IDENTIFICATION

Product Code:	Maindec 9A-D7AB-D
Product Name:	PDP-9 Basic Exerciser
Date Created:	November 27, 1967
Maintainer:	Diagnostics Group
Author:	J. W. Richardson

1. ABSTRACT

The PDP-9 Basic Exerciser is designed to exercise the CP, core memory and I/O devices associated with a basic PDP-9 configuration. Once initiated, the program will perform tests on all operate and memory reference instructions, tests on the adder, memory checkerboard patterns, tests on the real-time clock, punch, reader, Teletype and program interrupt.

The Basic Exerciser contains a condensed version of the PDP-9 Instruction Test, Parts 1 and 2, and a memory checkerboard test similar to the PDP-9 Basic Memory Checkerboard Test. These tests run continuously, and are interrupted by the punch, reader or Teletype at a device rate. The real-time clock will interrupt and suspend all operations at random time intervals. The instruction test or I/O device resumes operation after the clock interrupt has been serviced.

Nine ACS functions are provided to enable the operator to (1) inhibit the instruction and memory tests and run the real-time clock, program interrupt, and the punch, read, print sequence alone; (2) inhibit program interrupts and run the instruction and memory tests alone; (3) loop continuously on the adder test; (4) loop continuously on the memory checkerboard test; (5) inhibit program relocation; (6) inhibit the real-time clock, but continue testing with program interrupt and all other devices enabled; (7) run the instruction and memory tests, and the clock and punch with the read and print sequence inhibited; (8) run the reader, real-time clock and instruction and memory tests with the punch and Teletype inhibited; (9) run the read and print sequence, real-time clock and instruction and memory tests with the punch inhibited.

2. REQUIREMENTS

2.1 Equipment

A basic PDP-9 configuration.

2.2 Storage

The program requires all 8K of core memory to perform all tests. The program initially resides in memory locations 00000 to 7730. When the program is relocated to the higher 4K field, it occupies locations 10022 to 17730.

3. LOADING PROCEDURE

The tape supplied is punched in the HRI mode.

a. Set the ADDRESS switches to 00000.

b. Place all AC switches down.

c. Place the HRI tape in the reader.

d. Press I/O RESET, and then READ-IN.

The program is not self-starting.

4. STARTING PROCEDURE

4.1 Starting Addresses

22 or 10022 if the program is currently in the upper 4K field.

4.1.1 Restarting Addresses - 26 or 10026 if the program is currently in the upper 4K field.

4.2 Operator Action

FOR PDP-7, See below

a. Set the ADDRESS switches to 22.

b. Place all ACS down for normal program operation. See paragraph 5.1 for use of the ACS to inhibit certain portions of the program.

c. Press I/O RESET, and then START.

d. Approximately 3-1/2 feet of leader will be punched. This leader is blank except for one frame which has all channels punched.

e. Place the punched frame directly over the reader drive sprocket, and position the tape between reader and punch for minimum binding.

f. Press CONTINUE.

g. The program will run until an error halt occurs, or manually stopped by the operator.

h. Steps c through f above are similar to the procedure performed with the PDP-9 punch test.

4.2.1 Restarting Procedure -

a. Set the ADDRESS switches to 26.

b. Place all ACS down for normal program operation. See paragraph 5.1 for use of the ACS to inhibit certain portions of the program. Set SW's 6, 7, 8 up.

c. If the punch, read and print sequence is not inhibited, make sure there is tape in the reader. The tape does not have to be blank leader when restarting.

d. Press ~~I/O RESET~~, and then START.

e. The program will run until an error halt occurs, or manually stopped by the operator.

Note: For PDP-7 operation, [illegible] Patch 162 to 600223. (End of tape with reader [illegible]

5. OPERATING PROCEDURE

5.1 Operational Switch Settings

Normal program operation is achieved by placing all ACS down before starting from locations 22 or 26.

The operator is provided nine options with which to modify the operation of the program. These may be selected by placing any one or a combination of ACS 0 through 8 up before starting from locations 22 or 26.

To make changes in the ACS settings, the program must be stopped by the operator before the changes are made. The program must then be restarted from location 26 (or 22 if new leader is desired). The program may not recognize the new ACS settings if the above procedure is not followed.

ACS Functions

0 (1) Run only the punch, read and print sequence plus the real-time clock. Program interrupt will be enabled.

1 (1) Inhibit the punch, read and print sequence. Program interrupt is disabled. The real-time clock is on. The complete instruction test and memory checkerboard test will be performed.

2 (1) Loop continuously on the "add random pairs" test. The real-time clock, punch, read and print sequence plus program interrupt will be enabled unless specified otherwise by an ACS.

3 (1) Loop continuously on the memory checkerboard test. Program relocation will not take place. Program action otherwise is the same as that described for ACS 2.

4 (1) Inhibit program relocation. Unless otherwise specified, the program will run in a normal way, but will not relocate from its current 4K field location to the opposite field after completing the memory checkerboard test.

5 (1) Inhibit clock. Unless otherwise specified, program action is normal except that the clock should always be off.

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6 (1) Inhibit the reader and TTY. The punch will run continuously. Tape must be in the reader to prevent the no-tape indicator from being set. Program action is normal unless otherwise specified.

7 (1) Inhibit the punch and TTY. The reader will run continuously. A loop or fan-fold tape with any data may be used. Program action is normal unless otherwise specified.

8 (1) Inhibit the punch. The reader will read 52 characters at full speed and then halt. The TTY will then print the 52 characters read. Any tape loop or fan-fold tape may be used. Program action is normal unless otherwise specified.

Any combination of the nine ACS may be used, as long as the operations do not conflict; i.e., if ACS 2 and 3 are both up, the add random pairs test would be looped. Memory checkerboard would not be run unless the program is restarted with ACS 3 alone.

If using tape loop, use Sw 8 only - Do not let reader run out of tape. 45

The I/O devices may be controlled with several combinations of ACS 6, 7 and 8. If ACS 7 and 8 are both up the reader will run continuously, as if ACS 7 only were up. If ACS 6 and 7 or 6 and 8 are up, all devices will be inhibited. Program interrupt and the real-time clock will be enabled unless otherwise specified.

5.2 Subroutine Abstracts

The PDP-9 Basic Exerciser may be thought of as three separate programs; i.e., the instruction and memory tests; punch, read and print sequence, and operation of the real-time clock. The instruction and memory tests will be interrupted, at a device rate, by the punch, reader or Teletype. The clock will randomly interrupt any of the above operations at a rate determined by the program. After each clock interrupt, the clock is reinitialized with a new number obtained by a random number generator. The clock interrupts should occur no less than 2 seconds apart, nor more than 9 seconds. The clock interrupts take first priority, followed by the Teletype, reader, and punch.

5.2.1 Instruction and Memory Tests - The instruction test portion of the Basic Exerciser performs tests on all operate group and memory reference instructions. The individual instructions are looped a random number of times before proceeding to the next test. The maximum number of loops made on any one test is 32,767.

The adder is tested using two different methods. The first performs bit by bit tests on the adder using the ADD instruction. Besides checking for correct results after an addition, the link is tested during overflow and no overflow conditions.

The second method, the "Add Random Pairs" test, tests the adder using one pair of random numbers (A and B) and their 1's complement values (-A and -B), and the ADD instruction. These four values are added in various combinations, the results of which are compared against precalculated results. The precalculated results are obtained by adding the two pairs together using the TAD instruction. Four additions are made, the results of which are used in the test. The link is tested after each addition. If it is a 1, a 1 is added to the result to simulate an end-around-carry.

The numbers added and their sums are indicated in the listing using the following symbols:

-B+(-A) = SUMNEG
A+B = SUMPOS
B-A = BMASUM
A-B = AMBSUM

The values of A, -A, B and -B plus their sums are used to test the combinations of ADD's shown below.

ADD	SUM SHOULD EQUAL	
A + B	SUMPOS	
-B + A	AMBSUM	
-B + (-A)	SUMNEG	
B - A	BMASUM	
(A + B) - A	BPOS	(B)
(B - A) -B	ANEG	(-A)
(-A-B) +A	BNEG	(-B)
(A - B) +B	APOS	(A)
777777 + A	APOS	
A + B - A	BPOS	
A + B -A -A	BMASUM	(B - A)
A + B -A -A -B	ANEG	
A + B -A -A -B -B	SUMNEG	(-A -B)
A + B -A -A -B -B + A	BNEG	
A + B -A -A -B -B + A + A	AMBSUM	(-B + A)
A + B -A -A -B -B + A +A +B	APOS	

After completing one pass of the above tests, a second pass is made on the same tests. The second pass makes all "B" constants "A", and all "A" constants "B" before repeating.

Immediately following the second pass, one random number and its 1s complement is obtained and saved in APOS and ANEG, respectively. Bit 0 of APOS is tested for equaling 0 or 1. If the value is 1, the bit remains unchanged, and the respective bit in the complement number is changed to equal a 1. The two numbers are then added together, the sum of which should equal all 0s except for bit 0. If the ADD is successful, the program continues testing all other bit positions in the same manner.

Example: (Bit 0 altered)

Step	APOS Value	ANEG Value
1	577776	200001
2	577776	600001 (bit 0 altered)
3	Add together. Result should = altered bit.	

```
    101 111 111 111 111 110
+   110 000 000 000 000 001
  ---------------------------
    011 111 111 111 111 111
+                           1   (end around carry)
  ---------------------------
    100 000 000 000 000 000
```

The sum equals the altered bit position.

After completing the adder tests, the remaining memory reference instructions are tested. The last test performed by the exerciser is the memory checkerboard test. This routine writes and reads four different checkerboard patterns similar to the Basic Memory Checkerboard program. The memory test is looped three times before program relocation takes place.

After completing the memory checkerboard test, the program relocates the entire Basic Exerciser to the opposite 4K field. All memory reference instructions and memory locations used for testing are adjusted accordingly. All locations within the program which reference any memory location between 0 and 21 are not adjusted. These locations are used during program interrupts, autoindexing tests, etc., and must not be altered. Program interrupt is disabled while relocation is taking place.

After relocation of the program is completed, the exerciser is automatically restarted at location 70 (or 10067). This location is tagged SEQUEN. The operator is able to determine the location of the program by observing MB bit 5. This bit will glow brightly when the program is in the higher 4K field, as compared to when residing in the lower 4K field.

The Teletype BELL will ring once for each completed pass of the program. One pass is defined as the program performing all tests from each 4K field, and then relocating back to the field in which the program was first initiated.

When operating the Basic Exerciser with program interrupt inhibited (ACS 1 up), the message "COMPLETE" will be printed after five complete passes of the program. This message is printed after ten passes when ACS 4 (inhibit relocation) as well as ACS 1 is up. This feature is included as a means to determine the number of successful passes completed by the program if it is to be run for extended periods of time.

5.2.2 Punch, Read, Print Sequence - The instruction and memory tests will be interrupted, at a device rate, by the punch, reader, or Teletype. The data punched consists of the alphabet characters, followed by numbers 0 through 9, with a space character being punched between each letter or numeral character. The reader will read the tape at punch speed, storing away any punched character. Frames of all 0s are ignored. The punch and read sequence consists of 52 ASCII characters punched, read and stored away in an input buffer (tagged TTBUFA). After reading the 52nd character, the contents of TTBUFA are transferred directly to another 52 - location buffer tagged TTBUFB. This second buffer is provided to enable the operator to stop the program and compare the contents of either buffer A or buffer B with the punched data on tape. Punch and read operation is halted after the 52nd character is read and stored. The contents of TTBUFB are then printed on the Teletype. The punch and read sequence continues immediately after the 52nd character is printed. The data punched and read should appear on the Teletype as the example below.

```
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z 0 1 2 3 4 5 6 7 8 9
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z 0 1 2 3 4 5 6 7 8 9
```

The punch and read sequence generates 72 characters altogether, even though only 52 are punched, read and printed at one time. The alphabet and numbers sets with a space between each character enables a full line to be printed. The spacing also enables the operator to more easily detect a misprinted character. Each group of 72 characters is separated by 8 blank frames. The group which is positioned in the reader is the current line being printed. A carriage return and a line feed is punched at the end of each group. The program will punch 6 extra blank frames between two groups, approximately every fourteenth group, to enable the slack between reader and punch to remain constant.

5.2.3 Use of the Real Time Clock - The instruction and memory tests, and the punch, read and print sequence are both interrupted randomly by the real-time clock. When a clock interrupt occurs, all other operations are halted until the clock interrupt has been serviced. The program allows the clock to continue incrementing for 1/2 second after the interrupt occurs. This is evident during every clock interrupt by observing MB indicators 12 through 17 incrementing. Immediately after the clock has incremented, an additional 1/2 second, it is reset to a new random value. This value is chosen by the program to ensure that the clock interrupts no sooner than 2 seconds, nor later than 9 seconds. The clock is again enabled after being reset to a new value, and the instruction test or read, punch and print sequence is allowed to continue from the point of interrupt.

At times, the Basic Exerciser may appear to be caught in a loop after a clock interrupt occurs. The console indicators will show the clock and PIE as being disabled, and the punch, read and print sequence will be halted for several seconds. The program during this time is attempting to generate a number for the clock which falls within the 2 to 9 second limit. All operations will be resumed as soon as a suitable random value is found.

The operator may disable the clock interrupts by restarting from location 26 with ACS 5 up.

5.2.4 Interrupt Service Routine - Program interrupts by the clock, punch, reader or Teletype are all serviced by a common routine. A common routine for reentering the instruction test is also used.

Locations 0 through 6 are used to save the contents of the AC and PC immediately after an interrupt occurs. The contents of the AC are stored in the location tagged SAVAC. The contents of the link and PC are stored in the location tagged RJMP. The program then enters a routine which determines which of the four devices interrupted the program. This routine is tagged SRVINT. SRVINT will test for device flags in the following order: clock, Teletype, no-tape flags, reader, punch. The first device flag found to be set indicates the device which must be reinitiated by the program.

Immediately after selecting the proper device, a routine is entered which will restore the contents of the link and AC at the time of the program interrupt. The routine is tagged RTNIT. RTNIT first restores the AC (from SAVAC); restores the link (by testing bit 0 of RJMP); enables program interrupt; and then returns to the instruction test by a JMP indirect on the contents of RJMP.

The operator may disable program interrupts by restarting from location 26 with ACS 1 up.

5.3 Program and Operator Action

See Sections 4.2 and 5.2.

6. ERRORS

6.1 Error Halts and Description

Reference the program listing for all error halts.

All error halts are tagged EXXX, and are commented to aid debugging. Each test is self-contained, and may be looped. See Section 6.2.1 for looping instructions.

Unless a solution is obvious from following the listing, the proper MAINDEC diagnostic for the device in error should be run. This should be necessary mainly when errors are caused by one of the I/O devices. The diagnostics for the I/O devices are listed below:

Device	Program
Real-Time Clock	Instruction Test Part 1
Program Interrupt	Instruction Test Part 1
Punch	Punch Test (9A-D2DB)
Reader	Reader Test (9A-D2CB)
Teletype	TTY Test (9A-D2BB)

Incorrect operation of the real-time clock will appear as clock interrupts occurring sooner than 2 seconds apart, or greater than 9 seconds, or possibly no clock interrupts will occur. Also, after a clock interrupt, the clock should not increment further for any longer than approximately 1/2 second.

Printing of incorrect data may be caused by the data being incorrectly punched, read, or printed. Storage registers, and their locations in the program, which the punch, read, print sequence use are listed below.

Tag	Function
SAVAC (7643)	Saves contents of AC after a program interrupt.
RJMP (7644)	Saves contents of PC and link after a program interrupt.
WORK (7600)	Bit 1 if set indicates TTY is in use.
GOPNCH (6763)	Contains contents of PC at exit from punch routine.
SETCLK (6604)	Routine which sets a random value in clock register 7 when program interrupt is disabled.
CLKSET (6621)	Same function as SETCLK, but is used only after a clock interrupt.
TTOUT (7326)	Location pointer for TTBUFB when printing.
TTIN (7327)	Location pointer for TTBUFA when reading.

Tag	Function
TTBUFA (7361 to 7444)	Storage buffer for characters read.
TTBUFB (7445 to 7531)	Storage for characters to be printed. Contents should equal TTBUFA.
STORE (7336)	Contains character punched.
SETTY (7037)	Routine which is entered after 52 characters have been punched and read. Sets up TTBUFB before printing.
GENRAN (6101)	Random number generator used when PI is disabled.
RANGEN (6133)	Same as GENRAN, but used only after an interrupt.

When data is incorrectly printed, stop the program during print-out. This will enable both TTBUFA and TTBUFB to remain unchanged. TTBUFA will be changed as soon as reading begins.

The data punched is in ASCII mode, and one printed line is indicated on the paper tape by 8 blank frames separating each line. The punched data starts with character A (301) and ends with a line feed (212). A space (240) is punched between all alphabet and number characters.

The line of punched characters in the reader is the line currently being printed. The operator may inspect the tape for an incorrect character punched. If it appears correctly on the tape, it may have been read or printed incorrectly. The characters read are stored in a 52-word buffer beginning at location 7330 (tagged TTBUFA). The characters being printed are stored in a 52-word buffer beginning at location 7414 (tagged TTBUFB). If the program was stopped during printing, these two buffers should contain exactly the same information. The first character read or printed is stored in the first location of either buffer. One character is stored per location. If the data was read incorrectly, the contents of TTBUFA will not equal the last 52 characters on the tape. If the data on tape, and in TTBUFA and TTBUFB are equal, the teleprinter may be at fault.

6.2 Error Recovery

Press CONTINUE to receive further error halts or to continue testing, as indicated by the listing.

Recovery from error halts in the Add Random Pairs test is accomplished by pressing CONTINUE one or more times, depending on the type of error encountered. Pressing CONTINUE after a halt due to an incorrect sum will result in a second halt. The AC will equal the incorrect sum at the first halt, and the sum used for comparison at the second halt. If the error halt is the result of a LINK error, the next test in sequence will be executed.

Recovery from memory checkerboard errors is accomplished by pressing CONTINUE four times. The memory test is restarted after each error halt.

The contents of the AC after each halt will equal the information below.

C (PC)	C (AC)
6351	The address at which the memory error occurred.
6353	What the location should equal (000000 or 777777).
6355	The data as read.
6362	The pattern control word used.

Bit suppression may be accomplished by placing the corresponding ACS up after the halt at location 6354. Place all other ACS down, press CONTINUE, place all ACS down again, and then restore ACS 0 through 5 if needed. The bits selected will not be tested again during the memory test. The selected bits must be reselected after each error halt.

The memory checkerboard test may be continuously looped by restarting from location 26 with ACS 3 up. Program relocation will not take place.

6.2.1 Looping on Individual Tests - Looping on individual tests, except for the interrupt routines, Add Random Pairs test and Memory test, is accomplished by placing a JMP instruction in the first location of the next test in sequence. The address in the JMP instruction should equal the first location of the test to be looped. Restart the program at location 26, if program interrupt is to be enabled. Restart at the first location of the test to be looped, if interrupts are not wanted.

The complete series of tests for any one instruction may be looped by placing a NOP in the location which contains ISZ WORK3. This instruction appears at the end of each series of tests for each instruction. Restart at location 26, or at the beginning of the test to be looped.

6.2.2 Looping on Add Random Pairs - The complete series of tests may be looped by restarting from location 26 with ACS 2 up.

The individual tests may be looped by changing the LAW instruction, appearing after each test, to a JMP. For example, to loop on (A-B) + B = A (tagged AMBPBT), change the LAW AMBPBT instruction to JMP AMBPBT. Restart from location 26, or AMBPBT.

6.2.3 Looping on Memory Checkerboard - Place ACS 3 up, and restart from location 26.

6.2.4 Error Print-outs - The program continually tests for reader or punch no tape indicators being set. When either indicator is set the message "R NO TAPE", or "P NO TAPE" will be printed. The program continues on in sequence after either print-out.

7. OPERATING RESTRICTIONS

All MAINDEC diagnostics which apply to a basic PDP-9 configuration should be run before attempting to run this program.

8. MISCELLANEOUS

8.1 Execution Time

Approximately 1-1/2 minutes are required to execute all tests for one 4K field.

9. PROGRAM DESCRIPTION

The Basic Exerciser performs tests on all operate and memory reference instructions plus core memory.

During normal operation (all ACS down) the program exercises the real-time clock, punch, reader, Teletype and program interrupt while the instruction test portion is running. The MB indicators will change according to the portion of the instruction test currently being executed. When a clock interrupt occurs the MB bits 12 to 17 will increment for 1/2 second (due to clock counts), after which the MB indicators will return to their original state upon re-entering the instruction test.

When the punch, read and print sequence is operated with the instruction test inhibited (ACS 0 up) the MB will indicate a constant 600131 (JMP 131). On the listing this is written as JMP. at location 131. At location 130 the program interrupt is enabled, and all device interrupts will cause an interrupt immediately after the execution of the JMP. instruction. The interrupts are handled in the same manner as if the instruction test portion were operating; the difference being that the interrupt service routine (RTNIT) always returns to location 131 after reinitiating the device which caused the interrupt, instead of returning to the instruction test portion.

The instruction test portion of the program consists of MAINDEC 9A-D01A and D02A (Instruction Test, Parts 1 and 2) condensed onto one tape. Refer to the program listing or flow chart for the testing sequence.

The memory test is executed after the instruction test portion is completed. This test is similar to MAINDEC 9A-D1AA Basic Memory Checkerboard Test. This test is performed three times, after which a routine is entered which relocates the Basic Exerciser to the opposite 4K field in core memory (unless ACS 4 is up). The Exerciser is automatically restarted after relocation is completed.

If no errors occur, the Basic Exerciser will run until stopped by the operator.

10. LISTING

BASEX9 PAGE 1

```
                                .TITLE BASEX9
                            /PDP-9 BASIC EXERCISER
                            /
                                .ABS
00000                           .LOC 0
                            /
                            /PDP-9 INSTRUCTION TEST (CONDENSED)
                            /
00000   000000                    0
00001   741000                    SKP
00002   740040          F1        HALT                    /ERROR, PC INCREMENTED BY
                                                          /2 AT TIME OF P. I.
00003   047643                    DAC SAVAC               /SAVE AC
00004   200000                    LAC 0
00005   047644                    DAC RJMP                /SAVE PC AND LINK
00006   606536                    JMP SRVINT                      /SERVICE INTERRUPT
                            /
        740000              NOP1=NOP
        740000              NOP2=NOP
        740000              NOP3=NOP
        740040              HALT=HLT
                            /
00022                           .LOC 22
                            /
00022   107171          BEGIN    JMS PNLEDR
00023   107203                   JMS PNMARK
00024   107171                   JMS PNLEDR
00025   740040                   HALT
00026   147635                   DZM WORK4
00027   147312                   DZM BREAK
00030   703302                   CAF
00031   147631                   DZM WORK                /PRESS CONTINUE TO
00032   146763                   DZM GOPNCH                      /CLEAR GOPNCH
00033   206676                   LAC DATARL
00034   047327                   DAC TTIN                /SETUP POINTERS
00035   047326                   DAC TTOUT
00036   447326                   ISZ TTOUT
00037   167326                   DZM* TTOUT                      /CLEAR TTY BIN
00040   207326                   LAC TTOUT
00041   546677                   SAD ENDBIN
00042   741000                   SKP
00043   600036                   JMP .-5
00044   206676                   LAC DATARL                      /RESTORE POINTER
00045   047326                   DAC TTOUT
00046   206124                   LAC ENDTRL
00047   047313                   DAC WDCNT
00050   777737                   LAW -41
00051   047242                   DAC CRLF
00052   447313                   ISZ WDCNT
00053   167313                   DZM* WDCNT                      /CLEAR ERROR TABLE
00054   447242                   ISZ CRLF
00055   600052                   JMP .-3
                                 .EJECT
```

```
****
      00056     700002                IOF                 /PI OFF
      00057     750000                CLA
      00060     700104                RSA                 /INITIALIZE READER, PUNCH
      00061     750004                LAS
      00062     507547                AND K3K
      00063     741200                SNA                 /IF ACS 7 OR 8 A 1, DON'T PUNCH
      00064     700204                PSA
      00065     200130                LAC INITPI                  /INITPI = PNSTRT
      00066     046763                DAC GOPNCH
      00067     047644                DAC RJMP            /(RJMP) = PNSTRT
      00070     207617          SEQUEN LAC KSKP           /RESTORE ADDRESS 1 (SKP)
      00071     040001                DAC 1
      00072     206533                LAC SAV3            /RESTORE ADDRESS 3
      00073     040003                DAC 3
      00074     207652                LAC SAV4            /RESTORE ADDRESS 4
      00075     040004                DAC 4
      00076     206534                LAC SAV5            /RESTORE ADDRESS 5
      00077     040005                DAC 5
      00100     206535                LAC SAV6            /RESTORE ADDRESS 6
      00101     040006                DAC 6
      00102     207650                LAC KHALT           /RESTORE ADDRESS 2 (HALT)
      00103     040002                DAC 2
      00104     447635                ISZ WORK4           /PASS COUNTER
      00105     750004                LAS
      00106     507556                AND K10K
      00107     741200                SNA                 /CHECK ACS 5 FOR INHIBIT CLOCK
      00110     106604                JMS SETCLK
      00111     750004                LAS
      00112     741100                SPA
      00113     600131                JMP INHIT           /INHIBIT INST. TEST
      00114     740010                RAL
      00115     740100                SMA                 /CHECK FOR INHIBIT PI
      00116     700042                ION                 /PI ON
      00117     750004                LAS
      00120     507321                AND K100K
      00121     740200                SZA                 /CHECK LOOP ON RANDOM ADD
      00122     602360                JMP RANADD-2        /LOOP
      00123     750004                LAS
      00124     507553                AND K40K
      00125     740200                SZA                 /CHECK LOOP ON CHECKERBOARD
      00126     606055                JMP E641+3                  /LOOP
      00127     600133                JMP IOTST-2
                                      /
      00130     006702          INITPI  PNSTRT
                                      /
                                      /INHIBIT INSTRUCTION TEST
      00131     700042          INHIT   ION
      00132     600132                JMP .               /WAIT FOR PI
                                      .EJECT
```

```
****
                                /TEST CLEAR AC AT EVENT TIME 1 WITH MB 14.
                                /
00133   106102                  JMS GENRAN                      /GET NO. FOR LOOP
00134   106126                  JMS CKNO
00135   750001  IOTST           CLA!CMA         /AC = 7777777
00136   700110                  700110
00137   740200                  SZA             /AC = 0
00140   740040  F24             HALT            /ERROR, AC NOT 0
                                /
00141   750001                  CLA!CMA         /AC = 777777
00142   700210                  700210
00143   740200                  SZA             /AC = 0
00144   740040  F25             HALT            /ERROR, AC NOT 0
                                /
00145   750001                  CLA!CMA         /AC = 777777
00146   700310                  700310
00147   740200                  SZA             /AC = 0
00150   740040  F26             HALT            /ERROR, AC NOT 0
                                /
00151   750001                  CLA!CMA         /AC = 777777
00152   700010                  700010
00153   740200                  SZA             /AC = 0
00154   740040  F27             HALT            /ERROR, AC NOT 0
                                /
00155   447634                  ISZ WORK3       /CHECK DONE LOOPING
00156   600135                  JMP IOTST       /LOOP
00157   106102                  JMS GENRAN                      /GET NO. FOR NEXT TEST
00160   106126                  JMS CKNO
                                .EJECT
```

```
****
                        /TEST IOT 3344 (DBR), L= 0
                        /
00161   744000  TSDBR   CLL                     /LINK = 0
00162   100204          ~~JMS DBRX~~ JMP 223
00163   741400          SZL
00164   740040  F28     HALT                    /ERROR.  DBR FAILED; LINK NOT 0
                        /
                        /TEST IOT 3344 (DBR), < = 1
                        /
00165   744002          CLL!CML                 /L = 1
00166   100204          JMS DBRX
00167   740400          SNL
00170   740040  F29     HALT                    /ERROR.  DBR FAILED.  LINK NOT 1
                        /
                        /TEST IOT 3344 (DBR), L = 0
                        /
00171   754000          CLL!CLA                 /AC, L = 0
00172   100207          JMS DBRXX
00173   740400          SNL
00174   740040  F30     HALT                    /ERROR.  DBR FAILED, LINK NOT 1
                        /
                        /TEST IOT 3344 (DBR), L = 1
                        /
00175   754002          CLL!CML!CLA             /L = 1, AC = 0
00176   100215          JMS DBRXXX
00177   751400          CLA!SZL
00200   740040  F31     HALT                    /ERROR.  DBR FAILED, LINK NOT 0
00201   447634          ISZ WORK3               /CHECK DONE LOOPING
00202   600161          JMP TSDBR               /LOOP
00203   600223          JMP OPRAT               /START INSTRUCTION TEST
                        /
00204   000000  DBRX    0                       /LEAVE LINK ALONE
00205   703344          703344                  /DBR
00206   620204          JMP* DBRX
                        /
00207   000000  DBRXX    0
00210   200207          LAC DBRXX
00211   347554          TAD K4000K              /SET LINK TO A ONE
00212   040207          DAC DBRXX
00213   703344          703344                  /DBR
00214   620207          JMP* DBRXX
                        /
00215   000000  DBRXXX   0
00216   200215          LAC DBRXXX
00217   507627          AND M4000K              /CLEAR LINK
00220   040215          DAC DBRXXX
00221   703344          703344                  /DBR
00222   620215          JMP* DBRXXX
                        .EJECT
```

```
****
                        /TEST OPERATE GROUP
                        /
00223   106102  OPRAT   JMS GENRAN      /GET NO. FOR LOOP ON TEST
00224   106126          JMS CKNO
00225   777777  OPERAT  LAW 17777       /AC = 777777
                        /
00226   741000          SKP             /TEST SKP
00227   740040  E32     HALT            /ERROR; SKP FAILED TO SKIP
                        /
                        /TEST CLA - SZA
00230   750000          CLA             /AC = 0
00231   740200          SZA
00232   740040  E33     HALT            /ERROR; CLA OR SZA FAILED TO SKIP
                        /
                        /TEST SMA
00233   750000          CLA             /AC = 0
00234   740100          SMA
00235   741000          SKP
00236   740040  E34     HALT            /ERROR; SAME SKIPPED
                        /
                        /TEST SPA
00237   750000          CLA
00240   741100          SPA
00241   740040  E35     HALT            /ERROR; SPA FAILED TO SKIP
                        /
                        /TEST SNA
00242   750000          CLA
00243   741200          SNA
00244   741000          SKP
00245   740040  E36     HALT            /ERROR; SNA SKIPPED
                        /
                        /TEST SZL - CLL
00246   744000          CLL             /LINK = 0
00247   741400          SZL
00250   740040  E37     HALT            /ERROR; SZL FAILED TO SKIP OR
                                        /CLL FAILED TO CLEAR LINK
                        /
                        /TEST SNL
00251   744000          CLL             /LINK = 0
00252   740400          SNL
00253   741000          SKP
00254   740040  E38     HALT            /ERROR; SNL SKIPPED
                        .EJECT
```

```
****
                        /TEST CLA CLL
00255   754000                  CLA!CLL         /AC, LINK = 0
00256   740200                  SZA
00257   740040          E39     HALT            /ERROR; AC NOT 0
                        /
                        /TEST CLA CLL
00260   754000                  CLA!CLL         /AC AND LINK = 0
00261   741400                  SZL
00262   740040          E40     HALT            /ERROR; LINK NOT 0
                        /
                        /TEST SKP SPA
00263   750000                  CLA
00264   741100                  SKP!SPA
00265   740040          E41     HALT            /ERROR; SKP!SPA FAILED TO SKIP
                        /
                        /TEST SKP SNA
00266   750000                  CLA
00267   741200                  SKP!SNA
00270   741000                  SKP
00271   740040          E42     HALT            /ERROR; SKP;SNA SKIPPED
                        /
                        /TEST SKP SZL
00272   744000                  CLL             /LINK = 1
00273   741400                  SKP!SZL
00274   740040          E43     HALT            /ERROR; SKP;SZL FAILED TO SKIP
                        /
                        /TEST SPA SNA
00275   750000                  CLA
00276   741300                  SPA!SNA
00277   741000                  SKP
00300   740040          E44     HALT            /ERROR; SPA!SNA SKIPPED
                        /
                        /TEST SPA SZL
00301   754000                  CLA!CLL         /LINK AND AC = 0
00302   741500                  SPA!SZL
00303   740040          E45     HALT            /ERROR; SPA!SZL FAILED TO SKIP
                        /
                        /TEST SNA SZL
00304   754000                  CLA!CLL         /LINK AND AC = 0
00305   741600                  SNA!SZL
00306   741000                  SKP
00307   740040          E46     HALT            /ERROR; SNA!SZL SKIPPED
                        /
                        /TEST SNA, SPA, SKP, SZL
00310   754000                  CLA!CLL         /AC AND LINK = 0
00311   741700                  SKP!SPA!SZL!SNA
00312   741000                  SKP             /ERROR; SNA!SPA!SKP!SZL SKIPPED
00313   740040          E47     HALT
                                .EJECT
```

```
↑↑↑↑
                        /TEST SMA SZA
00314   750000                  CLA
00315   740300                  SMA!SZA
00316   740040  E48             HALT            /ERROR; SMA SZA FAILED TO SKIP
                        /
                        /TEST SMA SNL
00317   754000                  CLA!CLL         /LINK AND AC = 0
00320   740500                  SMA!SNL
00321   741000                  SKP
00322   740040  E49             HALT            /ERROR; SMA!SNL SKIPPED
                        /
                        /TEST SZA SNL
00323   754000                  CLA!CLL
00324   740600                  SZA!SNL
00325   740040  F50             HALT            /ERROR; SZA!SNL SKIPPED
                        /
                        /TEST SMA SZA SNL
00326   754000                  CLA!CLL
00327   740700                  SMA!SZA!SNL
00330   740040  F51             HALT            /ERROR; SMA!SZA!SNL FAILED TO SKIP
                        /
                        /TEST CML - SZL
00331   744000                  CLL             /LINK = 0
00332   740002                  CML             /LINK = 1
00333   741400                  SZL
00334   741000                  SKP
00335   740040  F52             HALT            /ERROR; SZL SKIPPED OR
                                                /CML FAILED TO SET LINK
                        /
                        /TEST CLL
00336   744000                  CLL             /LINK = 0
00337   740002                  CML             /LINK = 1
00340   744000                  CLL             /LINK = 0
00341   741400                  SZL
00342   740040  F53             HALT            /ERROR; CLL FAILED TO CLEAR LINK
                        /
                        /TEST CML
00343   744000                  CLL             /LINK = 0
00344   740002                  CML             /LINK = 1
00345   740002                  CML             /LINK = 0
00346   741400                  SZL
00347   740040  F54             HALT            /ERROR; CML FAILED TO SET LINK
                        /
                        /TEST CLL CML
00350   744000                  CLL             /LINK = 1
00351   740002                  CML             /LINK = 1
00352   744002                  CLL!CML         /LINK = 1
00353   741400                  SZL
00354   741000                  SKP
00355   740040  F55             HALT            /ERROR; CLL!CML FAILED TO SET LINK
                                .EJECT
```

```
****
                             /TEST CLL CML
   00356     744000                    CLL                   /LINK = 0
   00357     740002                    CML                   /LINK = 1
   00360     744000                    CLL                   /LINK = 0
   00361     744002                    CLL!CML               /LINK = 1
   00362     741400                    SZL
   00363     741000                    SKP
   00364     740040          E56       HALT                  /ERROR; CLL!CML FAILED TO SET LINK
                             /
                             /TEST SKP SZL
   00365     744000                    CLL                   /LINK = 0
   00366     741400                    SKP!SZL
   00367     740040          E57       HALT                  /ERROR; SKP!SZL FAILED TO SKIP
                             /
                             /TEST SZL SNA
   00370     750000                    CLA                   /AC = 0
   00371     744002                    CLL!CML               /LINK = 1
   00372     741600                    SZL!SNA
   00373     741000                    SKP
   00374     740040          E58       HALT                  /ERROR; SZL!SNA SKIPPED
                             /
                             /TEST SZL SPA
   00375     750000                    CLA                   /AC = 0
   00376     744002                    CLL!CML               /LINK = 1
   00377     741500                    SZL!SPA
   00400     741000                    SKP
   00401     740040          E59       HALT                  /ERROR; SZL!SPA SKIPPED
                             /
                             /TEST CLA CLL CML
   00402     754002                    CLA!CLL!CML           /AC = 0,  LINK = 1
   00403     741400                    SZL
   00404     741000                    SKP
   00405     740040          E60       HALT                  /ERROR; LINK NOT 1
                             /
                             /TEST CLA CLL CML
   00406     754002                    CLA!CLL!CML           /AC = 0, LINK = 1
   00407     740200                    SZA
   00410     740040          E61       HALT                  /ERROR; AC NOT 0
                             /
                             /TEST SNL SZA
   00411     754002                    CLA!CLL!CML           /AC = 0, LINK = 1
   00412     740600                    SNL!SZA
   00413     740040          E62       HALT                  /ERROR; SNL!SZA FAILED TO SKIP
                             /
                             /TEST SNL SMA
   00414     754002                    CLA!CLL!CML           /AC = 0, LINK = 1
   00415     740500                    SNL!SMA
   00416     740040          E63       HALT                  /ERROR; SNL!SMA FAILED TO SKIP
                                       .EJECT
```

```
↑↑↑↑
                        /TEST SNL SZA SMA
00417   754002          CLA!CLL!CML     /AC = 0, LINK = 1
00420   740700          SNL!SZA!SMA
00421   740040  F64     HALT            /ERROR: SNL!SZA!SMA FAILED TO SKIP
                        /
                        /TEST CMA CLA
00422   750000          CLA             /AC = 0
00423   740001          CMA             /AC = ONES
00424   750000          CLA
00425   741200          SNA
00426   741000          SKP
00427   740040  F65     HALT            /ERROR: CLA FAILED TO CLEAR AC
                        /
                        /TEST CMA SPA
00430   750000          CLA             /AC = 0
00431   740001          CMA             /AC = ONES
00432   741100          SPA
00433   741000          SKP
00434   740040  F66     HALT            /ERROR: SPA SKIPPED OR
                                        /CMA FAILED TO SET AC BIT 0
                        /
                        /TEST CMA SNA
00435   750000          CLA             /AC = 0
00436   740001          CMA             /AC = ONES
00437   741200          SNA
00440   740040  F67     HALT            /ERROR: SNA FAILED TO SKIP
                                        /OR CMA FAILED TO SET ANY AC BIT
                        /
                        /TEST CMA
00441   750000          CLA             /AC = 0
00442   740001          CMA             /AC = ONES
00443   740001          CMA             /AC = 0
00444   741200          SNA
00445   741000          SKP
00446   740040  F68     HALT            /ERROR: CMA FAILED TO
                                        /COMPLEMENT AC TO 0
                        /
                        /TEST CLA CMA
00447   750001          CLA!CMA         /AC = ONES
00450   741200          SNA
00451   740040  F69     HALT            /ERROR: CLA!CMA FAILED TO
                                        /SET ANY AC BIT
                        .EJECT
```

```
↑↑↑↑
                                /TEST SZA
    00452     750001                     CLA!CMA              /AC = ONES
    00453     740200                     SZA
    00454     741000                     SKP
    00455     740040            E70      HALT                 /ERROR; SZA SKIPPED
                                /
                                /TEST SMA
    00456     750001                     CLA!CMA              /AC = ONES
    00457     740100                     SMA
    00460     740040            E71      HALT                 /ERROR; SMA FAILED TO SKIP
                                /
                                /TEST SKP SPA
    00461     750001                     CLA!CMA              /AC = ONES
    00462     741100                     SKP!SPA
    00463     741000                     SKP
    00464     740040            E72      HALT                 /ERROR; SKP!SPA SKIPPED
                                /
                                /TEST SKP SNA
    00465     750001                     CLA!CMA              /AC = ONES
    00466     741200                     SKP!SNA
    00467     740040            E73      HALT                 /ERROR; SKP!SNA FAILED TO SKIP
                                /
                                /TEST SPA SNA
    00470     750001                     CLA!CMA              /AC = ONES
    00471     741300                     SPA!SNA
    00472     741000                     SKP
    00473     740040            E74      HALT                 /ERROR; SPA!SNA SKIPPED
                                /
                                /TEST SKP SNA SPA
    00474     754003                     CLA!CMA!CLL!CML      /AC = ONES, LINK = 1
    00475     741700                     SNA!SPA!SKP!SZL
    00476     741000                     SKP
    00477     740040            E75      HALT                 /ERROR; SKP!SNA!SPA!SZL SKIPPED
                                /
                                /TEST SMA!SZA
    00500     750001                     CLA!CMA              /AC = ONES
    00501     740300                     SMA!SZA
    00502     740040            E76      HALT                 /ERROR; SMA!SZA FAILED TO SKIP
                                /
                                /TEST SMA SZA SNL
    00503     754003                     CLA!CMA!CLL!CML      /AC = ONE, LINK = 1
    00504     740700                     SMA!SZA!SNL
    00505     740040            E77      HALT                 /ERROR; SMA!SZA!SNL
                                /
                                /TEST NOP
    00506     750001                     CLA!CMA              /AC = ONES
    00507     740000                     NOP
    00510     740001                     CMA                  /AC = 0
    00511     740200                     SZA
    00512     740040            E78      HALT                 /ERROR; NOP ALTERED THE AC
                                /
                                         .EJECT
```

```
****
                        /TEST NOP
00513   750000                  CLA             /AC = 0
00514   740000                  NOP
00515   740200                  SZA
00516   740040  F79             HALT            /ERROR; NOP SET AN AC BIT
                        /
                        /TEST NOT
00517   744002                  CLL!CML         /LINK = 1
00520   740000                  NOP
00521   740400                  SNL
00522   740040  E80             HALT            /ERROR; NO CLEARED THE LINK
                        /
                        /TEST NOP
00523   744000                  CLL             /LINK = 0
00524   740000                  NOP
00525   741400                  SZL
00526   740040  E81             HALT            /ERROR; NOP SET THE LINK
                        /
                        /TEST SZA CMA
00527   750000                  CLA             /AC = 0
00530   740201                  SZA!CMA         /AC = ONES
00531   740040  F82             HALT            /ERROR; SZA FAILED TO SKIP
                        /
                        /TEST SZA CLA
00532   750001                  CLA!CMA         /AC = ONES
00533   750200                  SZA!CLA         /AC = 0
00534   741000                  SKP
00535   740040  E83             HALT            /ERROR; SZA SKIPPED
                        /
                        /TEST SZL CML
00536   744000                  CLL             /LINK = 0
00537   741402                  SZL!CML
00540   740040  F84             HALT            /ERROR; SZL FAILED TO SKIP
                        /
                        /TEST SZL CLL
00541   744002                  CLL!CML         /LINK = 1
00542   745400                  SZL!CLL
00543   741000                  SKP
00544   740040  F85             HALT            /ERROR; SZL SKIPPED
                        /
                        /TEST SKP SZL SPA CLA CLL
00545   754003                  CLA!CMA!CLL!CML     /AC = ONES, LINK = 1
00546   755500                  SKP!SZL!SPA!CLA!CLL /AC = 0, LINK = 0
00547   741000                  SKP
00550   740040  F86             HALT            /ERROR; SKP!SZL!SPA SKIPPED
                                .EJECT
```

```
****
                        /TEST SZA SNL CMA CLL
00551   754002                  CLA!CLL!CML             /AC = 0, LINK = 1
00552   744601                  SZA!SNL!CMA!CLL         /AC=ONES, LINK =0
00553   740040          F87     HALT                    /ERROR, SZA!SNL FAILED TO SKP
                        /
                        /TEST CLA SKP
00554   750001                  CLA!CMA                 /AC = ONES
00555   751000                  SKP!CLA                 /AC = 0
00556   740000                  NOP
00557   740200                  SZA
00560   740040          F88     HALT                    /ERROR, CLA FAILED TO CLEAR AC
                        /
                        /TEST SKP CLA CMA
00561   750000                  CLA                     /AC = 0
00562   751001                  SKP!CLA!CMA             /AC = ONES
00563   740000                  NOP
00564   740001                  CMA
00565   740200                  SZA
00566   740040          F89     HALT                    /ERROR, CLA!CMA FAILED TO
                                                        /COMPLEMENT THE AC
                        /
                        /TEST SKP CLL CML
00567   744000                  CLL                     /LINK = 0
00570   745002                  SKP!CLL!CML             /LINK = 1
00571   740000                  NOP
00572   740400                  SNL
00573   740040          F90     HALT                    /ERROR, CLL!CML FALED TO SET THE LINK
                        /
                        /TEST CMA SERIES
00574   750001                  CLA!CMA                 /AC = ONES
00575   740001                  CMA                     /AC = 0
00576   740001                  CMA                     /AC = ONES
00577   740001                  CMA                     /AC = 0
00600   740001                  CMA                     /AC = ONES
00601   740001                  CMA                     /AC = 0
00602   740200                  SZA
00603   740040          F91     HALT                    /ERROR, AC NOT 0 CMA FAILED
                        /
                        /TEST CML SERIES
00604   744002                  CLL!CML                 /LINK = 1
00605   740002                  CML                     /LINK = 0
00606   740002                  CML                     /LINK = 1
00607   740002                  CML                     /LINK = 0
00610   740002                  CML                     /LINK = 1
00611   740002                  CML                     /LINK = 0
00612   741400                  SZL
00613   740040          F92     HALT                    /ERROR, LINK NOT 0 CML FAILED
                        /
00614   447634                  ISZ WORK3               /CHECK DONE LOOPING
00615   600225                  JMP OPERAT                      /LOOP
00616   106102                  JMS GENRAN                      /GET NO, FOR NEXT LOOP
00617   106126                  JMS CKNO
                                .EJECT
```

```
↑↑↑↑
                                /
                                /TEST RAR SERIES AND LINK
     00620      754002          RTAT    CLA!CLL!CML             /AC = 0, LINK = 1
     00621      740020                  RAR
     00622      740020                  RAR
     00623      740020                  RAR
     00624      740020                  RAR
     00625      740020                  RAR
     00626      740020                  RAR
     00627      740020                  RAR
     00630      740020                  RAR
     00631      740020                  RAR
     00632      740020                  RAR
     00633      740020                  RAR
     00634      740020                  RAR
     00635      740020                  RAR
     00636      740020                  RAR
     00637      740020                  RAR
     00640      740020                  RAR
     00641      740020                  RAR
     00642      740020                  RAR
     00643      741600                  SNA!SZL
     00644      740040          E113    HALT                    /ERROR; AC BIT 17 NOT 1, OR LINK = 1
                                                                /AFTER ROTATE SERIES
                                        .EJECT
```

```
****
                                /TEST RAL SERIES AND LINK
      00645     754002                CLA!CLL!CML           /AC = 0, LINK = 1
      00646     740010                RAL
      00647     740010                RAL
      00650     740010                RAL
      00651     740010                RAL
      00652     740010                RAL
      00653     740010                RAL
      00654     740010                RAL
      00655     740010                RAL
      00656     740010                RAL
      00657     740010                RAL
      00660     740010                RAL
      00661     740010                RAL
      00662     740010                RAL
      00663     740010                RAL
      00664     740010                RAL
      00665     740010                RAL
      00666     740010                RAL
      00667     740010                RAL
      00670     741600                SNA!SZL
      00671     740040          F114  HALT                  /ERROR: AC BIT 0 NOT 1, OR LINK = 1
                                                            /AFTER ROTATE SERIES
                                /
                                /TEST RTL SERIES AND LINK
      00672     754002                CLA!CLL!CML           /AC = 0, LINK = 1
      00673     742010                RTL
      00674     742010                RTL
      00675     742010                RTL
      00676     742010                RTL
      00677     742010                RTL
      00700     742010                RTL
      00701     742010                RTL
      00702     742010                RTL
      00703     742010                RTL
      00704     741600                SNA!SZL
      00705     740040          F115  HALT                  /ERROR: AC BIT 0 NOT 1, OR LINK = 1
                                                            /AFTER ROTATE SERIES
                                /
                                /TEST RTR SERIES AND LINK
      00706     754002                CLA!CLL!CML           /AC = 0, LINK = 1
      00707     742020                RTR
      00710     742020                RTR
      00711     742020                RTR
      00712     742020                RTR
      00713     742020                RTR
      00714     742020                RTR
      00715     742020                RTR
      00716     742020                RTR
      00717     742020                RTR
      00720     741600                SNA!SZL
      00721     740040          F116  HALT                  /ERROR: AC BIT 17 NOT 1, OR LINK = 1
                                                            /AFTER ROTATE SERIES
                                      .EOT
```

```
                        /PDP-9 BASIC EXERCISER - TAPE 2
                        /
                        /RAR SERIES
000722  754001  RTSS    CLA!CMA!CLL             /AC = ONES, LINK = 0
000723  740020          RAR;    RAR;    RAR;    RAR
000724  740020
000725  740020
000726  740020
000727  740020          RAR;    RAR;    RAR;    RAR
000730  740020
000731  740020
000732  740020
000733  740020          RAR;    RAR;    RAR;    RAR
000734  740020
000735  740020
000736  740020
000737  740020          RAR;    RAR;    RAR;    RAR
000740  740020
000741  740020
000742  740020
000743  740020          RAR;    RAR
000744  740020
000745  740003          CMA!CML                 /AC = 000001, LINK = 0
000746  741600          SNA!SZL
000747  740040  F140    HALT                    /ERROR: AC BIT 17 NOT 1, OR LINK = 0
                                                /AFTER ROTATE SERIES
                        /
                        /
                        /TEST RAL SERIES TEST
000750  754001          CLA!CMA!CLL             /AC = ONES, LINK = 0
000751  740010          RAL;    RAL;    RAL;    RAL
000752  740010
000753  740010
000754  740010
000755  740010          RAL;    RAL;    RAL;    RAL
000756  740010
000757  740010
000760  740010
000761  740010          RAL;    RAL;    RAL;    RAL
000762  740010
000763  740010
000764  740010
000765  740010          RAL;    RAL;    RAL;    RAL
000766  740010
000767  740010
000770  740010
000771  740010          RAL;    RAL;    CML     /AC = 377777, LINK = 0
000772  740010
000773  740002
000774  741500          SPA!SZL
000775  740040  F141    HALT                    /ERROR: AC BIT 0 NOT 0, OR LINK = 0
                                                /AFTER ROTATE SERIES
                        .EJECT
```

```
****
                        /TEST RTL SERIES
000776  754001                CLA!CMA!CLL             /AC = ONES, LINK = 0
000777  742010                RTL;        RTL;        RTL;        RTL
001000  742010
001001  742010
001002  742010
001003  742010                RTL;        RTL;        RTL;        RTL
001004  742010
001005  742010
001006  742010
001007  742010                RTL;        CML         /LINK = 0
001010  740002
001011  741500                SPA!SZL
001012  740040        F142    HALT                    /ERROR; AC BIT 0 NOT 0, OR LINK = 0
                                                      /AFTER ROTATE SERIES
                        /
                        /TEST RTR SERIES
001013  754001                CLA!CMA!CLL             /AC = ONES, LINK = 0
001014  742020                RTR;        RTR;        RTR;        RTR
001015  742020
001016  742020
001017  742020
001020  742020                RTR;        RTR;        RTR;        RTR
001021  742020
001022  742020
001023  742020
001024  742020                RTR
001025  740003                CMA!CML                 /AC = 000001, LINK = 0
001026  741600                SNA!SZL
001027  740040        F143    HALT                    /ERROR; AC BIT 17 NOT 1, OR LINK = 0
                                                      /AFTER ROTATE SERIES
                                .EJECT
```

```
                                /
                                /TEST RAL!SNA
01030   754002                          CLA!CLL!CML             /AC = 0, LINK = 1
01031   741210                          RAL!SNA
01032   741000                          SKP
01033   740040          F162            HALT                    /ERROR; SNA SKIPPED
                                /
                                /TEST RAR!SNA
01034   754002                          CLA!CLL!CML             /AC = 0, LINK = 1
01035   741220                          RAR!SNA
01036   741000                          SKP
01037   740040          F163            HALT                    /ERROR; SNA SKIPPED
                                /
                                /TEST RTL"SNA
01040   754002                          CLA!CLL!CML             /AC = 0, LINK = 1
01041   743210                          RTL!SNA
01042   741000                          SKP
01043   740040          F164            HALT                    /ERROR; SNA SKIPPED
                                /
                                /TEST RTR!SNA
01044   754002                          CLA!CLL!CML             /AC = 0, LINK = 1
01045   743220                          RTR!SNA
01046   741000                          SKP
01047   740040          F165            HALT                    /ERROR; SNA SKIPPED
                                /
                                /TEST RAL!SNA
01050   754002                          CLA!CLL!CML             /AC = 0, LINK = 1
01051   740020                          RAR                     /AC = 400000
01052   741210                          SNA!RAL
01053   740040          F166            HALT                    /ERROR, SNA FAILED TO SKIP
                                /
                                /TEST RAR!SNA
01054   754002                          CLA!CLL!CML             /AC = 0, LINK = 1
01055   740010                          RAL                     /AC = 000001
01056   741220                          SNA!RAR
01057   740040          F167            HALT                    /ERROR; SNA FAILED TO SKIP
                                        .EJECT
```

```
                        /TEST RTL!SNA
01060   754002                  CLA!CLL!CML             /AC = 0, LINK = 1
01061   742020                  RTR                     /AC = 200000
01062   743210                  SNA!RTL
01063   740040          F168    HALT                    /ERROR: SNA FAILED TO SKIP
                        /
                        /TEST RTR!SNA
01064   754002                  CLA!CLL!CML             /AC = 0, LINK = 1
01065   742010                  RTL
01066   743220                  SNA!RTR
01067   740040          F169    HALT                    /ERROR: SNA FAILED TO SKIP
                        /
                        /TEST CLL!SNA!RAR
01070   754001                  CLA!CMA!CLL             /AC = ONES, LINK = 0
01071   751220                  CLA!SNA!RAR
01072   740040          F170    HALT                    /ERROR: SNA FAILED TO SKIP
01073   447634                  ISZ WORK3               /CHECK DONE LOOPING
01074   600620                  JMP RTAT                /LOOP
01075   106102                  JMS GENRAN                      /GET NO FOR NEXT LOOP
01076   106126                  JMS CKNO
                        /
                                .EJECT
```

```
***
                        /
                        /TEST LAW 760000
01077   754000  TLAW    CLA!CLI                 /AC = 0
01100   760000          LAW 00000               /AC = 760000
01101   740010          RAL                     /AC = 740000
01102   744400          SNL!CLL                 /LINK = 1
01103   740040  F206    HALT                    /ERROR: AC NOT 0 NOT A 1,
                                                /LAW 760000 FAILED
01104   740010          RAL                     /AC = 700000
01105   744400          SNL!CLL                 /LINK = 1
01106   740040  F207    HALT                    /ERROR: AC BIT 1 NOT A 1
                                                /LAW 760000 FAILED
01107   740010          RAL                     /AC = 600000
01110   744400          SNL!CLL                 /LINK = 1
01111   740040  F208    HALT                    /ERROR: AC BIT 2 NOT A 1
                                                /LAW 760000 FAILED
01112   740010          RAL                     /AC = 400000
01113   744400          SNL!CLL                 /LINK = 1
01114   740040  F209    HALT                    /ERROR: AC BIT 3 NOT A 1
                                                /LAW 760000 FAILED
01115   740010          RAL                     /AC = 000000
01116   744400          SNL!CLL                 /LINK = 1
01117   740040  F210    HALT                    /ERROR: AC BIT 4 NOT A 1
                                                /LAW 760000 FAILED
01120   740200          SZA                     /AC = 000000
01121   740040  F211    HALT                    /ERROR: AC BITS 5-17 NOT 0
                                                /LAW 760000 FAILED
                        /
                        /TEST LAW 760000, AC = ONES
01122   754001          CLA!CMA!CLL             /AC = ONES, LINK = 0
01123   760000          LAW 00000               /AC = 760000
01124   741400          SZL
01125   740040  F212    HALT                    /ERROR: LINK NOT A 0, LAW SET LINK
01126   740010          RAL                     /AC = 740000
01127   744400          SNL!CLL                 /LINK = 1
01130   740040  F213    HALT                    /ERROR: AC BIT 0 NOT A 1,
                                                /LAW 760000 FAILED
01131   740010          RAL                     /AC = 700000
01132   744400          SNL!CLL                 /LINK = 1
01133   740040  F214    HALT                    /ERROR: AC BIT 1 NOT A 1
                                                /LAW 760000 FAILED
                        /
01134   740010          RAL                     /AC = 600000
01135   744400          SNL!CLL                 /LINK = 1
01136   740040  F215    HALT                    /ERROR: AC BIT 2 NOT A 1
                                                /LAW 760000 FAILED
01137   740010          RAL                     /AC = 400000
01140   744400          SNL!CLL                 /LINK = 1
01141   740040  F216    HALT                    /ERROR: AC BIT 3 NOT A 1, LAW 760000 FAILED
01142   740010          RAL                     /AC = 000000
01143   744400          SNL!CLL                 /LINK = 1
01144   740040  F217    HALT                    /ERROR: AC BIT 4 NOT A 1, LAW 760000 FAILED
01145   740200          SZA                     /AC = 000000
01146   740040  F218    HALT                    /ERROR: AC BITS 5-17 NOT 0
```

/LAW 760000 FAILED

.EJECT

```
***
                                /TEST LAW 777777, AC=0, L=0
    01147       754000                  CLA!CLL                 /AC = 0
    01150       777777                  LAW 17777               /AC = 760200
    01151       740001                  CMA
    01152       740200                  SZA
    01153       740040      F219        HALT                    /ERROR, AC NOT 0
                                                                /LAW 17777 FAILED
    01154       741400                  SZL                     /AC = 400760
    01155       740040      F220                HALT                    /LINK NOT 0
                                /
                                /TEST LAW 777777, AC=0, L=1
    01156       754002                  CLA!CLL!CML             /AC = 0
    01157       777777                  LAW 17777
    01160       740001                  CMA
    01161       740200                  SZA
    01162       740040      F221        HALT                    /ERROR, LINK NOT 0
    01163       740400                  SNL
    01164       740040      F222        HALT                    /ERROR, LINK NOT 0
                                /
                                /TEST LAW 777777, AC=1, L=0
    01165       754001                  CLA!CMA!CLL             /AC = 0
    01166       777777                  LAW 17777
    01167       740001                  CMA
    01170       740200                  SZA
    01171       740040      F223        HALT                    /ERROR, AC NOT 0
    01172       741400                  SZL                     /AC = 100760
    01173       740040      F224        HALT                    /ERROR, LINK NOT 0
                                        .EJECT
```

```
***
                                /TEST LAW 777777, AC=1, L=1
     01174      754003                  CLA!CMA!CLL!CML      /AC = 0
     01175      777777                  LAW 17777
     01176      740001                  CMA
     01177      740200                  SZA
     01200      740040        F225      HALT                 /ERROR, AC NOT 0
     01201      740400                  SNL
     01202      740040        F226      HALT                 /ERROR, LINK NOT 1
     01203      447634                  ISZ WORK3            /CHECK DONE LOOPING
     01204      601077                  JMP TLAW             /LOOP
     01205      106102                  JMS GENRAN                   /GET NO. FOR NEXT LOOP
     01206      106126                  JMS CKNO
                                        .EJECT
```

```
***
                                /TEST LAC 0'S
                                /
01207     754000                LACK       CLA!CLL              /AC = 0, LINK = 0
01210     207531                           LAC K0               /000000
01211     740200                           SZA
01212     740040                F258       HALT                 /ERROR,  AC NOT 0 AFTER LAC K0
01213     741400                           SZL
01214     740040                F259       HALT                 /ERROR; LINK NOT 0 AFTER LAC K0
                                /
01215     754002                           CLA!CLL!CML          /AC = 0, LINK = 1
01216     207531                           LAC K0
01217     740200                           SZA
01220     740040                F260       HALT                 /ERROR; AC NOT 0
01221     740400                           SNL
01222     740040                F261       HALT                 /ERROR,  LINK NOT 1 AFTER LAC K0
                                /
01223     754001                           CLA!CMA!CLL          /AC = 1'S, LIN = 0
01224     207531                           LAC K0
01225     740200                           SZA
01226     740040                F262       HALT                 /ERROR,  AC NOT 0 AFTER LAC K0
01227     741400                           SZL
01230     740040                F263       HALT                 /ERROR,  LINK NOT 0 AFTER LAC K0
                                /
01231     754003                           CLA!CMA!CLL!CML      /AC = 1'S, LINK = 1
01232     207531                           LAC K0
01233     740200                           SZA
01234     740040                F264       HALT                 /ERROR,  AC NOT 0
01235     740400                           SNL
01236     740040                F265       HALT                 /ERROR, LINK NOT 1
                                /
                                /TEST LAC 1'S
                                /
01237     754000                           CLA!CLL              /AC = 0, LINK = 0
01240     207573                           LAC K7S              /777777
01241     740001                           CMA
01242     740200                           SZA
01243     740040                F266       HALT                 /ERROR,  AC NOT 0 LAC K7S FAILED
01244     741400                           SZL
01245     740040                F267       HALT                 /ERROR,  LINK NOT 0 AFTER LAC K7S
                                /
01246     754002                           CLA!CLL!CML          /AC = 0, LINK = 1
01247     207573                           LAC K7S
01250     740001                           CMA
01251     740200                           SZA
01252     740040                F268       HALT                 /ERROR, AC NOT 0
01253     740400                           SNL
01254     740040                F269       HALT                 /ERROR, LINK NOT 1 AFTER LAC K7S
                                           .EJECT
```

```
***
01255   754001              CLA!CMA!CLL         /AC = 1'S, LINK = 0
01256   207573              LAC K7S
01257   740001              CMA
01260   740200              SZA
01261   740040      F270    HALT                /ERROR, AC NOT 0, LAC K7S FAILED
01262   741400              SZL
01263   740040      F271    HALT                /ERROR,  LINK NOT 1 AFTER LAC K7S
                    /
01264   754003              CLA!CMA!CLL!CML     /AC = 1'S, LINK = 1
01265   207573              LAC K7S
01266   740001              CMA
01267   740200              SZA
01270   740040      F272    HALT                /ERROR,  AC NOT 0
01271   740400              SNL
01272   740040              HALT                /ERROR,  LINK NOT 1 AFTER LAC K7S
                    /
01273   750000              CLA
01274   207606              LAC K101            /AC = 525252
01275   207605              LAC K010            /AC = 252525
01276   207573              LAC K7S             /AC = 777777
01277   740001              CMA
01300   740200              SZA
01301   740040      F273    HALT                /ERROR, AC NOT 0
01302   447634              ISZ WORK3           /CHECK FOR DONE LOOPING
01303   601207              JMP LACK            /LOOP
01304   106102              JMS GENRAN          /GET NO. FOR LOOP
01305   106126              JMS CKNO
                    /
                    /TEST AND
                    /
01306   750000      ANDAC   CLA                 /AC = 0
01307   507531              AND K0
01310   740200              SZA
01311   740040      F274    HALT                /ERROR, AC NOT 0 AFTER AND K0
                    /
01312   750001              CLA!CMA             /AC = 1'S
01313   507531              AND K0
01314   740200              SZA
01315   740040      F275    HALT                /ERROR, AC NOT 0 AFTER AND K0
                    /
01316   750000              CLA                 /AC = 0
01317   507573              AND K7S
01320   740200              SZA
01321   740040      F276    HALT                /ERROR, AC NOT 0 AFTER AND K7S
                    /
01322   750001              CLA!CMA             /AC = 1'S
01323   507573              AND K7S
01324   740001              CMA
01325   740200              SZA
01326   740040      F277    HALT                /ERROR, AC NOT 0 AFTER AND K7S
                            .EJECT
```

```
***
                        /SEQUENTIAL AND
                        /
01327   754002          CLA!CLL!CML     /AC = 0, LINK = 1
01330   507531          AND K0
01331   507573          AND K7S
01332   507606          AND K1010
01333   507605          AND K0110
01334   740001          CMA
01335   507531          AND K0
01336   507573          AND K7S
01337   507606          AND K1010
01340   507605          AND K0110
01341   740200          SZA
01342   740040  E278    HALT            /ERROR,  AC NOT 0
01343   740400          SNL
01344   740040  E279    HALT            /ERROR,  LINK NOT 1
01345   447634          ISZ WORK3       /CHECK FOR DONE LOOPING
01346   601306          JMP ANDAC       /LOOP
01347   106102          JMS GENRAN      /GET NO. FOR NEXT LOOP
01350   106126          JMS CKNO
                        /
                        /TEST XOR
                        /
01351   750000  XORAC   CLA             /AC = 0
01352   247531          XOR K0
01353   740200          SZA
01354   740040  E280    HALT            /ERROR,  AC NOT 0 AFTER XOR K0
                        /
01355   750001          CLA!CMA         /AC = 1'S
01356   247531          XOR K0
01357   740001          CMA
01360   740200          SZA
01361   740040  E281    HALT            /ERROR,  AC NOT 0
                        /
01362   750000          CLA             /AC = 0
01363   247573          XOR K7S         /777777
01364   740001          CMA
01365   740200          SZA
01366   740040  E282    HALT            /ERROR,  AC NOT 0 AFTER XOR K7S
                        /
01367   750001          CLA!CMA         /AC = 1'S
01370   247573          XOR K7S
01371   740200          SZA
01372   740040  E283    HALT            /ERROR,  AC NOT 0 AFTER XOR K7S
                        .EJECT
```

```
                        /SEQUENTIAL XOR
                        /
01373   750000          CLA             /AC = 0
01374   247606          XOR K101        /525252
01375   247605          XOR K010        /252525
01376   247531          XOR K0          /000000
01377   247573          XOR K7S         /777777
01400   247605          XOR K010
01401   247606          XOR K101
01402   247606          XOR K101
01403   247605          XOR K010
01404   740200          SZA
01405   740040  F284    HALT            /ERROR, AC NOT 0
                        /
01406   447634          ISZ WORK3       /CHECK FOR DONE LOOPING
01407   601351          JMP XORAC       /LOOP
01410   106102          JMS GENRAN      /GET NO, FOR NEXT LOOP
01411   106126          JMS CKNO
                        /
                        /TEST TAD
                        /
01412   754000  TADAC   CLA!CLL         /AC = 0, LINK = 0
01413   347531          TAD K0
01414   740200          SZA
01415   740040  E285    HALT            /ERROR,  AC NOT 0 AFTER TAD K0
01416   741400          SZL
01417   740040  F286    HALT            /ERROR,  LINK NOT 0 AFTER TAD K0
                        /
01420   754001          CLA!CMA!CLL     /AC = 1'S, LINK = 0
01421   347531          TAD K0
01422   740001          CMA
01423   740200          SZA
01424   740040  F287    HALT            /ERROR.AC NOT 0
01425   741400          SZL
01426   740040  F288    HALT            /ERROR,  LINK NOT 0
                        /
01427   754002          CLA!CLL!CML     /AC = 0,  LINK = 1
01430   347573          TAD K7S         /777777
01431   740001          CMA
01432   740200          SZA
01433   740040  E289    HALT            /ERROR, TAD K7S FAILED
01434   740400          SNL
01435   740040  F290    HALT            /ERROR,  CARRY OUT OR OVERFLOW
                                        /FAILED,  LINK NOT 0
                        /
01436   754001          CLA!CMA!CLL     /AC = 1'S, LINK = 0
01437   347573          TAD K7S
01440   740020          RAR
01441   740001          CMA
01442   740200          SZA
01443   740040  F291    HALT            /ERROR,  TAD K7S TO 1'S FAILED
01444   741400          SZL
01445   740040  F292    HALT            /ERROR,  LINK NOT 0
                        .EJECT
```

```
****
                                /TEST OVERFLOW
                                /
     01446      754001                      CLA!CMA!CLL          /AC = 1'S,  LINK = 0
     01447      347532                      TAD K1               /000001
     01450      740200                      SZA
     01451      740040          F293        HALT                 /ERROR,  AC NOT 0 AFTER TAD K1
     01452      740400                      SNL
     01453      740040          F294        HALT                 /ERROR,  LINK NOT 1 OVERFLOW FAILED
                                /
     01454      754003                      CLA!CMA!CLL!CML      /AC = 1'S, LINK = 1
     01455      347532                      TAD K1
     01456      740200                      SZA
     01457      740040          F295        HALT                 /ERROR,  AC NOT 0
     01460      741400                      SZL
     01461      740040          F296        HALT                 /ERROR, LINK NOT 0 OVERFLOW FAILED
                                /
                                /TAD 525252, AC = 252525, LINK = 0
                                /
     01462      754000                      CLA!CLL
     01463      347605                      TAD K0010
     01464      347606                      TAD K1101            /AC = 1'S
     01465      740001                      CMA
     01466      740200                      SZA
     01467      740040          E297        HALT                 /ERROR,  AC NOT 0
     01470      741400                      SZL
     01471      740040          E298        HALT                 /ERROR,  LINK NOT 0
                                /
                                /TAD 252525, AC = 525252, LINK = 1
                                /
     01472      754002                      CLA!CLL!CML
     01473      347606                      TAD K1101
     01474      347605                      TAD K0010            /AC = 1'S
     01475      740001                      CMA
     01476      740200                      SZA
     01477      740040          F299        HALT                 /ERROR,  AC NOT 0
     01500      740400                      SNL
     01501      740040          F300        HALT                 /ERROR,  LINK NOT 0
                                /
                                /SEQUENTIAL LAC, TAD, XOR
                                /
     01502      754000                      CLA!CLL              /AC = 0, LINK = 0
     01503      207605                      LAC K0010
     01504      347606                      TAD K1101            /AC = 1'S
     01505      247605                      XOR K0010
     01506      347605                      TAD K0010            /AC = 1'S
     01507      347532                      TAD K1
     01510      740400                      SNL
                                            .EJECT
```

```
****
01511  740040  F301  HALT                /ERROR.  LINK NOT 1
01512  207606        LAC K1M1
01513  247573        XOR K7S
01514  347606        TAD K1M1
01515  247573        XOR K7S
01516  740200        SZA
01517  740040  F302  HALT                /ERROR.  AC NOT 0
01520  447634        ISZ WORK3 /CHECK DONE LOOPING
01521  601412        JMP TADAC           /LOOP
01522  106102        JMS GENRAN          /GET NO. FOR NEXT LOOP
01523  106126        JMS CKNO
                     /
                     /
                     /TEST ADD
                     /TEST ADD K1S TO K6S, LINK = 0
01524  754000  ADDAC CLA!CLL             /AC = 0, LINK = 0
01525  307565        ADD K1S             /111111
01526  307572        ADD K6S             /666666
01527  740001        CMA                 /AC = 0
01530  740200        SZA
01531  740040  F303  HALT                /ERROR; ADD K1S TO K6S FAILED
01532  741400        SZL
01533  740040  F304  HALT                /ERROR; LINK NOT A0
                     /
                     /TEST ADD K2S TO K5S, LINK = 0
01534  754000        CLA!CLL             /AC , LINK = 0
01535  307566        ADD K2S             /22222
01536  307571        ADD K5S             /555555
01537  740001        CMA                 /AC = 0
01540  740200        SZA
01541  740040  F305  HALT                /ERROR; ADD K2S TO K5S FAILED
01542  741400        SZL
01543  740040  F306  HALT                /ERROR; LINK NOT A 0
                     /
                     /TEST ADD K3S TO K4S, LINK = 0
01544  754000        CLA!CLL             /AC, LINK =0
01545  307567        ADD K3S             /33333
01546  307570        ADD K4S             /444444
01547  740001        CMA                 /AC = 0
01550  740200        SZA
01551  740040  F307  HALT                /ERROR; ADD K3S TO K4S FAILED
01552  741400        SZL
01553  740040  F308  HALT                /ERROR; LINK NOT A0
                     /
                     /TEST ADD K4S TO K3S, LINK = 0
01554  754000        CLA!CLL             /AC, LINK =0
01555  307570        ADD K4S             /444444
01556  307567        ADD K3S             /333333
01557  740001        CMA                 /AC = 0
01560  740200        SZA
01561  740040  F309  HALT                /ERROR; AND K4S TO K3S FAILED
01562  741400        SZL
01563  740040  F310  HALT                /ERROR; LINK NOT A0
                     .EJECT
```

```
01610   740200                  SZA
01611   740040          F315    HALT                /ERROR: ADD K7S TO K0S FAILED
01612   741400                  SZL
01613   740040          F316    HALT                /ERROR: LINK NOT A 0
                                /
                                /TEST ADD 252525, AC = 525252, LINK = 0
01614   754001                  CLL!CLA!CMA         /AC = ONES, LINK = 0
01615   207606                  LAC K101            /AC = 525252
01616   307605                  ADD K010            /AC = 252525
01617   740001                  CMA                 /AC = 0
01620   740200                  SZA
01621   740040          F317    HALT                /ERROR: ADD K101 TO K010 FAILED
01622   741400                  SZL
01623   740040          F318    HALT                /ERROR: LINK NOT A 0
                                /
                                /TEST ADD 525252, AC = 252525, LINK = 0
01624   744000                  CLL                 /LINK = 0
01625   207605                  LAC K010            /AC = 252525
01626   307606                  ADD K101            /525252
01627   740001                  CMA                 /AC = 0
01630   740200                  SZA
01631   740040          F319    HALT                /ERROR: ADD K010 TO K101 FAILED
01632   741400                  SZL
01633   740040          E320    HALT                /ERROR: LINK NOT A0
                                .EJECT
```

```
****
                                /TEST ADD K7S, AC = K400K, LINK = 0
     01634      754001                  CLA!CMA!CLL             /AC = ONES, LINK = 0
     01635      207554                  LAC K400K               /AC = 400K
     01636      307573                  ADD K7S                 /ONES
     01637      507573                  AND K7S                 /AC = 400K
     01640      247554                  XOR K400K
     01641      740200                  SZA                     /AC = 0
     01642      740040        F321      HALT                    /ERROR; ADD-0 TO K400K FAILED
     01643      741400                  SZL
     01644      740040        F322      HALT                    /ERROR; LINK NOT A 0, CARRY FAILED
                                /
                                /TEST ADD K200K, AC = K200K, LINK = 0
     01645      754001                  CLA!CMA!CLL             /AC = ONES, LINK = 0
     01646      207560                  LAC K200K               /AC = 200K
     01647      307560                  ADD K200K               /ONES
     01650      507573                  AND K7S                 /AC = 400K
     01651      247554                  XOR K400K
     01652      740200                  SZA                     /AC = 0
     01653      740040        F323      HALT                    /ERROR; ADD K200K TO K200K FAILED
     01654      740400                  SNL
     01655      740040        F324      HALT                    /ERROR; LINK NOT A ONES, CARRY FAILED
                                /
                                /TEST ADD K7S, AC = K100K, LINK = 1
     01656      754003                  CLA!CMA!CLL!CML         /AC = ONES, LINK = 1
     01657      207321                  LAC K100K               /AC = 100K
     01660      307573                  ADD K7S                 /ONES
     01661      507573                  AND K7S                 /AC = 100K
     01662      247321                  XOR K100K
     01663      740200                  SZA                     /AC = 0
     01664      740040        F325      HALT                    /ERROR; ADD-0 TO K100K FAILED
     01665      740400                  SNL
     01666      740040        F326      HALT                    /ERROR; LINK NOT A ONE, LINK RESET
                                /
                                /TEST ADD K7S, AC = K40K, LINK = 0
     01667      754001                  CLA!CMA!CLL             /AC = ONES, LINK = 0
     01670      207553                  LAC K40K                /AC = 40K
     01671      307573                  ADD K7S                 /ONES
     01672      507573                  AND K7S                 /AC = 40K
     01673      247553                  XOR K40K
     01674      740200                  SZA                     /AC = 0
     01675      740040        F327      HALT                    /ERROR; ADD-0 TO K40K FAILED
     01676      741400                  SZL
     01677      740040        F328      HALT                    /ERROR; LINK NOT A ZERO, CARRY FAILED
                                        .EJECT
```

```
****
                        /TEST ADD K7S, AC = K20K, LINK = 0
01700   754001          CLA!CMA!CLL             /AC = ONES, LINK = 0
01701   207557          LAC K20K                /AC = 20K
01702   307573          ADD K7S                 /ONES
01703   507573          AND K7S                 /AC = 20K
01704   247557          XOR K20K
01705   740200          SZA                     /AC = 0
01706   740040  E329    HALT                    /ERROR; ADD-0 TO K20K FAILED
01707   741400          SZL
01710   740040  E330    HALT                    /ERROR; LINK NOT A ZERO, CARRY FAILED
                        /
                        /TEST AND K7S, AC = K10K, LINK = 0
01711   754001          CLA!CMA!CLL             /AC = ONES, LINK = 0
01712   207556          LAC K10K                /AC = 10K
01713   307573          ADD K7S                 /ONES
01714   507573          AND K7S                 /AC = 10K
01715   247556          XOR K10K
01716   740200          SZA                     /AC = 0
01717   740040  F331    HALT                    /ERROR; ADD-0 TO K10K FAILED
01720   741400          SZL
01721   740040  F332    HALT                    /ERROR; LINK NOT A ZERO, CARRY FAILED
                        /
                        /TEST ADD K7S, AC = K4K, LINK = 0
01722   754001          CLA!CMA!CLL             /AC = ONES, LINK = 0
01723   207550          LAC K4K                 /AC = 4K
01724   307573          ADD K7S                 /ONES
01725   507573          AND K7S                 /AC = 4K
01726   247550          XOR K4K
01727   740200          SZA                     /AC = 0
01730   740040  F333    HALT                    /ERROR; ADD-0 TO K4K FAILED
01731   741400          SZL
01732   740040  F334    HALT                    /ERROR; LINK NOT A ZERO, CARRY FAILED
                        /
                        /TEST ADD K7S, AC = K2K, LINK = 0
01733   754001          CLA!CMA!CLL             /AC = ONES, LINK = 0
01734   207546          LAC K2K                 /AC = 2K
01735   307573          ADD K7S                 /ONES
01736   507573          AND K7S                 /AC = 2K
01737   247546          XOR K2K
01740   740200          SZA                     /AC = 0
01741   740040  E335    HALT                    /ERROR; ADD-0 TO K2K2 FAILED
01742   741400          SZL
01743   740040  E336    HALT                    /ERROR; LINK NOT A ZERO, CARRY FAILED
                        .EJECT
```

```
↑↑↑↑
                        /TEST ADD K7S, AC = K1K, LINK = 0
01744   754001          CLA!CMA!CLL             /AC = ONES, LINK = 0
01745   207543          LAC K1K                 /AC = 1K
01746   307573          ADD K7S                 /ONES
01747   507573          AND K7S                 /AC = 1K
01750   247543          XOR K1K
01751   740200          SZA                     /AC = 0
01752   740040  F337    HALT                    /ERROR; ADD-0 TO K1K FAILED
01753   741400          SZL
01754   740040  F338    HALT                    /ERROR; LINK NOT A ZERO, CARRY FAILED
                        /
                        /TEST ADD K7S, AC = K400, LINK = 0
01755   754001          CLA!CMA!CLL             /AC = ONES, LINK = 0
01756   207545          LAC K400                /AC = 400
01757   307573          ADD K7S                 /ONES
01760   507573          AND K7S                 /AC = 400
01761   247545          XOR K400
01762   740200          SZA                     /AC = 0
01763   740040  F339    HALT                    /ERROR; ADD-0 TO K400 FAILED
01764   741400          SZL
01765   740040  F340    HALT                    /ERROR; LINK NOT A ZERO, CARRY FAILED
01766   447634          ISZ WORK3               /CHECK DONE LOOPING
01767   601524          JMP ADDAC               /LOOP
01770   106102          JMS GENRAN                      /GET NO, FOR NEXT LOOP
01771   106126          JMS CKNO
                        .EJECT
```

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****
                        /TEST ADD K7S, AC = K20, LINK = 0
01772   754001  ADDAC1  CLA!CMA!CLL             /AC = ONES, LINK = 0
01773   207541          LAC K20                 /AC = 20
01774   307573          ADD K7S                 /ONES
01775   507541          AND K20                 /AC = 20
01776   247541          XOR K20
01777   740200          SZA                     /AC = 0
02000   740040  E347    HALT                    /ERROR:  ADD -0 TO K20 FAILED
02001   741400          SZL
02002   740040  E348    HALT                    /ERROR: LINK NOT A ZERO, CARRY FAILED
                        /
                        /TEST ADD K7S, AC = K10, LINK = 0
02003   754001          CLA!CMA!CLL             /AC = ONES, LINK = 0
02004   207535          LAC K10                 /AC = 10
02005   307573          ADD K7S                 /ONES
02006   507573          AND K7S                 /AC = 10
02007   247535          XOR K10
02010   740200          SZA                     /AC = 0
02011   740040  E349    HALT                    /ERROR: ADD = 0 TO K10 FAILED
02012   741400          SZL
02013   740040  E350    HALT                    /ERROR: LINK NOT A ZERO CARRY FAILED
                        /
                        /TEST ADD K7S, AC = 4, LINK = 0
02014   754001          CLA!CMA!CLL             /AC = ONES, LINK = 0
02015   207534          LAC K4                  /AC = 4
02016   307573          ADD K7S                 /ONES
02017   507573          AND K7S                 /AC = 4
02020   247534          XOR K4
02021   740200          SZA                     /AC = 0
02022   740040  E351    HALT                    /ERROR: ADD -0 TO K4 FAILED
02023   741400          SZL
02024   740040  E352    HALT                    /ERROR: LINK NOT A ZERO, CARRY FAILED
                        /
                        /TEST ADD K7S, AC = K2, LINK = 0
02025   754001          CLA!CMA!CLL             /AC = ONES, LINK = 0
02026   207533          LAC K2                  /AC = 2
02027   307573          ADD K7S                 /ONES
02030   507573          AND K7S                 /AC = 2
02031   247533          XOR K2
02032   740200          SZA                     /AC = 0
02033   740040  E353    HALT                    /ERROR: ADD -0 TO K2 FAILED
02034   741400          SZL
02035   740040  E354    HALT                    /ERROR: LINK NOT A ZERO, CARRY FAILED
                        /
                        /TEST ADD K7S, AC = K1, LINK = 0
02036   754001          CLA!CMA!CLL             /AC = ONES, LINK = 0
02037   207532          LAC K1                  /AC = 1
02040   307573          ADD K7S                 /ONES
02041   507573          AND K7S                 /AC = 1
02042   247532          XOR K1
02043   740200          SZA                     /AC = 0
02044   740040  E355    HALT                    /ERROR:  ADD -0 TO K1 FAILED
02045   741400          SZL
02046   740040  E356    HALT                    /ERROR: LINK NOT A ZERO, CARRY FAILED
```

.EJECT

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****
                                /TEST ADD K400K, AC = ONES, LINK = 0
02047   744000                          CLL                     /LINK = 0
02050   777777                          LAW 17777               /AC = ONES
02051   507573                          AND K7S                 /AC = ONES
02052   307554                          ADD K400K               /400K
02053   247554                          XOR K400K
02054   740200                          SZA                     /AC = 0
02055   740040                  F357    HALT                    /ERROR; ADD K400K TO  -0 FAILED
02056   741400                          SZL
02057   740040                  F358    HALT                    /ERROR; LINK NOT A ZERO, CARRY FAILED
                                /
                                /TEST ADD K200K, AC = ONES, LINK = 1
02060   744002                          CLL!CML                 /LINK = 1
02061   777777                          LAW 17777               /AC = ONES
02062   507573                          AND K7S                 /AC = ONES
02063   307560                          ADD K200K               /200K
02064   247560                          XOR K200K
02065   740200                          SZA                     /AC = 0
02066   740040                  F359    HALT                    /ERROR; ADD K200K TO -0 FAILED
02067   740400                          SNL
02070   740040                  F360    HALT                    /ERROR; LINK NOT A ONE, LINK RESET
                                /
                                /TEST ADD K100K, AC = ONES, LINK = 1
02071   744002                          CLL!CML                 /LINK = 1
02072   777777                          LAW 17777               /AC = ONES
02073   507573                          AND K7S                 /AC = ONES
02074   307321                          ADD K100K               /100K
02075   247321                          XOR K100K
02076   740200                          SZA                     /AC = 0
02077   740040                  F361    HALT                    /ERROR; ADD K100K TO -0 FAILED
02100   740400                          SNL
02101   740040                  F362    HALT                    /ERROR; LINK NOT A ONE, LINK RESET
                                /
                                /TEST ADD K40K, AC = ONES, LINK = 1
02102   744002                          CLL!CML                 /LINK = 1
02103   777777                          LAW 17777               /AC = ONES
02104   507573                          AND K7S                 /AC = ONES
02105   307553                          ADD K40K                /40K
02106   247553                          XOR K40K
02107   740200                          SZA                     /AC = 0
02110   740040                  F363    HALT                    /ERROR; ADD K40K TO -0 FAILED
02111   740400                          SNL
02112   740040                  F364    HALT                    /ERROR; LINK NOT A ONE, LINK RESET
                                /
                                /TEST ADD K20K, AC = ONES, LINK = 1
02113   744002                          CLL!CML                 /LINK = 1
02114   777777                          LAW 17777               /AC = ONES
02115   507573                          AND K7S                 /AC = ONES
02116   307557                          ADD K20K                /20K
02117   247557                          XOR K20K
02120   740200                          SZA                     /AC = 0
02121   740040                  F365    HALT                    /ERROR; ADD K20K TO -0 FAILED
02122   740400                          SNL
02123   740040                  F366    HALT                    /ERROR; LINK NOT A ONE, LINK RESET
```

.EOT

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                        /PDP-9 BASIC EXERCISER - TAPE 3
                        /TEST ADD K10K, AC = ONES, LINK = 1
02124   744002                  CLL!CML             /LINK = 1
02125   777777                  LAW 17777           /AC = ONES
02126   507573                  AND K7S             /AC = ONES
02127   307556                  ADD K10K            /10K
02130   247556                  XOR K10K
02131   740200                  SZA                 /AC = 0
02132   740040          F367    HALT                /ERROR; ADD K10, TO -0 FAILED
02133   740400                  SNL
02134   740040          F368    HALT                /ERROR; LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K4K, AC = ONES, LINK = 1
02135   744002                  CLL!CML             /LINK = 1
02136   777777                  LAW 17777           /AC = ONES
02137   507573                  AND K7S             /AC = ONES
02140   307550                  ADD K4K             /4K
02141   247550                  XOR K4K
02142   740200                  SZA                 /AC = 0
02143   740040          F369    HALT                /ERROR; ADD K4K TO -0 FAILED
02144   740400                  SNL
02145   740040          F370    HALT                /ERROR; LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K2K, AC = ONES, LINK = 1
02146   744002                  CLL!CML             /LINK = 1
02147   777777                  LAW 17777           /AC = ONES
02150   507573                  AND K7S             /AC = ONES
02151   307546                  ADD K2K             /2K
02152   247546                  XOR K2K
02153   740200                  SZA                 /AC = 0
02154   740040          F371    HALT                /ERROR; AC K2K TO -0 FAILED
02155   740400                  SNL
02156   740040          F372    HALT                /ERROR; LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K1K, AC = ONES, LINK = 1
02157   744002                  CLL!CML             /LINK = 1
02160   777777                  LAW 17777           /AC = ONES
02161   507573                  AND K7S             /AC = ONES
02162   307544                  ADD K1K             /1K
02163   247544                  XOR K1K
02164   740200                  SZA                 /AC = 0
02165   740040          F373    HALT                /ERROR; ADD K1K TO -0 FAILED
02166   740400                  SNL
02167   740040          F374    HALT                /ERROR; LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K400, AC = ONES, LINK = 1
02170   744002                  CLL!CML             /LINK = 1
02171   777777                  LAW 17777           /AC = ONES
02172   507573                  AND K7S             /AC = ONES
02173   307545                  ADD K400            /400
02174   247545                  XOR K400
02175   740200                  SZA                 /AC = 0
02176   740040          F375    HALT                /ERROR; ADD K400 TO -0 FAILED
02177   740400                  SNL
02200   740040          F376    HALT                /ERROR; LINK NOT A ONE, LINK RESET
```

.EJECT

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****
                        /TEST ADD K200, AC = ONES, LINK = 1
02201   744002                  CLL!CML             /LINK = 1
02202   777777                  LAW 17777           /AC = ONES
02203   507573                  AND K7S             /AC = ONES
02204   307552                  ADD K200            /200
02205   247552                  XOR K200
02206   740200                  SZA                 /AC = 0
02207   740040          F377    HALT                /ERROR: ADD K200 TO -0 FAILED
02210   740400                  SNL
02211   740040          F378    HALT                /ERROR: LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K100, AC = ONES, LINK = 1
02212   744002                  CLL!CML             /LINK = 1
02213   777777                  LAW 17777           /AC = ONES
02214   507573                  AND K7S             /AC = ONES
02215   307540                  ADD K100            /100
02216   247540                  XOR K100
02217   740200                  SZA                 /AC = 0
02220   740040          F379    HALT                /ERROR: ADD K100 TO -0 FAILED
02221   740400                  SNL
02222   740040          E380    HALT                /ERROR: LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K40, AC = ONES, LINK = 1
02223   744002                  CLL!CML             /LINK = 1
02224   777777                  LAW 17777           /AC = ONES
02225   507573                  AND K7S             /AC = ONES
02226   307543                  ADD K40             /40
02227   247543                  XOR K40
02230   740200                  SZA                 /AC = 0
02231   740040          F381    HALT                /ERROR: ADD K40 TO -0 FAILED
02232   740400                  SNL
02233   740040          E382    HALT                /ERROR: LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K20, AC = ONES, LINK = 1
02234   744002                  CLL!CML             /LINK = 1
02235   777777                  LAW 17777           /AC = ONES
02236   507573                  AND K7S             /AC = ONES
02237   307541                  ADD K20             /20
02240   247541                  XOR K20
02241   740200                  SZA                 /AC = 0
02242   740040          F383    HALT                /ERROR: ADD K20 TO -0 FAILED
02243   740400                  SNL
02244   740040          E384    HALT                /ERROR: LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K10, AC = ONES, LINK = 1
02245   744002                  CLL!CML             /LINK = 1
02246   777777                  LAW 17777           /AC = ONES
02247   507573                  AND K7S             /AC = ONES
02250   307535                  ADD K10
02251   247535                  XOR K10
02252   740200                  SZA                 /AC = 0
02253   740040          F385    HALT                /ERROR: ADD K10 TO -0 FAILED
02254   740400                  SNL
02255   740040          F386    HALT                /ERROR: LINK NOT A ONE, LINK RESET
```

.EJECT

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****
                                    /TEST ADD K4, AC = ONES, LINK = 1
02256   744002                      CLL!CML             /LINK = 1
02257   777777                      LAW 17777           /AC = ONES
02260   507573                      AND K7S             /AC = ONES
02261   307534                      ADD K4              /4
02262   247534                      XOR K4
02263   740200                      SZA                 /AC = 0
02264   740040  F387                HALT                /ERROR: ADD K4 TO -0 FAILED
02265   740400                      SNL
02266   740040  F388                HALT                /ERROR: LINK NOT A ONE, LINK RESET
                                    /
                                    /TEST ADD K2, AC = ONES, LINK = 1
02267   744002                      CLL!CML             /LINK = 1
02270   777777                      LAW 17777           /AC = ONES
02271   507573                      AND K7S             /AC = ONES
02272   307533                      ADD K2              /2
02273   247533                      XOR K2
02274   740200                      SZA                 /AC = 0
02275   740040  F389                HALT                /ERROR: ADD K2 TO -0 FAILED
02276   740400                      SNL
02277   740040  F390                HALT                /ERROR: LINK NOT A ONE, LINK RESET
                                    /
                                    /TEST ADD K1, AC = ONES, LINK = 1
02300   744002                      CLL!CML             /LINK = 1
02301   777777                      LAW 17777           /AC = ONES
02302   507573                      AND K7S             /AC = ONES
02303   307532                      ADD K1              /1
02304   247532                      XOR K1
02305   740200                      SZA                 /AC = 0
02306   740040  F391                HALT                /ERROR: ADD K1 TO -0 FAILED
02307   740400                      SNL
02310   740040  F392                HALT                /ERROR: LINK NOT A ONE, LINK RESET
                                    /
                                    /TEST ADD K7S, AC = ONES, LINK = 0
02311   744000                      CLL                 /LINK = 0
02312   207573                      LAC K7S             /AC = ONES
02313   307573                      ADD K7S             /ONES
02314   740001                      CMA                 /AC = ONES
02315   740200                      SZA                 /AC = 0
02316   740040  F393                HALT                /ERROR: ADD K7S TO ALL ONES FAILED
02317   741400                      SZL
02320   740040  F394                HALT                /ERROR: LINK NOT A ONE, LINK RESET
                                    /
                                    /TEST ADD 525253, AC = 252525, LINK = 1
02321   744002                      CLL!CML             /LINK = 1
02322   207605                      LAC K010            /AC = 252525
02323   307607                      ADD K53             /525253
02324   247532                      XOR K1              /000001
02325   740200                      SZA                 /AC = 0
02326   740040  F395                HALT                /ERROR: ADD K5253 TO K5252 FAILED
02327   740400                      SNL
02330   740040  F396                HALT                /ERROR: LINK NOT A ONE, LINK RESET
                                    .EJECT
```

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****
                                    /TEST ADD 252525, AC = 525253, LINK RESET
02331   744000                      CLL                 /LINK = 0
02332   207607                      LAC K53             /AC = 525253
02333   307605                      ADD K0101           /252525
02334   247532                      XOR K1              /000001
02335   740200                      SZA                 /AC = 0
02336   740040      F397            HALT                /ERROR: ADD K2525 TO K5253 FAILED
02337   741400                      SZL
02340   740040      F398            HALT                /ERROR: LINK NOT A ZERO, CARRY FAILED
                                    /
                                    /TEST ADD SERIES
02341   754000                      CLA!CLL             /LINK = 0, AC = 0
02342   307565                      ADD K1S             /AC = 111111
02343   307566                      ADD K2S             /AC = 333333
02344   307567                      ADD K3S             /AC = 666666
02345   307570                      ADD K4S             /AC = 333333, LINK = 1
02346   307571                      ADD K5S             /AC = 111111
02347   307572                      ADD K6S             /AC = 777777
02350   307573                      ADD K7S             /AC = 777777
02351   740001                      CMA                 /AC = 0
02352   740200                      SZA
02353   740040      F399            HALT                /ERROR: ADD SERIES FAILED
02354   740400                      SNI
02355   740040      F400            HALT                /ERROR: LINK NOT A 1
02356   447634                      ISZ WORK3           /CHECK DONE LOOPING
02357   601772                      JMP ADDAC1                  /LOOP
02360   106102                      JMS GENRAN          /GET NO. FOR NEXT LOOP
02361   106126                      JMS CKNO
                                    .EJECT
```

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****
                                /ADD RANDOM PAIRS TEST
                                /
02362   106102          RANADD  JMS GENRAN              /GET RANDOM NUMBER
02363   741100                  SPA                     /+ NO
02364   740001                  CMA                     /- MAKE IT +
02365   741200                  SNA                     /0 NOT ALLOWED
02366   602362                  JMP RANADD
02367   043016                  DAC APOS                /IT IS + A
02370   740001                  CMA                     /1 COMPLEMENT
02371   043017          MINUSA  DAC ANEG                /IT IS -A
02372   106102                  JMS GENRAN              /GET NEXT RANDOM
02373   741100                  SPA                     /+ NO
02374   740001                  CMA                     /- MAKE +
02375   741200                  SNA                     /0 NOT ALLOWED
02376   602372                  JMP MINUSA+1
02377   043020                  DAC BPOS                /IT IS + B
02400   740001                  CMA                     /MAKE 1'S COMP
02401   043021          MINUSB  DAC BNEG                /IT IS - B
02402   777777                  LAW -1
02403   043027                  DAC PASS2
02404   744000                  CLL
02405   203021                  LAC BNEG                /RESTART HERE TO REGENERATE NEW COMPARE
02406   343017                  TAD ANEG                /-B -A
02407   741400                  SZL                     /EOC IF ADD
02410   347532                  TAD K1                  /YES MAKE CARRY
02411   043022          MINSAB  DAC SUMNEG              /SAVE -A -B
                                /
                                /NOW GENERATE A + B
02412   203016                  LAC APOS                /GET +A
02413   744000                  CLL
02414   343020                  TAD BPOS                /+B
02415   741400                  SZL                     /EOC IF ADD
02416   347532                  TAD K1                  /YES ADD CARRY
02417   043023          APLUSB  DAC SUMPOS
                                .EJECT
```

```
****
                        /NOW GENERATE B-A
02420   203020                  LAC BPOS            /GET B
02421   744000                  CLL
02422   343017                  TAD ANEG            /B-A
02423   741400                  SZL                 /EOC
02424   347532                  TAD K1              /YES ADD CARRY
02425   043024          BMINSA  DAC BMASUM          /SAVE B-A
                        /
                        /NOW GENERATE A-B
02426   203016                  LAC APOS            /GET A
02427   744000                  CLL
02430   343021                  TAD BNEG            /-B
02431   741400                  SZL                 /EOC
02432   347532                  TAD K1              /YES ADD CARRY
02433   043025          AMINSB  DAC AMBSUM          /A-B
                        /
                        /IF A+B IS AN OVERFLOW SITUATION
                        /MAKE OFLOW TESTS THAT APPLY = SNL
                        /IF A+B IS NOT OVERFLOW MAKE
                        /OVERFLOW TEST THAT APPLY = SZL
                        /
02434   203023                  LAC SUMPOS                  /GET A+B
02435   751100                  SPA!CLA             /STILL POS RESULT
02436   207654                  LAC KSNL            /NEG RESULT IS OVERFLOW
02437   741200                  SNA                 /AC = SNL IS OVERFLOW
02440   207653                  LAC KSZL            /+ RESULT IS NO OVERFLOW
02441   042464                  DAC OFLCK1                  /SET UP ALL OFLOW
02442   042512                  DAC OFLCK3                  /TESTS WHERE OFLOW
02443   042627                  DAC OFLCH1                  /MAY OR MAY NOT OCCUR
02444   042644                  DAC OFLCH2                  /AC = SNL IS A+B OFLOW
02445   042662                  DAC OFLCH3                  /AC = SZL IS A+B NOT OFLOW
02446   042701                  DAC OFLCH4                  /IF A+B OFLOW -A-B DOES ALSO
02447   042721                  DAC OFLCH5                  /IF A+B NOT OFLOW
02450   042742                  DAC OFLCH6                  /THEN NONE OF THESE
02451   042764                  DAC OFLCH7                  /ADDS CAN OVERFLOW
02452   042540                  DAC OFLCK5
02453   042566                  DAC OFLCK7
                                .EJECT
```

```
****
                        /NOW DO A COMPLETE SERIES OF
                        /ONES COMP ADDITIONS
                        /SHOULD GET THE SAME RESULTS AS
                        /THE TAD'S WITH FOC TAD (1
                        /
                        /FIRST TEST A+B
                        /
02454   744000  APLSRT  CLL             /FOR OVERFLOW CHECK
02455   203016          LAC APOS        /GET A
02456   303020          ADD BPOS        /A+B
02457   543023          SAD SUMPOS      /SHOULD = PREVIOUS A+B
02460   602464          JMP .+4         /OK
02461   740040  F401    HLT             /DISPLAY 1'S A+B
02462   203023          LAC SUMPOS      /GET 2'S COMP GEN
02463   740040          HLT             /DISPLAY 2'S A+B
02464   741400  OFLCK1  SZL             /OR SNL IF OVERFLOW
02465   740040  F402    HLT             /LINK OR OVERFLOW FAILED
02466   762454          LAW APLSRT              /MAKE JUMP FOR SCOPE LOOP
                        .EJECT
```

```
****
                        /2ND TEST -B+A
      02467   744000    AMNSBT  CLL
      02470   203021            LAC BNEG            /GET A
      02471   303016            ADD APOS            /A-B
      02472   543025            SAD AMBSUM          /SHOULD = PREVIOUS A-B
      02473   602477            JMP .+4             /OK
      02474   740040    F403    HLT                 /DISPLAY 1'S A-B
      02475   203025            LAC AMBSUM
      02476   740040            HLT                 /DISPLAY 2'S A-B
      02477   741400    OFLCK2  SZL                 /SHOULD NOT OVERFLOW
      02500   740040    F404    HLT
      02501   762467            LAW AMNSBT                  /MAKE JMP FOR SCOPE
                        /
                        /NOW 3RD TEST IS -A -B
      02502   744000    MAPLMB  CLL
      02503   203017            LAC ANEG            /GET -A
      02504   303021            ADD BNEG            /PLS -B
      02505   543022            SAD SUMNEG          /SHOULD = PREVIOUS -A-B
      02506   602512            JMP .+4             /OK
      02507   740040    F405    HLT                 /DISPLAY 1'S -A-B
      02510   203022            LAC SUMNEG
      02511   740040            HLT                 /DISPLAY 2'S -A-B
      02512   741400    OFLCK3  SZL                 /OR SNL
      02513   740040    F406    HLT                 /LINK FAILED
      02514   762502            LAW MAPLMB                  /MAKE JMP FOR SCOPE
                        /
                        /FOURTH TEST IN THIS SERIES
                        /IS TEST B-A
      02515   744000    BMNSAT  CLL
      02516   203020            LAC BPOS            /GET B
      02517   303017            ADD ANEG            /ADD -A
      02520   543024            SAD BMASUM          /SHOULD = PREVIOUS B-A
      02521   602525            JMP .+4             /OK
      02522   740040            HLT                 /DISPLAY 1'S B-A
      02523   203024            LAC BMASUM
      02524   740040            HLT                 /DISPLAY 2'S B-A
      02525   741400            SZL                 /CAN NOT OVERFLOW
      02526   740040            HLT                 /OVERFLOW FAILED
      02527   762515            LAW BMNSAT                  /MAKE JMP FOR SCOPE
                                .EJECT
```

```
****
                        /FIFTH TEST IN THIS SERIES
                        /IS TEST (A+B)-A = B
02530   744000  ABMATS  CLL
02531   203023          LAC SUMPOS
02532   303017          ADD ANEG
02533   543020          SAD BPOS
02534   602540          JMP .+4
02535   740040  F407    HLT
02536   203020          LAC BPOS
02537   740040          HLT
02540   741400  OFLCK5  SZL                     /CAN OVERFLOW SNL IF A+B OVERFLOW
02541   740040  F408    HLT                     /ILLEGAL LINK
02542   762530          LAW ABMATS                      /MAKE JMP FOR SCOPE
                        /
                        /SIXTH TEST IN THIS SERIES
                        /IS TEST (B-A)-B = -A
02543   744000  BMAMRT  CLL
02544   203024          LAC BMASUM
02545   303021          ADD BNEG
02546   543017          SAD ANEG
02547   602553          JMP .+4
02550   740040  F409    HLT
02551   203017          LAC ANEG
02552   740040          HLT
02553   741400  OFLCK6  SZL                     /CAN NOT OVERFLOW
02554   740040  F410    HLT
02555   762543          LAW BMAMRT                      /MAKE JMP FOR SCOPE
                        /
                        /SEVENTH TEST IN THIS SERIES
                        /IS (-A-B)+A = -B
02556   744000  MARPAT  CLL
02557   203022          LAC SUMNEG
02560   303016          ADD APOS
02561   543021          SAD BNEG
02562   602566          JMP .+4
02563   740040  E411    HLT
02564   203021          LAC BNEG
02565   740040          HLT
02566   741400  OFLCK7  SZL                     /CAN BE OVERFLOW IF A+B OVERFLOW THEN IS
02567   740040  F412    HLT                     /ILLEGAL LINK
02570   762556          LAW MARPAT                      /MAKE JMP FOR SCOPE
                        .EJECT
```

```
****
                        /EIGHTH TEST OF THE SERIES
                        /IS (A-B) +B = A
002571  744000          AMBPRT  CLL
002572  203025                  LAC AMBSUM
002573  303020                  ADD BPOS
002574  543016                  SAD APOS
002575  602601                  JMP .+4
002576  740040          F413    HLT
002577  203016                  LAC APOS
002600  740040                  HLT
002601  741400          OFLCK8  SZL                     /CAN NOT OVERFLOW
002602  740040          F414    HLT
002603  762571                  LAW AMBPRT                      /MAKE JMP FOR SCOPE
                        /
                        /9TH TEST OF SERIES
                        /NOW TEST AC = 777777 + A = A
                        /
002604  754001          MØACPA  CLL!CLA!CMA             /SET AC = 777777
002605  303016                  ADD APOS                /+ A
002606  543016                  SAD APOS                /SHOULD = A
002607  602613                  JMP .+4                 /TEST LINK
002610  740040          E415    HLT                     /FAILED RESULTS
002611  203016                  LAC APOS
002612  740040                  HLT                     /DISPLAY A
002613  741400          OFLCK9  SZL                     /CANNOT OVERFLOW
002614  740040          F416    HLT                     /OVERFLOW FAILED L - 1
002615  762604                  LAW MØACPA                      /MAKE JMP FOR SCOPE
                                .EJECT
```

```
****
                        /THE NEXT SERIES OF TESTS
                        /ARE ADD SEQUENCES THE RESULTS
                        /OF WHICH HAVE ALREADY BEEN
                        /COMPUTED AND VERIFIED
                        /
                        /FIRST SERIES TESTS A+B OK, THEN (A+B)-A = B
                        /SEE ABMATS FOR SHORTER TEST OR APLSAT OR MØACPA
                        /NOW TRY A+B-A = B
02616   754001  SERSØ1  CLL!CLA!CMA
02617   303016          ADD APOS
02620   303020          ADD BPOS
02621   303017          ADD ANEG
02622   543020          SAD BPOS
02623   602627          JMP .+4
02624   740040  E417    HLT
02625   203020          LAC BPOS
02626   740040          HLT
02627   741400  OFLCH1   SZL                     /OR SNL IF A+B OVERFLOW
02630   740040  E418    HLT                     /LINK FAILURE
02631   762616          LAW SERSØ1                      /MAKE JMP FOR SCOPE
                        /
                        /HAVE TESTED B-A PREVIOUS
                        /SEE BMNSAT FOR SHORTER TEST
                        /NOW TRY A+B-A-A = B-A
02632   754001  SERSØ2  CLL!CLA!CMA
02633   303016          ADD APOS
02634   303020          ADD BPOS
02635   303017          ADD ANEG
02636   303017          ADD ANEG
02637   543024          SAD BMASUM
02640   602644          JMP .+4
02641   740040  E419    HLT
02642   203024          LAC BMASUM
02643   740040          HLT
02644   740400  OFLCH2   SNL                     /OR SZL IF NO OVERFLOW
02645   740040  E420    HLT
02646   762632          LAW SERSØ2                      /MAKE JMP FOR SCOPE
                        .EJECT
```

↑↑↑↑

```
                        /HAVE TESTED (B-A)-B = -A PREVIOUS
                        /SEE BMAMBT FOR SHORTER TEST
                        /NOW TRY A+B-A-A-B = -A
002647  754001          SERS03  CLL!CLA!CMA
002650  303016                  ADD APOS
002651  303020                  ADD BPOS
002652  303017                  ADD ANEG
002653  303017                  ADD ANEG
002654  303021                  ADD BNEG
002655  543017                  SAD ANEG
002656  602662                  JMP .+4
002657  740040          F421    HLT
002660  203017                  LAC ANEG
002661  740040                  HLT
002662  741400          OFLCH3  SZL                     /SNL IF A+B OVERFLOW
002663  740040          F422    HLT                     /OVERFLOW FAILED
002664  762647                  LAW SERS03                      /MAKE JMP FOR SCOPE
                        /
                        /HAVE TEST -A-B NOW TRY A+B-A-A-B-B = -A-B
                        /SEE MAPLMB FOR SHORTER TEST
002665  754001          SERS04  CLL!CLA!CMA
002666  303016                  ADD APOS
002667  303020                  ADD BPOS
002670  303017                  ADD ANEG
002671  303017                  ADD ANEG
002672  303021                  ADD BNEG
002673  303021                  ADD BNEG
002674  543022                  SAD SUMNEG
002675  602701                  JMP .+4
002676  740040          F423    HLT
002677  203022                  LAC SUMNEG
002700  740040                  HLT
002701  741400          OFLCH4  SZL                     /SNL IF A+B OVERFLOW
002702  740040          F424    HLT                     /OVERFLOW FAILED OR LINK FAILED
002703  762665                  LAW SERS04                      /MAKE JMP FOR SCOPE LOOP
                        .EJECT
```

```
****
                                /HAVE TESTED (-A-B)+A = -B NOW A+B-A-A-B-B+A = -B
                                /USE MAHPAT FOR SHORTER TEST
02704   754001          SERS05  CLL!CLA!CMA
02705   303016                  ADD APOS
02706   303020                  ADD BPOS
02707   303017                  ADD ANEG
02710   303017                  ADD ANEG
02711   303021                  ADD BNEG
02712   303021                  ADD BNEG
02713   303016                  ADD APOS
02714   543021                  SAD BNEG
02715   602721                  JMP .+4
02716   740040          E425    HLT
02717   203021                  LAC BNEG
02720   740040                  HLT
02721   740400          OFLCH5  SNL                     /OR SZL IF A+B DO NOT OVERFLOW
02722   740040          E426    HLT                     /LINK OR OVERFLOW FAILED
02723   762704                  LAW SERS05                      /MAKE JMP FOR SCOPE
                                /
                                /HAVE DONE -B+A PREVIOUSLY
                                /NOW DO A+B-A-A-B-B+A+A = -B+A
                                /USE AMNSBT FOR SHORTER TEST
02724   754001          SERS06  CLL!CLA!CMA
02725   303016                  ADD APOS
02726   303020                  ADD BPOS
02727   303017                  ADD ANEG
02730   303017                  ADD ANEG
02731   303021                  ADD BNEG
02732   303021                  ADD BNEG
02733   303016                  ADD APOS
02734   303016                  ADD APOS
02735   543025                  SAD AMBSUM
02736   602742                  JMP .+4
02737   740040          E427    HLT
02740   203025                  LAC AMBSUM
02741   740040                  HLT
02742   741400          OFLCH6  SZL                     /OR SNL IF A+B OVERFLOW
02743   740040          E428    HLT                     /OVERFLOW OR LINK FAILED
02744   762724                  LAW SERS06                      /MAKE JMP FOR SCOPE
                                .EJECT
```

```
****
                        /HAVE DONE (-B+A)+B PREVIOUSLY
                        /NOW DOE A+B-A-A-B-B+A+A+B = A
                        /USE AMBPBT FOR SHORTER EST
02745   754001  SERS07  CLL!CLA!CMA
02746   303016          ADD APOS
02747   303020          ADD BPOS
02750   303017          ADD ANEG
02751   303017          ADD ANEG
02752   303021          ADD BNEG
02753   303021          ADD BNEG
02754   303016          ADD APOS
02755   303016          ADD APOS
02756   303020          ADD BPOS
02757   543016          SAD APOS
02760   602764          JMP .+4
02761   740040  F429    HLT
02762   203016          LAC APOS
02763   740040          HLT
02764   740400  OFLCH7  SNL                     /OR SZL IF A+B NOT OVERFLOW
02765   740040  F430    HLT                     /LINK OR OVERFLOW FAILED
02766   762745          LAW SERS07                      /MAKE JMP FOR SCOPE LOOP
                        /
                        /AFTER ONE PASS
                        /MAKE ALL B CONSTANTS A
                        /AND MAKE ALL A CONSTANTS B
                        /
02767   443027  CONCHG  ISZ PASS2               /2ND PASS
02770   603011          JMP CKLP                /YES DONE 2ND
02771   203016          LAC APOS                /A
02772   043020          DAC BPOS                /IS NOW B
02773   203021          LAC BNEG                /BNEG
02774   043017          DAC ANEG                /IS ANEG
02775   740001          CMA
02776   043016          DAC APOS                /B IS A
02777   203020          LAC BPOS
03000   740001          CMA                     /ANEG
03001   043021          DAC BNEG                /IS  NEG
03002   203024          LAC BMASUM
03003   040010          DAC 10
03004   203025          LAC AMBSUM                      /A-B
03005   043024          DAC BMASUM                      /IS NOW A-B
03006   200010          LAC 10                  /B-A
03007   043025          DAC AMBSUM                      /IS NOW A-B
03010   602454          JMP APLSBT                      /OVERFLOW SERUP
                        .EJECT
```

```
****
03011   447634   CKLP    ISZ WORK3          /CHECK DONE LOOPING
03012   602362           JMP RANADD                 /LOOP
03013   106102           JMS GENRAN                 /GET NO. FOR NEXT LOOP
03014   106126           JMS CKNO
03015   603030           JMP ADFDON
                         /
                         /
03016   000000   APOS    0          /A
03017   000000   ANEG    0          /-A
03020   000000   BPOS    0          /B
03021   000000   BNEG    0          /-B
03022   000000   SUMNEG  0          /-A+(-B)
03023   000000   SUMPOS  0          /A+B
03024   000000   BMASUM  0          /B+(-A)
03025   000000   AMBSUM  0          /A+(-B)
                         /
03026   000000   MSKBIT  0
                         .EJECT
```

```
     03027     000000          PASS2     0
****
                               /GET A RANDOM NUMBER AND ITS 1'S COMPLEMENT
                               /EACH BIT WILL HAVE A 0 IN ONE OF THE TWO NUMBERS
                               /MAKE THE 0 BIT = 1 AND ADD THE NUMBERS BOTH WAYS
                               /FIRST ADD IS THE (AC) IS THE ALTERED 0 = 1
                               /SECOND ADD IS THE (MB) IS THE ALTERED 0 = 1
                               /THE RESULT OF BOTH ADDS SHOULD = THE ALTERED BIT = 1
                               /
     03030     106102    ADFDON    JMS GENRAN                      /GET RANDOM NUMBER
     03031     043016              DAC APOS            /SAVE IT
     03032     740001              CMA                 /MAKE ONES COMPLEMENT
     03033     043017              DAC ANEG            /AND SAVE IT
                               /
                               /THE FIRST BIT TO BE ALTERED IS 0 THEN CONTINUE TO 17
     03034     207554              LAC K400K
     03035     043026              DAC MSKBIT
                               /
                               /SET UP NEXT BIT TO TEST - ALTERED NUMBER GOES TO BPOS
     03036     203016    BISETU    LAC APOS
     03037     503026              AND MSKBIT
     03040     740200              SZA                 /DOES APOS BIT = 0
     03041     603050              JMP MODNEG                  /NO ALTER ANEG
     03042     203016              LAC APOS
     03043     243026              XOR MSKBIT
     03044     043020              DAC BPOS            /MODIFIED NUMBER GOES TO APOS
     03045     203017              LAC ANEG
     03046     043021              DAC BNEG            /UNMOD NUMBER GOES TO BNEG
     03047     603055              JMP BITTS1
                               /
                               /THE ONES COMP NUMBER HAS THE 0 BIT MODIFY IT
     03050     203017    MODNEG    LAC ANEG
     03051     243026              XOR MSKBIT
     03052     043020              DAC BPOS            /MOD NUMBER TO BPOS
     03053     203016              LAC APOS
     03054     043021              DAC BNEG            /UNMOD NUMBER TO BNEG
                               /
                               /COMPLEMENTED BIT TEST1 (AC) = MODIFIED NUMBER AT ADD
                               /
     03055     744000    BITTS1    CLL
     03056     203020              LAC BPOS            /GET MODIFIED NUMBER
     03057     303021              ADD BNEG            /ADD UNMODIFIED
     03060     543026              SAD MSKBIT                  /RESULT SHOULD = BIT CHANGED
     03061     603065              JMP .+4
     03062     740040    F431      HLT                 /DISPLAY INCORRECT RESULTS
     03063     203026              LAC MSKBIT
     03064     740040              HLT                 /DISPLAY BIT ALTERED AND EXP
     03065     741400    OFLCH8    SZL                 /NO OVERFLOW
     03066     740040    F432      HLT                 /OVERFLOW NOT ALLOWED
     03067     763055              LAW BITTS1                  /MAKE JMP FOR SCOPE LOOP
                                   .EJECT
```

```
****
                        /COMP BIT TEST 2 (MB) = MODIFIED NUMBER AT ADD
                        /
03070   744000  BITTS2  CLL
03071   203021          LAC BNEG            /GET UNMODIFIED NUMBER
03072   303020          ADD BPOS            /ADD MODIFIED
03073   543026          SAD MSKBIT                  /RESULT SHOULD = BIT CHANGED
03074   603100          JMP .+4             /OK
03075   740040  F433    HLT                 /DISPLAY INCORRECT RESULTS
03076   203026          LAC MSKBIT
03077   740040          HLT                 /DISPLAY BIT ALTERED AND EXP
03100   741400  OFLCH9  SZL                 /SHOULD NOT OVERFLOW
03101   740040  F434    HLT
03102   763070          LAW BITTS2                  /MAKE JMP FOR SCOPE LOOP
                        /
                        /POSITION MASK BIT OVER 1 PLACE
                        /IF 17 HAS BEEN DONE CONTINUE
                        /
03103   203026          LAC MSKBIT                  /GET LAST
03104   744020          RCR                 /POSITION
03105   043026          DAC MSKBIT                  /SAVE
03106   740200          SZA                 /DONE ALL BITS
03107   603036          JMP BISETU                  /DO FOR NEXT BIT
                        /
                        /END OF TEST SEQUENCE
                        /
03110   447634          ISZ WORK3           /CHECK DONE LOOPING
03111   603030          JMP ADFDON                  /LOOP
03112   106102          JMS GENRAN                  /GET NO. FOR NEXT LOOP
03113   106126          JMS CKNO
03114   750004          LAS                 /CHECK FOR CONTINUOUS LOOP
03115   742010          RTL                 /CK ACS 2
03116   741100          SPA
03117   602362          JMP RANADD                  /LOOP
                        .EOT
```

```
                        /PDP-9 BASIC EXERCISER - TAPE 4
                        /TEST SAD
                        /
03120   207531  SADAC   LAC K0          /AC = 0
03121   547531          SAD K0
03122   741000          SKP
03123   740040  F435    HALT            /ERROR, SAD K0 SKIPPED
                        /
03124   207531          LAC K0          /AC = 0
03125   547573          SAD K7S
03126   740040  F436    HALT            /ERROR, SAD K7S FAILED TO SKIP
                        /
03127   207573          LAC K7S         /AC = 1'S
03130   547531          SAD K0
03131   740040  F437    HALT            /ERROR, SAD K0 FAILED TO SKIP
                        /
03132   207573          LAC K7S         /AC = 1'S
03133   547573          SAD K7S
03134   741000          SKP
03135   740040  F438    HALT            /ERROR, SAD K7S SKIPPED
                        /
                        /SAD, TAD
                        /
03136   750000          CLA             /AC = 0
03137   347531          TAD K0
03140   547531          SAD K0
03141   741000          SKP
03142   740040  F439    HALT            /ERROR, SAD K0 SKIPPED
                        /
03143   750000          CLA             /AC = 0
03144   347531          TAD K0
03145   547573          SAD K7S
03146   740040  F440    HALT            /ERROR, SAD K7S FAILED TO SKIP
                        /
03147   750000          CLA             /AC = 0
03150   347573          TAD K7S
03151   547531          SAD K0
03152   740040  F441    HALT            /ERROR, SAD K0 FAILED TO SKIP
                        /
03153   750000          CLA             /AC = 0
03154   347573          TAD K7S
03155   547573          SAD K7S
03156   741000          SKP
03157   740040  F442    HALT            /ERROR, SAD K7S SKIPPED
                        /
                        .EJECT
```

```
††††
                                    /SEQUENTIAL SAD
                                    /
    03160    207531                         LAC K0             /AC = 0
    03161    547573                         SAD K7S
    03162    760001                         LAW 1              /760001
    03163    547573                         SAD K7S
    03164    760002                         LAW 2              /760002
    03165    547573                         SAD K7S
    03166    760004                         LAW 4              /760004
    03167    547573                         SAD K7S
    03170    760010                         LAW 10             /760010
    03171    547573                         SAD K7S
    03172    760020                         LAW 20             /760020
    03173    547573                         SAD K7S
    03174    760040                         LAW 40             /760040
    03175    740200                         SZA
    03176    740040                 E443    HALT               /ERROR, AC NT 0. CONTENTS OF
                                                               /AC = LAST SAD THAT FAILED
                                    /
                                    /TEST SAD, SKP SERIES
                                    /
    03177    750000                         CLA                /AC = 0
    03200    54757X2                        SAD K7S
    03201    760001                         LAW 1              /760001
    03202    741000                         SKP
    03203    760002                         LAW 2              /760002
    03204    54757X2                        SAD K7S
    03205    760004                         LAW 4              /760004
    03206    741000                         SKP
    03207    760010                         LAW 10             /760010
    03210    54757X2                        SAD K7S
    03211    760020                         LAW 20             /760020
    03212    741000                         SKP
    03213    760040                         LAW 40             /760040
    03214    740200                         SZA
    03215    740040                 E444    HALT               /ERROR, AC NOT 0, CONTSNTS
                                                               /OF AC = LAST SAD OR SKP
                                    /
    03216    447634                         ISZ WORK3          /CHECK DONE LOOPING
    03217    603120                         JMP SADAC          /LOOP
    03220    106102                         JMS GENRAN         /GET NO. FOR NEXT LOOP
    03221    106126                         JMS CKNO
                                    /
                                            .EJECT
```

````
                         /TEST DZM
                         /
03222   207650           DZMAC   LAC KHALT        /AC = 740040
03223   151111                   DZM 11111        /ADDR 1111 OR 01111
03224   211111                   LAC 11111
03225   740200                   SZA
03226   740040           E445    HALT             /ERROR, DZM FAILED AT  1111
                                                  /OR 01111
                         /
03227   207650                   LAC KHALT        /AC = 740040
03230   152222                   DZM 12222
03231   212222                   LAC 12222
03232   740200                   SZA
03233   740040           E446    HALT             /ERROR, DZM FAILED AT 1222 OR
                                                  /02222
                         /
03234   207650                   LAC KHALT        /AC = 740040
03235   153333                   DZM 13333
03236   213333                   LAC 13333
03237   740200                   SZA
03240   740040           E447    HALT             /ERROR, DZM FAILED AT 13333 OR
                                                  /03333
                         /
03241   207650                   LAC KHALT        /AC = 740040
03242   154444                   DZM 14444
03243   214444                   LAC 14444
03244   740200                   SZA
03245   740040           E448    HALT             /ERROR,  DZM FAILED AT 14444
                                                  /OR 04444
                         /
03246   207650                   LAC KHALT        /AC = 740040
03247   155555                   DZM 15555
03250   215555                   LAC 15555
03251   740200                   SZA
03252   740040           E449    HALT             /ERROR,  DZM FAILED AT 15555
                                                  /OR 05555
                         /
03253   207650                   LAC KHALT        /AC = 740040
03254   156666                   DZM 16666
03255   216666                   LAC 16666
03256   740200                   SZA
03257   740040           E450    HALT             /ERROR,  DZM FAILED AT 16666
                                                  /OR 06666
                         /
03260   207650                   LAC KHALT        /AC = 740040
03261   157777                   DZM 17777
03262   217777                   LAC 17777
03263   740200                   SZA
03264   740040           E451    HALT             /ERROR, DZM FAILED AT 17777
                                                  /OR 07777

                                 .EJECT
````

```
↑↑↑↑
                          /
   03265    207650                LAC KHALT          /AC = 740040
   03266    152525                DZM 12525
   03267    212525                LAC 12525
   03270    740200                SZA
   03271    740040        F452    HALT               /ERROR.  DZM FAILED AT 12525
                                            /OR 02525
                          /
   03272    207650                LAC KHALT          /AC = 740040
   03273    155252                DZM 15252
   03274    215252                LAC 15252
   03275    740200                SZA
   03276    740040        F453    HALT               /ERROR.  DZM FAILED AT 15252 OR 05252
                          /
                          /
                          /TEST AC AFTER A DZM
                          /
   03277    207573                LAC K7S            /AC = 777777
   03300    157777                DZM 17777
   03301    740001                CMA
   03302    740200                SZA
   03303    740040        F454    HALT               /ERROR. AC CHANGED AFTER A DZM
                          /
                          //TEST AC, LINK, ADR. 17777 OR 07777 AFTER A DZM
                          /
   03304    754001                CLA!CMA!CLL        /AC = 1'S, LINK = 0
   03305    307573                ADD K7S
   03306    157777                DZM 17777
   03307    740001                CMA
   03310    740200                SZA
   03311    740040        F455    HALT               /ERROR.  AC NOT 1'S AFTER A DZM
   03312    741400                SZL
   03313    740040        F456    HALT               /ERROR.  LINK NOT 0
   03314    217777                LAC 17777
   03315    740200                SZA
   03316    740040        F457    HALT               /ERROR.  DZM FAILED AT 177777 OR 07777
                          /
                          /
                          /SEQUENTIAL DZM
                          /
   03317    207573                LAC K7S            /AC = 1'S
   03320    152525                DZM 12525
   03321    155252                DZM 15252
   03322    157777                DZM 17777
   03323    150000                DZM 10000
   03324    740001                CMA                /AC = 0
   03325    750200                CLA!SZA
   03326    740040        F458    HALT               /ERROR.  AC NOT 1'S AFTER
                                                     /DZM SERIES
                                  .EJECT
```

```
****
      03327     352525                TAD 12525
      03330     355252                TAD 15252
      03331     357777                TAD 17777
      03332     350000                TAD 10000
      03333     740200                SZA
      03334     740040    F459        HALT                /ERROR, DZM FAILED
                          /
      03335     447634                ISZ WORK3           /CHECK DONE LOOPING
      03336     603222                JMP DZMAC           /LOOP
      03337     106102                JMS GENRAN          /GET NO, FOR NEXT LOOP
      03340     106126                JMS CKNO
                          /
                          /
                          /TEST DAC
                          /
      03341     207574    DACAC       LAC K51S            /AC = 11111
      03342     051111                DAC 11111
      03343     551111                SAD 11111
      03344     741000                SKP
      03345     740040    F460        HALT                /ERROR, DAC ADR CONTENTS NOT EQUAL
                                                          /TO AC, DAC FAILED
      03346     207575                LAC K12S            /AC = 122222
      03347     052222                DAC 12222
      03350     552222                SAD 12222
      03351     741000                SKP
      03352     740040    F461        HALT                /ERROR, 122222 OR 022222 CONTENTS
                                                          /NOT = TO AC,  DAC FAILED
      03353     207576                LAC K13S            /AC = 13333
      03354     053333                DAC 13333
      03355     553333                SAD 13333
      03356     741000                SKP
      03357     740040    F462        HALT                /ERROR, 13333 OR 03333 CONTENTS
                                                          /NOT = TO AC DAC FAILED
      03360     207577                LAC K14S            /AC = 14444
      03361     054444                DAC 14444
      03362     554444                SAD 14444
      03363     741000                SKP
      03364     740040    F463        HALT                /ERROR, 14444 OR 03333 CONTENTS
                                                          /NOT = TO AC,  DAC FAILED
      03365     207600                LAC K15S            /AC = 15555
      03366     055555                DAC 15555
      03367     555555                SAD 15555
      03370     741000                SKP
      03371     740040    F464        HALT                /ERROR,  15555 OR 05555 CONTENTS
                                                          /NO = AC,  DAC FAILED
                                      .EJECT
```

```
****
     03372    207601              LAC K16S          /AC = 166666
     03373    056666              DAC 16666
     03374    556666              SAD 16666
     03375    741000              SKP
     03376    740040    F465      HALT              /ERROR,  16666 OR 06666 CONTENTS
                                                    /NOT = AC,  DAC FAILED
     03377    207602              LAC K17S          /AC = 17777
     03400    057777              DAC 17777
     03401    557777              SAD 17777
     03402    741000              SKP
     03403    740040    F466      HALT              /ERROR,  17777 OR 07777 CONTENTS
                                                    /NOT = AC,  DAC FAILED
     03404    207605              LAC K010          /AC = 252525
     03405    052525              DAC 12525
     03406    552525              SAD 12525
     03407    741000              SKP
     03410    740040    F467      HALT              /ERROR,  12525 OR 02525 CONTENTS
                                                    /AC = AC,  DAC FAILED
     03411    207606              LAC K101          /AC = 525252
     03412    055252              DAC 15252
     03413    555252              SAD 15252
     03414    741000              SKP
     03415    740040    F468      HALT              /ERROR,  15252 OR 05252 CONTENTS
                                                    /NOT = AC,  DAC FAILED
                        /
                        /
                        /SEQUENTIAL DAC
                        /
     03416    744000              CLL               /L = 0
     03417    207572              LAC K7S           /AC = 1'S
     03420    052525              DAC 12525
     03421    055252              DAC 15252
     03422    057777              DAC 17777
     03423    051000              DAC 11000
     03424    051111              DAC 11111
     03425    740001              CMA               /AC = 0
     03426    750200              CLA!SZA
     03427    740040    F469      HALT              /ERROR,  AC NOT 1'S AFTER DAC SERIES
     03430    312525              ADD 12525         /ONES
     03431    315252              ADD 15252         /ONES
     03432    317777              ADD 17777         /ONES
     03433    311000              ADD 11000         /ONES
     03434    311111              ADD 11111         /ONES
     03435    740001              CMA               /AC = 0
     03436    740200              SZA
     03437    740040    F470      HALT              /ERROR,  DAC FAILED,  ONE OR MORE
                                                    /ADDRESSES NOT ONES
                        /
     03440    447634              ISZ WORK3         /CHECK DONE LOOPING
     03441    603341              JMP DACAC         /LOOP
     03442    106102              JMS GENRAN        /GET NO. FOR NEXT LOOP
     03443    106126              JMS CKNO
                                  .EJECT
```

```
****
                                /TEST ISZ
                                /
      03444     207531    ISZAC     LAC K0          /AC = 0
      03445     050100              DAC 10100
      03446     450100              ISZ 10100
      03447     751001              SKP!CLA!CMA
      03450     740040    F471      HALT            /ERROR,  ISZ SKIPPED
      03451     507532              AND K1          /AC = 1
      03452     550100              SAD 10100
      03453     741000              SKP
      03454     740040    F472      HALT            /ERROR,  10100 OR 00100 NOT 1
                                                    /ISZ FAILED
      03455     207627              LAC M400K       /AC = 377777
      03456     050100              DAC 10100
      03457     450100              ISZ 10100
      03460     751001              SKP!CLA!CMA
      03461     740040    F473      HALT            /ERROR,  ISZ SKIPPED
      03462     507554              AND K400K
      03463     550100              SAD 10100
      03464     741000              SKP
      03465     740040    F474      HALT            /ERROR,  10100 OR 00100 NOT 400000
                                                    /ISZ FAILED
      03466     207621              LAC M1          /AC = 777776
      03467     050100              DAC 10100
      03470     450100              ISZ 10100
      03471     751001              SKP!CLA!CMA
      03472     740040    F475      HALT            /ERROR,  ISZ SKIPPED
      03473     507573              AND K7S
      03474     550100              SAD 10100
      03475     741000              SKP
      03476     740040    F476      HALT            /ERROR,  10100 OR 00100 NOT 777777
                                                    /ISZ FAILED
      03477     207621              LAC M1          /AC = 777776
      03500     057777              DAC 17777
      03501     457777              ISZ 17777
      03502     751001              SKP!CLA!CMA
      03503     740040    F477      HALT            /ERROR,  ISZ SKIPPED
      03504     507573              AND K7S
      03505     557777              SAD 17777
      03506     741000              SKP
      03507     740040    F478      HALT            /ERROR,  1777 OR 07777 NOT 777777
                                                    /ISZ FAILED
      03510     207627              LAC M400K       /AC = 377777
      03511     057777              DAC 17777
      03512     457777              ISZ 17777
      03513     751001              SKP!CLA!CMA
      03514     740040    F479      HALT            /ERROR,  ISZ SKIPPED
      03515     507554              AND K400K
      03516     557777              SAD 17777
      03517     741000              SKP
                                    .EJECT
```

```
****
     03520    740040     F480     HALT              /ERROR, 17777 OR 0777 NTOT 400000
                                                    /ISZ FAILED
     03521    207531              LAC K0
     03522    057777              DAC 17777
     03523    457777              ISZ 17777
     03524    751001              SKP!CLA!CMA
     03525    740040     F481     HALT              /ERROR,  ISZ SKIPPED
     03526    507532              AND K1
     03527    557777              SAD 17777
     03530    741000              SKP
     03531    740040     F482     HALT              /ERROR, 17777 OR 07777 NOT 1
                                                    /ISZ FAILED
     03532    750000              CLA               /AC = 0
     03533    247573              XOR K7S           /AC = 1'S
     03534    051111              DAC 11111
     03535    451111              ISZ 11111
     03536    740040     F483     HALT              /ERROR,  ISZ FAILED TO SKIP
     03537    211111              LAC 11111
     03540    740200              SZA
     03541    740040     F484     HALT              /ERROR,  11111 OR 01111 NOT 0
                                                    /ISZ FAILED
     03542    750000              CLA               /AC = 0
     03543    247573              XOR K7S           /AC = 1'S
     03544    052222              DAC 12222
     03545    452222              ISZ 12222
     03546    740040     E485     HALT              /ERROR,  ISZ FAILED TO SKIP
     03547    212222              LAC 12222
     03550    740200              SZA
     03551    740040     F486     HALT              /ERROR, 12222 OR 02222 NOT 0
                                                    /ISZ FAILED
     03552    750000              CLA
     03553    247573              XOR K7S           /AC = 1'S
     03554    053333              DAC 13333
     03555    453333              ISZ 13333
     03556    740040     E487     HALT              /ERROR,  ISZ DID NOT SKIP
     03557    213333              LAC 13333
     03560    740200              SZA
     03561    740040     F488     HALT              /ERROR, 13333 OR 03333 NOT 0
                                                    /ISZ FAILED
     03562    750000              CLA
     03563    247572              XOR K7S           /AC = 1'S
     03564    054444              DAC 14444
     03565    454444              ISZ 14444
     03566    740040     E489     HALT              /ERROR,  ISZ DID NOT SKIP
     03567    214444              LAC 14444
     03570    740200              SZA
     03571    740040     F490     HALT              /ERROR,  14444 OR 04444 NOT 0
                                                    /ISZ FAILED
                                  .EJECT
```

```
****
        03572   750000          CLA
        03573   247573          XOR K7S         /AC = 1'S
        03574   055555          DAC 15555
        03575   455555          ISZ 15555
        03576   740040  F491    HALT            /ERROR.  ISZ DID NOT SKIP
        03577   215555          LAC 15555
        03600   740200          SZA
        03601   740040  F492    HALT            /ERROR.  15555 OR 05555 NOT 0
                                                /ISZ FAILED
        03602   750000          CLA
        03603   247573          XOR K7S         /AC = 1'S
        03604   056666          DAC 16666
        03605   456666          ISZ 16666
        03606   740040  F493    HALT            /ERROR.  ISZ DID NOT SKIP
        03607   216666          LAC 16666
        03610   740200          SZA
        03611   740040  F494    HALT            /ERROR.  16666 OR 06666 NOT 0
                                                /ISZ FAILED
        03612   750000          CLA
        03613   247573          XOR K7S         /AC = 1'S
        03614   057777          DAC 17777
        03615   457777          ISZ 17777
        03616   740040  F495    HALT            /ERROR.  ISZ DID NOT SKIP
        03617   217777          LAC 17777
        03620   740200          SZA
        03621   740040  F496    HALT            /ERROR.  17777 OR 07777 NOT 0
                                                /ISZ FAILED
        03622   750000          CLA
        03623   247573          XOR K7S         /AC = 1'S
        03624   052525          DAC 12525
        03625   452525          ISZ 12525
        03626   740040  F497    HALT            /ERROR.  ISZ DID NOT SKIP
        03627   212525          LAC 12525
        03630   740200          SZA
                                /
        03631   740040  F498    HALT            /ERROR.  12525 OR 02525 NOT 0
                                                /ISZ FAILED
        03632   750000          CLA
        03633   247573          XOR K7S         /AC = 1'S
        03634   055252          DAC 15252
        03635   455252          ISZ 15252
        03636   740040  F499    HALT            /ERROR.  ISZ DID NOT SKIP
        03637   215252          LAC 15252
        03640   740200          SZA
        03641   740040  F500    HALT            /ERROR. 15252 OR 05252 NOT 0
                                                /ISZ FAILED
                                .EJECT
```

```
****
                                  /TEST ISZ, SKP
                                  /
    03642       207573                    LAC K7S             /AC = 1'S
    03643       052525                    DAC 12525           /12525 OR 02525
    03644       055252                    DAC 15252           /15252 OR 05252
    03645       057777                    DAC 17777           /17777 OR 07777
    03646       051000                    DAC 11000           /11000 OR 01000
    03647       050100                    DAC 10100           /10100 OR 00100
    03650       452525                    ISZ 12525
    03651       741000                    SKP
    03652       455252                    ISZ 15252
    03653       741000                    SKP
    03654       457777                    ISZ 17777
    03655       741000                    SKP
    03656       451000                    ISZ 11000
    03657       741000                    SKP
    03660       450100                    ISZ 10100
    03661       740040            E501    HALT                /ERROR.  ISZ DID NOT SKIP
    03662       312525                    ADD 12525
    03663       315252                    ADD 15252
    03664       317777                    ADD 17777
    03665       311000                    ADD 11000
    03666       310100                    ADD 10100
    03667       740001                    CMA
    03670       740200                    SZA
    03671       740040            E502    HALT                /ERROR. ALL ADRS. NOT 0
                                  /
                                  /
                                  /SEQUENTIAL ISZ, NO-SKIP
                                  /
    03672       207627                    LAC M400K           /AC = 377777
    03673       052525                    DAC 12525           /OR 02525
    03674       055252                    DAC 15252           /OR 05252
    03675       057777                    DAC 17777           /OR 07777
    03676       051000                    DAC 11000           /OR 01000
    03677       050100                    DAC 10100           /OR 00100
    03700       452525                    ISZ 12525
    03701       455252                    ISZ 15252
    03702       457777                    ISZ 17777
    03703       451000                    ISZ 11000
    03704       450100                    ISZ 10100
    03705       750000                    CLA                 /AC = 0
    03706       312525                    ADD 12525
    03707       315252                    ADD 15252
    03710       317777                    ADD 17777
    03711       311000                    ADD 11000
    03712       310100                    ADD 10100
    03713       247555                    XOR K402K           /RESULT = 400002
    03714       740200                    SZA
    03715       740040            E503    HALT                /ERROR.  ALL ADDRS. NOT 400000
                                          .EJECT
```

```
****
                                /TEST ISZ-SKP, SKIP
                                /
03716   207573                          LAC K7S                 /AC = 1'S
03717   055252                          DAC 15252
03720   455252                          ISZ 15252
03721   741000                          SKP
03722   741000                          SKP
03723   740040          E504            HALT                    /ERROR,  ISZ-SKIP DID NOT SKIP
                                /
                                /TEST SKP-ISZ, SKIP
                                /
03724   207573                          LAC K7S                 /AC = 17S
03725   055252                          DAC 15252
03726   741000                          SKP
03727   740000                          NOP
03730   455252                          ISZ 15252
03731   740040          E505            HALT                    /ERROR,  SKP-ISZ DID NOT SKIP
                                /
                                /TEST SKP-ISZ, NO-SKIP
                                /
03732   207531                          LAC K0                  /AC = 0
03733   055252                          DAC 15252
03734   741000                          SKP
03735   740000                          NOP
03736   455252                          ISZ 15252
03737   741000                          SKP
03740   740040          E506            HALT                    /ERROR,  SKP-ISZ SKIPPED
                                /
03741   447634                          ISZ WORK3               /CHECK DONE LOOPING
03742   603444                          JMP ISZAC               /LOOP
03743   106102                          JMS GENRAN                      /GET NO, FOR NEXT LOOP
03744   106126                          JMS CKNO
                                        .EJECT
```

```
****
                             /TEST JMP
                             /
     03745     207667                  LAC JMPRET
     03746     740200                  SZA
     03747     740040        E507      HALT              /ERROR JMP .-7, .+4 OR .+5 FAILED
     03750     204130        INIT4K    LAC JMPSEQ
     03751     047667                  DAC JMPRET                  /LOAD 4K WITH JMP TO 22
     03752     203752                  LAC .
     03753     507556                  AND K10K          /SEE IF IN UPPER 4K NOW
     03754     740200                  SZA
     03755     603761                  JMP .+4           /IN UPPER 4K
     03756     207556                  LAC K10K          /LOWER 4K
     03757     047630                  DAC RJCNT
     03760     603765                  JMP .+5
     03761     207541                  LAC K20
     03762     047630                  DAC RJCNT
     03763     741000                  SKP
     03764     147667                  DZM JMPRET                  /CLEAR ERROR TABLE
     03765     204130                  LAC JMPSEQ
     03766     067630                  DAC* RJCNT                  /STORE JMP 22
     03767     447630                  ISZ RJCNT         /INCR. ADDRESS
     03770     207630                  LAC RJCNT
     03771     546061                  SAD K17777                  /WILL = SAD 07777 WHEN IN
     03772     741000                  SKP               /  UPPER 4K
     03773     603764                  JMP .-7
     03774     207667                  LAC JMPRET
     03775     740200                  SZA
     03776     740040        E508      HALT              /ERROR,  JMPP.+4, .+5 OR .-7 FAILED
     03777     204131                  LAC MOD           /PRESS CONTINUE TO DETERMINE
     04000     043745                  DAC E507-2                  /JMP FAILURE
     04001     740000        MODX      NOP
                             /
     04002     207670                  LAC J111
     04003     740200                  SZA
     04004     740040        E509      HALT              /ERROR.  RJMP OR JMP TO 11111
                                                         /OR 01111 FAILED
     04005     204132                  LAC RJ111
     04006     047670                  DAC J111          /STORE JMP ADDRESS IN TABLE
     04007     051111                  DAC 11111
     04010     611111                  JMP 11111         /JMP TO 11111 OR 01111
     04011     741000                  SKP
     04012     147670        RJMP1     DZM J111          /CLEAR ERROR WORD TABLE
     04013     207671                  LAC J222
     04014     740200                  SZA
     04015     740040        E510      HALT              /ERROR.  RJMP OR JMP TO 12222
                                                         /OR 02222 FAILED
     04016     204133                  LAC RJ222
     04017     047671                  DAC J222
     04020     052222                  DAC 12222
     04021     612222                  JMP 12222         /JMP 1222 OR 02222
     04022     741000                  SKP
     04023     147671        RJMP2     DZM J222          /CLEAR ERROR TABLE
                                       .EJECT
```

```
****
     04024   207672              LAC J333
     04025   740200              SZA
     04026   740040      F511    HALT           /ERROR.  RJMP OR JMP TO 13333
                                                /OR 03333 FAILED
     04027   204134              LAC RJ333
     04030   047672              DAC J333
     04031   053333              DAC 13333
     04032   613333              JMP 13333      /JMP TO 13333 OR 03333
     04033   741000              SKP
     04034   147672      RJMP3   DZM J333       /CLEAR ERROR TABLE
                         /
     04035   207673              LAC J444
     04036   740200              SZA
     04037   740040      F512    HALT           /ERROR.  RJMP OR JMP TO 14444
                                                /OR 04444 FAILED
     04040   204135              LAC RJ444
     04041   047673              DAC J444
     04042   054444              DAC 14444
     04043   614444              JMP 14444      /JMP TO 14444 OR 04444
     04044   741000              SKP
     04045   147673      RJMP4   DZM J444       /CLEAR ERROR TABLE
                         /
     04046   207674              LAC J555
     04047   740200              SZA
     04050   740040      F513    HALT           /ERROR. RJMP OR JMP TO 15555
                                                /OR 05555 FAILED
     04051   204136              LAC RJ555
     04052   047674              DAC J555
     04053   055555              DAC 15555
     04054   615555              JMP 15555      /JMP TO 15555 OR 05555
     04055   741000              SKP
     04056   147674      RJMP5   DZM J555       /CLEAR ERROR TABLE
                         /
     04057   207675              LAC J666
     04060   740200              SZA
     04061   740040      F514    HALT           /ERROR. RJMP OR JMP TO 16666
                                                /OR 06666 FAILED
     04062   204137              LAC RJ666
     04063   047675              DAC J666
     04064   056666              DAC 16666
     04065   616666              JMP 16666      /JMP TO 16666 OR 06666
     04066   741000              SKP
     04067   147675      RJMP6   DZM J666       /CLEAR ERROR TABLE
                         /
                                 .EJECT
```

```
↑↑↑↑
     04070    207676              LAC J777
     04071    740200              SZA
     04072    740040    E515      HALT                /ERROR. RJMP OR JMP TO 17777
                                                       /OR 07777 FAILED
     04073    204140              LAC RJ777
     04074    047676              DAC J777
     04075    057777              DAC 17777
     04076    617777              JMP 17777           /JMP TO 17777 OR 07777
     04077    741000              SKP
     04100    147676    RJMP7     DZM J777            /CLEAR ERROR TABLE
                                  /
     04101    207700              LAC J252
     04102    740200              SZA
     04103    740040    E516      HALT                /ERROR. RJMP OR  MP TO 12525
                                                       /OR 02525 FAILED
     04104    204141              LAC RJ252
     04105    047700              DAC J252
     04106    052525              DAC 12525
     04107    612525              JMP 12525           /JMP TO 12525 OR 02525
     04110    741000              SKP
     04111    147700    RJMP8     DZM J252            /CLEAR ERROR TABLE
                                  /
     04112    207677              LAC J525
     04113    740200              SZA
     04114    740040    E517      HALT                /ERROR. RJMP OR JMP TO 15252
                                                       /OR 05252 FAILED
     04115    204142              LAC RJ525
     04116    047677              DAC J525
     04117    055252              DAC 15252
     04120    615252              JMP 15252           /JMP TO 15252 OR 05252
     04121    741000              SKP
     04122    147677    RJMP9     DZM J525            /CLEAR ERROR TABLE
                                  /
     04123    447634              ISZ WORK3           /CHECK DONE LOOPING
     04124    604002              JMP MODX+1                  /LOOP
     04125    106102              JMS GENRAN                  /GET NO. FOR NEXT LOOP
     04126    106126              JMS CKNO
     04127    604143              JMP TSCAL           /TEST CAL
                                  /
                                  /JMP CONSTANTS. THESE ARE MODIFIED WHEN IN HI 4K
                                  /
     04130    600070    JMPSEQ    JMP SEQUEN
     04131    604002    MOD       JMP MODX+1
     04132    604012    RJ111     JMP RJMP1
     04133    604023    RJ222     JMP RJMP2
     04134    604034    RJ333     JMP RJMP3
     04135    604045    RJ444     JMP RJMP4
     04136    604056    RJ555     JMP RJMP5
     04137    604067    RJ666     JMP RJMP6
     04140    604100    RJ777     JMP RJMP7
     04141    604111    RJ252     JMP RJMP8
     04142    604122    RJ525     JMP RJMP9
                                  .EJECT
```

```
****
                                /TEST CAL
                                /
      04143     20770Q    TSCAL     LAC CAL0
      04144     740200              SZA
      04145     740040    F518      HALT          /ERROR, CAL FROM 17757 OR 07757
      04146     707704              LEM           /CLEAR EXTEND MODE
      04147     754000              CLA!CLL       /AC = 0, LINK = 0
      04150     770020              LAW 10020     /AC = 770020
      04151     150704              DZM 10704     /CAL AT 10704 OR 00704
      04152     207563              LAC K2021
      04153     047701              DAC CAL0      /STORE ERROR CODE 2021
      04154     204215              LAC RCAL0
      04155     040021              DAC 21        /RJMP FROM CAL
      04156     610704              JMP 10704     /JMP TO 10704 OR 00704
      04157     147701    RCALS0    DZM CAL0      /CLEAR ERROR TABLE
      04160     200020              LAC 20
      04161     544216              SAD KCAL0     /10705 OR 00705
      04162     741000              SKP
      04163     740040    F519      HALT          /ERROR, (20) NOT 10705 OR 00705
      04164     210704              LAC 10704
      04165     740200              SZA
      04166     740040    F519A     HALT          /ERROR (10704 OR 00704) NOT 0
                                /
                                /TEST CAL  LINK = 1
                                /
      04167     20770X|             LAC CAL1
      04170     740200              SZA
      04171     740040    F520      HALT          /ERROR,  CAL FROM 10704 OR 00704
      04172     744002              CLL!CML       /LINK = 1
      04173     207564 3            LAC K2120
      04174     04770X|             DAC CAL1      /STORE ERROR CODE 2120
      04175     204217              LAC RCAL1
      04176     040021              DAC 21        /RJMP FROM CAL
      04177     610704              JMP 10704     /JMP TO 10704 OR 00704
      04200     14770X |  RCALS1    DZM CAL1      /CLEAR ERROR TABLE
      04201     200020              LAC 20
      04202     544220              SAD KCALE     /410705 OR 400705
      04203     741000              SKP
      04204     740040    F521      HALT          /ERROR,  (20) NOT 410705 OR 400705
      04205     210704              LAC 10704
      04206     740200              SZA
      04207     740040    F521A     HALT          /ERROR (10704 OR 00704) NOT 0
                                /
      04210     447634              ISZ WORK3     /CHECK DONE LOOPING
      04211     604143              JMP TSCAL     /LOOP
      04212     106102              JMS GENRAN              /GET NO. FOR NEXT LOOP
      04213     106126              JMS CKNO
      04214     604221              JMP TSJMS     /TEST JMS
                                /
                                          .EJECT
```

```
****
                                   /CAL CONSTANTS.  THESE ARE MODIFIED WHEN IN HI 4K
                                   /
     04215      604157             RCAL0      JMP RCALS0
     04216      010705             KCAL0      10705
     04217      604200             RCAL1      JMP RCALS1
     04220      410705             KCALF      410705
                                               .EJECT
```

```
****
                        /TEST JMS
                        /
04221   207703  TSJMS   LAC JSM71
04222   740200          SZA
04223   740040  F522    HALT            /ERROR.  JMS FROM 07777 TO 11111
                                        /OR FROM 17777 TO 01111
04224   744000          CLL             /LINK = 0
04225   204537          LAC RJSM71              /JMP TO RJMS71
04226   051112          DAC 11112       /RJMP FROM JMS DEST'N
04227   204540          LAC RSM71       /JMS 11111
04230   047777          DAC 07777
04231   047703          DAC JSM71
04232   771112          LAW 11112       /AC = 771112
04233   607777          JMP 07777
04234   147703  RJMS71  DZM JSM71       /CLEAR ERROR TABLE
04235   211111          LAC 11111
04236   544541          SAD K10000
04237   741000          SKP
04240   740040  F523    HALT            /ERROR. (11111 OR 01111) NOT
                                        /10000 OR 00000
04241   207704          LAC JSM72
04242   740200          SZA
04243   740040  F524    HALT            /ERROR.  JMS FROM 07776 TO 12222
                                        /OR FROM 17776 TO 02222
04244   707704          LEM
04245   744000          CLL
04246   204542          LAC RJSM72              /JMP TO RJMS72
04247   052223          DAC 12223
04250   204543          LAC RSM72       /JMS 12222
04251   047776          DAC 07776
04252   047704          DAC JSM72
04253   772223          LAW 12223       /AC = 772223
04254   607776          JMP 07776
04255   147704  RJMS72  DZM JSM72       /CLEAR ERROR TABLE
04256   212222          LAC 12222
04257   544544          SAD K77
04260   741000          SKP
04261   740040  F525    HALT            /ERROR. (12222 OR 02222) NOT
                                        /07777 OR 17777
04262   207705          LAC JSM73
04263   740200          SZA
04264   740040  F526    HALT            /ERROR. JMS FROM 07775 TO 13333
                                        /OR FROM 17775 TO 03333
04265   707704          LEM
04266   744000          CLL
04267   204545          LAC RJSM73              /JMP TO RJMS73
04270   053334          DAC 13334
04271   204546          LAC RSM73       /JMS 13333
04272   047775          DAC 07775
04273   047705          DAC JSM73
04274   773334          LAW 13334       /AC = 773334
04275   607775          JMP 07775
                        .EJECT
```

```
****
    04276    147705    RJMS73    DZM JSM73      /CLEAR ERROR TABLE
    04277    213333              LAC 13333
    04300    544547              SAD K76
    04301    741000              SKP
    04302    740040    F527      HALT           /ERROR. (13333 OR 03333) NOT
                                                /07776 OR 17776
    04303    207706              LAC JSM74
    04304    740200              SZA
    04305    740040    F528      HALT           /ERROR.  JMS FROM 07774 TO 14444
                                                /OR FROM 17774 TO 04444
    04306    707704              LEM
    04307    744000              CLL
    04310    204550              LAC RJSM74             /JMP RJMS74
    04311    054445              DAC 14445
    04312    204551              LAC RSM74      /JMS 14444
    04313    047774              DAC 07774
    04314    047706              DAC JSM74
    04315    774445              LAW 14445      /AC = 774445
    04316    607774              JMP 07774
    04317    147706    RJMS74    DZM JSM74      /CLEAR ERROR TABLE
    04320    214444              LAC 14444
    04321    544552              SAD K75
    04322    741000              SKP
    04323    740040    F529      HALT           /ERROR. (14444 OR 04444) NOT
                                                /07775 OR 17775
    04324    207707              LAC JSM75
    04325    740200              SZA
    04326    740040    F530      HALT           /ERROR. JMS FROM 07773 TO 15555
                                                /OR FROM 17773 TO 05555
    04327    707704              LEM
    04330    744000              CLL
    04331    204553              LAC RJSM75             /JMP TO RJMS75
    04332    055556              DAC 15556
    04333    204554              LAC RSM75      /JMS 15555
    04334    047773              DAC 07773
    04335    047707              DAC JSM75
    04336    775556              LAW 15556      /AC = 775556
    04337    607773              JMP 07773
    04340    147707    RJMS75    DZM JSM75      /CLEAR ERROR TABLE
    04341    215555              LAC 15555
    04342    544555              SAD K74
    04343    741000              SKP
    04344    740040    F531      HALT           /ERROR. (15555 OR 05555) NOT
                                                /07774 OR 17774
    04345    207710              LAC JSM76
    04346    740200              SZA
    04347    740040    F532      HALT           /ERROR. JMS FROM 07772 TO 16666
                                                /OR 17772 TO 06666
                                 .EJECT
```

```
****
     04350    707704                LEM
     04351    744000                CLL
     04352    204556                LAC RJSM76                /JMP TO RJMS76
     04353    056667                DAC 16667
     04354    204557                LAC RSM76           /JMS 16666
     04355    047772                DAC 07772
     04356    047710                DAC JSM76
     04357    776667                LAW 16667           /AC = 776667
     04360    607772                JMP 07772
     04361    147710      RJMS76    DZM JSM76           /CLEAR ERROR TABLE
     04362    216666                LAC 16666
     04363    544560                SAD K73
     04364    741000                SKP
     04365    740040      F533      HALT                /ERROR. (16666 OR 06666) NOT
                                                        /07773 OR 17773
     04366    207711                LAC JSM77
     04367    740200                SZA
     04370    740040      F534      HALT                /ERROR.JMS FROM 07771 TO 17777
                                                        /OR 17771 TO 07777
     04371    707704                LEM
     04372    744000                CLL
     04373    700004                CLOF
     04374    700002                IOF                 /PI OFF FOR THIS TEST
     04375    204561                LAC RJSM77                /JMP TO RJMS77
     04376    040000                DAC 0000
     04377    204562                LAC RSM77           /JMS 17777
     04400    047771                DAC 07771
     04401    047711                DAC JSM77
     04402    760000                LAW 0               /AC = 760000
     04403    607771                JMP 07771
     04404    147711      RJMS77    DZM JSM77           /CLEAR ERROR TABLE
     04405    217777                LAC 17777
     04406    544563                SAD K72
     04407    741000                SKP
     04410    740040      F535      HALT                /ERROR (17777 OR 07777) NOT
                                                        /07772 OR 17772
     04411    750004                LAS
     04412    740010                RAL
     04413    740100                SMA
     04414    700042                ION                 /PI BACK ON
     04415    507557                AND K20K
     04416    741200                SNA                 /CHECK ACS 5
     04417    106604                JMS SETCLK                /CLOCK BACK ON
     04420    207712                LAC JS252
     04421    740200                SZA
     04422    740040      F536      HALT                /ERROR. JMS FROM 12525 TO 15252
                                                        /OR FROM 02525 TO 05252
                                    .EJECT
```

```
****
    04423    744002              CLL!CML         /LINK = 1
    04424    204564              LAC RJSM25              /JMP TO RJMS14
    04425    055253              DAC 15253
    04426    204565              LAC RSM25       /JMS 15252
    04427    052525              DAC 12525
    04430    047712              DAC JS252
    04431    775253              LAW 15253       /AC = 775253
    04432    612525              JMP 12525
    04433    147712    RJMS14    DZM JS252       /CLEAR ERROR TABLE
    04434    215252              LAC 15252
    04435    544566              SAD K426        /412526 OR 402526
    04436    741000              SKP
    04437    740040    E537      HALT            /ERROR, (15252 OR 05252) NOT
                                                 /412526 OR 402526
    04440    207713              LAC JS525
    04441    740200              SZA
    04442    740040    E538      HALT            /ERROR, JMS FROM 15252 TO 12525
                                                 /OR 05252 TO 02525
    04443    744002              CLL!CML         /LINK = 1
    04444    204567              LAC RJSM52              /RJMP TO RJMS15
    04445    052526              DAC 12526
    04446    204570              LAC RSM52       /JMS 12525
    04447    055252              DAC 15252
    04450    047713              DAC JS525
    04451    772526              LAW 12526       /AC = 772526
    04452    615252              JMP 15252
    04453    147713    RJMS15    DZM JS525       /CLEAR ERROR TABLE
    04454    212525              LAC 12525
    04455    544572              SAD K415        /415253 OR 405253
    04456    741000              SKP
    04457    740040    E539      HALT            /ERROR, (12525 OR 02525) NOT
                                                 /415253 OR 405253
                                 .EOT
```

```
                        /PDP-9 BASIC EXERCISER  -  TAPE 5
                        /TEST JMS SERIES
                        /
04460   207714          LAC JSSS
04461   740200          SZA
04462   740040  E540    HALT                    /ERROR, JMS SERIES FAILED
                        /
04463   744002          CLL!CML                 /LINK = 1
04464   104465  JS1     JMS .+1
04465   740040  E541    HALT                    /ERROR,  JMS SERIES
04466   104467  JS2     JMS .+1
04467   740040  E542    HALT                    /ERROR,  JMS SERIES
04470   104471  JS3     JMS .+1
04471   740040  E543    HALT                    /ERROR,  JMS SERIES
04472   707704          LEM
04473   744000          CLL
04474   104475  JS4     JMS .+1
04475   740040  E544    HALT                    /ERROR,  JMS SERIES
04476   147714  RJMSS   DZM JSSS                /CLEAR ERROR TABLE
04477   204573          LAC KJS1                /TEST JS1, LINK = 1
04500   347554          TAD K400K
04501   740001          CMA
04502   344465          TAD JS1+1
04503   740001          CMA
04504   740200          SZA
04505   740040  E545    HALT                    /ERROR,  JS1+1
04506   204574          LAC KJS2                /TEST JS2, LINK = 1
04507   347554          TAD K400K
04510   740001          CMA
04511   344467          TAD JS2+1
04512   740001          CMA
04513   740200          SZA
04514   740040  E546    HALT                    /ERROR, JS2+1
04515   204575          LAC KJS3                /TEST JS3, LINK = 1
04516   347554          TAD K400K
04517   740001          CMA
04520   344471          TAD JS3+1
04521   740001          CMA
04522   740200          SZA
04523   740040  E547    HALT                    /ERROR,  JS3+1
04524   204576          LAC KJS4                /TEST JS4, EXT = 0, LINK = 0
04525   740001          CMA
04526   344475          TAD JS4+1
04527   740001          CMA
04530   740200          SZA
04531   740040  E548    HALT                    /ERROR, JS4+1
                        /
04532   447634          ISZ WORK3               /CHECK DONE LOOPING
04533   604221          JMP TSJMS               /LOOP
04534   106102          JMS GENRAN                      /GET NO. FOR NEXT LOOP
04535   106126          JMS CKNO
04536   604577          JMP TSXCT               /TEST XCT
                        .EJECT
```

```
***
                                /CONSTANTS FOR JMS.  MODIFIED WHEN IN HI 4K
                                /
004537      604234              RJSM71      JMP RJMS71
004540      111111              RSM71       JMS 11111
004541      010000              K10000      10000
004542      604255              RJSM72      JMP RJMS72
004543      112222              RSM72       JMS 12222
004544      007777              K77         07777
004545      604276              RJSM73      JMP RJMS73
004546      113333              RSM73       JMS 13333
004547      007776              K76         07776
004550      604317              RJSM74      JMP RJMS74
004551      114444              RSM74       JMS 14444
004552      007775              K75         07775
004553      604340              RJSM75      JMP RJMS75
004554      115555              RSM75       JMS 15555
004555      007774              K74         07774
004556      604361              RJSM76      JMP RJMS76
004557      116666              RSM76       JMS 16666
004560      007773              K73         07773
004561      604404              RJSM77      JMP RJMS77
004562      117777              RSM77       JMS 17777
004563      007772              K72         07772
004564      604433              RJSM25      JMP RJMS14
004565      115252              RSM25       JMS 15252
004566      412526              K426        412526
004567      604453              RJSM52      JMP RJMS15
004570      112525              RSM52       JMS 12525
004571      007771              K71         07771
004572      415253              K415        415253
004573      004465              KJS1        JS1+1
004574      004467              KJS2        JS2+1
004575      004471              KJS3        JS3+1
004576      004475              KJS4        JS4+1
                                /
                                .EJECT
```

```
***
                        /TEST XCT
                        /
004577  754003  TSXCT   CLA!CMA!CLL!CML      /AC = ONES, LINK = 0
004600  404601          XCT .+1              /NOP
004601  740000          NOP
004602  740400          SNL
004603  740040  F549    HALT                 /ERROR: XCT NOP; LINK WAS RESET
004604  740001          CMA
004605  740200          SZA
004606  740040  F550    HALT                 /ERROR: XCT NOP; AC NOT ONES
                        /
                        /TEST EXECUTE NOP, AC = 0, LINK = 0
004607  754000          CLA!CLL              /AC = 0, LINK = 0
004610  404611          XCT .+1
004611  740000          NOP
004612  741400          SZL
004613  740040  F551    HALT                 /ERROR; XCT NOP; LINK WAS SET
004614  740200          SZA
004615  740040  F552    HALT                 /ERROR: XCT NOP; AC NOT 0
                        /
                        /TEST XCT SKP
004616  407617          XCT KSKP             /SKIP
004617  740040  F553    HALT                 /ERROR: XCT SKP FAILED
004620  750001          CLA!CMA              /AC = ONES
004621  407620          XCT KCLA             /CLA
004622  740200          SZA
004623  740040  F554    HALT                 /ERROR: XCT CLA FAILED
                        /
                        /TEST XCT LAW
004624  750000          CLA                  /AC = 0
004625  407573          XCT K7S              /LAW = 17777
004626  740001          CMA                  /AC = 0
004627  740200          SZA
004630  740040  F555    HALT                 /ERROR: XCT LAW FAILED
                        /TEST XCT ISZ
004631  750001          CLA!CMA              /AC = ONES
004632  057777          DAC 17777
004633  405052          XCT XCTISZ                   /ISZ 17777
004634  740040  F556    HALT                 /ERROR: XCT ISZ FAILED TO SKP
                        /
                        /TEST XCT TAD
004635  744002          CLL!CML              /LINK = 1
004636  777777          LAW 17777            /AC = ONES
004637  057777          DAC 17777            /17777=777777
004640  405054          XCT XCTTAD                   /TAD K1
004641  740200          SZA
004642  740040  F557    HALT                 /ERROR: XCT TAD FAILED, AC NOT 0
004643  741400          SZL
004644  740040  F558    HALT                 /ERROR: XCT TAD FAILED LINK
                        .EJECT
```

```
***
                                /TEST XCT RAL, AC = ONES, LINK = 1
    04645       754003                  CLA!CMA!CLL!CML     /AC = ONES, LINK = 1
    04646       407641                  XCT XCTRAL                  /RAL
    04647       740001                  CMA                 /AC = 0
    04650       740200                  SZA
    04651       740040          F559    HALT                /ERROR: XCT RAL FAILED AC DROPPED A BIT
    04652       744400                  SNL!CLL
    04653       740040          F560    HALT                /ERROR: XCTRAL FAILED LINK DROPPED
                                /
                                /TEST XCT DAC
    04654       207567                  LAC K3S             /AC = 333333
    04655       405053                  XCT XCTDAC                  /DAC 17777
    04656       347570                  TAD K4S             /AC = 777777
    04657       740001                  CMA                 /AC = 0
    04660       740200                  SZA
    04661       740040          F561    HALT                /ERROR: XCT DAC FAILED, K3S
                                                            /NOT STORED AT 17777
                                        .EJECT
```

```
***
                        /TEST XCT JMS
                        /
    04662   207715              LAC XCT11
    04663   740200              SZA
    04664   740040      F562    HALT            /ERROR,  XCT (16666 O R 06666)
                                                /FROM 11111 OR 01111
    04665   205030              LAC XT11S       /XCT (16666 OR 06666)
    04666   047715              DAC XCT11
    04667   051111              DAC 11111       /OR 01111
    04670   205031              LAC XTR11       /JMS 11111 OR 01111
    04671   056666              DAC 16666       /OR 06666
    04672   205032              LAC XT1R        /RJMP TO RXCT1
    04673   051112              DAC 11112       /OR 01112
    04674   611111              JMP 11111       /OR 01111 AND XCT (16666 OR 06666)
    04675   147715      RXCT1   DZM XCT11       /CLEAR ERROR TABLE
    04676   211111              LAC 11111       /OR 01111
    04677   545033              SAD K12
    04700   741000              SKP
    04701   740040      F563    HALT            /ERROR,  RJMP ADR, NOT 1112
                                                /OR 01112
    04702   207716              LAC XCT12
    04703   740200              SZA
    04704   740040      F564    HALT            /ERROR, XCT (15555 OR 05555)
                                                /FROM 12222 OR 02222
    04705   205034              LAC XT12S       /XCT (15555 OR 05555)
    04706   047716              DAC XCT12
    04707   052222              DAC 12222
    04710   205035              LAC XTR12       /JMS 12222 OR 02222
    04711   055555              DAC 15555
    04712   205036              LAC XT2R        /RJMP TO RXCT2
    04713   052223              DAC 12223
    04714   612222              JMP 12222
    04715   147716      RXCT2   DZM XCT12       /CLEAR ERROR TABLE
    04716   212222              LAC 12222
    04717   545037              SAD K23
    04720   741000              SKP
    04721   740040      F565    HALT            /ERROR,  RJMP NOT 12223
                                                /OR 02223
    04722   207717              LAC XCT13
    04723   740200              SZA
    04724   740040      F566    HALT            /ERROR, XCT (14444 OR 04444)
                                                /FROM 13333 OR 03333
                        .EJECT
```

```
***
    04725   205040              LAC XT13S       /XCT (14444 OR 04444)
    04726   047717              DAC XCT13
    04727   053333              DAC 13333
    04730   205041              LAC XTR13       /JMS 13333 OR 03333
    04731   054444              DAC 14444
    04732   205042              LAC XT3R        /RJMP TO RXCT3
    04733   053334              DAC 13334
    04734   613333              JMP 13333
    04735   147717    RXCT3     DZM XCT13       /CLEAR ERROR TABLE
    04736   213333              LAC 13333
    04737   545043              SAD K34
    04740   741000              SKP
    04741   740040    F567      HALT            /ERROR,  RJMP NOT 13334 OR 03334
    04742   207720              LAC XCT17
    04743   740200              SZA
    04744   740040    F568      HALT            /ERROR,  XCT (17776 OR 07776)
                                                /FROM 07776 OR 17776
    04745   205044              LAC XT17S       /XCT (17776 OR 07776)
    04746   047720              DAC XCT17
    04747   047776              DAC 07776       /OR 17776
    04750   205045              LAC XTR17       /JMS 07776 OR 17776
    04751   057776              DAC 17776       /OR 07776
    04752   205046              LAC XT4R        /RJMP TO RXCT4
    04753   047777              DAC 07777       /OR 17777
    04754   607776              JMP 07776       /OR 17776
    04755   147720    RXCT4     DZM XCT17       /CLEAR ERROR TABLE
    04756   207776              LAC 07776       /FOR 17776
    04757   544544              SAD K77
    04760   741000              SKP
    04761   740040    E569      HALT            /ERROR, RJMP NOT 07777 OR 17777
    04762   207721              LAC XCT125
    04763   740200              SZA
    04764   740040    F570      HALT            /ERROR, XCT (12525 OR 02525)
                                                /FROM 15252 OR 05252
    04765   205047              LAC XCT12S
    04766   047721              DAC XCT125              /XCT (12525 OR 02525)
    04767   055252              DAC 15252       /OR 05252
    04770   205050              LAC XCTR12
    04771   052525              DAC 12525       /JMS 15252 OR 05252
    04772   205051              LAC XT5R        /RJMP TO RXCT5
    04773   055253              DAC 15253
    04774   615252              JMP 15252
    04775   147721    RXCT5     DZM XCT125              /CLEAR ERROR TABLE
    04776   215252              LAC 15252
    04777   545435              SAD K15253
    05000   741000              SKP
    05001   740040    F571      HALT            /ERROR, RJMP NOT 15253 OR 05253
                                .EJECT
```

```
***
                                        /TEST XCT SERIES
                                        /
      05002     754003                            CLA!CMA!CLL!CML      /AC = ONES, LINK = 1
      05003     405004                            XCT .+1;  XCT .+1;  XCT .+1
      05004     405005
      05005     405006
      05006     405007                            XCT .+1;  XCT .+1;  XCT .+1
      05007     405010
      05010     405011
      05011     405012                            XCT .+1;  XCT .+1;  XCT .+1
      05012     405013
      05013     405014
      05014     405015                            XCT .+1
      05015     740000                            NOP
      05016     740001                            CMA
      05017     740200                            SZA
      05020     740040                  F572      HALT                 /ERROR, XCT SERIES FAILED AC NOT ONES
      05021     740400                            SNL
      05022     740040                  F573      HALT                 /ERROR,  LINK CHANGED
      05023     447634                            ISZ WORK3            /CHECK DONE LOOPING
      05024     604577                            JMP TSXCT            /LOOP
      05025     106102                            JMS GENRAN                     /GET NO FOR NEXT LOOP
      05026     106126                            JMS CKNO
      05027     605055                            JMP TSAUTO                     /TEST AUTO-INDEXING
                                        /
                                        /XCT CONSTANTS, MODIFIED WHEN IN UPPER 4K
                                        /
      05030     416666                  XT11S     XCT 16666
      05031     111111                  XTR11     JMS 11111
      05032     604675                  XT1R      JMP RXCT1
      05033     011112                  K12       11112
      05034     415555                  XT12S     XCT 15555
      05035     112222                  XTR12     JMS 12222
      05036     604715                  XT2R      JMP RXCT2
      05037     012223                  K23       12223
      05040     414444                  XT13S     XCT 14444
      05041     113333                  XTR13     JMS 13333
      05042     604735                  XT3R      JMP RXCT3
      05043     013334                  K34       13334
      05044     417776                  XT17S     XCT 17776
      05045     107776                  XTR17     JMS 07776
      05046     604755                  XT4R      JMP RXCT4
      05047     412525                  XCT12S    XCT 12525
      05050     115252                  XCTR12    JMS 15252
      05051     604775                  XT5R      JMP RXCT5
      05052     457777                  XCTISZ    ISZ 17777
      05053     057777                  XCTDAC    DAC 17777
      05054     347532                  XCTTAD    TAD K1
                                                  .EJECT
```

```
***
                                /AUTO-INDEX
                                /
05055   200020          TSAUTO  LAC 20                 /TEST AUTO-INDEX 20
05056   047637                  DAC AUTNOT                      /STORE (20) AT AUTNOT
05057   220020                  LAC* 20                 /FALSE AUTO-INDEX 20
05060   207637                  LAC AUTNOT
05061   540020                  SAD 20                  /COMPARE (AUTNOT) WITH (20)
05062   741000                  SKP
05063   740040          E574    HALT                    /ERROR: (20) AUTO-INDEXED
05064   040020                  DAC 20                  /RESTORE (20)
                                /TEST AUTO-INDEX (30)
05065   200030                  LAC 30
05066   047637                  DAC AUTNOT                      /STORE (30) AT AUTNOT
05067   220030                  LAC* 30                 /FALSE AUTO INDEX 30
05070   207637                  LAC AUTNOT
05071   540030                  SAD 30                  /COMPARE (AUTNOT) WITH 830)
05072   741000                  SKP
05073   740040          E575    HALT                    /ERROR: (30) AUTO-INDEXED
05074   040030                  DAC 30                  /RESTORE 30
                                /
                                /TEST AUTO-INDEX 50
05075   200050                  LAC 50
05076   047637                  DAC AUTNOT                      /STORE (50) AT AUTNOT
05077   220050                  LAC* 50                 /FALSE AUTO-INDEX 50
05100   207637                  LAC AUTNOT
05101   540050                  SAD 50                  /COMPARE (AUTNOT) WITH (50)
05102   741000                  SKP
05103   740040          E576    HALT                    /ERROR: (50) AUTO-INDEXED
05104   040050                  DAC 50                  /RESTORE 50
                                /
                                /TEST AUTO-INDEX 110
05105   200110                  LAC 110
05106   047637                  DAC AUTNOT                      /STORE (110) AT AUTNOT
05107   220110                  LAC* 110                /FALSE AUTO INDEX 110
05110   207637                  LAC AUTNOT
05111   540110                  SAD 110                 /COMPARE (AUTNOT) WITH (110)
05112   741000                  SKP
05113   740040          E577    HALT                    /ERROR: (110) AUTO-INDEXED
05114   040110                  DAC 110                 /RESTORE 110
                                /
                                /TEST AUTO-INDEX 210
05115   200210                  LAC 210
05116   047637                  DAC AUTNOT                      /STORE (210) AT AUTNOT
05117   220210                  LAC* 210                /FALSE AUTO-INDEX 210
05120   207637                  LAC AUTNOT
05121   540210                  SAD 210                 /COMPARE (AUTNOT) WITH (210)
05122   741000                  SKP
05123   740040          E578    HALT                    /ERROR: (210) AUTO-INDEXED
05124   040210                  DAC 210                 /RESTORE 210
                                .EJECT
```

```
'***
                              /TEST AUTO-INDEX 410
    05125     200410                  LAC 410
    05126     047637                  DAC AUTNOT                          /STORE (410) AT AUTNOT
    05127     220410                  LAC* 410              /FALSE AUTOINDEX 410
    05130     207637                  LAC AUTNOT
    05131     540410                  SAD 410               /COMPARE (AUTNOT) WITH (410)
    05132     741000                  SKP
    05133     740040      F579        HALT                  /ERROR; (410) AUT-INDEXED
    05134     040410                  DAC 410               /RESTORE 410
                              /
                              /TEST AUTO-INDEX 1010
    05135     201010                  LAC 1010
    05136     047637                  DAC AUTNOT                          /STORE (1010) AT AUTNOT
    05137     221010                  LAC* 1010             /FALSE AUTO-INDEX 1010
    05140     207637                  LAC AUTNOT
    05141     541010                  SAD 1010              /COMPARE (AUTNOT) WITH (1010)
    05142     741000                  SKP
    05143     740040      F580        HALT                  /ERROR; (1010) AUT-INDEXED
    05144     041010                  DAC 1010              /RESTORE 1010
                              /
                              /TEST AUTO-INDEX 2010
    05145     202010                  LAC 2010
    05146     047637                  DAC AUTNOT                          /STORE (2010) AT AUTNOT
    05147     222010                  LAC* 2010             /FALSE AUTO INDEX 2010
    05150     207637                  LAC AUTNOT
    05151     542010                  SAD 2010              /COMPARE (AUTNOT) WITH (2010)
    05152     741000                  SKP
    05153     740040      F581        HALT                  /ERROR; (2010) AUTO-INDEXED
    05154     042010                  DAC 2010              /RESTORE 2010
                              /
                              /TEST AUTO-INDEX 4010
    05155     204010                  LAC 4010
    05156     047637                  DAC AUTNOT                          /STORE (4010) AT AUTNOT
    05157     224010                  LAC* 4010             /FALSE AUTO INDEX 4010
    05160     207637                  LAC AUTNOT
    05161     544010                  SAD 4010              /COMPARE (AUTNOT) WITH (4010)
    05162     741000                  SKP
    05163     740040      F582        HALT                  /ERROR; (4010) AUTO-INDEXED
    05164     044010                  DAC 4010              /RESTORE 4010
                              /
    05165     447634                  ISZ WORK3             /CHECK DONE LOOPING
    05166     605055                  JMP TSAUTO                    /LOOP
    05167     106102                  JMS GENRAN                    /GET NO. FOR NEXT LOOP
    05170     106126                  JMS CKNO
                                      .EJECT
```

```
                        /TEST LAC INDIRECT
                        /
05171   204544  LACIN   LAC K77
05172   057777          DAC 17777       /(17777 OR 07777) = 07777 OR 17777
05173   207627          LAC M400K       /377777
05174   047777          DAC 07777       /OR 17777
05175   237777          LAC* 17777      /OR 07777
05176   347554          TAD K400K       /AC = 777777
05177   740001          CMA
05200   740200          SZA
05201   740040  F584    HALT            /ERROR,  LAC* 17777 OR 07777 FAILED
                        /
05202   204547          LAC K76
05203   056666          DAC 16666       /(16666 OR 06666) = 07776 OR 17776
05204   207626          LAC M40K        /737777
05205   047776          DAC 07776
05206   236666          LAC* 16666      /AC = 737777
05207   347553          TAD K40K        /AC = 777777
05210   740001          CMA
05211   740200          SZA
05212   740040  F585    HALT            /ERROR, LAC* 16666 OR 06666 FAILED
                        /
05213   204552          LAC K75
05214   055555          DAC 15555       /(15555 OR 05555) = 07775 OR 17775
05215   207625          LAC M4K         /AC = 773777
05216   047775          DAC 07775
05217   235555          LAC* 15555      /AC = 773777
05220   347550          TAD K4K         /AC = 777777
05221   740001          CMA
05222   740200          SZA
05223   740040  F586    HALT            /ERROR, LAC* 15555 OR 05555 FAILED
                        /
05224   204555          LAC K74
05225   054444          DAC 14444       /(14444 OR 04444) = 07774 OR 17774
05226   207624          LAC M400        /AC = 777377
05227   047774          DAC 07774
05230   234444          LAC* 14444      /AC = 777377
05231   347545          TAD K400        /AC = 777777
05232   740001          CMA
05233   740200          SZA
05234   740040  F587    HALT            /ERROR, LAC* 14444 OR 04444 FAILED
                        /
05235   204560          LAC K73
05236   053333          DAC 13333       /(13333 OR 03333) = 07773 OR 17773
05237   207623          LAC M40         /AC = 777737
05240   047773          DAC 07773
05241   233333          LAC* 13333      /AC = 777737
05242   347543          TAD K40         /AC = 77777
05243   740001          CMA
05244   740200          SZA
05245   740040  F588    HALT            /ERROR, LAC* 13333 OR 03333 FAILED
                        .EJECT
```

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****
     05246   204563            LAC K72
     05247   052222            DAC 12222       /(12222 OR 02222) = 07772 OR 17772
     05250   207622            LAC M4          /AC = 777773
     05251   047772            DAC 07772
     05252   232222            LAC* 12222      /AC = 777773
     05253   347534            TAD K4          /AC = 777777
     05254   740001            CMA
     05255   740200            SZA
     05256   740040   F589     HALT            /ERROR, LAC* 12222 OR 02222 FAILED
                      /
     05257   204571            LAC K71
     05260   051111            DAC 11111       /(11111 OR 01111) = 07771 OR 17771
     05261   207621            LAC M1          /AC = 777776
     05262   047771            DAC 07771
     05263   231111            LAC* 11111      /AC = 777776
     05264   347532            TAD K1          /AC = 777777
     05265   740001            CMA
     05266   740200            SZA
     05267   740040   F590     HALT            /ERROR, LAC* 11111 OR 01111 FAILED
                      /
     05270   205427            LAC INK52
     05271   055252            DAC 15252       /(15252 OR 05252) = 02525 OR 12525
     05272   207606            LAC K101        /AC = 525252
     05273   052525            DAC 12525
     05274   235252            LAC* 15252      /AC = 525252
     05275   347605            TAD K010        /AC = 777777
     05276   740001            CMA
     05277   740200            SZA
     05300   740040   F591     HALT            /ERROR, LAC* 15252 OR 05252 FAILED
                      /
     05301   447634            ISZ WORK3       /CHECK DONE LOOPING
     05302   605171            JMP LACIN       /LOOP
     05303   106102            JMS GENRAN      /GET NO. FOR NEXT LOOP
     05304   106126            JMS CKNO
                               .EJECT
```

```
****
                        /TEST XCT JMS INDIRECT
                        /
05305   744000  XTJMSI  CLL
05306   750000          CLA
05307   547722          SAD JST77
05310   741000          SKP
05311   740040  E592    HALT                    /ERROR, JMS DEST'B ERROR
                        /
05312   206060          LAC K17776              /DIRECT ADDRESS
05313   047777          DAC 07777
05314   205430          LAC JMSI1               /JMS* 07777 OR 17777
05315   047722          DAC JST77               /ERROR TABLE
05316   055252          DAC 15252
05317   205431          LAC RJMI1               /JMP RJSI1
05320   057777          DAC 17777
05321   415252          XCT 15252               /XCT TEST
05322   741000          SKP
05323   147722  RJSI1   DZM JST77
05324   217776          LAC 17776
05325   545432          SAD RJSI1X              /RJSI1X = RJSI1-1
05326   751000          CLA!SKP
05327   740040  E593    HALT                    /ERROR (17776 OR 07776) NOT =
                                                /TO RJSI1-1
                        /
                        /
                        /TEST JMS INDIRECT
                        /
05330   744000          CLL
05331   750000          CLA
05332   547723          SAD JST66
05333   741000          SKP
05334   740040  E594    HALT                    /ERROR, JMS DEST'N ERROR
                        /
05335   206075          LAC K11111              /DIRECT ADR, 11111 OR 01111
05336   056666          DAC 16666               /OR 06666
05337   205433          LAC JSI66               /JMS* 16666 OR 06666
05340   047723          DAC JST66
05341   055252          DAC 15252               /JMS* 16666 OR 06666 AT 15252
                                                /OR 05252
05342   205434          LAC RJMI2               /JMP RJSI2
05343   051112          DAC 11112 /OR 01112
05344   615252          JMP 15252               /OR 05252
05345   741000          SKP
05346   147723  RJSI2   DZM JST66               /CLEAR ERROR TABLE
05347   211111          LAC 11111
05350   545435          SAD K15253
05351   751000          CLA!SKP
05352   740040  E595    HALT                    /ERROR, RJMP ADR, (11111 OR 01111)
                                                /NOT 15253 OR 05253
                        .EJECT
```

```
****
      05353     744000                CLL
      05354     750000                CLA
      05355     547724                SAD JST55
      05356     741000                SKP
      05357     740040    F596        HALT                /ERROR, JMS DEST'N ERROR
      05360     206073                LAC K12222          /DIRECT ADR, 12222 OR 02222
      05361     055555                DAC 15555 /OR 055555
      05362     205436                LAC JST55           /JMS* 15555 OR 05555
      05363     047724                DAC JST55
      05364     055252                DAC 15252           /JMS* 15555 OR 05555 AT
                                                          /15252 OR 05252
      05365     205437                LAC RJMI3           /JMP RJSI3
      05366     052223                DAC 12223           /OR 02223
      05367     615252                JMP 15252           /OR 05252
      05370     741000                SKP
      05371     147724    RJSI3       DZM JST55           /CLEAR ERROR TABLE
      05372     212222                LAC 12222           /OR 02222
      05373     545435                SAD K15253
      05374     751000                CLA!SKP
      05375     740040    F597        HALT                /ERROR, RJMP ADR, (12222 OR 02222)
                                                          /NOT 15253 OR 05253
      05376     744000                CLL
      05377     750000                CLA
      05400     547725                SAD JST44
      05401     741000                SKP
      05402     740040    F598        HALT                /ERROR, JMS DEST'N ERROR
                                      /
      05403     206071                LAC K13333          /DIRECT ADR, 13333 OR 03333
      05404     054444                DAC 14444           /OR 04444
      05405     205440                LAC JST44           /JMS* 14444 OR 04444
      05406     047725                DAC JST44
      05407     055252                DAC 15252           /OR 05252
      05410     205441                LAC RJMI4
      05411     053334                DAC 13334           /OR 03334
      05412     615252                JMP 15252           /OR 05252
      05413     741000                SKP
      05414     147725    RJSI4       DZM JST44           /CLEAR ERROR TABLE
      05415     213333                LAC 13333           /OR 03333
      05416     545435                SAD K15253
      05417     751000                CLA!SKP
      05420     740040    F599        HALT                /ERROR, RJMP ADR (13333 OR 03333)
                                                          /NOT 15253 OR 05253
      05421     447634                ISZ WORK3           /CHECK DONE LOOPING
      05422     605305                JMP XTJMSI          /LOOP
      05423     106102                JMS GENRAN          /GET NO. FOR NEXT LOOP
      05424     106126                JMS CKNO
      05425     700004                CLOF
      05426     605442                JMP XTXCT           /TEST XCT INDIRECTS
                                      .EJECT
```

```
****
                                    /CONSTANTS FOR LAC*, XCT JMS* MODIFIED
                                    /WHEN IN UPPER 4K
                                    /
      05427     012525              INK52     12525
      05430     127777              JMSI1     JMS* 07777
      05431     605323              RJMI1     JMP RJSI1
      05432     005322              RJSI1X    RJSI1-1
      05433     136666              JSI66     JMS* 16666
      05434     605346              RJMI2     JMP RJSI2
      05435     015253              K15253    15253
      05436     135555              JSI55     JMS* 15555
      05437     605371              RJMI3     JMP RJSI3
      05440     134444              JSI44     JMS* 14444
      05441     605414              RJMI4     JMP RJSI4
                                              .EOT
```

```
                        /PDP-9 BASIC EXERCISER  -  TAPE 6
                        /TEST XCT INDIRECT
                        /
     05442      700002  XTXCT   IOF                     /PI OFF FOR XCT* TO USE
                                                        /LOCATION 0
     05443      207531          LAC K0
     05444      057777          DAC 17777               /OR 07777
     05445      205516          LAC XCTDZM
     05446      040000          DAC 0                   /DZM 12525 OR 02525
     05447      777777          LAW 17777
     05450      052525          DAC 12525             /(12525 OR 02525) = 777777
     05451      437777          XCT* 17777            /OR 07777
     05452      212525          LAC 12525             /OR 02525
     05453      740200          SZA
     05454      740040  F600    HALT                  /ERROR, XCT* A DZM FAILED
                                                      /(12525 OR 02525) NOT 777777
                        /
                        /TEST ISZ INDIRECT,  PI IS OFF
                        /
     05455      207531          LAC K0
     05456      057777          DAC 17777             /OR 07777
     05457      777777          LAW 17777
     05460      040000          DAC 0                 /(0) = 777777
     05461      477777          ISZ* 17777
     05462      740040  F601    HALT                  /ERROR ISZ* FAILED TO SKIP/
                                .EJECT
```

```
****
                                /TEST XCT* AND* PI IS OFF
                                /
     05463      207531                  LAC K0
     05464      057777                  DAC 17777           /OR 07777, INDIRECT ADR FOR XCT*
     05465      207532                  LAC K1              /DIRECT ADR, FOR AND*
     05466      057776                  DAC 17776           /OR 07776
     05467      205517                  LAC ANDI
     05470      040000                  DAC 0               /AND* 17776 OR 07776
     05471      207603                  LAC K2525
     05472      040001                  DAC 1               /(1) = 2525
     05473      750001                  CLA!CMA             /AC = ONES
     05474      437777                  XCT* 17777          /OR 07777
     05475      547603                  SAD K2525
     05476      741000                  SKP
     05477      740040        F602      HALT                /ERROR, XCT* 17777 OR 07777
                                                           /FOLLOWED BY AND* 17776
                                                           /OR 07776 FAILED
     05500      447634                  ISZ WORK3           /CHECK DONE LOOPING
     05501      605442                  JMP XTXCT           /LOOP
     05502      106102                  JMS GENRAN          /GET NO, FOR NEXT LOOP
     05503      106126                  JMS CKNO
     05504      207617                  LAC KSKP
     05505      040001                  DAC 1               /RESTORE LOC 1
     05506      750004                  LAS
     05507      740010                  RAL
     05510      740100                  SMA
     05511      700042                  ION                 /PI BACK ON
     05512      507557                  AND K20K
     05513      741200                  SNA                 /TEST ACS5
     05514      106604                  JMS SETCLK                  /CLOCK BACK ON
     05515      605520                  JMP AUTOIN                  /TEST INDEX REGISTERS
                                        .EJECT
```

```
****
                        /CONSTANTS FOR PRECEDING LOOPS, MODIFIED WHEN IN UPPER 4K
                        /
005516  152525          XCTDEM  DEM 12525
005517  537776          ANDI    AND* 17776
                        /
                        /
                        /TEST AUTO-INDEX (XOR* 10)
                        /
005520  206060          AUTOIN  LAC K17776
005521  040010                  DAC 10              /(10) = 17776 OR 07776
005522  207565                  LAC K1S             /AC = 11111
005523  057777                  DAC 17777           /OR 07777
005524  260010                  XOR* 10
005525  740200                  SZA
005526  740040          F603    HALT                /ERROR, XOR* 10 FAILED
                                                    /AC NOT 111111
005527  200010                  LAC 10
005530  546061                  SAD K17777
005531  741000                  SKP
005532  740040          F604    HALT                /ERROR, (10) NOT INCREMENTED+1
                        /
005533  206062                  LAC K16665
005534  040010                  DAC 10              /(10) = 16665 OT 06665
005535  207566                  LAC K2S             /AC = 22222
005536  056666                  DAC 16666           /OR 06666
005537  260010                  XOR* 10
005540  740200                  SZA
005541  740040          F605    HALT                /ERROR, XOR* 10 FAILED
                                                    /AC NOT 22222
005542  200010                  LAC 10
005543  546063                  SAD K16666
005544  741000                  SKP
005545  740040          F606    HALT                /ERROR, (10) NOT INCREMENTED+1
                        /
005546  206064                  LAC K15554
005547  040010                  DAC 10              /(10) = 15554 OR 05554
005550  207567                  LAC K3S             /AC = 333333
005551  055555                  DAC 15555
005552  260010                  XOR* 10
005553  740200                  SZA
005554  740040          F607    HALT                /ERROR, XOR* 10 FAILED,  AC NOT 333333
005555  200010                  LAC 10
005556  546065                  SAD K15555
005557  741000                  SKP
005560  740040          F608    HALT                /ERROR, (10) NOT INCREMENTED +1
                                .EJECT
```

```
****
     05561     206066               LAC K14443
     05562     040010               DAC 10              /(10) = 14443 OR 04443
     05563     207570               LAC K4S             /AC = 444444
     05564     054444               DAC 14444
     05565     260010               XOR* 10
     05566     740200               SZA
     05567     740040     F609      HALT                /ERROR,  XOR* 10 FAILED AC NOT 444444
     05570     200010               LAC 10
     05571     546067               SAD K14444
     05572     741000               SKP
     05573     740040     F610      HALT                /ERROR, (10) NOT INCREMENTED +1
     05574     206070               LAC K13332
     05575     040010               DAC 10              /(10) = 13332 OR 03332
     05576     207571               LAC K5S             /AC = 55555
     05577     053333               DAC 13333
     05600     260010               XOR* 10
     05601     740200               SZA
     05602     740040     F611      HALT                /ERROR, XOR* 10 FAILED AC NOT 555555
     05603     200010               LAC 10
     05604     546071               SAD K13333
     05605     741000               SKP
     05606     740040     F612      HALT                /ERROR, (10) NOT INCREMENTED+1
                                    /
     05607     206072               LAC K12221
     05610     040010               DAC 10              /(10) = 12221 OR 02221
     05611     207572               LAC K6S             /AC = 666666
     05612     052222               DAC 12222
     05613     260010               XOR* 10
     05614     740200               SZA
     05615     740040     F613      HALT                /ERROR, XOR* 10 FAILED, AC NOT 666666
     05616     200010               LAC 10
     05617     546073               SAD K12222
     05620     741000               SKP
     05621     740040     F614      HALT                /ERROR, (10 NOT INCREMENTED+1
     05622     206074               LAC K11110
     05623     040010               DAC 10              /(10) = 11110 OR 01110
     05624     207573               LAC K7S             /AC = 777777
     05625     051111               DAC 11111
     05626     260010               XOR* 10
     05627     740200               SZA
     05630     740040     F615      HALT                /ERROR, XOR* 10 FAILED,  AC NOT 777777
     05631     200010               LAC 10
     05632     546075               SAD K11111
     05633     741000               SKP
     05634     740040     F616      HALT                /ERROR, (10) NOT INCREMENTED +1
                                    .EJECT
```

```
****
                                /TEST ISZ* 11
                                /
05635   206076                          LAC K15252
05636   040011                          DAC 11          /(11) = 15252 OR 05252
05637   207573                          LAC K7S
05640   055253                          DAC 15253       /OR 05253
05641   460011                          ISZ* 11
05642   740040          F617    HALT                    /ERROR, ISZ FAILED TO SKIP
                                                        /AUTO-INDEX 11 FAILED
05643   215253                          LAC 15253
05644   740200                          SZA
05645   740040          F618    HALT                    /ERROR, (15253 OR 05253) NOT 0
                                                        /ISZ FAILED
05646   200011                          LAC 11
05647   545435                          SAD K15253
05650   741000                          SKP
05651   740040          F619    HALT                    /ERROR, (11) NOT INCREMENTED+1
                                /
                                /AUTON-INDEX  JMP* 12,
                                /
05652   207726                          LAC AUTJMP
05653   740200                          SZA
05654   740040          F620    HALT                    /ERROR, JMP* 12 FAILED TO REACH 15253
05655   207651                          LAC JMPAUT      /JMP* 12
05656   047726                          DAC AUTJMP
05657   206077                          LAC AUTRET      /RJMP TO AUTR
05660   055253                          DAC 15253
05661   206076                          LAC K15252
05662   040012                          DAC 12          /(12) = 15252
05663   620012                          JMP* 12
05664   741000                          SKP
05665   147726          AUTR    DZM AUTJMP              /CLEAR ERROR TABLE
05666   200012                          LAC 12
05667   545435                          SAD K15253
05670   741000                          SKP
05671   740040          F621    HALT                    /ERROR, (12) NOT INCREMENTED+1
                                /
                                /AUTO-INDEX (DAC* 13),
                                /
05672   204547                          LAC K76
05673   040013                          DAC 13          /(13) = 07776 OR 17776
05674   204547                          LAC K76
05675   047777                          DAC 07777       /(07777) = 07776
05676   207531                          LAC K0
05677   060013                          DAC* 13
05700   207777                          LAC 07777
05701   740200                          SZA
05702   740040          F622    HALT                    /ERROR, (07777) NOT 0, DAC* 13 FAILED
05703   200013                          LAC 13
05704   544544                          SAD K77
05705   741000                          SKP
05706   740040          F623    HALT                    /ERROR (13) NOT INCREMENTED+1
                                .EJECT
```

```
****
                        /AUTO-INDEX (XCT* 14),
                        /
05707   204571          F624    LAC K71
05710   040014                  DAC 14          /(14) = 07771
05711   207642                  LAC AUTCMA
05712   047772                  DAC 07772       /(07772) = CMA
05713   750001                  CLA!CMA
05714   420014                  XCT* 14
05715   740200                  SZA
05716   740040                  HALT            /ERROR, AC NOT 0 (XCT* 14) A CMA
05717   200014                  LAC 14
05720   544563                  SAD K72
05721   741000                  SKP
05722   740040          F625    HALT            /ERROR, (14) NOT INCREMENTED+1
                        /
                        /AUTO-INDEX (TAD* 15),
                        /
05723   206060                  LAC K17776
05724   040015                  DAC 15          /(15) = 17776 OR 07776
05725   207532                  LAC K1
05726   057777                  DAC 17777       /OR 07777
05727   754001                  CLL!CLA!CMA
05730   360015                  TAD* 15
05731   740200                  SZA
05732   740040          F626    HALT            /ERROR, AC NOT 0 (TAD* 15)
05733   740400                  SNL
05734   740040          F627    HALT            /ERROR, LINK NOT 1 (TAD* 15)
05735   200015                  LAC 15
05736   546061                  SAD K17777
05737   741000                  SKP
05740   740040          F628    HALT            /ERROR, (15) NOT INCREMENTED+1
05741   217777                  LAC 17777
05742   547532                  SAD K1
05743   741000                  SKP
05744   740040          F629    HALT            /ERROR, (17777 OR 07777) NOT 1
                        /
                        /AUTO-INDEX (SAD* 16),
                        /
05745   204555                  LAC K74
05746   040016                  DAC 16          /(16) = 07774
05747   207604                  LAC K5252
05750   047775                  DAC 07775       /(07775) = 5252
05751   560016                  SAD* 16
05752   741000                  SKP
05753   740040          F630    HALT            /ERROR, SAD SKIPPED (SAD* 16)
05754   207775                  LAC 07775
05755   547604                  SAD K5252
05756   741000                  SKP
05757   740040          F631    HALT            /ERROR, (07775) NOT 5252
05760   200016                  LAC 16
05761   544552                  SAD K75
05762   741000                  SKP
05763   740040          F632    HALT            /ERROR, (16) NOT INCREMENTED+1
                                .EJECT
```

```
****
                        /AUTO-INDEX (JMS* 17).
                        /
05764   207727                  LAC AUTJMS
05765   744200                  SZA!CLL
05766   740040  F633            HALT                    /ERROR. ERROR TABLE NOT 0
05767   206100                  LAC AUTRJM
05770   047773                  DAC 07773               /JMP AUTRE1
05771   204571                  LAC K71
05772   040017                  DAC 17                  /(17) = 07771
05773   207647                  LAC JMSAUT
05774   047727                  DAC AUTJMS              /JMS* 17 IN ERROR TABLE
05775   120017                  JMS* 17
05776   741000                  SKP
05777   147727  AUTRE1          DZM AUTJMS              /CLEAR ERROR TABLE
06000   207772                  LAC 07772
06001   546101                  SAD AURJMP
06002   741000                  SKP
06003   740040  F634            HALT                    /ERROR. (07772) STORED WRONG
                                                        /(07772) SHOULD = AUTRE1-1
06004   200017                  LAC 17
06005   544563                  SAD K72
06006   741000                  SKP
06007   740040  F635            HALT                    /ERROR. (17) NOT INCREMENTED+1
                        /
                        /AUTO-INDEX (ISZ* 10) (10) = 10.
                        /
06010   207535                  LAC K10
06011   040010                  DAC 10
06012   207573                  LAC K7S
06013   040011                  DAC 11                  /(11) = 777777
06014   460010                  ISZ* 10
06015   740040  F636            HALT                    /ERROR. ISZ FAILED TO SKIP
06016   200010                  LAC 10
06017   547536                  SAD K11
06020   741000                  SKP
06021   740040  F637            HALT                    /ERROR. (10) NOT 11
06022   200011                  LAC 11
06023   740200                  SZA
06024   740040  F638            HALT                    /ERROR. (11) NOT 0
                        /
                        /AUTO-INDEX (ISZ* 11) (11) = 10.
                        /
06025   207535                  LAC K10
06026   040011                  DAC 11                  /(11) = 10
06027   460011                  ISZ* 11
06030   200011                  LAC 11
06031   547537                  SAD K12A
06032   741000                  SKP
06033   740040  F639            HALT                    /ERROR. ISZ* 11 FAILED TO
                                                        /INCREMENT +2 (11)
                        .EJECT
```

```
****
                        /AUTO-INDEX (XCT* 15),
                        /
06034   204560          LAC K73
06035   040015          DAC 15          /(15) = 07773
06036   207645 4        LAC LAWAUT
06037   047774          DAC 07774       /(07774) = XCT* 15
06040   207646 5        LAC LAWFUL
06041   047775          DAC 07775       /(07775) = LAW 17777
06042   750000          CLA             /AC = 0
06043   420015          XCT* 15
06044   740001          CMA
06045   740200          SZA
06046   740040  F640    HALT            /ERROR,  AC NOT ONES
                                        /LAW 1777 DID NOT OCCUR
06047   200015          LAC 15
06050   544552          SAD K75
06051   741000          SKP
06052   740040  F641    HALT            /ERROR, (15) NOT 7775 (XCT* 15)
06053   447634 3        ISZ WORK3       /CHECK DONE LOOPING
06054   605520          JMP AUTOIN              /LOOP
06055   777775          LAW -3
06056   047634 3        DAC WORK3
06057   606154          JMP CHKBRD      /BASIC MEMORY CHECKERBOARD
                        .EJECT
```

(21)

```
****
                                    /CONSTANTS FOR AUTO-INDEXING.  MODIFIED WHEN IN HI 4K
                                    /
      006060      017776            K17776      17776
      006061      017777            K17777      17777
      006062      016665            K16665      16665
      006063      016666            K16666      16666
      006064      015554            K15554      15554
      006065      015555            K15555      15555
      006066      014443            K14443      14443
      006067      014444            K14444      14444
      006070      013332            K13332      13332
      006071      013333            K13333      13333
      006072      012221            K12221      12221
      006073      012222            K12222      12222
      006074      011110            K11110      11110
      006075      011111            K11111      11111
      006076      015252            K15252      15252
      006077      605665            AUTRET      JMP AUTR
      006100      605777            AUTRJM      JMP AUTRE1
      006101      005776            AURJMP      AUTRE1-1
                                                .EJECT
```

```
****
                                /RANDOM NUMBER GENERATORS
                                /
06102   000000          GENRAN  0
06103   206123                  LAC RANDEX
06104   546124                  SAD ENDTBL              /CHECK FOR END OF TABLE
06105   741000                  SKP                     /END
06106   606116                  JMP RANTAD-1            /GENERATE RANDOM
06107   206125                  LAC TBLTOP
06110   046123                  DAC RANDEX              /RESET INDEX TO FIRST
06111   207655                  LAC RANCON              /POSITION MODIFIER
06112   744010                  CLL!RAL                 /1 LEFT
06113   741400                  SZL                     /WAS BIT 0 A 1
06114   347532                  TAD K1                  /YES MAKE 17 A 1
06115   047655                  DAC RANCON              /RESTORE MODIFIER
06116   226123                  LAC* RANDEX             /GET FIRST CONTROL
06117   347655          RANTAD  TAD RANCON              /ADD MODIFIER
06120   066123                  DAC* RANDEX             /NEW CONTROL = RANDOM
06121   446123                  ISZ RANDEX              /STEP POINTER
06122   626102                  JMP* GENRAN             /EXIT
                                /
06123   007666          RANDEX  RANTBL+10
06124   007666          ENDTBL  RANTBL+10
06125   007656          TBLTOP  RANTBL
                                /
06126   000000          CKNO    0
06127   507610                  AND K37S                /MAKE 65K OR LESS
06130   740001                  CMA
06131   047634                  DAC WQRK3               /LOOP COUNTER
06132   626126                  JMP* CKNO               /EXIT
                                /
06133   000000          RANGEN  0
06134   206123                  LAC RANDEX
06135   546124                  SAD ENDTBL              /CHECK FOR TABLE END
06136   741000                  SKP                     /END
06137   606147                  JMP TADRAN-1            /GENERATE RANDOM
06140   206125                  LAC TBLTOP
06141   046123                  DAC RANDEX              /RESET INDEX TO FIRST
06142   207655                  LAC RANCON              /POSITION MODIFIER
06143   744010                  CLL!RAL                 /1 LEFT
06144   741400                  SZL                     /WAS BIT 0 A 1
06145   347532                  TAD K1                  /MAKE 17 A 1
06146   047655                  DAC RANCON              /RESTORE MODIFIER
06147   226123                  LAC* RANDEX             /GET FIRST CONTROL
06150   347655          TADRAN  TAD RANCON              /ADD MODIFIER
06151   066123                  DAC* RANDEX             /NEW CONTROL = RANDOM
06152   446123                  ISZ RANDEX              /STEP POINTER
06153   626133                  JMP* RANGEN             /EXIT
                                .EJECT
```

```
****
      006154    700002          CHKBRD    IOF
      006155    750004                    LAS
      006156    740010                    RAL
      006157    740100                    SMA                 /CHECK PI INHIBITED
      006160    700042                    ION                 /PI ON
      006161    777777                    LAW -1
      006162    047317                    DAC BITSUP
      006163    206165                    LAC .+2
      006164    046332                    DAC NEXPAT
      006165    207301                    LAC KPAT
      006166    047305                    DAC MPAT
      006167    147632                    DEM WORK1
      006170    707704                    LEM
                                  /
                                  /LOAD CHECKERBOARD
                                  /
      006171    106312                    JMS ADJUST
      006172    207305          LOAD      LAC MPAT
      006173    047307                    DAC PATWD
      006174    777776                    LAW -2
      006175    047314                    DAC WC256
      006176    777770          LCNTA     LAW -10
      006177    047277                    DAC WC128
      006200    777760          LCNTR     LAW -20             /-16 DECIMAL
      006201    047276                    DAC WC16
      006202    207307                    LAC PATWD
      006203    047306                    DAC PATR
      006204    207306          WCLOOP    LAC PATR
      006205    744010                    RCL
      006206    047306                    DAC PATR
      006207    751400                    SZL!CLA             /TEST FOR A 1 OR 0
      006210    740001                    CMA
      006211    067300                    DAC* LLREG                  /STORE WORD
      006212    207300                    LAC LLREG
      006213    546061                    SAD K17777                  /DONE LOADING?
      006214    606234                    JMP READ            /YES
      006215    447300                    ISZ LLREG           /INCR. ADR
      006216    447276                    ISZ WC16            /16 WORDS?
      006217    606204                    JMP WCLOOP          /NO
      006220    447277                    ISZ WC128
      006221    606200                    JMP LCNTR
      006222    207305                    LAC MPAT
      006223    744020                    RCR
      006224    740400                    SNL
      006225    606230                    JMP .+3
      006226    447314                    ISZ WC256
      006227    606176                    JMP LCNTA
      006230    207307                    LAC PATWD
      006231    740001                    CMA
      006232    047307                    DAC PATWD
      006233    606174                    JMP LOAD+2
                                          .EJECT
```

```
****
                                /READ CHECKERBOARD
    06234   207305              READ    LAC MPAT
    06235   047633                      DAC WORK2         /RESTORE PATTERN GEN
    06236   106312                      JMS ADJUST
    06237   777776              RCNTA   LAW -2
    06240   047314                      DAC WC256
    06241   777770                      LAW -10
    06242   047277                      DAC WC128
    06243   207633              RCNTB   LAC WORK2
    06244   047306                      DAC PATR
    06245   777760                      LAW -20           /-26 DECIMAL
    06246   047276                      DAC WC16
    06247   777772              RCLOOP  LAW -6
    06250   047242                      DAC CRLF
    06251   207306                      LAC PATR
    06252   744010                      RCL
    06253   047306                      DAC PATR
    06254   751400                      SZL!CLA
    06255   740001                      CMA
    06256   047307                      DAC PATWD         /SAVE FOR COMPARE
    06257   227300                      LAC* LLREG
    06260   740001                      CMA
    06261   067300                      DAC* LLREG
    06262   447242                      ISZ CRLF
    06263   606257                      JMP .-4
    06264   227300                      LAC* LLREG
    06265   547307                      SAD PATWD         /COMPARE
    06266   741000                      SKP               /OK
    06267   606340                      JMP ERROR
    06270   207300              RDRTN   LAC LLREG
    06271   546061                      SAD K17777                  /DONE READING?
    06272   606325                      JMP NXTST         /YES
    06273   447300                      ISZ LLREG         /INCR. ADR
    06274   447276                      ISZ WC16          /16 WORDS?
    06275   606247                      JMP RCLOOP        /NO,
    06276   447277                      ISZ WC128
    06277   606243                      JMP RCNTB
    06300   207305                      LAC MPAT
    06301   744020                      RCR
    06302   740400                      SNL
    06303   606306                      JMP .+3
    06304   447314                      ISZ WC256
    06305   606241                      JMP RCNTA+2
    06306   207633                      LAC WORK2
    06307   740001                      CMA
    06310   047633                      DAC WORK2
    06311   606237                      JMP RCNTA
                                        .EJECT
```

```
****
      06312     000000          ADJUST    0
      06313     206313                    LAC .
      06314     507556                    AND K10K
      06315     740200                    SZA
      06316     606322                    JMP ULADJ
      06317     207556                    LAC K10K              /SA = 010000 FOR PATTERN
      06320     047300                    DAC LLREG
      06321     626312                    JMP* ADJUST
                                          /
      06322     207545          ULADJ     LAC K400              /SA = 400 FOR PATTERN
      06323     047300                    DAC LLREG
      06324     626312                    JMP* ADJUST
                                          /
      06325     207632          NXTST     LAC WORK1
      06326     247561                    XOR K600K
      06327     741200                    SNA
      06330     606363                    JMP CKLOOP
      06331     446332                    ISZ .+1
      06332     207301          NEXPAT    LAC KPAT
      06333     047305                    DAC MPAT
      06334     207632                    LAC WORK1
      06335     347560                    TAD K230K
      06336     047632                    DAC WORK1
      06337     606171                    JMP LOAD-1
                                          .EJECT
```

```
****
                                /BASIC MEMORY CHECKERBOARD ERROR ROUTINE.
     06340      047634          ERROR   DAC WORK3
     06341      507317                  AND BITSUP
     06342      740200                  SZA
     06343      740001                  CMA
     06344      507317                  AND BITSUP
     06345      741200                  SNA
     06346      606270                  JMP RDRTN
     06347      207300                  LAC LLREG           /DISPLAY ADDRESS
     06350      740040          F642    HLT
     06351      207307                  LAC PATWD           /GOOD DATA
     06352      740040          GDATA   HLT
     06353      207634                  LAC WORK3           /BAD DATA
     06354      740040          BDATA   HLT
     06355      750004                  LAS                 /SUPPRESS HERE
     06356      740001                  CMA
     06357      047317                  DAC BITSUP
     06360      207633                  LAC WORK2           /PATTERN CONTROL WORD
     06361      740040          PATT    HLT
     06362      606055                  JMP E641+3          /START OVER
                                /
     06363      750004          CKLOOP  LAS
     06364      742010                  RTL
     06365      740010                  RAL
     06366      741100                  SPA
     06367      606154                  JMP CHKBRD                  /LOOP ON MEMORY TEST
     06370      447634                  ISZ WORK3           /CHECK  DONE LOOPING
     06371      606154                  JMP CHKBRD                  /LOOP
     06372      700002                  IOF
     06373      750004                  LAS
     06374      507557                  AND K20K            /CHECK ACS 4 FOR
                                                            /INHIBIT RELOCATION
     06375      741200                  SNA
     06376      606406                  JMP FNTST           /RELOCATE
     06377      760207                  LAW 207
     06400      107211                  JMS TLSSF           /BELL FOR ONE PASS
     06401      750004                  LAS
     06402      740010                  RAL
     06403      741100                  SPA                 /CHECK FOR PI INHIBITED
     06404      107251                  JMS PINOT           /INHIBITED
     06405      600070                  JMP SEQUEN                  /START OVER IN THIS 4K
                                        .EOT
```

```
                        /PDP-9 BASIC EXERCISER  -  TAPE 7
                        /
                        /ROUTINE FOR PROGRAM RELOCATION
                        /
06406   700002  ENTST   IOF                     /PI OFF DURING RELOCATION
06407   770023          LAW -7755
06410   047313          DAC WDCNT
06411   206411          LAC .
06412   507556          AND K10K
06413   740200          SZA                     /SEE IF IN LO OR HI 4K
06414   606510          JMP MVRK                /HI 4K
06415   740001          CMA
06416   047633          DAC WORK2               /SOURCE ADDRESS
06417   207320          LAC K7777               /DEST'N ADR. TO HI 4K
06420   047634          DAC WORK3
06421   207633  MOVE    LAC WORK2
06422   047315          DAC MOVES
06423   207634          LAC WORK3
06424   047316          DAC MOVED
06425   447316          ISZ MOVED
06426   167316          DZM* MOVED              /CLEAR DEST'N TO 0'S
06427   447313          ISZ WDCNT
06430   606425          JMP .-3
06431   207634          LAC WORK3
06432   047316          DAC MOVED               /RESTORE DEST'N S.A.
06433   447315  RFROM   ISZ MOVES
06434   227315          LAC* MOVES              /SOURCE ADR.
06435   047634          DAC WORK3               /SAVE INSTRUCTION
06436   507562          AND K700K
06437   247562          XOR K700K
06440   740200          SZA                     /OPERATE INST. IF 0
06441   606515          JMP MRINS               /MEMORY REF
06442   207634          LAC WORK3
06443   447316  MVRTN   ISZ MOVED
06444   067316          DAC* MOVED              /STORE IN OPPOSITE 4K
06445   547275          SAD LIMITA              /DONE WITH INST. IF EQUAL
06446   741000          SKP                     /MOVE CONSTANT TABLES
06447   606433          JMP RFROM               /MOVE ANOTHER INST.
06450   147634          DZM WORK3
06451   447315  MVCST   ISZ MOVES
06452   227315          LAC* MOVES              /SOURCE
06453   447316          ISZ MOVED
06454   067316          DAC* MOVED              /DEST'N
06455   547275          SAD LIMITA              /DONE MOVING IF EQUAL
06456   741000          SKP                     /DONE
06457   606451          JMP MVCST               /MOVE ANOTHER CONSTANT
                        .EJECT
```

```
****
      06460     204541                LAC K10000
      06461     247556                XOR K10K
      06462     054541                DAC K10000+10000
      06463     204376                LAC E534+6
      06464     247556                XOR K10K
      06465     054376                DAC E534+6+10000
      06466     207327                LAC TTIN
      06467     247556                XOR K10K
      06470     057327                DAC TTIN+10000
      06471     207326                LAC TTOUT
      06472     247556                XOR K10K
      06473     057326                DAC TTOUT+10000
      06474     750004                LAS                   /LOWER
      06475     740010                RAL
      06476     741100                SPA                   /CHECK FOR INHIBIT PI
      06477     107251                JMS PINOT             /INHIBITED
                                      .EJECT
```

```
****
      06500     206500          BGNAGN    LAC .
      06501     507556                    AND K10K
      06502     740200                    SZA                 /SEE WHICH 4K
      06503     741000                    SKP
      06504     627311                    JMP* BGNHI          /START OVER IN HI 4K
      06505     760207                    LAW 207             /BELL
      06506     107211                    JMS TLSSF
      06507     627310                    JMP* BGNLO                  /START IN LOW 4K
                                  /
                                  /SETUP TO MOVE TO LOW 4K
                                  /
      06510     777777          MVRK      LAW 17777           /DEST'N
      06511     047634                    DAC WORK3
      06512     207320                    LAC K7777           /SOURCE
      06513     047315                    DAC MOVES
      06514     606423                    JMP MOVE+2          /MOVE PROGRAM
                                  /
                                  /
                                  /ADJUST MEMORY REF. INSTRUCTIONS. DO NOT ADJUST IF
                                  /ADR. PORTION=ANY ADR. FROM 0 TO 21.
                                  /
      06515     147313          MRINS     DZM WDCNT           /ADR. COMPARE WORD
      06516     207634                    LAC WORK3           /INST. TO BE MODIFIED
      06517     507320                    AND K7777           /CLEAR BITS 0-5
      06520     047633                    DAC WORK2           /SAVE
      06521     207313                    LAC WDCNT
      06522     547542                    SAD K22             /DONE IF EQUAL TO 22
      06523     606530                    JMP .+5
      06524     547633                    SAD WORK2           /COMPARE
      06525     606442                    JMP MVRTN-1         /ADR. IS SOME REG. FROM 0
                                                              /TO 21, MOVE WITHOUT ADJUSTING
      06526     447313                    ISZ WDCNT           /ADR. COUNT+1
      06527     606521                    JMP .-6
      06530     207556                    LAC K10K            /10000
      06531     247634                    XOR WORK3           /ADJUST INST. BY 10000
      06532     606443                    JMP MVRTN           /MOVE
                                  /
      06533     047643          SAV3      DAC SAVAC           /THESE ARE MODIFIED FOR
      06534     047644          SAV5      DAC RJMP            /RELOCATION
      06535     606536          SAV6      JMP SRVINT
                                          .EJECT
```

```
****
                                /
                                /SERVICE ALL INTERRUPTS
                                /
06536   700001  SRVINT  CLSF                  /CHECK FOR PI FROM CLOCK
06537   741000          SKP                   /SOME OTHER DEVICE
06540   606575          JMP CLKINT
06541   700314          IORS
06542   741100          SPA                   /STATUS WORD BIT 0 MUST = 0
06543   740040  E643    HALT                  /ERROR.  BIT 0 SET.  PI OFF
06544   207631          LAC WORK
06545   740010          RAL
06546   741100          SPA                   /SEE IF TTY IN USE AT TIME
                                              /OF PI
06547   606636          JMP TTYINT            /CONTINUE PRINTING
06550   700314          IORS                  /I/O STATUS WORD
06551   507322          AND K1400
06552   740200          SZA                   /CHECK FOR NO TAPE FLAGS
06553   107142          JMS RNFLG             /EITHER READER OR PUNCH NO TAPE
06554   700101          RSF                   /CHECK FOR PI FROM READER
06555   741000          SKP
06556   606776          JMP READA             /READ MORE
06557   700201          PSF                   /CHECK PUNCH PI
06560   606562          JMP RTNIT             /SOME OTHER DEVICE
06561   626763          JMP* GOPNCH           /PUNCH MORE
                                /
                                /SETUP TO RETURN TO INSTRUCTION TEST
                                /
06562   744000  RTNIT    CLL
06563   207644          LAC RJMP              /C(0) AT PI
06564   741100          SPA                   /CHECK LINK
06565   744002          STL                   /RESTORE LINK
06566   507602          AND K17S
06567   546574          SAD ILINT
06570   740040  E644    HALT                  /ERROR, PI OCCURRED AFTER LAC SAVAC
                                              /INSTEAD OF JMP * RJMP.
06571   207643          LAC SAVAC             /AC AT TIME OF PI
06572   700042  PION    ION                   /PI ON
06573   627644          JMP* RJMP             /CONTENTS OF (0) AFTER PI
                                /
06574   006572  ILINT    PION
                                /
06575   200007  CLKINT   LAC 7
06576   547540          SAD K100              /LET CLOCK CONTINUE FOR 1/2 SEC
06577   741000          SKP
06600   606575          JMP .-3
06601   700004          CLOF
06602   106621          JMS CLKSET                    /RESET CLOCK TO RANDOM VALUE
06603   606562          JMP RTNIT             /RETURN TO INST. TEST
                        .EJECT
```

```
****
                        /
                        /SETUP CLOCK VALUES
                        /
 06604   000000   SETCLK  0
 06605   106102          JMS GENRAN          /GET A NO. FOR CLOCK
 06606   047313          DAC WDCNT           /SAVE
 06607   507324          AND K777            /MAX. TIME = 9 SECS.
 06610   047313          DAC WDCNT           /SAVE
 06611   347325          TAD M167            /MIN. TIME = 2 SEC.
 06612   741100          SPA                 /POS.=2 SECS. OR MORE
 06613   606605          JMP SETCLK+1        /NEG = LESS THAN 2 SEC.
 06614   207313          LAC WDCNT
 06615   740001          CMA
 06616   040007          DAC 7               /PUT VALUE IN (7)
 06617   700044          CLON                /CLOCK ON
 06620   626604          JMP* SETCLK         /EXIT
                        /
 06621   000000   CLKSET  0
 06622   106133          JMS RANGEN                  /GET A NO. FOR CLOCK
 06623   047313          DAC WDCNT           /SAVE
 06624   507324          AND K777            /MAX. TIME = 9 SECS.
 06625   047313          DAC WDCNT           /SAVE
 06626   347325          TAD M167            /MIN. TIME = 2 SECS.
 06627   741100          SPA                 /POS. = 2 SECS. OR MORE
 06630   606622          JMP CLKSET+1        /NEG. = LESS THAN 2 SECS.
 06631   207313          LAC WDCNT
 06632   740001          CMA
 06633   040007          DAC 7               /PUT VALUE IN (7)
 06634   700044          CLON                /CLOCK ON
 06635   626621          JMP* CLKSET         /EXIT
                         .EJECT
```

```
****
                        /SETUP FOR READ, PUNCH, OR PRINT
                        /
06636   207326  TTYINT  LAC TTOUT
06637   546701          SAD ENDOUT              /IF EQUAL GO PUNCH AND READ
06640   606657          JMP PREADY
06641   207631          LAC WORK
06642   507531          AND K0
06643   247560          XOR K200K
06644   047631          DAC WORK
06645   700101          RSF
06646   741000          SKP
06647   740040  F645    HALT                    /ERROR,  READ FLAG UP
06650   700201          PSF
06651   741000          SKP
06652   740040  F646    HALT                    /ERROR,  PUNCH FLAG UP
06653   447326          ISZ TTOUT               /TTOUT = CHAR, BIN POINTER
06654   227326          LAC* TTOUT              /GET CHAR, FROM TTY BIN
06655   700406          TLS                     /PRINT ONE CHARACTER
06656   606562          JMP RTNIT               /RETURN TO INST, TEST
                        /
06657   147631  PREADY  DZM WORK
06660   147330          DZM CNTA
06661   147331          DZM CNTB
06662   700402          TCF                     /CLEAR TTY FLAG
06663   750004          LAS
06664   507544          AND K1K
06665   741200          SNA                     /TEST ACS 8 A 1
06666   606671          JMP .+3
06667   700104          RSA                     /SELECT READER
06670   606562          JMP RTNIT               /RETURN TO INST, TEST
06671   206763          LAC GOPNCH
06672   741200          SNA                     /0=1ST TIME THRU
06673   606702          JMP PNSTRT              /START SEQUENCE
06674   700104          RSA                     /SELECT READER
06675   626763          JMP* GOPNCH             /CONTINUE SEQUENCE
                        /
06676   007360  DATARL  TTBUFA-1
06677   007444  ENDBIN  TTBUFA+63
06700   007444  OUTTOP  TTBUFB-1
06701   007530  ENDOUT  TTBUFB+63
                        .EJECT
```

```
****
                                /
                                /PUNCH DATA
                                /
     06702      107242          PNSTRT    JMS CRLF            /CR,LF
     06703      700402                    TCF                 /CLEAR TTY FLAG
     06704      750004                    LAS
     06705      507547                    AND K3K             /MASK ACS 7 AND 8
     06706      741200                    SNA                 /IF EITHER IS A 1, DON'T PUNCH
     06707      606712                    JMP .+3             /PUNCH DATA
     06710      700202                    PCF                 /CLEAR PUNCH FLAG, NO MORE
                                                              /PI'S FROM PUNCH SHOULD OCCUR.
     06711      606562                    JMP RTNIT           /RETURN TO INST. TEST
     06712      750000                    CLA
     06713      700104                    RSA                 /SELECT READER AND PUNCH
     06714      106763                    JMS GOPNCH          /TO INITIATE SEQUENCE
     06715      207334                    LAC K300
     06716      047336                    DAC STORE
     06717      447336          PNXT      ISZ STORE
     06720      207336                    LAC STORE
     06721      106763                    JMS GOPNCH          /PUNCH CHAR. IN AC 10-17
     06722      207337                    LAC SPCE            /(SPCE)=240
     06723      106763                    JMS GOPNCH          /PUNCH SPACE
     06724      207336                    LAC STORE
     06725      547340                    SAD K332            /DONE WITH ALPHABET IF EQUAL
     06726      741000                    SKP
     06727      606717                    JMP PNXT            /PUNCH MORE CHARS.
     06730      207332                    LAC K257
     06731      047336                    DAC STORE
     06732      447336          PNXTA     ISZ STORE
     06733      207336                    LAC STORE
     06734      106763                    JMS GOPNCH
     06735      207337                    LAC SPCE
     06736      106763                    JMS GOPNCH
     06737      207336                    LAC STORE
     06740      547333                    SAD K271
     06741      741000                    SKP
     06742      606732                    JMP PNXTA
     06743      207341                    LAC KCRLF           /(KCRLF)=CR,LF
     06744      047336                    DAC STORE
     06745      106763                    JMS GOPNCH          /PUNCH CR
     06746      207336                    LAC STORE
     06747      107233                    JMS ROTAT9          /ROTATE 9 RIGHT
     06750      106763                    JMS GOPNCH          /PUNCH LF
     06751      777770                    LAW -10
     06752      047336                    DAC STORE
     06753      750001                    CLA!CMA             /AC = 777777
     06754      700010                    700010              /CLEAR AC WITH MB 14
     06755      740200                    SZA
     06756      740040          E647      HALT                /ERROR, EVENT TIME 1 DIDN'T
                                                                    /CLEAR AC.
     06757      106763                    JMS GOPNCH                /PUNCH 8 FRAMES OF 0'S
     06760      447336                    ISZ STORE
     06761      606753                    JMP .-6
     06762      606715                    JMP PNXT-2          /START NEW LINE
```

.EJECT

```
****
     06763     000000          GOPNCH    0
     06764     700204                    PSA
     06765     750004                    LAS
     06766     507550                    AND K4K             /MASK ACS 6
     06767     740200                    SZA                 /IF A 1, DON'T USE CNTA OR CNTB
     06770     606562                    JMP RTNIT           /RETURN TO INST. TEST
     06771     447330                    ISZ CNTA            /CNTA=PUNCH SELECTED
     06772     207331                    LAC CNTB
     06773     740200                    SZA                 /0=WAIT FOR PI
     06774     607031                    JMP SUB1            /1=SELECT READER AGAIN
     06775     606562                    JMP RTNIT           /RETURN TO INST. TEST
                               /READ PUNCHED INFO
                               /
     06776     750004          READA     LAS
     06777     507547                    AND K3K             /MASK ACS 7 AND 8
     07000     740200                    SZA                 /IF EITHER IS A 1, READ FULL SPEED
     07001     607113                    JMP READR
     07002     750004                    LAS
     07003     507550                    AND K4K             /MASK ACS 6
     07004     741200                    SNA                 /IF A 1, CLEAR READER FLAG, NO
                                                             /MORE PI'S FROM READER
     07005     607010                    JMP .+3
     07006     700112                    RRB                 /CLEAR READER FLAG
     07007     606562                    JMP RTNIT           /RETURN TO INST. TEST AND
                                                             /WAIT FOR PUNCH PI
     07010     700112                    RRB                 /READ ONE
     07011     740200                    SZA                 /0=NO DATA IN READER YET
     07012     607017                    JMP ZRONOT
     07013     207330                    LAC CNTA            /SEE IF PUNCH IS SELECTED
     07014     740200                    SZA
     07015     607031                    JMP SUB1            /YES, SUBTRACT FROM CNTA
     07016     607027                    JMP TADD1           /READER SELECTED
     07017     447327          ZRONOT    ISZ TTIN            /STORE CHAR. IN TTY BIN
     07020     067327                    DAC* TTIN
     07021     207327                    LAC TTIN
     07022     546677                    SAD ENDBIN                    /CHECK FOR 52 CHARACTERS STORED
     07023     607037                    JMP SETTY           /DONE, SETUP TO PRINT
     07024     207330                    LAC CNTA
     07025     740200                    SZA
     07026     607031                    JMP .+3
                               /
     07027     447331          TADD1     ISZ CNTB
     07030     606562                    JMP RTNIT           /RETURN TO INST. TEST
     07031     777777          SUB1      LAW -1
     07032     347330                    TAD CNTA            /(CNTA)-1
     07033     047330                    DAC CNTA
     07034     147331                    DZM CNTB
     07035     700104                    RSA
     07036     606562                    JMP RTNIT           /RETURN TO INST. TEST
                               /
                                         .EJECT
```

```
****
     07037     700201     SETTY    PSF                 /WAIT FOR PUNCH
     07040     607037              JMP .-1
     07041     700202              PCF                 /CLEAR PUNCH FLAG
     07042     700402              TCF                 /CLEAR TTY FLAG
     07043     207312              LAC BREAK
     07044     547537              SAD K12A
     07045     607070              JMP PUN6
     07046     447312              ISZ BREAK
     07047     206676              LAC DATABL          /RESTORE INPUT/OUTPUT POINTERS
     07050     047327              DAC TTIN            /READER TO BIN
     07051     206700              LAC OUTTOP
     07052     047326              DAC TTOUT           /BIN TO TTY
     07053     447327     XFR1     ISZ TTIN            /TRANSFER BUFFER A TO BUFFER B
     07054     227327              LAC* TTIN
     07055     447326              ISZ TTOUT
     07056     067326              DAC* TTOUT
     07057     207326              LAC TTOUT
     07060     546701              SAD ENDOUT                  /DONE IF EQUAL TO TTBUFB+63
     07061     741000              SKP
     07062     607053              JMP XFR1            /TRANSFER ANOTHER
     07063     206676              LAC DATABL                  /RESTORE BUFFER POINTERS
     07064     047327              DAC TTIN
     07065     206700              LAC OUTTOP                  /TTBUFB-1
     07066     047326              DAC TTOUT
     07067     606641              JMP TTYINT+3        /BEGIN PRINTING
                                   /
     07070     206763     PUN6     LAC GOPNCH
     07071     547112              SAD K647  /PUNCH 0'S ONLY AT END OF BLOCK
     07072     741000              SKP
     07073     607047              JMP XFR1-4          /(GOPNCH) NOT=E647+2
     07074     147312              DZM BREAK
     07075     777772              LAW -6
     07076     047336              DAC STORE /FRAME COUNTER
     07077     777777              LAW -1              /AC=777777
     07100     700010              700010              /CLEAR AC WITH BIT 14
     07101     740200              SZA
     07102     740040     E648     HALT                /ERROR, MB14 DIDN'T CLEAR AC
     07103     700204              PSA                 /PUNCH BLANK FRAME
     07104     700201              PSF
     07105     607104              JMP .-1
     07106     447336              ISZ STORE
     07107     607077              JMP E648-3
     07110     700202              PCF                 /CLEAR PUNCH FLAG
     07111     607047              JMP XFR1-4          /SETUP TO PRINT
                                   /
     07112     006760     K647     E647+2
                                   /
                                   .EJECT
```

```
****
                        /READB ROUTINE IS USED ONLY WHEN PUNCH IS INHIBITED
                        /BY ACS 7 OR 8, OR BOTH, READER RUNS AT FULL SPEED.
                        /
07113   750004  READB   LAS
07114   507550          AND K4K             /MASK ACS 6
07115   741200          SNA                 /IF A 1, DON'T READ
07116   607121          JMP .+3
07117   700112          RRB                 /CLEAR READER FLAG
07120   606562          JMP RTNIT           /RETURN TO INST. TEST
07121   700112          RRB                 /GET CHAR. FROM BUFFER.
07122   741200          SNA                 /0 = NO DATA IN READER YET.
07123   607131          JMP SELECT                  /SELECT READER AGAIN
07124   447327          ISZ TTIN            /BUFFER POINTER +1
07125   067327          DAC* TTIN           /STORE CHAR. IN TTBUFA
07126   207327          LAC TTIN
07127   546677          SAD ENDBIN                  /CHECK FOR 52 CHARS. STORED
07130   607133          JMP .+3             /TTBUFA IS FULL
07131   700104  SELECT  RSA                 /SELECT READER
07132   606562          JMP RTNIT           /RETURN TO INST. TEST
                        /
07133   206676          LAC DATABL
07134   047327          DAC TTIN            /RESTORE TTBUFA POINTER
07135   750004          LAS
07136   507551          AND K6K             /MASK ACS 6 AND 7
07137   740200          SZA                 /IF EITHER A 1, DON'T PRINT
07140   607131          JMP SELECT                  /SELECT READER AGAIN
07141   607042          JMP SETTY+3         /SETUP TO PRINT
                        /
                        /SERVICE NO TAPE CONDITIONS
                        /
07142   000000  RNFLG   0
07143   507544          AND K1K             /CHECK FOR READER NO TAPE
07144   740200          SZA
07145   607152          JMP .+5             /READER
07146   760320          LAW 320             /PUNCH NO TAPE
07147   247342          XOR K520K
07150   047352          DAC NTFLG+1
07151   607154          JMP OUTFLG          /PRINT R OR P NO TAPE
07152   760322          LAW 322             /READER NO TAPE
07153   607147          JMP .-4
                        /
07154   207351  OUTFLG  LAC NTFLG
07155   047313          DAC WDCNT
07156   107242          JMS CRLF            /CR,LF
07157   447313          ISZ WDCNT
07160   227313          LAC* WDCNT
07161   741200          SNA
07162   607167          JMP CLRFLG
07163   107211          JMS TLSSF
07164   107233          JMS ROTAT9
07165   107211          JMS TLSSF
07166   607157          JMP OUTFLG+3
07167   107242  CLRFLG  JMS CRLF            /CR,LF
07170   627142          JMP* RNFLG          /RETURN TO SEQUENCE
```

.EJECT

```
****
                                /PUNCH LEADER
                                /
      07171     000000          PNLEDR    0
      07172     777440                    LAW -340
      07173     047313                    DAC WDCNT
      07174     750000                    CLA
      07175     700204                    PSA
      07176     700201                    PSF
      07177     607176                    JMP .-1
      07200     447313                    ISZ WDCNT
      07201     607175                    JMP .-4
      07202     627171                    JMP* PNLEDR
                                /
      07203     000000          PNMARK    0
      07204     777777                    LAW -1
      07205     700204                    PSA
      07206     700201                    PSF
      07207     607206                    JMP .-1
      07210     627203                    JMP* PNMARK          /EXIT
                                          .EJECT
```

```
****
                                /
                                /PRINT A CHARACTER
                                /
07211   000000          TLSSF   0
07212   047316                  DAC MOVED
07213   207631                  LAC WORK
07214   740010                  RAL
07215   740100                  SMA                     /CHECK TTY FLAG
07216   607221                  JMP .+3
07217   700401                  TSF
07220   607217                  JMP .-1                 /WAIT FOR FLAG
07221   207316                  LAC MOVED
07222   700406                  TLS
07223   700401                  TSF
07224   607223                  JMP .-1
07225   207631                  LAC WORK                /CLEAR TTY IF BIT 1 = 0
07226   740010                  RAL
07227   740100                  SMA
07230   700402                  TCF
07231   207316                  LAC MOVED
07232   627211                  JMP* TLSSF
                                /
                                /ROTATE 9 RIGHT
                                /
07233   000000          ROTAT9  0
07234   742020                  RTR;    RTR;    RTR
07235   742020
07236   742020
07237   742020                  RTR;    RAR
07240   740020
07241   627233                  JMP*    ROTAT9
                                /
                                /CARRIAGE RETURN, LINEFEED
                                /
07242   000000          CRLF    0
07243   760215                  LAW 215                 /CR
07244   107211                  JMS TLSSF
07245   547247                  SAD .+2
07246   627242                  JMP* CRLF               /EXIT
07247   760212                  LAW 212                 /LF
07250   607244                  JMP CRLF+2
                                .EJECT
```

```
****
                        /PRINT "COMPLETE"
                        /
     07251    000000    PINOT   0
     07252    207635            LAC WORK4           /PASS COUNTER
     07253    547537            SAD K12A            /PRINT IF EQUAL TO 10
     07254    741000            SKP
     07255    627251            JMP* PINOT                  /START PROGRAM
     07256    147635            DZM WORK4
     07257    157635            DZM WORK4+10000
     07260    207274            LAC COMPA
     07261    040014            DAC 14              /PRINT COMPLETE
     07262    107242            JMS CRLF
     07263    220014            LAC* 14
     07264    741200            SNA                 /DONE PRINTING IF 0
     07265    607272            JMP .+5
     07266    107211            JMS TLSSF           /PRINT 1 CHAR
     07267    107233            JMS ROTAT9
     07270    107211            JMS TLSSF           /PRINT 2ND
     07271    607263            JMP .-6             /GET NEXT PAIR
     07272    107242            JMS CRLF            /CR, LF
     07273    627251            JMP* PINOT
                        /
     07274    007343    COMPA   COMP
                        .EJECT
```

```
****
                        /CONSTANT TABLE FOR CHECKERBOARD AND PI
                        /SERVICE ROUTINES
                        /
007275  752525          LIMITA  752525          /DELIMITER
007276  000000          WC16    0
007277  000000          WC12B   0
007300  000000          ILREG   0
007301  037700          KPAT    037700
007302  740076                  740076
007303  037701                  037701
007304  740077                  740077
007305  037700          MPAT    037700
007306  000000          PATR    0
007307  000000          PATWD   0
007310  000070          RGNLO   SEQUEN
007311  010070          RGNHI   SEQUEN+10000
007312  000000          BREAK   0
007313  000000          WDCNT   0
007314  777776          WC256   777776
007315  000000          MOVES   0
007316  000000          MOVED   0
007317  777777          BITSUP  777777
007320  007777          K7777   7777
007321  100000          K1000K  100000
007322  001400          K1400   1400
007323  500000          K500K   500000
007324  000777          K777    777
007325  777611          M167    777611
007326  000000          TTOUT   0
007327  000000          TTIN    0
007330  000000          CNTA    0
007331  000000          CNTR    0
007332  000257          K257    257
007333  000271          K271    271
007334  000300          K300    300
007335  000301          K301    301
007336  000000          STORE   0
007337  000240          SPCE    240
007340  000332          K332    332
007341  212215          KCRLF   212215
007342  520000          K520K   520000
                        .EJECT
```

```
****
                                /
                                /PRINT ROUTINE CONSTANTS
                                /"COMPLETE"
                                /
     07343      007343          COMP        .
     07344      317303                      317303;   320315;   305314;   305324;   0
     07345      320315
     07346      305314
     07347      305324
     07350      000000
                                /
                                /R OR P NO TAPE
                                /
     07351      007351          NTFLG       .
     07352      000000                      0
     07353      317316                      317316;   324240;   320301
     07354      324240
     07355      320301
     07356      240305                      240305;   207207
     07357      207207
     07360      000000                      0
                                /
                                /TTY BIN
                                /
     07361                      TTBUFA      .BLOCK 64           /READER BUF = 52 LOCS, (DECIMAL)
                                /
     07445                      TTBUFB      .BLOCK 64           /TTY BUF = 52 LOCS, ( DECIMAL)
                                            .EJECT
```

```
****
                                    /CONSTANT AND ERROR TABLES.  NOT MODIFIED WHEN IN HI 4K
                                    /
07531       000000          K0          0
07532       000001          K1          1
07533       000002          K2          2
07534       000004          K4          4
07535       000010          K10         10
07536       000011          K11         11
07537       000012          K12A        12
07540       000040          K100        40
07541       000020          K20         20
07542       000022          K22         22
07543       000040          K40         40
07544       001000          K1K         1000
07545       000400          K400        400
07546       002000          K2K         2000
07547       003000          K3K         3000
07550       004000          K4K         4000
07551       006000          K6K         6000
07552       000200          K200        200
07553       040000          K40K        40000
07554       400000          K400K       400000
07555       400002          K402K       400002
07556       010000          K10K        10000
07557       020000          K20K        20000
07560       200000          K200K       200000
07561       600000          K600K       600000
07562       700000          K700K       700000
07563       002021          K2021       2021
07564       002120          K2120       2120
07565       111111          K1S         111111
07566       222222          K2S         222222
07567       333333          K3S         333333
07570       444444          K4S         444444
07571       555555          K5S         555555
07572       666666          K6S         666666
07573       777777          K7S         777777
07574       011111          K51S        11111
07575       012222          K12S        12222
07576       013333          K13S        13333
07577       014444          K14S        14444
07600       015555          K15S        15555
07601       016666          K16S        16666
07602       017777          K17S        17777
07603       002525          K2525       2525
07604       005252          K5252       5252
07605       252525          K010        252525
07606       525252          K101        525252
07607       525253          K53         525253
07610       077777          K37S        077777
                                        .EJECT
```

```
****
      07611     700042          K7X42       700042
      07612     700002          K7XX2       700002
      07613     760002          K76X2       760002
      07614     100002          K1XX2       100002
      07615     604002          K6X42       604002
      07616     344002          K344X2      344002
      07617     741000          KSKP        SKP
      07620     750000          KCLA        CLA
      07621     777776          M1          777776
      07622     777773          M4          777773
      07623     777737          M40         777737
      07624     777377          M400        777377
      07625     773777          M4K         773777
      07626     737777          M40K        737777
      07627     377777          M400K       377777
                                /
      07630     000000          RJCNT       0
      07631     000000          WORK        0
      07632     000000          WORK1       0
      07633     000000          WORK2       0
      07634     000000          WORK3       0
      07635     000000          WORK4       0
      07636     000000          IIADR       0
      07637     000000          AUTNOT      0
      07640     000000          TCLK        0
      07641     740010          XCTRAL      RAL
      07642     740001          AUTCMA      CMA
      07643     000000          SAVAC       0
      07644     000000          RJMP        0
      07645     420015          LAWAUT      XCT* 15
      07646     777777          LAWFUL      LAW 17777
      07647     120015          JMSAUT      JMS* 15
      07650     740040          KHALT       740040
      07651     620012          JMPAUT      JMP* 12
      07652     200000          SAV4        LAC 0
      07653     741400          KSZL        741400
      07654     740400          KSNL        740400
      07655     123456          RANCON      123456
      07656     654321          RANTRL      654321
      07657     361416                      361416
      07660     055363                      055363
      07661     546060                      546060
      07662     243035                      243035
      07663     762572                      762572
      07664     453237                      453237
      07665     150214                      150214
      07666     000000                      0
                                            .EJECT
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                                        /ERROR TABLES
                                        /
     07667      000000      JMPRET      0          /JMP 22
     07670      000000      J111        0          /JMP 11111 (E509)
     07671      000000      J222        0          /JMP 12222 (E510)
     07672      000000      J333        0          /JMP 13333 (E5111)
     07673      000000      J444        0          /JMP 14444 (E512)
     07674      000000      J555        0          /JMP 15555 (E513)
     07675      000000      J666        0          /JMP 16666 (E514)
     07676      000000      J777        0          /JMP 17777 (E515)
     07677      000000      J525        0          /JMP 15252 (E516)
     07700      000000      J252        0          /JMP 12525 (E517)
     07701      000000      CAL0        0          /CAL FROM 17757 EXT, LINK = 0 (E518)
     07702      000000      CAL1        0          /CAL FROM 17757, LINK = 1 (E520)
     07703      000000      JSM71       0          /JMS FROM 07777 TO 11111 (E522)
     07704      000000      JSM72       0          /JMS FROM 07776 TO 12222 (E524)
     07705      000000      JSM73       0          /JMS FROM 07775 TO 13333 (E526)
     07706      000000      JSM74       0          /JMS FROM 07774 TO 14444 (E528)
     07707      000000      JSM75       0          /JMS FROM 07773 TO 15555 (E530)
     07710      000000      JSM76       0          /JMS FROM 07772 TO 16666 (E532)
     07711      000000      JSM77       0          /JMS FROM 07771 TO 17777 (E534)
     07712      000000      JS252       0          /JMS FROM 12525 TO 15252 (E536)
     07713      000000      JS525       0          /JMS FROM 15252 TO 12525 (E538)
     07714      000000      JSSS        0          /JMS SERIES TEST (E540)
                                        /
     07715      000000      XCT11       0          /XCT JMS, FROM 11111 XCT (16666) (E562)
     07716      000000      XCT12       0          /XCT JMS, FROM 12222 XCT (15555) (E564)
     07717      000000      XCT13       0          /XCT JMS, FROM 13333 XCT (14444) (E566)
     07720      000000      XCT17       0          /XCT J,S FROM 07776 XCT (17776) (E568)
     07721      000000      XCT125      0          /XCT JMS, FROM 12525 XCT (15252)
                                        /
     07722      000000      JST77       0          /JMS* 07777 (E592)
     07723      000000      JST66       0          /JMS* 16666 (E594)
     07724      000000      JST55       0          /JMS* 15555 (E596)
     07725      000000      JST44       0          /JMS* 14444 (E598)
     07726      000000      AUTJMP      0          /JMP* 12 (AUTO-INDEX) (E620)
     07727      000000      AUTJMS      0          /JMS* 17 (AUTO-INDEX) (E633)
     07730      752525                  752525
                000000                  .END
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E439 03142
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E464 03371

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F484        03541
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E488        03561
E489        03566
F49         00322
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F491        03576
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GOPNCH       06763
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INIT4K       03750
INK52        05427
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JMPRET       07667
JMPSEQ       04130
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JSM73        07705
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JSM75        07707
JSM76        07710
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JST44        07725
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JST66        07723
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JS2          04466
JS252        07712
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J444         07673
J525         07677
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KCRLF       07341
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KSZL        07653
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LLREG    07300
LOAD     06172
MARPAT   02556
MAPLMB   02502
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MINUSA   02371
MINUSB   02401
MOD      04131
MODNEG   03050
MODX     04001
MOVE     06421
MOVED    07316
MOVES    07315
MPAT     07305
MRINS    06515
MSKBIT   03026
MVBK     06510
MVCST    06451
MVRTN    06443
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M167     07325
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M400     07624
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RCAL1	04217
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READ	06234
READA	06776
READR	07113
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XT12S	05034
XT13S	05040
XT17S	05044
XT2R	05036
XT3R	05042
XT4R	05046
XT5R	05051
ZRONOT	07017

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BASEX	PAGE
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MINUSA	02371
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APLUSB	02417
BMINSA	02425
AMINSB	02433
APLSRT	02454
E401	02461
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5ERS06	02724
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5ERS07	02745

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NEG	03017
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NEG	03021
UMNEG	03022
UMPOS	03023
MASUM	03024
MBSUM	03025
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ASS2	03027
DFDON	03030
ISETU	03036
OONEG	03050
ITTS1	03055
431	03062
FLCH8	03065
432	03066
ITTS2	03070
433	03075
FLCH9	03100
434	03101
ADAC	03120
435	03123
436	03126
437	03131
438	03135
439	03142
440	03146
441	03152
442	03157
443	03176
444	03215
ZMAC	03222
445	03226
446	03233
447	03240
448	03245
449	03252
450	03257
451	03264
452	03271
453	03276
454	03303
455	03311
456	03313
457	03316
458	03326
459	03334
ACAC	03341
460	03345

```
:402      02465
MNSRT     02467
:403      02474
DFLCK2    02477
:404      02500
APLMB     02502
:405      02507
DFLCK3    02512
:406      02513
BMNSAT    02515
BMATS     02530
:407      02535
DFLCK5    02540
:408      02541
BMAMRT    02543
:409      02550
DFLCK6    02553
:410      02554
ABPAT     02556
:411      02563
DFLCK7    02566
:412      02567
MBPRT     02571
:413      02576
DFLCK8    02601
:414      02602
0ACPA     02604
:415      02610
DFLCK9    02613
:416      02614
ERS01     02616
:417      02624
DFLCH1    02627
:418      02630
ERS02     02632
:419      02641
DFLCH2    02644
:420      02645
ERS03     02647
:421      02657
DFLCH3    02662
:422      02663
ERS04     02665
:423      02676
DFLCH4    02701
:424      02702
ERS05     02704
:425      02716
DFLCH5    02721
:426      02722
ERS06     02724
:427      02737
DFLCH6    02742
:428      02743
ERS07     02745
```

```
:429        02761
FLCH7       02764
:430        02765
:ONCHG      02767
:KLP        03011
.POS        03016
.NEG        03017
:POS        03020
:NEG        03021
:UMNEG      03022
:UMPOS      03023
:MASUM      03024
.MBSUM      03025
ISKBIT      03026
'ASS2       03027
.DFDON      03030
:LSETU      03036
IO0NEG      03050
:ITTS1      03055
:431        03062
FLCH8       03065
:432        03066
:ITTS2      03070
:433        03075
FLCH9       03100
:434        03101
:ADAC       03120
:435        03123
:436        03126
437         03131
438         03135
439         03142
440         03146
441         03152
442         03157
443         03176
444         03215
ZMAC        03222
445         03226
446         03233
447         03240
448         03245
449         03252
450         03257
451         03264
452         03271
453         03276
454         03303
455         03311
456         03313
457         03316
458         03326
459         03334
ACAC        03341
460         03345
```

```
JMS76     04361
533       04365
534       04370
JMS77     04404
535       04410
536       04422
JMS14     04433
537       04437
538       04442
JMS15     04453
539       04457
540       04462
S1        04464
541       04465
S2        04466
542       04467
S3        04470
543       04471
S4        04474
544       04475
JMSS      04476
545       04505
546       04514
547       04523
548       04531
JSM71     04537
SM71      04540
1M000     04541
JSM72     04542
SM72      04543
77        04544
JSM73     04545
SM73      04546
76        04547
JSM74     04550
S474      04551
75        04552
JSM75     04553
SM75      04554
74        04555
JSM76     04556
SM76      04557
73        04560
JSM77     04561
SM77      04562
72        04563
JSM25     04564
SM25      04565
426       04566
JSM52     04567
SM52      04570
71        04571
415       04572
JS1       04573
JS2       04574
```

```
JS3         04575
JS4         04576
SECT        04577
:549        04603
:550        04606
:551        04613
:552        04615
:553        04617
:554        04623
:555        04630
:556        04634
:557        04642
:558        04644
:559        04651
:560        04653
:561        04661
:562        04664
!XCT1       04675
:563        04701
:564        04704
!XCT2       04715
:565        04721
:566        04724
!XCT3       04735
:567        04741
:568        04744
!XCT4       04755
:569        04761
:570        04764
!XCT5       04775
:571        05001
:572        05020
:573        05022
(T11S       05030
(TR11       05031
(T1R        05032
(12         05033
(T12S       05034
(TR12       05035
(T2R        05036
(23         05037
(T13S       05040
(TR13       05041
(T3R        05042
(34         05043
(T17S       05044
(TR17       05045
(T4R        05046
(CT12S      05047
(CTR12      05050
(T5R        05051
(CTISZ      05052
(CTDAC      05053
(CTTAD      05054
'SAUTO      05055
```

```
E574        05063
E575        05073
E576        05103
E577        05113
E578        05123
E579        05133
E580        05143
E581        05153
E582        05163
.ACIN       05171
E584        05201
E585        05212
E586        05223
E587        05234
E588        05245
E589        05256
E590        05267
E591        05300
XTJMSI      05305
E592        05311
RJSI1       05323
E593        05327
E594        05334
RJSI2       05346
E595        05352
E596        05357
RJSI3       05371
E597        05375
E598        05402
RJSI4       05414
E599        05420
INK52       05427
JMSI1       05430
RJMI1       05431
RJSI1X      05432
JSI66       05433
RJMI2       05434
X15253      05435
JSI55       05436
RJMI3       05437
JSI44       05440
RJMI4       05441
XTXCT       05442
E670        05454
E671        05462
E672        05477
XCTDZM      05516
ANDI        05517
AUTOIN      05520
E673        05526
E674        05532
E675        05541
E676        05545
E677        05554
E678        05560
```

E609	05567
E610	05573
E611	05602
E612	05606
E613	05615
E614	05621
E615	05630
E616	05634
E617	05642
E618	05645
E619	05651
E620	05654
AUTR	05665
E621	05671
E622	05702
E623	05706
E624	05716
E625	05722
E626	05732
E627	05734
E628	05740
E629	05744
E630	05753
E631	05757
E632	05763
E633	05766
AUTREF1	05777
E634	06003
E635	06007
E636	06015
E637	06021
E638	06024
E639	06033
E640	06046
E641	06052
X17776	06060
X17777	06061
X15665	06062
X15666	06063
X15554	06064
X15555	06065
X14443	06066
X14444	06067
X13332	06070
X13333	06071
X12221	06072
X12222	06073
X11110	06074
X11111	06075
X10252	06076
AUTREF	06077
AUTRJM	06100
AURJMP	06101
GENRAN	06102
RANTAD	06117

RANDFX 06123
ENDTRL 06124
THLTOP 06125
CKNO 06126
RANGEN 06133
TADRAN 06150
CHKRRD 06154
LOAD 06172
LCNTA 06176
LCNTR 06200
WCLOOP 06204
READ 06234
RCNTA 06237
RCNTR 06243
RCLOOP 06247
RDRTN 06270
ADJUST 06312
ULADJ 06322
NXTST 06325
NEXPAT 06332
ERROR 06340
E642 06350
GDATA 06352
BDATA 06354
PATT 06361
CKLOOP 06363
ENTST 06406
MOVE 06421
REFROM 06433
MVRTN 06443
MVCST 06451
BGNAGN 06500
MVBK 06510
MRINS 06515
SAV3 06533
SAV5 06534
SAV6 06535
SRVINT 06536
E643 06543
RTNIT 06562
E644 06570
PION 06572
ILINT 06574
CLKINT 06575
SETCLK 06604
CLKSFT 06621
TTYINT 06636
E645 06647
E646 06652
PREADY 06657
DATARL 06676
ENDBIN 06677
OUTTOP 06700
ENDOUT 06701
PNSTRT 06702

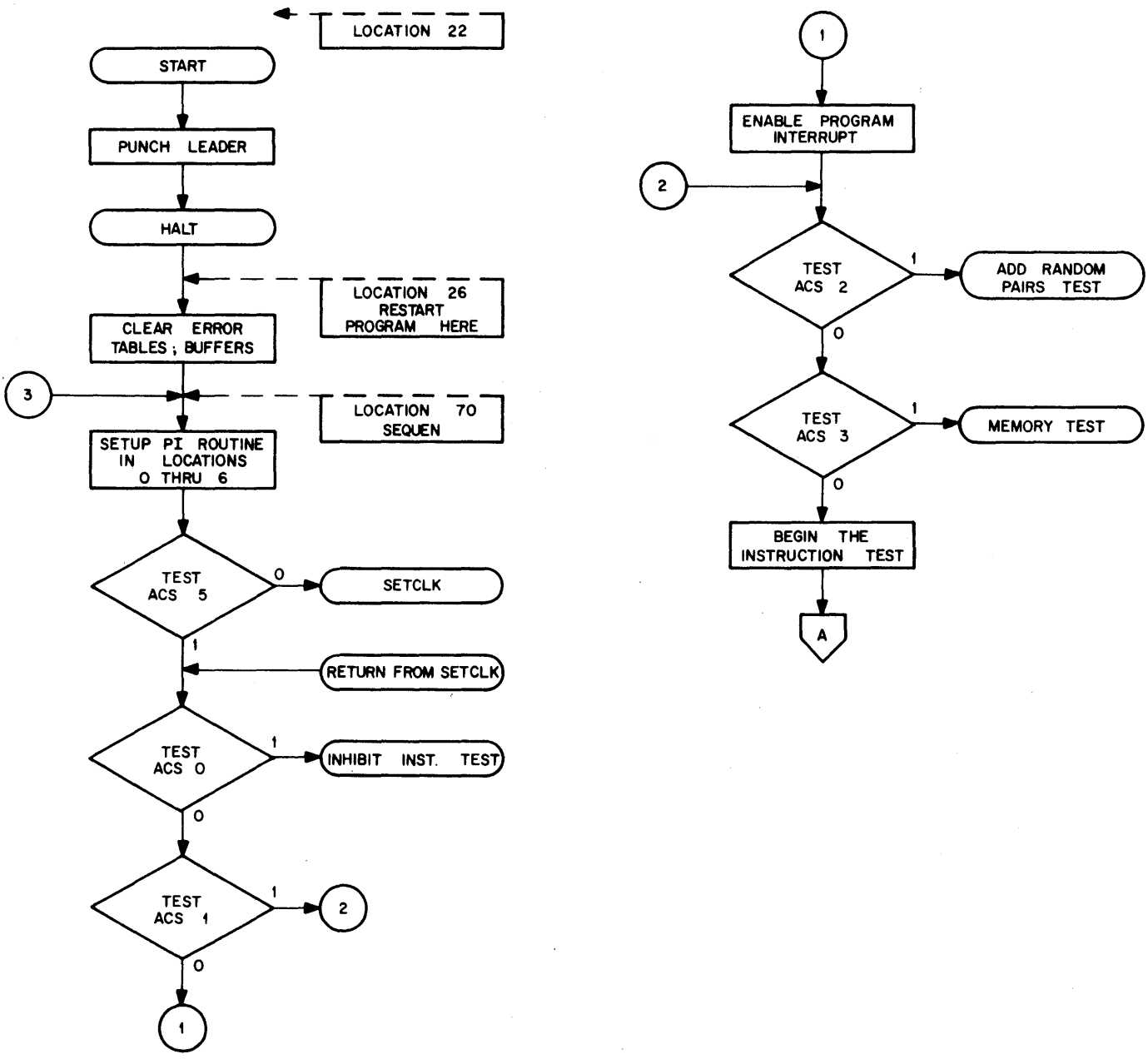
PNXT	06717
PNXTA	06732
E647	06756
GOPNCH	06763
READA	06776
ARONOT	07017
TAND1	07027
SUM1	07031
SETTY	07037
XFR1	07053
PUT6	07070
E648	07102
R647	07112
READR	07113
SELECT	07131
RNFLG	07142
OUTFLG	07154
CLRFLG	07167
PNLEDR	07171
PNMARK	07203
TLSSF	07211
ROTATY	07233
CRLF	07242
PIVOT	07251
COMPA	07274
LIMITA	07275
MC16	07276
MC128	07277
LLREG	07300
XPAT	07301
IPAT	07305
PATR	07306
PATWD	07307
SGNLO	07310
SGNHI	07311
BREAK	07312
NDCNT	07313
MC256	07314
MOVES	07315
MOVED	07316
SITSUP	07317
K7777	07320
K1400K	07321
K1400	07322
K500K	07323
K777	07324
K167	07325
TTOUT	07326
TTIN	07327
CNTA	07330
CNTB	07331
K257	07332
K271	07333
K370	07334
K371	07335

STORE	07336
SPCE	07337
K332	07340
KCRLF	07341
K520K	07342
COMP	07343
NTFLG	07351
TTBUFA	07361
TTBUFB	07445
K0	07531
K1	07532
K2	07533
K4	07534
K10	07535
K11	07536
K12A	07537
K1M0	07540
K20	07541
K22	07542
K40	07543
K1K	07544
K4M0	07545
K2K	07546
K3K	07547
K4K	07550
K6K	07551
K2M0	07552
K4MK	07553
K4M0K	07554
K4M2K'	07555
K1MK	07556
K2MK	07557
K2M0K	07560
K6M0K	07561
K7M0K	07562
K2'21	07563
K2120	07564
K1S	07565
K2S	07566
K3S	07567
K4S	07570
K5S	07571
K6S	07572
K7S	07573
K51S	07574
K12S	07575
K13S	07576
K14S	07577
K15S	07600
K16S	07601
K17S	07602
K2525	07603
K5252	07604
K010	07605
K101	07606

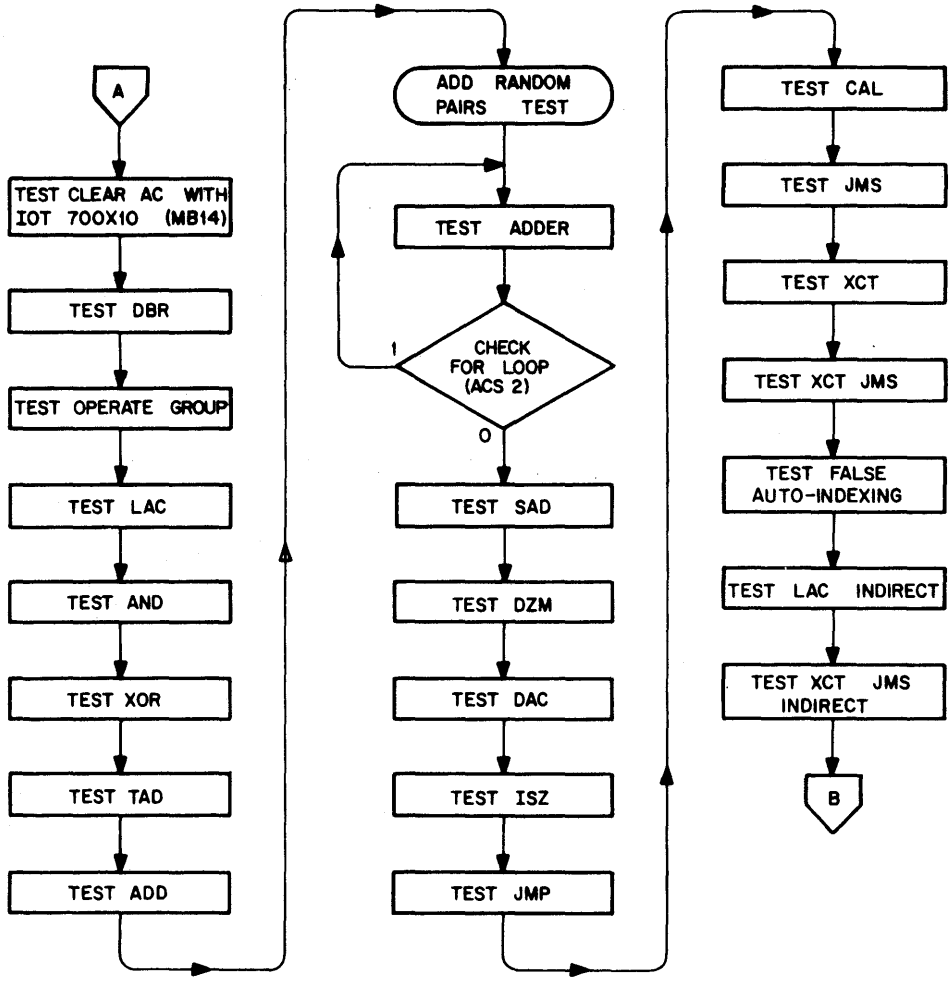
K5X	07607
K37S	07610
K7X42	07611
K7XX2	07612
K75X2	07613
K1XX2	07614
K6X42	07615
K344X2	07616
KSKP	07617
KCLA	07620
M1	07621
M4	07622
M42	07623
M420	07624
M4K	07625
M42K	07626
M420K	07627
RJCNT	07630
WORK	07631
WORK1	07632
WORK2	07633
WORK3	07634
WORK4	07635
IIADR	07636
AUTNOT	07637
ICLK	07640
XCTRAL	07641
AUTCMA	07642
SAVAC	07643
RJMP	07644
LAMAUT	07645
LAMFUL	07646
JMSAUT	07647
XHALT	07650
JMPAUT	07651
SAV4	07652
KS7L	07653
KSAL	07654
RAXCON	07655
RAXTRL	07656
JMPRET	07667
J111	07670
J222	07671
J333	07672
J444	07673
J555	07674
J666	07675
J777	07676
J525	07677
J252	07700
CAL0	07701
CAL1	07702
JSM71	07703
JSM72	07704
JSM73	07705

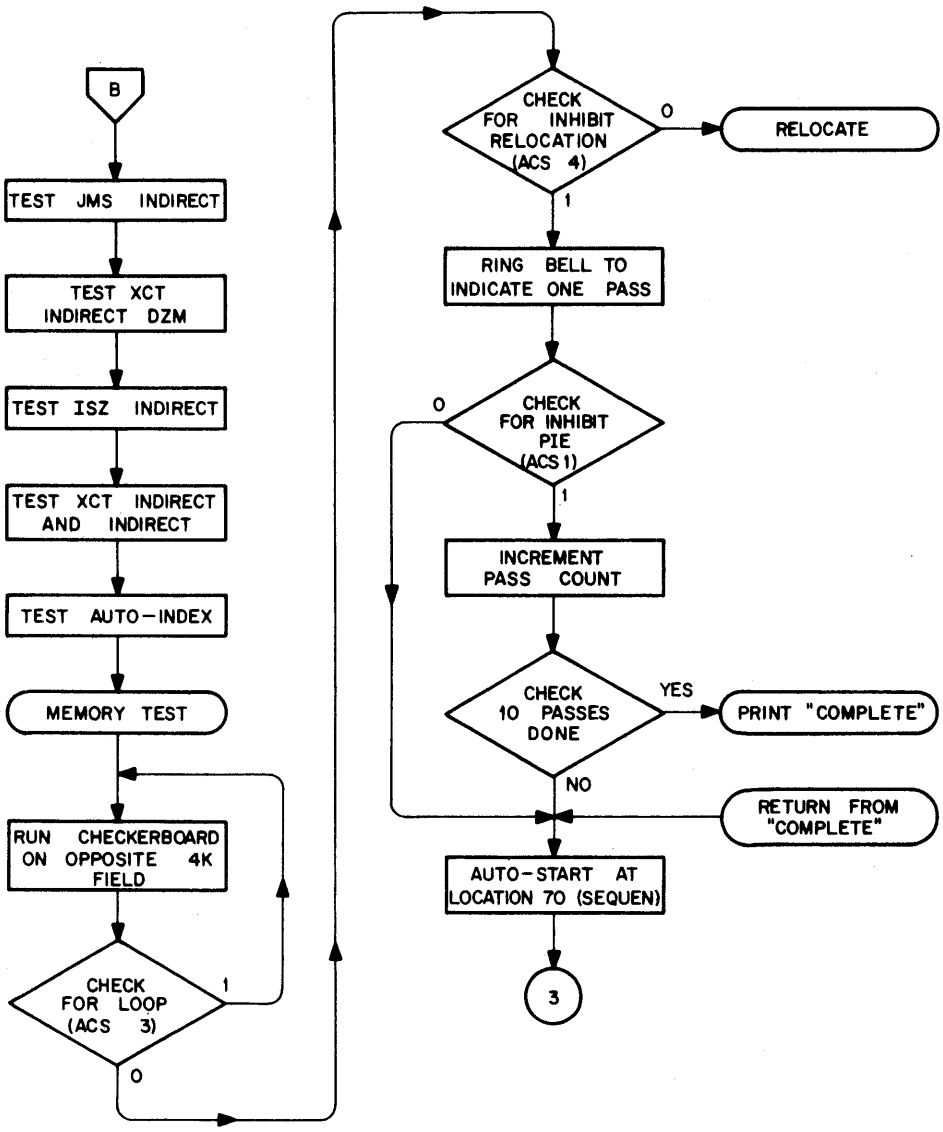
```
JSM74       07706
JSM75       07707
JSM76       07710
JSM77       07711
JS?52       07712
JS525       07713
JSSS        07714
XCT11       07715
XCT12       07716
XCT13       07717
XCT17       07720
XCT125      07721
JST77       07722
JST66       07723
JST55       07724
JST44       07725
AUTJMP      07726
AUTJMS      07727
NOP1       740000
NOP2       740000
NOP3       740000
HALT       740040
```

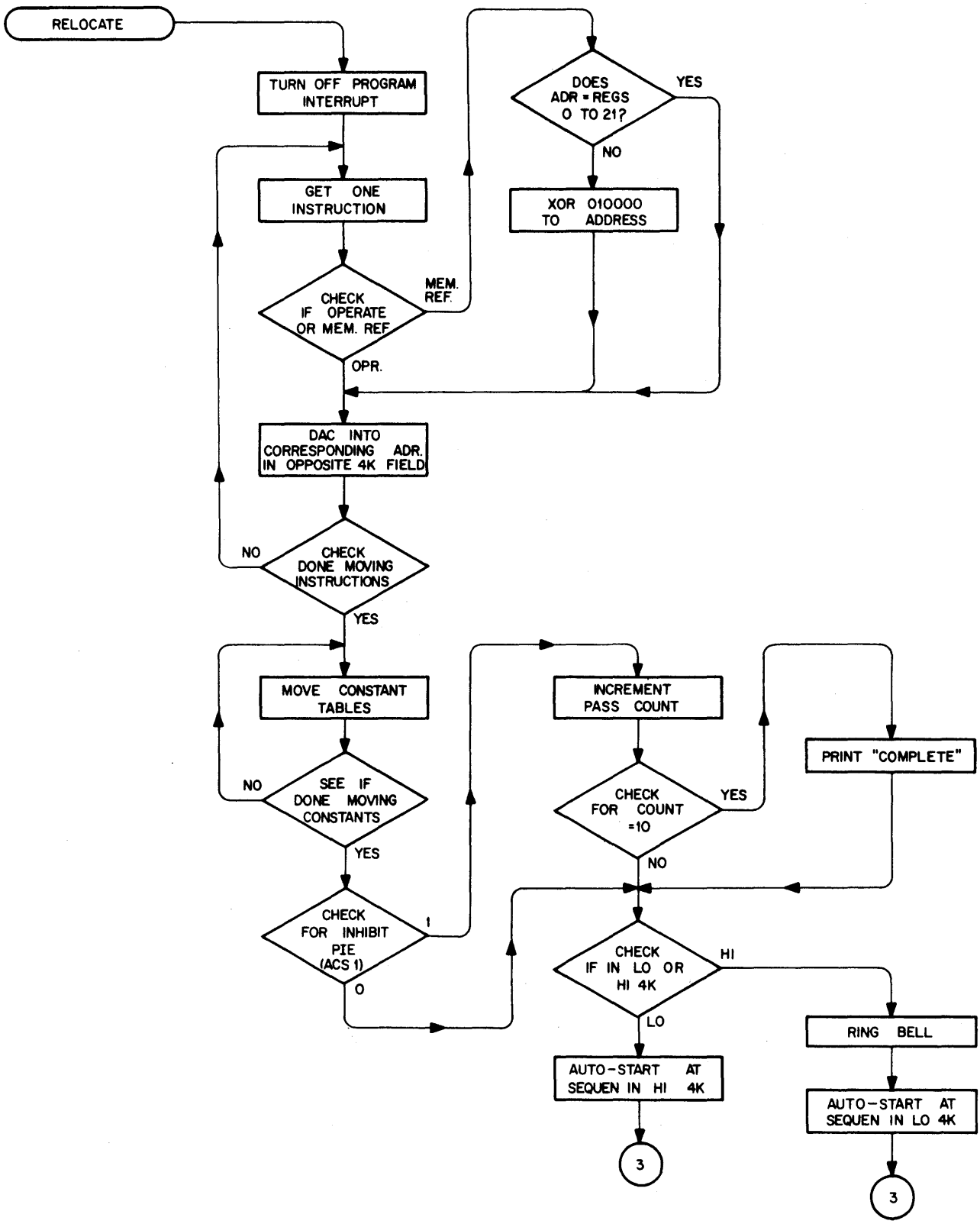
11. FLOW CHARTS



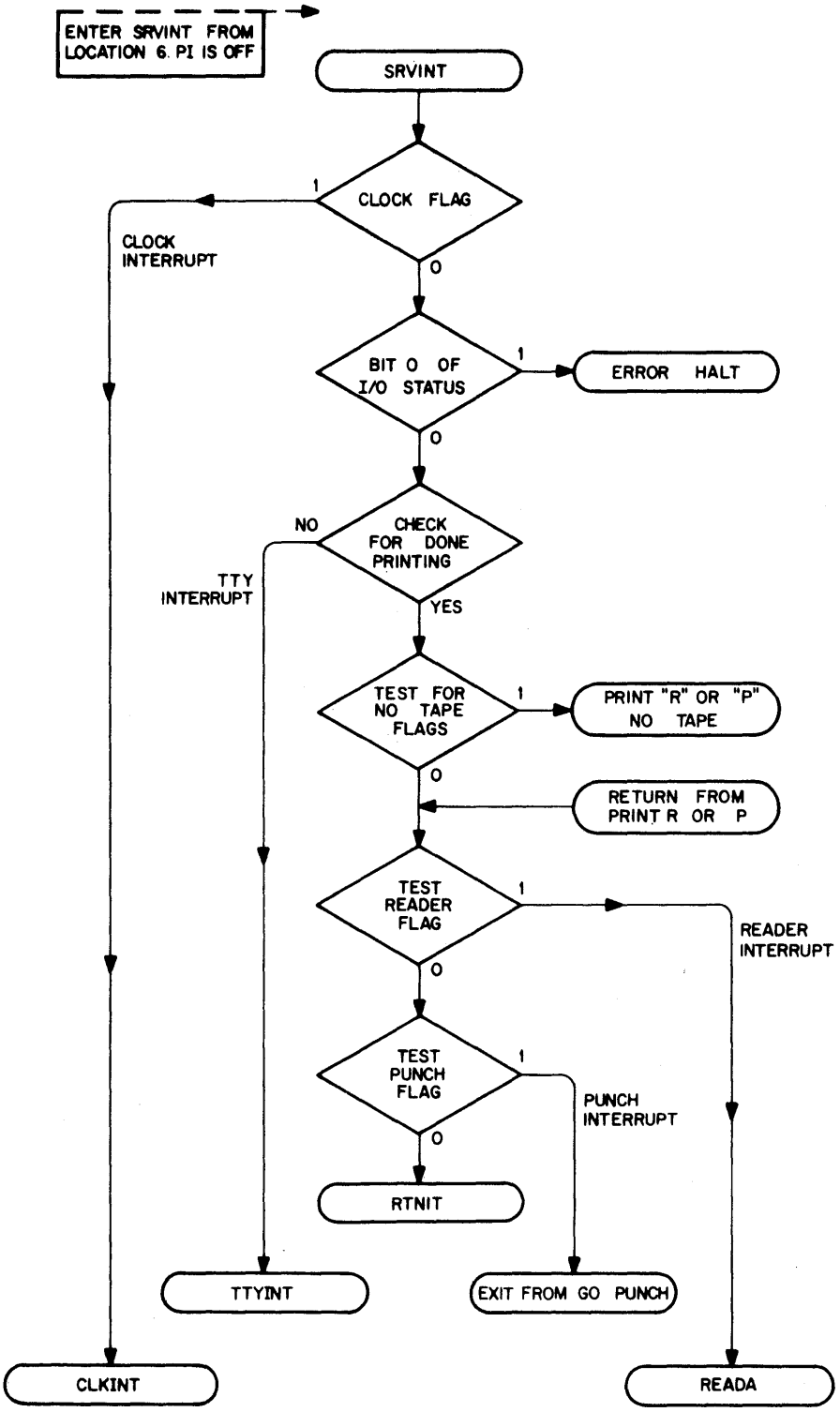
Generalized Flow of PDP-9 Basic Exerciser


A
TEST CLEAR AC WITH IOT 700X10 (MB14)
TEST DBR
TEST OPERATE GROUP
TEST LAC
TEST AND
TEST XOR
TEST TAD
TEST ADD
ADD RANDOM PAIRS TEST
TEST ADDER
CHECK FOR LOOP (ACS 2)
1
0
TEST SAD
TEST DZM
TEST DAC
TEST ISZ
TEST JMP
TEST CAL
TEST JMS
TEST XCT
TEST XCT JMS
TEST FALSE AUTO-INDEXING
TEST LAC INDIRECT
TEST XCT JMS INDIRECT
B

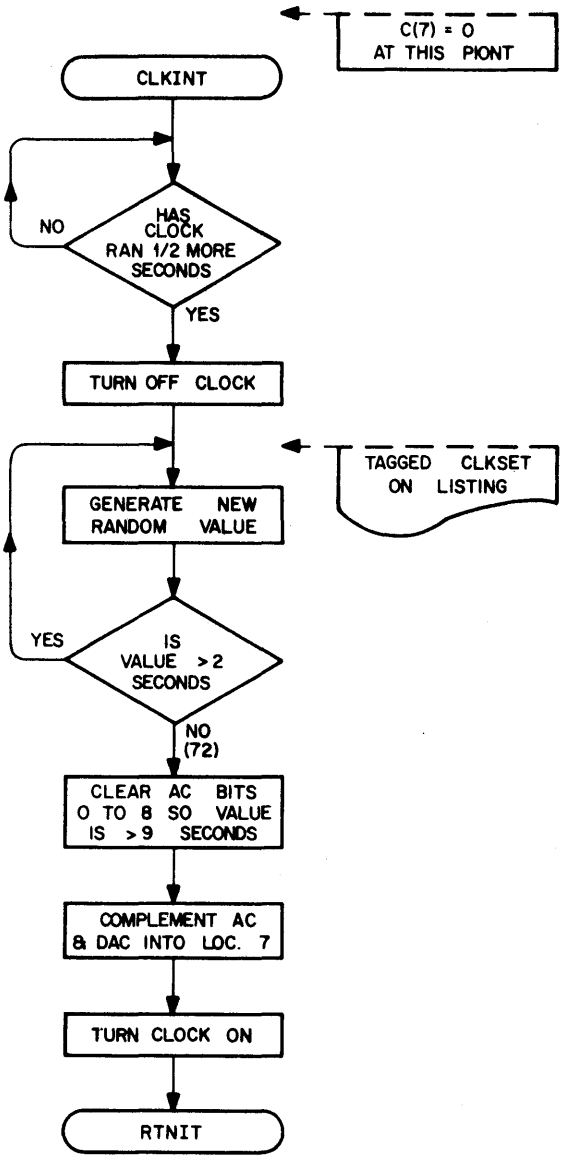

B
TEST JMS INDIRECT
TEST XCT INDIRECT DZM
TEST ISZ INDIRECT
TEST XCT INDIRECT AND INDIRECT
TEST AUTO-INDEX
MEMORY TEST
RUN CHECKERBOARD ON OPPOSITE 4K FIELD
CHECK FOR LOOP (ACS 3)
1
0
CHECK FOR INHIBIT RELOCATION (ACS 4)
0
RELOCATE
1
RING BELL TO INDICATE ONE PASS
CHECK FOR INHIBIT PIE (ACS 1)
0
1
INCREMENT PASS COUNT
CHECK 10 PASSES DONE
YES
PRINT "COMPLETE"
NO
RETURN FROM "COMPLETE"
AUTO-START AT LOCATION 70 (SEQUEN)
3



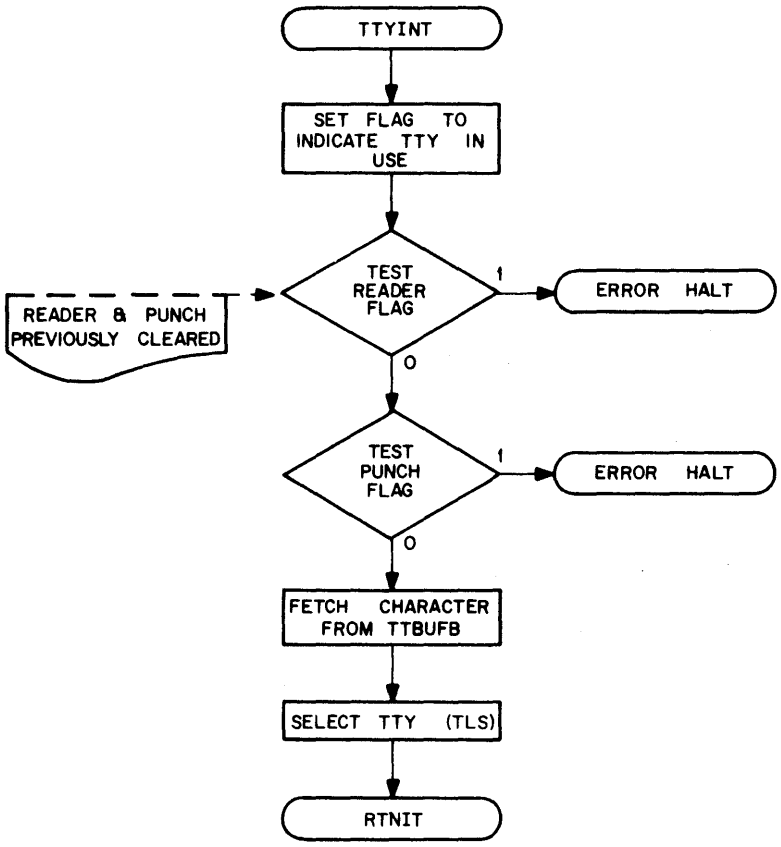
Program Relocation Routine



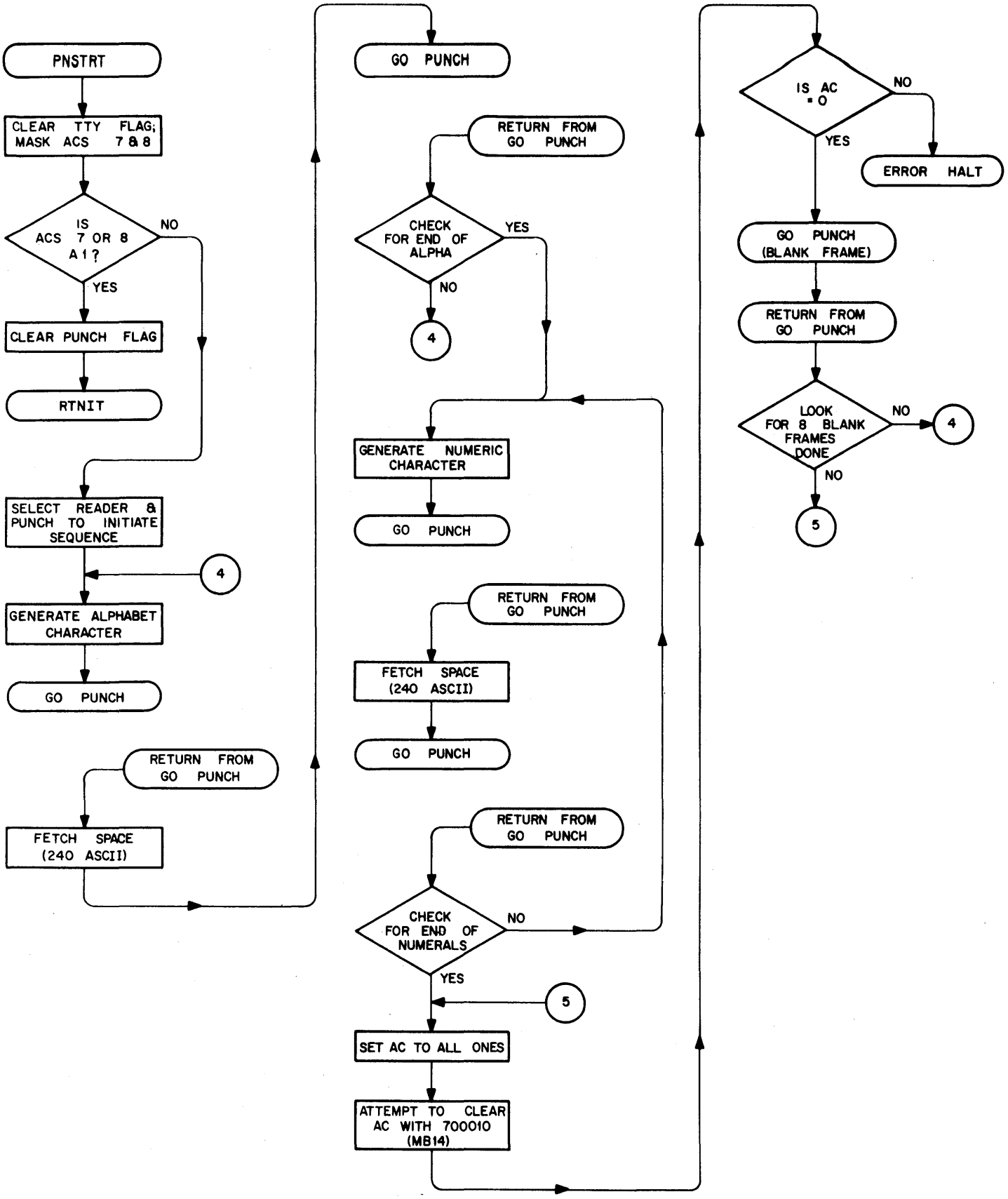
Interrupt Service Routine



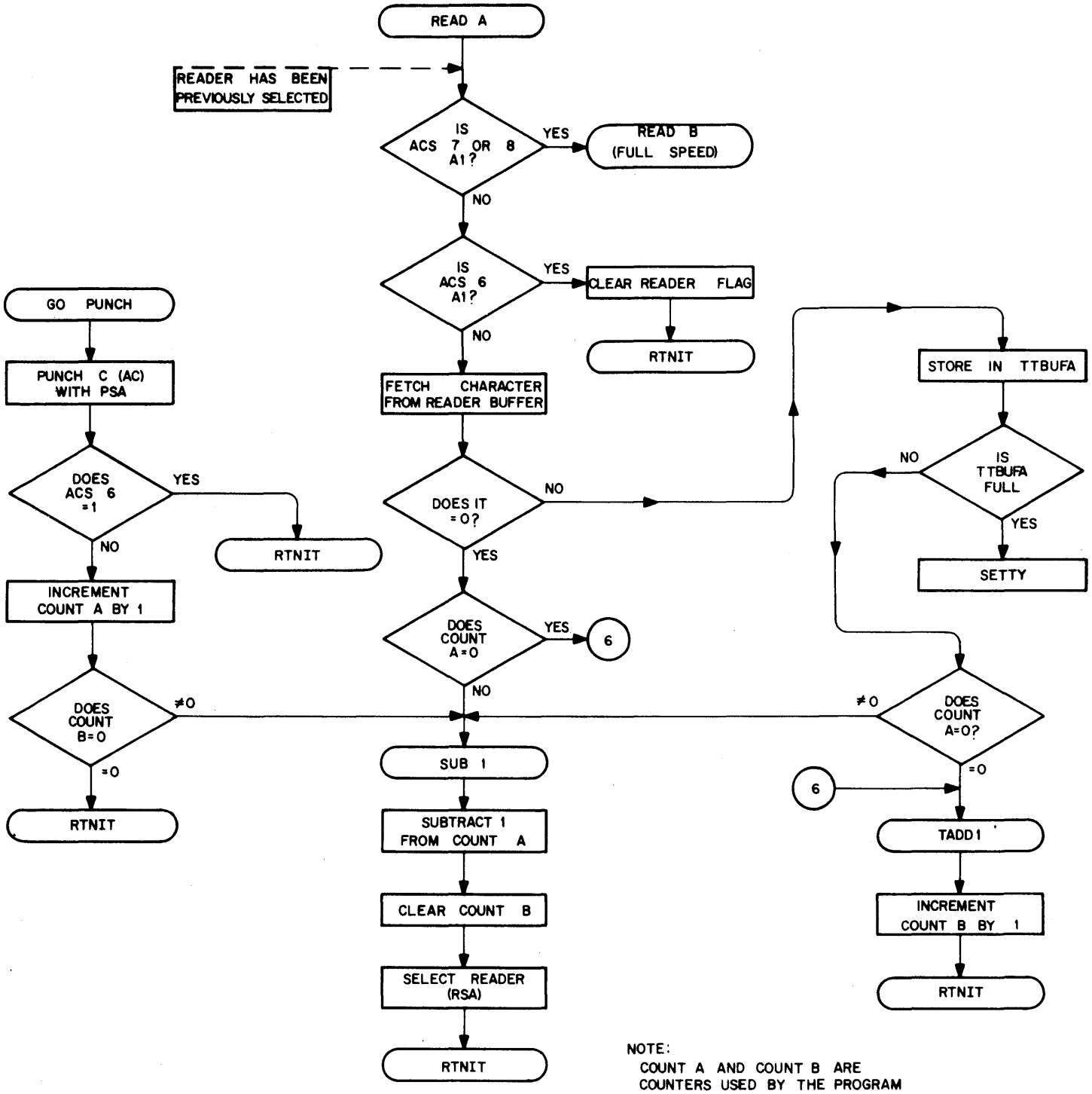
Service Clock Interrupt

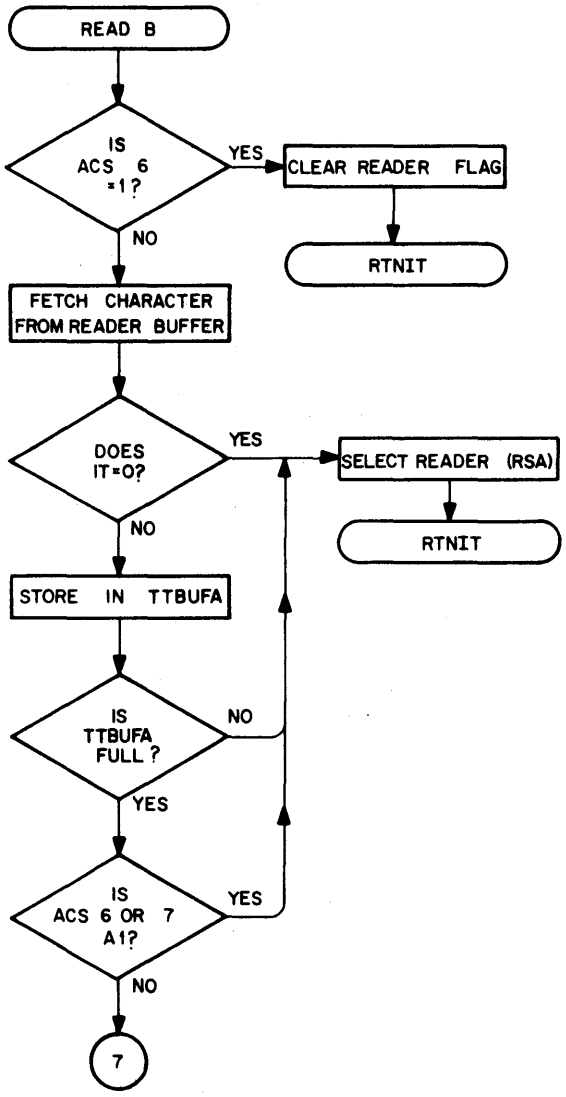


Service TTY Interrupt

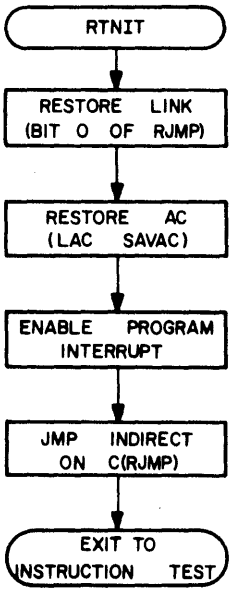


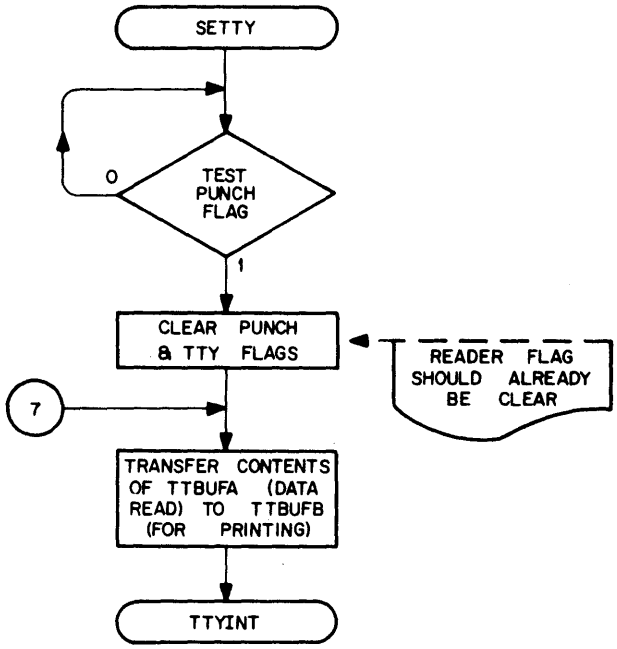
Punch Routine


READ A
READER HAS BEEN PREVIOUSLY SELECTED
IS ACS 7 OR 8 A1?
YES
READ B (FULL SPEED)
NO
IS ACS 6 A1?
YES
CLEAR READER FLAG
RTNIT
NO
FETCH CHARACTER FROM READER BUFFER
DOES IT =0?
NO
YES
DOES COUNT A=0
YES
6
NO
SUB 1
SUBTRACT 1 FROM COUNT A
CLEAR COUNT B
SELECT READER (RSA)
RTNIT
STORE IN TTBUFA
IS TTBUFA FULL
NO
YES
SETTY
DOES COUNT A=0?
≠0
=0
6
TADD1
INCREMENT COUNT B BY 1
RTNIT
GO PUNCH
PUNCH C (AC) WITH PSA
DOES ACS 6 =1
YES
RTNIT
NO
INCREMENT COUNT A BY 1
DOES COUNT B=0
≠0
=0
RTNIT
NOTE:
COUNT A AND COUNT B ARE COUNTERS USED BY THE PROGRAM TO ENABLE THE READER TO OPERATE AT PUNCH SPEED.



Read full speed ACS 7 A 1


RTNIT
RESTORE LINK (BIT 0 OF RJMP)
RESTORE AC (LAC SAVAC)
ENABLE PROGRAM INTERRUPT
JMP INDIRECT ON C(RJMP)
EXIT TO INSTRUCTION TEST


SETTY
TEST PUNCH FLAG
0
1
CLEAR PUNCH & TTY FLAGS
READER FLAG SHOULD ALREADY BE CLEAR
7
TRANSFER CONTENTS OF TTBUFA (DATA READ) TO TTBUFB (FOR PRINTING)
TTYINT