023727	016732	177400	CMP 2*TEMP, #177400
2390	010720	001401			BEQ .+4
2391	010722	104000			HLT
2392	010724	104400			SCOPE ;CLRB FAILED
2393					
2394	010726	012737	177777	016732	MOV # -1, 2*TEMP
2395	010734	012700	177771		MOV # -7, %0
2396	010740	105060	016742		CLRB D(0)
2397	010744	023727	016732	000377	CMP 2*TEMP, #000377
2398	010752	001401			BEQ .+4
2399	010754	104000			HLT
2400	010756	104400			SCOPE ;CLRB FAILED
2401					
2402	010760	012737	177777	016732	MOV # -1, 2*TEMP
2403	010766	012700	000010		MOV # +10, %0
2404	010772	105060	016722		CLRB C(0)
2405	010776	105737	016732		TSTB 2*TEMP
2406	011002	001401			BEQ .+4

2407	011004	104000		HLT			
2408	011006	104400		SCOPE			:CLRB FAILED
2409							
2410	011010	012737	177777 016732	MOV	#-1, @TEMP		
2411	011016	012700	177770	MOV	#-10, %0		
2412	011022	105160	016742	COMB	D(0)		
2413	011026	105737	016732	TSTB	@TEMP		
2414	011032	001401		BEQ	.+4		
2415	011034	104000		HLT			:COMB FAILED
2416	011036	104400		SCOPE			
2417							
2418	011040	012737	177777 016732	MOV	#-1, @TEMP		
2419	011046	012700	000010	MOV	#10, %0		
2420	011052	105160	016722	COMB	C(0)		
2421	011056	105737	016732	TSTB	@TEMP		
2422	011062	001401		BEQ	.+4		
2423	011064	104000		HLT			:COMB FAILED
2424	011066	104400		SCOPE			
2425	011070	012737	177777 016732	MOV	#-1, @TEMP		
2426	011076	012700	177770	MOV	#-10, %0		
2427	011102	105260	016742	INCB	D(0)		
2428	011106	105737	016732	TSTB	@TEMP		
2429	011112	001401		BEQ	.+4		
2430	011114	104000		HLT			:INCB FAILED
2431	011116	023727	016732 177400	CMP	@TEMP, #177400		
2432	011124	001401		BEQ	.+4		
2433	011126	104000		HLT			:INCB FAILED
2434	011130	104400		SCOPE			
2435							
2436	011132	012737	177777 016732	MOV	#-1, @TEMP		
2437	011140	012700	000010	MOV	#+10, %0		
2438	011144	105260	016722	INCB	C(0)		
2439	011150	105737	016732	TSTB	@TEMP		
2440	011154	001401		BEQ	.+4		
2441	011156	104000		HLT			:INCB FAILED
2442	011160	104400		SCOPE			
2443							
2444	011162	012737	000001 016732	MOV	#1, @TEMP		
2445	011170	012700	177770	MOV	#-10, %0		
2446	011174	105360	016742	DECB	D(0)		
2447	011200	105737	016732	TSTB	@TEMP		
2448	011204	001401		BEQ	.+4		
2449	011206	104000		HLT			:DECB FAILED
2450	011210	104400		SCOPE			
2451							
2452	011212	012737	000001 016732	MOV	#1, @TEMP		
2453	011220	012700	000010	MOV	#10, %0		
2454	011224	105360	016722	DECB	C(0)		
2455	011230	105737	016732	TSTB	@TEMP		
2456	011234	001401		BEQ	.+4		
2457	011236	104000		HLT			:DECB FAILED
2458	011240	104400		SCOPE			
2459							
2460	011242	012737	000001 016732	MOV	#1, @TEMP		
2461	011250	012700	177770	MOV	#-10, %0		
2462	011254	105460	016742	NEGB	D(0)		

2463	011260	023727	016732	000377	CMP	2#TEMP, #377	
2464	011266	001401			BEQ	.+4	
2465	011270	104000			HLT		:NEGB FAILED
2466	011272	104400			SCOPE		
2467							
2468	011274	012737	000001	016732	MOV	#1, 2#TEMP	
2469	011302	012700	000010		MOV	#+10, %0	
2470	011306	105460	016722		NEGB	C(0)	
2471	011312	023727	016732	000377	CMP	2#TEMP, #377	
2472	011320	001401			BEQ	.+4	
2473	011322	104000			HLT		:NEGB FAILED
2474	011324	104400			SCOPE		
2475							
2476	011326	012737	177777	016732	MOV	#-1, 2#TEMP	
2477	011334	012700	177770		MOV	#-10, %0	
2478	011340	000261			SEC		
2479	011342	105560	016742		ADCB	D(0)	
2480	011346	023727	016732	177400	CMP	2#TEMP, #177400	
2481	011354	001401			BEQ	.+4	
2482	011356	104000			HLT		:ADCB FAILED
2483	011360	104400			SCOPE		
2484							
2485	011362	012737	177777	016732	MOV	#-1, 2#TEMP	
2486	011370	012700	000010		MOV	#+10, %0	
2487	011374	000261			SEC		
2488	011376	105560	016722		ADCB	C(0)	
2489	011402	023727	016732	177400	CMP	2#TEMP, #177400	
2490	011410	001401			BEQ	.+4	
2491	011412	104000			HLT		:ADCB FAILED
2492	011414	104400			SCOPE		
2493							
2494	011416	012737	000401	016732	MOV	#401, 2#TEMP	
2495	011424	012700	177771		MOV	#-7, %0	
2496	011430	000261			SEC		
2497	011432	105660	016742		SBCB	D(0)	
2498	011436	022737	000001	016732	CMP	#1, 2#TEMP	
2499	011444	001401			BEQ	.+4	
2500	011446	104000			HLT		:SBCB FAILED
2501	011450	104400			SCOPE		
2502							
2503	011452	012737	000001	016732	MOV	#1, 2#TEMP	
2504	011460	012700	000010		MOV	#+10, %0	
2505	011464	000261			SEC		
2506	011466	105660	016722		SBCB	C(0)	
2507	011472	005737	016732		TST	2#TEMP	
2508	011476	001401			BEQ	.+4	
2509	011500	104000			HLT		:SBCB FAILED
2510	011502	104400			SCOPE		
2511							
2512							
2513							
2514	011504	123727	016700	000252	;TEST INDIRECT ADDRESSING		
2515	011512	001401			;TEST COMPARE INSTRUCTION		
2516	011514	104000			CMPB	2#B, #000252	
2517	011516	104000			BEQ	.+4	
2518					HLT		:CMPB FAILED
					SCOPE		

2519	011520	123727	016701	000252	CMPB	Q#B+1, #252	
2520	011526	001401			BEQ	.+4	
2521	011530	104000			HLT		;CMPB FAILED
2522	011532	104400			SCOPE		
2523							
2524							
2525	011534	122737	125252	016700	CMPB	#125252, Q#B	
2526	011542	001401			BEQ	.+4	
2527	011544	104000			HLT		;CMPB FAILED
2528	011546	104400			SCOPE		
2529							
2530	011550	123737	016700	016700	CMPB	Q#B, Q#B	
2531	011556	001401			BEQ	.+4	
2532	011560	104000			HLT		;CMPB FAILED
2533	011562	104400			SCOPE		
2534							
2535							
2536	011564	113700	016700		;TEST MOVE INSTRUCTIONS		
2537	011570	122700	000252		MOVB	Q#B, %0	
2538	011574	001401			CMPB	#000252, %0	
2539	011576	104000			BEQ	.+4	
2540	011600	104400			HLT		;MOVB FAILED
2541					SCOPE		
2542	011602	112737	125252	016732	MOVB	#125252, Q#TEMP	
2543	011610	126737	005064	016732	CMPB	B, Q#TEMP	
2544	011616	001401			BEQ	.+4	
2545	011620	104000			HLT		;MOVB FAILED
2546	011622	104400			SCOPE		
2547							
2548	011624	113737	016700	016722	MOVB	Q#B, Q#C	
2549	011632	126737	005042	016722	CMPB	B, Q#C	
2550	011640	001401			BEQ	.+4	
2551	011642	104000			HLT		;MOVB FAILED
2552	011644	104400			SCOPE		
2553							
2554	011646	012737	177777	016732	;TEST UNARYS INDIRECT		
2555	011654	105037	016732		MOV	#-1, Q#TEMP	
2556	011660	023727	016732	177400	CLRB	Q#TEMP	
2557	011666	001401			CMP	Q#TEMP, #177400	
2558	011670	104000			BEQ	.+4	
2559	011672	104400			HLT		;CLRB FAILED
2560					SCOPE		
2561	011674	012737	125252	016732	MOV	#125252, Q#TEMP	
2562	011702	105137	016732		COMB	Q#TEMP	
2563	011706	022737	125125	016732	CMP	#125125, Q#TEMP	
2564	011714	001401			BEQ	.+4	
2565	011716	104000			HLT		;COMB FAILED
2566	011720	104400			SCOPE		
2567							
2568	011722	012737	125252	016732	MOV	#125252, Q#TEMP	
2569	011730	105137	016733		COMB	Q#TEMP+1	
2570	011734	022737	052652	016732	CMP	#052652, Q#TEMP	
2571	011742	001401			BEQ	.+4	
2572	011744	104000			HLT		;COMB FAILED
2573	011746	104400			SCOPE		
2574							

2575	011750	005037	016732		CLR	2#TEMP	
2576	011754	105237	016733		INCB	2#TEMP+1	
2577	011760	022737	000400	016732	CMP	2#400, 2#TEMP	
2578	011766	001401			BEQ	.+4	
2579	011770	104000			HLT		: INCB FAILED
2580	011772	104400			SCOPE		
2581							
2582	011774	005037	016732		CLR	2#TEMP	
2583	012000	105377	004730		DECB	2#TEMP+2	
2584	012004	023727	016732	000377	CMP	2#TEMP, #377	
2585	012012	001401			BEQ	.+4	
2586	012014	104000			HLT		: DECB FAILED
2587	012016	104400			SCOPE		
2588							
2589	012020	005037	016732		CLR	2#TEMP	
2590	012024	112737	000001	016733	MOVB	#1, 2#TEMP+1	
2591	012032	105437	016733		NEGB	2#TEMP+1	
2592	012036	022737	177400	016732	CMP	2#177400, 2#TEMP	
2593	012044	001401			BEQ	.+4	
2594	012046	104000			HLT		: NEGB FAILED
2595	012050	104400			SCOPE		
2596							
2597							
2598							
2599	012052	127727	004624	125252	; TEST INDIRECT ADDRESSING WITH INDEXING		
2600	012060	001401			; TEST COMPARE INSTRUCTION		
2601	012062	104000			CMPB	2B+2, #125252	
2602	012064	104400			BEQ	.+4	
2603					HLT		: CMPB FAILED
2604	012066	122777	125252	004606	SCOPE		
2605	012074	001401			CMPB	#125252, 2B+2	
2606	012076	104000			BEQ	.+4	
2607	012100	104400			HLT		: CMPB FAILED
2608					SCOPE		
2609	012102	127777	004574	004572	CMPB	2B+2, 2B+2	
2610	012110	001401			BEQ	.+4	
2611	012112	104000			HLT		: CMPB FAILED
2612	012114	104400			SCOPE		
2613							
2614	012116	117700	004560		; TEST MOVE INSTRUCTIONS		
2615	012122	122700	125252		MOVB	2B+2, %0	
2616	012126	001401			CMPB	#125252, %0	
2617	012130	104000			BEQ	.+4	
2618	012132	104400			HLT		: MOVB FAILED
2619					SCOPE		
2620	012134	112777	125252	004572	MOVB	#125252, 2#TEMP+2	
2621	012142	126737	004532	016732	CMPB	B, 2#TEMP	
2622	012150	001401			BEQ	.+4	
2623	012152	104000			HLT		: MOVB FAILED
2624	012154	104400			SCOPE		
2625							
2626	012156	117777	004520	004540	MOVB	2B+2, 2C+2	
2627	012164	126737	004510	016722	CMPB	B, 2#C	
2628	012172	001401			BEQ	.+4	
2629	012174	104000			HLT		: MOVB FAILED
2630	012176	104400			SCOPE		

2631					
2632					
2633	012200	012700	177777		
2634	012204	147700	004472		
2635	012210	120027	052525		
2636	012214	001401			
2637	012216	104000			
2638	012220	104400			
2639					
2640	012222	012737	177777	016732	
2641	012230	142777	125252	004476	
2642	012236	122737	052525	016732	
2643	012244	001401			
2644	012246	104000			
2645	012250	104400			
2646					
2647	012252	012737	177777	016722	
2648	012260	147777	004416	004436	
2649	012266	126737	004426	016722	
2650	012274	001401			
2651	012276	104000			
2652	012300	104400			
2653					
2654	012302	012737	177777	016732	
2655	012310	105077	004420		
2656	012314	105737	016732		
2657	012320	001401			
2658	012322	104000			
2659	012324	104400			
2660					
2661	012326	012737	125252	016732	
2662	012334	105177	004374		
2663	012340	122737	052525	016732	
2664	012346	001401			
2665	012350	104000			
2666	012352	104400			
2667					
2668	012354	005037	016732		
2669	012360	105277	004350		
2670	012364	122737	000001	016732	
2671	012372	001401			
2672	012374	104000			
2673	012376	104400			
2674					
2675	012400	005037	016732		
2676	012404	105377	004324		
2677	012410	123727	016732	177777	
2678	012416	001401			
2679	012420	104000			
2680	012422	104400			
2681					
2682	012424	012737	000001	016732	
2683	012432	105477	004276		
2684	012436	122737	177777	016732	
2685	012444	001401			
2686	012446	104000			

;TEST BIC INSTRUCTION INDIRECT WITH INDEXING				
	MOV	#-1,%0		
	BICB	2B+2,%0		
	CMPB	%0,%52525		
	BEQ	.+4		
	HLT			
	SCOPE			;BICB FAILED
;TEST UNARYS INDIRECT WITH INDEXING				
	MOV	#-1,%TEMP		
	CLRB	2TEMP+2		
	TSTB	2TEMP		
	BEQ	.+4		
	HLT			
	SCOPE			;CLRB FAILED
	MOV	#125252,%TEMP		
	COMB	2TEMP+2		
	CMPB	#052525,%TEMP		
	BEQ	.+4		
	HLT			
	SCOPE			;COMB FAILED
	CLR	2TEMP		
	INCB	2TEMP+2		
	CMPB	#1,%TEMP		
	BEQ	.+4		
	HLT			
	SCOPE			;INCB FAILED
	CLR	2TEMP		
	DECB	2TEMP+2		
	CMPB	2TEMP,%-1		
	BEQ	.+4		
	HLT			
	SCOPE			;DECB FAILED
	MOV	#1,%TEMP		
	NEGB	2TEMP+2		
	CMPB	#-1,%TEMP		
	BEQ	.+4		
	HLT			
				;NEGB FAILED

2687	012450	104400			SCOPE	
2688						
2689	012452	012737	177777	016732	MOV	#-1, @TEMP
2690	012460	000261			SEC	
2691	012462	105577	004246		ADCB	@TEMP+2
2692	012466	022737	177400	016732	CMP	#177400, @TEMP
2693	012474	001401			BEQ	.+4
2694	012476	104000			HLT	
2695	012500	105737	016732		TSTB	@TEMP
2696	012504	001401			BEQ	.+4
2697	012506	104000			HLT	
2698	012510	104400			SCOPE	
2699						
2700	012512	012737	000001	016732	MOV	#1, @TEMP
2701	012520	000261			SEC	
2702	012522	105377	004206		DECB	@TEMP+2
2703	012526	005737	016732		TST	@TEMP
2704	012532	001401			BEQ	.+4
2705	012534	104000			HLT	
2706	012536	104400			SCOPE	
2707						
2708						
2709	012540	012700	177772		; TEST OF COMBINED INDEXING AND INDIRECT	
2710	012544	127027	016710	125252	MOV	#-6, %0
2711	012552	001401			CMPB	@A(0), #125252
2712	012554	104000			BEQ	.+4
2713	012556	104400			HLT	
2714					SCOPE	
2715	012560	012700	177772			
2716	012564	122770	125252	016710	MOV	#-6, %0
2717	012572	001401			CMPB	#125252, @A(0)
2718	012574	104000			BEQ	.+4
2719	012576	104400			HLT	
2720					SCOPE	
2721	012600	012700	177772			
2722	012604	012701	000002		MOV	#-6, %0
2723	012610	127071	016710	016710	MOV	#+2, %1
2724	012616	001401			CMPB	@A(0), @A(1)
2725	012620	104000			BEQ	.+4
2726	012622	104400			HLT	
2727					SCOPE	
2728	012624	012700	000006		; TEST BIC INSTRUCTION	
2729	012630	012767	177777	004074	MOV	#+6, %0
2730	012636	147067	016710	004066	MOV	#-1, TEMP
2731	012644	122767	125252	004060	BICB	@A(0), TEMP
2732	012652	001401			CMPB	#125252, TEMP
2733	012654	104000			BEQ	.+4
2734	012656	104400			HLT	
2735					SCOPE	
2736	012660	012700	177772			
2737	012664	012737	177777	016722	MOV	#-6, %0
2738	012672	142770	125252	016732	MOV	#-1, @#C
2739	012700	123727	016722	000125	BICB	#125252, @TEMP(0)
2740	012706	001401			CMPB	@#C, #000125
2741	012710	104000			BEQ	.+4
2742	012712	104400			HLT	
					SCOPE	

; ADCB FAILED

; TSTB FAILED

; DECB FAILED

; CMPB FAILED

; CMPB FAILED

; CMPB FAILED

; BICB FAILED

; BICB FAILED

2743						
2744	012714	012700	016702		MOV	#B+2,%0 ;ADDRESS OF ADDRESS OF B
2745	012720	023067	003754		CMP	2(0)+.B
2746	012724	001401			BEQ	.+4
2747	012726	104000			HLT	
2748	012730	104400			SCOPE	;CMP FAILED
2749						
2750	012732	012700	016704		MOV	#B+4,%0
2751	012736	025067	003736		CMP	2-(0).B
2752	012742	001401			BEQ	.+4
2753	012744	104000			HLT	
2754	012746	104400			SCOPE	;CMP FAILED
2755						
2756	012750	012700	016704		MOV	#B+4,%0
2757	012754	125067	003720		CMPB	2-(0).B
2758	012760	001401			BEQ	.+4
2759	012762	104000			HLT	
2760	012764	104400			SCOPE	;CMPB FAILED
2761						
2762	012766	012700	016726		MOV	#C+4,%0
2763	012772	012737	177777	016722	MOV	#-1,2#C
2764	013000	105050			CLRB	2-(0)
2765	013002	023727	016722	177400	CMP	2#C,2177400
2766	013010	001401			BEQ	.+4
2767	013012	104000			HLT	
2768	013014	104400			SCOPE	;CLRB FAILED
2769	013016	012737	177777	016722	MOV	#-1,2#C
2770	013024	012700	177772		MOV	#-6,%0
2771	013030	012701	177772		MOV	#-6,%1
2772	013034	147071	016710	016732	BICB	2A(0),2TEMP(1)
2773	013042	022737	177525	016722	CMP	2177525,2#C
2774	013050	001401			BEQ	.+4
2775	013052	104000			HLT	
2776	013054	104400			SCOPE	;BICB FAILED
2777						
2778	013056	012700	052525		MOV	#52525,%0
2779						
2780						
2781	013062	004767	000002		JSR	%7,TJSR2
2782	013066	000405			BR	TJSR3
2783	013070	121627	013066		CMPB	2%6,2TJSR1
2784	013074	001401			BEQ	.+4
2785	013076	104000			HLT	
2786	013100	000207			RTS	%7
2787	013102	104400			SCOPE	
2788						
2789	013104	000257			CCC	
2790	013106	004717			JSR	%7,2%7
2791	013110	121627	013110		CMPB	2%6,2TJSR3+6
2792	013114	001401			BEQ	.+4
2793	013116	104000			HLT	
2794	013120	005726			TST	(6)+
2795	013122	104400			SCOPE	
2796						
2797						
2798	013124	000257			CCC	

;TEST THAT RD IS NOT DESTROYED BY FALSE SELECTION
;TEST JSR INSTRUCTION
;PLACE PC ON STACK
;RETURN HERE ON RTS %7
;CHECK FOR CORRECT PC ON STACK
;INCORRECT PC ON STACK
;RETURN TO INST AFTER JSR
;INSTRUCTION UNDER TEST
;TEST THE STACK
;PC OF JSR DID NOT GO TO STACK
;REPOSITION THE STACK
;TEST NESTED SUBROUTINES
;CLEAR CONDITION CODES

2799	013126	004767	003366	JSR	%.7, SUBR6	
2800	013132	100401		BMI	.+4	
2801	013134	104000		HLT		;JSR OR RTS FAILED
2802	013136	001401		BEQ	.+4	
2803	013140	104000		HLT		;JSR OR RTS FAILED
2804	013142	102401		BVS	.+4	
2805	013144	104000		HLT		;JSR OR RTS FAILED
2806	013146	103401		BCS	.+4	
2807	013150	104000		HLT		;JSR OR RTS FAILED
2808	013152	104400		SCOPE		
2809				:TEST ROTATE ODD BYTE		
2810	013154	104400		SCOPE		
2811	013156	000257		CCC		;CLEAR "C"
2812	013160	012767	123456 003544	MOV	#123456, TEMP	
2813	013166	106067	003541	RORB	TEMP+1	;ROTATE ODD BYTE
2814	013172	103401		BCS	.+4	
2815	013174	104000		HLT		;C NOT SET
2816	013176	102401		BVS	.+4	
2817	013200	104000		HLT		;V NOT SET
2818	013202	022767	051456 003522	CMP	#051456, TEMP	
2819	013210	001401		BEQ	.+4	
2820	013212	104000		HLT		;ROTATE FAILED
2821	013214	104400		SCOPE		
2822	013216	000277		SCC		;SET C
2823	013220	012767	123456 003504	MOV	#123456, TEMP	
2824	013226	106067	003501	RORB	TEMP+1	
2825	013232	103401		BCS	.+4	
2826	013234	104000		HLT		;C NOT SET
2827	013236	102001		BVC	.+4	
2828	013240	104000		HLT		;V NOT CLEARED
2829	013242	022767	151456 003462	CMP	#151456, TEMP	
2830	013250	001401		BEQ	.+4	
2831	013252	104000		HLT		;ROTATE FAILED
2832	013254	104400		SCOPE		
2833						
2834	013256	000257		CCC		
2835	013260	012767	123456 003444	MOV	#123456, TEMP	
2836	013266	106167	003441	ROLB	TEMP+1	
2837	013272	103401		BCS	.+4	
2838	013274	104000		HLT		;C NOT SET
2839	013276	102401		BVS	.+4	
2840	013300	104000		HLT		;V NOT SET
2841	013302	022767	047056 003422	CMP	#047056, TEMP	
2842	013310	001401		BEQ	.+4	
2843	013312	104000		HLT		;ROTATE BYTE FAILED
2844	013314	104400		SCOPE		
2845						
2846	013316	000277		SCC		;SET C
2847	013320	012767	123456 003404	MOV	#123456, TEMP	
2848	013326	106167	003401	ROLB	TEMP+1	
2849	013332	103401		BCS	.+4	
2850	013334	104000		HLT		;C NOT SET
2851	013336	102401		BVS	.+4	
2852	013340	104000		HLT		;V NOT SET
2853	013342	022767	047456 003362	CMP	#047456, TEMP	
2854	013350	001401		BEQ	.+4	

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2855 013352 104000 HLT
2856 013354 104400 SCOPE
2857
2858 013356 000257 CCC
2859 013360 012767 177777 003344 MOV # -1 TEMP
2860 013366 106267 003341 ASRB TEMP+1
2861 013372 103401 BCS .+4
2862 013374 104000 HLT
2863 013376 102001 BVC .+4
2864 013400 104000 HLT
2865 013402 026727 003324 177777 CMP TEMP, # -1
2866 013410 001401 BEQ .+4
2867 013412 104000 HLT
2868 013414 104400 SCOPE
2869
2870 013416 000277 SCC
2871 013420 012767 177777 003304 MOV # -1 TEMP
2872 013426 106367 003301 ASLB TEMP+1
2873 013432 103401 BCS .+4
2874 013434 104000 HLT
2875 013436 102001 BVC .+4
2876 013440 104000 HLT
2877 013442 026727 003264 177377 CMP TEMP, #177377
2878 013450 001401 BEQ .+4
2879 013452 104000 HLT
2880 013454 104400 SCOPE
2881
2882 ;TEST COMBINATION OF N, C AND V
2883 .MACR TNCV
2884 BPL .+12
2885 BCC .+20
2886 BVC .+30
2887 HLT
2888 BR .+24
2889 BCC .+16
2890 BVS .+20
2891 HLT
2892 BR .+14
2893 BVS .+12
2894 HLT
2895 BR .+6
2896 BVC .+4
2897 HLT
2898 SCOPE
2899 .ENDM
2900 013456 005037 016462 CLR @#ICOUNT
2901
2902 ;TEST ROTATING NUMBERS
2903 013462 104400 SCOPE
2904 013464 012767 177777 000142 MOV # -1 REFF
2905 013472 005267 000136 TSROT: INC REFF
2906 013476 004767 000012 JSR %7, ROTALL
2907 013502 026727 000126 100077 CMP REFF, #100077
2908 013510 001370 BNE TSROT
2909 013512 000452 BR TSRT2A
2910 013514 016767 000114 000114 ROTALL: MOV REFF, TEST

```

;ROTATE ODD BYTE FAILED

;CLEAR C

;C NOT SET

;V NOT CLEARED

;SHIFT FAILED

;C NOT SET

;V NOT CLEARED

;SHIFT BYTE FAILED

;Z=1

;Z=1, C=1

;Z=C, BUT V=1

;Z=0

;Z=0, C=1

;Z NOT EQUAL C, V=1

;Z=1, C=0

;Z NOT EQUAL C, V=1

;Z=0, C=0

;Z=C, BUT V=1

;NO ITERATION

;INITIALIZE BASE NUMBER

;INCREMENT NUMBER

;GO TO COMPARE ROUTINE

;TEST ALL VALUES

;NO TEST THEM ALL

;WE ARE DONE

2911	013522	006167	000110	ROL	TEST	
2912	013526	006067	000104	ROR	TEST	
2913	013532	006067	000100	ROR	TEST	
2914	013536	006067	000074	ROR	TEST	
2915	013542	006067	000070	ROR	TEST	
2916	013546	006167	000064	ROL	TEST	
2917	013552	006167	000060	ROL	TEST	
2918	013556	006167	000054	ROL	TEST	
2919	013562			TNCV		
2920	013562	100004		BPL	.+12	
2921	013564	103007		BCC	.+20	:Z=1
2922	013566	102013		BVC	.+30	:Z=1, C=1
2923	013570	104000		HLT		:Z=C, BUT V=1
2924	013572	000411		BR	.+24	
2925	013574	103006		BCC	.+16	:Z=0
2926	013576	102407		BVS	.+20	:Z=0, C=1
2927	013600	104000		HLT		:Z NOT EQUAL C, V=1
2928	013602	000405		BR	.+14	
2929	013604	102404		BVS	.+12	:Z=1, C=0
2930	013606	104000		HLT		:Z NOT EQUAL C, V=1
2931	013610	000402		BR	.+6	
2932	013612	102001		BVC	.+4	:Z=0, C=0
2933	013614	104000		HLT		:Z=C, BUT V=1
2934	013616	104400		SCOPE		
2935	013620	026767	000012 000006	CMP	TEST, REFF	
2936	013626	001401		BEQ	.+4	
2937	013630	104000		HLT		
2938	013632	000207		RTS	%7	:INITIAL NOT EQUAL TO FINAL
2939	013634	000000				:ROTATE WORD FAILED
2940	013636	000000				:GOOD DATA
2941		013634				:BAD DATA
2942				REF=REFF		
2943	013640	012767	177777 177766	:TEST ROTATING BYTE EVEN/ODD, ALL NUMBERS		
2944	013646	005267	177762	TSRT2A: MOV	#-1 REFF	
2945	013652	004767	000016	TSROT2: INC	REFF	
2946	013656	004767	000122	JSR	%7, ROTBE	
2947	013662	022767	177777 177744	JSR	%7, ROTBO	
2948	013670	001366		CMP	#-1, REFF	
2949	013672	000505		BNE	TSROT2	
2950	013674	016767	177734 177734	BR	ROTE1	
2951	013702	106067	177730	MOV	REFF, TEST	
2952	013706	106067	177724	RORB	TEST	:ROTATE BYTE EVEN
2953	013712	106067	177720	RORB	TEST	
2954	013716	106167	177714	RORB	TEST	
2955	013722	106167	177710	ROLB	TEST	
2956	013726	106167	177704	ROLB	TEST	
2957	013732			TNCV		
2958	013732	100004		BPL	.+12	
2959	013734	103007		BCC	.+20	:Z=1
2960	013736	102013		BVC	.+30	:Z=1, C=1
2961	013740	104000		HLT		:Z=C, BUT V=1
2962	013742	000411		BR	.+24	
2963	013744	103006		BCC	.+16	:Z=0
2964	013746	102407		BVS	.+20	:Z=0, C=1
2965	013750	104000		HLT		:Z NOT EQUAL C, V=1
2966	013752	000405		BR	.+14	

2967	013754	102404		BVS	.+12		:Z=1, C=0
2968	013756	104000		HLT			:Z NOT EQUAL C, V=1
2969	013750	000402		BR	.+6		
2970	013762	102001		BVC	.+4		:Z=0, C=0
2971	013764	104000		HLT			:Z=C, BUT V=1
2972	013766	104400		SCOPE			
2973	013770	026767	177642 177636	CMP	TEST, REFF		
2974	013776	001401		BEQ	.+4		
2975	014000	104000		HLT			
2976	014002	000207		RTS	%7		
2977	014004	106067	177627	ROTBO: RORB	TEST+1		:ROTATE BYTE ODD
2978	014010	106067	177623	RORB	TEST+1		
2979	014014	106067	177617	RORB	TEST+1		
2980	014020	106167	177613	ROLB	TEST+1		
2981	014024	106167	177607	ROLB	TEST+1		
2982	014030	106167	177603	ROLB	TEST+1		
2983	014034			TNCV			
2984	014034	100004		BPL	.+12		
2985	014036	103007		BCC	.+20		:Z=1
2986	014040	102013		BVC	.+30		:Z=1, C=1
2987	014042	104000		HLT			:Z=C, BUT V=1
2988	014044	000411		BR	.+24		
2989	014046	103006		BCC	.+16		:Z=0
2990	014050	102407		BVS	.+20		:Z=0, C=1
2991	014052	104000		HLT			:Z NOT EQUAL C, V=1
2992	014054	000405		BR	.+14		
2993	014056	102404		BVS	.+12		:Z=1, C=0
2994	014060	104000		HLT			:Z NOT EQUAL C, V=1
2995	014062	000402		BR	.+6		
2996	014064	102001		BVC	.+4		:Z=0, C=0
2997	014066	104000		HLT			:Z=C, BUT V=1
2998	014070	104400		SCOPE			
2999	014072	026767	177540 177534	CMP	TEST, REFF		
3000	014100	001401		BEQ	.+4		
3001	014102	104000		HLT			
3002	014104	000207		RTS	%7		

3003	014106	104400			ROTE1: SCOPE
3004					:WILL ALLOW TWO FAST PASSES
3005	014110	005227	177776		INC #177776
3006	014114	100002			BPL +6
3007	014116	000167	000632		JMP EAESRT
3008					:ADD AND SUBTRACT ALL NUMBERS AGAINST FIXED NUMBERS
3009					:A+B=C, C-A=B, BF SHOULD EQUAL BI
3010	014122	011667	000072		↑STARI: MOV 2%6, NUMA
3011	014126	012767	000001	177500	MOV #1, REF
3012	014134	005267	177474		ARITST: INC REF


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3013 014140 004767 000014 JSR %7,ADSUB
3014 014144 022767 177777 177462 CMP #-1,REFF
3015 014152 001370 BNE ARITST
3016 014154 000422 BR ARIEND
3017 014156 104400 SCOPE
3018 014160 016767 177450 177450 ADSUB: MOV REF,TEST
3019 014166 066767 000026 177442 ADD NUMA,TEST
3020 014174 166767 000020 177434 SUB NUMA,TEST
3021 014202 026767 177426 177426 CMP REF,TEST
3022 014210 001401 BEQ .+4
3023 014212 104000 HLT
3024 014214 104400 SCOPE
3025 014216 000207 RTS %7
3026 014220 000000
3027 014222 104400 NUMA: 0
ARIEND: SCOPE

;TEST ALL COMBINATIONS OF NUMBERS WITH COMPARE INSTRUCTION
3030 014224 005002 COMPAR: CLR %2 ;INIT %2
3031 014226 005001 CLR %1 ;INIT %1
3032 014230 020201 CMP1: CMP %2,%1 ;ARE THE EQUAL
3033 014232 001401 BEQ .+4
3034 014234 104000 HLT
3035 014236 020227 177777 CMP %2,#-1 ;RD AND R1 DID NOT COMPARE
3036 014242 001403 BEQ CMP2 ;AT UPPER LIMIT
3037 014244 005202 INC %2 ;YES EXIT
3038 014246 005201 INC %1 ;INCREMENT TO NEXT NUMBER
3039 014250 000767 BR CMP1
3040 014252 104400 CMP2: SCOPE
3041 ;TEST COMPLEMENTING ALL NUMBERS
3042 014254 005067 002452 CLR TEMP ;BASE DATA
3043 014260 005067 002452 CLR TEMP+4 ;BASE REFERENCE
3044 014264 005167 002442 TCOM: COM TEMP ;COMPLEMENT DATA
3045 014270 005367 002442 DEC TEMP+4 ;DECREMENT REFERENCE
3046 014274 026767 002432 002434 CMP TEMP,TEMP+4 ;COMPARE
3047 014302 001401 BEQ .+4 ;TEST
3048 014304 104000 HLT ;COMPLIMENT OR DECREMENT FAILED
3049 014306 005167 002420 COM TEMP ;INCREMENT AND TEST FOR DONE
3050 014312 005267 002414 INC TEMP ;NOT FINISHED GO LOOP
3051 014316 001362 BNE TCOM
3052 014320 104400 SCOPE

;TEST COMB (EVEN BYTE)
3055 014322 005067 002404 CLR TEMP ;BASE DATA
3056 014326 005067 002404 CLR TEMP+4 ;REFERENCE DATA
3057 014332 105167 002374 TCOM2: COMB TEMP
3058 014336 005367 002374 DEC TEMP+4
3059 014342 126767 002364 002366 CMPB TEMP,TEMP+4 ;COMPARE
3060 014350 001401 BEQ .+4 ;COMPLIMENT OR INCREMENT BYTE FAILED
3061 014352 104000 HLT
3062 014354 105167 002352 COMB TEMP
3063 014360 105267 002346 INCB TEMP
3064 014364 001362 BNE TCOM2
3065 014366 104400 SCOPE

;TEST COMB (ODD BYTE)
3067 014370 005067 002336 CLR TEMP ;BASE DATA
3068 014374 005067 002336 CLR TEMP+4 ;REFERENCE DATA

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3069 014400 105167 002327 TCOM3: COMB TEMP+1 :ODD BYTE
3070 014404 005367 002326 DEC TEMP+4
3071 014410 126767 002317 002320 CMPB TEMP+1,TEMP+4
3072 014416 001401 BEQ .+4
3073 014420 104000 HLT :COMPLIMENT BYTE FAILED
3074 014422 105167 002305 COMB TEMP+1
3075 014426 105267 002301 INCB TEMP+1
3076 014432 001362 BNE TCOM3
3077 014434 104400 SCOPE
3078
3079 :TEST COMPARE ALL VALUE EVEN BYTE WITH ODD
3080 014436 005067 002270 CLR TEMP :BASE VALUE
3081 014442 126767 002264 002263 TSCOMB: CMPB TEMP,TEMP+1 :COMPARE
3082 014450 001401 BEQ .+4
3083 014452 104000 HLT :COMPARE FAILED
3084 014454 002001 BGE .+4
3085 014456 104000 HLT :V IS NOT = TO N
3086 014460 003401 BLE .+4
3087 014462 104000 HLT :V IS SET
3088 014464 062767 000401 002240 ADD #401,TEMP
3089 014472 022767 177777 002232 CMP #-1,TEMP
3090 014500 001360 BNE TSCOMB
3091 014502 104400 SCOPE
3092 014504 012737 004000 016462 MOV #4000,2#ICOUNT
3093 014512 104400 WAIT3: SCOPE
3094 014514 WAIT5:
3095 014514 012737 000010 016462 MOV #10,2#ICOUNT
3096
3097 :TEST TO SEE IF I/O DEVICES WERE SELECTED
3098 014522 122737 000377 001540 CMPB #377,2#REG1 :SELECTED DEVICES STORED IN REG1
3099 014530 001404 BEQ WAIT4 :BRANCH IF NO DEVICES SELECTED
3100 014532 000001 WAIT :INTERRUPTS WILL OCCUR
3101 014534 000001 WAIT :IF DEVICES ARE SELECTED
3102 014536 000001 WAIT
3103 014540 000001 WAIT
3104 014542 104400 WAIT4: SCOPE
3105 014544 012737 004000 016462 MOV #4000,2#ICOUNT
3106
3107 :TEST SWAB
3108 014552 012767 000200 177056 MOV #0200,TEST
3109 014560 000367 177052 SWAB TEST
3110 014564 100001 BPL .+4
3111 014566 104000 HLT
3112 014570 001401 BEQ .+4
3113 014572 104000 HLT
3114 014574 000367 177036 SWAB TEST
3115 014600 100401 BMI .+4
3116 014602 104000 HLT
3117 014604 001001 BNE .+4
3118 014606 104000 HLT
3119 014610 104400 SCOPE
3120 014612 005037 016462 CLR 2#ICOUNT
3121
3122 :TEST ALL COMBINATIONS OF SWAB
3123 014616 005067 177014 CLR TEST :NUMBER UNDER TEST
3124 014622 005067 177006 CLR REF :REFERENCE NUMBER

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3125	014626	000367	177004		SWABA: SWAB	TEST	: OPERATION UNDER TEST
3126	014632	026767	177000	176774	CMP	TEST, REF	: TEST SWAB INSTRUCTION
3127	014640	001401			BEG	.+4	
3128	014642	104000			HLT		: SWAB FAILED
3129	014644	000367	176766		SWAB	TEST	
3130	014650	005267	176760		INC	REF	: INCREMENT REFERENCE NUMBER
3131	014654	105267	176757		INCB	TEST+1	: INC TEST NUMBER
3132	014660	001362			BNE	SWABA	: LOOP TILL DONE
3133	014662	104400			SCOPE		
3134	014664	012737	004000	016462	MOV	#4000, @COUNT	
3135		000240					
3136		177776					
3137							
3138	014672	012767	177777	002032	MOV	#-1, TEMP	
3139	014700	000261			SEC		
3140	014702	105567	002025		ADCB	TEMP+1	
3141	014706	103401			BCS	.+4	
3142	014710	104000			HLT		: ADCB FAILED
3143	014712	022767	000377	002012	CMP	#377, TEMP	
3144	014720	001401			BEG	.+4	
3145	014722	104000			HLT		: ADCB FAILED
3146	014724	104400			SCOPE		
3147							
3148	014726	012703	000100				
3149	014732	012705	016732		MOV	#100, %3	
3150	014736	012737	177777	016732	MOV	#TEMP, %5	
3151	014744	030315			MOV	#-1, @TEMP	
3152	014746	001001			BIT	%3, @%5	
3153	014750	104000			BNE	.+4	
3154	014752	104400			HLT		: BIT FAILED
3155	014754	000402			SCOPE		
3156	014756	000167	000362		EAESRT: BR	.+6	: NOP IF NO EAE
3157					JMP	ENDEAE	
3158	014762	104400					
3159	014764	005077	163360		SCOPE		: TEST OF LOGICAL SHIFT
3160	014770	012777	125252	163354	CLR	@MQ	: LOAD MQ WITH 0
3161	014776	012777	177760	163362	MOV	#125252, @AC	: LOAD AC WITH 125252
3162	015004	005777	163342		MOV	#-16., @LSH	: LOAD SHIFT COUNT (LSH) WITH -16
3163	015010	001401			TST	@AC	: COMPARE AC WITH 0
3164	015012	104000			BEG	.+4	: GO TO HLT IF BAD
3165	015014	022777	125252	163326	HLT		
3166	015022	001401			CMP	#125252, @MQ	: COMPARE MQ WITH 125252
3167	015024	104000			BEG	.+4	: GO TO HLT IF BAD
3168	015026	122777	000020	163322	HLT		
3169	015034	001401			CMPB	#20, @SRE	: COMPARE SR WITH 2
3170	015036	104000			BEG	.+4	: SKIP HLT IF GOOD
3171					HLT		: HALT ON ERROR (LEFT SHIFT)
3172							
3173	015040	104400					
3174	015042	005077	163302		SCOPE		: TEST OF ARITHMETIC SHIFT
3175	015046	012777	177777	163276	CLR	@MQ	: LOAD MQ WITH 0
3176	015054	012777	000020	163306	MOV	#-1, @AC	: LOAD AC WITH -1
3177	015062	005777	163264		MOV	#16., @ASH	: LOAD SHIFT COUNT (ASH) WITH 16.
3178	015066	100401			TST	@AC	: COMPARE AC WITH 100000
3179	015070	104000			BMI	.+4	: SKIP HLT IF GOOD
3180	015072	005777	163252		HLT		: HALT ON ERROR
					TST	@MQ	: COMPARE MQ WITH 0

3181	015076	001401			BEQ	+.4		:SKIP HLT IF GOOD
3182	015100	104000			HLT			:HALT ON ERROR
3183	015102	122777	000110	163246	CMPB	#110, ASFE		:COMPARE SR WITH 10
3184	015110	001401			BEQ	+.4		:SKIP HLT IF GOOD
3185	015112	104000			HLT			:HALT ON ERROR (RIGHT SHIFT)
3186								
3187								
3188	015114	104400						:TEST NORMALIZE
3189	015116	012777	125252	163224	SCOPE			:TEST OF NORMALIZE
3190	015124	012777	170000	163220	MOV	#125252, AMQ		:LOAD MQ WITH 125252
3191	015132	005077	163226		MOV	#170000, AAC		:LOAD AC WITH 170000
3192	015136	022777	100005	163206	CLR	ANOR		:START NORMALIZE
3193	015144	001401			CMP	#100005, AAC		:COMPARE AC WITH 100005
3194	015146	104000			BEQ	+.4		:SKIP HLT IF GOOD
3195	015150	022777	052520	163172	HLT			:HALT ON ERROR
3196	015156	001401			CMP	#52520, AMQ		:COMPARE MQ WITH 52520
3197	015160	104000			BEQ	+.4		:SKIP HLT IF GOOD
3198	015162	122777	000003	163164	HLT			:HALT ON ERROR
3199	015170	001401			CMPB	#3, ASC		:COMPARE SC WITH 3
3200	015172	104000			BEQ	+.4		:SKIP HLT IF GOOD
3201					HLT			:HALT ON ERROR (NORMALIZE)
3202	015174	104400						:TEST MULTIPLY
3203	015176	012777	125252	163144	SCOPE			:TEST OF MULTIPLY
3204	015204	012777	040000	163146	MOV	#125252, AMQ		:LOAD MQ WITH 125252
3205	015212	022777	165252	163132	MOV	#40000, AMUL		:LOAD MUL WITH 40000
3206	015220	001401			CMP	#165252, AAC		:COMPARE AC WITH 1652
3207	015222	104000			BEQ	+.4		:SKIP IF GOOD
3208	015224	005777	163120		HLT			:HALT ON ERROR
3209	015230	100401			TST	AMQ		:COMPARE MQ WITH 10000
3210	015232	104000			BMI	+.4		:SKIP HLT IF GOOD
3211	015234	122777	000300	163114	HLT			:HALT ON ERROR
3212	015242	001401			CMPB	#300, ASRE		:COMPARE SR WITH 300
3213	015244	104000			BEQ	+.4		:SKIP HLT IF GOOD
3214					HLT			:HALT ON ERROR (MULTIPLY)
3215								
3216	015246	104400						:TEST DIVIDE
3217	015250	012777	125252	163072	SCOPE			:TEST OF DIVIDE
3218	015256	012777	177777	163066	MOV	#125252, AMQ		:LOAD MQ WITH 125252
3219	015264	012777	000002	163070	MOV	#-1, AAC		:LOAD AC WITH -1
3220	015272	005777	163054		MOV	#2, ADIV		:LOAD DIV WITH 2 AND DIVIDE
3221	015276	001401			TST	AAC		:COMPARE AC WITH 0 (QUOTIENT)
3222	015300	104000			BEQ	+.4		:SKIP HLT IF GOOD
3223	015302	022777	152525	163040	HLT			:HALT ON ERROR
3224	015310	001401			CMP	#152525, AMQ		:COMPARE MQ WITH 152525
3225	015312	104000			BEQ	+.4		:SKIP HLT IF GOOD
3226	015314	104400			HLT			:DIVIDE ERROR
3227	015316	012767	177777	001406	SCOPE			
3228	015324	000261			MOV	#-1, TEMP		
3229	015326	105667	001401		SEC			
3230	015332	022767	177377	001372	SBCB	TEMP+1		
3231	015340	001401			CMP	#177377, TEMP		
3232	015342	104000			BEQ	+.4		
3233	015344	104400			HLT			
3234	015346	022700	052525		ENDARE: SCOPE			
3235	015352	001401			CMP	#52525, %0		
3236	015354	104000			BEQ	+.4		:SOME OPERATION DESTROYED %0
					HLT			

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3237 015356 012737 016526 000024      MOV      #PFail,2#24      ;POWER FAIL VECTOR
3238 015364 012737 000340 000026      MOV      #340,2#26      ;PROCESSOR PRIORITY
3239                                     ;SKIP OVER BELL-NOP ON CORE EXPANSION
3240 015372 000401                      SKPBEL: BR      +4
3241 015374 000501                      BR      TRPA
3242 015376 032777 000100 162660      BIT      #100,2TTCSR
3243 015404 001006                      BNE      SBELL
3244                                     ;DON'T RING BELL IF TTY IS BUSY
3245 015406 012777 000207 000466      ;BELL ON PASS COMPLETE
3246 015414 105777 000464      BELL:  MOV      #207,2TDBR
3247 015420 100375                      TSTB     2TCSR
3248 015422 005227 000000      BPL      -4
3249 015426 010700                      SBELL:  INC      #0
3250 015430 042700 017777                      MOV      %7,%0      ;PASS COUNT LOCATION
3251 015434 062700 015460                      BIC      #17777,%0    ;SET UP RESERVED INSTRUCTION
3252 015440 010037 000010                      ADD      #BEG20,%0    ;OFFSET
3253 015444 006701                      MOV      %0,2#10
3254 015446 000240                      6701
3255 015450 012737 000006 015574      NOP
3256 015456 000403                      MOV      #6,2#YESRT
3257 015460 012737 000002 015574      BR      BEGANY
3258 015466 012737 000012 000010      BEG20: MOV      #2,2#YESRT
3259                                     BEGANY: MOV     #12,2#10
3260                                     ;ROUTINE TO CHECK FOR TRACE TRAP TO BE RUN WITH PROGRAM
3261                                     ;SAVE OLD CONTENTS, SET UP FOR TRACE TRAP
3262 015474 005046                      YESTR:  CLR      -(6)
3263 015476 032777 010000 162470      BIT      #10000,2SRPTR
3264 015504 001013                      BNE      ACT
3265 015506 012737 015574 000014      MOV      #YESRT,2#14
3266 015514 005167 000052                      COM      TRPB
3267 015520 001405                      BEQ      ACT
3268 015522 012716 000020                      MOV      #20,(6)
3269 015526 012746 004440      YESTR1: MOV     #BEGIN,-(6)
3270 015532 000002                      YESTR2: RTI
3271 015534 013700 000042      ACT:   MOV      2#42,%0
3272 015540 001772                      BEQ      YESTR1
3273 015542 012737 015554 000014      MOV      #CLEAR,2#14
3274 015550 012707 015554                      MOV      #CLEAR,%7
3275 015554 000005      CLEAR: RESET
3276 015556 004710      LOGICA: JSR      %7,2#0
3277 015560 000240                      NOP
3278 015562 000240                      NOP
3279 015564 000240                      NOP
3280 015566 000137 000502      JMP      2#START
3281 015572 000000      TRPB:  0
3282 015574 000002      YESRT: RTI
3283 015576 000000                      HALT
3284 015600 000137 004440      TRPA:  JMP      2#BEGIN
3285 015604 000000      PRFLAG: 0
3286                                     ;ENTERED WITH SYSTEM TRAP CALL(HLT)
3287                                     ;PRINT OUT THE ERROR PC AND STATUS REGISTER
3288                                     PRINT:  TST      PRFLAG
3289 015606 005767 177772                      BEQ      +4
3290 015612 001401                      RTI
3291 015614 000002                      INC      PRFLAG
3292 015616 005267 177762                      ;YES EXIT
3293                                     ;NO SET FLAG

```


3293	015622	005227	000000		INC	#0			
3294	015626	037727	162342	020000	BIT	SRPTR, #20000			:ERROR COUNT LOCATION
3295	015634	001401			BEG	+.4			:TEST FOR INHIBIT PRINT OUT
3296	015636	000501			BR	PRINT1			:BRANCH TO PRINT
3297	015640	012667	000242		MOV	(6)+, SAVPC			:INHIBIT RETURN TO MAIN STREAM
3298	015644	012667	000240		MOV	(6)+, SAVCC			:PC OF FAILING ROUTINE
3299	015650	024646			CMP	-(6), -(6)			:CC OF ERROR CONDITION
3300	015652	042767	000140	162116	BIC	#140, STATUS			:REPOSITION THE STACK
3301	015660	105777	000220		TSTB	ATCSR			
3302	015664	100375			BPL	-.4			:WAIT FOR FLAG
3303	015666	012777	000215	000206	MOV	#215, ATDBR			:FILLER CHARACTER.
3304	015674	105777	000204		TSTB	ATCSR			
3305	015700	100375			BPL	-.4			
3306	015702	012777	000212	000172	MOV	#212, ATDBR			:LINE FEED
3307	015710	105777	000170		TSTB	ATCSR			
3308	015714	100375			BPL	-.4			
3309	015716	010267	000152		MOV	%2, SAVR2			:SAVE R2
3310	015722	010367	000150		MOV	%3, SAVR3			:SAVE R3
3311	015726	010467	000146		MOV	%4, SAVR4			:SAVE R4
3312	015732	016702	000150		MOV	SAVPC, %2			
3313	015736	004767	000150		JSR	%7, PRTAB			:PRINT OCTAL NUMBER
3314	015742	012777	000240	000132	MOV	#240, ATDBR			
3315	015750	105777	000130		TSTB	ATCSR			:SPACE BETWEEN WORDS
3316	015754	100375			BPL	-.4			
3317	015756	016702	000126		MOV	SAVCC, %2			
3318	015762	004767	000124		JSR	%7, PRTAB			:PRINT OCTAL NUMBER
3319	015766	012777	000240	000106	MOV	#240, ATDBR			
3320	015774	105777	000104		TSTB	ATCSR			
3321	016000	100375			BPL	-.4			
3322	016002	016702	000460		MOV	RETURN, %2			:WHERE CPU TEST IS AT
3323	016006	004767	000100		JSR	%7, PRTAB			:RESTORE REGISTERS
3324	016012	016702	000056		MOV	SAVR2, %2			
3325	016016	016703	000054		MOV	SAVR3, %3			
3326	016022	016704	000052		MOV	SAVR4, %4			
3327	016026	012777	000377	000046	MOV	#377, ATDBR			
3328	016034	105777	000044		TSTB	ATCSR			
3329	016040	100375			BPL	-.4			
3330	016042	005777	162126		PRINT1: TST	SRPTR			:TEST FOR HALT SWITCH
3331	016046	100001			BPL	+.4			
3332	016050	000000			HALT				:HALT ON ERROR SET
3333	016052	005067	177526		CLR	PRFLAG			:CLEAR FLAG WHEN DONE
3334	016056	032777	000400	162110	BIT	#400, SRPTR			
3335	016064	001402			BEG	EXPRINT			
3336	016066	000167	162410		JMP	START			:RESTART ON ERROR
3337	016072	000002			EXPRINT: RTI				:RETURN TO MAIN STREAM
3338	016074	000000			SAVR2:	0			
3339	016076	000000			SAVR3:	0			
3340	016100	000000			SAVR4:	0			
3341	016102	177566			TDBR:	177566			:DATA
3342	016104	177564			TCSR:	177564			:STATUS
3343	016106	000000			SAVPC:	0			
3344	016110	000000			SAVCC:	0			
3345		017004			BUFF=FIN				:END OF PROGRAM-SP AREA.
3346									
3347	016112	005067	000252		PRTAB: CLR	BINCT			
3348	016116	005067	000244		CLR	WGTCT			


```

3349 016122 012704 016374      MOV      #LIST,%4
3350 016126 012767 000005 000236  MOV      #5,ASCNT
3351 016134 012767 000007 000220  MOV      #7,SEVEN
3352 016142 012767 000001 000214  MOV      #1,DECML
3353 016150 105777 177730      WAIT1:  TSTB   @TCSR
3354 016154 100375      BPL     WAIT1
3355 016156 005702      TST     %2
3356 016160 100404      BMI     MINUS
3357 016162 012777 000260 177712  MOV      #260,@TDBR
3358 016170 000403      BR      STAR
3359 016172 012777 000261 177702  MINUS:  MOV      #261,@TDBR
3360 016200 016703 000156      STAR:  MOV      SEVEN,%3
3361 016204 010267 000150      MOV      %2,TOODLE
3362 016210 005167 000144      COM     TOODLE
3363 016214 046703 000140      BIC     TOODLE,%3
3364 016220 001410      BEQ     WRTOC
3365 016222 066767 000136 000136  MKNUM:  ADD     DECML,WGTCT
3366 016230 005267 000134      INC     BINCT
3367 016234 026703 000126      CMP     WGTCT,%3
3368 016240 001370      BNE     MKNUM
3369 016242 062767 000260 000120  WRTOC:  ADD     #260,BINCT
3370 016250 016724 000114      MOV      BINCT,(4)+
3371 016254 066767 000102 000102  ADD     SEVEN,DECML
3372 016262 005067 000100      CLR     WGTCT
3373 016266 005067 000076      CLR     BINCT
3374 016272 005367 000074      DEC     ASCNT
3375 016276 001410      BEQ     XLIST
3376 016300 012703 000003      MOV      #3,%3
3377 016304 066767 000052 000050  MOADD:  ADD     SEVEN,SEVEN
3378 016312 005303      DEC     %3
3379 016314 001373      BNE     MOADD
3380 016316 000730      BR      STAR
3381 016320 012767 000005 000044  XLIST:  MOV      #5,ASCNT
3382 016326 105777 177552      WAIT2:  TSTB   @TCSR
3383 016332 100375      BPL     WAIT2
3384 016334 014477 177542      MOV      -(4),@TDBR
3385 016340 005367 000026      DEC     ASCNT
3386 016344 001401      BEQ     HDFHM
3387 016346 000767      BR      WAIT2
3388 016350 105777 177530      HDFHM:  TSTB   @TCSR
3389 016354 100375      BPL     -4
3390 016356 000207      RTS     %7
3391 016360 000000      TOODLE: 0
3392 016362 000000      SEVEN:  0
3393 016364 000000      DECML:  0
3394 016366 000000      WGTCT:  0
3395 016370 000000      BINCT:  0
3396 016372 000000      ASCNT:  0
3397 016374 000000      LIST:   0
3398 016376 000000      0
3399 016400 000000      0
3400 016402 000000      0
3401 016404 000000      0
3402
3403
3404
;SCOPE LOOP ROUTINE ENTERED BY USER TRAP
;SCOPE OR/AND ITERATION LOOP FOR EACH TEST 4000 TIMES

```

;GET LIST ADDRESS

;NEG SIGN PRINT 1
;POS SIGN PRINT 0;PUT MASK IN R3
;GET READY TO DOODLE NUMBER IN TOODLE
;COMPENSATES FOR COMPLEMENT DURING BIC
;AND IN OCTAL CHARACTER
;ZERO, WRITE 0 IN LIST
;COUNT UP TO
;AND RECORD
;SAME BINARY WEIGHT
;KEEP COUNTN
;ADD ASCII PREFIX
;WRITE ASCII CHAR IN LIST
;EXPAND BINARY WEIGHT;5 CHAR IN LIST
;SET X3 FOR ADD LOOP
;MAKING SEVENTY BY SEVEN;NX SEVEN SET GET NX OCTAL
;SEND 5 CHAR TO TTY

;FINISH PRINTING GET NXT NUM

;HEAD FOR HOME

3405	016406	032777	040000	161560	SCOPEC: BIT	#40000, JSR PTR	: TEST SR FOR SCOPE
3406	016414	001012			BNE	SCOPEB	: YES SCOPE
3407	016416	032777	004000	161550	BIT	#4000, JSR PTR	: NO - TEST FOR ITERATION
3408	016424	001011			BNE	SCOPEB	: INHIBIT ITERATION
3409	016426	026767	000032	000026	CMP	SCOPEF, ICOUNT	
3410	016434	001405			BEG	SCOPEB	: EXIT - DONE
3411	016436	005267	000022		INC	SCOPEF	: INCREMENT COUNT
3412	016442	016716	000020		SCOPEB: MOV	RETURN, 2%6	: REPOSITION THE STACK
3413	016446	000002			RTI		: SCOPE RETURN
3414	016450	005067	000010		SCOPEB: CLR	SCOPEF	: CLEAR COUNT
3415	016454	011667	000006		MOV	2%6, RETURN	: SAVE SCOPE RETURN POINTER
3416	016460	000002			RTI		: RETURN INLINE-NEXT TEST
3417	016462	004000			ICOUNT: 4000		
3418	016464	000000			SCOPEF: 0		: COUNT LOCATION FOR ITERATION LOOP
3419	016466	004440			RETURN: BEGIN		: ADDRESS OF LAST TEST
3420							
3421					: GROUP OF NESTED SUBROUTINES		
3422	016470	000207			SUBR1: RTS	%7	: ONE INSTRUCTION
3423	016472	000277			SUBR2: SCC		: ONE DEEP
3424	016474	000205			RTS	%5	
3425	016476	004537	016472		SUBR3: JSR	%5, 2#SUBR2	: TWO DEEP
3426	016502	000204			RTS	%4	
3427	016504	004467	177766		SUBR4: JSR	%4, SUBR3	: THREE DEEP
3428	016510	000203			RTS	%3	
3429	016512	004367	177766		SUBR5: JSR	%3, SUBR4	: FOUR DEEP
3430	016516	000202			RTS	%2	
3431	016520	004267	177766		SUBR6: JSR	%2, SUBR5	: FIVE DEEP
3432	016524	000207			RTS	%7	
3433					: ENTER HERE OR POWER FAIL		
3434							
3435	016526	010046			PFAIL: MOV	%0, -(6)	: SAVE REGISTER OR STACK
3436	016530	010146			MOV	%1, -(6)	: WHEN POWERING DOWN
3437	016532	010246			MOV	%2, -(6)	
3438	016534	010346			MOV	%3, -(6)	
3439	016536	010446			MOV	%4, -(6)	
3440	016540	010546			MOV	%5, -(6)	
3441	016542	016746	161256		MOV	24, -(6)	
3442	016546	012737	000002	000006	MOV	#RTI, 2%6	: IN CASE OF NO EAE
3443	016554	012700	016614		MOV	#HAC, %0	

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3444 016560 017720 161566      MOV      SAC, (%0)+
3445 016564 017720 161560      MOV      SMO, (%0)+
3446 016570 017720 161560      MOV      SSC, (%0)+
3447 016574 010046      MOV      %0, -(%6)
3448 016576 010667 000010      MOV      %6, SAVR6
3449 016602 012767 016622 161214      MOV      #RESTART, 24
3450 016610 000000      HALT
3451 016612 000000      SAVR6: 0
3452 016614 000000      HAC: 0
3453 016616 000000      HMO: 0
3454 016620 000000      HSC: 0
3455 016622 016706 177764      RESTART:
3456 016626 012600      MOV      SAVR6, %6
3457 016630 014077 161520      MOV      (%6)+, %0
3458 016634 014077 161510      MOV      -(%0), SSC
3459 016640 014077 161506      MOV      -(%0), SMO
3460 016644 005037 000006      MOV      -(%0), SAC
3461 016650 012667 161150      CLR      S#6
3462 016654 012605      MOV      (6)+, 24
3463 016656 012604      MOV      (6)+, %5
3464 016660 012603      MOV      (6)+, %4
3465 016662 012602      MOV      (6)+, %3
3466 016664 012601      MOV      (6)+, %2
3467 016666 012600      MOV      (6)+, %1
3468 016670 005037 016612      MOV      (6)+, %0
3469 016674 104000      CLR      S#SAVR6
3470 016676 000002      HLT
3471 016700 125252      RTI
3472      B: 125252
3473      ;FIXED VALUES FOR USE IN TEST
3474 016702 016700      B
3475 016704 052525      052525
3476      ;ADDRESS OF B
3477      . = B+10
3478 016710 177777      A: -1
3479 016712 016714      A+4
3480      . = A+4
3481 016714 016714
3482 016716 125252
3483 016720 016720
3484 016720 052525
3485      ;FOR STORAGE
3486 016722 000000      C: 0
3487 016724 016722      C
3488      ;ADDRESS OF C
3489      . = C+10
3490 016732 000000      TEMP: 0
3491 016734 016732      TEMP
3492      ;ADDRESS OF TEMP
3493      . = TEMP+6
3494 016740 016742      TEMP+10
3495 016742 000000      ;ADDRESS OF TEMP+10 OR "D"
3496 017004 017004      D: 0
3497 017006 000207      . = +40
3498      FIN: 0
3499      USER: RTS %7
          ;PDP-11 MEMORY DETERMINATION AND SETUP
          ;USE WITH VARIABLE CORE QUANTITY SYSTEMS
          ;BUFFER FOR SP
          ;OVERLAY USER ROUTINE HERE IF 4KW, USE BANK1 IF 8KW

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3500 017010 017010 004440 176564 DET1: =FIN + 4 ;APPLICABLE TO SYSTEM TEST 21
3501 017016 012767 000401 176346 MOV #BEGIN,TRPA+2
3502 017024 004767 000412 017010 MOV #401,SKFBEL ;BR .+4
3503 017030 023727 000042 017010 JSR #7,MAMF
3504 017036 101401 000042 017010 CMP #42,DET1 ;CHECK FOR DDP1
3505 017040 000207 000042 017010 BLOS .+4
3506 017042 032777 001000 161124 RTS %7 ;NO CORE EXPANSION WITH DDP1
3507 017050 001401 000042 017010 BIT #1000,JSRPTR ;CHECK VARIABLE CORE SWITCH
3508 017052 000207 000042 017010 BEQ DET4 ;USE VARIABLE CORE ROUTINE
3509 017054 012767 000042 017010 RTS %7 ;4K ONLY
3510 017062 012767 000340 160722 DET4: MOV #DET2,4 ;TRAP VECTOR SETUP
3511 017070 005537 037770 160716 MOV #340,6 ;TRAP STATUS SETUP
3512 017074 005537 057770 EIGHT: ADC #37770 ;CHECK FOR 8K
3513 017100 005537 077770 TWELVE: ADC #57770 ;CHECK FOR 12K
3514 017104 005537 117770 SXTEEN: ADC #077770 ;CHECK FOR 16K
3515 017110 005537 137770 TWENTY: ADC #117770 ;CHECK FOR 20K
3516 017114 005537 157770 TWOFOR: ADC #137770 ;CHECK FOR 24K
3517 017120 000430 000430 TWOEIG: ADC #157770 ;CHECK FOR 28K
3518 017122 012602 000430 BR STRT28
3519 017124 005726 000430 DET2: MOV (6)+,%2 ;RETRIEVE TRAP PC
3520 017126 022702 017074 TST (6)+ ;DISCARD TRAP STATUS WORD
3521 017132 001542 017100 CMP #EIGHT+4,%2 ;4K
3522 017134 022702 017100 BEQ DET3
3523 017140 001437 017104 CMP #TWELVE+4,%2 ;8K
3524 017142 022702 017104 BEQ STRT8
3525 017146 001431 017110 CMP #SXTEEN+4,%2 ;12K
3526 017150 022702 017110 BEQ STRT12
3527 017154 001423 017114 CMP #TWENTY+4,%2 ;16K
3528 017156 022702 017114 BEQ STRT16
3529 017162 001415 017114 CMP #TWOFOR+4,%2 ;20K
3530 017164 000411 017114 BEQ STRT20
3531 017166 005000 017114 BR STRT24 ;24K
3532 017170 012021 017006 MOVE: CLR %0 ;SET UP MAIN CORE CURRENT
3533 017172 020027 017006 MOV (0)+,(1)+ ;MOVE WORD
3534 017176 001374 017006 CMP %0,#FIN+2 ;MOVE COMPLETE?
3535 017200 000207 000040 BNE .-6 ;MOVE ANOTHER WORD
3536 017202 004767 000040 RTS %7 ;MOVE COMPLETE
3537 017206 000450 000040 STRT28: JSR %7,XFER28 ;START 28K TRANSFER
3538 017210 004767 000042 STRT24: BR MOD24 ;START 24K MODIFY
3539 017214 000453 000044 STRT20: JSR %7,XFER24 ;START 24K TRANSFER
3540 017216 004767 000044 STRT20: BR MOD20 ;START 20K MODIFY
3541 017222 000456 000046 STRT16: JSR %7,XFER20 ;START 20K TRANSFER
3542 017224 004767 000046 STRT16: BR MOD16 ;START 16K MODIFY
3543 017230 000461 000050 STRT12: JSR %7,XFER16 ;START 16K TRANSFER
3544 017232 004767 000050 STRT12: BR MOD12 ;START 12K MODIFY
3545 017236 000464 000052 STRT8: JSR %7,XFER12 ;START 12K TRANSFER
3546 017240 004767 000052 STRT8: BR MOD8 ;START 8K MODIFY
3547 017244 000467 000052 STRT8: JSR %7,XFER8 ;START 8K TRANSFER
3548 017246 012701 140000 XFER28: MOV #140000,%1 ;START 4K MODIFY
3549 017252 004767 177710 XFER24: JSR %7,MOVE ;SET UP MOVE START LOCATION
3550 017256 012701 120000 XFER24: MOV #120000,%1 ;GO TO MOVE SUBROUTINE
3551 017262 004767 177700 XFER20: JSR %7,MOVE
3552 017266 012701 100000 XFER20: MOV #100000,%1
3553 017272 004767 177670 XFER16: JSR %7,MOVE
3554 017276 012701 060000 XFER16: MOV #60000,%1
3555

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3556 017302 004767 177660      JSR      %7, MOVE
3557 017306 012701 040000      XFER12: MOV    #40000, %1
3558 017312 004767 177650      JSR      %7, MOVE
3559 017316 012701 020000      XFER8:  MOV    #20000, %1
3560 017322 004767 177640      JSR      %7, MOVE
3561 017326 000207              RTS      %7, MOVE
3562 017330 012767 144446 116244 MOD24: MOV    #BEGIN+140006, TRPA+120002
3563 017336 012767 000240 116026 MOD24: MOV    #NOP, SKPBEL+120000
3564 017344 012767 124446 076230 MOD20: MOV    #BEGIN+120006, TRPA+100002
3565 017352 012767 000240 076012 MOD20: MOV    #NOP, SKPBEL+100000
3566 017360 012767 104446 056214 MOD16: MOV    #BEGIN+100006, TRPA+60002
3567 017366 012767 000240 055776 MOD16: MOV    #NOP, SKPBEL+60000
3568 017374 012767 064446 036200 MOD12: MOV    #BEGIN+60006, TRPA+40002
3569 017402 012767 000240 035762 MOD12: MOV    #NOP, SKPBEL+40000
3570 017410 012767 044446 016164 MOD8:  MOV    #BEGIN+40006, TRPA+20002
3571 017416 012767 000240 015746 MOD8:  MOV    #NOP, SKPBEL+20000
3572 017424 012767 024446 176150 MOD4:  MOV    #BEGIN+20006, TRPA+2
3573 017432 012767 000240 175732 MOD4:  MOV    #NOP, SKPBEL
3574 017440 000207              DET3:   RTS      %7
3575                                ;ROUTINE TO SET ACTION ENABLE ON MA/MF PARITY MEMORIES
3576                                ;CALL:   JSR      PC, .MAMF
3577
3578                                PARCSR= 172100
3579                                PARVEC= 114
3580                                ERRVEC=4
3581                                RO=%0
3582                                SP=%6
3583                                R2=%2
3584                                PC=%7
3585
3586 017442 012737 000006 000004 .MAMF:  MOV    #ERRVEC+2, 2#ERRVEC
3587 017450 012737 000002 000006      MOV    #RTI, 2#ERRVEC+2
3588 017456 012700 172100          MOV    #PARCSR, RO
3589 017462 012702 000001          MOV    #1, R2
3590                                ;GET FIRST CSR ADDRESS
3591
3592 017466 012720 000001          1$:    MOV    #1, (RO)+
3593                                ;SET TIME OUT INDICATOR
3594                                ;SET ACTION ENABLE IF AVAI
3595                                ;BRANCH IF CSR NOT AVAILAB
3596                                ;SHIFT AVAILABILITY INDICA
3597                                ASL      R2
3598                                BCC      1$
3599                                RTS      PC
3600                                .PARSRV: HLT
3601                                JMP      2#START
3602                                ;ROUTINE TO OUTPUT TITLE
3603                                ;PARITY ERROR
3604                                TYPE:   MOV    (%6), %1
3605                                MOV    (%1), %1
3606                                ADD    #2, (%6)
3607                                LOOP:  MOVB  (%1)+, CHAR
3608                                BNE     1$
3609                                RTS      %7
3610                                1$:     TSTB  2#TTCSR
3611                                BPL     1$
3612                                MOVB  CHAR, 2#TTDBR
3613                                BR      LOOP
3614                                CHAR:   0

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F06

MAIN. MACY11 30A(1052) 20-JAN-78 11:05 PAGE 70
CZQKBH.P11 20-JAN-78 11:05

SEG 0070

3612	017546	006412	055103	045521	MSG:	.ASCIZ(12)(15)/CZQKB-H T17-4K SYSTEM EXERCISER(12)(15)
3613	017554	026502	020110	030524		
3614	017562	026467	045464	051440		
3615	017570	051531	042524	020115		
3616	017576	054105	051105	044503		
3617	017604	042523	005122	000015		
3618		000001			.END	

	016710	1626	1631	1660	1666	1672	1678	1685	1690	1697	1703	1717	1724	1747
		1755	1779	1793	1800	2105	2145	2205	2211	2218	2226	2242	2254	2260
		2266	2272	2278	2284	2291	2296	2303	2310	2317	2324	2347	2355	2360
		2710	2716	2723	2730	2772	3477*	3478	3480	3482				
AC	000352	711*	3160*	3162	3175*	3177	3190*	3192	3205	3218*	3220	3444	3459*	
ACT	015534	3264	3267	3271*										
ADSUB	014160	3013	3018*											
ARIEND	014222	3016	3027*											
ARITST	014134	3012*	3015											
ASCNT	016372	3350*	3374*	3381*	3385*	3396*								
ASH	000370	718*	3176*											
B	016700	1786	1941	1946	1951	1957	1964	1969	1970	1976	1990	1998	2005	2011
		2054	2059	2064	2070	2077	2082	2083	2090	2104	2111	2118	2124	2131
		2514	2519	2525	2530	2536	2543	2548	2549	2599	2604	2609	2614	2621
		2626	2627	2634	2648	2744	2745	2750	2751	2756	2757	3471*	3473	3478
BEGANY	015466	3256	3258*											
BEGIN	004440	808	900	1102	1621*	3269	3284	3419	3501	3562	3564	3566	3568	3570
		3572												
BEG20	015460	3251	3257*											
BELL	015406	3245*												
BINCT	016370	3347*	3366*	3369*	3370	3373*	3395*							
BR	= 000002	1107*												
BUFF	= 017004	587*	761	780	796	817	1656	3345*						
C	016722	1709	1732	1800*	1816*	1832*	1847*	1863*	1879*	1897*	1915*	1969*	1970	1989*
		1990*	1991	2082*	2083	2103*	2104*	2105	2233*	2235	2239*	2243	2332	2389*
		2420*	2438*	2454*	2470*	2488*	2506*	2548*	2549	2626*	2627	2647*	2648*	2649*
		2737*	2739	2762	2763*	2765	2769*	2773*	3485*	3486	3488			
		585*	3136*											
CC	= 177776	3604*	3609	3611*										
CHAR	017544	3273	3274	3275*										
CLEAR	015554	874*	1009	1012*	1019*	1031*								
CLINCT	002312	3032*	3039											
CMP1	014230	3036	3040*											
CMP2	014252	3030*												
COMPAR	014224	875*	1001*	1002	1013	1015*	1017*	1029*						
CURPAT	002306	1808*	1824*	1839*	1855*	1871*	1888*	1906*	2380*	2388*	2396*	2412*	2427*	2446*
D	016742	2462*	2479*	2497*	3494*									
		813*	914	917*	919*	923*								
DATA1	001616	814*	930*	931	934*									
DATA2	001644	815*	942	945*	947*	951*								
DATA3	001720	816*	955*	956	967*	971*								
DATA4	002014	3352*	3365	3371*	3393*									
DECML	016364	818*	838*	961	966	973*								
DELAY	002020	892	3501*	3504										
DET1	017010	3510	3519*											
DET2	017122	834	835	3522	3574*									
DET3	017440	3508	3510*											
DET4	017054	715*	3219*											
DIV	000362	869	1110*	1163	1171	1212								
DO	= 000001	754*	3007	3155*										
EASRT	014754	3512*	3521											
EIGHT	017070	3156	3233*											
ENDEAE	015344	3580*	3586*	3587*										
ERRVEC	= 000004	776	779*											
ESTART	000606	3335	3337*											
EXPRIN	016072	1108*												
F	= 000000													

[illegible]

[illegible]

SEQ 0077

		1806*	1809	1814*	1817	1822*	1825	1830*	1833	1837*	1840	1845*	1848	1853*
		1856	1861*	1864	1869*	1872	1877*	1880	1885*	1889	1894*	1898	1903*	1907
		1912*	1916	1923*	1924	1927*	1933*	1938	1943*	1947	1952*	1956	1961*	1965
		2018*	2019	2024*	2025*	2026	2031*	2032*	2033	2038*	2039*	2040	2045*	2046*
		2047	2076*	2077	2096*	2097*	2098	2117*	2118*	2123*	2124*	2125	2138*	2139*
		2140	2144*	2145*	2146	2152*	2153*	2154	2159*	2160*	2161	2166*	2167*	2168
		2173*	2174*	2175	2180*	2181*	2182	2187*	2189*	2190*	2195*	2197*	2198	2225*
		2226*	2227	2234*	2242*	2317*	2318	2324*	2325	2331*	2338*	2339	2345*	2347*
		2348	2353*	2355*	2356	2361*	2363*	2364	2370*	2371*	2372	2378*	2381	2386
		2389	2394*	2397	2402*	2405	2410*	2413	2418*	2421	2425*	2428	2431	2436*
		2439	2444*	2447	2452*	2455	2460*	2463	2468*	2471	2476*	2480	2485*	2489
		2494*	2498	2503*	2507	2542*	2543	2554*	2555*	2556	2561*	2562*	2563	2568*
		2569*	2570	2575*	2576*	2577	2582*	2583*	2584	2589*	2590*	2591*	2592	2620*
		2621	2640*	2641*	2642	2654*	2655*	2656	2661*	2662*	2663	2668*	2669*	2670
		2675*	2676*	2677	2682*	2683*	2684	2689*	2691*	2692	2695	2700*	2702*	2703
		2729*	2730*	2731	2738*	2772*	2812*	2813*	2818	2823*	2824*	2829	2835*	2836*
		2841	2847*	2848*	2853	2859*	2860*	2865	2871*	2872*	2877	3042*	3043*	3044*
		3045*	3046	3049*	3050*	3055*	3056*	3057*	3058*	3059	3062*	3063*	3067*	3068*
		3069*	3070*	3071	3074*	3075*	3080*	3081	3088*	3089	3138*	3140*	3143	3149
TEST	013636	3150*	3227*	3229*	3230	3489*	3490	3492	3493					
		2910*	2911*	2912*	2913*	2914*	2915*	2916*	2917*	2918*	2935	2940*	2950*	2951*
		2952*	2953*	2954*	2955*	2956*	2973	2977*	2978*	2979*	2980*	2981*	2982*	2999
		3018*	3019*	3020*	3021	3108*	3109*	3114*	3123*	3125*	3126	3129*	3131*	
TIME	002140	842*	976*	984*	985	989	995*							
TJSR1	013066	2782*	2783											
TJSR2	013070	2781	2783*											
TJSR3	013102	2782	2787*	2791										
TOODLE	016360	3361*	3362*	3363	3391*									
TRCSR	000260	682*	789*	791	825*	886*	909	920*						
TRDR	000262	683*	912	914										
TRPA	015600	3241	3284*	3501*	3562*	3564*	3566*	3568*	3570*	3572*				
TRPB	015572	880*	3266*	3281*										
TSCOMB	014442	3081*	3090											
TSROT	013472	2904*	2907											
TSROT2	013646	2944*	2948											
TSRT2A	013640	2908	2943*											
TSTARI	014122	3010*												
TTCSR	000264	684*	798*	799	802*	804*	805*	822*	887*	927	3242	3607		
TTDBR	000266	685*	931*	3609*										
TTYINR	001544	644	909*											
TTYIN1	001602	919*												
TTYIN2	001610	913	918	920*										
TTYIN3	001574	915	917*											
TTYIN4	001600	918*												
TWELVE	017074	3513*	3523											
TWENTY	017104	3515*	3527											
TWOEIC	017114	3517*												
TWOFOR	017110	3516*	3529											
TYOUTR	001620	646	927*											
TYOUT1	001634	931*												
TYPE	017506	765	3601*											
USER	017006	891	3497*											
WAIT1	016150	3353*	3354											
WAIT2	016326	3382*	3383	3387										
WAIT3	014512	3093*												
WAIT4	014542	3099	3104*											

3094#												
1105#	1171											
3348#	3365*	3367	3372*	3394#								
3364	3369#											
1154#	1199											
3545	3557#											
3543	3555#											
3541	3553#											
3539	3551#											
3537	3549#											
3547	3559#											
3375	3381#											
595#	923	934	951	971								
3255#	3257*	3265	3282#									
3262#												
3269#	3272											
3270#												
596#	601	602#	603	605#	608#	611#	614#	616#	643#	652#	655#	659#
662#	664#	670#	673#	677#	749	792	800	848	851	853	896	910
928	938	943	959	981	992	1007	1022	1040	1054	1060	1074	1091
1130	1143	1149	1174	1181	1196	1202	1216	1627	1632	1661	1667	1673
1679	1686	1691	1698	1704	1711	1719	1726	1733	1740	1749	1757	1765
1773	1780	1787	1794	1801	1810	1818	1826	1834	1841	1849	1857	1865
1873	1881	1890	1899	1908	1917	1936	1942	1947	1952	1959	1965	1971
1978	1985	1992	2000	2006	2013	2020	2027	2034	2041	2048	2055	2060
2065	2072	2078	2084	2092	2099	2106	2113	2119	2126	2134	2141	2147
2155	2162	2169	2176	2183	2191	2199	2206	2212	2219	2228	2236	2244
2249	2255	2261	2267	2273	2279	2285	2292	2297	2304	2311	2319	2326
2333	2340	2349	2357	2365	2373	2382	2390	2398	2406	2414	2422	2429
2432	2440	2448	2456	2464	2472	2481	2490	2499	2508	2515	2520	2526
2531	2538	2544	2550	2557	2564	2571	2578	2585	2593	2600	2605	2610
2616	2622	2628	2636	2643	2650	2657	2664	2671	2678	2685	2693	2696
2704	2711	2717	2724	2732	2740	2746	2752	2758	2766	2774	2784	2792
2800	2802	2804	2806	2814	2816	2819	2825	2827	2830	2837	2839	2842
2849	2851	2854	2861	2863	2866	2873	2875	2878	2882	2890	2892	2894
2925	2926	2928	2929	2931	2932	2936	2958	2959	2960	2962	2963	2964
2966	2967	2969	2970	2974	2984	2985	2986	2988	2989	2990	2992	2993
2995	2996	3000	3006	3022	3033	3047	3060	3072	3082	3084	3086	3110
3112	3115	3117	3127	3141	3144	3152	3155	3163	3166	3169	3178	3181
3184	3193	3196	3199	3206	3209	3212	3221	3224	3231	3235	3240	3247
3290	3295	3302	3305	3308	3316	3321	3329	3331	3389	3476#	3480#	3488#

.MAMF 017442
.PARSR 017500

B07

MAIN. MACY11 30A(1052) 20-JAN-78 11:05 PAGE 81
CZQKBH.P11 20-JAN-78 11:05 CROSS REFERENCE TABLE -- MACRO NAMES

SEQ 0079

TNCV 2882# 2919 2957 2983

. ABS. 017612 000

ERRORS DETECTED: 0

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

RUN-TIME: 3 7 1 SECONDS

RUN-TIME RATIO: 91/12=7.3

CORE USED: 11K (21 PAGES)

