.NLIST SEQ
.REPT 0

IDENTIFICATION
****

PRODUCT CODE: AC-9031H-MC

PRODUCT NAME: CZQKBHO T17-4K SYSTEM EXERCISER
THIS VERSION TEST DECTAPE UNIT 1 NOT UNIT 0

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MAINTAINER: DIAGNOSTIC GROUP

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1. ABSTRACT

THIS PROGRAM IS A MEMORY EXPANDABLE INTERACTIVE BUS EXER-
CISER 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

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(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
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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 EXCUTED 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 TTYIN1 (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 COMPARSION 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
"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.

5.2.9 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 NUM-
BER 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 LPSC FROM [illegible]

5.2.12 HSRIN1 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 IN 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 VERFIY 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 TRANFERRED TO THE CURRENT BANK THAT INSTRUCTIONS ARE BEING EXECTUTED 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 RP03 THE ISR MUST BE MOTIFIED TO TEST THE FULL SURFACE

[illegible] CORE EXPANSION DET[illegible]

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 DETECED 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. IT 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 PRINTER 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 "SCOPEF" 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 SHOLD 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 JSEP 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,@#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 BE
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 ROU-
     TINES,
(3) THE PROCESSOR TESTS AND
(4) CONTROL AND UTILITY ROUTINES.
(5) CORE DETECTOR AND EXPANSION ROUTINE.

10. LISTING

11. FLOW CHART(S)

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        .ENDR
        .ENABLE ABS

;PDP11 PRELIMINARY SYSTEM TEST --- TTY-PC11-LP11,RF11,TC11,KW11L,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
000240          NOP=240                 ;SYSTEM NULL OPERATION
104000          HLT=EMT         ;TRAP USED FOR ERROR PRINTOUT
104400          SCOPE=TRAP              ;TRAP USED SCOPE LOOP AND ITERATION OF SUB PROBLEMS
177776          CC=177776
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                016104                  IDSB=ICSR
                017004                  BUFF=FIN
                000000                  R100=%0
                000001                  R101=%1
                000002                  RSR=%2
                176000                  RKWORDCT=-2000
                176000                  RPWORDCT=-2000
                176040                  RCWORDCT=-2000+40
                176040                  RFWORDCT=-2000+40
                000000                  XX=0
                000000                  .=0
                000100                  .REPT 100
                                        .+2                             ;TRAP ENTRANCE
                                        HALT                            ;TRAPPED TO PREVIOUS LOCATION
                                        .ENDR
                                        .LIST   SEQ,ME
                000014                  .=14
  000014        000016                  .+2
  000016        000000                  HALT                            ;FALSE TRACE TRAP
                000024                  .=24
  000024        016526                  PFAIL
  000026        000340                  340
                000030                  .=30
  000030        015606                  PRINT                           ;FOR HALT TRAPS
  000032        000340                  340                             ;HIGHEST PRIORITY
                000034                  .=34
  000034        016406                  SCOPEC                          ;USER TRAP
  000036        000000                  0
                000046                  .=46
  000046        015556                  LOGICA                  ;RETURN TO MONITOR ADDRESS
                000052                  .=52
  000052        040000                  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.
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                                        ;PDP11 SIMULTANEOUS I/O
                    000060                      .=60
000060  001544                          TTYINR                 ;TTY IN INTERRUPT VECTOR
000062  000200                          200
000064  001620                          TYOUTR                 ;TTY OUT INTERRUPT VECTOR
000066  000200                          200
000070  001646                          HSRINR                 ;HSR INTERRUPT VECTOR
000072  000200                          200
000074  001740                          HPOUTR                 ;HSP INTERRUPT VECTOR
000076  000200                          200
                    000100              .=100
000100  002044                          LK3                    ;INTERRUPT VECTOR LINE CLOCK
000102  000300                          300                    ;LEVEL SIX PRIORITY
                    000004              .=4
000004  017500                          .PARSRV                ;MEMORY PARITY
000006  000340                          340

                    000174              .=174
000174  177570                  SRPTR:  177570
000176  000000                  SOFTSR: 000000
                    000200              .=200
000200  000137  000502                  JMP     @#START
                    000204              .=204
000204  002632                          IRF                    ;RF11 DISK
000206  000240                          240                    ;LEVEL 5
000210  002534                          IRC                    ;RC DISK
000212  000240                          240

                    000214              .=214
000214  002716                          FENDZ                  ;DEC TAPE
000216  000300                          300                    ;LEVEL 6
                    000220              .=220
000220  002344                          IRK                    ;RK DISK
000222  000240                          240

                    000254              .=254
000254  002450                          IRP                    ;RP DISK
000256  000240                          240

                    177776          STATUS=177776
000260  177560                  TRCSR:  177560
000262  177562                  TRDR:   177562
000264  177564                  TTCSR:  177564
000266  177566                  TTDBR:  177566
000270  177550                  HRCSR:  177550
000272  177552                  HRDBR:  177552
000274  177554                  HPCSR:  177554
000276  177556                  HPDBR:  177556
000300  177546                  LKCSR:  177546
000302  177514                  LPCSR:  177514
000304  177516                  LPDBR:  177516
000306  177470                  RFDAE:  177470          ;DISK ADDRESS AND ERROR
000310  177466                  RFDAR:  177466          ;DISK ADDRESS REGISTER
000312  177462                  RFWC:   177462          ;WORD COUNT REGISTER
000314  177464                  RFCAR:  177464          ;CURRENT ADDRESS REGISTER
000316  177460                  RFCSR:  177460          ;STATUS REGISTER
```

```
                                RFCSRH: 177461          ;HIGH BYTE ADDRESS OR CSR
                                RCDAR:  177442          ;DISK ADDRESS REGISTER
                                RCWC:   177450          ;WORD COUNT REGISTER
                                RCBAR:  177452          ;CURRENT ADDRESS REGISTER
                                RCCSR:  177446          ;STATUS REGISTER
                                RCCSRH: 177447          ;HIGH BYTE ADDRESS OR CSR
                                RKDAH:  177413          ;HIGH BYTE OF DISK ADDRESS
                                RKDAE:  177412          ;DISK ADDRESS REGISTER
                                RKWC:   177406          ;WORD COUNT REGISTER
                                RKBAR:  177410          ;CURRENT ADDRESS REGISTER
                                RKCSR:  177404          ;STATUS REGISTER
                                RKCSRH: 177405          ;HIGH BYTE ADDRESS OR CSR
                                MQ:     177304          ;EAE LOCATIONS
                                AC:     177302
                                SC:     177310
                                SRE:    177311
                                MUL:    177306
                                DIV:    177300
                                NOR:    177312
                                LSH:    177314
                                ASH:    177316

                                ;DECTAPE ADDRESSES
            177340              TC=177340
                                TCCM:   TC+2            ;CONTROL AND FUNCTION
                                TCST:   TC              ;GENERAL STATUS
                                TCDT:   TC+10
                                        BR      START   ;DATA
                                TCWC:   TC+4            ;WORD COUNT
                                TCBA:   TC+6            ;BUS ADDRESS
                                TCIV:   214             ;DECTAPE INTERRUPT VECTOR
                                RPCA:   176722          ;CYLINDER ADDRESS RP11 DISK
                                RPDAH:  176725          ;HIGH BYTE OF DISK ADDRESS
                                RPDAE:  176724          ;DISK ADDRESS
                                RPDSR:  176710          ;DRIVE STATUS REGISTER
                                RPDAR:  176724          ;DISK ADDRESS REGISTER
                                RPWC:   176716          ;WORD COUNT REGISTER
                                RPBAR:  176720          ;CURRENT ADDRESS REGISTER
                                RPCSR:  176714          ;STATUS REGISTER
                                RPCSRH: 176715          ;HIGH BYTE ADDRESS OR CSR
                                RPFUNCTION:     0       ;DISK COMMAND
                                ;THIS ROUTINE CHECKS THE READ DATA BUFFER TC11
                                ;BY DOING A CHECK SUM ON THE DATA
                                TC1:    MOV     %1,-(6)         ;SAVE THESE ON THE STACK
                                        MOV     %3,-(6)
                                        CLR     %3              ;SUM OF DATA
                                        MOV     #TCRBUF,%1      ;ADDRESS OF READ BUFFER
                                TC2:    ADD     (1)+,%3         ;EVEN ADD
                                        ADD     (1)+,%3         ;ODD ADD -2'S COMPLIMENT
                                        BEQ     TC2
                                        CMP     %1,#TCRBUF+1000         ;AT END OF BUFFER?
                                        BHI     .+4             ;YES BRANCH
                                        HLT                     ;DATA ERROR
                                        MOV     (6)+,%3         ;RESTORE THE REGISTERS
                                        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     #PFAIL,24       ;SET POWER FAIL VECTOR
 761  000510  012706  017004                  MOV     #BUFF,%6        ;SET UP STACK
 762  000514  012767  000546  177262          MOV     #1$,4           ;SET UP TIME OUT VECTOR
 763  000522  023737  000042  000046          CMP     @#42,   @#46    ;UNDER ACT11 AUTO MODE?
 764  000530  001403                          BEQ     3$              ;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 TIME OUT TRAP OCCURRS
 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                     ;A POWER FAIL OCCURRED
 779  000606  005067  015650          ESTART: CLR     ICOUNT
 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 BACK 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
```

```
                                                TST     @#0             ;TRAP IF NONEXISTANT
                                                MOV     #RTIA,4         ;SET UP FOR NON-EXISTANT I O
                                                MOV     #340,6          ;KEEP NEW PSW AT 340
                                                MOV     #1,DATA1        ;BASE DATA FOR TTY READER OR KEYBOARD
                                                CLR     DATA2           ;BASE DATA FOR TTY PUNCH OR TELEPRINTER
                                                MOV     #1,DATA3        ;BASE DATA FOR HSR
                                                CLR     DATA4           ;BASE DATA FOR HSP
                                                MOV     #BUFF,%6
                                                CLR     DELAY           ;FOR READER STALL - HSR -
                                                MOV     #340,STATUS     ;LOCK OUT INTERRUPTS
                                                BIT     RSR,#1
                                                BNE     ST1
                                                BIS     R100,@TTCSR     ;TTY OUT
                                        ST1:    BIT     RSR,#2
                                                BNE     ST2
                                                BIS     R101,@TRCSR     ;TTY IN
                                        ST2:    TST     @HPCSR          ;TEST FOR OUT OF TAPE
                                                BMI     ST3
                                                BIT     RSR,#4
                                                BNE     ST3
                                                BIS     R100,@HPCSR     ;HSP
                                        ST3:    TST     @HRCSR          ;TEST FOR OUT OF TAPE
                                                BMI     ST4
                                                BR      ST3A            ;RESERVED FOR OVERLAYS
                                                DET3                    ;1020 GTP OVER LAY
                                                DET3                    ;1022 GTP OVER LAY
                                        ST3A:   BIT     RSR,#10
                                                BNE     ST4
                                                MOV     R100,DELAY      ;FOR STALL HSR
                                                BIS     R101,@HRCSR     ;HSR
                                        ST4:    BIT     RSR,#20
                                                BNE     ST5
                                                CLR     TIME
                                                BIS     R100,@LKCSR     ;LINE CLOCK 50 OR 60 CYCLES
                                        ST5:    BIT     RSR,#40
                                                BNE     ST6
                                                MOV     #ST5A,4
                                                TSTB    @RPCSR          ;WAIT FOR CONTROLLER READY
                                                BPL     .-4
                                                MOV     #15,@RPCSR      ;RESET DRIVE
                                                TSTB    @RPCSR          ;WAIT FOR CONTROLLER READY
                                                BPL     .-4
                                                BIT     @RPDSR          ;WAIT FOR ACCESS READY
                                                BPL     .-4
                                                CLR     @RPDSR          ;CLR ATTENTION
                                        ST5A:   MOV     #RTIA,4
                                                MOV     #37,@RCDAR
                                                MOV     #43503,RFFUNCTION       ;WRITE CHECK/WRITE RF
                                                MOV     #43503,RCFUNCTION
                                                MOV     #43503,RKFUNCTION
                                                MOV     #43503,RPFUNCTION
                                                MOVB    R100,@RFCSR             ;TELL DISK TO READ OR WRITE
                                                MOVB    R100,@RKCSR
                                                MOVB    R100,@RCCSR
                                                MOVB    R100,@RPCSR
                                        ST6:    BIT     RSR,R100        ;TEST FOR DECTAPE
```

```
001314  001011                          BNE     ST7
001316  012767  002706  001370          MOV     #TCFIRST,TCEMPE         ;FIRST BLOCK SHOULD BE SET
001324  012777  002716  177054          MOV     #FENDZ,@TCIN            ;GO TO END ZONE ON INTERRUPT
001332  012777  004503  177032          MOV     #R+IE+RB+DO,@TCSM       ;MOVE REVERSE
001340  105702          ST7:    TSTB    RSR                             ;LINE PRINTER
001342  100427                  BMI     ST8
001344  012767  001422  176432          MOV     #ST6,4                  ;DON'T CHANGE 200
001352  012767  000137  000730          MOV     #137,SOLPAT             ;RESET FOR START OF LINE PATTERN
001360  016767  000616  000724          MOV     LP6+4,CLINCT            ;LINE COUNT
001366  012767  000040  000712          MOV     #40,CURPAT
001374  012777  000014  176702          MOV     #14,@LPDBR              ;LINE FEED TO POSITION BUFFER
001402  012737  002166  000200          MOV     #LPINTR,@#200           ;INTERRUPT VECTOR
001410  012737  000200  000202          MOV     #200,@#202              ;PROCESSOR LEVEL 4
001416  010077  176660                  MOV     R100,@LPCSR             ;INTERRUPT ENABLE
001422  005037  015570          ST8:    CLR     @#TRPB                  ;NO "T" BIT FIRST PASS
                                ;IF OPERATION WITH DIAGNOSTIC PACKAGE OR ACT11
001426  005767  176410                  TST     42
001432  001417                  BEQ     ST8A            ;BRANCH IF NO MONITOR
001434  012767  001542  176342          MOV     #RTIA,4
001442  005077  176634                  CLR     @LPCSR          ;NO LINE PRINTER WITH MONITOR
001446  005077  176606                  CLR     @TRCSR          ;NO LSR WITH MONITOR
001452  005077  176606                  CLR     @TTCSR          ;NO CONSOLE TEST WITH MONITOR
001456  122767  000002  176355          CMPB    #2,     41      ;IS IT RKDP
001464  001002                  BNE     ST8A
001466  005077  176652                  CLR     @RKCSR          ;YES DON'T TEST RK DISK
001472  004737  017006          ST8A:   JSR     %7,@#USER               ;FOR USER I/O PROGRAM
001476  004767  015306                  JSR     %7,DETI                 ;CHECK FOR CORE EXPANSION
001502  005067  176300                  CLR     6                       ;HALT FOR BUS ERROR
001506  012767  000006  176270          MOV     #6,4                    ;FOR USER I/O PROGRAM
001514  005067  176256                  CLR     STATUS                  ;ALLOW INTERRUPTS
001520  000401                  BR      .+4
001522  000001          MAINLINE:       WAIT                            ;WAIT HERE FOR INTERRUPTS
001524  037727  176444  002000          BIT     @SRPTR,#2000            ;INHIBIT PROCESSOR TEST
001532  001373                  BNE     MAINLINE
001534  000167  002700                  JMP     BEGIN
001540  000000          REG1:   0                                       ;STATUS OF SELECTED DEVICES
001542  000002          RTIA:   RTI                                     ;AN RTI FOR NON EXISTANT I/O


                                ;TTY RECEIVER VALUES 0 TO 377

001544  105777  176510          TTYINR: TSTB    @TRCSR                  ;IS DONE SET
001550  100401                  BMI     .+4
001552  104000                  HLT                                     ;FALSE RETURN FROM MAINLINE
001554  105777  176502                  TSTB    @TRDR                   ;TEST DATA FOR LEADER
001560  001413                  BEQ     TTYIN2                  ;IF LEADER GO BACK
001562  127767  176474  000026          CMPB    @TRDR,DATA1             ;NOT LEADER TEST FOR DATA
001570  001401                  BEQ     TTYIN3
001572  104000                  HLT                                     ;DATA COMPARISON ERROR
001574  105267  000016          TTYIN3: INCB    DATA1                   ;INCREMENT DATA
001600  001003          TTYIN4: BNE     TTYIN2
001602  012767  000001  000006  TTYIN1: MOV     #1,DATA1                ;BASE DATA
001610  005277  176444          TTYIN2: INC     @TRCSR                  ;START READER
001614  000002                  RTI                                     ;RETURN TO MAINLINE
```

```
                                ;EXPECTED DATA
001616  000000          DATA1:  XX
                        ;TTY TRANSMITTER PRINT VALUES 0 TO 377
001620  105777  176440  TYOUTR: TSTB    @TTCSR          ;TEST FOR DONE
001624  100401                  BMI     .+4             ;BRANCH IF FLAG FOUND
001626  104000                  HLT                     ;FALSE INTERRUPT RETURN
001630  105267  000010          INCB    DATA2           ;INCREMENT DATA
001634  016777  000004  176424  TYOUT1: MOV     DATA2,@TTDBR    ;OUTPUT TO DEVICE
001642  000002                  RTI                     ;RETURN TO MAINLINE
001644  000000          DATA2:  XX                      ;TRANSMITTED DATA
                        ;HSR SECTION VALUES 0 TO 377
001646  105777  176416  HSRINR: TSTB    @HRCSR          ;IS DONE SET
001652  100401                  BMI     .+4
001654  104000                  HLT                     ;FALSE RETURN FROM MAINLINE
001656  105777  176410          TSTB    @HRDBR          ;TEST DATA FOR LEADER
001662  001413                  BEQ     HSRIN2          ;IF LEADER GO BACK
001664  127767  176402  000026  CMPB    @HRDBR,DATA3    ;NOT LEADER TEST FOR DATA
001672  001401                  BEQ     .+4
001674  104000                  HLT                     ;DATA COMPARISON ERROR
001676  105267  000016          INCB    DATA3           ;INCREMENT DATA
001702  001003                  BNE     HSRIN2
001704  012767  000001  000006  HSRIN1: MOV     #1,DATA3        ;BASE DATA
001712  005277  176352  HSRIN2: INC     @HRCSR          ;START READER
001716  000002                  RTI                     ;RETURN TO MAINLINE
001720  000000          DATA3:  XX                      ;EXPECTED DATA
                        ;HS PUNCH SECTION, VALUES 0 TO 377
                        ;ENABLE READER ON FIX COUNT OF PUNCH ONLY (14 TIMES)
001722  012767  000000  000064  HPOUT:  MOV     #0,DATA4        ;INITAL DATA
001730  016777  000060  176340  HPOUT1: MOV     DATA4,@HPDBR    ;OUTPUT TO DEVICE
001736  000002                  RTI                     ;RETURN TO MAINLINE
001740  105777  176330  HPOUTR: TSTB    @HPCSR          ;TEST FOR DONE
001744  100401                  BMI     .+4             ;BRANCH IF FLAG FOUND
001746  104000                  HLT                     ;FALSE INTERRUPT RETURN
001750  046777  000044  176312  BIC     DELAY,@HRCSR    ;CLEAR HSR INTERRUPT ENABLE
001756  005267  000034          INC     INTCNT          ;COUNT INTERRUPTS
001762  026727  000030  000014  CMP     INTCNT,#14      ;SAVE TO TURN READER ON?
001770  001005                  BNE     HPOUT2          ;NO-NEED MORE TIME
001772  005067  000020          CLR     INTCNT          ;YES RESET COUNTER
001776  056777  000016  176264  BIS     DELAY,@HRCSR    ;SET READER INT ENABLE
002004  105267  000004  HPOUT2: INCB    DATA4           ;INCREMENT DATA
002010  001744                  BEQ     HPOUT           ;AT UPPER LIMIT START OVER
002012  000746                  BR      HPOUT1          ;FINISH REST OF DATA
002014  000000          DATA4:  XX
002016  000000          INTCNT: 0
002020  000000          DELAY:  0                       ;EQUAL 100 IF HSR RUNNING
                        ;TEST OF LINE CLOCK, INTERRUPT FOR 55 SECONDS THEN STALL FOR 5 SECONDS
002022  005037  002140  LK1:    CLR     @#TIME          ;CLEAR LINE CLOCK TIMER
002026  052777  000100  176244          BIS     #100,@LKCSR
```

```
978  002034  052737  000100  [illegible]      BIS     #100,@#STATUS
979  002042  000002          LP2:    RTI                             ;RETURN TO MAINLINE
980  002044  105777  176230  LP3:    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 INTERUPTS ENTER HERE
985  002066  023737  006344  002140  CMP     #3300.,@#TIME           ;4 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           ;LOWER PRIORITY
989  002112  022737  007020  002140  CMP     #3600.,@#TIME           ;ONE MINUTE UP
990  002120  001740          BEQ     LK1                             ;YES-RESET TIMER
991  002122  105777  176152          TSTB    @LKCSR                  ;NO-SKIP ON FLAG TILL IT IS.
992  002126  100375          BPL     .-4
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          LP80=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,@LPDBR           ;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                                     ;FALSE RETURN FROM MAIN LINE
1009 002176  026727  000110  000117  LP6:    CMP     CLINCT,#79.     ;TEST FOR END OF LINE
1010                                                                 ;CHANGE THIS VALUE FOR 132 COLUMN PRINTER
1011 002204  001415          BEQ     LP4                             ;GO GENERATE CR/LF
1012 002206  005267  000100          INC     CLINCT                  ;INCREMENT LINE POSITION COUNT
1013 002212  026727  000070  000137  CMP     CURPAT,#137             ;TEST FOR MAXIMUM PATTERN
1014 002220  001403          BEQ     LP3                             ;YES - GO TO LP3 AND RESET
1015 002222  005267  000060          INC     CURPAT                  ;NO - INCREMENT TO NEXT PATTERN
1016 002226  000750          BR      LP2                             ;GO SEND IT TO LINE PRINTER
1017 002230  012767  000040  000050  LP3:    MOV     #40,CURPAT      ;RESET PATTERN AND SEND TO PRINTER
1018 002236  000744          BR      LP2                             ;SENT TO LINE PRINTER
1019 002240  005067  000046  LP4:    CLR     CLINCT                  ;RESET LINE COUNT
1020 002244  012777  000012  176032          MOV     #12,@LPDBR      ;LINE FEED
1021 002252  105777  176024          TSTB    @LPCSR
1022 002256  100375          BPL     .-4
1023 002260  026727  000024  000137  CMP     SOLPAT,#137             ;START OF LINE PATTERN
1024 002266  001403          BEQ     LP5
1025 002270  005267  000014          INC     SOLPAT                  ;INCREMENT START OF LINE
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
```

```
002314 005077 176016         RKSTART:         CLR    @RKDAE                ;INITIALIZE DISK - DAR-DAE
002320 016777 002360 176014  RK1:      MOV    LLIMIT,@RKBAR                ;CORE BASE
002326 012777 176000 176004            MOV    #RKWORDCT,@RKWC              ;LENGTH OF TRANSFER
002334 113777 002406 176002            MOVB   @#RKFUNCTION,@RKCSR          ;WRITE OR WRITE CHECK TO DISK
002342 000002                          RTI                                 ;RETURN TO MAINLINE CODE
002344 032777 100200 175772  IRK:      BIT    #100200,@RKCSR               ;INTERRUPT VECTOR POINTS HERE
002352 003002                          BGT    .+6
002354 104000                          HLT                                 ;RK-11 ERROR FLAG UP OR READ[illegible]
002356 000756                          BR     RKSTART
002360 032777 000037 175750            BIT    #37,@RKDAE                   ;DISK AT UPPER LIMIT?
002366 001354                          BNE    RK1
002370 122777 000031 175736            CMPB   #31,@RKDAH
002376 001350                          BNE    RK1                          ;NO
002400 000337 002406                   SWAB   @#RKFUNCTION                 ;CHANGE COMMAND
002404 000743                          BR     RKSTART                      ;RESTART NEW TRANSFER OF DISK

002406 000000                RKFUNCTION:      0                            ;DISK COMMAND
                             ;RP11 DISK SERVICE ROUTINE
002410 112777 000001 176010  RPSTART:MOVB     #1,@RPCSR                    ;INITIALIZE DISK - DAR-DAE
002416 105777 176004                   TSTB   @RPCSR
002422 100375                          BPL    .-4
002424 016777 000254 175772  RP1:      MOV    LLIMIT,@RPBAR                ;INITIAL CORE ADDRESS
002432 012777 176000 175762            MOV    #RPWORDCT,@RPWC              ;LENGTH OF TRANSFER
002440 113777 000432 175760            MOVB   @#RPFUNCTION,@RPCSR          ;WRITE OR WRITE CHECK TO DISK
002446 000002                          RTI                                 ;RETURN TO MAINLINE CODE
002450 032777 100200 175750  IRP:      BIT    #100200,@RPCSR               ;INTERRUPT VECTOR POINTS HERE
002456 003002                          BGT    .+6
002460 104000                          HLT                                 ;RP11 READY NOT UP OR ERROR
002462 000752                          BR     RPSTART
002464 122777 000312 175716            CMPB   #312,@RPCA                   ;CYLINDER NO. 312, 624 FOR RP03
002472 001354                          BNE    RP1                          ;NO
002474 000337 000432                   SWAB   @#RPFUNCTION                 ;CHANGE COMMAND
002500 000743                          BR     RPSTART                      ;RESTART NEW TRANSFER OF DISK
                             ;RC11 DISK SERVICE ROUTINE
002502 012777 000040 175612  RCSTART: MOV     #40,@RCDAR                   ;INITIALIZE DISK - DAR-DAE
002510 016777 000170 175610  RC2:      MOV    LLIMIT,@RCBAR                ;CORE BASE
002516 012777 176040 175600            MOV    #RCWORDCT,@RCWC              ;LENGTH OF TRANSFER
002524 113777 002572 175576            MOVB   @#RCFUNCTION,@RCCSR          ;WRITE OR WRITE CHECK TO DISK
002532 000002                          RTI                                 ;RETURN TO MAINLINE CODE
002534 037727 175570 100200  IRC:      BIT    @RCCSR,#100200               ;INTERRUPT VECTOR POINTS HERE
002542 003002                          BGT    .+6
002544 104000                          HLT                                 ;RC11 READY NOT UP OR ERROR IS UP
002546 000755                          BR     RCSTART
002550 005277 175546                   INC    @RCDAR                       ;TO INCREASE XFER RATE
002554 022777 002000 175540            CMP    #2000,@RCDAR                 ;DISK AT UPPER LIMIT. 4000=2. 6000=3. 10000=4
002562 001352                          BNE    RC2                          ;NO
002564 000337 002572                   SWAB   @#RCFUNCTION                 ;CHANGE COMMAND
002570 000744                          BR     RCSTART                      ;RESTART NEW TRANSFER OF DISK
002572 000000                RCFUNCTION:      0                            ;DISK COMMAND
                             ;RF11 DISK
002574 105277 175520         RFSTART:         INCB   @RFCSRH               ;INITIALIZE DISK - DAR-DAE
002600 062777 000040 175502            ADD    #40,@RFDAR                   ;INCREASE DUTY CYCLE
002606 016777 000072 175500  RF1:      MOV    LLIMIT,@RFCAR                ;CORE BASE
002614 012777 176040 175470            MOV    #RFWORDCT,@RFWC              ;LENGTH OF TRANSFER
002622 113777 002702 175466            MOVB   @#RFFUNCTION,@RFCSR          ;WRITE OR WRITE CHECK TO DISK
002630 000002                          RTI                                 ;RETURN TO MAINLINE CODE
```

```
MAIN  MM  ..30M1052  20-JAN-78  11:05  PAGE 21
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 .090  002632  037727  175460  100200  RF:     BIT     @RFCSR,#100200          ;INTERRUPT VECTOR POINTS HERE
 .091  002640  003002                          BGT     .+6
 .092  002642  104000                          HLT                             ;RF11 READY NOT UP OR ERROR UP
 .093  002644  000753                          BR      RFSTART
 .094  002646  062777  000040  175434          ADD     #40,@RFDAR              ;INCREASE DUTY CYCLE
 .095  002654  122777  000003  175424          CMPB    #3,@RFDAE               ;DISK AT UPPER LIMIT? 7=2, 6=4, 5=6
 .096  002662  001351                          BNE     RF1                     ;NO
 .097  002664  027727  175420  174000          CMP     @RFDAR,#174000          ;AS FAR ON DISK AS WE CAN GO
 .098  002672  101745                          BLOS    RF1                     ;NO
 .099  002674  000337  002702                  SWAB    @#RFFUNCTION            ;CHANGE COMMAND
 .100  002700  000735                          BR      RFSTART                 ;RESTART NEW TRANSFER OF DISK
 .101  002702  000000          RFFUNCTION:     0                               ;DISK COMMAND
 .102  002704  004440          L.IMIT: BEGIN                                   ;FIRST CORE ADDRESS OF TRANSFER
 .103                          ;DT11 DEC TAPE
 .104                  000004  RD=4                           ;READ DATA
 .105                  000014  WD=14                          ;WRITE DATA
 .106                  000002  RB=2
 .107                  000002  BR=2                           ;READ BLOCK
 .108                  000000  F=0                            ;FORWARD
 .109                  000500  IE=500                         ;INTERRUPT ENABLE AND UNIT - UNIT #.
 .110                  000001  DO=1                           ;DO - THE FUNCTION
 .111                  004000  R=4000                         ;REVERSE
 .112
 .113  002706  000000          TCFIRST:        0               ;FIRST BLOCK TO BE SEARCHED FOR
 .114  002710  001101          TCLAST: 577.                    ;LAST BLOCK TO BE SEARCHED FOR
 .115  002712  000000          TCBLK:  0                       ;CURRENT BLOCK FOUND
 .116  002714  000000          TCEXPE: 0                       ;THE BLOCK THAT IS EXPECTED
 .117
 .118                          ;GO TO FORWARD END ZONE
 .119  002716  012777  002716  175462  FENDZ:  MOV     #FENDZ,@TCIV    ;END ZONE VECTOR SETUP
 .120  002724  005777  175444          TST     @TCST                   ;TEST FOR END ZONE
 .121  002730  100403                  BMI     FEND1                   ;AT END ZONE?
 .122  002732  105277  175434          INCB    @TCCM                   ;SET DO - NO DELAY
 .123  002736  000002                  RTI                             ;NO - WAIT SOME MORE
 .124  002740  012777  002770  175440  FEND1:  MOV     #TCF1,@TCIV     ;YES - NEW VECTOR
 .125  002746  042777  104000  175416          BIC     #104000,@TCCM   ;SEARCH BLOCK FOWARD
 .126  002754  016767  177726  177732          MOV     TCFIRST,TCEXPE  ;COUNT WHEN THIS BLOCK IS FOUND
 .127  002762  105277  175404  TCF1A:  INCB    @TCCM                   ;SET DO
 .128  002766  000002                  RTI                             ;RETURN ON NEXT BLOCK
 .129  002770  032777  100200  175374  TCF1:   BIT     #100200,@TCCM   ;ANY ERROR ON READ?
 .130  002776  003001                  BGT     .+4
 .131  003000  104000                  HLT                             ;TC ERROR SET - FORWARD READ BLOCK
 .132  003002  027767  175370  177704          CMP     @TCDT,TCEXPE    ;IS THIS OUR BLOCK FOR SYNC
 .133  003010  002764                  BLT     TCF1A                   ;NO-READ SOME MORE BLOCKS
 .134  003012  001401                  BEQ     TCF2                    ;YES
 .135  003014  104000                  HLT                             ;WE PASSED THE BLOCK
 .136
 .137  003016  012777  003032  175362  TCF2:   MOV     #TCF3,@TCIV     ;VECTOR FOR SEQUENTIAL READS
 .138  003024  105277  175342          INCB    @TCCM                   ;SET DO
 .139  003030  000002                  RTI                             ;RETURN AND TEST SEQENTIAL BLOCKS
 .140
 .141                          ;FIND SEQUENTIAL BLOCK AT FOWARD DIRECTION
 .142  003032  032777  100200  175332  TCF3:   BIT     #100200,@TCCM   ;TEST ERROR AND READY
 .143  003040  003001                  BGT     .+4
 .144  003042  104000                  HLT                             ;FALSE INTERRUPT ON TC-11
 .145  003044  027767  175326  177636          CMP     @TCDT,TCLAST    ;HAVE WE TESTED ALL BLOCKS
```

```
1146  003052  001414                        BEQ     RENDZ           ;YES DRIVE UNIT IN END ZONE - START TAPE
1147  003054  005267  177634                INC     TCEXPE          ;NO-INCREMENT EXPECTED COUNT
1148  003060  027767  175312  177626        CMP     @TCDT,TCEXPE    ;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    @TCCM           ;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 RENDZ:  MOV     #RENDZ,@TCIV    ;END ZONE VECTOR SETUP
1158  003112  016767  177572  177574        MOV     TCLAST,TCEXPE   ;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     #TCWBUF,@TCBA   ;THE WRITE BUFFER ADDRESS
1171  003174  112777  000515  175170        MOVB    #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        MOVB    #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                     ;DECTAPE ERROR ON READ BLOCK REVERSE
1183  003244  027767  175126  177442        CMP     @TCDT,TCEXPE    ;IS IT OUR FIRST BLOCK
1184  003252  001406                        BEQ     TCR2            ;YES - GO TEST THE REST
1185  003254  002002                        BGE     TCR1A           ;NO - HAVE WE PASSED THE BLOCK
1186  003256  104000                        HLT                     ;WE PASS OUR BLOCK
1187  003260  000711                        BR      RENDZ           ;GO TO END ZONE AND TRY AGAIN
1188  003262  105277  175104        TCR1A:  INCB    @TCCM           ;SET DO
1189  003266  000002                        RTI                     ;WE FOUND OUR FIRST BLOCK
1190  003270  012777  003304  175110 TCR2:   MOV     #TCR3,@TCIV     ;SET UP INTERRUPT TO TEST ALL BLOCKS
1191  003276  105277  175070                INCB    @TCCM           ;SET DO
1192  003302  000002                        RTI                     ;WAIT FOR NEXT BLOCK TO INTERRUPT
1193
1194                                 ;FIND SEQUENTIAL BLOCK IN REVERSE DIRECTION
```

```
 1135  003304  032777  100200  175060  TCR3:   BIT     #100200,@TCCM   ;TEST FOR READ AND ERROR
 1136  003312  003001                          BGT     .+4
```

L02


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.IRT 003314 104000 HLT VERR R READING SEQUENTIAL ... IN REVERSE
```

```
1198  003316  026777  177364  175052          CMP     TCFIRST,@TCDT   ;DID WE DO ALL THE BLOCKS
1199  003324  001666                          BEQ     XFEND2          ;YES - GO TO END ZONE TO RESTART
1200  003326  005367  177362                  DEC     TCEXPE          ;NO - DECREMENT BLOCK NUMBER
1201  003332  027767  175040  177354          CMP     @TCDT,TCEXPE    ;TEST SEQUENTAIL BLOCK IN REVERSE
1202  003340  001401                          BEQ     .+4
1203  003342  104000                          HLT                     ;TEST SEQUENTIAL READ BLOCK IN REVERSE FAILED
1204  003344  000403                          BR      TCRBK           ;THIS ROUTINE READ A BLOCK
1205  003346  105277  175020          TCR4:   INCB    @TCCM           ;SET DO
1206  003352  000002                          RTI                     ;LETS TRY A NEW BLOCK
1207
1208                                  ;READ REVERSE ALL BLOCK EXCEPT BLOCK 1101
1209  003354  012777  003412  175024  TCRBK:  MOV     #TCRB1,@TCIV    ;SET UP INTERRUPT VECTOR
1210  003362  012777  177400  175012          MOV     #-400,@TCWC     ;READ ONE BLOCK
1211  003370  012777  003440  175006          MOV     #TCRBUF,@TCBA   ;WHERE BUFFER IS
1212  003376  112777  000505  174766          MOVB    #IE+RD+DO,@TCCM ;READ THE BLOCK
1213  003404  004767  175024                  JSR     %7,TC1          ;CHECK DATA BUFFER
1214  003410  000002                          RTI                     ;EXIT - RETURN WHEN BLOCK IS READ
1215  003412  005777  174754          TCRB1:  TST     @TCCM           ;AND ERRORS
1216  003416  100001                          BPL     .+4
1217  003420  104000                          HLT                     ;DECTAPE ERROR
1218  003422  012777  003304  174756          MOV     #TCR3,@TCIV     ;NEW VECTOR FOR BLOCK SEARCH
1219  003430  112777  000502  174734          MOVB    #IE+RB,@TCCM    ;READ BLOCK FUNCTION
1220  003436  000743                          BR      TCR4            ;RETURN TO BLOCK SEARCH
1221
1222                                  ;THIS WRITE BUFFER LOOK THE SAME FORWARD OR REVERSE
1223  003440                          TCWBUF:
1224  003440                          TCRBUF:
1225              000001                      N=1
1226              000100                      .REPT   100
1227                                          N                       ;DECTAPE READ/WRITE BUFFER
1228                                          -N
1229                                          N=N+1
1230                                          .ENDR
1231  003440  000001                          N                       ;DECTAPE READ/WRITE BUFFER
1232  003442  177777                          -N
1233              000002                      N=N+1
1234  003444  000002                          N                       ;DECTAPE READ/WRITE BUFFER
1235  003446  177776                          -N
1236              000003                      N=N+1
1237  003450  000003                          N                       ;DECTAPE READ/WRITE BUFFER
1238  003452  177775                          -N
1239              000004                      N=N+1
1240  003454  000004                          N                       ;DECTAPE READ/WRITE BUFFER
1241  003456  177774                          -N
1242              000005                      N=N+1
1243  003460  000005                          N                       ;DECTAPE READ/WRITE BUFFER
1244  003462  177773                          -N
1245              000006                      N=N+1
1246  003464  000006                          N                       ;DECTAPE READ/WRITE BUFFER
1247  003466  177772                          -N
1248              000007                      N=N+1
1249  003470  000007                          N                       ;DECTAPE READ/WRITE BUFFER
1250  003472  177771                          -N
1251              000010                      N=N+1
1252  003474  000010                          N                       ;DECTAPE READ/WRITE BUFFER
1253  003476  177770                          -N
```

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

E03


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

F03

```
004254  177743          -N
004256  000035          N               ;DEC TAPE READ WRITE BUFFER
        000034          N=N-1
004260  177744          -N
004262  000034          N               ;DEC TAPE READ WRITE BUFFER
        000033          N=N-1
004264  177745          -N
004266  000033          N               ;DEC TAPE READ WRITE BUFFER
        000032          N=N-1
004270  177746          -N
004272  000032          N               ;DEC TAPE READ WRITE BUFFER
        000031          N=N-1
004274  177747          -N
004276  000031          N               ;DEC TAPE READ WRITE BUFFER
        000030          N=N-1
004300  177750          -N
004302  000030          N               ;DEC TAPE READ WRITE BUFFER
        000027          N=N-1
004304  177751          -N
004306  000027          N               ;DEC TAPE READ/WRITE BUFFER
        000026          N=N-1
004310  177752          -N
004312  000026          N               ;DEC TAPE READ WRITE BUFFER
        000025          N=N-1
004314  177753          -N
004316  000025          N               ;DEC TAPE READ/WRITE BUFFER
        000024          N=N-1
004320  177754          -N
004322  000024          N               ;DEC TAPE READ/WRITE BUFFER
        000023          N=N-1
004324  177755          -N
004326  000023          N               ;DEC TAPE READ/WRITE BUFFER
        000022          N=N-1
004330  177756          -N
004332  000022          N               ;DEC TAPE READ/WRITE BUFFER
        000021          N=N-1
004334  177757          -N
004336  000021          N               ;DEC TAPE READ/WRITE BUFFER
        000020          N=N-1
004340  177760          -N
004342  000020          N               ;DEC TAPE READ/WRITE BUFFER
        000017          N=N-1
004344  177761          -N
004346  000017          N               ;DEC TAPE READ/WRITE BUFFER
        000016          N=N-1
004350  177762          -N
004352  000016          N               ;DEC TAPE READ/WRITE BUFFER
        000015          N=N-1
004354  177763          -N
004356  000015          N               ;DEC TAPE READ/WRITE BUFFER
        000014          N=N-1
004360  177764          -N
004362  000014          N               ;DEC TAPE READ/WRITE BUFFER
        000013          N=N-1
004364  177765          -N
004366  000013          N               ;DEC TAPE READ WRITE BUFFER
```

G03


```
                000012                  N=N-1
        004370  177766                  -N
        004372  000012                  N                                 ;DEC TAPE READ WRITE BUFFER
                000011                  N=N-1
        004374  177767                  -N
        004376  000011                  N                                 ;DEC TAPE READ WRITE BUFFER
                000010                  N=N-1
        004400  177770                  -N
        004402  000010                  N                                 ;DEC TAPE READ WRITE BUFFER
                000007                  N=N-1
        004404  177771                  -N
        004406  000007                  N                                 ;DEC TAPE READ/WRITE BUFFER
                000006                  N=N-1
        004410  177772                  -N
        004412  000006                  N                                 ;DEC TAPE READ/WRITE BUFFER
                000005                  N=N-1
        004414  177773                  -N
        004416  000005                  N                                 ;DEC TAPE READ/WRITE BUFFER
                000004                  N=N-1
        004420  177774                  -N
        004422  000004                  N                                 ;DEC TAPE READ/WRITE BUFFER
                000003                  N=N-1
        004424  177775                  -N
        004426  000003                  N                                 ;DEC TAPE READ/WRITE BUFFER
                000002                  N=N-1
        004430  177776                  -N
        004432  000002                  N                                 ;DEC TAPE READ/WRITE BUFFER
                000001                  N=N-1
        004434  177777                  -N
        004436  000001                  N                                 ;DEC TAPE READ/WRITE BUFFER

        004440  012767  004440  012020  BEGIN:  MOV     #BEGIN,RETURN             ;FOR SCOPING
        004446  104400                          SCOPE
        004450  012737  004000  016462          MOV     #4000,@#ICOUNT            ;ITERATION COUNT
                                        ;TEST COMPARE INSTRUCTION INDEXED
        004456  012700  177770                  MOV     #-10,%0                   ;MINUS 10 TO REG 0
        004462  026027  016710  125252          CMP     A(0),#125252              ;(A INDEX BY MINUS 10)  TO #125252
        004470  001401                          BEQ     .+4
        004472  104000                          HLT                               ;COMPARE WITH INDEX FAILED
        004474  104400                          SCOPE

        004476  022760  125252  016710          CMP     #125252,A(0)              ;A INDEXED
        004504  001401                          BEQ     .+4
        004506  104000                          HLT                               ;COMPARE FAILED DESTINATION INDE.
        004510  104400                          SCOPE
                                        ;SET "ISR" FOR DISKS AND KW11L TO CURRENT BANK
        004512  010700                          MOV     %7,%0                     ;CURRENT BANK
        004514  042700  007777                  BIC     #007777,%0                ;LEAVE ONLY BANK BITS
        004520  062700  002044                  ADD     #LK3,%0                   ;ADD IN CLOCK ENTRANCE
        004524  010037  000100                  MOV     %0,@#100                  ;LINE CLOCK, KW11L
        004530  042700  007777                  BIC     #007777,%0
        004534  062700  002632                  ADD     #IRF,%0
        004540  010037  000204                  MOV     %0,@#204                  ;RF11 ISR
        004544  042700  007777                  BIC     #007777,%0
        004550  062700  002534                  ADD     #IRC,%0
        004554  010037  000210                  MOV     %0,@#210                  ;RC11 ISR
```

```
1646  004560  042700  007777          BI      #007777,-
1647  004564  062700  002344          ADD     #IRP,%0
1648  004570  010037  000220          MOV     %0,@#220          ;RP11 :SR
1649  004574  042700  007777          BIC     #7777,%0
1650  004600  062700  002450          ADD     #IRP,%0
1651  004604  010037  000254          MOV     %0,@#254          ;RP11 :SR
1652  004610  042700  007777          BIC     #007777,%0
1653  004614  063700  002704          ADD     @#LLIMIT,%0
1654  004620  010067  176060          MOV     %0,LLIMIT         ;CHANGE DISK VPR 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 RAM
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                                  ;REGISTER 0 CONTAINS 000010
1666  004656  022760  052525  016710  CMP     #052525,A(0)
1667  004664  001401                  BEQ     .+4
1668  004666  104000                  HLT                       ;COMPARE FAILED
1669  004670  104400                  SCOPE
1670
1671                                  ;REGISTER 0 CONTAINS 000010
1672  004672  026060  016710  016710  CMP     A(0),A(0)
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                                  ;REGISTER 0 CONTAINS 177770 (-10)
1684  004726  012701  000004          MOV     #+4,%1
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)
```

```
                                                        ;REGISTER 1 CONTAINS GOOD:D
1702
1703  005006  026160  016700  [illegible]      CMP     A,1,R0
1704  005014  001401                           BEQ     .+4
1705  005016  104000                           HLT                     ;COMPARE FAILED
1706  005020  104400                           SCOPE
1707                                ;TEST MOVE ODD BYTE TO REGISTER
1708                                ;PROBLEM 11S023?-?-[illegible]AR-72
1709  005022  116700  011677                   MOVB    C+2,%0
1710  005026  022700  000035                   CMP     #35,%0
1711  005032  001401                           BEQ     .+4
1712  005034  104000                           HLT
1713  005036  104400                           SCOPE
1714                                ;TEST MOVE INSTRUCTION FOR INDE*
1715
1716  005040  012700  177770                   MOV     #-10,%0
1717  005044  016067  016710  000660           MOV     A(0),TEMP
1718  005052  026727  011654  125252           CMP     TEMP,#125252
1719  005060  001401                           BEQ     .+4
1720  005062  104000                           HLT                     ;COMPARE FAILED
1721  005064  104400                           SCOPE
1722
1723  005066  012700  000010                   MOV     #+10,%0
1724  005072  016067  016710  011632           MOV     A(0),TEMP
1725  005100  026727  011626  052525           CMP     TEMP,#052525
1726  005106  001401                           BEQ     .+4
1727  005110  104000                           HLT                     ;MOV FAILED
1728  005112  104400                           SCOPE
1729
1730  005114  012700  177770                   MOV     #-10,%0
1731  005120  012760  125252  016732           MOV     #125252,TEMP(0
1732  005126  023727  016722  125252           CMP     @#C,#125252
1733  005134  001401                           BEQ     .+4
1734  005136  104000                           HLT                     ;MOV FAILED
1735  005140  104400                           SCOPE
1736
1737  005142  012700  000010                   MOV     #+10,%0
1738  005146  012760  052525  016732           MOV     #052525,TEMP(0)
1739  005154  023727  016742  052525           CMP     @#TEMP+10,#052525
1740  005162  001401                           BEQ     .+4
1741  005164  104000                           HLT                     ;MOV FAILED
1742  005166  104400                           SCOPE
1743
1744                                ;TEST BIC INSTRUCTION FOR INDEXING
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                     ;BIC FAILED
1751  005222  104400                           SCOPE
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
```

```
1758  005254  104000                          HLT                             ;BIC FAILED
1759  005256  104400                          SCOPE
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                             ;BIC FAILED
1767  005312  104400                          SCOPE
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                             ;BIC FAILED
1775  005346  104400                          SCOPE
1776                          ;TEST SUBTRACT INSTRUCTION FOR INDEXING
1777  005350  012767  125252  011354          MOV     #125252,TEMP
1778  005356  012700  177770                  MOV     #-10,%0
1779  005362  166067  016710  011342          SUB     A(0),TEMP
1780  005370  001401                          BEQ     .+4
1781  005372  104000                          HLT                             ;SUB FAILED
1782  005374  104400                          SCOPE
1783
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                             ;SUB FAILED
1789  005422  104400                          SCOPE
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                             ;SUB FAILED
1796  005450  104400                          SCOPE
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                             ;SUB FAILED
1803  005476  104400                          SCOPE
1804
1805                          ;TEST UNARYS INDEXED
1806  005500  012737  177777  016732          MOV     #-1,@#TEMP
1807  005506  012700  177770                  MOV     #-10,%0
1808  005512  005060  016742                  CLR     D(0)
1809  005516  005737  016732                  TST     @#TEMP
1810  005522  001401                          BEQ     .+4
1811  005524  104000                          HLT                             ;CLR FAILED
1812  005526  104400                          SCOPE
1813
```

```
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                             ;CLR FAILED
1820  005556  104400                          SCOPE
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                             ;COM FAILED
1828  005606  104400                          SCOPE
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                             ;COM FAILED
1836  005636  104400                          SCOPE
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                             ;INC FAILED
1843  005666  104400                          SCOPE
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                             ;INC FAILED
1851  005716  104400                          SCOPE
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                             ;DEC FAILED
1859  005746  104400                          SCOPE
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                             ;DEC FAILED
1867  005776  104400                          SCOPE
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                             ;NEG FAILED
1875  006030  104400                  SCOPE
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                             ;NEG FAILED
1883  006062  104400                  SCOPE
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                             ;ADC FAILED
1892  006114  104400                  SCOPE
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                             ;ADC FAILED
1901  006146  104400                  SCOPE
1902
1903  006150  012737  000001  016732  MOV     #1,@#TEMP
1904  006156  012700  177770          MOV     #-10,%0
1905  006162  000261                  SEC
1906  006164  005660  016742          SBC     D(0)
1907  006170  005737  016732          TST     @#TEMP
1908  006174  001401                  BEQ     .+4
1909  006176  104000                  HLT                             ;SBC FAILED
1910  006200  104400                  SCOPE
1911
1912  006202  012737  000001  016732  MOV     #1,@#TEMP
1913  006210  012700  000010          MOV     #+10,%0
1914  006214  000261                  SEC
1915  006216  005660  016722          SBC     C(0)
1916  006222  005737  016732          TST     @#TEMP
1917  006226  001401                  BEQ     .+4
1918  006230  104000                  HLT                             ;SBC FAILED
1919  006232  104400                  SCOPE
1920
1921                          ;TEST JMP INDIRECT
1922  006234  010700                  MOV     %7,%0
1923  006236  062700  000010          ADD     #10,%0
1924  006242  000110                  JMP     @%0
1925  006244  104000                  HLT                             ;JMP FAILED
```

M03


```
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                             ;MOV REGISTOR FAILED
1938  006274  104400                        SCOPE
1939                                ;TEST INDIRECT ADDRESSING
1940                                ;TEST COMPARE INSTRUCTION
1941  006276  023727  016700  125252        CMP     @#8,#125252
1942  006304  001401                        BEQ     .+4
1943  006306  104000                        HLT                             ;CMP FAILED
1944  006310  104400                        SCOPE
1945
1946  006312  022737  125252  016700        CMP     #125252,@#8
1947  006320  001401                        BEQ     .+4
1948  006322  104000                        HLT                             ;CMP FAILED
1949  006324  104400                        SCOPE
1950
1951  006326  023737  016700  016700        CMP     @#8,@#8
1952  006334  001401                        BEQ     .+4
1953  006336  104000                        HLT                             ;CMP FAILED
1954  006340  104400                        SCOPE
1955
1956                                ;TEST MOVE INSTRUCTIONS
1957  006342  013700  016700                MOV     @#8,%0
1958  006346  022700  125252                CMP     #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                          ;TEST BIC INSTRUCTION INDIRECT
1975  006424  012700  177777                MOV     #-1,%0
1976  006430  043700  016700                BIC     @#B,%0
1977  006434  020027  052525                CMP     %0,#052525
1978  006440  001401                        BEQ     .+4
1979  006442  104000                        HLT                             ;BIC FAILED
1980  006444  104400                        SCOPE
1981
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                          ;TEST SUBTRACT INSTRUCTION
1997  006526  012700  125252                MOV     #125252,%0
1998  006532  163700  016700                SUB     @#B,%0
1999  006536  020027  000000                CMP     %0,#0
2000  006542  001401                        BEQ     .+4
2001  006544  104000                        HLT                             ;SUB FAILED
2002  006546  104400                        SCOPE
2003
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                             ;TST FAILED
2022  006642  104400                          SCOPE
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                             ;COM FAILED
2029  006670  104400                          SCOPE
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                             ;INC FAILED
2036  006714  104400                          SCOPE
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                             ;DEC FAILED
2043  006740  104400                          SCOPE
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                             ;NEG FAILED
2050  006766  104400                          SCOPE
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                             ;CMP FAILED
2057  007002  104400                          SCOPE
2058
2059  007004  027727  125252  007670          CMP     #125252,@B+2
2060  007012  001401                          BEQ     .+4
2061  007014  104000                          HLT                             ;CMP FAILED
2062  007016  104400                          SCOPE
2063
2064  007020  027727  007656  007654          CMP     @B+2,@B+2
2065  007026  001401                          BEQ     .+4
2066  007030  104000                          HLT                             ;CMP FAILED
2067  007032  104400                          SCOPE
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                          ;TEST BIC INSTRUCTION INDIRECT WITH INDEXING
2089  007116  012700  177777          MOV     #-1,%0
2090  007122  047700  007554          BIC     @R+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
```

```
2127  007306  104000                        HLT                             ;SUB FAILED
2128  007310  104400                        SCOPE
2129
2130                              ;TEST ADD INDIRECT WITH INDEXING
2131  007312  005000                        CLR     %0
2132  007314  067700  007362                ADD     @B+2,%0
2133  007320  022700  125252                CMP     #125252,%0
2134  007324  001401                        BEQ     .+4
2135  007326  104000                        HLT                             ;ADD FAILED
2136  007330  104400                        SCOPE
2137
2138  007332  005037  016732                CLR     @#TEMP
2139  007336  062777  125252  007370        ADD     #125252,@TEMP+2
2140  007344  022737  125252  016732        CMP     #125252,@#TEMP
2141  007352  001401                        BEQ     .+4
2142  007354  104000                        HLT                             ;ADD FAILED
2143  007356  104400                        SCOPE
2144  007360  012737  125252  016732        MOV     #125252,@#TEMP
2145  007366  067777  007324  007340        ADD     @A+6,@TEMP+2
2146  007374  023727  016732  177777        CMP     @#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  016732        MOV     #-1,@#TEMP
2153  007416  005077  007312                CLR     @TEMP+2
2154  007422  005737  016732                TST     @#TEMP
2155  007426  001401                        BEQ     .+4
2156  007430  104000                        HLT                             ;TST FAILED
2157  007432  104400                        SCOPE
2158
2159  007434  012737  125252  016732        MOV     #125252,@#TEMP
2160  007442  005177  007266                COM     @TEMP+2
2161  007446  022737  052525  016732        CMP     #052525,@#TEMP
2162  007454  001401                        BEQ     .+4
2163  007456  104000                        HLT                             ;COM FAILED
2164  007460  104400                        SCOPE
2165
2166  007462  005037  016732                CLR     @#TEMP
2167  007466  005277  007242                INC     @TEMP+2
2168  007472  022737  000001  016732        CMP     #1,@#TEMP
2169  007500  001401                        BEQ     .+4
2170  007502  104000                        HLT                             ;INC FAILED
2171  007504  104400                        SCOPE
2172
2173  007506  005037  016732                CLR     @#TEMP
2174  007512  005377  007216                DEC     @TEMP+2
2175  007516  023727  016732  177777        CMP     @#TEMP,#-1
2176  007524  001401                        BEQ     .+4
2177  007526  104000                        HLT                             ;DEC FAILED
2178  007530  104400                        SCOPE
2179
2180  007532  012737  000001  016732        MOV     #1,@#TEMP
2181  007540  005477  007170                NEG     @TEMP+2
2182  007544  022737  177777  016732        CMP     #-1,@#TEMP
```

```
2183  007552  001401                          BEQ     .+4
2184  007554  104000                          HLT                             ;NEG FAILED
2185  007556  104400                          SCOPE
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                             ;ADC FAILED
2193  007604  104400                          SCOPE
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                             ;SBC FAILED
2201  007632  104400                          SCOPE
2202
2203                                  ;TEST OF COMBINED INDEXING AND INDIRECT
2204  007634  012700  177772                  MOV     #-6,%0
2205  007640  027027  016710  125252          CMP     @A(0),#125252
2206  007646  001401                          BEQ     .+4
2207  007650  104000                          HLT                             ;CMP FAILED
2208  007652  104400                          SCOPE
2209
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                             ;CMP FAILED
2214  007672  104400                          SCOPE
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                             ;CMP FAILED
2221  007716  104400                          SCOPE
2222
2223                                  ;TEST BIC INSTRUCTION
2224  007720  012700  000006                  MOV     #+6,%0
2225  007724  012767  177777  007000          MOV     #-1,TEMP
2226  007732  047067  016710  006772          BIC     @A(0),TEMP
2227  007740  022767  125252  006764          CMP     #125252,TEMP
2228  007746  001401                          BEQ     .+4
2229  007750  104000                          HLT                             ;BIC FAILED
2230  007752  104400                          SCOPE
2231
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                             ;BIC FAILED
2238  010006  104400                          SCOPE
```

```
2239  010010  012737  177777  016722          MOV     #-1,@#C
2240  010016  012700  177772                  MOV     #-6,%0
2241  010022  012701  177772                  MOV     #-6,%1
2242  010026  047071  016710  016732          BIC     @A(0),@TEMP 1
2243  010034  022737  052525  016722          CMP     #052525,@#C
2244  010042  001401                          BEQ     .+4
2245  010044  104000                          HLT                             ;BIC FAILED
2246  010046  104400                          SCOPE
2247
2248  010050  122727  000000  000001          CMPB    #0,#1           ;T7 FIX
2249  010056  002401                          BLT     .+4
2250  010060  104000                          HLT                     ;CMPB FAILED
2251  010062  104400                          SCOPE
2252                          ;TEST COMPARE INSTRUCTION INDEXED
2253  010064  012700  177770                  MOV     #-10,%0                 ;MINUS 10 TO REG 0
2254  010070  126027  016710  000252          CMPB    A(0),#000252            ;A INDEX BY MINUS 10, TO #125252
2255  010076  001401                          BEQ     .+4
2256  010100  104000                          HLT                             ;COMPARE WITH INDEX FAILED
2257  010102  104400                          SCOPE
2258
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
```

```
2295
2296  010250  126160  016710  016710          CMPB    A(1),A(0)
2297  010256  001401                          BEQ     .+4
2298  010260  104000                          HLT                             ;CMPB FAILED
2299  010262  104400                          SCOPE
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                             ;CMPB FAILED
2306  010306  104400                          SCOPE
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                             ;CMPB FAILED
2313  010332  104400                          SCOPE
2314                                ;TEST MOVE INSTRUCTION FOR INDEX
2315
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                             ;MOVB FAILED
2321  010360  104400                          SCOPE
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                             ;MOVB FAILED
2328  010406  104400                          SCOPE
2329
2330  010410  012700  177770                  MOV     #-10,%0
2331  010414  112760  125252  016732          MOVB    #125252,TEMP(0
2332  010422  123727  016722  125252          CMPB    @#0,#125252
2333  010430  001401                          BEQ     .+4
2334  010432  104000                          HLT                             ;MOVB FAILED
2335  010434  104400                          SCOPE
2336
2337  010436  012700  000010                  MOV     #+10,%0
2338  010442  112760  052525  016732          MOVB    #052525,TEMP(0
2339  010450  123727  016742  052525          CMPB    @#TEMP+10,#052525
2340  010456  001401                          BEQ     .+4
2341  010460  104000                          HLT                             ;MOVB FAILED
2342  010462  104400                          SCOPE
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                             ;BICB FAILED
```

```
2352  010516  104400                          SCOPE
2353
2354  010520  012767  177777  006204          MOV     #-1,TEMP
2355  010526  012700  000010                  MOV     #10,%0
2356  010532  146067  016710  006172          BICB    A(0),TEMP
2357  010540  126727  006166  007652          CMPB    TEMP,#007652
2358  010546  001401                          BEQ     .+4
2359  010550  104000                          HLT                             ;BICB FAILED
2360  010552  104400                          SCOPE
2361
2362  010554  012737  177777  016742          MOV     #-1,@#TEMP+10
2363  010562  012700  000010                  MOV     #10,%0
2364  010566  142760  125252  016732          BICB    #125252,TEMP(0)
2365  010574  123727  016742  002525          CMPB    @#TEMP+10,#2525
2366  010602  001401                          BEQ     .+4
2367  010604  104000                          HLT                             ;BICB FAILED
2368  010606  104400                          SCOPE
2369
2370  010610  012700  177770                  MOV     #-10,%0
2371  010614  012767  177777  006100          MOV     #-1,TEMP-10
2372  010622  142767  052525  006072          BICB    #052525,TEMP-10
2373  010630  126727  006066  125252          CMPB    TEMP-10,#125252
2374  010636  001401                          BEQ     .+4
2375  010640  104000                          HLT                             ;BICB FAILED
2376  010642  104400                          SCOPE
2377
2378                          ;TEST UNARYS INDEXED
2379  010644  012737  177777  016732          MOV     #-1,@#TEMP
2380  010652  012700  177770                  MOV     #-10,%0
2381  010656  105060  016742                  CLRB    D(0)
2382  010662  105737  016732                  TSTB    @#TEMP
2383  010666  001401                          BEQ     .+4
2384  010670  104000                          HLT                             ;CLRB FAILED
2385  010672  104400                          SCOPE
2386
2387  010674  012737  177777  016732          MOV     #-1,@#TEMP
2388  010702  012700  177770                  MOV     #-10,%0
2389  010706  105060  016742                  CLRB    D(0)
2390  010712  023727  016732  177400          CMP     @#TEMP,#177400
2391  010720  001401                          BEQ     .+4
2392  010722  104000                          HLT                             ;CLRB FAILED
2393  010724  104400                          SCOPE
2394
2395  010726  012737  177777  016732          MOV     #-1,@#TEMP
2396  010734  012700  177771                  MOV     #-7,%0
2397  010740  105060  016742                  CLRB    D(0)
2398  010744  023727  016732  000377          CMP     @#TEMP,#000377
2399  010752  001401                          BEQ     .+4
2400  010754  104000                          HLT                             ;CLRB FAILED
2401  010756  104400                          SCOPE
2402
2403  010760  012737  177777  016732          MOV     #-1,@#TEMP
2404  010766  012700  000010                  MOV     #+10,%0
2405  010772  105060  016722                  CLRB    C(0)
2406  010776  105737  016732                  TSTB    @#TEMP
2407  011002  001401                          BEQ     .+4
```

```
2407  011004  104000                    HLT                             ;CLRB FAILED
2408  011006  104400                    SCOPE
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     @#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,@#TEMP
2469  011302  012700  000010                  MOV     #+10.,%0
2470  011306  105460  016722                  NEGB    C(0)
2471  011312  023727  016732  000377          CMP     @#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,@#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     @#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,@#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     @#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,@#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,@#TEMP
2499  011444  001401                          BEQ     .+4
2500  011446  104000                          HLT                             ;SBCB FAILED
2501  011450  104400                          SCOPE
2502
2503  011452  012737  000001  016732          MOV     #1,@#TEMP
2504  011460  012700  000010                  MOV     #+10.,%0
2505  011464  000261                          SEC
2506  011466  105660  016722                  SBCB    C(0)
2507  011472  005737  016732                  TST     @#TEMP
2508  011476  001401                          BEQ     .+4
2509  011500  104000                          HLT                             ;SBCB FAILED
2510  011502  104400                          SCOPE
2511
2512                                  ;TEST INDIRECT ADDRESSING
2513                                  ;TEST COMPARE INSTRUCTION
2514  011504  123727  016700  000252          CMPB    @#B,#000252
2515  011512  001401                          BEQ     .+4
2516  011514  104000                          HLT                             ;CMPB FAILED
2517  011516  104400                          SCOPE
2518
```

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

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

```
2631
2632                                    ;TEST BIC INSTRUCTION INDIRECT WITH INDEXING
2633  012200  012700  177777           MOV     #-1,%0
2634  012204  147700  004472           BICB    @B+2,%0
2635  012210  120027  052525           CMPB    %0,#52525
2636  012214  001401                   BEQ     .+4
2637  012216  104000                   HLT                                     ;BICB FAILED
2638  012220  104400                   SCOPE
2639
2640  012222  012737  177777  016732   MOV     #-1,@#TEMP
2641  012230  142777  125252  004476   BICB    #125252,@TEMP+2
2642  012236  122737  052525  016732   CMPB    #52525,@#TEMP
2643  012244  001401                   BEQ     .+4
2644  012246  104000                   HLT                                     ;BICB FAILED
2645  012250  104400                   SCOPE
2646
2647  012252  012737  177777  016722   MOV     #-1,@#C
2648  012260  147777  004416  004436   BICB    @B+2,@C+2
2649  012266  126737  004426  016722   CMPB    A+10,@#C
2650  012274  001401                   BEQ      +4
2651  012276  104000                   HLT                                     ;BICB FAILED
2652  012300  104400                   SCOPE
2653                                    ;TEST UNARYS INDIRECT WITH INDEXING
2654  012302  012737  177777  016732   MOV     #-1,@#TEMP
2655  012310  105077  004420           CLRB    @TEMP+2
2656  012314  105737  016732           TSTB    @#TEMP
2657  012320  001401                   BEQ     .+4
2658  012322  104000                   HLT                                     ;CLRB FAILED
2659  012324  104400                   SCOPE
2660
2661  012326  012737  125252  016732   MOV     #125252,@#TEMP
2662  012334  105177  004374           COMB    @TEMP+2
2663  012340  122737  052525  016732   CMPB    #052525,@#TEMP
2664  012346  001401                   BEQ     .+4
2665  012350  104000                   HLT                                     ;COMB FAILED
2666  012352  104400                   SCOPE
2667
2668  012354  005037  016732           CLR     @#TEMP
2669  012360  105277  004350           INCB    @TEMP+2
2670  012364  122737  000001  016732   CMPB    #1,@#TEMP
2671  012372  001401                   BEQ     .+4
2672  012374  104000                   HLT                                     ;INCB FAILED
2673  012376  104400                   SCOPE
2674
2675  012400  005037  016732           CLR     @#TEMP
2676  012404  105377  004324           DECB    @TEMP+2
2677  012410  123727  016732  177777   CMPB    @#TEMP,#-1
2678  012416  001401                   BEQ     .+4
2679  012420  104000                   HLT                                     ;DECB FAILED
2680  012422  104400                   SCOPE
2681
2682  012424  012737  000001  016732   MOV     #1,@#TEMP
2683  012432  105477  004276           NEGB    @TEMP+2
2684  012436  122737  177777  016732   CMPB    #-1,@#TEMP
2685  012444  001401                   BEQ     .+4
2686  012446  104000                   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                             ;ADCB FAILED
 2695  012500  105737  016732                  TSTB    @#TEMP
 2696  012504  001401                          BEQ     .+4
 2697  012506  104000                          HLT                             ;TSTB FAILED
 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                             ;DECB FAILED
 2706  012536  104400                          SCOPE
 2707
 2708                                  ;TEST OF COMBINED INDEXING AND INDIRECT
 2709  012540  012700  177772                  MOV     #-6,%0
 2710  012544  127027  016710  125252          CMPB    @A(0),#125252
 2711  012552  001401                          BEQ     .+4
 2712  012554  104000                          HLT                             ;CMPB FAILED
 2713  012556  104400                          SCOPE
 2714
 2715  012560  012700  177772                  MOV     #-6,%0
 2716  012564  122770  125252  016710          CMPB    #125252,@A(0)
 2717  012572  001401                          BEQ     .+4
 2718  012574  104000                          HLT                             ;CMPB FAILED
 2719  012576  104400                          SCOPE
 2720
 2721  012600  012700  177772                  MOV     #-6,%0
 2722  012604  012701  000002                  MOV     #+2,%1
 2723  012610  127071  016710  016710          CMPB    @A(0),@A(1)
 2724  012616  001401                          BEQ     .+4
 2725  012620  104000                          HLT                             ;CMPB FAILED
 2726  012622  104400                          SCOPE
 2727                                  ;TEST BIC INSTRUCTION
 2728  012624  012700  000006                  MOV     #+6,%0
 2729  012630  012767  177777  004074          MOV     #-1,TEMP
 2730  012636  147067  016710  004066          BICB    @A(0),TEMP
 2731  012644  122767  125252  004060          CMPB    #125252,TEMP
 2732  012652  001401                          BEQ     .+4
 2733  012654  104000                          HLT                             ;BICB FAILED
 2734  012656  104400                          SCOPE
 2735
 2736  012660  012700  177772                  MOV     #-6,%0
 2737  012664  012737  177777  016722          MOV     #-1,@#C
 2738  012672  142770  125252  016732          BICB    #125252,@TEMP(0)
 2739  012700  123727  016722  000125          CMPB    @#C,#000125
 2740  012706  001401                          BEQ     .+4
 2741  012710  104000                          HLT                             ;BICB FAILED
 2742  012712  104400                          SCOPE
```

```
2743
2744  012714  012700  016702          MC.     #B+2,%0         ;ADDRESS OF ADDRESS F 2
2745  012720  023067  003754          CMP     @%0,#.B
2746  012724  001401                  BEQ     .+4
2747  012726  104000                  HLT                             ;CMP FAILED
2748  012730  104400                  SCOPE
2749
2750  012732  012700  016704          MOV     #B+4,%0
2751  012736  025067  003736          CMP     @-(0),#.B
2752  012742  001401                  BEQ     .+4
2753  012744  104000                  HLT                             ;CMP FAILED
2754  012746  104400                  SCOPE
2755
2756  012750  012700  016704          MOV     #B+4,%0
2757  012754  125067  003720          CMPB    @-(0),#.B
2758  012760  001401                  BEQ     .+4
2759  012762  104000                  HLT                             ;CMPB FAILED
2760  012764  104400                  SCOPE
2761
2762  012766  012700  016726          MOV     #C+4,%0
2763  012772  012737  177777  016722  MOV     #-1,@#C
2764  013000  105050                  CLRB    @-(0)
2765  013002  023727  016722  177400  CMP     @#C,#177400
2766  013010  001401                  BEQ     .+4
2767  013012  104000                  HLT                             ;CLRB FAILED
2768  013014  104400                  SCOPE
2769  013016  012737  177777  016722  MOV     #-1,@#C
2770  013024  012700  177772          MOV     #-6,%0
2771  013030  012701  177772          MOV     #-6,%1
2772  013034  147071  016710  016732  BICB    @A(0),@TEMP(1)
2773  013042  022737  177525  016722  CMP     #177525,@#C
2774  013050  001401                  BEQ     .+4
2775  013052  104000                  HLT                             ;BICB FAILED
2776  013054  104400                  SCOPE
2777                          ;TEST THAT R0 IS NOT DESTROYED BY FALSE SELECTION
2778  013056  012700  052525          MOV     #52525,%0       ;THIS IS CHECK LATER IN PROGRAM
2779                          ;TEST JSR INSTRUCTION
2780
2781  013062  004767  000002          JSR     %7, TJSR2       ;PLACE PC ON STACK
2782  013066  000405          TJSR1:  BR      TJSR3           ;RETURN HERE ON RTS %7
2783  013070  121627  013066  TJSR2:  CMPB    @%6,#TJSR1      ;CHECK FOR CORRECT PC ON STACK
2784  013074  001401                  BEQ     .+4
2785  013076  104000                  HLT                     ;INCORRECT PC ON STACK
2786  013100  000207                  RTS     %7              ;RETURN TO INST AFTER JSR
2787  013102  104400          TJSR3:  SCOPE
2788
2789  013104  000257                  CCC
2790  013106  004717                  JSR     %7,@%7          ;INSTRUCTION UNDER TEST
2791  013110  121627  013110          CMPB    @%6,#TJSR3+6            ;TEST THE STACK
2792  013114  001401                  BEQ     .+4
2793  013116  104000                  HLT                     ;PC OF JSR DID NOT GO TO STACK
2794  013120  005726                  TST     (6)+            ;REPOSITION THE STACK
2795  013122  104400                  SCOPE
2796                          ;TEST NESTED SUBROUTINES
2797
2798  013124  000257                  CCC                     ;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
```

```
2855  013352  104000                        HLT                     ;ROTATE ODD BYTE FAILED
2856  013354  104400                        SCOPE
2857
2858  013356  000257                        CCC                     ;CLEAR C
2859  013360  012767  177777  003344        MOV     #-1,TEMP
2860  013366  106267  003341                ASRB    TEMP+1
2861  013372  103401                        BCS     .+4
2862  013374  104000                        HLT                     ;C NOT SET
2863  013376  102001                        BVC     .+4
2864  013400  104000                        HLT                     ;V NOT CLEARED
2865  013402  026727  003324  177777        CMP     TEMP,#-1
2866  013410  001401                        BEQ     .+4
2867  013412  104000                        HLT                     ;SHIFT FAILED
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                     ;C NOT SET
2875  013436  102001                        BVC     .+4
2876  013440  104000                        HLT                     ;V NOT CLEARED
2877  013442  026727  003264  177377        CMP     TEMP,#177377
2878  013450  001401                        BEQ     .+4
2879  013452  104000                        HLT                     ;SHIFT BYTE FAILED
2880  013454  104400                        SCOPE
2881                                ;TEST COMBINATION OF N, C AND V
2882                                        .MACR   TNCV
2883                                        BPL     .+12
2884                                        BCC     .+20            ;Z=1
2885                                        BVC     .+30            ;Z=1, C=1
2886                                        HLT                     ;Z=C, BUT V=1
2887                                        BR      .+24
2888                                        BCC     .+16            ;Z=0
2889                                        BVS     .+20            ;Z=0, C=1
2890                                        HLT                     ;Z NOT EQUAL C, V=1
2891                                        BR      .+14
2892                                        BVS     .+12            ;Z=1, C=0
2893                                        HLT                     ;Z NOT EQUAL C, V=1
2894                                        BR      .+6
2895                                        BVC     .+4             ;Z=0, C=0
2896                                        HLT                     ;Z=C, BUT V=1
2897                                        SCOPE
2898                                        .ENDM
2899  013456  005037  016462                CLR     @#ICOUNT                ;NO ITERATION
2900
2901                                ;TEST ROTATING NUMBERS
2902  013462  104400                        SCOPE
2903  013464  012767  177777  000142        MOV     #-1,REFF        ;INITIALIZE BASE NUMBER
2904  013472  005267  000136        TSROT:  INC     REFF            ;INCREMENT NUMBER
2905  013476  004767  000012                JSR     %7,ROTALL       ;GO TO COMPARE ROUTINE
2906  013502  026727  000126  100077        CMP     REFF,#100077    ;TEST ALL VALUES
2907  013510  001370                        BNE     TSROT           ;NO TEST THEM ALL
2908  013512  000452                        BR      TSRT2A          ;WE ARE DONE
2909
2910  013514  016767  000114  000114  ROTALL: MOV     REFF,TEST
```

```
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                             ;INITIAL NOT EQUAL TO FINAL
2938  013632  000207                          RTS     %7                      ;ROTATE WORD FAILED
2939  013634  000000                  REFF:   0                               ;GOOD DATA
2940  013636  000000                  TEST:   0                               ;BAD DATA
2941          013634                          REF=REFF
2942                                  ;TEST ROTATING BYTE EVEN/ODD, ALL NUMBERS
2943  013640  012767  177777  177766  TSRT2A: MOV     #-1,REFF
2944  013646  005267  177762          TSROT2: INC     REFF
2945  013652  004767  000016                  JSR     %7,ROTBE
2946  013656  004767  000122                  JSR     %7,ROTBO
2947  013662  022767  177777  177744          CMP     #-1,REFF
2948  013670  001366                          BNE     TSROT2
2949  013672  000505                          BR      ROTEN1
2950  013674  016767  177734  177734  ROTBE:  MOV     REFF,TEST
2951  013702  106067  177730                  RORB    TEST                    ;ROTATE BYTE EVEN
2952  013706  106067  177724                  RORB    TEST
2953  013712  106067  177720                  RORB    TEST
2954  013716  106167  177714                  ROLB    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  013760  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     TES ,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                 ROTEN1: 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         ASTART: MOV     @%6,NUMA
 3011  014126  012767  000001  177500         MOV     #1,REF
 3012  014134  005267  177474         ARITST: INC     REF
```

```
3013  014140  004767  000014                        ISR     %7,ADSUB
3014  014144  022767  177[illegible]  .-46                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                  NUMA:   0
3027  014222  104400                  ARIEND: SCOPE
3028
3029                                  ;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                             ;R0 AND R1 DID NOT COMPARE
3035  014236  020227  177777                  CMP     %2,#-1                  ;AT UPPER LIMIT
3036  014242  001403                          BEQ     CMP2                    ;YES EXIT
3037  014244  005202                          INC     %2                      ;INCREMENT TO NEXT NUMBER
3038  014246  005201                          INC     %1
3039  014250  000767                          BR      CMP1
3040  014252  104400                  CMP2:   SCOPE
3041                                  ;TEST COMPLIMENTING 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                    ;COMPLIMENT 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
3050  014312  005267  002414                  INC     TEMP                    ;INCREMENT AND TEST FOR DONE
3051  014316  001362                          BNE     TCOM                    ;NOT FINISHED GO LOOP
3052  014320  104400                          SCOPE
3053
3054                                  ;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
3061  014352  104000                          HLT                             ;COMPLIMENT OR INCREMENT BYTE FAILED
3062  014354  105167  002352                  COMB    TEMP
3063  014360  105267  002346                  INCB    TEMP
3064  014364  001362                          BNE     TCOM2
3065  014366  104400                          SCOPE
3066                                  ;TEST COMB (ODD BYTE)
3067  014370  005067  002336                  CLR     TEMP                    ;BASE DATA
3070  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,@#ICOUNT
3093  014512  104400                  WAIT3:  SCOPE
3094  014514                          WAIT5:
3095  014514  012737  000010  016462          MOV     #10,@#ICOUNT
3096
3097                                  ;TEST TO SEE IF I/O DEVICES WERE SELECTED
3098  014522  122737  000377  001540          CMPB    #377,@#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,@#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     @#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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[illegible]  30A(1052)  20-JAN-78  ..  05  PAGE 5.
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3125  014626  000367  177004          SWABA:  SWAB    TEST            ;OPERATION UNDER TEST
3126  014632  026767  177000  .-6---4         CMP     TEST,REF        ;TEST SWAB INSTRUCTION
3127  014640  001401                          BEQ     .+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  176-5-                  INCB    TES+1           ;INC TEST NUMBER
3132  014660  001362                          BNE     SWABA           ;LOOP TILL DONE
3133  014662  104400                          SCOPE
3134  014664  012737  004000  016462          MOV     #4000,@#ICOUNT
3135          000240                  NOP=240
3136          177776                  CC=177776
3137
3138  014672  012767  177---  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                          BEQ     .+4
3145  014722  104000                          HLT                     ;ADCB FAILED
3146  014724  104400                          SCOPE
3147                          ;PROBLEM 115 030C 17 AUG 1972
3148  014726  012703  000100                  MOV     #100,%3
3149  014732  012705  016732                  MOV     #TEMP,%5
3150  014736  012737  177777  016732          MOV     #-1,@#TEMP
3151  014744  030315                          BIT     %3,@%5
3152  014746  001001                          BNE     .+4
3153  014750  104000                          HLT                     ;BIT FAILED
3154  014752  104400                          SCOPE
3155  014754  000402                  EAESRT: BR      .+6             ;NOP IF NO EAE
3156  014756  000167  000362                  JMP     ENDEAE
3157                          ;TEST LEFT SHIFT
3158  014762  104400                          SCOPE                   ;TEST OF LOGICAL SHIFT
3159  014764  005077  163360                  CLR     @MQ             ;LOAD MQ WITH 0
3160  014770  012777  125252  163354          MOV     #125252,@AC     ;LOAD AC WITH 125252
3161  014776  012777  177760  163362          MOV     #-16.,@LSH      ;LOAD SHIFT COUNT (LSH) WITH -16
3162  015004  005777  163342                  TST     @AC             ;COMPARE AC WITH 0
3163  015010  001401                          BEQ     .+4             ;GO TO HLT IF BAD
3164  015012  104000                          HLT
3165  015014  022777  125252  163326          CMP     #125252,@MQ     ;COMPARE MQ WITH 125252
3166  015022  001401                          BEQ     .+4             ;GO TO HLT IF BAD
3167  015024  104000                          HLT
3168  015026  122777  000020  163322          CMPB    #20,@SRE                ;COMPARE SR WITH 2
3169  015034  001401                          BEQ     .+4             ;SKIP HLT IF GOOD
3170  015036  104000                          HLT                     ;HALT ON ERROR (LEFT SHIFT)
3171
3172                          ;TEST RIGHT SHIFT
3173  015040  104400                          SCOPE                   ;TEST OF ARITHMETIC SHIFT
3174  015042  005077  163302                  CLR     @MQ             ;LOAD MQ WITH 0
3175  015046  012777  177777  163276          MOV     #-1,@AC         ;LOAD AC WITH -1
3176  015054  012777  000020  163306          MOV     #16.,@ASH       ;LOAD SHIFT COUNT (ASH) WITH 16.
3177  015062  005777  163264                  TST     @AC             ;COMPARE AC WITH 100000
3178  015066  100401                          BMI     .+4             ;SKIP HLT IF GOOD
3179  015070  104000                          HLT                     ;HALT ON ERROR
3180  015072  005777  163252                  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,@SPE       ;COMPARE SR WITH 10
3184  015110  001401                          BEQ     .+4             ;SKIP HLT IF GOOD
3185  015112  104000                          HLT                     ;HALT ON ERROR (RIGHT SHIFT
3186
3187                                  ;TEST NORMALIZE
3188  015114  104400                          SCOPE                   ;TEST OF NORMALIZE
3189  015116  012777  125252  163224          MOV     #125252,@MQ     ;LOAD MQ WITH 125252
3190  015124  012777  170000  163220          MOV     #170000,@AC     ;LOAD AC WITH 170000
3191  015132  005077  163226                  CLR     @NOR            ;START NORMALIZE
3192  015136  022777  100005  163206          CMP     #100005,@AC     ;COMPARE AC WITH 100005
3193  015144  001401                          BEQ     .+4             ;SKIP HLT IF GOOD
3194  015146  104000                          HLT                     ;HALT ON ERROR
3195  015150  022777  052520  163172          CMP     #52520,@MQ      ;COMPARE MQ WITH 52520
3196  015156  001401                          BEQ     .+4             ;SKIP HLT IF GOOD
3197  015160  104000                          HLT                     ;HALT ON ERROR
3198  015162  122777  000003  163164          CMPB    #3,@SC          ;COMPARE SC WITH 3
3199  015170  001401                          BEQ     .+4             ;SKIP HLT IF GOOD
3200  015172  104000                          HLT                     ;HALT ON ERROR (NORMALIZE
3201                                  ;TEST MULTIPLY
3202  015174  104400                          SCOPE                   ;TEST OF MULTIPLY
3203  015176  012777  125252  163144          MOV     #125252,@MQ     ;LOAD MQ WITH 125252
3204  015204  012777  040000  163146          MOV     #40000,@MUL     ;LOAD MUL WITH 40000
3205  015212  022777  165252  163132          CMP     #165252,@AC     ;COMPARE AC WITH 1652
3206  015220  001401                          BEQ     .+4             ;SKIP IF GOOD
3207  015222  104000                          HLT                     ;HALT ON ERROR
3208  015224  005777  163120                  TST     @MQ             ;COMPARE MQ WITH 10000
3209  015230  100401                          BMI     .+4             ;SKIP HLT IF GOOD
3210  015232  104000                          HLT                     ;HALT ON ERROR
3211  015234  122777  000300  163114          CMPB    #300,@SRE       ;COMPARE SR WITH 300
3212  015242  001401                          BEQ     .+4             ;SKIP HLT IF GOOD
3213  015244  104000                          HLT                     ;HALT ON ERROR (MULTIPLY)
3214
3215                                  ;TEST DIVIDE
3216  015246  104400                          SCOPE                   ;TEST OF DIVIDE
3217  015250  012777  125252  163072          MOV     #125252,@MQ     ;LOAD MQ WITH 125252
3218  015256  012777  177777  163066          MOV     #-1,@AC         ;LOAD AC WITH -1
3219  015264  012777  000002  163060          MOV     #2,@DIV         ;LOAD DIV WITH 2 AND DIVIDE
3220  015272  005777  163054                  TST     @AC             ;COMPARE AC WITH 0 (QUOTIANT)
3221  015276  001401                          BEQ     .+4             ;SKIP HLT IF GOOD
3222  015300  104000                          HLT                     ;HALT ON ERROR
3223  015302  022777  152525  163040          CMP     #152525,@MQ     ;COMPARE MQ WITH 152525
3224  015310  001401                          BEQ     .+4             ;SKIP HLT IF GOOD
3225  015312  104000                          HLT                     ;DIVIDE ERROR
3226  015314  104400                          SCOPE
3227  015316  012767  177777  001406          MOV     #-1,TEMP
3228  015324  000261                          SEC
3229  015326  105667  001401                  SBCB    TEMP+1
3230  015332  022767  177377  001372          CMP     #177377,TEMP
3231  015340  001401                          BEQ     .+4
3232  015342  104000                          HLT
3233  015344  104400                  ENDEAE: SCOPE
3234  015346  022700  052525                  CMP     #52525,%0
3235  015352  001401                          BEQ     .+4
3236  015354  104000                          HLT                     ;SOME OPERATION DESTROYED %0
```

```
3237  015356  012737  016526  000024          MOV     #PFAIL,@#24             ;POWER FAIL VECTOR
3238  015364  012737  000340  000026          MOV     #340,@#26                       ;PROCESSOR PRIORITY
3239
3240  015372  000401                  SKPBEL: BR      .+4                     ;SKIP OVER BELL-NOP ON CORE EXPANSION
3241  015374  000501                          BR      TRPA
3242  015376  032777  000100  162660          BIT     #100,@TTCSR
3243  015404  001006                          BNE     SBELL                   ;DON'T RING BELL IF TTY IS BUS
3244                                  ;BELL ON PASS COMPLETE
3245  015406  012777  000207  000466  BELL:   MOV     #207,@TDBR
3246  015414  105777  000464                  TSTB    @TCSR
3247  015420  100375                          BPL     .-4
3248  015422  005227  000000          SBELL:  INC     #0                      ;PASS COUNT LOCATION
3249  015426  010700                          MOV     %7,%0                   ;SET UP RESERVED INSTRUCTION
3250  015430  042700  017777                  BIC     #17777,%0               ;OFFSET
3251  015434  062700  015460                  ADD     #BEG20,%0
3252  015440  010037  000010                  MOV     %0,@#10
3253  015444  006701                          6701                            ;ATTEMPT TO EXECUTE SIGN EXTEND
3254  015446  000240                          NOP
3255  015450  012737  000006  015574          MOV     #6,@#YESRT              ;NO TRAP, PROCESSOR IS NOT=20,15,05
3256  015456  000403                          BR      BEGANY
3257  015460  012737  000002  015574  BEG20:  MOV     #2,@#YESRT              ;TRAP OCCURRED
3258  015466  012737  000012  000010  BEGANY: MOV     #12,@#10                ;RESTORE HALT FOR RESERVED INC
3259                                  ;ROUTINE TO CHECK FOR TRACE TRAP TO BE RUN WITH PROGRAM
3260
3261                                  ;SAVE OLD CONTENTS, SET UP FOR TRACE TRAP
3262  015474  005046                  YESTR:  CLR     -(6)
3263  015476  032777  010000  162470          BIT     #10000,@SRPTR           ;INHIBIT "T" TRAP IF SET
3264  015504  001013                          BNE     ACT
3265  015506  012737  015574  000014          MOV     #YESRT,@#14             ;T TRAP VECTOR
3266  015514  005167  000052                  COM     TRPB
3267  015520  001405                          BEQ     ACT
3268  015522  012716  000020                  MOV     #20,(6)                 ;SET TRACE TRAP
3269  015526  012746  004440          YESTR1: MOV     #BEGIN,-(6)             ;START OF TEST WITH TRACE ON
3270  015532  000002          YESTR2: RTI
3271  015534  013700  000042  ACT:    MOV     @#42,%0                 ;ARE WE UNDER ACT?
3272  015540  001772                          BEQ     YESTR1                  ;NO
3273  015542  012737  015554  000014          MOV     #CLEAR,@#14             ;TO BANK ZERO
3274  015550  012707  015554                  MOV     #CLEAR,%7
3275  015554  000005          CLEAR:  RESET                                   ;CLER  THE WORLD
3276  015556  004710          LOGICA: JSR     %7,@%0                  ;YES
3277  015560  000240                          NOP                             ;FOR ACT 11
3278  015562  000240                          NOP
3279  015564  000240                          NOP
3280  015566  000137  000502                  JMP     @#START
3281  015572  000000          TRPB:   0
3282  015574  000002          YESRT:  RTI                                     ;RETURN TO PROGRAM FROM TRAP - CAN BE AN RTT
3283  015576  000000                          HALT                            ;RTI FAILED
3284  015600  000137  004440  TRPA:   JMP     @#BEGIN                 ;BEGIN MODIFY BY EXPANSION
3285  015604  000000          PRFLAG: 0                               ;PRINT ROUTINE BUSY IF NOT ZERO
3286
3287                                  ;ENTERED WITH SYSTEM TRAP CALL(HLT)
3288                                  ;PRINT OUT THE ERROR PC AND STATUS REGISTER
3289  015606  005767  177772  PRINT:  TST     PRFLAG                  ;IS ROUTINE BUSY
3290  015612  001401                          BEQ     .+4
3291  015614  000002                          RTI                             ;YES EXIT
3292  015616  005267  177762                  INC     PRFLAG                  ;NO SET FLAG
```

```
3293  015622  005227  000000          INC     #0                      ;ERROR COUNT LOCATION
3294  015626  037727  162342  020000  BIT     @SRPTR,#20000           ;TEST FOR INHIBIT PRINT BIT
3295  015634  001401                  BEQ     .+4                     ;BRANCH TO PRINT
3296  015636  000501                  BR      PRINT1                  ;INHIBIT, RETURN TO MAIN STREAM
3297  015640  012667  000242          MOV     (6)+,SAVPC              ;PC OF FAILING ROUTINE
3298  015644  012667  000240          MOV     (6)+,SAVCC              ;CC OF ERROR CONDITION
3299  015650  024646                  CMP     -(6),-(6)               ;REPOSITION THE STACK
3300  015652  042767  000140  162116  BIC     #140,STATUS
3301  015660  105777  000220          TSTB    @TCSR           ;WAIT FOR FLAG
3302  015664  100375                  BPL     .-4
3303  015666  012777  000215  000206  MOV     #215,@TDBR      ;FILLER CHARACTER.
3304  015674  105777  000204          TSTB    @TCSR
3305  015700  100375                  BPL     .-4
3306  015702  012777  000212  000172  MOV     #212,@TDBR              ;LINE FEED
3307  015710  105777  000170          TSTB    @TCSR
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,@TDBR
3315  015750  105777  000130          TSTB    @TCSR                   ;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,@TDBR
3320  015774  105777  000104          TSTB    @TCSR
3321  016000  100375                  BPL     .-4
3322  016002  016702  000460          MOV     RETURN,%2               ;WHERE CPU TEST IS AT
3323  016006  004767  000100          JSR     %7,PRTAB
3324  016012  016702  000056          MOV     SAVR2,%2                ;RESTORE REGISTERS
3325  016016  016703  000054          MOV     SAVR3,%3
3326  016022  016704  000052          MOV     SAVR4,%4
3327  016026  012777  000377  000046  MOV     #377,@TDBR
3328  016034  105777  000044          TSTB    @TCSR
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                  BEQ     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        ;GET LIST ADDRESS
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           ;NEG SIGN PRINT 1
3357  016162  012777  000260  177712        MOV     #260,@TDBR      ;POS SIGN PRINT 0
3358  016170  000403                        BR      STAR
3359  016172  012777  000261  177702  MINUS: MOV     #261,@TDBR
3360  016200  016703  000156          STAR:  MOV     SEVEN,%3        ;PUT MASK IN R3
3361  016204  010267  000150                MOV     %2,TOODLE       ;GET READY TO DOODLE NUMBER IN TOODLE
3362  016210  005167  000144                COM     TOODLE          ;COMPENSATES FOR COMPLEMENT DURING BIC
3363  016214  046703  000140                BIC     TOODLE,%3       ;AND IN OCTAL CHARACTER
3364  016220  001410                        BEQ     WRTOC           ;ZERO, WRITE 0 IF LIST
3365  016222  066767  000136  000136  MKNUM: ADD     DECML,WGTCT     ;COUNT UP TO
3366  016230  005267  000134                INC     BINCT           ;AND RECORD
3367  016234  026703  000126                CMP     WGTCT,%3        ;SAME BINARY WEIGHT
3368  016240  001370                        BNE     MKNUM           ;KEEP COUNTN
3369  016242  062767  000260  000120  WRTOC: ADD     #260,BINCT      ;ADD ASCII PREFIX
3370  016250  016724  000114                MOV     BINCT,(4)+      ;WRITE ASCII CHAR IN LIST
3371  016254  066767  000102  000102        ADD     SEVEN,DECML     ;EXPAND BINARY WEIGHT
3372  016262  005067  000100                CLR     WGTCT
3373  016266  005067  000076                CLR     BINCT
3374  016272  005367  000074                DEC     ASCNT
3375  016276  001410                        BEQ     XLIST           ;5 CHAR IN LIST
3376  016300  012703  000003                MOV     #3,%3           ;SET X3 FOR ADD LOOP
3377  016304  066767  000052  000050  MOADD: ADD     SEVEN,SEVEN     ;MAKING SEVENTY BY SEVEN
3378  016312  005303                        DEC     %3
3379  016314  001373                        BNE     MOADD
3380  016316  000730                        BR      STAR            ;NX SEVEN SET GET NX OCTAL
3381  016320  012767  000005  000044  XLIST: MOV     #5,ASCNT        ;SEND 5 CHAR TO TTY
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           ;FINISH PRINTING GET NXT NUM
3387  016346  000767                        BR      WAIT2
3388  016350  105777  177530          HDFHM: TSTB    @TCSR
3389  016354  100375                        BPL     .-4
3390  016356  000207                        RTS     %7              ;HEAD FOR HOME
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                          ;SCOPE LOOP ROUTINE ENTERED BY USER TRAP
3403
3404                          ;SCOPE OR/AND ITERATION LOOP FOR EACH TEST 4000 TIMES
```

```
3405  016406  032777  040000  161560  SCOPEC: BIT     @#40000,@SRPTR          ;TEST SR FOR SCOPE
3406  016414  001012                          BNE     SCOPEB                  ;YES SCOPE
3407  016416  032777  004000  161550          BIT     @#4000,@SRPTR           ;NO - TEST FOR ITERATION
3408  016424  001011                          BNE     SCOPEG                  ;INHIBIT ITERATION
3409  016426  026767  000032  000026          CMP     SCOPEF,ICOUNT
3410  016434  001405                          BEQ     SCOPEG                  ;EXIT - DONE
3411  016436  005267  000022                  INC     SCOPEF                  ;INCREMENT COUNT
3412  016442  016716  000020          SCOPEB: MOV     RETURN,@#6              ;REPOSITION THE STACK
3413  016446  000002                          RTI                             ;SCOPE RETURN
3414  016450  005067  000010          SCOPEG: CLR     SCOPEF                  ;CLEAR COUNT
3415  016454  011667  000006                  MOV     @#6,RETURN              ;SAVE SCOPE RETURN POINTER
3416  016460  000002                          RTI                             ;RETURN INLINE-NEXT TEST
3417  016462  004000          ICOUNT: 4000                                    ;COUNT LOCATION FOR ITERATION LOOP
3418  016464  000000          SCOPEF: 0
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,@#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,@#6                ;IN CASE OF NO EAE
3443  016554  012700  016614          MOV     @#HAC,%0
```

```
3444  016560  017720  161566                  MOV     @AC,(%0)+
3445  016564  017720  161560                  MOV     @MQ,(%0)+
3446  016570  017720  161560                  MOV     @SC,(%0)+
3447  016574  010046                          MOV     %0,-(%6)
3448  016576  010667  000010                  MOV     %6,SAVR6                ;STORE STACK POSITION, POWER FAIL FLAG
3449  016602  012767  016622  161214          MOV     #RESTART,24
3450  016610  000000                          HALT                            ;HALT ON POWER DOWN NORMAL
3451  016612  000000                  SAVR6:  0                               ;STACK IS SAVED HERE
3452  016614  000000                  HAC:    0
3453  016616  000000                  HMQ:    0
3454  016620  000000                  HSC:    0
3455  016622  016706  177764          RESTART:        MOV     SAVR6,%6        ;RESTORE REGISTER OFF STACK
3456  016626  012600                          MOV     (%6)+,%0
3457  016630  014077  161520                  MOV     -(%0),@SC
3458  016634  014077  161510                  MOV     -(%0),@MQ               ;MQ MUST BE LOADED BEFORE AC
3459  016640  014077  161506                  MOV     -(%0),@AC
3460  016644  005037  000006                  CLR     @#6                     ;RESTORE TIME OUT
3461  016650  012667  161150                  MOV     (6)+,24                 ;WHEN POWERING UP
3462  016654  012605                          MOV     (6)+,%5
3463  016656  012604                          MOV     (6)+,%4
3464  016660  012603                          MOV     (6)+,%3
3465  016662  012602                          MOV     (6)+,%2
3466  016664  012601                          MOV     (6)+,%1
3467  016666  012600                          MOV     (6)+,%0
3468  016670  005037  016612                  CLR     @#SAVR6
3469  016674  104000                          HLT                             ;POWER FAIL OCCURRED
3470  016676  000002                          RTI                             ;RETURN TO MAIN LINE
3471  016700  125252                  B:      125252
3472                                  ;FIXED VALUES FOR USE IN TEST
3473  016702  016700                          B                       ;ADDRESS OF B
3474  016704  052525                          052525
3475
3476          016710                  .=B+10
3477  016710  177777                  A:      -1
3478  016712  016714                          A+4
3479
3480          016714                  .=A+4
3481  016714  125252                          125252
3482  016716  016720                          A+10                    ;ADDRESS OF A+10
3483  016720  052525                          052525
3484                                  ;FOR STORAGE
3485  016722  000000                  C:      0
3486  016724  016722                          C                       ;ADDRESS OF C
3487
3488          016732                  .=C+10
3489  016732  000000                  TEMP:   0
3490  016734  016732                          TEMP                    ;ADDRESS OF TEMP
3491
3492          016740                  .=TEMP+6
3493  016740  016742                          TEMP+10                 ;ADDRESS OF TEMP+10 OR "D"
3494  016742  000000                  D:      0
3495          017004                  .=.+40
3496  017004  000000                  FIN:    0                       ;BUFFER FOR SP
3497  017006  00020?                  USER:   RTS     %7              ;OVERLAY USER ROUTINE HERE IF 4KW, USE BANK 1 IF SY
3498                                  ;PDP-11 MEMORY DETERMINATION AND SETUP
3499                                  ;USE WITH VARIABLE CORE QUANTITY SYSTEMS
```

```
3500                    017010                          .=FIN + 4               ;APPLICABLE TO SYSTEM TEST 2.
3501  017010  012767  004440  176564  DET1:   MOV     #BEGIN,TRPA+2
3502  017016  012767  000401  176346          MOV     #401,SKFBEL             ;BR .+4
3503  017024  004767  000412                  JSR     %7,MAMF
3504  017030  023727  000042  017010          CMP     @#42,#DET1              ;CHECK FOR DDP1
3505  017036  101401                          BLOS    .+4
3506  017040  000207                          RTS     %7                      ;NO CORE EXPANSION WITH DDP1
3507  017042  032777  001000  161124          BIT     #1000,@SRPTR            ;CHECK VARIABLE CORE SWITCH
3508  017050  001401                          BEQ     DET4                    ;USE VARIABLE CORE ROUTINE
3509  017052  000207                          RTS     %7                      ;4K ONLY
3510  017054  012767  017122  160722  DET4:   MOV     #DET2,4                 ;TRAP VECTOR SETUP
3511  017062  012767  000340  160716          MOV     #340,6                  ;TRAP STATUS SETUP
3512  017070  005537  037770          EIGHT:  ADC     @#37770                 ;CHECK FOR 8K
3513  017074  005537  057770          TWELVE: ADC     @#57770                 ;CHECK FOR 12K
3514  017100  005537  077770          SXTEEN: ADC     @#077770                ;CHECK FOR 16K
3515  017104  005537  117770          TWENTY: ADC     @#117770                ;CHECK FOR 20K
3516  017110  005537  137770          TWOFOR: ADC     @#137770                ;CHECK FOR 24K
3517  017114  005537  157770          TWOEIG: ADC     @#157770                ;CHECK FOR 28K
3518  017120  000430                          BR      STRT28
3519  017122  012602                  DET2:   MOV     (6)+,%2                 ;RETRIEVE TRAP PC
3520  017124  005726                          TST     (6)+                    ;DISCARD TRAP STATUS WORD
3521  017126  022702  017074                  CMP     #EIGHT+4,%2
3522  017132  001542                          BEQ     DET3                    ;4K
3523  017134  022702  017100                  CMP     #TWELVE+4,%2
3524  017140  001437                          BEQ     STRT8                           ;8K
3525  017142  022702  017104                  CMP     #SXTEEN+4,%2
3526  017146  001431                          BEQ     STRT12                  ;12K
3527  017150  022702  017110                  CMP     #TWENTY+4,%2
3528  017154  001423                          BEQ     STRT16                  ;16K
3529  017156  022702  017114                  CMP     #TWOFOR+4,%2
3530  017162  001415                          BEQ     STRT20                  ;20K
3531  017164  000411                          BR      STRT24                  ;24K
3532  017166  005000                  MOVE:   CLR     %0                      ;SET UP MAIN CORE CURRENT
3533  017170  012021                          MOV     (0)+,(1)+               ;MOVE WORD
3534  017172  020027  017006                  CMP     %0,#FIN+2               ;MOVE COMPLETE?
3535  017176  001374                          BNE     .-6                     ;MOVE ANOTHER WORD
3536  017200  000207                          RTS     %7                      ;MOVE COMPLETE
3537  017202  004767  000040          STRT28: JSR     %7,XFER28               ;START 28K TRANSFER
3538  017206  000450                          BR      MOD24                   ;START 24K MODIFY
3539  017210  004767  000042          STRT24: JSR     %7,XFER24               ;START 24K TRANSFER
3540  017214  000453                          BR      MOD20                   ;START 20K MODIFY
3541  017216  004767  000044          STRT20: JSR     %7,XFER20               ;START 20K TRANSFER
3542  017222  000456                          BR      MOD16                   ;START 16K MODIFY
3543  017224  004767  000046          STRT16: JSR     %7,XFER16               ;START 16K TRANSFER
3544  017230  000461                          BR      MOD12                   ;START 12K MODIFY
3545  017232  004767  000050          STRT12: JSR     %7,XFER12               ;START 12K TRANSFER
3546  017236  000464                          BR      MOD8                    ;START 8K MODIFY
3547  017240  004767  000052          STRT8:  JSR     %7,XFER8                ;START 8K TRANSFER
3548  017244  000467                          BR      MOD4                    ;START 4K MODIFY
3549  017246  012701  140000          XFER28: MOV     #140000,%1              ;SET UP MOVE START LOCATION
3550  017252  004767  177710                  JSR     %7,MOVE                 ;GO TO MOVE SUBROUTINE
3551  017256  012701  120000          XFER24: MOV     #120000,%1
3552  017262  004767  177700                  JSR     %7,MOVE
3553  017266  012701  100000          XFER20: MOV     #100000,%1
3554  017272  004767  177670                  JSR     %7,MOVE
3555  017276  012701  060000          XFER16: MOV     #60000,%1
```

```
3556  017302  004767  177660                  JSR     %7,MOVE
3557  017306  012701  040000          *FER12: MOV     #40000,%1
3558  017312  004767  177650                  JSR     %7,MOVE
3559  017316  012701  020000          *FER8:  MOV     #20000,%1
3560  017322  004767  177640                  JSR     %7,MOVE
3561  017326  000207                          RTS     %7                      ;RETURN FROM [illegible]
3562  017330  012767  144446  116244  MOD24:  MOV     #BEGIN+140006,TRPA+120002
3563  017336  012767  000240  116026          MOV     #NOP,SKPBEL+120000
3564  017344  012767  124446  076230  MOD20:  MOV     #BEGIN+120006,TRPA+100002
3565  017352  012767  000240  076012          MOV     #NOP,SKPBEL+100000
3566  017360  012767  104446  056214  MOD16:  MOV     #BEGIN+100006,TRPA+60002
3567  017366  012767  000240  055776          MOV     #NOP,SKPBEL+60000
3568  017374  012767  064446  036200  MOD12:  MOV     #BEGIN+60006,TRPA+40002
3569  017402  012767  000240  035762          MOV     #NOP,SKPBEL+40000
3570  017410  012767  044446  016164  MOD8:   MOV     #BEGIN+40006,TRPA+20002
3571  017416  012767  000240  015746          MOV     #NOP,SKPBEL+20000
3572  017424  012767  024446  176150  MOD4:   MOV     #BEGIN+20006,TRPA+2
3573  017432  012767  000240  175732          MOV     #NOP,SKPBEL
3574  017440  000207                  DET3:   RTS     %7                      ;RETURN FROM MODIF
3575                                  ;ROUTINE TO SET ACTION ENABLE ON MA/MF PARITY MEMORIES
3576                                  ;CALL:  JSR     PC,.MAMF
3577
3578          172100                          PARCSR= 172100                  ;ADDRESS OF FIRST MA/MF PA
3579          000114                          PARVEC= 114                     ;ADDRESS OF PARITY INTERRU
3580          000004                          ERRVEC=4
3581          000000                          R0=%0
3582          000006                          SP=%6
3583          000002                          R2=%2
3584          000007                          PC=%7
3585
3586  017442  012737  000006  000004  .MAMF:  MOV     #ERRVEC+2,@#ERRVEC
3587  017450  012737  000002  000006          MOV     #RTI,@#ERRVEC+2
3588  017456  012700  172100                  MOV     #PARCSR,R0              ;GET FIRST CSR ADDRESS
3589  017462  012702  000001                  MOV     #1,R2
3590
3591                                                                          ;SET TIME OUT INDICATOR
3592  017466  012720  000001          1$:     MOV     #1,(R0)+                ;SET ACTION ENABLE IF AVAI
3593                                                                          ;BRANCH IF CSR NOT AVAILAB
3594  017472  006302                          ASL     R2                      ;SHIFT AVAILABILITY INDICA
3595  017474  103374                          BCC     1$
3596  017476  000207                          RTS     PC
3597  017500  104000                  .PARSRV:HLT                             ;PARITY ERROR
3598  017502  000137  000502                  JMP     @#START
3599                                  ;ROUTINE TO OUTPUT TITLE
3600
3601  017506  011601                  TYPE:   MOV     (%6),   %1
3602  017510  011101                          MOV     (%1),   %1
3603  017512  062716  000002                  ADD     #2,     (%6)
3604  017516  112167  000022          LOOP:   MOVB    (%1)+,  CHAR
3605  017522  001001                          BNE     1$
3606  017524  000207                          RTS     %7
3607  017526  105777  160532          1$:     TSTB    @TTCSR
3608  017532  100375                          BPL     1$
3609  017534  116777  000004  160524          MOVB    CHAR,   @TTDBR
3610  017542  000765                          BR      LOOP
3611  017544  000000                  CHAR:   0
```

F06


```
 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	2643
		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*											
ARIENC	014222	3016	3027*											
ARITST	014134	3012*	3015											
ASCN*	016372	3350*	3374*	3381*	3385*	3396*								
ASH	000370	718*	3176*											
B	016700	1786	1941	1946	1951	1957	1964	1969	1970	1976	1990	1998	2005	2014
		2054	2059	2064	2070	2077	2082	2083	2090	2104	2111	2118	2124	2132
		2514	2519	2525	2530	2536	2543	2548	2549	2599	2604	2609	2614	2622
		2626	2627	2634	2648	2744	2745	2750	2751	2756	2757	3471*	3473	3476
BEGAN*	013466	3256	3258*											
BEGIN	004440	808	900	1102	1621*	3269	3284	3419	3501	3562	3564	3566	3568	3570
		3572												
BEG2C	015460	3251	3257*											
BE__	015406	3245*												
BINC*	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*	1963*	1970	1989*
		1990*	1991	2082*	2083	2103*	2104*	2105	2233*	2235	2239*	2243	2332	2404*
		2420*	2438*	2454*	2470*	2488*	2506*	2548*	2549	2626*	2627	2647*	2648*	2649
		2737*	2739	2762	2763*	2765	2769*	2773*	3485*	3486	3488			
CC =	177776	585*	3136*											
CHAR	017544	3604*	3609	3611*										
CLEAR	015554	3273	3274	3275*										
CLINCT	002312	874*	1009	1012*	1019*	1031*								
CMP1	014230	3032*	3039											
CMP2	014252	3036	3040*											
COMPAR	014224	3030*												
CURPAT	002306	875*	1001*	1002	1013	1015*	1017*	1029*						
D	016742	1808*	1824*	1839*	1855*	1871*	1888*	1906*	2380*	2388*	2396*	2412*	2437*	2445*
		2462*	2479*	2497*	3494*									
DATA1	001616	813*	914	917*	919*	923*								
DATA2	001644	814*	930*	931	934*									
DATA3	001720	815*	942	945*	947*	951*								
DATA4	002014	816*	955*	956	967*	971*								
DECML	016364	3352*	3365	3371*	3393*									
DELAY	002020	818*	838*	961	966	973*								
DFT1	017010	892	3501*	3504										
DET2	017122	3510	3519*											
DET3	017440	834	835	3522	3574*									
DET4	017054	3508	3510*											
DIV	000362	715*	3219*											
DO =	000001	869	1110*	1163	1171	1212								
ERASRT	014754	754*	3007	3155*										
EIGHT	017070	3512*	3521											
ENDERR	015344	3156	3233*											
ERRVEC=	000004	3580*	3586*	3587*										
ESTART	000606	776	779*											
F.PRIM	016072	3335	3337*											
F =	000000	1108*												

```
FEND2   002716   671   868  1119*  1154
FEND1   002740  1121  1124*
FIN     017004   587  3345   3496*  3500   3534
HMC     016614  3443  3452*
HMCFHM  016350  3386  3388*
.=      104000   583*  750   778   793   801   911   916   929   939   944   960   982  1008
                1041  1061  1075  1092  1101  1135  1144  1150  1175  1182  1186  1197  1203
                1217  1628  1633  1662  1668  1674  1680  1687  1692  1699  1705  1712  1720
                1727  1734  1741  1750  1758  1766  1774  1781  1788  1795  1802  1811  1819
                1827  1835  1842  1850  1858  1866  1874  1882  1891  1900  1909  1918  1925
                1937  1943  1948  1953  1960  1966  1972  1979  1986  1993  2001  2007  2014
                2021  2028  2035  2042  2049  2056  2061  2066  2073  2079  2085  2093  2100
                2107  2114  2120  2127  2135  2142  2148  2156  2163  2170  2177  2184  2192
                2200  2207  2213  2220  2229  2237  2245  2250  2256  2262  2268  2274  2280
                2286  2293  2298  2305  2312  2320  2327  2334  2341  2350  2358  2366  2374
                2383  2391  2399  2407  2415  2423  2430  2433  2441  2449  2457  2465  2473
                2482  2491  2500  2509  2516  2521  2527  2532  2539  2545  2551  2558  2565
                2572  2579  2586  2594  2601  2606  2611  2617  2623  2629  2637  2644  2651
                2658  2665  2672  2679  2686  2694  2697  2705  2712  2718  2725  2733  2741
                2747  2753  2759  2767  2775  2785  2793  2801  2803  2805  2807  2815  2817
                2820  2826  2828  2831  2838  2840  2843  2850  2852  2855  2862  2864  2867
                2874  2876  2879  2923  2927  2930  2933  2937  2961  2965  2968  2971  2975
                2987  2991  2994  2997  3001  3023  3034  3048  3061  3073  3083  3085  3087
                3111  3113  3116  3118  3128  3142  3145  3153  3164  3167  3170  3179  3182
                3185  3194  3197  3200  3207  3210  3213  3222  3225  3232  3236  3469  3597
HMQ     016616  3453*
HPCSR   000274   688*  826   830*  958
HPDBR   000276   689*  956*
HPOUT   001722   955*  968
HPOUTR  001740   650   958*
HPOUT1  001730   956*  969
HPOUT2  002004   964   967*
HRCSR   000270   686*  831   839*  937   948*  961*  966*
HRDBR   000272   687*  940   942
HSC     016620  3454*
HSRINR  001646   648   937*
HSRIN1  001704   947*
HSRIN2  001712   941   946   948*
ICOUNT  016462   779*  1623*  2899*  3092*  3095*  3105*  3120*  3134*  3409  3417*
IE      000500   869  1109*  1163  1171  1177  1212  1219
INTCNT  002016   962*  963   965*  972*
IRC     002534   667  1073*  1644
IRF     002632   665  1090*  1641
IRX     002344   674  1039*  1647
IRP     002450   678  1059*  1650
LIST    016374  3349  3397*
LKCSR   000300   690*  843*  977*  990   983*  987*  991   993*
LK1     002022   976*  990
LK2     002042   979*  986
LK3     002044   653   980*  1638
LK4     002062   984*  994
LLIMIT  002704  1035  1055  1069  1086  1102*  1653  1654*
LOGICA  015556   615  3276*
LOOP    017516  3604*  3610
LPCSP   000302   691*  879*  885*  1003  1006  1021
LPDBP   000304   692*  876*  1002*  1020*
```

I06

LPINTR	002166	877	1006*											
LP1	002142	1001*	1026	1028										
LP2	002150	1002*	1016	1019										
LP3	002230	1014	1017*											
LP4	002240	1011	1019*											
LP5	002276	1024	1027*											
LP6	002176	874	999	1004	1009*									
LP80 =	002202	999*												
LSH	000366	717*	3161*											
MAINLI	001522	897*	899											
MINUS	016172	3356	3359*											
MKNUM	016222	3365*	3368											
MOADD	016304	3377*	3379											
MOD12	017374	3544	3568*											
MOD16	017360	3542	3566*											
MOD20	017344	3540	3564*											
MOD24	017330	3538	3562*											
MOD4	017424	3548	3572*											
MOD8	017410	3546	3570*											
MOVE	017166	3532*	3550	3552	3554	3556	3558	3560						
MQ	000350	7.0*	810	3159*	3165	3174*	3180	3189*	3195	3203*	3208	3217*	3223	3445
		3458*												
MSG	017546	766	3612*											
[illegible]	000360	714*	3204*											
[illegible] =	000001	1225*	1231	1232	1233*	1234	1235	1236*	1237	1238	1239*	1240	1241	1242*
		1243	1244	1245*	1246	1247	1248*	1249	1250	1251*	1252	1253	1254*	1255
		1256	1257*	1258	1259	1260*	1261	1262	1263*	1264	1265	1266*	1267	1268
		1269*	1270	1271	1272*	1273	1274	1275*	1276	1277	1278*	1279	1280	1281*
		1282	1283	1284*	1285	1286	1287*	1288	1289	1290*	1291	1292	1293*	1294
		1295	1296*	1297	1298	1299*	1300	1301	1302*	1303	1304	1305*	1306	1307
		1308*	1309	1310	1311*	1312	1313	1314*	1315	1316	1317*	1318	1319	1320*
		1321	1322	1323*	1324	1325	1326*	1327	1328	1329*	1330	1331	1332*	1333
		1334	1335*	1336	1337	1338*	1339	1340	1341*	1342	1343	1344*	1345	1346
		1347*	1348	1349	1350*	1351	1352	1353*	1354	1355	1356*	1357	1358	1359*
		1360	1361	1362*	1363	1364	1365*	1366	1367	1368*	1369	1370	1371*	1372
		1373	1374*	1375	1376	1377*	1378	1379	1380*	1381	1382	1383*	1384	1385
		1386*	1387	1388	1389*	1390	1391	1392*	1393	1394	1395*	1396	1397	1398*
		1399	1400	1401*	1402	1403	1404*	1405	1406	1407*	1408	1409	1410*	1411
		1412	1413*	1414	1415	1416*	1417	1418	1419*	1420	1421	1422*	1428*	1429
		1430	1431*	1432	1433	1434*	1435	1436	1437*	1438	1439	1440*	1441	1442
		1443*	1444	1445	1446*	1447	1448	1449*	1450	1451	1452*	1453	1454	1455*
		1456	1457	1458*	1459	1460	1461*	1462	1463	1464*	1465	1466	1467*	1468
		1469	1470*	1471	1472	1473*	1474	1475	1476*	1477	1478	1479*	1480	1481
		1482*	1483	1484	1485*	1486	1487	1488*	1489	1490	1491*	1492	1493	1494*
		1495	1496	1497*	1498	1499	1500*	1501	1502	1503*	1504	1505	1506*	1507
		1508	1509*	1510	1511	1512*	1513	1514	1515*	1516	1517	1518*	1519	1520
		1521*	1522	1523	1524*	1525	1526	1527*	1528	1529	1530*	1531	1532	1533*
		1534	1535	1536*	1537	1538	1539*	1540	1541	1542*	1543	1544	1545*	1546
		1547	1548*	1549	1550	1551*	1552	1553	1554*	1555	1556	1557*	1558	1559
		1560*	1561	1562	1563*	1564	1565	1566*	1567	1568	1569*	1570	1571	1572*
		1573	1574	1575*	1576	1577	1578*	1579	1580	1581*	1582	1583	1584*	1585
		1586	1587*	1588	1589	1590*	1591	1592	1593*	1594	1595	1596*	1597	1598
		1599*	1600	1601	1602*	1603	1604	1605*	1606	1607	1608*	1609	1610	1611*
		1612	1613	1614*	1615	1616	1617*	1618	1619					
NOEAE	000472	754*	809											
NOP =	000240	582*	3135*	3563	3565	3567	3569	3571	3573					

CROSS REFERENCE TABLE -- USER SYMBOLS

```
NOR     000364            716#   3191*
NUMA    014220           3010#   3019    3020    3026#
PARCSR= 172100           3578#   3588
PARVEC= 000114           3579#
PFAIL   016526            606     760   3237    3435#
PRFLAG  015604            784#   3285#  3289    3292*   3333#
PRINT   015606            609    3289#
PRINTI  016042           3296    3330#
PRTAB   016112           3313    3318   3323    3347#
R       = 004000          869    1111#  1163
RB      = 000002          869    1106#  1163    1177    1219
RCBAR   000326            701#   1069#
RCCSR   000330            702#    863*  1071*   1073
RCCSRH  000332            703#
RCDAR   000322            699#    856*  1068*   1077*   1078
RCFUNC  002572            858#   1071   1080*   1082#
RCSTAR  002502           1068#   1076   1081
RCWC    000324            700#   1070*
RCWORD= 176040            593#   1070
RC2     002510           1069#   1079
RD      = 000004          1104#  1212
REF     = 013634          2941#  3011*  3012*   3018    3021    3124*   3126    3130*
REFF    013634            2903#  2904*  2906    2910    2935    2939#   2941    2943*   2944*   2947    2950    2973    2999
                          3014
REGI    001540             774*   785    901#   3098
RENDZ   003104            1146   1157#  1187
RENDI   003134            1160   1163#
RESTAR  016622            3449   3455#
RETURN  016466             781*   808*  1621*   3322    3412    3415*   3419#
RFCAR   000314             696#  1086*
RFCSR   000316             697#   861*  1088*   1090
RFCSRH  000320             698#  1084*
RFDAE   000306             693#  1095
RFDAR   000310             694#  1085*  1094*   1097
RFFUNC  002702             857*  1088   1099*   1101#
RFSTAR  002574            1084#  1093   1100
RFWC    000312             695#  1087*
RFWORD= 176040             594#  1087
RF1     002606            1086#  1096   1098
RKBAR   000342             707#  1035*
RKCSR   000344             708#   862*   890*   1037*   1039
RKCSRH  000346             709#
RKDAE   000336             705#  1034*  1043
RKDAH   000334             704#  1045
RKFUNC  002406             859*  1037   1047*   1050#
RKSTAR  002314            1034#  1042   1048
RKWC    000340             706#  1036*
RKWORD= 176000             591#  1036
RK1     002320            1035#  1044   1046
ROTALL  013514            2905   2910#
ROTBE   013674            2945   2950#
ROTBO   014004            2946   2977#
ROTEN1  014106            2949   3003#
RPBAR   000424             735#  1055*
RPCA    000410             729#  1063
RPCSR   000426             736#   847    849*    850     864*   1052*   1053    1057*   1059
```

CROSS REFERENCE TABLE -- USER SYMBOLS

RPCSRH 000430 737#
RPDAE 000414 731#
RPDAH 000412 730#
RPDAR 000420 733#
RPDSR 000416 732# 852 854#
RPFUNC 000432 738# 860# 1057 1065#
RPSTAR 002410 1052# 1062 1066
RPWC 000422 734# 1056#
RPWORD= 176000 592# 1056
RP1 002424 1055# 1064
RTIA 001542 811 855 884 902#
SAVCC 016110 3298# 3317 3344#
SAVPC 016106 3297# 3312 3343#
SAVR2 016074 3309# 3324 3338#
SAVR3 016076 3310# 3325 3339#
SAVR4 016100 3311# 3326 3340#
SAVR6 016612 775 777# 3448# 3451# 3455 3468#
SBELL 015422 3243 3248#
SC 000354 712# 3198 3446 3457#
SCOPE = 104400 584# 788 794 803 806 1622 1629 1634 1663 1669 1675 1681 1688
1693 1700 1706 1713 1721 1728 1735 1742 1751 1759 1767 1775 1782
1789 1796 1803 1812 1820 1828 1836 1843 1851 1859 1867 1875 1883
1892 1901 1910 1919 1927 1938 1944 1949 1954 1961 1967 1973 1980
1987 1994 2002 2008 2015 2022 2029 2036 2043 2050 2057 2062 2067
2074 2080 2086 2094 2101 2108 2115 2121 2128 2136 2143 2149 2157
2164 2171 2178 2185 2193 2201 2208 2214 2221 2230 2238 2246 2251
2257 2263 2269 2275 2281 2287 2294 2299 2306 2313 2321 2328 2335
2342 2351 2359 2367 2375 2384 2392 2400 2408 2416 2424 2434 2442
2450 2458 2466 2474 2483 2492 2501 2510 2517 2522 2528 2533 2540
2546 2552 2559 2566 2573 2580 2587 2595 2602 2607 2612 2618 2624
2630 2638 2645 2652 2659 2666 2673 2680 2687 2698 2706 2713 2719
2726 2734 2742 2748 2754 2760 2768 2776 2787 2795 2808 2810 2821
2832 2844 2856 2868 2880 2902 2934 2972 2998 3003 3017 3024 3027
3040 3052 3065 3077 3091 3093 3104 3119 3133 3146 3154 3158 3173
3188 3202 3216 3226 3233
SCOPEB 016442 3406 3412#
SCOPEC 016406 612 3405#
SCOPEF 016464 782# 3409 3411# 3414# 3418#
SCOPEG 016450 3408 3410 3414#
SEVEN 016362 3351# 3360 3371 3377# 3392#
SKPBEL 015372 3240# 3502# 3563# 3565# 3567# 3569# 3571# 3573#
SOFTSR 000176 661# 770
SOLPAT 002310 873# 1001 1023 1025# 1027# 1030#
SRE 000356 713# 3168 3183 3211
SRPTR 000174 660# 767 770# 774 898 3263 3294 3330 3334 3405 3407 3507
STAR 016200 3358 3360# 3380
START 000502 663 725 760# 3280 3336 3598
START2 000660 781 789#
STATUS= 177776 681# 783# 819# 895# 978# 988# 3300#
STRT12 017232 3526 3545#
STRT16 017224 3528 3543#
STRT20 017216 3530 3541#
STRT24 017210 3531 3539#
STRT28 017202 3518 3537#
STRTB 017240 3524 3547#
ST1 001054 821 823#

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ST2       001066          824     826#
ST3       001106          827     829     831#
ST3A      001122          833     836#
ST4       001140          832     837     840#
ST5       001156          841     844#
ST5A      001226          846     855#
ST6       001312          845     865#
ST7       001340          866     870#
ST8       001422          871     872     880#
ST8A      001472          883     889     891#
SUBR1     016470         3422#
SUBR2     016472         3423#   3425
SUBR3     016476         3425#   3427
SUBR4     016504         3427#   3429
SUBR5     016512         3429#   3431
SUBR6     016520         2799    3431#
SWABA     014626         3125#   3132
SIXTEEN   017100         3514#   3525
TC      = 177340          721#    722     723     724     726     727
TCBA      000404          727#   1170#   1211#
TCBLK     002712         1115#
TCOM      000372          722#    869#   1122#   1125#   1127#   1129    1138#   1142    1152#   1161#   1163#   1171#   1173
                         1177#   1180    1188#   1191#   1195    1205#   1212#   1215    1219#
TCOT      000376          724#   1132    1145    1148    1183    1198    1201
TCEXPE    002714          867#   1116#   1126#   1132    1147#   1148    1158#   1183    1200#   1201
TCFIRS    002706          867    1113#   1126    1198
TCF1      002770         1124    1129#
TCF1A     002762         1127#   1133
TCF2      003016         1134    1137#
TCF3      003032         1137    1142#   1176
TCF4      003074         1152#   1178
TCIV      000406          728#    868#   1119#   1124#   1137#   1157#   1164#   1168#   1176#   1190#   1209#   1218#
TCLAST    002710         1114#   1145    1158
TCOM      014264         3044#   3051
TCOM2     014332         3057#   3064
TCOM3     014400         3069#   3076
TCRBK     003354         1204    1209#
TCRBUF    003440          744     748    1211    1224#
TCRB1     003412         1209    1215#
TCR1      003232         1164    1180#
TCR1A     003262         1185    1188#
TCR2      003270         1184    1190#
TCR3      003304         1190    1195#   1218
TCR4      003346         1205#   1220
TCSR      016104          586    3246    3301    3304    3307    3315    3320    3328    3342#   3353    3382    3388
TCST      000374          723#   1120    1159
TCWBK     003152         1151    1168#
TCWBUF    003440         1170    1223#
TCWB1     003204         1168    1173#
TCWC      000402          726#   1169#   1210#
TC1       000434          741#   1213
TC2       000446          745#    747
TDBR      016102         3245#   3303#   3306#   3314#   3319#   3327#   3341#   3357#   3359#   3384#
TDSR    = 016104          586#
TEMP      016732         1717#   1718    1724#   1725    1731#   1738#   1739    1745#   1747#   1748    1753#   1755#   1756
                         1761#   1763#   1764    1770#   1771#   1772    1777#   1779#   1784#   1786#   1791#   1793#   1798#
```

M06

		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	1963*	1964	1982*	1983*	1984	2004*	2005*	2010*	2011*	2012	2017*
		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*	2161*	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*	2496	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
		3150*	3227*	3229*	3230	[illegible]	3490	3492	3493					
"ES"	013636	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*							
TJSR.	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*											
TSTART	014122	3010*												
TTCSR	000264	684*	798*	799	802*	804*	805*	822*	887*	927	3242	3607		
TTDBR	000266	685*	931*	3609*										
TTYINR	001540	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*											

CROSS REFERENCE TABLE -- USER SYMBOLS

```
WAITS   014514          3094#
WD    = 000014          1105#  1171
WGTCT   016366          3348#  3365*  3367    3372*   3394#
WRTOC   016242          3364   3369#
XFENDZ  003102          1154#  1199
XFER12  017306          3545   3557#
XFER16  017276          3543   3555#
XFER20  017266          3541   3553#
XFER24  017256          3539   3551#
XFER28  017246          3537   3549#
XFER8   017316          3547   3559#
XLIST   016320          3375   3381#
XX    = 000000           595#   923    934     951     971
YESRT   015574          3255*  3257*  3265    3282#
YESTR   015474          3262#
YESTR1  015526          3269#  3272
YESTR2  015532          3270#
.     = 017612           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    1728    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    2920    2921    2922    2924
                        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#
                        3492#  3495#  3500#   3505    3535
.MAMF   017442          3503   3586#
.PARSR  017500           656   3597#
```

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MAIN  MACRO  V04.1052  20-JAN-78  11:05  PAGE 8
CZQKBH.P11  20-JAN-78 11:05          CROSS REFERENCE TABLE -- MACRO NAMES  SEQ 0079

ENDC    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)
```