

The left side of the page contains a grid of 60 small, illegible technical diagrams or data tables arranged in 10 rows and 6 columns. Each cell in the grid appears to contain a different type of information, possibly related to system exercises or hardware configurations.



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801

EOF1000000001  
DZQKB.P11

16-SEP-77 12:58

NO010000Y11 30770000

16-SEP-77 00P50 400GE 1

MOR1DZQKBGSEQ

00010000

771114  
SEG 0001

000000

LIST SEG  
READY

IDENTIFICATION  
\*\*\*\*\*

PRODUCT CODE: MAINDEC-11-DZQKB-G-D  
 PRODUCT NAME: T17-4K SYSTEM EXERCISER  
 THIS VERSION TEST DECTAPE UNIT 1 (NOT UNIT 0)  
 DATE: 01-OCTOBER-1977  
 MAINTAINER: DIAGNOSTIC GROUP  
 AUTHOR: JOHN MITTELL  
 REVISED BY: W.F. KELICKER 25-FEB-74  
 AL LOSCHAK 21-DEC-75  
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## 1. ABSTRACT

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

IN THIS VERSION THE INTERRUPT SERVICE ROUTINE FOR THE DISKS, K111, 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
K111L	LINE CLOCK
PC11	HIGH SPEED READER/PUNCH
BL11	ASR33 OR ASR35 TELEPRINTER-LC11.VTOS
LP11	LINE PRINTER
LS11	LINE PRINTER...SEE 5.2.11

## 2.2 STORAGE

2.2.1 PROGRAM STORAGE - THE ROUTINE USES  
4K OF MEMORY

## 3. LOADING PROCEDURE

## 3.1 METHOD

PROCEDURE FOR NORMAL ABSOLUTE TAPES SHOULD BE FOLLOWED.

4. STARTING PROCEDURE

THIS PROGRAM HAS BEEN MODIFIED TO RUN WITH OR WITHOUT A CONSOLE PROCESSOR. IF A CONSOLE MACHINE IS USED; THEN THE PROGRAM LOOKS AT THE HARDWARE SWITCH REGISTER. IF A CONSOLE-LESS MACHINE IS USED; THEN THE PROGRAM AUTOMATICALLY LOOKS AT THE CONTENTS OF LOCATION SOFTSR (176) AS A SWITCH REGISTER.

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

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

4.1 CONTROL SWITCH SETTING

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

4.2 STARTING ADDRESS OR ADDRESSES

- (A) 200 = SR = 000777 TEST PROCESSOR ONLY-WITH CORE EXPANSION
- (B) 200 = SR = 001777 TEST PROCESSOR ONLY-4K-INHIBIT
- CORE EXPANSION
- (C) 200 = SR = 002XXX TEST I/O ONLY
- (D) 200 = SR = 000000 -CORE EXPAND AND TEST ALL AVAILABLE I/O DEVICES

- SW0 = 1 INHIBIT TTY OUTPUT
  - SW1 = 1 INHIBIT TTY INPUT
  - SW2 = 1 INHIBIT HSP
  - SW3 = 1 INHIBIT MSR
  - SW4 = 1 INHIBIT LINE CLOCK
  - SW5 = 1 INHIBIT RF11, RK11, RC11 AND RP11 DISK(S)
  - SW6 = 1 INHIBIT TC11 DECTAPE
  - SW7 = 1 INHIBIT LINE PRINTER --- IF LINE PRINTER IS USED, MUST RESTART AT 502
- IF EAE EXIST IT WILL BE AUTOMATICALLY SELECTED

## 4.3 PROGRAM AND/OR OPERATOR ACTION

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

## 5. OPERATING PROCEDURE

## 5.1 OPERATIONAL SWITCH SETTINGS

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

## 5.1.2 SWITCH SETTINGS ARE

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

## 5.1.3

## 5.2. SUBROUTINE ABSTRACTS

## 5.2.1 BEGIN SA 200

## 5.2.2 SCOPE

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

## 5.2.3 HLT

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

## 5.2.4 TRTRAP

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

## 5.2.5 TRAPCATCHER

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

THE PRINCIPLE OF THIS ROUTINE IS: THE VECTOR ENTRANCE ADDRESS POINTS TO THE NEXT SEQUENTIAL WORD WHICH CONTAINS A HALT (0000). (THIS LOCATION IS ALSO THE STATUS FOR THAT VECTOR ENTRANCE, BUT THIS HAS NO EFFECT ON IT ALSO BEING THE NEXT INSTRUCTION).

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

## 5.2.6 TTYINI (TTY INPUT)

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

## 5.2.7 TYOUT (TTY OUTPUT)

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

#### 5.2.8 RFSTART (RF-11 DISK)

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

#### 5.2.9 FENDZ (TC11 FORWARD END ZONE)

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

#### 5.2.10 LCLK (LINE CLOCK)

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

#### 5.2.11 LP1 (LINE PRINTER)

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

## 5.2.12 HSRINI (PC11 INPUT)

THIS ROUTINE OPERATES IN THE INTERRUPT MODE AND CHECKS FOR A COUNT PATTERN IN THE PC11 READER. THE ROUTINE WILL ACCEPT AN INFINITE NUMBER OF ZERO BYTES (BLANK TAPE). BUT THE FIRST BYTE THAT IS NOT A ZERO MUST BE A ONE AND ALL SEQUENTIAL BYTES MUST BE ONE GREATER. IF THE ROUTINE DETECTS AN ERROR IN THE COUNT PATTERN, A DATA ERROR IS FLAGED.  
WHEN TESTING THE MSR 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 VERIFY THAT THE DATA HAS BEEN WRITTEN CORRECTLY ON THE DISK. NOTE THAT NO "DATA" ARE USED IN EXERCISING THE DISK (DATA IS NOT TRANSFERRED INTO CORE). THE INTERRUPT SERVICE ROUTINE AND DATA BUFFER 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 "DATA" ARE USED IN EXERCISING THE DISK (DATA IS NOT TRANSFERRED INTO CORE). THE INTERRUPT SERVICE ROUTINE AND DATA BUFFER IS TRANSFERRED TO THE CURRENT BANK THAT INSTRUCTIONS ARE BEING EXECUTED IN.

## 5.2.16 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 "DATA" ARE USED IN EXERCISING THE DISK (DATA IS NOT TRANSFERRED INTO CORE). THE INTERRUPT SERVICE ROUTINE AND DATA BUFFER IS TRANSFERRED TO THE CURRENT BANK THAT INSTRUCTIONS ARE BEING EXECUTED IN. (FOR THE RPO3 THE ISR MUST BE MOTIFIED TO TEST THE FULL SURFACE)



## 5.2.17 CORE EXPANSION (DET1)

THIS ROUTINE IS CONTROLLED BY SWITCH 9. THE PROCESSOR MAINLINE CODE WILL BE EITHER 4KH 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. IF YOU DESIRE TO HAVE THE PROGRAM RESTART ON AN ERROR MAKE SWITCH REGISTER BIT8 AN ONE.

## 7. RESTRICTIONS

## 7.1 STARTING RESTRICTION

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

## 7.2 OPERATIONAL RESTRICTION

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

8. MISCELLANEOUS

TRACKING DOWN UNUSUAL FAILURES

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

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

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

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

INSERTION OF USER I/O ROUTINES

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

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

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

#### 8.1 EXECUTION TIME

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

#### 9. PROGRAM DESCRIPTION

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

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

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

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

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

THE CORE LAYOUT IS BROKEN INTO FIVE DISTINCT PARTS:

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

10. LISTING

11. FLOW CHART(S)

.ENDR  
.ENABLE ABS

;PDP11 PRELIMINARY SYSTEM TEST --- TTY-PC11-LP11 RF11 TC11 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  
NOP=240 ;SYSTEM NULL OPERATION  
HLT=EMT ;TRAP USED FOR ERROR PRINTOUT  
SCOPE=TRAP ;TRAP USED SCOPE LOOP AND ITERATION OF SUB PROBLEMS  
CC=177776

000240  
104000  
104400  
177776

016062  
016065  
000000  
000001  
000002  
176000  
176000  
176040  
176040  
000000  
000000  
000100

TDSB=ICSR  
BUFF=FYN  
R100=%0  
R101=%1  
RSR=%2  
BKWORDCT=-2000  
BKWORDCT=-2000  
RCWORDCT=-2000+40  
RFWORDCT=-2000+40

XX=0  
=0  
.REPT 100  
.+2

; TRAP ENTRANCE  
; TRAPPED TO PREVIOUS LOCATION

600  
601  
602 000014 000014  
603 000016 000016  
604 000024 000024  
605 000024 016504  
606 000026 000340  
607 000030 000030  
608 000030 015564  
609 000032 000340  
610 000034 000034  
611 000034 016364  
612 000036 000000  
613 000046 000046  
614 000046 015534  
615 000052 000052  
616 000052 040000  
617  
618  
619  
620

.ENDR  
.LIST SEQ,ME  
.=14  
.+2

; FALSE TRACE TRAP

HALT  
.=24  
PFAIL  
340

; FOR HALT TRAPS  
; HIGHEST PRIORITY

.=30  
PRINT  
340

; USER TRAP

.=34  
SCOPEC  
0

; RETURN TO MONITOR ADDRESS

.=46  
LOGICA  
.=52  
040000

; EXECUTION TIME IS MEMORY SIZE DEPENDENT

621  
622  
623  
624  
625  
626  
627  
628  
629  
630  
631  
632  
633  
634  
635  
636  
637  
638  
639  
640

;(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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641 ;PDP11 SIMULTANEOUS I/O
642 =60
643 000060 001522 †TTYINR ;TTY IN INTERRUPT VECTOR
644 000062 000200 200
645 000064 001576 TYOUTR ;TTY OUT INTERRUPT VECTOR
646 000066 000200 200
647 000070 001624 HSRINR ;HSR INTERRUPT VECTOR
648 000072 000200 200
649 000074 001716 HPOUTR ;HSP INTERRUPT VECTOR
650 000076 000200 200
651 =100
652 000100 002022 LK3 ;INTERRUPT VECTOR LINE CLOCK
653 000102 000300 300 ;LEVEL SIX PRIORITY
654 =4
655 000004 017456 .PARSRV ;MEMORY PARITY
656 000006 000340 340
657
658 000174 =174
659 000174 177570 SRPTR: 177570
660 000176 000000 SOFTSR: 000000
661 000200 =200
662 000200 000137 000502 JMP @#START
663 000204 =204
664 000204 002610 IRF ;RF11 DISK
665 000206 000240 240 ;LEVEL 5
666 000210 002512 IRC ;RC DISK
667 000212 000240 240
668
669 000214 =214
670 000214 002674 FENDZ ;DEC TAPE
671 000216 000300 300 ;LEVEL 6
672 000220 =220
673 000220 002322 IRK ;RK DISK
674 000222 000240 240
675
676 000254 =254
677 000254 002426 IRP ;RP DISK
678 000256 000240 240
679
680 STATUS=177776
681 000260 177776 TRCSR: 177560
682 000262 177562 TRDR: 177562
683 000264 177564 TTCSR: 177564
684 000266 177566 TTDBR: 177566
685 000270 177550 HRCR: 177550
686 000272 177552 HRDBR: 177552
687 000274 177554 HPCR: 177554
688 000276 177556 HPDBR: 177556
689 000300 177546 LKCSR: 177546
690 000302 177514 LPCSR: 177514
691 000304 177516 LPDBR: 177516
692 000306 177470 RFDAR: 177470
693 000310 177466 RFDAR: 177466
694 000312 177462 RFWC: 177462
695 000314 177464 RFCAR: 177464
696 000316 177460 RFCR: 177460
;DISK ADDRESS AND ERROR
;DISK ADDRESS REGISTER
;WORD COUNT REGISTER
;CURRENT ADDRESS REGISTER
;STATUS REGISTER

```

697 000320 177461  
698 000320 177444  
699 000320 177450  
700 000320 177452  
701 000320 177448  
702 000320 177447  
703 000320 177413  
704 000320 177413  
705 000320 177413  
706 000320 177410  
707 000320 177410  
708 000320 177405  
709 000320 177304  
710 000320 177303  
711 000320 177310  
712 000320 177311  
713 000320 177306  
714 000320 177300  
715 000364 177312  
716 000366 177314  
717 000370 177316  
718  
719  
720  
721 000372 177340  
722 000374 177342  
723 000376 177340  
724 000400 000440  
725 000402 177344  
726 000404 177346  
727 000406 000214  
728 000410 176722  
729 000412 176725  
730 000414 176724  
731 000416 176710  
732 000420 176724  
733 000422 176716  
734 000424 176720  
735 000426 176714  
736 000430 176715  
737 000432 000000  
738  
739  
740 000434 010146  
741 000436 010346  
742 000440 005003  
743 000442 012701 003416  
744 000446 062103  
745 000450 062103  
746 000452 001775  
747 000454 020127 004416  
748 000460 101001  
749 000462 104000  
750 000464 012603  
751 000466 012601  
752 000470 000207

RFCSRH: 177461  
RCDAR: 177444  
RCMC: 177450  
RCBA: 177452  
RCCSR: 177448  
RCCSRH: 177447  
RCDARH: 177413  
RCDAR: 177413  
RCLC: 177410  
RCLC: 177410  
RCLC: 177405  
RCLC: 177405  
RCLC: 177304  
RCLC: 177303  
SC: 177310  
SRE: 177311  
MLL: 177306  
DIV: 177300  
NOR: 177312  
LSH: 177314  
ASH: 177316

:HIGH BYTE ADDRESS OR CSR  
:DISK ADDRESS REGISTER  
:WORD COUNT REGISTER  
:CURRENT ADDRESS REGISTER  
:STATUS REGISTER  
:HIGH BYTE ADDRESS OR CSR  
:HIGH BYTE OF DISK ADDRESS  
:DISK ADDRESS REGISTER  
:WORD COUNT REGISTER  
:CURRENT ADDRESS REGISTER  
:STATUS REGISTER  
:HIGH BYTE ADDRESS OR CSR  
:ARE LOCATIONS

:DECTAPE ADDRESSES

TC=177340  
TCM: TC+2  
TCST: TC  
TCDT: TC+10  
TCMC: TC+4  
TCBA: TC+6  
TCIV: 214  
RPCA: 176722  
RPOAH: 176725  
RPOAF: 176724  
RPOSR: 176710  
RPOAR: 176724  
RPMC: 176716  
RPAR: 176720  
RPCR: 176714  
RPCSRH: 176715

:CONTROL AND FUNCTION  
:GENERAL STATUS  
:DATA  
:WORD COUNT  
:BUS ADDRESS  
:DECTAPE INTERRUPT VECTOR  
:CYLINDER ADDRESS RPII DISK  
:HIGH BYTE OF DISK ADDRESS  
:DISK ADDRESS  
:DRIVE STATUS REGISTER  
:DISK ADDRESS REGISTER  
:WORD COUNT REGISTER  
:CURRENT ADDRESS REGISTER  
:STATUS REGISTER  
:HIGH BYTE ADDRESS OR CSR  
:DISK COMMAND

RPFUNCTION: 0  
:THIS ROUTINE CHECKS THE READ DATA BUFFER TC11  
:BY DOING A CHECK SUM ON THE DATA

TC1: MOV %1,-(6)  
MOV %3,-(6)  
CLR %3  
MOV #TCRBUF,%1  
TC2: ADD (1)+,%3  
ADD (1)+,%3  
BEQ TC2  
CMP %1,#TCRBUF+1000  
BHI .+4  
HLT  
MOV (6)+,%3  
MOV (6)+,%1  
RTS %7

:SAVE THESE ON THE STACK  
:SUM OF DATA  
:ADDRESS OF READ BUFFER  
:EVEN ADD  
:ODD ADD -2'S COMPLIMENT  
:AT END OF BUFFER?  
:YES BRANCH  
:DATA ERROR  
:RESTORE THE REGISTERS  
:EXIT

```

753 000472 012767 000240 014232 NOEAE: MOV      #240,EAE$RT      ;BRANCH AROUND EAE ROUTINE
754 000500 000002                                RTI                    ;JUMP OVER EAE SECTION
755
756                                ;START UP FOR MINI MONITOR
757                                ;RESTART HERE IF LINE PRINTER WAS ENABLED
758
759 000502 012767 016504 177314 START: MOV      @PFAIL,24      ;SET POWER FAIL VECTOR
760 000510 012706 016762                                MOV      @BUFF,%6      ;SET UP STACK
761 000514 012767 000530 177262                                MOV      #15,4          ;SET UP TIME OUT VECTOR
762 000522 005777 177446                                TST      @SRPTR         ;TRY TO REFERENCE THE
763                                ;HARDWARE SWITCH REGISTER
764 000526 000404                                BR       25             ;BRANCH IF NO TIME OUT TRAP OCCURS
765 000530 012767 000176 177436 1S:  MOV      @SOFTSR,SRPTR    ;CHANGE THE SWITCH REGISTER POINTER
766                                ;TO POINT TO A SOFTWARE SWITCH REGISTER
767 000536 022626                                CMP      (6)+,(6)+      ;RESTORE THE STACK
768 000540 012767 000006 177236 2S:  MOV      #6,4          ;RESTORE TIME OUT VECTOR
769 000546 017767 177422 000742                                MOV      @SRPTR,REG1    ;MOV SR TO REGISTER
770 000554 005737 016570                                TST      @SAVR6         ;SET ON POWER FAIL
771 000560 001403                                BEQ      @START         ;
772 000566 005037 016570                                CLR      @SAVR6         ;
773 000568 104000                                HLT                                     ;A POWER FAIL OCCURRED
774 000570 005067 015644                                ESTART: CLR      ICOUNT
775 000574 012706 016762                                MOV      @BUFF,%6      ;SET UP STACK
776 000580 012767 000642 015636                                MOV      @START2,RETURN
777 000586 005067 015630                                CLR      SCOPE
778 000592 012767 000340 177156                                MOV      @340,STATUS    ;LOCK OUT INTERRUPTS
779 000598 005067 014736                                CLR      PFLAG         ;PRINT ROUTINE BUSY
780 000604 016702 000666                                MOV      REG1,RSR       ;SAVE SWITCHES
781 000610 012700 000100                                MOV      #100,R100     ;INTERRUPT ENABLE
782 000616 012701 000101                                MOV      #101,R101     ;INTERRUPT ENABLE AND GO
783 000622 104400                                SCOPE
784 000628 050077 177412                                START2: BIS      R100,@TRCSR
785 000634 000005                                RESET
786 000640 030077 177404                                BIT      R100,@TRCSR   ;INTERRUPT ENABLE
787 000646 001401                                BEQ      .+4
788 000652 104000                                HLT                                     ;RESET DID NOT CLEAR INTERRUPT ENABLE
789 000658 104400                                SCOPE
790                                ;DOES "RESET" ON THE BUS LAST TOO LONG
791 000662 012706 016762                                MOV      @BUFF,%6      ;SET UP STACK
792 000668 000005                                RESET
793 000674 050077 177370                                BIS      R100,@TTCSR   ;SET A BIT
794 000680 030077 177364                                BIT      R100,@TTCSR   ;IS IT SET
795 000686 001001                                BNE     .+4
796 000692 104000                                HLT                                     ;RESET IS ON BUS TOO LONG
797 000698 005077 177354                                CLR      @TTCSR
798 000704 104400                                SCOPE
799 000710 050077 177346                                BIS      R100,@TTCSR
800 000716 005077 177342                                CLR      @TTCSR       ;IF BUS HANG, CHECK NO SACK TIMEOUT
801 000722 104400                                SCOPE
802 000728 000005                                RESET
803 000734 012767 004416 015510                                MOV      @BEGIN,RETURN
804 000740 012737 000472 000004                                MOV      @NOEAE,@#4
805 000746 005777 177402                                TST      @M0
806 000752 012767 001520 177030                                MOV      @RTIA,4
807 000758 012767 000340 177024                                MOV      #340,6
808 000764 012767 000001 000604                                MOV      #1,DATA1      ;TEST FOR EAE
                                                                ;TRAP IF NONEXISTANT
                                                                ;SET UP FOR NON-EXISTANT I/O
                                                                ;KEEP NEW PSW AT 340
                                                                ;BASE DATA FOR TTY READER OR KEYBOARD
    
```



809	000770	005067	000626		CLR	DATA2	:BASE DATA FOR TTY PUNCH OR TELEPRINTER
810	000774	012767	000001	000674	MOV	#1,DATA3	:BASE DATA FOR HSR
811	001002	005067	000764		CLR	DATA4	:BASE DATA FOR HSP
812	001006	012706	016762		MOV	#BUFF,%6	
813	001013	005067	000760		CLR	DELAY	:FOR READER STALL - HSR -
814	001016	012767	000340	176752	MOV	#340,STATUS	:LOCK OUT INTERRUPTS
815	001024	030227	000001		BIT	RSR,#1	
816	001030	001002			BNE	ST1	
817	001032	050077	177226		BIS	R100,#ATTCR	:TTY OUT
818	001033	030227	000002	ST1:	BIT	RSR,#2	
819	001034	001002			BNE	ST2	
820	001041	050177	177210	ST2:	BIS	R101,#TRCSR	:TTY IN
821	001050	005777	177220		TST	#HPCR	:TEST FOR OUT OF TAPE
822	001054	100406			BMI	ST3	
823	001055	030227	000004		BIT	RSR,#4	
824	001062	001002			BNE	ST3	
825	001064	050077	177204	ST3:	BIS	R100,#HPCR	:HSP
826	001070	005777	177174		TST	#HRCR	:TEST FOR OUT OF TAPE
827	001074	100412			BMI	ST4	
828	001076	000402			BR	ST3A	:RESERVED FOR OVERLAYS
829	001100	017416			DET3		:1020 GTP OVER LAY
830	001102	017416			DET3		:1022 GTP OVER LAY
831	001104	030227	000010	ST3A:	BIT	RSR,#10	
832	001110	001004			BNE	ST4	
833	001112	010067	000660		MOV	R100,DELAY	:FOR STALL HSR
834	001116	050177	177146	ST4:	BIS	R101,#HRCR	:HSR
835	001122	030227	000020		BIT	RSR,#20	
836	001126	001004			BNE	ST5	
837	001130	005067	000762		CLR	TIME	
838	001134	050077	177140	ST5:	BIS	R100,#LKCSR	:LINE CLOCK 50 OR 60 CYCLES
839	001140	030227	000040		BIT	RSR,#40	
840	001144	001053			BNE	ST6	
841	001146	012767	001210	176630	MOV	#ST5A,4	
842	001154	105777	177246		TSTB	#RPCR	:WAIT FOR CONTROLLER READY
843	001160	100375			BPL	.-4	
844	001162	012777	000015	177236	MOV	#15,#RPCR	:RESET DRIVE
845	001170	105777	177232		TSTB	#RPCR	:WAIT FOR CONTROLLER READY
846	001174	100375			BPL	.-4	
847	001176	005777	177214		TST	#RPCR	:WAIT FOR ACCESS READY
848	001202	100375			BPL	.-4	
849	001204	005077	177206	ST5A:	CLR	#RPCR	:CLR ATTENTION
850	001210	012767	001520	176566	MOV	#RTIA,4	
851	001216	012777	000037	177076	MOV	#37,#ACDAR	
852	001224	012767	043503	001426	MOV	#43503,#RFFUNCTION	:WRITE CHECK/WRITE RF
853	001232	012767	043503	001310	MOV	#43503,#RCFUNCTION	
854	001240	012767	043503	001116	MOV	#43503,#RKFUNCTION	
855	001246	012767	043503	177156	MOV	#43503,#RPFUNCTION	
856	001254	110077	177036		MOVB	R100,#RCSR	:TELL DISK TO READ OR WRITE
857	001260	110077	177060		MOVB	R100,#RKCSR	
858	001264	110077	177040		MOVB	R100,#RCCSR	
859	001270	110077	177132		MOVB	R100,#RPCR	
860	001274	030200		ST6:	BIT	RSR,#100	:TEST FOR DECTAPE
861	001276	001011			BNE	ST7	
862	001300	012767	002664	001364	MOV	#TCFIRST,TCXPE	:FIRST BLOCK SHOULD BE ZERO
863	001306	012777	002674	177072	MOV	#FEND2,#TCIV	:GO TO END ZONE ON INTERRUPT
864	001314	012777	004503	177050	MOV	#R+IE+AB+DO,#ATCCM	:MOVE REVERSE

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865 001322 105702          ST7:  TSTB  RSR          ;LINE PRINTER
866 001324 100427          BMI  STB          ;
867 001326 012767 001404 176450  MOV  @STB,4        ;DON'T CHANGE 200
868 001334 012767 000137 000724  MOV  @137,SOLPAT   ;RESET FOR START OF LINE PATTERN
869 001342 016767 000612 000720  MOV  L#4,CLINCT    ;LINE COUNT
870 001350 012767 000040 000706  MOV  @40,CURPAT    ;
871 001356 012777 000014 176720  MOV  @14,LPDR      ;LINE FEED TO POSITION BUFFER
872 001364 012737 002144 000200  MOV  @LPINTR,@200  ;INTERRUPT VECTOR
873 001372 012737 000200 000202  MOV  @200,@202    ;PROCESSOR LEVEL 4
874 001400 010077 176676  MOV  @R100,@LPCSR ;INTERRUPT ENABLE
875 001404 005037 015550  STB:  CLR  @STRPB   ;NO "T" BIT FIRST PASS
      ;IF OPERATION WITH DIAGNOSTIC PACKAGE OR ACT11
876
877 001410 005767 176426          TST  42
878 001414 001415          BEQ  STBA          ;BRANCH IF NO MONITOR
879 001416 012767 001520 176360  MOV  @RTIA,4
880 001424 005077 176652          CLR  @LPCSR       ;NO LINE PRINTER WITH MONITOR
881 001430 005077 176630          CLR  @TTCSR       ;NO CONSOLE TEST WITH MONITOR
882 001434 122767 000002 176377  CMPB @2,41
883 001442 001002          BNE  STBA          ;IS IT RKDP
884 001444 005077 176674          CLR  @RKCSR       ;YES DON'T TEST RK DISK
885 001450 004737 016764  STBA: JSR  %7,@USER  ;FOR USER I/O PROGRAM
886 001454 004767 015306          JSR  %7,@DETI     ;CHECK FOR CORE EXPANSION
887 001460 005067 176322          CLR  6            ;HALT FOR BUS ERROR
888 001464 012767 000006 176312  MOV  @6,4         ;FOR USER I/O PROGRAM
889 001472 005067 176300          CLR  STATUS       ;ALLOW INTERRUPTS
890 001476 000401          BR   .+4
891 001500 000001          MAINLINE: WAIT      ;WAIT HERE FOR INTERRUPTS
892 001502 037727 176466 002000  BIT  @SRPTR,@2000 ;INHIBIT PROCESSOR TEST
893 001510 001373          BNE  MAINLINE
894 001512 000167 002700          JMP  BEGIN
895 001516 000000          REG1: 0          ;STATUS OF SELECTED DEVICES
896 001520 000002          RTIA: RTI        ;AN RTI FOR NON EXISTANT I/O
897
898
899
900
901          ;TTY RECEIVER VALUES 0 TO 377
902
903 001522 105777 176532  TTYINR: TSTB @TRCSR ;IS DONE SET
904 001526 100401          BMI  .+4
905 001530 104000          HLT
906 001532 105777 176524          TSTB @TRDR
907 001536 001413          BEQ  TTYIN2       ;FALSE RETURN FROM MAINLINE
908 001540 127767 176516 000026  CMPB @TRDR,DATA1 ;TEST DATA FOR LEADER
909 001546 001401          BEQ  TTYIN3       ;IF LEADER GO BACK
910 001550 104000          HLT              ;NOT LEADER TEST FOR DATA
911 001552 105267 000016          TTYIN3: INCB DATA1 ;DATA COMPARISON ERROR
912 001556 001003          TTYIN4: BNE TTYIN2 ;INCREMENT DATA
913 001560 012767 000001 000006  TTYIN1: MOV  @1,DATA1 ;BASE DATA
914 001566 005277 176466          TTYIN2: INC  @TRCSR ;START READER
915 001572 000002          RTI              ;RETURN TO MAINLINE
916
917 001574 000000          DATA1: XX      ;EXPECTED DATA
918
919          ;TTY TRANSMITTER PRINT VALUES 0 TO 377
920

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921 001576 105777 176462 TYOUTR: TSTB @TTCSR ;TEST FOR DONE
922 001602 100401 BMI .+4 ;BRANCH IF FLAG FOUND
923 001604 104000 HLT ;FALSE INTERRUPT RETURN
924 001606 105267 000010 INCB DATA2 ;INCREMENT DATA
925 001612 016777 000004 176446 TYOUT1: MOV DATA2,@TTDBR ;OUTPUT TO DEVICE
926 001620 000002 RTI ;RETURN TO MAINLINE
927
928 001622 000000 DATA2: XX ;TRANSMITTED DATA
929 ;HSR SECTION VALUES 0 TO 377
930
931 001624 105777 176440 HSRINR: TSTB @HRCSR ;IS DONE SET
932 001630 100401 BMI .+4
933 001632 104000 HLT ;FALSE RETURN FROM MAINLINE
934 001634 105777 176432 TSTB @HRDBR ;TEST DATA FOR LEADER
935 001640 001413 BEQ HSRIN2 ;IF LEADER GO BACK
936 001642 127767 176424 000026 CMPB @HRDBR,DATA3 ;NOT LEADER TEST FOR DATA
937 001650 001401 BEQ .+4
938 001652 104000 HLT ;DATA COMPARISON ERROR
939 001654 105267 000016 INCB DATA3 ;INCREMENT DATA
940 001660 001003 BNE HSRIN2
941 001662 012767 000001 000006 HSRIN1: MOV #1,DATA3 ;BASE DATA
942 001670 005277 176374 HSRIN2: INC @HRCSR ;START READER
943 001674 000002 RTI ;RETURN TO MAINLINE
944
945 001676 000000 DATA3: XX ;EXPECTED DATA
946
947 ;HS PUNCH SECTION, VALUES 0 TO 377
948 ;ENABLE READER ON FIX COUNT OF PUNCH ONLY (14 TIMES)
949 001700 012767 000000 000064 HPOUT: MOV #0,DATA4 ;INITIAL DATA
950 001706 016777 000060 176362 HPOUT1: MOV DATA4,@HPDBR ;OUTPUT TO DEVICE
951 001714 000002 RTI ;RETURN TO MAINLINE
952 001716 105777 176352 HPOUTR: TSTB @HPCSR ;TEST FOR DONE
953 001722 100401 BMI .+4 ;BRANCH IF FLAG FOUND
954 001724 104000 HLT ;FALSE INTERRUPT RETURN
955 001726 046777 000044 176334 BIC DELAY,@HRCSR ;CLEAR HSR INTERRUPT ENABLE
956 001734 005267 000034 INC INTCNT ;COUNT INTERRUPTS
957 001740 026727 000030 000014 CMP INTCNT,#14 ;SAVE TO TURN READER ON?
958 001746 001005 BNE HPOUT2 ;NO-NEED MORE TIME
959 001750 005067 000020 176306 CLR INTCNT ;YES RESET COUNTER
960 001754 056777 000016 HPOUT2: BIS DELAY,@HRCSR ;SET READER INT ENABLE
961 001762 105267 000004 INCB DATA4 ;INCREMENT DATA
962 001766 001744 BEQ HPOUT ;AT UPPER LIMIT START OVER
963 001770 000746 BR HPOUT1 ;FINISH REST OF DATA
964
965 001772 000000 DATA4: XX
966 001774 000000 INTCNT: 0
967 001776 000000 DELAY: 0 ;EQUAL 100 IF HSR RUNNING
968
969 ;TEST OF LINE CLOCK INTERRUPT FOR 55 SECONDS THEN STALL FOR 5 SECONDS.
970 002000 005037 002116 LK1: CLR @TIME ;CLEAR LINE CLOCK TIMER
971 002004 052777 000100 176266 BIS #100,@LKCSR
972 002012 052737 000100 177776 BIS #100,@STATUS
973 002020 000002 RTI ;RETURN TO MAINLINE
974 002022 105777 176252 LK2: TSTB @LKCSR ;TEST FOR DONE
975 002026 100401 BMI .+4
976 002030 104000 HLT ;FALSE INTERRUPT
    
```

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977 002032 042777 000200 176240      LK4:  BIC      #200,ALKCSR
978 002040 005237 002116      INC      @TIME      ;ON INTERRUPTS ENTER HERE
979 002044 022737 006344 002116      CMP      #3300.,@TIME ;A LAPS OF 55 SECONDS
980 002052 103362      BHIS     LK2      ;BRANCH IF TIME LESS THAN 55 SECONDS
981 002054 042777 000100 176216      BIC      #100,ALKCSR
982 002062 042737 000100 177776      BIC      #100,@STATUS ;LOWER PRIORITY
983 002070 022737 007020 002116      CMP      #3600.,@TIME ;ONE MINUTE UP
984 002076 001740      BEQ     LK1      ;YES-RESET TIMER
985 002100 105777 176174      TSTB    ALKCSR    ;NO-SKIP ON FLAG TILL IT IS.
986 002104 100375      BPL     -4
987 002106 042777 000200 176164      BIC      #200,ALKCSR ;CLEARS THE FLAG
988 002114 000751      BR      LK4      ;FOUND FLAG GO INCREMENT COUNTER
989 002116 000000      TIME:  0
990
991      ;LINE PRINTER SHOULD RAISE PROCESSOR PRIORITY TO LEVEL OF LINE PRINTER
992      ;INTERRUPT VECTOR IS 200
993      LP80=LP6+4
994
995 002120 016767 000142 000136  LP1:  MOV      SOLPAT,CURPAT ;START OF LINE TO CURRENT
996 002126 016777 000132 176150  LP2:  MOV      CURPAT,ALPDBR ;CURRENT PATTERN TO LINE PRINTER
997 002134 105777 176142      TSTB    ALPCSR
998 002140 100405      BMI     LP6
999 002142 000002      RTI
1000 002144 105777 176132      LPINTR: TSTB    ALPCSR ;RETURN TO MAIN LINE
1001 002150 100401      BMI     .+4 ;TEST FOR FLAG
1002 002152 104000      HLT
1003 002154 026727 000110 000117  LP6:  CMP      CLINCT,#79. ;FALSE RETURN FROM MAIN LINE
1004      ;TEST FOR END OF LINE
1005 002162 001415      BEQ     LP4 ;CHANGE THIS VALUE FOR 132 COLUMN PRINTER
1006 002164 005267 000100      INC     CLINCT ;GO GENERATE CR/LF
1007 002170 026727 000070 000137      CMP     CURPAT,#137 ;INCREMENT LINE POSITION COUNT
1008 002176 001403      BEQ     LP3 ;TEST FOR MAXIMUM PATTERN
1009 002200 005267 000060      INC     CURPAT ;YES - GO TO LP3 AND RESET
1010 002204 000750      BR      LP2 ;NO - INCREMENT TO NEXT PATTERN
1011 002206 012767 000040 000050  LP3:  MOV      #40,CURPAT ;GO SEND IT TO LINE PRINTER
1012 002214 000744      BR      LP2 ;RESET PATTERN AND SEND TO PRINTER
1013 002216 005067 000046      LP4:  CLR     CLINCT ;SENT TO LINE PRINTER
1014 002222 012777 000012 176054      MOV     #12,ALPDBR ;RESET LINE COUNT
1015 002230 105777 176046      TSTB    ALPCSR ;LINE FEED
1016 002234 100375      BPL     -4
1017 002236 026727 000024 000137      CMP     SOLPAT,#137 ;START OF LINE PATTERN
1018 002244 001403      BEQ     LP5
1019 002246 005267 000014      INC     SOLPAT ;INCREMENT START OF LINE
1020 002252 000722      BR      LP1
1021 002254 012767 000040 000004  LP5:  MOV      #40,SOLPAT ;RESET START OF LINE
1022 002262 000716      BR      LP1 ;PRINT
1023 002264 000000      CURPAT: 0 ;CURRENT CHARACTER BEING PRINTED
1024 002266 000000      SOLPAT: 0 ;START OF LINE CHARACTER
1025 002270 000000      CLINCT: 0 ;POSITION OF LINE
1026
1027      ;RK11 DISK TEST INTERRUPT LEVEL 5, 2000 WORD TRANSFERS
1028 002272 005077 176040      RKSTART: CLR     @RKDAE ;INITIALIZE DISK - DAR-DAE
1029 002276 016777 000360 176036      RK1:  MOV     LLIMIT,@RKBAR ;CORE BASE
1030 002304 012777 176000 176026      MOV     @RKWORDCT,@RKWC ;LENGTH OF TRANSFER
1031 002312 113777 002364 176024      MOVB    @RKFUNCTION,@RKCSR ;WRITE OR WRITE CHECK TO DISK
1032 002320 000002      RTI ;RETURN TO MAINLINE CODE

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1033 002322 032777 100200 176014 IRK: BIT #100200, @RKCSR ; INTERRUPT VECTOR POINTS HERE
1034 002330 003002 BGT .+6 ;
1035 002332 104000 HLT ; RK-11 ERROR FLAG UP OR READY NOT UP
1036 002334 000756 BR RKSTART ;
1037 002336 032777 000037 175772 BIT #37, @RKDAE ; DISK AT UPPER LIMIT?
1038 002344 001354 BNE RK1 ; NO
1039 002346 122777 000031 175760 CMPB #31, @RKDAH ; NO
1040 002354 001350 BNE RK1 ; CHANGE COMMAND
1041 002356 000337 002364 SWAB @@RKFUNCTION ; RESTART NEW TRANSFER OF DISK
1042 002362 000743 BR RKSTART ;
1043 ;
1044 002364 000000 RKFUNCTION: 0 ; DISK COMMAND
1045 ;RP11 DISK SERVICE ROUTINE ;
1046 002366 112777 000001 176032 RPSTART: MOVB #1, @RPCR ; INITIALIZE DISK - DAR-DAE
1047 002374 105777 176026 TSTB @RPCR ;
1048 002400 100375 BPL .-4 ;
1049 002402 016777 000254 176014 RP1: MOV LLIMIT, @RPAR ; INITIAL CORE ADDRESS
1050 002410 012777 176000 176004 MOV @RWORDCT, @RWC ; LENGTH OF TRANSFER
1051 002416 113777 000432 176002 MOVB @@RPFUNCTION, @RPCR ; WRITE OR WRITE CHECK TO DISK
1052 002424 000002 RTI ; RETURN TO MAINLINE CODE
1053 002426 032777 100200 175772 IRP: BIT #100200, @RPCR ; INTERRUPT VECTOR POINTS HERE
1054 002434 003002 BGT .+6 ;
1055 002436 104000 HLT ; RP11 READY NOT UP OR ERROR
1056 002440 000752 BR RPSTART ;
1057 002442 122777 000312 175740 CMPB #312, @RPCA ; CYLINDER NO. 312, 624 FOR RPO3
1058 002450 001354 BNE RP1 ; NO
1059 002452 000337 000432 SWAB @@RPFUNCTION ; CHANGE COMMAND
1060 002456 000743 BR RPSTART ; RESTART NEW TRANSFER OF DISK
1061 ;
1062 002460 012777 000040 175634 :RC11 DISK SERVICE ROUTINE ;
1063 002466 016777 000170 175632 RCSTART: MOV #40, @RCDA ; INITIALIZE DISK - DAR-DAE
1064 002474 012777 176040 175622 RC2: MOV LLIMIT, @RCBAR ; CORE BASE
1065 002502 113777 002550 175620 MOV @RCWORDCT, @RCWC ; LENGTH OF TRANSFER
1066 002510 000002 MOVB @@RCFUNCTION, @RCCSR ; WRITE OR WRITE CHECK TO DISK
1067 002512 037727 175612 100200 RTI ; RETURN TO MAINLINE CODE
1068 002520 003002 BIT @RCCSR, #100200 ; INTERRUPT VECTOR POINTS HERE
1069 002522 104000 BGT .+6 ;
1070 002524 000755 HLT ; RC11 READY NOT UP OR ERROR IS UP
1071 002526 005277 175570 BR RCSTART ;
1072 002532 022777 002000 175562 INC @RCDA ; TO INCREASE XFER RATE
1073 002540 001352 CMP #2000, @RCDA ; DISK AT UPPER LIMIT, 4000=2, 6000=3, 10000=4
1074 002542 000337 002550 BNE RC2 ; NO
1075 002546 000744 SWAB @@RCFUNCTION ; CHANGE COMMAND
1076 002550 000000 BR RCSTART ; RESTART NEW TRANSFER OF DISK
1077 ;
1078 002552 105277 175542 RCFUNCTION: 0 ; DISK COMMAND
1079 002556 062777 000040 175524 RFSTART: INCB @RFCSRH ; INITIALIZE DISK - DAR-DAE
1080 002564 016777 000072 175522 RF1: ADD #40, @RFDAR ; INCREASE DUTY CYCLE
1081 002572 012777 176040 175512 MOV LLIMIT, @RFCAR ; CORE BASE
1082 002600 113777 002660 175510 MOV @RFWORDCT, @RFWC ; LENGTH OF TRANSFER
1083 002606 000002 MOVB @@RFFUNCTION, @RFCSR ; WRITE OR WRITE CHECK TO DISK
1084 002610 037727 175502 100200 RTI ; RETURN TO MAINLINE CODE
1085 002616 003002 BIT @RFCSR, #100200 ; INTERRUPT VECTOR POINTS HERE
1086 002620 104000 BGT .+6 ;
1087 002622 000753 BR RFSTART ; RF11 READY NOT UP OR ERROR UP
1088 002624 062777 000040 175456 ADD #40, @RFDAR ; INCREASE DUTY CYCLE

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1089	002632	122777	000003	175446	CMPB	#3,@RFDAR	:DISK AT UPPER LIMIT? 7=2, 17=4, 37=8
1090	002640	001351			BNE	RF1	:NO
1091	002642	027727	175442	174000	CMP	@RFDAR,#174000	:AS FAR ON DISK AS WE CAN GO
1092	002650	101745			BLOS	RF1	:NO
1093	002652	000337	002660		SWAB	@RFFUNCTION	:CHANGE COMMAND
1094	002656	000735			BR	RFSTART	:RESTART NEW TRANSFER OF DISK
1095	002660	000000				0	:DISK COMMAND
1096	002662	004416			RFFUNCTION:		:FIRST CORE ADDRESS OF TRANSFER
1097					LLIMIT: BEGIN		
1098		000004			:DT11 DEC TAPE		
1099		000014			RD=4		:READ DATA
1100		000002			WD=14		:WRITE DATA
1101		000002			RB=2		
1102		000000			BR=2		:READ BLOCK
1103		000500			F=0		:FORWARD
1104		000001			IE=500		:INTERRUPT ENABLE AND UNIT - UNIT #1
1105		004000			DO=1		:DO - THE FUNCTION
1106					R=4000		:REVERSE
1107	002664	000000			TCFIRST: 0		:FIRST BLOCK TO BE SEARCHED FOR
1108	002666	001101			TCLAST: 577.		:LAST BLOCK TO BE SEARCHED FOR
1109	002670	000000			TCBLK: 0		:CURRENT BLOCK FOUND
1110	002672	000000			TCEXPE: 0		:THE BLOCK THAT IS EXPECTED
1111							
1112					:GO TO FORWARD END ZONE		
1113	002674	012777	002674	175504	FENDZ: MOV	#FENDZ,@TCIV	:END ZONE VECTOR SETUP
1114	002702	005777	175466		TST	@TCST	:TEST FOR END ZONE
1115	002706	100403			BMI	FEND1	:AT END ZONE?
1116	002710	105277	175456		INCB	@TCCM	:SET DO - NO DELAY
1117	002714	000002			RTI		:NO - WAIT SOME MORE
1118	002716	012777	002746	175462	FEND1: MOV	#TCF1,@TCIV	:YES - NEW VECTOR
1119	002724	042777	104000	175440	BIC	#104000,@TCCM	:SEARCH BLOCK FOWARD
1120	002732	016767	177726	177732	MOV	TCFIRST,TCEXPE	:COUNT WHEN THIS BLOCK IS FOUND
1121	002740	105277	175426		TCF1A: INCB	@TCCM	:SET DO
1122	002744	000002			RTI		:RETURN ON NEXT BLOCK
1123	002746	032777	100200	175416	TCF1: BIT	#100200,@TCCM	:ANY ERROR ON READ?
1124	002754	003001			BGT	.+4	
1125	002756	104000			HLT		:TC ERROR SET - FORWARD READ BLOCK
1126	002760	027767	175412	177704	CMP	@TCDT,TCEXPE	:IS THIS OUR BLOCK FOR SYNC
1127	002766	002764			BLT	TCF1A	:NO-READ SOME MORE BLOCKS
1128	002770	001401			BEQ	TCF2	:YES
1129	002772	104000			HLT		:WE PASSED THE BLOCK
1130							
1131	002774	012777	003010	175404	TCF2: MOV	#TCF3,@TCIV	:VECTOR FOR SEQUENTIAL READS
1132	003002	105277	175364		INCB	@TCCM	:SET DO
1133	003006	000002			RTI		:RETURN AND TEST SEQUENTIAL BLOCKS
1134							
1135					:FIND SEQUENTIAL BLOCK AT FOWARD	DIRECTION	
1136	003010	032777	100200	175354	TCF3: BIT	#100200,@TCCM	:TEST ERROR AND READY
1137	003016	003001			BGT	.+4	
1138	003020	104000			HLT		:FALSE INTERRUPT ON TC-11
1139	003022	027767	175350	177636	CMP	@TCDT,TCLAST	:HAVE WE TESTED ALL BLOCKS
1140	003030	001414			BEQ	RENDZ	:YES DRIVE UNIT IN END ZONE TO START OVER
1141	003032	005267	177634		INC	TCEXPE	:NO-INCREMENT EXPECTED COUNT
1142	003036	027767	175334	177626	CMP	@TCDT,TCEXPE	:IS CURRENT BLOCK CORRECT
1143	003044	001401			BEQ	.+4	
1144	003046	104000			HLT		:FAILED IN FOWARD READ TO FIND NEXT BLOCK

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1145 003050 000427          BR      TCWBK      ;THIS ROUTINE WRITES A BLOCK
1146 003052 105277 175314  TCF4:  INCB    @TCCM      ;SET DO
1147 003056 000002          RTI
1148 003060 000705          XFENDZ: BR      FENDZ      ;INDIRECT LINK
1149
1150          :MOVE TAPE TO REVERSE END ZONE
1151 003062 012777 003062 175316  @RENDZ,@TCIV  ;END ZONE VECTOR SETUP
1152 003070 016767 177572 177574  MOV      TCLAST,TCEXPE ;SET UP FOR REVERSE SEARCH
1153 003076 005777 175272          TST      @TCST      ;IN END ZONE
1154 003102 100403          BMI      REND1     ;YES - START TO TURN UNIT AROUND
1155 003104 105277 175262          INCB    @TCCM      ;SET DO
1156 003110 000002          RTI      NO - WAIT TILL WE ARE
1157 003112 012777 004503 175252  REND1:  MOV      @R+IE+RB+DO,@TCCM ;FUNCTION = READ BLOCK, REVERSE AND GO
1158 003120 012777 003210 175260  MOV      @TCR1,@TCIV ;SET UP NEW INTERRUPT VECTOR
1159 003126 000002          RTI
1160          ;WRITE FORWARD ALL BLOCKS EXCEPT 0
1161
1162 003130 012777 003162 175250  TCWBK:  MOV      @TCWB1,@TCIV ;INTERRUPT VECTOR FOR WRITE
1163 003136 012777 177400 175236  MOV      @-400,@TWC  ;ONE BLOCK
1164 003144 012777 003416 175232  MOV      @TCWBUF,@TCBA ;THE WRITE BUFFER ADDRESS
1165 003152 112777 000515 175212  MOV      @IE+WD+DO,@TCCM ;WRITE THE BLOCK
1166 003160 000002          RTI      ;RETURN WHEN BLOCK IS WRITTEN
1167 003162 005777 175204          TCWB1:  TST      @TCCM      ;ANY ERRORS
1168 003166 100001          BPL      .+4
1169 003170 104000          HLT
1170 003172 012777 003010 175206  MOV      @TCF3,@TCIV ;SEARCH BLOCK VECTOR
1171 003200 112777 000502 175164  MOV      @IE+RB,@TCCM ;READ BLOCK
1172 003206 000721          BR      TCF4      ;FIND THE NEXT BLOCK
1173
1174 003210 032777 100200 175154  TCR1:  BIT      @100200,@TCCM ;TEST FOR ERROR AND READY
1175 003216 003001          BGT      .+4
1176 003220 104000          HLT
1177 003222 027767 175150 177442  CMP      @TCDT,TCEXPE ;DECTAPE ERROR ON READ BLOCK REVERSE
1178 003230 001406          BEQ     TCR2     ;IS IT OUR FIRST BLOCK
1179 003232 002002          BGE     TCR1A   ;YES - GO TEST THE REST
1180 003234 104000          HLT      ;NO - HAVE WE PASSED THE BLOCK
1181 003236 000711          BR      RENDZ   ;WE PASS OUR BLOCK
1182 003240 105277 175126          TCR1A:  INCB    @TCCM      ;GO TO END ZONE AND TRY AGAIN
1183 003244 000002          RTI      ;SET DO
1184 003246 012777 003262 175132  TCR2:  MOV      @TCR3,@TCIV ;WE FOUND OUR FIRST BLOCK
1185 003254 105277 175112          INCB    @TCCM      ;SET UP INTERRUPT TO TEST ALL BLOCKS
1186 003260 000002          RTI      ;SET DO
1187          ;WAIT FOR NEXT BLOCK TO INTERRUPT
1188          :FIND SEQUENTIAL BLOCK IN REVERSE DIRECTION
1189 003262 032777 100200 175102  TCR3:  BIT      @100200,@TCCM ;TEST FOR READ AND ERROR
1190 003270 003001          BGT      .+4
1191 003272 104000          HLT      ;ERROR READING SEQUENTIAL BLOCK IN REVERSE

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1192 003274 026777 177364 175074      CMP      TCFIRST,@TCDT      ;DID WE DO ALL THE BLOCKS
1193 003302 001666                      BEQ      XFENDZ             ;YES - GO TO END ZONE TO RESTART
1194 003304 005367 177362                      DEC      TCXPE             ;NO - DECREMENT BLOCK NUMBER
1195 003310 027767 175062 177354      CMP      @TCDT,TCXPE      ;TEST SEQUENTIAL BLOCK IN REVERSE
1196 003316 001401                      BEQ      .+4              ;
1197 003320 104000                      HLT                               ;TEST SEQUENTIAL READ BLOCK IN REVERSE FAILED
1198 003322 000403                      BR      TCRBK             ;THIS ROUTINE READ A BLOCK
1199 003324 105277 175042      TCR4:   INCB             @TCCM      ;SET DO
1200 003330 000002                      RTI                               ;LETS TRY A NEW BLOCK
1201
1202      ;READ REVERSE ALL BLOCK EXCEPT BLOCK 1101
1203 003332 012777 003370 175046      TCRBK:  MOV      @TCRB1,@TCIV  ;SET UP INTERRUPT VECTOR
1204 003340 012777 177400 175034      MOV      #-400,@TCMC      ;READ ONE BLOCK
1205 003346 012777 003416 175030      MOV      @TCRBUF,@TCBA    ;WHERE BUFFER IS
1206 003354 112777 000505 175010      MOV      @IE+RD+DO,@TCCM  ;READ THE BLOCK
1207 003362 004767 175046      JSR      *7,TC1          ;CHECK DATA BUFFER
1208 003366 000002                      RTI                               ;EXIT - RETURN WHEN BLOCK IS READ
1209 003370 005777 174776      TCRB1:  TST      @TCCM      ;AND ERRORS
1210 003374 100001                      BPL      .+4              ;
1211 003376 104000                      HLT                               ;DECTAPE ERROR
1212 003400 012777 003262 175000      MOV      @TCR3,@TCIV      ;NEW VECTOR FOR BLOCK SEARCH
1213 003406 112777 000502 174756      MOV      @IE+RB,@TCCM     ;READ BLOCK FUNCTION
1214 003414 000743                      BR      TCR4             ;RETURN TO BLOCK SEARCH
1215
1216      ;THIS WRITE BUFFER LOOK THE SAME FORWARD OR REVERSE
1217 003416      TCRBUF:
1218 003416      TCRBUF:
1219      000001
1220      000100
1221      N=1
1222      .REPT      100
1223      N
1224      ;DECTAPE READ/WRITE BUFFER
1225      -N
1226      N=N+1
1227      .ENDR
1228      ;DECTAPE READ/WRITE BUFFER
1229      N
1230      ;DECTAPE READ/WRITE BUFFER
1231      -N
1232      N=N+1
1233      ;DECTAPE READ/WRITE BUFFER
1234      N
1235      ;DECTAPE READ/WRITE BUFFER
1236      -N
1237      N=N+1
1238      ;DECTAPE READ/WRITE BUFFER
1239      N
1240      ;DECTAPE READ/WRITE BUFFER
1241      -N
1242      N=N+1
1243      ;DECTAPE READ/WRITE BUFFER
1244      N
1245      ;DECTAPE READ/WRITE BUFFER
1246      -N
1247      N=N+1

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1248		000011	N=N+1	
1249	003456	000011	N	;DECTAPE READ/WRITE BUFFER
1250	003460	177767	-N	
1251		000012	N=N+1	
1252	003462	000012	N	;DECTAPE READ/WRITE BUFFER
1253	003464	177766	-N	
1254		000013	N=N+1	
1255	003466	000013	N	;DECTAPE READ/WRITE BUFFER
1256	003470	177765	-N	
1257		000014	N=N+1	
1258	003472	000014	N	;DECTAPE READ/WRITE BUFFER
1259	003474	177764	-N	
1260		000015	N=N+1	
1261	003476	000015	N	;DECTAPE READ/WRITE BUFFER
1262	003500	177763	-N	
1263		000016	N=N+1	
1264	003502	000016	N	;DECTAPE READ/WRITE BUFFER
1265	003504	177762	-N	
1266		000017	N=N+1	
1267	003506	000017	N	;DECTAPE READ/WRITE BUFFER
1268	003510	177761	-N	
1269		000020	N=N+1	
1270	003512	000020	N	;DECTAPE READ/WRITE BUFFER
1271	003514	177760	-N	
1272		000021	N=N+1	
1273	003516	000021	N	;DECTAPE READ/WRITE BUFFER
1274	003520	177757	-N	
1275		000022	N=N+1	
1276	003522	000022	N	;DECTAPE READ/WRITE BUFFER
1277	003524	177756	-N	
1278		000023	N=N+1	
1279	003526	000023	N	;DECTAPE READ/WRITE BUFFER
1280	003530	177755	-N	
1281		000024	N=N+1	
1282	003532	000024	N	;DECTAPE READ/WRITE BUFFER
1283	003534	177754	-N	
1284		000025	N=N+1	
1285	003536	000025	N	;DECTAPE READ/WRITE BUFFER
1286	003540	177753	-N	
1287		000026	N=N+1	
1288	003542	000026	N	;DECTAPE READ/WRITE BUFFER
1289	003544	177752	-N	
1290		000027	N=N+1	
1291	003546	000027	N	;DECTAPE READ/WRITE BUFFER
1292	003550	177751	-N	
1293		000030	N=N+1	
1294	003552	000030	N	;DECTAPE READ/WRITE BUFFER
1295	003554	177750	-N	
1296		000031	N=N+1	
1297	003556	000031	N	;DECTAPE READ/WRITE BUFFER
1298	003560	177747	-N	
1299		000032	N=N+1	
1300	003562	000032	N	;DECTAPE READ/WRITE BUFFER
1301	003564	177746	-N	
1302		000033	N=N+1	
1303	003566	000033	N	;DECTAPE READ/WRITE BUFFER

1304	003570	177745	-N	
1305		000034	N=N+1	
1306	003572	000034	N	; DECTAPE READ/WRITE BUFFER
1307	003574	177744	-N	
1308		000035	N=N+1	
1309	003576	000035	N	; DECTAPE READ/WRITE BUFFER
1310	003600	177743	-N	
1311		000036	N=N+1	
1312	003602	000036	N	; DECTAPE READ/WRITE BUFFER
1313	003604	177742	-N	
1314		000037	N=N+1	
1315	003606	000037	N	; DECTAPE READ/WRITE BUFFER
1316	003610	177741	-N	
1317		000040	N=N+1	
1318	003612	000040	N	; DECTAPE READ/WRITE BUFFER
1319	003614	177740	-N	
1320		000041	N=N+1	
1321	003616	000041	N	; DECTAPE READ/WRITE BUFFER
1322	003620	177737	-N	
1323		000042	N=N+1	
1324	003622	000042	N	; DECTAPE READ/WRITE BUFFER
1325	003624	177736	-N	
1326		000043	N=N+1	
1327	003626	000043	N	; DECTAPE READ/WRITE BUFFER
1328	003630	177735	-N	
1329		000044	N=N+1	
1330	003632	000044	N	; DECTAPE READ/WRITE BUFFER
1331	003634	177734	-N	
1332		000045	N=N+1	
1333	003636	000045	N	; DECTAPE READ/WRITE BUFFER
1334	003640	177733	-N	
1335		000046	N=N+1	
1336	003642	000046	N	; DECTAPE READ/WRITE BUFFER
1337	003644	177732	-N	
1338		000047	N=N+1	
1339	003646	000047	N	; DECTAPE READ/WRITE BUFFER
1340	003650	177731	-N	
1341		000050	N=N+1	
1342	003652	000050	N	; DECTAPE READ/WRITE BUFFER
1343	003654	177730	-N	
1344		000051	N=N+1	
1345	003656	000051	N	; DECTAPE READ/WRITE BUFFER
1346	003660	177727	-N	
1347		000052	N=N+1	
1348	003662	000052	N	; DECTAPE READ/WRITE BUFFER
1349	003664	177726	-N	
1350		000053	N=N+1	
1351	003666	000053	N	; DECTAPE READ/WRITE BUFFER
1352	003670	177725	-N	
1353		000054	N=N+1	
1354	003672	000054	N	; DECTAPE READ/WRITE BUFFER
1355	003674	177724	-N	
1356		000055	N=N+1	
1357	003676	000055	N	; DECTAPE READ/WRITE BUFFER
1358	003700	177723	-N	
1359		000056	N=N+1	

1360	003702	000056	-N	; DECTAPE READ/WRITE BUFFER
1361	003704	177722	-N	
1362		000057	N=N+1	
1363	003706	000057	-N	; DECTAPE READ/WRITE BUFFER
1364	003710	177721	-N	
1365		000060	N=N+1	
1366	003712	000060	-N	; DECTAPE READ/WRITE BUFFER
1367	003714	177720	-N	
1368		000061	N=N+1	
1369	003716	000061	-N	; DECTAPE READ/WRITE BUFFER
1370	003720	177717	-N	
1371		000062	N=N+1	
1372	003722	000062	-N	; DECTAPE READ/WRITE BUFFER
1373	003724	177716	-N	
1374		000063	N=N+1	
1375	003726	000063	-N	; DECTAPE READ/WRITE BUFFER
1376	003730	177715	-N	
1377		000064	N=N+1	
1378	003732	000064	-N	; DECTAPE READ/WRITE BUFFER
1379	003734	177714	-N	
1380		000065	N=N+1	
1381	003736	000065	-N	; DECTAPE READ/WRITE BUFFER
1382	003740	177713	-N	
1383		000066	N=N+1	
1384	003742	000066	-N	; DECTAPE READ/WRITE BUFFER
1385	003744	177712	-N	
1386		000067	N=N+1	
1387	003746	000067	-N	; DECTAPE READ/WRITE BUFFER
1388	003750	177711	-N	
1389		000070	N=N+1	
1390	003752	000070	-N	; DECTAPE READ/WRITE BUFFER
1391	003754	177710	-N	
1392		000071	N=N+1	
1393	003756	000071	-N	; DECTAPE READ/WRITE BUFFER
1394	003760	177707	-N	
1395		000072	N=N+1	
1396	003762	000072	-N	; DECTAPE READ/WRITE BUFFER
1397	003764	177706	-N	
1398		000073	N=N+1	
1399	003766	000073	-N	; DECTAPE READ/WRITE BUFFER
1400	003770	177705	-N	
1401		000074	N=N+1	
1402	003772	000074	-N	; DECTAPE READ/WRITE BUFFER
1403	003774	177704	-N	
1404		000075	N=N+1	
1405	003776	000075	-N	; DECTAPE READ/WRITE BUFFER
1406	004000	177703	-N	
1407		000076	N=N+1	
1408	004002	000076	-N	; DECTAPE READ/WRITE BUFFER
1409	004004	177702	-N	
1410		000077	N=N+1	
1411	004006	000077	-N	; DECTAPE READ/WRITE BUFFER
1412	004010	177701	-N	
1413		000100	N=N+1	
1414	004012	000100	-N	; DECTAPE READ/WRITE BUFFER
1415	004014	177700	-N	

1441		000101	N=N+1	
1442		000100	.REPT	100
1443			N=N-1	
1444			-N	
1445			Z	:DEC TAPE READ/WRITE BUFFER
1446			.ENOR	
1447			N=N-1	
1448	004016	000100	-N	
1449	004020	177700	Z	:DEC TAPE READ/WRITE BUFFER
1450		000100	N=N-1	
1451		000077	-N	
1452	004022	177701	Z	:DEC TAPE READ/WRITE BUFFER
1453	004024	000077	N=N-1	
1454		000077	-N	
1455	004026	177702	Z	:DEC TAPE READ/WRITE BUFFER
1456	004030	000076	N=N-1	
1457		000076	-N	
1458	004032	177703	Z	:DEC TAPE READ/WRITE BUFFER
1459	004034	000075	N=N-1	
1460		000074	-N	
1461	004036	177704	Z	:DEC TAPE READ/WRITE BUFFER
1462	004040	000074	N=N-1	
1463		000073	-N	
1464	004042	177705	Z	:DEC TAPE READ/WRITE BUFFER
1465	004044	000073	N=N-1	
1466		000072	-N	
1467	004046	177706	Z	:DEC TAPE READ/WRITE BUFFER
1468	004050	000072	N=N-1	
1469		000071	-N	
1470	004052	177707	Z	:DEC TAPE READ/WRITE BUFFER
1471	004054	000071	N=N-1	
1472		000070	-N	
1473	004056	177710	Z	:DEC TAPE READ/WRITE BUFFER
1474	004060	000070	N=N-1	
1475		000067	-N	
1476	004062	177711	Z	:DEC TAPE READ/WRITE BUFFER
1477	004064	000067	N=N-1	
1478		000066	-N	
1479	004066	177712	Z	:DEC TAPE READ/WRITE BUFFER
1480	004070	000066	N=N-1	
1481		000065	-N	
1482	004072	177713	Z	:DEC TAPE READ/WRITE BUFFER
1483	004074	000065	N=N-1	
1484		000064	-N	
1485	004076	177714	Z	:DEC TAPE READ/WRITE BUFFER
1486	004100	000064	N=N-1	
1487		000063	-N	
1488	004102	177715	Z	:DEC TAPE READ/WRITE BUFFER
1489	004104	000063	N=N-1	
1490		000062	-N	
1491	004106	177716	Z	:DEC TAPE READ/WRITE BUFFER
1492	004110	000062	N=N-1	
1493		000061	-N	
1494	004112	177717	Z	:DEC TAPE READ/WRITE BUFFER
1495	004114	000061	N=N-1	
1496		000060	-N	
1497	004116	177720	Z	:DEC TAPE READ/WRITE BUFFER

1547	004120	000060	Z	;DEC TAPE READ/WRITE BUFFER
1548		000057	Z=N-1	
1549	004122	177727	Z	
1550	004124	000055	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1551		000052	Z	
1552	004126	177726	Z=N-1	
1553	004128	000050	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1554		000047	Z	
1555	004130	177725	Z=N-1	
1556	004132	000045	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1557		000042	Z	
1558	004134	177724	Z=N-1	
1559	004136	000040	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1560		000037	Z	
1561	004138	177723	Z=N-1	
1562	004140	000035	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1563		000032	Z	
1564	004142	177722	Z=N-1	
1565	004144	000030	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1566		000027	Z	
1567	004146	177721	Z=N-1	
1568	004148	000025	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1569		000022	Z	
1570	004150	177720	Z=N-1	
1571		000019	Z	
1572	004152	177719	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1573	004154	000017	Z=N-1	
1574		000014	Z	
1575	004156	177718	Z=N-1	
1576	004160	000010	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1577		000007	Z	
1578	004162	177731	Z=N-1	
1579	004164	000047	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1580		000046	Z	
1581	004166	177732	Z=N-1	
1582	004170	000046	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1583		000045	Z	
1584	004172	177733	Z=N-1	
1585	004174	000045	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1586		000044	Z	
1587	004176	177734	Z=N-1	
1588	004200	000044	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1589		000043	Z	
1590	004202	177735	Z=N-1	
1591	004204	000043	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1592		000042	Z	
1593	004206	177736	Z=N-1	
1594	004210	000042	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1595		000041	Z	
1596	004212	177737	Z=N-1	
1597	004214	000041	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1598		000040	Z	
1599	004216	177740	Z=N-1	
1600	004220	000040	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1601		000037	Z	
1602	004222	177741	Z=N-1	
1603	004224	000037	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1604		000036	Z	
1605	004226	177742	Z=N-1	
1606	004230	000036	Z=N-1	;DEC TAPE READ/WRITE BUFFER
1607		000035	Z	
1608		000035	Z=N-1	

1528	004232	177743	-N	
1529	004234	000035	-N	;DEC TAPE READ/WRITE BUFFER
1530		000034	-N-1	
1531	004236	177744	-N	
1532	004240	000034	-N-1	;DEC TAPE READ/WRITE BUFFER
1533		000033	-N-1	
1534	004242	177745	-N	
1535	004244	000033	-N-1	;DEC TAPE READ/WRITE BUFFER
1536		000032	-N-1	
1537	004246	177746	-N	
1538	004250	000031	-N-1	;DEC TAPE READ/WRITE BUFFER
1539		000031	-N-1	
1540	004252	177747	-N	
1541	004254	000031	-N-1	;DEC TAPE READ/WRITE BUFFER
1542		000030	-N-1	
1543	004256	177750	-N	
1544	004260	000030	-N-1	;DEC TAPE READ/WRITE BUFFER
1545		000029	-N-1	
1546	004262	177751	-N	
1547	004264	000027	-N-1	;DEC TAPE READ/WRITE BUFFER
1548		000026	-N-1	
1549	004266	177752	-N	
1550	004270	000026	-N-1	;DEC TAPE READ/WRITE BUFFER
1551		000025	-N-1	
1552	004272	177753	-N	
1553	004274	000025	-N-1	;DEC TAPE READ/WRITE BUFFER
1554		000024	-N-1	
1555	004276	177754	-N	
1556	004300	000024	-N-1	;DEC TAPE READ/WRITE BUFFER
1557		000023	-N-1	
1558	004302	177755	-N	
1559	004304	000023	-N-1	;DEC TAPE READ/WRITE BUFFER
1560		000022	-N-1	
1561	004306	177756	-N	
1562	004310	000022	-N-1	;DEC TAPE READ/WRITE BUFFER
1563		000021	-N-1	
1564	004312	177757	-N	
1565	004314	000021	-N-1	;DEC TAPE READ/WRITE BUFFER
1566		000020	-N-1	
1567	004316	177760	-N	
1568	004320	000020	-N-1	;DEC TAPE READ/WRITE BUFFER
1569		000017	-N-1	
1570	004322	177761	-N	
1571	004324	000017	-N-1	;DEC TAPE READ/WRITE BUFFER
1572		000016	-N-1	
1573	004326	177762	-N	
1574	004330	000016	-N-1	;DEC TAPE READ/WRITE BUFFER
1575		000015	-N-1	
1576	004332	177763	-N	
1577	004334	000015	-N-1	;DEC TAPE READ/WRITE BUFFER
1578		000014	-N-1	
1579	004336	177764	-N	
1580	004340	000014	-N-1	;DEC TAPE READ/WRITE BUFFER
1581		000013	-N-1	
1582	004342	177765	-N	
1583	004344	000013	-N	;DEC TAPE READ/WRITE BUFFER

1584		000012				N=N-1	
1585	004346	177769				-N	
1586	004350	000012				N	;DEC TAPE READ/WRITE BUFFER
1587		000011				N=N-1	
1588	004352	177767				-N	
1589	004354	000011				N	;DEC TAPE READ/WRITE BUFFER
1590		000010				N=N-1	
1591	004356	177770				-N	
1592	004360	000010				N	;DEC TAPE READ/WRITE BUFFER
1593		000007				N=N-1	
1594	004362	177771				-N	
1595	004364	000007				N	;DEC TAPE READ/WRITE BUFFER
1596		000006				N=N-1	
1597	004366	177772				-N	
1598	004370	000006				N	;DEC TAPE READ/WRITE BUFFER
1599		000005				N=N-1	
1600	004372	177773				-N	
1601	004374	000005				N	;DEC TAPE READ/WRITE BUFFER
1602		000004				N=N-1	
1603	004376	177774				-N	
1604	004400	000004				N	;DEC TAPE READ/WRITE BUFFER
1605		000003				N=N-1	
1606	004402	177775				-N	
1607	004404	000003				N	;DEC TAPE READ/WRITE BUFFER
1608		000002				N=N-1	
1609	004406	177776				-N	
1610	004410	000002				N	;DEC TAPE READ/WRITE BUFFER
1611		000001				N=N-1	
1612	004412	177777				-N	
1613	004414	000001				N	;DEC TAPE READ/WRITE BUFFER
1614							
1615	004416	012767	004416	012020	BEGIN:	MOV	#BEGIN, RETURN ;FOR SCOPING
1616	004424	104400				SCOPE	
1617	004426	012737	004000	016440		MOV	#4000, #ICOUNT ; ITERATION COUNT
1618					;TEST COMPARE	INSTRUCTION INDEXED	
1619	004434	012700	177770			MOV	#-10, %0 ; MINUS 10 TO REG 0
1620	004440	026027	016666	125252		CMP	A(0), #125252 ; (A INDEX BY MINUS 10) TO #125252
1621	004446	001401				BEQ	+.4
1622	004450	104000				HLT	;COMPARE WITH INDEX FAILED
1623	004452	104400				SCOPE	
1624							
1625	004454	022760	125252	016666		CMP	#125252, A(0) ; A INDEXED
1626	004462	001401				BEQ	+.4
1627	004464	104000				HLT	;COMPARE FAILED DESTINATION INDEX
1628	004466	104400				SCOPE	
1629					;SET "ISR" FOR DISKS AND KWILL TO CURRENT BANK		
1630	004470	010700				MOV	%7, %0 ;CURRENT BANK
1631	004472	042700	007777			BIC	#007777, %0 ;LEAVE ONLY BANK BITS
1632	004476	062700	002022			ADD	#LK3, %0 ;ADD IN CLOCK ENTRANCE
1633	004502	010037	000100			MOV	%0, #100 ;LINE CLOCK, KWILL
1634	004506	042700	007777			BIC	#007777, %0
1635	004512	062700	002610			ADD	#IRF, %0
1636	004516	010037	000204			MOV	%0, #204 ;RF11 ISR
1637	004522	042700	007777			BIC	#007777, %0
1638	004526	062700	002512			ADD	#IRC, %0
1639	004532	010037	000210			MOV	%0, #210 ;RC11, ISR

1640	004536	042700	007777		BIC	#007777,%0	
1641	004542	062700	002322		ADD	#IRK,%0	
1642	004546	010037	000220		MOV	%0,00220	:RK11 ISR
1643	004552	042700	007777		BIC	#7777,%0	
1644	004558	062700	002426		ADD	#IRP,%0	
1645	004562	010037	000254		MOV	%0,00254	:RP11 ISR
1646	004566	042700	007777		BIC	#007777,%0	
1647	004572	063700	002662		ADD	#LLIMIT,%0	
1648	004576	010067	175060		MOV	%0,LLIMIT	:CHANGE DISK NPR BUFFER
1649	004602	042700	007777		BIC	#007777,%0	
1650	004606	062700	016762		ADD	#BUFF,%0	
1651	004612	010006			MOV	%0,%6	:CHANGE STACK TO EXISTING BANK
1652							
1653	004614	012700	000010		MOV	#10,%0	:INDEX
1654	004620	026027	016666	052525	CMP	A(0),#052525	
1655	004626	001401			BEQ	+.4	
1656	004630	104000			HLT		:COMPARE FAILED
1657	004632	104400			SCOPE		
1658							
1659							:REGISTER 0 CONTAINS 000010
1660	004634	022760	052525	016666	CMP	#052525,A(0)	
1661	004642	001401			BEQ	+.4	
1662	004644	104000			HLT		:COMPARE FAILED
1663	004646	104400			SCOPE		
1664							
1665							:REGISTER 0 CONTAINS 000010
1666	004650	026060	016666	016666	CMP	A(0),A(0)	
1667	004656	001401			BEQ	+.4	
1668	004660	104000			HLT		:COMPARE FAILED
1669	004662	104400			SCOPE		
1670							
1671	004664	012700	177770		MOV	#-10,%0	
1672	004670	026060	016666	016666	CMP	A(0),A(0)	
1673	004676	001401			BEQ	+.4	
1674	004700	104000			HLT		:COMPARE FAILED
1675	004702	104400			SCOPE		
1676							
1677							:REGISTER 0 CONTAINS 177770 (-10)
1678	004704	012701	000004		MOV	#+4,%1	
1679	004710	026061	016666	016666	CMP	A(0),A(1)	
1680	004716	001401			BEQ	+.4	
1681	004720	104000			HLT		:COMPARE FAILED
1682	004722	104400			SCOPE		
1683							
1684	004724	026160	016666	016666	CMP	A(1),A(0)	
1685	004732	001401			BEQ	+.4	
1686	004734	104000			HLT		:COMPARE FAILED
1687	004736	104400			SCOPE		
1688							
1689	004740	012700	177774		MOV	#-4,%0	
1690	004744	012701	000010		MOV	#+10,%1	
1691	004750	026061	016666	016666	CMP	A(0),A(1)	
1692	004756	001401			BEQ	+.4	
1693	004760	104000			HLT		:CMP FAILED
1694	004762	104400			SCOPE		
1695							:REGISTER 0 CONTAINS 177774 (-4)



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1696                                     ;REGISTER 1 CONTAINS 000010
1697 004764 026160 016666 016666      CMP      A(1),A(0)
1698 004772 001401                      BEQ      .+4
1699 004774 104000                      HLT
1700 004776 104400                      SCOPE      ;COMPARE FAILED
1701                                     ;TEST MOVE ODD BYTE TO REGISTER
1702                                     ;PROBLEM 1150237-7-MAR-72
1703 005000 116700 011677              MOV      C+3,%0
1704 005004 022700 000035              CMP      #35,%0
1705 005010 001401                      BEQ      .+4
1706 005012 104000                      HLT
1707 005014 104400                      SCOPE
1708                                     ;TEST MOVE INSTRUCTION FOR INDEX
1709
1710 005016 012700 177770              MOV      #-10,%0
1711 005022 016067 016666 011660      MOV      A(0),TEMP
1712 005030 026727 011654 125252      CMP      TEMP,#125252
1713 005036 001401                      BEQ      .+4
1714 005040 104000                      HLT
1715 005042 104400                      SCOPE      ;COMPARE FAILED
1716
1717 005044 012700 000010              MOV      #+10,%0
1718 005050 016067 016666 011632      MOV      A(0),TEMP
1719 005056 026727 011626 052525      CMP      TEMP,#052525
1720 005064 001401                      BEQ      .+4
1721 005066 104000                      HLT
1722 005070 104400                      SCOPE      ;MOV FAILED
1723
1724 005072 012700 177770              MOV      #-10,%0
1725 005076 012760 125252 016710      MOV      #125252,TEMP(0)
1726 005104 023727 016700 125252      CMP      @B,C,#125252
1727 005112 001401                      BEQ      .+4
1728 005114 104000                      HLT
1729 005116 104400                      SCOPE      ;MOV FAILED
1730
1731 005120 012700 000010              MOV      #+10,%0
1732 005124 012760 052525 016710      MOV      #052525,TEMP(0)
1733 005132 023727 016720 052525      CMP      @B,TEMP+10,#052525
1734 005140 001401                      BEQ      .+4
1735 005142 104000                      HLT
1736 005144 104400                      SCOPE      ;MOV FAILED
1737
1738                                     ;TEST BIC INSTRUCTION FOR INDEXING
1739 005146 012767 177777 011534      MOV      #-1,TEMP
1740 005154 012700 177770              MOV      #-10,%0
1741 005160 046067 016666 011522      BIC      A(0),TEMP
1742 005166 026727 011516 052525      CMP      TEMP,#052525
1743 005174 001401                      BEQ      .+4
1744 005176 104000                      HLT
1745 005200 104400                      SCOPE      ;BIC FAILED
1746
1747 005202 012767 177777 011500      MOV      #-1,TEMP
1748 005210 012700 000010              MOV      #10,%0
1749 005214 046067 016666 011466      BIC      A(0),TEMP
1750 005222 026727 011462 125252      CMP      TEMP,#125252
1751 005230 001401                      BEQ      .+4
    
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# H03

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SEQ 0033

1752	005232	104000			HLT				:BIC FAILED
1753	005234	104400			SCOPE				
1754									
1755	005236	012737	177777	016720	MOV	#-1,@TEMP+10			
1756	005244	012700	000010		MOV	#10,%0			
1757	005250	042760	125252	016710	BIC	#125252,TEMP(0)			
1758	005256	023727	016720	052525	CMP	@TEMP+10,#52525			
1759	005264	001401			BEQ	+.4			
1760	005266	104000			HLT				:BIC FAILED
1761	005270	104400			SCOPE				
1762									
1763	005272	012700	177770		MOV	#-10,%0			
1764	005276	012767	177777	011374	MOV	#-1,TEMP-10			
1765	005304	042767	052525	011366	BIC	#052525,TEMP-10			
1766	005312	026727	011362	125252	CMP	TEMP-10,#125252			
1767	005320	001401			BEQ	+.4			
1768	005322	104000			HLT				:BIC FAILED
1769	005324	104400			SCOPE				
1770									
1771	005326	012767	125252	011354	; TEST SUBTRACT	INSTRUCTION FOR INDEXING			
1772	005334	012700	177770		MOV	#125252,TEMP			
1773	005340	166067	016666	011342	MOV	#-10,%0			
1774	005346	001401			SUB	A(0),TEMP			
1775	005350	104000			BEQ	+.4			:SUB FAILED
1776	005352	104400			HLT				
1777					SCOPE				
1778	005354	012737	125252	016710	MOV	#125252,@TEMP			
1779	005362	012700	177770		MOV	#-10,%0			
1780	005366	166760	011264	016720	SUB	B,TEMP+10(0)			
1781	005374	001401			BEQ	+.4			:SUB FAILED
1782	005376	104000			HLT				
1783	005400	104400			SCOPE				
1784									
1785	005402	012767	052525	011300	MOV	#052525,TEMP			
1786	005410	012700	000010		MOV	#10,%0			
1787	005414	166067	016666	011266	SUB	A(0),TEMP			
1788	005422	001401			BEQ	+.4			:SUB FAILED
1789	005424	104000			HLT				
1790	005426	104400			SCOPE				
1791									
1792	005430	012737	052525	016710	MOV	#052525,@TEMP			
1793	005436	012700	000010		MOV	#10,%0			
1794	005442	166760	011230	016700	SUB	A+10,C(0)			
1795	005450	001401			BEQ	+.4			:SUB FAILED
1796	005452	104000			HLT				
1797	005454	104400			SCOPE				
1798									
1799									
1800	005456	012737	177777	016710	; TEST UNARYS INDEXED				
1801	005464	012700	177770		MOV	#-1,@TEMP			
1802	005470	005060	016720		MOV	#-10,%0			
1803	005474	005737	016710		CLR	D(0)			
1804	005500	001401			TST	@TEMP			
1805	005502	104000			BEQ	+.4			:CLR FAILED
1806	005504	104400			HLT				
1807					SCOPE				

1808	005506	012737	177777	016710	MOV	#-1,@TEMP	
1809	005514	012700	000010		MOV	#+10,%0	
1810	005520	005060	016700		CLR	C(0)	
1811	005524	005737	016710		TST	@TEMP	
1812	005530	001401			BEQ	+.4	
1813	005532	104000			HLT		:CLR FAILED
1814	005534	104400			SCOPE		
1815							
1816	005536	012737	177777	016710	MOV	#-1,@TEMP	
1817	005544	012700	177770		MOV	#-10,%0	
1818	005550	005160	016720		COM	D(0)	
1819	005554	005737	016710		TST	@TEMP	
1820	005560	001401			BEQ	+.4	
1821	005562	104000			HLT		:COM FAILED
1822	005564	104400			SCOPE		
1823							
1824	005566	012737	177777	016710	MOV	#-1,@TEMP	
1825	005574	012700	000010		MOV	#10,%0	
1826	005600	005160	016700		COM	C(0)	
1827	005604	005737	016710		TST	@TEMP	
1828	005610	001401			BEQ	+.4	
1829	005612	104000			HLT		:COM FAILED
1830	005614	104400			SCOPE		
1831	005616	012737	177777	016710	MOV	#-1,@TEMP	
1832	005624	012700	177770		MOV	#-10,%0	
1833	005630	005260	016720		INC	D(0)	
1834	005634	005737	016710		TST	@TEMP	
1835	005640	001401			BEQ	+.4	
1836	005642	104000			HLT		:INC FAILED
1837	005644	104400			SCOPE		
1838							
1839	005646	012737	177777	016710	MOV	#-1,@TEMP	
1840	005654	012700	000010		MOV	#+10,%0	
1841	005660	005260	016700		INC	C(0)	
1842	005664	005737	016710		TST	@TEMP	
1843	005670	001401			BEQ	+.4	
1844	005672	104000			HLT		:INC FAILED
1845	005674	104400			SCOPE		
1846							
1847	005676	012737	000001	016710	MOV	#1,@TEMP	
1848	005704	012700	177770		MOV	#-10,%0	
1849	005710	005360	016720		DEC	D(0)	
1850	005714	005737	016710		TST	@TEMP	
1851	005720	001401			BEQ	+.4	
1852	005722	104000			HLT		:DEC FAILED
1853	005724	104400			SCOPE		
1854							
1855	005726	012737	000001	016710	MOV	#1,@TEMP	
1856	005734	012700	000010		MOV	#10,%0	
1857	005740	005360	016700		DEC	C(0)	
1858	005744	005737	016710		TST	@TEMP	
1859	005750	001401			BEQ	+.4	
1860	005752	104000			HLT		:DEC FAILED
1861	005754	104400			SCOPE		
1862							
1863	005756	012737	000001	016710	MOV	#1,@TEMP	

1864	005764	012700	177770		MOV	#-10,%0	
1865	005770	005460	016720		NEG	D(0)	
1866	005774	022737	177777	016710	CMP	#-1,@TEMP	
1867	006002	001401			BEQ	+.4	
1868	006004	104000			HLT		:NEG FAILED
1869	006006	104400			SCOPE		
1870							
1871	006010	012737	000001	016710	MOV	#1,@TEMP	
1872	006016	012700	000010		MOV	#+10,%0	
1873	006022	005460	016700		NEG	C(0)	
1874	006026	022737	177777	016710	CMP	#-1,@TEMP	
1875	006034	001401			BEQ	+.4	
1876	006036	104000			HLT		:NEG FAILED
1877	006040	104400			SCOPE		
1878							
1879	006042	012737	177777	016710	MOV	#-1,@TEMP	
1880	006050	012700	177770		MOV	#-10,%0	
1881	006054	000261			SEC		
1882	006056	005560	016720		ADC	D(0)	
1883	006062	005737	016710		TST	@TEMP	
1884	006066	001401			BEQ	+.4	
1885	006070	104000			HLT		:ADC FAILED
1886	006072	104400			SCOPE		
1887							
1888	006074	012737	177777	016710	MOV	#-1,@TEMP	
1889	006102	012700	000010		MOV	#+10,%0	
1890	006106	000261			SEC		
1891	006110	005560	016700		ADC	C(0)	
1892	006114	005737	016710		TST	@TEMP	
1893	006120	001401			BEQ	+.4	
1894	006122	104000			HLT		:ADC FAILED
1895	006124	104400			SCOPE		
1896							
1897	006126	012737	000001	016710	MOV	#1,@TEMP	
1898	006134	012700	177770		MOV	#-10,%0	
1899	006140	000261			SEC		
1900	006142	005560	016720		SBC	D(0)	
1901	006146	005737	016710		TST	@TEMP	
1902	006152	001401			BEQ	+.4	
1903	006154	104000			HLT		:SBC FAILED
1904	006156	104400			SCOPE		
1905							
1906	006160	012737	000001	016710	MOV	#1,@TEMP	
1907	006166	012700	000010		MOV	#+10,%0	
1908	006172	000261			SEC		
1909	006174	005560	016700		SBC	C(0)	
1910	006200	005737	016710		TST	@TEMP	
1911	006204	001401			BEQ	+.4	
1912	006206	104000			HLT		:SBC FAILED
1913	006210	104400			SCOPE		
1914							
1915							
1916	006212	01070C					
1917	006214	062700	000010		MOV	%7,%0	
1918	006220	000110			ADD	#10,%0	
1919	006222	104000			JMP	%0	
					HLT		:JMP FAILED

;TEST JMP INDIRECT

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1920 006224 000240      NOP
1921 006226 104400      SCOPE
1922 006228 010600      MOV      %6,%0
1923 006230 010600      MOV      %0,%1
1924 006232 010001      MOV      %1,%2
1925 006234 010102      MOV      %2,%3
1926 006236 010203      MOV      %3,%4
1927 006238 010304      MOV      %4,%5
1928 006240 010405      CMP      %6,%5
1929 006242 020605      BEQ      .+4
1930 006244 001401      HLT
1931 006246 104000      ;MOV REGISTOR FAILED
1932 006248 104400      SCOPE
1933 006250 104400      ;TEST INDIRECT ADDRESSING
1934 006252 104400      ;TEST COMPARE INSTRUCTION
1935 006254 023727 016656 125252  CMP      2(B),2(B),#125252
1936 006256 001401      BEQ      .+4
1937 006258 104000      HLT
1938 006260 104400      ;CMP FAILED
1939 006262 104400      SCOPE
1940 006270 022737 125252 016656  CMP      #125252,2(B)
1941 006272 001401      BEQ      .+4
1942 006274 104000      HLT
1943 006276 104400      ;CMP FAILED
1944 006278 104400      SCOPE
1945 006304 023737 016656 016656  CMP      2(B),2(B)
1946 006306 001401      BEQ      .+4
1947 006308 104000      HLT
1948 006310 104400      ;CMP FAILED
1949 006312 104400      SCOPE
1950 006314 104400      ;TEST MOVE INSTRUCTIONS
1951 006320 013700 016656  MOV      2(B),%0
1952 006324 022700 125252  CMP      #125252,%0

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1953	006330	001401			BEQ	.+4	
1954	006332	104000			HLT		;MOV FAILED
1955	006334	104400			SCOPE		
1956							
1957	006336	012737	125252	016710	MOV	#125252,@TEMP	
1958	006344	023737	016656	016710	CMP	@B,@TEMP	
1959	006352	001401			BEQ	.+4	
1960	006354	104000			HLT		;MOV FAILED
1961	006356	104400			SCOPE		
1962							
1963	006360	013737	016656	016700	MOV	@B,@C	
1964	006366	023737	016656	016700	CMP	@B,@C	
1965	006374	001401			BEQ	.+4	
1966	006376	104000			HLT		;MOV FAILED
1967	006400	104400			SCOPE		
1968							
1969	006402	012700	177777		;TEST BIC INSTRUCTION INDIRECT		
1970	006406	043700	016656		MOV	#-1,%0	
1971	006412	020027	052525		BIC	@B,%0	
1972	006416	001401			CMP	%0,#052525	
1973	006420	104000			BEQ	.+4	
1974	006422	104400			HLT		;BIC FAILED
1975					SCOPE		
1976	006424	012737	177777	016710	MOV	#-1,@TEMP	
1977	006432	042737	125252	016710	BIC	#125252,@TEMP	
1978	006440	022737	052525	016710	CMP	#052525,@TEMP	
1979	006446	001401			BEQ	.+4	
1980	006450	104000			HLT		;BIC FAILED
1981	006452	104400			SCOPE		
1982							
1983	006454	012737	177777	016700	MOV	#-1,@C	
1984	006462	043737	016656	016700	BIC	@B,@C	
1985	006470	023727	016700	052525	CMP	@C,#52525	
1986	006476	001401			BEQ	.+4	
1987	006500	104000			HLT		;BIC FAILED
1988	006502	104400			SCOPE		
1989							
1990							
1991	006504	012700	125252		;TEST SUBTRACT INSTRUCTION		
1992	006510	163700	016656		MOV	#125252,%0	
1993	006514	020027	000000		SUB	@B,%0	
1994	006520	001401			CMP	%0,#0	
1995	006522	104000			BEQ	.+4	
1996	006524	104400			HLT		;SUB FAILED
1997					SCOPE		
1998	006526	012737	125252	016710	MOV	#125252,@TEMP	
1999	006534	166737	010116	016710	SUB	B,@TEMP	
2000	006542	001401			BEQ	.+4	
2001	006544	104000			HLT		;SUB FAILED
2002	006546	104400			SCOPE		
2003							
2004	006550	012767	125252	010132	MOV	#125252,TEMP	
2005	006556	163767	016656	010124	SUB	@B,TEMP	
2006	006564	005767	010120		TST	TEMP	
2007	006570	001401			BEQ	.+4	
2008	006572	104000			HLT		;SUB FAILED

2009	006574	104400			SCOPE		
2010					; TEST UNARYS INDIRECT		
2011	006576	012737	177777	016710	MOV	#-1,@TEMP	
2012	006604	005037	016710		CLR	@TEMP	
2013	006610	005737	016710		TST	@TEMP	
2014	006614	001401			BEQ	+.4	
2015	006616	104000			HLT		; TST FAILED
2016	006620	104400			SCOPE		
2017							
2018	006622	012737	125252	016710	MOV	#125252,@TEMP	
2019	006630	005137	016710		COM	@TEMP	
2020	006634	022737	052525	016710	CMP	#052525,@TEMP	
2021	006642	001401			BEQ	+.4	
2022	006644	104000			HLT		; COM FAILED
2023	006646	104400			SCOPE		
2024							
2025	006650	005037	016710		CLR	@TEMP	
2026	006654	005237	016710		INC	@TEMP	
2027	006660	022737	000001	016710	CMP	#1,@TEMP	
2028	006666	001401			BEQ	+.4	
2029	006670	104000			HLT		; INC FAILED
2030	006672	104400			SCOPE		
2031							
2032	006674	005037	016710		CLR	@TEMP	
2033	006700	005377	010006		DEC	@TEMP+2	
2034	006704	023727	016710	177777	CMP	@TEMP,#-1	
2035	006712	001401			BEQ	+.4	
2036	006714	104000			HLT		; DEC FAILED
2037	006716	104400			SCOPE		
2038							
2039	006720	012737	000001	016710	MOV	#1,@TEMP	
2040	006726	005437	016710		NEG	@TEMP	
2041	006732	022737	177777	016710	CMP	#-1,@TEMP	
2042	006740	001401			BEQ	+.4	
2043	006742	104000			HLT		; NEG FAILED
2044	006744	104400			SCOPE		
2045							
2046					; TEST INDIRECT ADDRESSING WITH INDEXING		
2047					; TEST COMPARE INSTRUCTION		
2048	006746	027727	007706	125252	CMP	@B+2,#125252	
2049	006754	001401			BEQ	+.4	
2050	006756	104000			HLT		; CMP FAILED
2051	006760	104400			SCOPE		
2052							
2053	006762	022777	125252	007670	CMP	#125252,@B+2	
2054	006770	001401			BEQ	+.4	
2055	006772	104000			HLT		; CMP FAILED
2056	006774	104400			SCOPE		
2057							
2058	006776	027777	007656	007654	CMP	@B+2,@B+2	
2059	007004	001401			BEQ	+.4	
2060	007006	104000			HLT		; CMP FAILED
2061	007010	104400			SCOPE		
2062							
2063					; TEST MOVE INSTRUCTIONS		
2064	007012	017700	007642		MOV	@B+2,%0	

2065	007016	022700	125252		CMP	#125252,%0	
2066	007022	001401			BEQ	.+4	
2067	007024	104000			HLT		;MOV FAILED
2068	007026	104400			SCOPE		
2069							
2070	007030	012777	125252	007654	MOV	#125252,@TEMP+2	
2071	007036	023737	016656	016710	CMP	@B,@TEMP	
2072	007044	001401			BEQ	.+4	
2073	007046	104000			HLT		;MOV FAILED
2074	007050	104400			SCOPE		
2075							
2076	007052	017777	007602	007622	MOV	@B+2,@C+2	
2077	007060	023737	016656	016700	CMP	@B,@C	
2078	007066	001401			BEQ	.+4	
2079	007070	104000			HLT		
2080	007072	104400			SCOPE		
2081							
2082							
2083	007074	012700	177777		MOV	#-1,%0	
2084	007100	047700	075554		BIC	@B+2,%0	
2085	007104	020027	052525		CMP	%0,#52525	
2086	007110	001401			BEQ	.+4	
2087	007112	104000			HLT		;BIC FAILED
2088	007114	104400			SCOPE		
2089							
2090	007116	012737	177777	016710	MOV	#-1,@TEMP	
2091	007124	042777	125252	007560	BIC	#125252,@TEMP+2	
2092	007132	022737	052525	016710	CMP	#52525,@TEMP	
2093	007140	001401			BEQ	.+4	
2094	007142	104000			HLT		;BIC FAILED
2095	007144	104400			SCOPE		
2096							
2097	007146	012737	177777	016700	MOV	#-1,@C	
2098	007154	047777	007500	007520	BIC	@B+2,@C+2	
2099	007162	026737	007510	016700	CMP	A+10,@C	
2100	007170	001401			BEQ	.+4	
2101	007172	104000			HLT		;BIC FAILED
2102	007174	104400			SCOPE		
2103							
2104	007176	012700	125252		MOV	#125252,%0	
2105	007202	167700	007452		SUB	@B+2,%0	
2106	007206	020027	000000		CMP	%0,#0	
2107	007212	001401			BEQ	.+4	
2108	007214	104000			HLT		;SUB FAILED
2109	007216	104400			SCOPE		
2110							
2111	007220	012737	125252	016710	MOV	#125252,@TEMP	
2112	007226	166777	007424	007456	SUB	B,@TEMP+2	
2113	007234	001401			BEQ	.+4	
2114	007236	104000			HLT		;SUB FAILED
2115	007240	104400			SCOPE		
2116							
2117	007242	012737	125252	016710	MOV	#125252,@TEMP	
2118	007250	167777	007404	007434	SUB	@B+2,@TEMP+2	
2119	007256	005737	016710		TST	@TEMP	
2120	007262	001401			BEQ	.+4	

;TEST BIC INSTRUCTION INDIRECT WITH INDEXING



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007264 104000 HLT ;SUB FAILED
007266 104400 SCOPE
;TEST ADD INDIRECT WITH INDEXING
007270 005000 CLR %0
007272 067700 ADD @B+2,%0 007362
007274 022700 CMP @125252,%0 125252
007300 001401 BEQ .+4
007302 104000 HLT ;ADD FAILED
007306 104400 SCOPE
007310 005037 016710 CLR @TEMP
007312 067777 125252 007370 ADD @125252,@TEMP+2
007314 022737 125252 016710 CMP @125252,@TEMP
007330 001401 BEQ .+4
007332 104000 HLT ;ADD FAILED
007334 104400 SCOPE
007336 012737 125252 016710 MOV @125252,@TEMP
007338 067777 007340 007340 ADD @A+6,@TEMP+2
007342 023727 016710 177777 CMP @TEMP,@-1
007360 001401 BEQ .+4
007362 104000 HLT ;ADD FAILED
007364 104400 SCOPE
;TEST UNARYS INDIRECT WITH INDEXING
007366 012737 177777 016710 MOV @-1,@TEMP
007374 005077 007312 CLR @TEMP+2
007400 005737 016710 TST @TEMP
007404 001401 BEQ .+4
007406 104000 HLT ;TST FAILED
007410 104400 SCOPE
007412 012737 125252 016710 MOV @125252,@TEMP
007420 005177 007266 016710 COM @TEMP+2
007424 022737 052525 016710 CMP @052525,@TEMP
007430 001401 BEQ .+4
007432 104000 HLT ;COM FAILED
007436 104400 SCOPE
007440 005037 016710 CLR @TEMP
007444 005277 007242 INC @TEMP+2
007450 022737 000001 016710 CMP @1,@TEMP
007456 001401 BEQ .+4
007460 104000 HLT ;INC FAILED
007462 104400 SCOPE
007464 005037 016710 CLR @TEMP
007470 005377 007216 DEC @TEMP+2
007474 023727 016710 177777 CMP @TEMP,@-1
007502 001401 BEQ .+4
007504 104000 HLT ;DEC FAILED
007506 104400 SCOPE
007510 012737 000001 016710 MOV @1,@TEMP
007516 005477 007170 NEG @TEMP+2
007522 022737 177777 016710 CMP @-1,@TEMP

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177 007530 001401 BEQ .+4
178 007532 104000 HLT ;NEG FAILED
179 007534 104400 SCOPE
007536 012737 177777 016710 MOV # -1, @TEMP
007544 000261 SEC
007546 005777 007140 ADC @TEMP+2
007552 005737 016710 TST @TEMP
007556 001401 BEQ .+4
007560 104000 HLT ;ADC FAILED
007562 104400 SCOPE
007564 012737 000001 016710 MOV #1, @TEMP
007572 000261 SEC
007574 005777 007112 SBC @TEMP+2
007600 005737 016710 TST @TEMP
007604 001401 BEQ .+4
007606 104000 HLT ;SBC FAILED
007610 104400 SCOPE
;TEST OF COMBINED INDEXING AND INDIRECT
007612 012700 177772 MOV # -6, %0
007616 027027 016666 125252 CMP @A(0), @125252
007624 001401 BEQ .+4
007626 104000 HLT ;CMP FAILED
007630 104400 SCOPE
007632 012700 177772 MOV # -6, %0
007636 022770 125252 016666 CMP @125252, @A(0)
007644 001401 BEQ .+4
007646 104000 HLT ;CMP FAILED
007650 104400 SCOPE
007652 012700 177772 MOV # -6, %0
007656 012701 000002 MOV # +2, %1
007662 027071 016666 016666 CMP @A(0), @A(1)
007670 001401 BEQ .+4
007672 104000 HLT ;CMP FAILED
007674 104400 SCOPE
;TEST BIC INSTRUCTION
007676 012700 000006 MOV # +6, %0
007702 012767 177777 007000 MOV # -1, TEMP
007710 047067 016666 006772 BIC @A(0), TEMP
007716 022767 125252 006764 CMP @125252, TEMP
007724 001401 BEQ .+4
007726 104000 HLT ;BIC FAILED
007730 104400 SCOPE
007732 012700 177772 MOV # -6, %0
007736 012737 177777 016700 MOV # -1, @BC
007744 042770 125252 016710 BIC @125252, @TEMP(0)
007752 023727 016700 052525 CMP @BC, @052525
007760 001401 BEQ .+4
007762 104000 HLT ;BIC FAILED
007764 104400 SCOPE

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22733	007766	012737	177777	016700	MOV	#-1,%0		
22734	007774	012700	177772		MOV	#-6,%0		
22735	010000	012701	177772		MOV	#-6,%1		
22736	010004	047071	016666	016710	BIC	3A(0),TEMP(1)		
22737	010018	022737	052525	016700	CMP	#052525,%0		
22738	010020	001401			BEQ	.+4		
22739	010020	104000			HLT			:BIC FAILED
22740	010024	104400			SCOPE			
22741	010026	122727	000000	000001	CMPB	#0,%1		:T7 FIX
22742	010034	002401			BLT	.+4		
22743	010036	104000			HLT			:CMPB FAILED
22744	010040	104400			SCOPE			
22745	010042	012700	177770		:TEST COMPARE INSTRUCTION INDEXED			
22746	010046	126027	016666	000252	MOV	#-10,%0		:MINUS 10 TO REG 0
22747	010054	001401			CMPB	A(0),#000252		:(A INDEX BY MINUS 10) TO #125252
22748	010056	104000			BEQ	.+4		
22749	010060	104400			HLT			:COMPARE WITH INDEX FAILED
22750	010060	104400			SCOPE			
22751	010062	012700	177770		MOV	#-10,%0		:FOR INDEX
22752	010066	122760	000252	016666	CMPB	#000252,A(0)		:A INDEXED
22753	010074	001401			BEQ	.+4		
22754	010076	104000			HLT			:CMPB FAILED
22755	010100	104400			SCOPE			
22756	010102	012700	000010		MOV	#10,%0		:INDEX
22757	010106	126027	016666	000125	CMPB	A(0),#000125		
22758	010114	001401			BEQ	.+4		:CMPB FAILED
22759	010116	104000			HLT			
22760	010120	104400			SCOPE			
22761	010122	012700	000010		MOV	#10,%0		
22762	010126	122760	000125	016666	CMPB	#000125,A(0)		
22763	010134	001401			BEQ	.+4		:CMPB FAILED
22764	010136	104000			HLT			
22765	010140	104400			SCOPE			
22766	010142	012700	177770		MOV	#-10,%0		
22767	010146	126060	016666	016666	CMPB	A(0),A(0)		
22768	010154	001401			BEQ	.+4		:CMPB FAILED
22769	010156	104000			HLT			
22770	010160	104400			SCOPE			
22771	010162	012700	000010		MOV	#+10,%0		
22772	010166	126060	016666	016666	CMPB	A(0),A(0)		
22773	010174	001401			BEQ	.+4		:CMPB FAILED
22774	010176	104000			HLT			
22775	010200	104400			SCOPE			
22776	010202	012700	177770		MOV	#-10,%0		
22777	010206	012701	000004		MOV	#+4,%1		
22778	010212	126061	016666	016666	CMPB	A(0),A(1)		
22779	010220	001401			BEQ	.+4		:CMPB FAILED
22780	010222	104000			HLT			
22781	010224	104400			SCOPE			

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2329 010226 126160 016666 016666      CMPB  A(1),A(0)
2330 010234 001401      BEQ   .+4
2331 010236 104000      HLT
2332 010240 104400      SCOPE      ;CMPB FAILED
2333
2334 010242 012700 177774      MOV   #-4,%0
2335 010244 012701 000010      MOV   #+10,%1
2336 010246 126061 016666 016666      CMPB  A(0),A(1)
2337 010250 001401      BEQ   .+4
2338 010252 104000      HLT
2339 010254 104400      SCOPE      ;CMPB FAILED
2340
2341 010256 012700 177774      MOV   #-4,%0
2342 010258 012701 000010      MOV   #+10,%1
2343 010260 126160 016666 016666      CMPB  A(1),A(0)
2344 010304 001401      BEQ   .+4
2345 010306 104000      HLT
2346 010310 104400      SCOPE      ;CMPB FAILED
2347
2348                                     ;TEST MOVE INSTRUCTION FOR INDEX
2349
2350 010312 012700 177770      MOV   #-10,%0
2351 010316 116067 016666 006364      MOVB  A(0),TEMP
2352 010324 126727 006360 000252      CMPB  TEMP,#000252
2353 010332 001401      BEQ   .+4
2354 010334 104000      HLT
2355 010336 104400      SCOPE      ;MOVB FAILED
2356
2357 010340 012700 000010      MOV   #+10,%0
2358 010344 116067 016666 006336      MOVB  A(0),TEMP
2359 010352 126727 006332 000125      CMPB  TEMP,#000125
2360 010360 001401      BEQ   .+4
2361 010362 104000      HLT
2362 010364 104400      SCOPE      ;MOVB FAILED
2363
2364 010366 012700 177770      MOV   #-10,%0
2365 010372 112760 125252 016710      MOVB  #125252,TEMP(0)
2366 010400 123727 016700 125252      CMPB  @C,#125252
2367 010406 001401      BEQ   .+4
2368 010410 104000      HLT
2369 010412 104400      SCOPE      ;MOVB FAILED
2370
2371 010414 012700 000010      MOV   #+10,%0
2372 010420 112760 052525 016710      MOVB  #052525,TEMP(0)
2373 010426 123727 016720 052525      CMPB  @TEMP+10,#052525
2374 010434 001401      BEQ   .+4
2375 010436 104000      HLT
2376 010440 104400      SCOPE      ;MOVB FAILED
2377
2378                                     ;TEST BIC INSTRUCTION FOR INDEXING
2379
2380 010442 012767 177777 006240      MOV   #-1,TEMP
2381 010450 012700 177770      MOV   #-10,%0
2382 010454 146067 016666 006226      BICB  A(0),TEMP
2383 010462 126727 006222 177525      CMPB  TEMP,#177525
2384 010470 001401      BEQ   .+4
2385 010472 104000      HLT
2386                                     ;BICB FAILED

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2345	010474	104400			SCOPE		
2346	010476	012767	177777	006204	MOV	#-1,TEMP	
2347	010504	012700	000010		MOV	#10,%0	
2348	010510	146067	016666	006172	BICB	D(0),TEMP	
2349	010516	126727	006166	007652	CMPB	TEMP,#007652	
2350	010524	001401			BEQ	.+4	
2351	010526	104000			HLT		:BICB FAILED
2352	010530	104400			SCOPE		
2353	010532	012737	177777	016720	MOV	#-1,@TEMP+10	
2354	010540	012700	000010		MOV	#10,%0	
2355	010544	142760	125252	016710	BICB	#125252,TEMP(0)	
2356	010552	123727	016720	002525	CMPB	@TEMP+10,#2525	
2357	010560	001401			BEQ	.+4	
2358	010562	104000			HLT		:BICB FAILED
2359	010564	104400			SCOPE		
2360	010566	012700	177770		MOV	#-10,%0	
2361	010572	012767	177777	006100	MOV	#-1,TEMP-10	
2362	010600	142767	052525	006072	BICB	#052525,TEMP-10	
2363	010606	126727	006066	125252	CMPB	TEMP-10,#125252	
2364	010614	001401			BEQ	.+4	
2365	010616	104000			HLT		:BICB FAILED
2366	010620	104400			SCOPE		
2367							
2368							
2369							
2370							
2371							
2372	010622	012737	177777	016710	:TEST UNARYS INDEXED	MOV	#-1,@TEMP
2373	010630	012700	177770		MOV	#-10,%0	
2374	010634	105060	016720		CLRB	D(0)	
2375	010640	105737	016710		TSTB	@TEMP	
2376	010644	001401			BEQ	.+4	
2377	010646	104000			HLT		:CLRB FAILED
2378	010650	104400			SCOPE		
2379							
2380	010652	012737	177777	016710	MOV	#-1,@TEMP	
2381	010660	012700	177770		MOV	#-10,%0	
2382	010664	105060	016720		CLRB	D(0)	
2383	010670	023727	016710	177400	CMP	@TEMP,#177400	
2384	010676	001401			BEQ	.+4	
2385	010700	104000			HLT		:CLRB FAILED
2386	010702	104400			SCOPE		
2387							
2388	010704	012737	177777	016710	MOV	#-1,@TEMP	
2389	010712	012700	177771		MOV	#-7,%0	
2390	010716	105060	016720		CLRB	D(0)	
2391	010722	023727	016710	000377	CMP	@TEMP,#000377	
2392	010730	001401			BEQ	.+4	
2393	010732	104000			HLT		:CLRB FAILED
2394	010734	104400			SCOPE		
2395							
2396	010736	012737	177777	016710	MOV	#-1,@TEMP	
2397	010744	012700	000010		MOV	#+10,%0	
2398	010750	105060	016700		CLRB	C(0)	
2399	010754	105737	016710		TSTB	@TEMP	
2400	010760	001401			BEQ	.+4	

010762	104000			HLT				:CLRB FAILED
010764	104400			SCOPE				
010766	012737	177777	016710	MOV	#-1,@TEMP			
010774	012700	177770		MOV	#-10,%0			
011000	105160	016720		COMB	D(0)			
011004	105737	016710		TSTB	@TEMP			
011010	001401			BEQ	+.4			
011012	104000			HLT				:COMB FAILED
011014	104400			SCOPE				
011016	012737	177777	016710	MOV	#-1,@TEMP			
011024	012700	000010		MOV	#10,%0			
011030	105160	016700		COMB	C(0)			
011034	105737	016710		TSTB	@TEMP			
011040	001401			BEQ	+.4			
011042	104000			HLT				:COMB FAILED
011044	104400			SCOPE				
011046	012737	177777	016710	MOV	#-1,@TEMP			
011054	012700	177770		MOV	#-10,%0			
011060	105260	016720		INCB	D(0)			
011064	105737	016710		TSTB	@TEMP			
011070	001401			BEQ	+.4			
011072	104000			HLT				:INCB FAILED
011074	023727	016710	177400	CMP	@TEMP,#177400			
011102	001401			BEQ	+.4			
011104	104000			HLT				:INCB FAILED
011106	104400			SCOPE				
011110	012737	177777	016710	MOV	#-1,@TEMP			
011116	012700	000010		MOV	#+10,%0			
011122	105260	016700		INCB	C(0)			
011126	105737	016710		TSTB	@TEMP			
011132	001401			BEQ	+.4			
011134	104000			HLT				:INCB FAILED
011136	104400			SCOPE				
011140	012737	000001	016710	MOV	#1,@TEMP			
011146	012700	177770		MOV	#-10,%0			
011152	105360	016720		DECB	D(0)			
011156	105737	016710		TSTB	@TEMP			
011162	001401			BEQ	+.4			
011164	104000			HLT				:DECB FAILED
011166	104400			SCOPE				
011170	012737	000001	016710	MOV	#1,@TEMP			
011176	012700	000010		MOV	#10,%0			
011202	105360	016700		DECB	C(0)			
011206	105737	016710		TSTB	@TEMP			
011212	001401			BEQ	+.4			
011214	104000			HLT				:DECB FAILED
011216	104400			SCOPE				
011220	012737	000001	016710	MOV	#1,@TEMP			
011226	012700	177770		MOV	#-10,%0			
011232	105460	016720		NEGB	D(0)			

011236	023727	016710	000377	CMP	2@TEMP, #377	
011244	001401			BEQ	+.4	
011246	104000			HLT		:NEGB FAILED
011250	104400			SCOPE		
011252	012737	000001	016710	MOV	#1, 2@TEMP	
011254	012700	000010		MOV	#+10, %0	
011256	105460	016700		NEGB	C(0)	
011270	023727	016710	000377	CMP	2@TEMP, #377	
011272	001401			BEQ	+.4	
011274	104000			HLT		:NEGB FAILED
011302	104400			SCOPE		
011304	012737	177777	016710	MOV	#-1, 2@TEMP	
011312	012700	177770		MOV	#-10, %0	
011314	000261			SEC		
011320	105560	016720		ADCB	D(0)	
011324	023727	016710	177400	CMP	2@TEMP, #177400	
011326	001401			BEQ	+.4	
011328	104000			HLT		:ADCB FAILED
011336	104400			SCOPE		
011340	012737	177777	016710	MOV	#-1, 2@TEMP	
011342	012700	000010		MOV	#+10, %0	
011344	000261			SEC		
011354	105560	016700		ADCB	C(0)	
011360	023727	016710	177400	CMP	2@TEMP, #177400	
011362	001401			BEQ	+.4	
011370	104000			HLT		:ADCB FAILED
011372	104400			SCOPE		
011374	012737	000401	016710	MOV	#401, 2@TEMP	
011402	012700	177771		MOV	#-7, %0	
011404	000261			SEC		
011410	105560	016720		SBCB	D(0)	
011414	022737	000001	016710	CMP	#1, 2@TEMP	
011422	001401			BEQ	+.4	
011424	104000			HLT		:SBCB FAILED
011426	104400			SCOPE		
011430	012737	000001	016710	MOV	#1, 2@TEMP	
011432	012700	000010		MOV	#+10, %0	
011442	000261			SEC		
011444	105560	016700		SBCB	C(0)	
011450	005737	016710		TST	2@TEMP	
011454	001401			BEQ	+.4	
011456	104000			HLT		:SBCB FAILED
011460	104400			SCOPE		
				:TEST INDIRECT ADDRESSING		
				:TEST COMPARE INSTRUCTION		
011462	123727	016656	000252	CMPB	2@B, #000252	
011470	001401			BEQ	+.4	
011472	104000			HLT		:CMPB FAILED
011474	104400			SCOPE		

2513	011476	123727	016657	000252	CMPB	2#B+1, #252	
2514	011504	001401			BEQ	.+4	
2515	011506	104000			HLT		:CMPB FAILED
2516	011510	104400			SCOPE		
2517							
2518	011512	122737	125252	016656	CMPB	#125252, 2#B	
2519	011520	001401			BEQ	.+4	
2520	011522	104000			HLT		:CMPB FAILED
2521	011524	104400			SCOPE		
2522							
2523	011526	123737	016656	016656	CMPB	2#B, 2#B	
2524	011534	001401			BEQ	.+4	
2525	011536	104000			HLT		:CMPB FAILED
2526	011540	104400			SCOPE		
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:TEST MOVE INSTRUCTIONS

2542	011542	113700	016656		MOV	2#B, %0	
2543	011544	122700	000252		CMP	#000252, %0	
2544	011552	001401			BEQ	.+4	
2545	011554	104000			HLT		:MOV FAILED
2546	011556	104400			SCOPE		

2537	011560	112737	125252	016710	MOV	#125252, 2#TEMP	
2538	011566	126737	005064	016710	CMP	B, 2#TEMP	
2539	011574	001401			BEQ	.+4	
2540	011576	104000			HLT		:MOV FAILED
2541	011600	104400			SCOPE		

2543	011602	113737	016656	016700	MOV	2#B, 2#C	
2544	011610	126737	005042	016700	CMP	B, 2#C	
2545	011616	001401			BEQ	.+4	
2546	011620	104000			HLT		:MOV FAILED
2547	011622	104400			SCOPE		

:TEST UNARYS INDIRECT

2548	011624	012737	177777	016710	MOV	#-1, 2#TEMP	
2549	011632	105037	016710		CLRB	2#TEMP	
2550	011636	023727	016710	177400	CMP	2#TEMP, #177400	
2551	011644	001401			BEQ	.+4	
2552	011646	104000			HLT		:CLRB FAILED
2553	011650	104400			SCOPE		

2555	011652	012737	125252	016710	MOV	#125252, 2#TEMP	
2556	011660	105137	016710		COMB	2#TEMP	
2557	011664	022737	125125	016710	CMP	#125125, 2#TEMP	
2558	011672	001401			BEQ	.+4	
2559	011674	104000			HLT		:COMB FAILED
2560	011676	104400			SCOPE		

2562	011700	012737	125252	016710	MOV	#125252, 2#TEMP	
2563	011706	105137	016711		COMB	2#TEMP+1	
2564	011712	022737	052652	016710	CMP	#052652, 2#TEMP	
2565	011720	001401			BEQ	.+4	
2566	011722	104000			HLT		:COMB FAILED
2567	011724	104400			SCOPE		



2669	011726	005037	016710		CLR	@TEMP	
2670	011732	105337	016711		INCB	@TEMP+1	
2671	011736	022737	000400	016710	CMP	@400,@TEMP	
2672	011744	001401			BEQ	+.4	
2673	011746	104000			HLT		:INCB FAILED
2674	011750	104400			SCOPE		
2675	011752	005037	016710		CLR	@TEMP	
2676	011756	105377	004730		DECB	@TEMP+2	
2677	011762	023727	016710	000377	CMP	@TEMP,@377	
2678	011770	001401			BEQ	+.4	
2679	011772	104000			HLT		:DECB FAILED
2680	011774	104400			SCOPE		
2681	011776	005037	016710		CLR	@TEMP	
2682	012002	112737	000001	016711	MOVB	@1,@TEMP+1	
2683	012010	105437	016711		NEGB	@TEMP+1	
2684	012014	022737	177400	016710	CMP	@177400,@TEMP	
2685	012022	001401			BEQ	+.4	
2686	012024	104000			HLT		:NEGB FAILED
2687	012026	104400			SCOPE		
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:TEST INDIRECT ADDRESSING WITH INDEXING

:TEST COMPARE INSTRUCTION

012030	127727	004624	125252		CMPB	@B+2,@125252	
012036	001401				BEQ	+.4	
012040	104000				HLT		:CMPB FAILED
012042	104400				SCOPE		

012044	122777	125252	004606		CMPB	@125252,@B+2	
012052	001401				BEQ	+.4	
012054	104000				HLT		:CMPB FAILED
012056	104400				SCOPE		

012060	127777	004574	004572		CMPB	@B+2,@B+2	
012066	001401				BEQ	+.4	
012070	104000				HLT		:CMPB FAILED
012072	104400				SCOPE		

:TEST MOVE INSTRUCTIONS

012074	117700	004560			MOVB	@B+2,%0	
012100	122700	125252			CMPB	@125252,%0	
012104	001401				BEQ	+.4	
012106	104000				HLT		:MOVB FAILED
012110	104400				SCOPE		

012112	112777	125252	004572		MOVB	@125252,@TEMP+2	
012120	126737	004532	016710		CMPB	B,@TEMP	
012126	001401				BEQ	+.4	
012130	104000				HLT		:MOVB FAILED
012132	104400				SCOPE		

012134	117777	004520	004540		MOVB	@B+2,@C+2	
012142	126737	004510	016700		CMPB	B,@C	
012150	001401				BEQ	+.4	
012152	104000				HLT		:MOVB FAILED
012154	104400				SCOPE		

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012156	012700	177777			MOV	#-1,%0	
012162	147700	004472			BICB	@B+2,%0	
012166	120027	052525			CMPB	%0,#52525	
012172	001401				BEQ	+.4	
012174	104000				HLT		:BICB FAILED
012176	104400				SCOPE		
012200	012737	177777	016710		MOV	#-1,@TEMP	
012206	142777	125252	004476		BICB	@125252,@TEMP+2	
012214	122737	052525	016710		CMPB	@52525,@TEMP	
012222	001401				BEQ	+.4	
012224	104000				HLT		:BICB FAILED
012226	104400				SCOPE		
012230	012737	177777	016700		MOV	#-1,@BC	
012236	147777	004416	004436		BICB	@B+2,@C+2	
012244	126737	004426	016700		CMPB	A+10,@BC	
012252	001401				BEQ	+.4	
012254	104000				HLT		:BICB FAILED
012256	104400				SCOPE		
012260	012737	177777	016710		MOV	#-1,@TEMP	
012266	105077	004420			CLRB	@TEMP+2	
012272	105737	016710			TSTB	@TEMP	
012276	001401				BEQ	+.4	
012300	104000				HLT		:CLRB FAILED
012302	104400				SCOPE		
012304	012737	125252	016710		MOV	@125252,@TEMP	
012312	105177	004374			COMB	@TEMP+2	
012316	122737	052525	016710		CMPB	@052525,@TEMP	
012324	001401				BEQ	+.4	
012326	104000				HLT		:COMB FAILED
012330	104400				SCOPE		
012332	005037	016710			CLR	@TEMP	
012336	105277	004350			INCB	@TEMP+2	
012342	122737	000001	016710		CMPB	@1,@TEMP	
012350	001401				BEQ	+.4	
012352	104000				HLT		:INCB FAILED
012354	104400				SCOPE		
012356	005037	016710			CLR	@TEMP	
012362	105377	004324			DECB	@TEMP+2	
012366	123727	016710	177777		CMPB	@TEMP,#-1	
012374	001401				BEQ	+.4	
012376	104000				HLT		:DECB FAILED
012400	104400				SCOPE		
012402	012737	000001	016710		MOV	@1,@TEMP	
012410	105477	004276			NEGB	@TEMP+2	
012414	122737	177777	016710		CMPB	@-1,@TEMP	
012422	001401				BEQ	+.4	
012424	104000				HLT		:NEGB FAILED

:TEST BIC INSTRUCTION INDIRECT WITH INDEXING

:TEST UNARYS INDIRECT WITH INDEXING

2681	012426	104400			SCOPE	
2682	012430	012737	177777	016710	MOV	#-1,@TEMP
2683	012436	000261			SEC	
2684	012440	105577	004246		ADCB	@TEMP+2
2685	012444	022737	177400	016710	CMP	#177400,@TEMP
2686	012450	001401			BEQ	+.4
2687	012454	104000			HLT	;ADCB FAILED
2688	012456	105737	016710		TSTB	@TEMP
2689	012462	001401			BEQ	+.4
2690	012464	104000			HLT	;TSTB FAILED
2691	012466	104400			SCOPE	
2692	012470	012737	000001	016710	MOV	#1,@TEMP
2693	012476	000261			SEC	
2694	012500	105377	004206		DECB	@TEMP+2
2695	012504	005737	016710		TST	@TEMP
2696	012510	001401			BEQ	+.4
2697	012512	104000			HLT	;DECB FAILED
2698	012514	104400			SCOPE	
2701						
2702						;TEST OF COMBINED INDEXING AND INDIRECT
2703	012516	012700	177772		MOV	#-6,%0
2704	012522	127027	016666	125252	CMPB	@A(0),#125252
2705	012530	001401			BEQ	+.4
2706	012532	104000			HLT	;CMPB FAILED
2707	012534	104400			SCOPE	
2708						
2709	012536	012700	177772		MOV	#-6,%0
2710	012542	122770	125252	016666	CMPB	@125252,@A(0)
2711	012550	001401			BEQ	+.4
2712	012552	104000			HLT	;CMPB FAILED
2713	012554	104400			SCOPE	
2714						
2715	012556	012700	177772		MOV	#-6,%0
2716	012562	012701	000002		MOV	#+2,%1
2717	012566	127071	016666	016666	CMPB	@A(0),@A(1)
2718	012574	001401			BEQ	+.4
2719	012576	104000			HLT	;CMPB FAILED
2720	012600	104400			SCOPE	
2721						;TEST BIC INSTRUCTION
2722	012602	012700	000006		MOV	#+6,%0
2723	012606	012767	177777	004074	MOV	#-1,TEMP
2724	012614	147067	016666	004066	BICB	@A(0),TEMP
2725	012622	122767	125252	004060	CMPB	#125252,TEMP
2726	012630	001401			BEQ	+.4
2727	012632	104000			HLT	;BICB FAILED
2728	012634	104400			SCOPE	
2729						
2730	012636	012700	177772		MOV	#-6,%0
2731	012642	012737	177777	016700	MOV	#-1,@#C
2732	012650	142770	125252	016710	BICB	#125252,@TEMP(0)
2733	012656	123727	016700	000125	CMPB	@#C,#000125
2734	012664	001401			BEQ	+.4
2735	012666	104000			HLT	;BICB FAILED
2736	012670	104400			SCOPE	

```

2737 012672 012700 016660 MOV #B+2,%0 ;ADDRESS OF ADDRESS OF B
2738 012676 023067 003754 CMP @-(0),B
2739 012702 001401 BEQ .+4
2740 012704 104000 HLT ;CMP FAILED
2741 012706 104400 SCOPE
2742
2743
2744 012710 012700 016662 MOV #B+4,%0
2745 012714 025067 003736 CMP @-(0),B
2746 012720 001401 BEQ .+4
2747 012722 104000 HLT ;CMP FAILED
2748 012724 104400 SCOPE
2749
2750 012726 012700 016662 MOV #B+4,%0
2751 012732 125067 003720 CMPB @-(0),B
2752 012736 001401 BEQ .+4
2753 012740 104000 HLT ;CMPB FAILED
2754 012742 104400 SCOPE
2755
2756 012744 012700 016704 MOV #C+4,%0
2757 012750 012737 177777 016700 MOV #-1,@#C
2758 012756 105050 CLRB @-(0)
2759 012760 023727 016700 177400 CMP @#C,#177400
2760 012766 001401 BEQ .+4
2761 012770 104000 HLT ;CLRB FAILED
2762 012772 104400 SCOPE
2763 012774 012737 177777 016700 MOV #-1,@#C
2764 013002 012700 177772 MOV #-6,%0
2765 013006 012701 177772 MOV #-6,%1
2766 013012 147071 016666 016710 BICB @A(0),@TEMP(1)
2767 013020 022737 177525 016700 CMP #177525,@#C
2768 013026 001401 BEQ .+4
2769 013030 104000 HLT ;BICB FAILED
2770 013032 104400 SCOPE
2771 ;TEST THAT RD IS NOT DESTROYED BY FALSE SELECTION
2772 013034 012700 052525 MOV #52525,%0 ;THIS IS CHECK LATER IN PROGRAM
2773 ;TEST JSR INSTRUCTION
2774
2775 013040 004767 000002 TJSR1: JSR %7,TJSR2 ;PLACE PC ON STACK
2776 013044 000405 TJSR2: BR TJSR3 ;RETURN HERE ON RTS %7
2777 013046 121627 013044 TJSR2: CMPB @%6,#TJSR1 ;CHECK FOR CORRECT PC ON STACK
2778 013052 001401 BEQ .+4
2779 013054 104000 HLT ;INCORRECT PC ON STACK
2780 013056 000207 TJSR3: RTS %7 ;RETURN TO INST AFTER JSR
2781 013060 104400 SCOPE
2782
2783 013062 000257 CCC
2784 013064 004717 JSR %7,@%7 ;INSTRUCTION UNDER TEST
2785 013066 121627 013066 CMPB @%6,#TJSR3+6 ;TEST THE STACK
2786 013072 001401 BEQ .+4
2787 013074 104000 HLT ;PC OF JSR DID NOT GO TO STACK
2788 013076 005726 TST (6)+ ;REPOSITION THE STACK
2789 013100 104400 SCOPE
2790 ;TEST NESTED SUBROUTINES
2791
2792 013102 000257 CCC ;CLEAR CONDITION CODES
  
```

2793	013104	004767	003366	JSR	%7, SUBR6			
2794	013110	100401		BMI	.+4			
2795	013112	104000		HLT			;JSR OR RTS FAILED	
2796	013114	001401		BEQ	.+4			
2797	013116	104000		HLT			;JSR OR RTS FAILED	
2798	013120	102401		BVS	.+4			
2799	013122	104000		HLT			;JSR OR RTS FAILED	
2800	013124	103401		BCS	.+4			
2801	013126	104000		HLT			;JSR OR RTS FAILED	
2802	013130	104400		SCOPE				
2803				;TEST ROTATE ODD BYTE				
2804	013132	104400		SCOPE				
2805	013134	000257		CCC			;CLEAR "C"	
2806	013136	012767	123456	MOV	#123456, TEMP			
2807	013144	106067	003541	RORB	TEMP+1		;ROTATE ODD BYTE	
2808	013150	103401		BCS	.+4			
2809	013152	104000		HLT			;C NOT SET	
2810	013154	102401		BVS	.+4			
2811	013156	104000		HLT			;V NOT SET	
2812	013160	022767	051456	CMP	#051456, TEMP			
2813	013166	001401		BEQ	.+4			
2814	013170	104000		HLT			;ROTATE FAILED	
2815	013172	104400		SCOPE				
2816	013174	000277		SCC			;SET C	
2817	013176	012767	123456	MOV	#123456, TEMP			
2818	013204	106067	003501	RORB	TEMP+1			
2819	013210	103401		BCS	.+4			
2820	013212	104000		HLT			;C NOT SET	
2821	013214	102001		BVC	.+4			
2822	013216	104000		HLT			;V NOT CLEARED	
2823	013220	022767	151456	CMP	#151456, TEMP			
2824	013226	001401		BEQ	.+4			
2825	013230	104000		HLT			;ROTATE FAILED	
2826	013232	104400		SCOPE				
2827								
2828	013234	000257		CCC				
2829	013236	012767	123456	MOV	#123456, TEMP			
2830	013244	106167	003441	ROLB	TEMP+1			
2831	013250	103401		BCS	.+4			
2832	013252	104000		HLT			;C NOT SET	
2833	013254	102401		BVS	.+4			
2834	013256	104000		HLT			;V NOT SET	
2835	013260	022767	047056	CMP	#047056, TEMP			
2836	013266	001401		BEQ	.+4			
2837	013270	104000		HLT			;ROTATE BYTE FAILED	
2838	013272	104400		SCOPE				
2839								
2840	013274	000277		SCC			;SET C	
2841	013276	012767	123456	MOV	#123456, TEMP			
2842	013304	106167	003401	ROLB	TEMP+1			
2843	013310	103401		BCS	.+4			
2844	013312	104000		HLT			;C NOT SET	
2845	013314	102401		BVS	.+4			
2846	013316	104000		HLT			;V NOT SET	
2847	013320	022767	047456	CMP	#047456, TEMP			
2848	013326	001401	003362	BEQ	.+4			

```

2849 013330 104000 HLT ;ROTATE ODD BYTE FAILED
2850 013332 104400 SCOPE
2851 013334 000257 CCC ;CLEAR C
2852 013336 012767 177777 003344 MOV B-1 TEMP
2853 013338 105267 003341 ASRB TEMP+1
2854 013340 103401 BCS .+4
2855 013342 104000 HLT ;C NOT SET
2856 013344 102001 BVC .+4 ;V NOT CLEARED
2857 013346 104000 HLT
2858 013348 026727 003324 177777 CMP TEMP,B-1
2859 013350 001401 BEQ .+4
2860 013352 104000 HLT ;SHIFT FAILED
2861 013372 104400 SCOPE
2862 013374 000277 SCC
2863 013376 012767 177777 003304 MOV B-1 TEMP
2864 013404 105367 003301 ASLB TEMP+1
2865 013410 103401 BCS .+4
2866 013412 104000 HLT ;C NOT SET
2867 013414 102001 BVC .+4 ;V NOT CLEARED
2868 013416 104000 HLT
2869 013420 026727 003264 177377 CMP TEMP,B177377
2870 013422 001401 BEQ .+4
2871 013424 104000 HLT ;SHIFT BYTE FAILED
2872 013430 104000 HLT
2873 013432 104400 SCOPE
2874 ;TEST COMBINATION OF N, C AND V
2875 .MACR TNCV
2876 BPL .+12
2877 BCC .+20
2878 BVC .+30
2879 HLT
2880 BR .+24
2881 BCC .+16
2882 BVS .+20
2883 HLT
2884 BR .+14
2885 BVS .+12
2886 HLT
2887 BR .+6
2888 BVC .+4
2889 HLT
2890 SCOPE
2891 .ENDM
2892 013434 005037 016440 CLR @BICOUNT ;NO ITERATION
2893 ;TEST ROTATING NUMBERS
2894 013440 104400 SCOPE
2895 013442 012767 177777 000142 MOV B-1 REFF ;INITIALIZE BASE NUMBER
2896 013450 005267 000136 TSROT: INC REFF ;INCREMENT NUMBER
2897 013454 004767 000012 JSR %7 ROTALL ;GO TO COMPARE ROUTINE
2898 013460 026727 000126 100077 CMP REFF,B100077 ;TEST ALL VALUES
2899 013466 001370 BNE TSROT ;NO TEST THEM ALL
2900 013470 000452 BR TSRT2A ;WE ARE DONE
2901
2902
2903
2904 013472 016767 000114 000114 ROTALL: MOV REFF,TEST

```

Address	Hex	Hex	Hex	Hex	Hex	Instruction	Comments
000000	000110	000110	000110	000110	000110	ROL	TEST
000001	000104	000104	000104	000104	000104	ROL	TEST
000002	000100	000100	000100	000100	000100	ROL	TEST
000003	000074	000074	000074	000074	000074	ROL	TEST
000004	000070	000070	000070	000070	000070	ROL	TEST
000005	000064	000064	000064	000064	000064	ROL	TEST
000006	000060	000060	000060	000060	000060	ROL	TEST
000007	000054	000054	000054	000054	000054	ROL	TEST
000008	100004	100004	100004	100004	100004	TNCV	
000009	103007	103007	103007	103007	103007	BPL	:+12
000010	102013	102013	102013	102013	102013	BCC	:+30
000011	104000	104000	104000	104000	104000	BVC	:+30
000012	000411	000411	000411	000411	000411	HLT	
000013	103006	103006	103006	103006	103006	BR	:+24
000014	102407	102407	102407	102407	102407	BCC	:+16
000015	104000	104000	104000	104000	104000	BVS	:+20
000016	000405	000405	000405	000405	000405	HLT	
000017	104000	104000	104000	104000	104000	BR	:+14
000018	000402	000402	000402	000402	000402	BR	:+6
000019	102001	102001	102001	102001	102001	BVC	:+4
000020	104000	104000	104000	104000	104000	HLT	
000021	104000	104000	104000	104000	104000	HLT	
000022	026767	000012	000006	000012	000006	SCOPE	TEST, REFF
000023	001401	001401	001401	001401	001401	BEQ	:+4
000024	104000	104000	104000	104000	104000	HLT	
000025	000207	000207	000207	000207	000207	RTS	%7
000026	000000	000000	000000	000000	000000	O	
000027	000000	000000	000000	000000	000000	O	
000028	013612	013612	013612	013612	013612	REF=REFF	
000029	012767	177777	177766	012767	177766	TSROT2A: MOV	:TEST ROTATING BYTE EVEN/ODD, ALL NUMBERS
000030	005267	177762	177762	005267	177762	TSROT2: INC	8-1 REFF
000031	004767	000016	000016	004767	000016	JSR	%7, ROTBE
000032	004767	000122	000122	004767	000122	JSR	%7, ROTBO
000033	022767	177777	177744	022767	177744	CHP	8-1 REFF
000034	001366	001366	001366	001366	001366	BNE	TSROT2
000035	000505	000505	000505	000505	000505	BR	ROTEB1
000036	016767	177734	177734	016767	177734	ROTBE: MOV	REFF, TEST
000037	106067	177730	177730	106067	177730	RORB	TEST
000038	106067	177724	177724	106067	177724	RORB	TEST
000039	106067	177720	177720	106067	177720	RORB	TEST
000040	106167	177714	177714	106167	177714	ROLB	TEST
000041	106167	177710	177710	106167	177710	ROLB	TEST
000042	106167	177704	177704	106167	177704	ROLB	TEST
000043	100004	100004	100004	100004	100004	TNCV	
000044	103007	103007	103007	103007	103007	BPL	:+12
000045	102013	102013	102013	102013	102013	BCC	:+30
000046	104000	104000	104000	104000	104000	BVC	:+30
000047	000411	000411	000411	000411	000411	HLT	
000048	103006	103006	103006	103006	103006	BR	:+24
000049	102407	102407	102407	102407	102407	BCC	:+16
000050	104000	104000	104000	104000	104000	BVS	:+20
000051	000405	000405	000405	000405	000405	HLT	
000052	000405	000405	000405	000405	000405	BR	:+14

```

:Z=1
:Z=1, C=1
:Z=C, BUT V=1

:Z=0
:Z=0, C=1
:Z NOT EQUAL C, V=1

:Z=1, C=0
:Z NOT EQUAL C, V=1

:Z=0, C=0
:Z=C, BUT V=1

:INITIAL NOT EQUAL TO FINAL
:ROTATE WORD FAILED
:GOOD DATA
:BAD DATA

```

```

:ROTATE BYTE EVEN

```

```

:Z=1
:Z=1, C=1
:Z=C, BUT V=1

:Z=0
:Z=0, C=1
:Z NOT EQUAL C, V=1

```

991	013738	102404		BVS	+.12	:Z=1, C=0
992	013739	104000		HLT		:Z NOT EQUAL C, V=1
993	013740	000402		BR	+.6	
994	013741	102001		BVC	+.4	:Z=0, C=0
995	013742	104000		HLT		:Z=C, BUT V=1
996	013743	104000		SCOPE		
997	013744	026767	177642 177636	CMP	TEST, REFF	
998	013745	001401		BEG	+.4	
999	013746	104000		HLT		
990	013747	000207		RTS	%7	
991	013748	106067	177627	ROTBO:	TEST+1	:ROTATE BYTE ODD
992	013749	106067	177623	RORB	TEST+1	
993	013750	106067	177617	RORB	TEST+1	
994	013751	106067	177617	RORB	TEST+1	
995	013752	106167	177613	ROLB	TEST+1	
996	014000	106167	177607	ROLB	TEST+1	
997	014000	106167	177603	ROLB	TEST+1	
998	014012	100004		TNCV		
999	014014	103007		BPL	+.12	:Z=1
990	014014	103007		BCC	+.20	:Z=1, C=1
991	014016	102013		BVC	+.30	:Z=C, BUT V=1
992	014020	104000		HLT		
993	014020	000411		BR	+.24	
994	014026	103006		BCC	+.16	:Z=0
995	014026	102407		BVS	+.20	:Z=0, C=1
996	014030	104000		HLT		:Z NOT EQUAL C, V=1
997	014030	000405		BR	+.14	
998	014034	102404		BVS	+.12	:Z=1, C=0
999	014036	104000		HLT		:Z NOT EQUAL C, V=1
990	014040	000402		BR	+.6	
991	014042	102001		BVC	+.4	:Z=0, C=0
992	014044	104000		HLT		:Z=C, BUT V=1
993	014046	104400		SCOPE		
994	014050	026767	177540 177534	CMP	TEST, REFF	
995	014056	001401		BEG	+.4	
996	014060	104000		HLT		
997	014062	000207		RTS	%7	



2997	014064	104400	
2998			
2999	014066	005227	177776
3000	014072	100002	
3001	014074	000167	000632
3002			
3003			
3004	014100	011667	000072
3005	014104	012767	000001 177500
3006	014112	005267	177474

```

ROTENI: SCOPE
:WILL ALLOW TWO FAST PASSES
      INC      #177776
      BPL      +6
      JMP      ERESRT
:ADD AND SUBTRACT ALL NUMBERS AGAINST FIXED NUMBERS
:A+B=C, C-A=B, BF SHOULD EQUAL BI
↑STARI: MOV    2*6, NUMA
      MOV    #1, REF
ARITST: INC    REF

```

```

3007 014116 004767 000014      ISB      %7,ADSUB
3008 014122 022767 177777 177462    CMP      8-1,REF
3009 014130 001370      BNE      ARI1ST
3010 014132 000422      BR       ARIEND
3011 014134 104400      SCOPE
3012 014136 016767 177450 177450  ADSUB:  MOV     REF,TEST
3013 014142 066767 000026 177442      ADD     NUMA,TEST
3014 014144 166767 000020 177434      SUB     NUMA,TEST
3015 014152 026767 177426 177426      CMP     REF,TEST
3016 014160 001401      BEQ     .+4
3017 014170 104000      HLT
3018 014172 104400      SCOPE
3019 014174 000207      RTS     %7
3020 014176 000000      NUMA:  0
3021 014200 104400      ARIEND:SCOPE

;TEST ALL COMBINATIONS OF NUMBERS WITH COMPARE INSTRUCTION
COMPAR: CLR     %2      ;INIT %2
        CLR     %1      ;INIT %1
CMP1:   CMP     %2,%1   ;ARE THE EQUAL
        BEQ     .+4
        HLT
        CMP     %2,8-1 ;R0 AND R1 DID NOT COMPARE
        BEQ     CMP2    ;AT UPPER LIMIT
        INC     %2      ;YES EXIT
        INC     %1      ;INCREMENT TO NEXT NUMBER
        BR     CMP1
CMP2:   SCOPE
;TEST COMPLIMENTING ALL NUMBERS
TCOM:   CLR     TEMP    ;BASE DATA
        CLR     TEMP+4  ;BASE REFERENCE
        COM     TEMP    ;COMPLIMENT DATA
        DEC     TEMP+4  ;DECREMENT REFERENCE
        CMP     TEMP,TEMP+4 ;COMPARE
        BEQ     .+4    ;TEST
        HLT          ;COMPLIMENT OR DECREMENT FAILED
        COM     TEMP    ;INCREMENT AND TEST FOR DONE
        INC     TEMP    ;NOT FINISHED GO LOOP
        BNE    TCOM
        SCOPE

;TEST COMB (EVEN BYTE)
TCOM2:  CLR     TEMP    ;BASE DATA
        CLR     TEMP+4  ;REFERENCE DATA
        COMB    TEMP    ;COMPLIMENT DATA
        DEC     TEMP+4  ;DECREMENT REFERENCE
        CMPB   TEMP,TEMP+4 ;COMPARE
        BEQ     .+4    ;TEST
        HLT          ;COMPLIMENT OR INCREMENT BYTE FAILED
        COMB    TEMP    ;INCREMENT AND TEST FOR DONE
        INCB   TEMP    ;NOT FINISHED GO LOOP
        BNE    TCOM2
        SCOPE

;TEST COMB (ODD BYTE)
        CLR     TEMP    ;BASE DATA
        CLR     TEMP+4  ;REFERENCE DATA
    
```

```

3063 014356 105167 002327 TCOM3: COMB TEMP+1 ; ODD BYTE
3064 014358 005367 002328 DEC TEMP+4
3065 014360 126767 002319 002320 CMPB TEMP+1,TEMP+4
3066 014374 001401 BEQ .+4
3067 014376 104000 HLT ; COMPLIMENT BYTE FAILED
3068 014400 105167 002305 COMB TEMP+1
3069 014404 105267 002301 INCB TEMP+1
3070 014410 001362 BNE TCOM3
3071 014412 104400 SCOPE
3072
3073 ; TEST COMPARE ALL VALUE EVEN BYTE WITH ODD
3074 014414 005067 002270 CLR TEMP ; BASE VALUE
3075 014420 126767 002264 002263 TSCOMB: CMPB TEMP,TEMP+1 ; COMPARE
3076 014426 001401 BEQ .+4
3077 014430 104000 HLT ; COMPARE FAILED
3078 014432 002001 BGE .+4
3079 014434 104000 HLT ; V IS NOT = TO N
3080 014436 003401 BLE .+4
3081 014440 104000 HLT ; V IS SET
3082 014442 062767 000401 002240 ADD #401,TEMP
3083 014450 022767 177777 002232 CMP #-1,TEMP
3084 014456 001360 BNE TSCOMB
3085 014460 104400 SCOPE
3086 014462 012737 004000 016440 MOV #4000,#ICOUNT
3087 014470 104400 WAIT3: SCOPE
3088 014472
3089 WAIT5:
3090 014472 012737 000010 016440 MOV #10,#ICOUNT
3091
3092 ; TEST TO SEE IF I/O DEVICES WERE SELECTED
3093 014500 122737 000377 001516 CMPB #377,#REG1 ; SELECTED DEVICES STORED IN REG1
3094 014506 001404 BEQ WAIT4 ; BRANCH IF NO DEVICES SELECTED
3095 014510 000001 WAIT ; INTERRUPTS WILL OCCUR
3096 014512 000001 WAIT ; IF DEVICES ARE SELECTED
3097 014514 000001 WAIT
3098 014516 000001 WAIT
3099 014520 104400 WAIT4: SCOPE
3100 014522 012737 004000 016440 MOV #4000,#ICOUNT
3101
3102 ; TEST SWAB
3103 014530 012767 000200 177056 MOV #0200,TEST
3104 014536 000367 177052 SWAB TEST
3105 014542 100001 BPL .+4
3106 014544 104000 HLT
3107 014546 001401 BEQ .+4
3108 014550 104000 HLT
3109 014552 000367 177036 SWAB TEST
3110 014556 100401 BMI .+4
3111 014560 104000 HLT
3112 014562 001001 BNE .+4
3113 014564 104000 HLT
3114 014566 104400 SCOPE
3115 014570 005037 016440 CLR #ICOUNT
3116
3117 ; TEST ALL COMBINATIONS OF SWAB
3118 014574 005067 177014 CLR TEST ; NUMBER UNDER TEST
014600 005067 177006 CLR REF ; REFERENCE NUMBER

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3119	014604	000367	177004		SWABA: SWAB	TEST	: OPERATION UNDER TEST
3120	014610	026767	177000	176774	CMP	TEST, REF	: TEST SWAB INSTRUCTION
3121	014616	001401			BEQ	.+4	
3122	014620	104000			HLT		: SWAB FAILED
3123	014620	000367	176766		SWAB	TEST	
3124	014626	005267	176760		INC	REF	: INCREMENT REFERENCE NUMBER
3125	014632	105267	176757		INCB	TEST+1	: INC TEST NUMBER
3126	014636	001362			BNE	SWABA	: LOOP TILL DONE
3127	014640	104400			SCOPE		
3128	014642	012737	004000	016440	MOV	#4000, @ICOUNT	
3129		000240					
3130		177776					
3131							
3132	014650	012767	177777	002032	MOV	#-1, TEMP	
3133	014656	000261			SEC		
3134	014660	105567	002025		ADCB	TEMP+1	
3135	014664	103401			BCS	.+4	
3136	014666	104000			HLT		: ADCB FAILED
3137	014670	022767	000377	002012	CMP	#377, TEMP	
3138	014676	001401			BEQ	.+4	
3139	014700	104000			HLT		: ADCB FAILED
3140	014702	104400			SCOPE		
3141							
3142	014704	012703	000100				
3143	014710	012705	016710		MOV	#100, %3	
3144	014714	012737	177777	016710	MOV	#TEMP, %5	
3145	014722	030315			MOV	#-1, @TEMP	
3146	014724	001001			BIT	%3, @%5	
3147	014726	104000			BNE	.+4	
3148	014730	104400			HLT		: BIT FAILED
3149	014732	000402			SCOPE		
3150	014734	000167	000362		EASRT: BR	.+6	: NOP IF NO EAE
3151					JMP	ENDEAE	
3152	014740	104400					
3153	014742	005077	163402				
3154	014746	012777	125252	163376	CLR	@MQ	: TEST OF LOGICAL SHIFT
3155	014754	012777	177760	163404	MOV	#125252, @AC	: LOAD MQ WITH 0
3156	014762	005777	163364		MOV	#-16., @LSH	: LOAD AC WITH 125252
3157	014766	001401			TST	@AC	: LOAD SHIFT COUNT (LSH) WITH -16
3158	014770	104000			BEQ	.+4	: COMPARE AC WITH 0
3159	014772	022777	125252	163350	HLT		: GO TO HLT IF BAD
3160	015000	001401			CMP	#125252, @MQ	: COMPARE MQ WITH 125252
3161	015002	104000			BEQ	.+4	: GO TO HLT IF BAD
3162	015004	122777	000020	163344	HLT		
3163	015012	001401			CMPB	#20, @SRE	: COMPARE SR WITH 2
3164	015014	104000			BEQ	.+4	: SKIP HLT IF GOOD
3165					HLT		: HALT ON ERROR (LEFT SHIFT)
3166							
3167	015016	104400					
3168	015020	005077	163324		SCOPE		: TEST OF ARITHMETIC SHIFT
3169	015024	012777	177777	163320	CLR	@MQ	: LOAD MQ WITH 0
3170	015032	012777	000020	163330	MOV	#-1, @AC	: LOAD AC WITH -1
3171	015040	005777	163306		MOV	#16., @ASH	: LOAD SHIFT COUNT (ASH) WITH 16.
3172	015044	100401			TST	@AC	: COMPARE AC WITH 100000
3173	015046	104000			BMI	.+4	: SKIP HLT IF GOOD
3174	015050	005777	163274		HLT		: HALT ON ERROR
					TST	@MQ	: COMPARE MQ WITH 0

3175	015054	001401			BEQ	+.4		:SKIP HLT IF GOOD
3176	015056	104000			HLT			:HALT ON ERROR
3177	015060	122777	000110	163270	CMPB	#110,ASRE		:COMPARE SR WITH 10
3178	015066	001401			BEQ	+.4		:SKIP HLT IF GOOD
3179	015070	104000			HLT			:HALT ON ERROR (RIGHT SHIFT)
3180								
3181								
3182	015072	104400						:TEST NORMALIZE
3183	015074	012777	125252	163246	SCOPE			:TEST OF NORMALIZE
3184	015102	012777	170000	163242	MOV	#125252,AMQ		:LOAD MQ WITH 125252
3185	015110	005077	163250		MOV	#170000,AC		:LOAD AC WITH 170000
3186	015114	022777	100005	163230	CLR	ANOR		:START NORMALIZE
3187	015122	001401			CMP	#100005,AC		:COMPARE AC WITH 100005
3188	015124	104000			BEQ	+.4		:SKIP HLT IF GOOD
3189	015126	022777	052520	163214	HLT			:HALT ON ERROR
3190	015134	001401			CMP	#52520,AMQ		:COMPARE MQ WITH 52520
3191	015136	104000			BEQ	+.4		:SKIP HLT IF GOOD
3192	015140	122777	000003	163206	HLT			:HALT ON ERROR
3193	015146	001401			CMPB	#3,ASC		:COMPARE SC WITH 3
3194	015150	104000			BEQ	+.4		:SKIP HLT IF GOOD
3195					HLT			:HALT ON ERROR (NORMALIZE)
3196								
3197	015152	104400						:TEST MULTIPLY
3198	015154	012777	125252	163166	SCOPE			:TEST OF MULTIPLY
3199	015162	012777	040000	163170	MOV	#125252,AMQ		:LOAD MQ WITH 125252
3200	015170	022777	165252	163154	MOV	#40000,MUL		:LOAD MUL WITH 40000
3201	015176	001401			CMP	#165252,AC		:COMPARE AC WITH 1652
3202	015200	104000			BEQ	+.4		:SKIP IF GOOD
3203	015202	005777	163142		HLT			:HALT ON ERROR
3204	015206	100401			TST	AMQ		:COMPARE MQ WITH 10000
3205	015210	104000			BMI	+.4		:SKIP HLT IF GOOD
3206	015212	122777	000300	163136	HLT			:HALT ON ERROR
3207	015220	001401			CMPB	#300,ASRE		:COMPARE SR WITH 300
3208	015222	104000			BEQ	+.4		:SKIP HLT IF GOOD
3209					HLT			:HALT ON ERROR (MULTIPLY)
3210								
3211	015224	104400						:TEST DIVIDE
3212	015226	012777	125252	163114	SCOPE			:TEST OF DIVIDE
3213	015234	012777	177777	163110	MOV	#125252,AMQ		:LOAD MQ WITH 125252
3214	015242	012777	000002	163112	MOV	#-1,AC		:LOAD AC WITH -1
3215	015250	005777	163076		MOV	#2,ADIV		:LOAD DIV WITH 2 AND DIVIDE
3216	015254	001401			TST	AC		:COMPARE AC WITH 0 (QUOTIANT)
3217	015256	104000			BEQ	+.4		:SKIP HLT IF GOOD
3218	015260	022777	152525	163062	HLT			:HALT ON ERROR
3219	015266	001401			CMP	#152525,AMQ		:COMPARE MQ WITH 152525
3220	015270	104000			BEQ	+.4		:SKIP HLT IF GOOD
3221	015272	104400			HLT			:DIVIDE ERROR
3222	015274	012767	177777	001406	SCOPE			
3223	015302	000261			MOV	#-1,TEMP		
3224	015304	105667	001401		SEC	TEMP+1		
3225	015310	022767	177377	001372	SBCB	#177377,TEMP		
3226	015316	001401			CMP	+.4		
3227	015320	104000			BEQ	+.4		
3228	015322	104400			HLT			
3229	015324	022700	052525		SCOPE			
3230	015330	001401			CMP	#52525,%0		
3231	015332	104000			BEQ	+.4		:SOME OPERATION DESTROYED %0
3232					HLT			

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3231 015334 012737 016504 000024      MOV      #PFAIL, @#24      ;POWER FAIL VECTOR
3232 015342 012737 000340 000026      MOV      #340, @#26      ;PROCESSOR PRIORITY
3233 015350 000401          SKPBEL: BR      +4      ;SKIP OVER BELL-NOP ON CORE EXPANSION
3234 015352 000501          BR      TRPA
3235 015354 032777 000100 162702      BIT      #100, @TCSR
3236 015362 001006          BNE     SBELL          ;DON'T RING BELL IF TTY IS BUSY
3237          :BELL ON PASS COMPLETE
3238 015364 012777 000207 000466      BELL:  MOV     #207, @TDBR
3239 015372 105777 000464          TSTB    @TCSR
3240 015376 100375          BPL     .-4
3241 015400 005227 000000      SBELL:  INC     #0      ;PASS COUNT LOCATION
3242 015404 010700          MOV     %7, %0      ;SET UP RESERVED INSTRUCTION
3243 015406 042700 017777          BIC     #17777, %0    ;OFFSET
3244 015412 062700 015436          ADD     #BEG20, %0
3245 015416 010037 000010          MOV     %0, @#10
3246 015422 006701          NOP
3247 015424 000240          MOV     #6, @YESRT    ;ATTEMPT TO EXECUTE SIGN EXTEND
3248 015426 012737 000006 015552      BR      BEGANY        ;NO TRAP, PROCESSOR IS NOT=20,15,05
3249 015434 000403          MOV     #2, @YESRT
3250 015436 012737 000002 015552      BEG20: MOV     #12, @#10 ;TRAP OCCURRED
3251 015444 012737 000012 000010      BEGANY: MOV     #12, @#10 ;RESTORE HALT FOR RESERVED INC
3252          ;ROUTINE TO CHECK FOR TRACE TRAP TO BE RUN WITH PROGRAM
3253          ;SAVE OLD CONTENTS, SET UP FOR TRACE TRAP
3254 015452 005046      YESTR:  CLR     -(6)
3255 015454 032777 010000 162512      BIT     #10000, @SRPTR ;INHIBIT "T" TRAP IF SET
3256 015462 001013          BNE     ACT
3257 015464 012737 015552 000014      MOV     #YESRT, @#14  ;T TRAP VECTOR
3258 015472 005167 000052          COM    TRPB
3259 015476 001405          BEQ     ACT
3260 015500 012716 000020          MOV     #20, (6)
3261 015504 012716 004416      YESTR1: MOV     #BEGIN, -(6) ;SET TRACE TRAP
3262 015510 000002          RTI
3263 015512 013700 000042      ACT:    MOV     @#42, %0 ;START OF TEST WITH TRACE ON
3264 015516 001772          BEQ     YESTR1        ;ARE WE UNDER ACT?
3265 015520 012737 015532 000014      MOV     #CLEAR, @#14 ;NO
3266 015526 012707 015532          MOV     #CLEAR, %7   ;TO BANK ZERO
3267 015532 000005          CLEAR: RESET
3268 015534 004710          LOGICA: JSR     %7, @%0 ;CLER THE WORLD
3269 015536 000240          NOP
3270 015540 000240          NOP
3271 015542 000240          NOP
3272 015544 000137 000502      JMP     @#START
3273 015550 000000      TRPB:  0
3274 015552 000002          YESRT: RTI
3275 015554 000000          HALT
3276 015556 000137 004416      TRPA:  JMP     @#BEGIN ;RETURN TO PROGRAM FROM TRAP - CAN BE AN RTT
3277 015562 000000          PRFLAG: 0 ;RTI FAILED
3278          ;BEGIN MODIFY BY EXPANSION
3279          ;PRINT ROUTINE BUSY IF NOT ZERO
3280          ;ENTERED WITH SYSTEM TRAP CALL(HLT)
3281          ;PRINT OUT THE ERROR PC AND STATUS REGISTER
3282 015564 005767 177772      PRINT: TST     PRFLAG ;IS ROUTINE BUSY
3283 015570 001401          BEQ     .+4
3284 015572 000002          RTI
3285 015574 005267 177762          INC     PRFLAG ;YES EXIT
3286          ;NO SET FLAG
    
```

3287	015600	005227	000000		INC	80		: ERROR COUNT LOCATION
3288	015604	037727	162364	020000	BIT	2SRPTR, 20000		: TEST FOR INHIBIT PRINT OUT
3289	015612	001401			BEQ	.+4		: BRANCH TO PRINT
3290	015614	000501			BR	PRINT1		: INHIBIT RETURN TO MAIN STREAM
3291	015616	012667	000242		MOV	(6)+, SAVPC		: PC OF FAILING ROUTINE
3292	015622	012667	000240		MOV	(6)+, SAVCC		: CC OF ERROR CONDITION
3293	015628	024646			CMF	-(6), -(6)		: REPOSITION THE STACK
3294	015630	042767	000140	162140	BIC	8140, STATUS		
3295	015638	105777	000220		TSTB	2TCSR		: WAIT FOR FLAG
3296	015642	100375			BPL	.-4		
3297	015644	012777	000215	000206	MOV	2215, 2TDBR		: FILLER CHARACTER.
3298	015652	105777	000204		TSTB	2TCSR		
3299	015656	100375			BPL	.-4		
3300	015660	012777	000212	000172	MOV	2212, 2TDBR		: LINE FEED
3301	015666	105777	000170		TSTB	2TCSR		
3302	015672	100375			BPL	.-4		
3303	015674	010267	000152		MOV	%2, SAVR2		: SAVE R2
3304	015700	010367	000150		MOV	%3, SAVR3		: SAVE R3
3305	015704	010467	000146		MOV	%4, SAVR4		: SAVE R4
3306	015710	016702	000150		MOV	SAVPC, %2		
3307	015714	004767	000150		JSR	%7, PRTAB		: PRINT OCTAL NUMBER
3308	015720	012777	000240	000132	MOV	2240, 2TDBR		
3309	015726	105777	000130		TSTB	2TCSR		: SPACE BETWEEN WORDS
3310	015732	100375			BPL	.-4		
3311	015734	016702	000126		MOV	SAVCC, %2		
3312	015740	004767	000124		JSR	%7, PRTAB		: PRINT OCTAL NUMBER
3313	015744	012777	000240	000106	MOV	2240, 2TDBR		
3314	015752	105777	000104		TSTB	2TCSR		
3315	015756	100375			BPL	.-4		
3316	015760	016702	000460		MOV	RETURN, %2		: WHERE CPU TEST IS AT
3317	015764	004767	000100		JSR	%7, PRTAB		
3318	015770	016702	000056		MOV	SAVR2, %2		: RESTORE REGISTERS
3319	015774	016703	000054		MOV	SAVR3, %3		
3320	016000	016704	000052		MOV	SAVR4, %4		
3321	016004	012777	000377	000046	MOV	2377, 2TDBR		
3322	016012	105777	000044		TSTB	2TCSR		
3323	016016	100375			BPL	.-4		
3324	016020	005777	162150		TST	2SRPTR		: TEST FOR HALT SWITCH
3325	016024	100001			BPL	.+4		
3326	016026	000000			HALT			: HALT ON ERROR SET
3327	016030	005067	177526		CLR	PRFLAG		: CLEAR FLAG WHEN DONE
3328	016034	032777	000400	162132	BIT	2400, 2SRPTR		
3329	016042	001402			BEQ	EXPRINT		
3330	016044	000167	162432		JMP	START		: RESTART ON ERROR
3331	016050	000002			EXPRINT: RTI			: RETURN TO MAIN STREAM
3332	016052	000000			SAVR2: 0			
3333	016054	000000			SAVR3: 0			
3334	016056	000000			SAVR4: 0			
3335	016060	177566			TDBR: 177566			: DATA
3336	016062	177564			TCSR: 177564			: STATUS
3337	016064	000000			SAVPC: 0			
3338	016066	000000			SAVCC: 0			
3339		016762			BUFF=FIN			: END OF PROGRAM-SP AREA.
3340								
3341	016070	005067	000252		PRTAB: CLR	BINCT		
3342	016074	005067	000244		CLR	WGCT		

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3343 016100 012704 016352          MOV      @LIST,%4          ;GET LIST ADDRESS
3344 016104 012767 000005 000236  MOV      #5,ASCNT
3345 016112 012767 000007 000220  MOV      #7,SEVEN
3346 016120 012767 000001 000214  MOV      #1,DECML
3347 016126 105777 177730          WAIT1:  TSTB      @TCSR
3348 016132 100375          BPL      WAIT1
3349 016134 005702          TST      %2
3350 016136 100404          BMI      MINUS          ;NEG SIGN PRINT 1
3351 016140 012777 000260 177712  MOV      #260,@TOBR     ;POS SIGN PRINT 0
3352 016146 000403          BR       STAR
3353 016150 012777 000261 177702  MINUS:  MOV      #261,@TOBR
3354 016156 016703 000156  STAR:   MOV      SEVEN,%3
3355 016162 010267 000150          MOV      %2,TOODLE
3356 016166 005167 000144          COM      TOODLE
3357 016172 046703 000140          BIC      TOODLE,%3
3358 016176 001410          BEQ      WRTOC
3359 016200 066767 000136 000136  MKNUM:  ADD      DECML,WGTCT
3360 016206 005267 000134          INC      BINCT
3361 016212 026703 000126          CMP      WGTCT,%3
3362 016216 001370          BNE      MKNUM
3363 016220 062767 000260 000120  WRTOC:  ADD      #260,BINCT
3364 016226 016724 000114          MOV      BINCT,(4)+
3365 016232 066767 000102 000102  ADD      SEVEN,DECML
3366 016240 005067 000100          CLR      WGTCT
3367 016244 005067 000076          CLR      BINCT
3368 016250 005367 000074          DEC      ASCNT
3369 016254 001410          BEQ      XLIST
3370 016256 012703 000003          MOV      #3,%3
3371 016262 066767 000052 000050  MOADD:  ADD      SEVEN,SEVEN
3372 016270 005303          DEC      %3
3373 016272 001373          BNE      MOADD
3374 016274 000730          BR       STAR
3375 016276 012767 000005 000044  XLIST:  MOV      #5,ASCNT
3376 016304 105777 177552          WAIT2:  TSTB      @TCSR
3377 016310 100375          BPL      WAIT2
3378 016312 014477 177542          MOV      -(4),@TOBR
3379 016316 005367 000026          DEC      ASCNT
3380 016322 001401          BEQ      HDFHM
3381 016324 000767          BR       WAIT2
3382 016326 105777 177530          HDFHM:  TSTB      @TCSR
3383 016332 100375          BPL      RTS
3384 016334 000207          RTS
3385 016336 000000          TOODLE: 0
3386 016340 000000          SEVEN:  0
3387 016342 000000          DECML:  0
3388 016344 000000          WGTCT:  0
3389 016346 000000          BINCT:  0
3390 016350 000000          ASCNT:  0
3391 016352 000000          LIST:  0
3392 016354 000000
3393 016356 000000
3394 016360 000000
3395 016362 000000
3396
3397
3398
;SCOPE LOOP ROUTINE ENTERED BY USER TRAP
;SCOPE OR/AND ITERATION LOOP FOR EACH TEST 4000 TIMES

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3399 016364 032777 040000 161602 SCOPEC: BIT      #40000,JSRPTR      ;TEST SR FOR SCOPE
3400 016372 001012          BNE      SCOPEB      ;YES SCOPE
3401 016374 032777 004000 161572          BIT      #4000,JSRPTR ;NO - TEST FOR ITERATION
3402 016402 001011          BNE      SCOPEB      ;INHIBIT ITERATION
3403 016404 026767 000032 000026          CMP      SCOPEB,ICOUNT
3404 016412 001405          BEQ      SCOPEB
3405 016414 005267 000022          INC      SCOPEB
3406 016420 016716 000020          SCOPEB: MOV     RETURN,%6
3407 016424 000002          RTI
3408 016426 005067 000010          SCOPEB: CLR     SCOPEB
3409 016432 011667 000006          MOV     %6,RETURN
3410 016436 000002          RTI
3411 016440 004000          ICOUNT: 4000
3412 016442 000000          SCOPEB: 0
3413 016444 004416          RETURN: BEGIN
3414
3415          ;GROUP OF NESTED SUBROUTINES
3416 016446 000207          SUBR1: RTS      %7      ;ONE INSTRUCTION
3417 016450 000277          SUBR2: SCC
3418 016452 000205          RTS      %5
3419 016454 004537 016450          SUBR3: JSR     %5,%SUBR2 ;TWO DEEP
3420 016460 000204          RTS      %4
3421 016462 004467 177766          SUBR4: JSR     %4,SUBR3 ;THREE DEEP
3422 016466 000203          RTS      %3
3423 016470 004367 177766          SUBR5: JSR     %3,SUBR4 ;FOUR DEEP
3424 016474 000202          RTS      %2
3425 016476 004267 177766          SUBR6: JSR     %2,SUBR5 ;FIVE DEEP
3426 016502 000207          RTS      %7
3427          ;ENTER HERE OR POWER FAIL
3428
3429 016504 010046          PFAIL: MOV     %0,-(6) ;SAVE REGISTER OR STACK
3430 016506 010146          MOV     %1,-(6) ;WHEN POWERING DOWN
3431 016510 010246          MOV     %2,-(6)
3432 016512 010346          MOV     %3,-(6)
3433 016514 010446          MOV     %4,-(6)
3434 016516 010546          MOV     %5,-(6)
3435 016520 016746 161300          MOV     24,-(6)
3436 016524 012737 000002 000006          MOV     #RTI,%6 ;IN CASE OF NO EAE
3437 016532 012700 016572          MOV     #HAC,%0
  
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3438 016536 017720 161610      MOV      @AC, (%B)+
3439 016537 017720 161602      MOV      @AC, (%B)+
3440 016546 017720 161602      MOV      @SC, (%B)+
3441 016552 010046      MOV      %D, -(%B)
3442 016554 010567 000010      MOV      %B, SAVR6
3443 016560 012767 016600 161236      MOV      @RESTART, 24
3444 016566 000000      HALT
3445 016570 000000      SAVR6: 0
3446 016572 000000      MAC: 0
3447 016574 000000      HMQ: 0
3448 016576 000000      HSC: 0
3449 016600 016706 177764      RESTART: MOV      SAVR6, %B
3450 016604 012600      MOV      (%B)+, %D
3451 016606 014077 161542      MOV      -(%D), @SC
3452 016612 014077 161532      MOV      -(%D), @MQ
3453 016616 014077 161530      MOV      -(%D), @AC
3454 016622 005037 000006      CLR      @#6
3455 016626 012667 161172      MOV      (%B)+, 24
3456 016632 012605      MOV      (%B)+, %5
3457 016634 012604      MOV      (%B)+, %4
3458 016636 012603      MOV      (%B)+, %3
3459 016640 012602      MOV      (%B)+, %2
3460 016642 012601      MOV      (%B)+, %1
3461 016644 012600      MOV      (%B)+, %0
3462 016646 005037 016570      CLR      @#SAVR6
3463 016652 104000      HLT
3464 016654 000002      RTI
3465 016656 125252      B: 125252
3466      ;FIXED VALUES FOR USE IN TEST
3467 016660 016656      B 052525 ;ADDRESS OF B
3468 016662 052525
3469
3470      .=B+10
3471 016666 177777      A: -1
3472 016670 016672      A+4
3473
3474      .=A+4
3475 016672 125252      125252
3476 016674 016676      A+10 ;ADDRESS OF A+10
3477 016676 052525      052525
3478      ;FOR STORAGE
3479 016700 000000      C: 0
3480 016702 016700      C ;ADDRESS OF C
3481
3482      .=C+10
3483 016710 000000      TEMP: 0
3484 016712 016710      TEMP ;ADDRESS OF TEMP
3485
3486      .=TEMP+6
3487 016716 016720      TEMP+10 ;ADDRESS OF TEMP+10 OR "D"
3488 016720 000000      D: 0
3489      .=+40
3490 016762 000000      FIN: 0 ;BUFFER FOR SP
3491 016764 000207      USER: RTS %7 ;OVERLAY USER ROUTINE HERE IF 4KW, USE BANK1 IF 8KW
3492      ;PDP-11 MEMORY DETERMINATION AND SETUP
3493      ;USE WITH VARIABLE CORE QUANTITY SYSTEMS

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016766 016766 004416 176564 DET1:  MOV #FIN + 4 ;APPLICABLE TO SYSTEM TEST 21
016767 016767 000401 176346  MOV #BEGIN TRPA+2 ;BR .+4
017000 004767 000412  JSR X7, #401, SRPBL
017000 023787 000042 016766  CMP #42, @DET1 ;CHECK FOR DDP1
017015 001401  RTS ;+4
017015 000207  BIT #7 ;NO CORE EXPANSION WITH DDP1
017015 022777 001000 161146  BEQ #1000, @SRPTR ;CHECK VARIABLE CORE SWITCH
017015 001401  DET4 ;USE VARIABLE CORE ROUTINE
017015 000207  RTS ;4K ONLY
017015 012767 017100 160744  DET4:  MOV #DET2, 4 ;TRAP VECTOR SETUP
017015 012767 000340 160740  MOV #340, 6 ;TRAP STATUS SETUP
017015 000537 037770  EIGHT:  RDC #837770 ;CHECK FOR 8K
017015 000537 057770  TWELVE: RDC #857770 ;CHECK FOR 12K
017015 000537 077770  SIXTEEN: RDC #807770 ;CHECK FOR 16K
017015 000537 117770  TWENTY: RDC #811770 ;CHECK FOR 20K
017015 000537 137770  TWOFOR:  RDC #813770 ;CHECK FOR 24K
017015 000537 157770  TWOEIG:  RDC #815770 ;CHECK FOR 28K
017072 000430  BR STRT28
017100 012503  DET2:  MOV (6)+, %2 ;RETRIEVE TRAP PC
017100 005726  TST (6)+ ;DISCARD TRAP STATUS WORD
017104 022702 017052  CMP #EIGHT+4, %2 ;4K
017110 001542  BEQ DET3
017110 022702 017056  CMP #TWELVE+4, %2 ;8K
017116 001437  BEQ STRT8
017120 022702 017062  CMP #SIXTEEN+4, %2 ;12K
017126 001431  BEQ STRT12
017130 022702 017066  CMP #TWENTY+4, %2 ;16K
017136 001423  BEQ STRT16
017140 022702 017072  CMP #TWOFOR+4, %2 ;20K
017146 001415  BEQ STRT20
017146 000411  BR STRT24
017146 005000  MOVE:  CLR %0 ;SET UP MAIN CORE CURRENT
017146 012021  MOV (0)+ (1)+ ;MOVE WORD
017150 020027 016764  CMP %0, #FIN+2 ;MOVE COMPLETE?
017150 001374  BNE #6 ;MOVE ANOTHER WORD
017150 000207  RTS ;MOVE COMPLETE
017156 004767 000040  STRT28: JSR X7 XFER28 ;START 28K TRANSFER
017164 000450  BR MOD24 ;START 24K MODIFY
017166 004767 000042  STRT24: JSR X7 XFER24 ;START 24K TRANSFER
017172 000453  BR MOD20 ;START 20K MODIFY
017174 004767 000044  STRT20: JSR X7 XFER20 ;START 20K TRANSFER
017200 000456  BR MOD16 ;START 16K MODIFY
017202 004767 000046  STRT16: JSR X7 XFER16 ;START 16K TRANSFER
017206 000461  BR MOD12 ;START 12K MODIFY
017210 004767 000050  STRT12: JSR X7 XFER12 ;START 12K TRANSFER
017214 000464  BR MOD8 ;START 8K MODIFY
017216 004767 000052  STRT8:  JSR X7 XFER8 ;START 8K TRANSFER
017222 000467  BR MOD4 ;START 4K MODIFY
017224 012701 140000  XFER28: MOV #140000, %1 ;SET UP MOVE START LOCATION
017230 004767 177710  JSR X7 MOVE ;GO TO MOVE SUBROUTINE
017234 012701 120000  XFER24: MOV #120000, %1
017240 004767 177700  JSR X7 MOVE
017244 012701 100000  XFER20: MOV #100000, %1
017250 004767 177670  JSR X7 MOVE
017254 012701 060000  XFER16: MOV #60000, %1

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017250 017260 004767 177660
017264 012701 040000 XFER12: MOV @40000,x1
017270 004767 177650 XFER8: JSR x7,MOVE
017274 012701 020000 XFER8: MOV @20000,x1
017278 004767 177640 XFER8: JSR x7,MOVE
017282 000207 :RTS x7,MOVE ;RETURN FROM TRANSFERS
017286 012767 144424 MOD24: MOV @BEGIN+140006,TRPA+120002
017290 012767 000240 MOD24: MOV @NOOP,SKPBEL+120000
017294 012767 124424 MOD20: MOV @BEGIN+120006,TRPA+100002
017298 012767 000240 MOD20: MOV @NOOP,SKPBEL+100000
017302 012767 104424 MOD16: MOV @BEGIN+100006,TRPA+60002
017306 012767 000240 MOD16: MOV @NOOP,SKPBEL+60000
017310 012767 084424 MOD12: MOV @BEGIN+80006,TRPA+40002
017314 012767 000240 MOD12: MOV @NOOP,SKPBEL+40000
017318 012767 064424 MOD8: MOV @BEGIN+40006,TRPA+20002
017322 012767 044424 MOD8: MOV @NOOP,SKPBEL+20000
017326 012767 024424 MOD4: MOV @BEGIN+20006,TRPA+2
017330 012767 000240 MOD4: MOV @NOOP,SKPBEL
017416 000207 DET3: RTS x7 ;RETURN FROM MODIFY
:ROUTINE TO SET ACTION ENABLE ON MA/MF PARITY MEMORIES
:CALL: JSR PC,.MAMF

172100 PARCSR= 172100 ;ADDRESS OF FIRST MA/MF PA
000114 PARVEC= 114 ;ADDRESS OF PARITY INTERRUPT
000004 ERRVEC=4
000000 R0=X0
000006 SP=X6
000002 R2=X2
000007 PC=X7

017420 012737 000006 000004 .MAMF: MOV @ERRVEC+2,@ERRVEC
017426 012737 000002 000006 .MAMF: MOV @RTI,@ERRVEC+2
017434 012700 172100 .MAMF: MOV @PARCSR,R0 ;GET FIRST CSR ADDRESS
017440 012702 000001 .MAMF: MOV @1,R2

017444 012720 000001 IS: MOV @1,(R0)+ ;SET TIME OUT INDICATOR
;SET ACTION ENABLE IF AVAIL
;BRANCH IF CSR NOT AVAILAB
;SHIFT AVAILABILITY INDICA

017450 006302 ASL R2
017452 103374 BCC IS
017454 000207 RTS PC
017456 104000 .PARSRV: HLT ;PARITY ERROR
017460 000137 000502 .PARSRV: JMP @START
000001 .END

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CROSS REFERENCE TABLE -- USER SYMBOLS

RPDR 000420  
 RPDSR 000416  
 RPFUNC 000432  
 RPSTAR 002366  
 RPMC 000422  
 RPMORD= 176000  
 RPI 002402  
 RTIA 001520  
 SAVCC 016066  
 SAVPC 016064  
 SAVR2 016052  
 SAVR3 016054  
 SAVR4 016056  
 SAVR6 016570  
 SBELL 015400  
 SC 000354  
 SCOPE = 104400  
  
 SCOPEB 016420  
 SCOPEC 016364  
 SCOPEF 016442  
 SCOPEG 016426  
 SEVEN 016340  
 SKPBEL 015350  
 SOFTSR 000176  
 SOLPAT 002266  
 SRE 000356  
 SRPTR 000174  
 STAR 016156  
 START 000502  
 START2 000642  
 STATUS= 177776  
 STRT12 017210  
 STRT16 017202  
 STRT20 017174  
 STRT24 017166  
 STRT28 017160  
 STRT8 017216  
 ST1 001036  
 ST2 001050  
 ST3 001070  
 ST3A 001104

732#	847	849#																
731#	847	1051	1059#															
737#	855#	1060																
1046#	1055#																	
733#	1050#																	
591#	1050																	
1049#	1058#																	
806	850#	879	896#															
3292#	3311	3338#																
3291#	3330#	3337#																
3303#	3331#	3332#																
3304#	3320	3334#																
3305#	770	772#	3445#	3449	3462#													
770	3237	324#																
711#	319#	3440	3451#															
583#	783	789	798	801	1616	1623	1628	1657	1663	1669	1675	1682						
1687	1694	1700	1707	1715	1722	1725	1736	1745	1753	1761	1769	1776						
1783	1790	1797	1806	1814	1822	1830	1837	1845	1853	1861	1869	1877						
1886	1893	1904	1913	1921	1933	1938	1943	1948	1955	1961	1967	1974						
1981	1988	1996	2002	2009	2016	2023	2030	2037	2044	2051	2056	2061						
2068	2074	2080	2088	2095	2101	2108	2111	2122	2130	2137	2143	2151						
2158	2165	2171	2179	2185	2191	2198	2203	2208	2214	2222	2229	2234						
2251	2257	2263	2271	2277	2283	2288	2293	2298	2307	2315	2322	2329						
2351	2357	2363	2371	2377	2383	2388	2393	2398	2407	2415	2422	2434						
2451	2457	2463	2471	2477	2483	2488	2493	2498	2507	2515	2522	2534						
2551	2557	2563	2571	2577	2583	2588	2593	2598	2607	2615	2622	2634						
2651	2657	2663	2671	2677	2683	2688	2693	2698	2707	2715	2722	2734						
2751	2757	2763	2771	2777	2783	2788	2793	2798	2807	2815	2822	2834						
2851	2857	2863	2871	2877	2883	2888	2893	2898	2907	2915	2922	2934						
2951	2957	2963	2971	2977	2983	2988	2993	2998	3007	3015	3022	3034						
3051	3057	3063	3071	3077	3083	3088	3093	3098	3107	3115	3122	3134						
3151	3157	3163	3171	3177	3183	3188	3193	3198	3207	3215	3222	3234						
3251	3257	3263	3271	3277	3283	3288	3293	3298	3307	3315	3322	3334						
3351	3357	3363	3371	3377	3383	3388	3393	3398	3407	3415	3422	3434						
3451	3457	3463	3471	3477	3483	3488	3493	3498	3507	3515	3522	3534						
3551	3557	3563	3571	3577	3583	3588	3593	3598	3607	3615	3622	3634						
3651	3657	3663	3671	3677	3683	3688	3693	3698	3707	3715	3722	3734						
3751	3757	3763	3771	3777	3783	3788	3793	3798	3807	3815	3822	3834						
3851	3857	3863	3871	3877	3883	3888	3893	3898	3907	3915	3922	3934						
3951	3957	3963	3971	3977	3983	3988	3993	3998	4007	4015	4022	4034						
4051	4057	4063	4071	4077	4083	4088	4093	4098	4107	4115	4122	4134						
4151	4157	4163	4171	4177	4183	4188	4193	4198	4207	4215	4222	4234						
4251	4257	4263	4271	4277	4283	4288	4293	4298	4307	4315	4322	4334						
4351	4357	4363	4371	4377	4383	4388	4393	4398	4407	4415	4422	4434						
4451	4457	4463	4471	4477	4483	4488	4493	4498	4507	4515	4522	4534						
4551	4557	4563	4571	4577	4583	4588	4593	4598	4607	4615	4622	4634						
4651	4657	4663	4671	4677	4683	4688	4693	4698	4707	4715	4722	4734						
4751	4757	4763	4771	4777	4783	4788	4793	4798	4807	4815	4822	4834						
4851	4857	4863	4871	4877	4883	4888	4893	4898	4907	4915	4922	4934						
4951	4957	4963	4971	4977	4983	4988	4993	4998	5007	5015	5022	5034						
5051	5057	5063	5071	5077	5083	5088	5093	5098	5107	5115	5122	5134						
5151	5157	5163	5171	5177	5183	5188	5193	5198	5207	5215	5222	5234						
5251	5257	5263	5271	5277	5283	5288	5293	5298	5307	5315	5322	5334						
5351	5357	5363	5371	5377	5383	5388	5393	5398	5407	5415	5422	5434						
5451	5457	5463	5471	5477	5483	5488	5493	5498	5507	5515	5522	5534						
5551	5557	5563	5571	5577	5583	5588	5593	5598	5607	5615	5622	5634						
5651	5657	5663	5671	5677	5683	5688	5693	5698	5707	5715	5722	5734						
5751	5757	5763	5771	5777	5783	5788	5793	5798	5807	5815	5822	5834						
5851	5857	5863	5871	5877	5883	5888	5893	5898	5907	5915	5922	5934						
5951	5957	5963	5971	5977	5983	5988	5993	5998	6007	6015	6022	6034						
6051	6057	6063	6071	6077	6083	6088	6093	6098	6107	6115	6122	6134						
6151	6157	6163	6171	6177	6183	6188	6193	6198	6207	6215	6222	6234						
6251	6257	6263	6271	6277	6283	6288	6293	6298	6307	6315	6322	6334						
6351	6357	6363	6371	6377	6383	6388	6393	6398	6407	6415	6422	6434						
6451	6457	6463	6471	6477	6483	6488	6493	6498	6507	6515	6522	6534						
6551	6557	6563	6571	6577	6583	6588	6593	6598	6607	6615	6622	6634						
6651	6657	6663	6671	6677	6683	6688	6693	6698	6707	6715	6722	6734						
6751	6757	6763	6771	6777	6783	6788	6793	6798	6807	6815	6822	6834						
6851	6857	6863	6871	6877	6883	6888	6893	6898	6907	6915	6922	6934						
6951	6957	6963	6971	6977	6983	6988	6993	6998	7007	7015	7022	7034						
7051	7057	7063	7071	7077	7083	7088	7093	7098	7107	7115	7122	7134						
7151	7157	7163	7171	7177	7183	7188	7193	7198	7207	7215	7222	7234						
7251	7257	7263	7271	7277	7283	7288	7293	7298	7307	7315	7322	7334						
7351	7357	7363	7371	7377	7383	7388	7393	7398	7407	7415	7422	7434						
7451	7457	7463	7471	7477	7483	7488	7493	7498	7507	7515	7522	7534						
7551	7557	7563	7571	7577	7583	7588	7593	7598	7607	7615	7622	7634						
7651	7657	7663	7671	7677	7683	7688	7693	7698	7707	7715	7722	7734						
7751	7757	7763	7771	7777	7783	7788	7793	7798	7807	7815	7822	7834						
7851	7857	7863	7871	7877	7883	7888	7893	7898	7907	7915	7922	7934						
7951	7957	7963	7971	7977	7983	7988	7993	7998	8007	8015	8022	8034						
8051	8057	8063	8071	8077	8083	8088	8093	8098	8107	8115	8122	8134						
8151	8157	8163	8171	8177	8183	8188	8193	8198	8207	8215	8222	8234						
8251	8257	8263	8271	8277	8283	8288	8293	8298	8307	8315	8322	8334						
8351	8357	8363	8371	8377	8383	8388	8393	8398	8407	8415	8422	8434						
8451																		

ST4	001122	827	832	835#										
ST5	001140	836	833											
ST5A	001210	841	830											
ST6	001274	840	850											
ST7	001322	851	850											
ST8	001404	866	867	875#										
ST8A	001450	878	883	885#										
SUBR1	016446	3416#												
SUBR2	016450	3417#												
SUBR3	016454	3419#												
SUBR4	016462	3421#												
SUBR5	016470	3423#												
SUBR6	016476	3793#												
SWABA	014604	3119#												
SXTEEN	017056	3508#												
TC	= 177340	720#	721	722	723	725	726							
TCBA	000404	726#	1164#	1205#										
TCBLK	002670	1109#												
TCCM	000372	721#	864#	1116#	1119#	1121#	1123	1132#	1136	1146#	1155#	1157#	1165#	1167
TCDT	000376	1171#	1174	1182#	1185#	1189	1199#	1206#	1209	1213#				
TCEXPE	002672	723#	1126	1139	1142	1177	1192	1195	1177	1194#	1195			
TCFIRS	002664	862#	1110#	1120#	1126	1141#	1142	1152#						
TCF1	002746	1118	1107#	1120	1192									
TCF1A	002740	1121#	1123#											
TCF2	002774	1128	1127											
TCF3	003010	1131	1131#	1170										
TCF4	003052	1146#	1136#											
TCIV	000406	727#	1172											
TCLAST	002666	1108#	863#	1113#	1118#	1131#	1151#	1158#	1162#	1170#	1184#	1203#	1212#	
TCOM	014242	3038#	1139	1152										
TCOM2	014310	3051#	1139											
TCOM3	014356	3063#	3045											
TCRBK	003332	1198	3058											
TCRBUF	003416	743	3070											
TCRB1	003370	1203	1203#	1205	1218#									
TCR1	003210	1158	747											
TCR1A	003240	1179	1209#											
TCR2	003246	1178	1174#											
TCR3	003262	1184	1182#											
TCR4	003324	1199#	1184#	1212										
TCSR	016062	585	1189#	1212										
TCST	000374	722#	1214											
TCMBK	003130	1145	3240	3295	3298	3301	3309	3314	3322	3336#	3347	3376	3382	
TCMBUF	003416	1164	1114	1153										
TCMB1	003162	1162	1162#											
TCWC	000402	725#	1217#	1204#										
TC1	000434	740#	1167#											
TC2	000446	744#	1163#											
TDBR	016060	3239#	1207											
TDSR	= 016062	585#	746											
TEMP	016710	1711#	3297#	3300#	3308#	3313#	3321#	3335#	3351#	3353#	3378#			
		1755#	1712	1718#	1719	1725#	1732#	1733	1739#	1741#	1742	1747#	1749#	1750
		1800#	1757#	1758	1764#	1765#	1766	1771#	1773#	1778#	1780#	1785#	1787#	1792#
		1850	1803	1808#	1811	1816#	1819	1824#	1827	1831#	1834	1839#	1842	1847#
		1906#	1855#	1858	1863#	1866	1871#	1874	1879#	1883	1888#	1892	1897#	1901
			1910	1957#	1958	1976#	1977#	1978	1998#	1999#	2004#	2005#	2006	2011#

CROSS REFERENCE TABLE -- USER SYMBOLS

TEST	013614	2012*	2013	2018*	2019*	2020	2022*	2026*	2027	2032*	2033*	2034	2039*	2040*
TIME	002116	2041*	2070*	2071*	2090*	2091*	2095*	2111*	2111*	2111*	2111*	2119*	2132*	2133*
TJSR1	013044	2134*	2138*	2139*	2140*	2146*	2147*	2148*	2152*	2153*	2153*	2160*	2161*	2162*
TJSR2	013046	2167*	2168*	2169*	2174*	2175*	2176*	2181*	2182*	2183*	2183*	2191*	2192*	2193*
TJSR3	013060	2200*	2201*	2202*	2203*	2204*	2205*	2206*	2207*	2208*	2209*	2210*	2211*	2212*
TOODLE	016336	2233*	2234*	2235*	2236*	2237*	2238*	2239*	2240*	2241*	2242*	2243*	2244*	2245*
TRCSR	000260	2238*	2239*	2240*	2241*	2242*	2243*	2244*	2245*	2246*	2247*	2248*	2249*	2250*
TROR	000262	2248*	2249*	2250*	2251*	2252*	2253*	2254*	2255*	2256*	2257*	2258*	2259*	2260*
TRPA	015556	2253*	2254*	2255*	2256*	2257*	2258*	2259*	2260*	2261*	2262*	2263*	2264*	2265*
TRPB	015550	2266*	2267*	2268*	2269*	2270*	2271*	2272*	2273*	2274*	2275*	2276*	2277*	2278*
TSCOMB	014420	2279*	2280*	2281*	2282*	2283*	2284*	2285*	2286*	2287*	2288*	2289*	2290*	2291*
TSROT	013450	2292*	2293*	2294*	2295*	2296*	2297*	2298*	2299*	2300*	2301*	2302*	2303*	2304*
TSROT2	013624	2305*	2306*	2307*	2308*	2309*	2310*	2311*	2312*	2313*	2314*	2315*	2316*	2317*
TSRT2A	013616	2318*	2319*	2320*	2321*	2322*	2323*	2324*	2325*	2326*	2327*	2328*	2329*	2330*
TSTARI	014100	2331*	2332*	2333*	2334*	2335*	2336*	2337*	2338*	2339*	2340*	2341*	2342*	2343*
TTCSR	000264	2344*	2345*	2346*	2347*	2348*	2349*	2350*	2351*	2352*	2353*	2354*	2355*	2356*
TTDBR	000266	2357*	2358*	2359*	2360*	2361*	2362*	2363*	2364*	2365*	2366*	2367*	2368*	2369*
TTYINR	001522	2370*	2371*	2372*	2373*	2374*	2375*	2376*	2377*	2378*	2379*	2380*	2381*	2382*
TTYIN1	001560	2383*	2384*	2385*	2386*	2387*	2388*	2389*	2390*	2391*	2392*	2393*	2394*	2395*
TTYIN2	001566	2396*	2397*	2398*	2399*	2400*	2401*	2402*	2403*	2404*	2405*	2406*	2407*	2408*
TTYIN3	001552	2409*	2410*	2411*	2412*	2413*	2414*	2415*	2416*	2417*	2418*	2419*	2420*	2421*
TTYIN4	001556	2422*	2423*	2424*	2425*	2426*	2427*	2428*	2429*	2430*	2431*	2432*	2433*	2434*
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TWENTY	017062	2448*	2449*	2450*	2451*	2452*	2453*	2454*	2455*	2456*	2457*	2458*	2459*	2460*
TWOEIG	017072	2461*	2462*	2463*	2464*	2465*	2466*	2467*	2468*	2469*	2470*	2471*	2472*	2473*
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WAIT2	016304	2539*	2540*	2541*	2542*	2543*	2544*	2545*	2546*	2547*	2548*	2549*	2550*	2551*
WAIT3	014470	2552*	2553*	2554*	2555*	2556*	2557*	2558*	2559*	2560*	2561*	2562*	2563*	2564*
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L06

.MAIN. MACY11 30(1046) 16-SEP-77 12:59 PAGE 78  
DZQKBG.P11 16-SEP-77 12:58 CROSS REFERENCE TABLE -- MACRO NAMES

SEQ 0076

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ERRORS DETECTED: 0

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RUN-TIME: 3 6 1 SECONDS

RUN-TIME RATIO: 228/11=20.4

CORE USED: 11K (21 PAGES)