PDP - 15
ALLGEMEIN
47

IDENTIFICATION

PRODUCT CODE: MAINDEC-15-D7BC-D-(D)

PRODUCT NAME: PDP-15 BASIC EXERCISER

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1. ABSTRACT

The PDP-15 Basic Exerciser is designed to exercise the CP, core memory and models 33 or 35 teleprinters with the program interrupt facility enabled. The program will also test the real time clock, high speed reader and high speed punch, if these options are present on the PDP-15 being used. The operator must specify the I/O configuration with the A C switches as described in section 5.1.

The Basic Exerciser consists of a condensed version of the PDP-15 Instruction Tests. These tests run continuously, and are interrupted at a device rate by the I/O device (s). The real time clock, if used, 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.

Ten A C S functions (described in sect. 5.1) are provided to enable the operator to (1) inhibit the instruction and memory tests and run the I/O device (s) alone; (2) inhibit program interrupts and run the instruction tests alone; (3) loop continuously on the adder test; (4) inhibit program relocation; (5) inhibit the real time clock, but continue testing with program interrupt and all other devices enabled; (6) run the instruction tests and the clock and punch with the read and print sequence inhibited; (7) run the reader, real time clock and instruction tests with the punch and Teletype inhibited; (8) run the read and print sequence, real time clock, instruction tests with the punch inhibited; (9) run the Teletype and instruction tests with the punch and reader inhibited. Items 6, 7 and 8 above, are applicable only when the high speed reader and punch option is installed.

2. REQUIREMENTS

2.1 Equipment

A PDP-15 with at least 8K of core memory.

2.2 Storage

The program requires the entire 8K of core memory to perform all tests. The program initially resides in memory locations 00000 to 7757 (octal). When the program is relocated to the high order 4K field, it occupies locations 10022 to 17757 (octal).

3. LOADING PROCEDURE

The tape supplied is in the .ABS format.

a. Set the ADDRESS switches to 17700.

b. Place all AC switches on a 0; the BANK MODE switch on.

c. Place the tape in the reader.

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

4. STARTING PROCEDURE

4.1 Starting Addresses

200, or 10200 if the program is currently in the upper 4K field.

4.1.1 Restarting Addresses

32, or 10032 if the program is currently in the upper 4K field.

4.2 Operator Action Without High Speed Reader and Punch

a. Set the ADDRESS switches to 00200.

b. Place ACS 9 on a 1 to indicate no high speed reader and punch.

c. If a real time clock is not installed place ACS 5 on a 1. Otherwise, leave on a 0.

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

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

4.2.1 Operator Action With High Speed Reader and Punch

a. Set the ADDRESS switches to 00200.

b. Place all ACS on a 0.

c. If a real time clock is not installed place ACS 5 on a 1. Otherwise, leave on a 0.

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

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

f. Place the punched frame directly over the high speed reader drive sprocket, and arrange the tape between the reader and punch for minimum binding.

g. Press CONTINUE.

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

4.2.2 Restarting Procedure

a. Set the ADDRESS switches to 00032.

b. Set ACS 5 and 9 according to the I/O configuration being used. Other AC switches may be set at this point. See section 5.1.

c. If the high speed reader and punch are used, 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.

The program may also be restarted from 200, if new leader is desired.

5. OPERATIONAL SWITCH SETTINGS

The ACS functions provided are listed in section 5.1. 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 address 32 (or 10032). The program may not acknowledge the new ACS settings if the above procedure is not followed.

5.1 ACS Functions

ACS	Function
0 (1)	Run only the I/O device (s). Program interrupt will be enabled.
1 (1)	Inhibit the I/O device (s). Program interrupt is disabled. The real-time clock is on. The complete instruction test will be performed.
2 (1)	Loop continuously on the "add random pairs" test. The I/O devices cnd program interrupt will be enabled unless specified otherwise by an ACS.

5.1 Continued

ACS	Function
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 instruction tests.
5 (1)	Inhibit clock. Unless otherwise specified, program action is normal except that the clock should always be off.
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.
9 (1)	No high speed reader and punch installed.
(0)	The high speed reader and punch option is present.

With ACS 9 on a 1 switches 6, 7 and 8 are ignored.

If the reader and punch option is installed, the I/O devices may be controlled with several combinations of ACS 6, 8 and 8. If ACS 7 and 8 are set to ones, the reader will run continuously, as if ACS 7 only were on a 1. If ACS 6 and 7 or 6 and 8 are set to ones, all devices will be inhibited. Program interrupt and the real time clock (if installed) will be enabled unless otherwise specified.

*Applies only if the high speed reader/punch option is installed.

5.2 Subroutine Abstracts

The PDP-15 Basic Exerciser may be the thought of as three separate programs, i.e., the instruction tests; control of the I/O device (s), and operation of the real time clock if installed. The instruction tests will be interrupted by the I/O device (s) at the device rate. The real time clock will randomly interrupt any of the above operations at a rate determined by the program. After each clock interrupt, the clock is re-initialized with a new number obtained by a random number generator. The clock interrupts take first priority, followed by the Teletype, reader and punch.

5.2.1 Instruction 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

5.2.1 Continued

ADD	SUM SHOULD EQUAL	
(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 0's 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

5.2.1 Continued

are tested and the program relocates the entire Basic Exerciser to the opposite 4K field. All memory reference instructions and memory locations used for testing are adjusted accordinly. All locations within the program which reference any memory location between 0 and 21 are not adjusted. These locations are used during program interrupts, auto-indexing 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 112 (or 10112). This location is tagged SEQUEN. The operator is able to determine the location of the program by observing the PC.

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 on a 1), 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) and ACS 1 are on a 1. 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

This section applies only to those PDP-15's with the high speed reader and punch option installed. The instruction 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 0's 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 Ø 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 Ø 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

This section applies only to those PDP-15's with the real time clock option installed. 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. Immediately after the clock interrupt is granted, 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 32 with ACS 5 on a 1.

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 servicing 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); enable 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 32 with ACS 1 on a 1.

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, any 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.

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.

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	Saves contents of AC after a program interrupt.
RJMP	Saves contents of PC and link after a program interrupt.

6.1 Continued

Tag	Function
WORK	Bit 1 if set indicates TTY is in use.
GOPNCH	Contains contents of PC at exit from punch routine.
SETCLK	Routine which sets a random value in clock register 7 when program interrupt is disabled.
CLKSET	Same function as SETCLK, but is used only after a clock interrupt.
TTOUT	Location pointer for TTBUFB when printing.
TTIN	Location pointer for TTBUFA when reading with a high speed reader.
TTBUFA	Storage buffer for characters read with a high speed reader.
TTBUFB	Storage for characters to be printed. Contents should equal TTBUFA.
STORE	Contains character punched.
SETTY	Routine which is entered after 52 characters have been punched and read. Sets up TTBUFB before printing.
GENRAN	Random number generator used when PI is disabled.
RANGEN	Same as GENRAN, but used only after an interrupt.

When using the teleprinter alone (ACS 9 on a 1) the characters printed are generated by the routine tagged PNXT on the program listing. After generating one character, the routine will either immediately print it (ACS 9 on a 1), or punch it with the high speed punch (ACS 9 on a 0).

When operating with the high speed reader and punch (ACS 9 on a 0) 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 character (240) is punched between all alphabet and number characters.

When data is incorrectly printed, stop the program during print-out. This will enable TTBUFA and TTBUFB to be examined before the contents of either are changed. The contents of TTBUFA will be changed as soon as reading begins.

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 tagged TTBUFA. The characters being printed are stored in a 52-word buffer beginning at location 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.

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 test to be looped. Restart the program at location 32, 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 32, or at the beginning of the test to be looped.

Looping on Add Random Pairs

The complete series of tests may be looped by restarting from location 32 with ACS 2 on a 1.

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 32, or AMBPBT.

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 the PDP-15 configuration being used should be run before attempting to run this program.

8. MISCELLANEOUS

8.1 Execution Time

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

9. PROGRAM DESCRIPTION

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

During normal operation, i.e., with ACS 5 and 9 set for the I/O configuration in use, and all other ACS on a 0, the program will exercise the I/O device (s) and program interrupt while the instruction test portion is running. The PC indicators will change according to the portion of the instruction test being executed.

When the I/O device (s) is operated with the instruction test inhibited (ACS 0 on a 1) the MI will indicate a constant 600151 (JMP 151). On the listing this is written as JMP. . at location 151. Program interrupt is enabled at location 150, and all device interrupts will occur immediately after the execution of the JMP instruction. The interrupts are handled in the same manner as if the instruction test were operating; the only difference being that the interrupt service routine (RTNIT) always returns to location 150 after reinitiating the device which caused the interrupt, instead of returning to the instruction test.

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

10. LISTINGS

```
                    /IOT DEFINITIONS
                    /
                    /
700001              CLSF=700001
700004              CLOF=700004
700044              CLON=700044
                    /
700101              RSF=700101
700102              RCF=700102
700112              RRB=700112
700104              RSA=700104
700144              RSB=700144
                    /
700201              PSF=700201
700202              PCF=700202
700204              PSA=700204
700244              PSB=700244
                    /
700301              KSF=700301
700312              KRB=700312
                    /
700401              TSF=700401
700402              TCF=700402
700406              TLS=700406
740030              IAC=740030
742030              SWHA=742030
                    /
```

```
                        .TITLE BX8K
                        /PDP-15 BASIC EXERCISER FOR 8K OR MORE
                        /
                        /COPYRIGHT 1969, DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
                        .ABS
                        /
          740000        NOP1=NOP
          740000        NOP2=NOP
          740000        NOP3=NOP
          740040        HALT=HLT
                        /
     00022                      .LOC 22
                        /
     00022    750004    BEGIN   LAS
     00023    507345            AND K3400               /CHECK FOR SWITCHES 7,8 OR 9
     00024    740200            SZA
     00025    600032            JMP .+5
     00026    107217            JMS PNLEDR
     00027    107231            JMS PNMARK
     00030    107217            JMS PNLEDR
     00031    740040            HALT
     00032    147520            DZM WORK4
     00033    147334            DZM BREAK
     00034    703302            CAF
     00035    147514            DZM WORK
     00036    147001            DZM GOPNCH
     00037    206704            LAC DATABL
     00040    047352            DAC TTIN                /SETUP POINTERS
     00041    047351            DAC TTOUT
     00042    447351            ISZ TTOUT
     00043    167351            DZM* TTOUT              /CLEAR TTY BIN
     00044    207351            LAC TTOUT
     00045    546705            SAD ENDBIN
     00046    741000            SKP
     00047    600042            JMP .-5
     00050    206704            LAC DATABL              /RESTORE POINTER
     00051    047351            DAC TTOUT
     00052    206360            LAC ENDTBL
     00053    047335            DAC WDCNT
     00054    777737            LAW -41
     00055    047273            DAC CRLF
     00056    447335            ISZ WDCNT
     00057    167335            DZM* WDCNT              /CLEAR ERROR TABLE
     00060    447273            ISZ CRLF
     00061    600056            JMP .-3
                        .EJECT
```

```
00062   700002              IOF             /PI OFF
00063   750004              LAS
00064   507425              AND K400
00065   741200              SNA
00066   600076              JMP TELLY               /NO TTY
00067   207302              LAC KJMP                /JMP E646+3
00070   047002              DAC GOPNCH+1
00071   760377              LAW 377
00072   700406              TLS             /SET FLAG
00073   207245              LAC TLSSF+6
00074   046567              DAC RTNIT-3
00075   600107              JMP SEQUEN-3
00076   700104      TELLY   RSA             /INITIALIZE READER, PUNCH
00077   750004              LAS
00100   507427              AND K3K
00101   741200              SNA             /IF ACS 7 OR 8 A 1, DONIT PUNCH
00102   700204              PSA
00103   206656              LAC E645+1
00104   046567              DAC RTNIT-3
00105   206406              LAC TADRAN+2            /NOP
00106   047002              DAC GOPNCH+1
00107   200147              LAC INITPI              /INITPI = PNSTRT
00110   047001              DAC GOPNCH
00111   047527              DAC RJMP                /(RJMP) = PNSTRT
00112   207501      SEQUEN  LAC KSKP                /RESTORE ADDRESS 1 (SKP)
00113   040001              DAC 1
00114   206526              LAC SAV3                /RESTORE ADDRESS 3
00115   040003              DAC 3
00116   207535              LAC SAV4                /RESTORE ADDRESS 4
00117   040004              DAC 4
00120   206527              LAC SAV5                /RESTORE ADDRESS 5
00121   040005              DAC 5
00122   206530              LAC SAV6                /RESTORE ADDRESS 6
00123   040006              DAC 6
00124   207533              LAC KHALT               /RESTORE ADDRESS 2 (HALT)
00125   040002              DAC 2
00126   040021              DAC 21
00127   447520              ISZ WORK4               /PASS COUNTER
00130   750004              LAS
00131   507437              AND K10K
00132   741200              SNA             /CHECK ACS 5 FOR INHIBIT CLOCK
00133   106614              JMS SETCLK
00134   750004              LAS
00135   741100              SPA
00136   600150              JMP INHIT               /INHIBIT INST, TEST
00137   740010              RAL
00140   740100              SMA             /CHECK FOR INHIBIT PI
00141   700042              ION             /PI ON
00142   750004              LAS
00143   507343              AND K100K
00144   740200              SZA             /CHECK LOOP ON RANDOM ADD
00145   602413              JMP RANADD-2    /LOOP
00146   600152              JMP IOTST-2
                    /
00147   006710      INITPI  PNSTRT
```

```
                        /
                        /INHIBIT INSTRUCTION TEST
00150   700042          INHIT   ION
00151   600151                  JMP .           /WAIT FOR PI
                        /
                                .EJECT
```

```
                        /TEST CLEAR AC AT EVENT TIME 1 WITH MB 14.
                        /
00152   106336                  JMS GENRAN              /GET NO. FOR LOOP
00153   106362                  JMS CKNO
00154   750001          IOTST   CLA!CMA           /AC = 7777777
00155   700110                  700110
00156   740200                  SZA                 /AC = 0
00157   740040          E24     HALT                /ERROR, AC NOT 0
                        /
00160   750001                  CLA!CMA             /AC = 777777
00161   700210                  700210
00162   740200                  SZA                 /AC = 0
00163   740040          E25     HALT                /ERROR, AC NOT 0
                        /
00164   750001                  CLA!CMA             /AC = 777777
00165   700310                  700310
00166   740200                  SZA                 /AC = 0
00167   740040          E26     HALT                /ERROR, AC NOT 0
                        /
00170   750001                  CLA!CMA             /AC = 777777
00171   700010                  700010
00172   740200                  SZA                 /AC = 0
00173   740040          E27     HALT                /ERROR, AC NOT 0
                        /
00174   600201                  JMP 201
                        /
00200                           .LOC 200
00200   600022                  JMP BEGIN
                        /
                        /
                        /TEST IORS BIT 0 = 1 IF PI ENABLED.
                        /
00201   750004                  LAS
00202   740010                  RAL
00203   741100                  SPA
00204   600210                  JMP     .+4             /PI INHIBITED
00205   700314                  IORS
00206   740100                  SMA
00207   740040          E27A    HALT                    /ERROR, PI ENABLED, BUT IORS-0 NOT SET
                        /
00210   447517                  ISZ WORK3               /CHECK DONE LOOPING
00211   600154                  JMP IOTST               /LOOP
00212   106336                  JMS GENRAN              /GET NO. FOR NEXT TEST
00213   106362                  JMS CKNO
                                .EJECT
```

```
                        /TEST IOT 3344 (DBR), L= 0
                        /
00214   744000  TSDBR   CLL             /LINK = 0
00215   100237          JMS DBRx
00216   741400          SZL
00217   740040  E28     HALT            /ERROR, DBR FAILED; LINK NOT 0
                        /
                        /TEST IOT 3344 (DBR), L = 1
                        /
00220   744002          CLL!CML         /L = 1
00221   100237          JMS DBRx
00222   740400          SNL
00223   740040  E29     HALT            /ERROR, DBR FAILED,     LINK NOT 1
                        /
                        /TEST IOT 3344 (DBR), L = 0
                        /
00224   754000          CLL!CLA         /AC, L = 0
00225   100242          JMS DBRxx
00226   740400          SNL
00227   740040  E30     HALT            /ERROR, DBR FAILED, LINK NOT 1
                        /
                        /TEST IOT 3344 (DBR), L = 1
                        /
00230   754002          CLL!CML!CLA     /L = 1, AC = 0
00231   100250          JMS DBRxxx
00232   751400          CLA!SZL
00233   740040  E31     HALT            /ERROR, DBR FAILED, LINK NOT 0
00234   447517          ISZ WORK3               /CHECK DONE LOOPING
00235   600214          JMP TSDBR               /LOOP
00236   600256          JMP OPRAT               /START INSTRUCTION TEST
                        /
00237   000000  DBRx    0               /LEAVE LINK ALONE
00240   703344          703344          /DBR
00241   620237          JMP* DBRx
                        /
00242   000000  DBRxx   0
00243   200242          LAC DBRxx
00244   347435          TAD K400K               /SET LINK TO A ONE
00245   040242          DAC DBRxx
00246   703344          703344          /DBR
00247   620242          JMP* DBRxx
                        /
00250   000000  DBRxxx  0
00251   200250          LAC DBRxxx
00252   507511          AND M400K               /CLEAR LINK
00253   040250          DAC DBRxxx
00254   703344          703344          /DBR
00255   620250          JMP* DBRxxx
                        .EJECT
```

```
                        /TEST OPERATE GROUP
                        /
00256   106336  OPRAT   JMS GENRAN      /GET NO, FOR LOOP ON TEST
00257   106362          JMS CKNO
00260   777777  OPERAT  LAW 17777               /AC = 777777
                        /
00261   741000          SKP             /TEST SKP
00262   740040  E32     HALT            /ERROR; SKP FAILED TO SKIP
                        /
                        /TEST CLA + SZA
00263   750000          CLA             /AC = 0
00264   740200          SZA
00265   740040  E33     HALT            /ERROR; CLA OR SZA FAILED TO SKIP
                        /
                        /TEST SMA
00266   750000          CLA             /AC = 0
00267   740100          SMA
00270   741000          SKP
00271   740040  E34     HALT            /ERROR; SAME SKIPPED
                        /
                        /TEST SPA
00272   750000          CLA
00273   741100          SPA
00274   740040  E35     HALT            /ERROR; SPA FAILED TO SKIP
                        /
                        /TEST SNA
00275   750000          CLA
00276   741200          SNA
00277   741000          SKP
00300   740040  E36     HALT            /ERROR; SNA SKIPPED
                        /
                        /TEST SZL + CLL
00301   744000          CLL             /LINK = 0
00302   741400          SZL
00303   740040  E37     HALT            /ERROR; SZL FAILED TO SKIP OR
                                        /CLL FAILED TO CLEAR LINK
                        /
                        /TEST SNL
00304   744000          CLL             /LINK = 0
00305   740400          SNL
00306   741000          SKP
00307   740040  E38     HALT            /ERROR; SNL SKIPPED
                        .EJECT
```

```
                        /TEST CLA CLL
00310   754000                  CLA!CLL         /AC, LINK = 0
00311   740200                  SZA
00312   740040          E39     HALT            /ERROR; AC NOT 0
                        /
                        /TEST CLA CLL
00313   754000                  CLA!CLL         /AC AND LINK = 0
00314   741400                  SZL
00315   740040          E40     HALT            /ERROR; LINK NOT 0
                        /
                        /TEST SKP SPA
00316   750000                  CLA
00317   741100                  SKP!SPA
00320   740040          E41     HALT            /ERROR; SKP!SPA FAILED TO SKIP
                        /
                        /TEST SKP SNA
00321   750000                  CLA
00322   741200                  SKP!SNA
00323   741000                  SKP
00324   740040          E42     HALT            /ERROR; SKP!SNA SKIPPED
                        /
                        /TEST SKP SZL
00325   744000                  CLL             /LINK = 1
00326   741400                  SKP!SZL
00327   740040          E43     HALT            /ERROR; SKP!SZL FAILED TO SKIP
                        /
                        /TEST SPA SNA
00330   750000                  CLA
00331   741300                  SPA!SNA
00332   741000                  SKP
00333   740040          E44     HALT            /ERROR; SPA!SNA SKIPPED
                        /
                        /TEST SPA SZL
00334   754000                  CLA!CLL         /LINK AND AC = 0
00335   741500                  SPA!SZL
00336   740040          E45     HALT            /ERROR; SPA!SZL FAILED TO SKIP
                        /
                        /TEST SNA SZL
00337   754000                  CLA!CLL         /LINK AND AC = 0
00340   741600                  SNA!SZL
00341   741000                  SKP
00342   740040          E46     HALT            /ERROR; SNA!SZL SKIPPED
                        /
                        /TEST SNA, SPA, SKP, SZL
00343   754000                  CLA!CLL         /AC AND LINK = 0
00344   741700                  SKP!SPA!SZL!SNA
00345   741000                  SKP             /ERROR; SNA!SPA!SKP!SZL SKIPPED
00346   740040          E47     HALT
                                .EJECT
```

```
                        /TEST SMA SZA
00347   750000                  CLA
00350   740300                  SMA!SZA
00351   740040          E48     HALT            /ERROR; SMA SZA FAILED TO SKIP
                        /
                        /TEST SMA SNL
00352   754000                  CLA!CLL         /LINK AND AC = 0
00353   740500                  SMA!SNL
00354   741000                  SKP
00355   740040          E49     HALT            /ERROR; SMA!SNL SKIPPED
                        /
                        /TEST SZA SNL
00356   754000                  CLA!CLL
00357   740600                  SZA!SNL
00360   740040          E50     HALT            /ERROR; SZA!SNL SKIPPED
                        /
                        /TEST SMA SZA SNL
00361   754000                  CLA!CLL
00362   740700                  SMA!SZA!SNL
00363   740040          E51     HALT            /ERROR; SMA!SZA!SNL FAILED TO SKIP
                        /
                        /TEST CML - SZL
00364   744000                  CLL             /LINK = 0
00365   740002                  CML             /LINK = 1
00366   741400                  SZL
00367   741000                  SKP
00370   740040          E52     HALT            /ERROR; SZL SKIPPED OR
                                                /CML FAILED TO SET LINK
                        /
                        /TEST CLL
00371   744000                  CLL             /LINK = 0
00372   740002                  CML             /LINK = 1
00373   744000                  CLL             /LINK = 0
00374   741400                  SZL
00375   740040          E53     HALT            /ERROR; CLL FAILED TO CLEAR LINK
                        /
                        /TEST CML
00376   744000                  CLL             /LINK = 0
00377   740002                  CML             /LINK = 1
00400   740002                  CML             /LINK = 0
00401   741400                  SZL
00402   740040          E54     HALT            /ERROR; CML FAILED TO SET LINK
                        /
                        /TEST CLL CML
00403   744000                  CLL             /LINK = 1
00404   740002                  CML             /LINK = 1
00405   744002                  CLL!CML         /LINK = 1
00406   741400                  SZL
00407   741000                  SKP
00410   740040          E55     HALT            /ERROR; CLL!CML FAILED TO SET LINK
                                .EJECT
```

```
                        /TEST CLL CML
00411   744000                  CLL             /LINK = 0
00412   740002                  CML             /LINK = 1
00413   744000                  CLL             /LINK = 0
00414   744002                  CLL!CML         /LINK = 1
00415   741400                  SZL
00416   741000                  SKP
00417   740040          E56     HALT            /ERROR: CLL!CML FAILED TO SET LINK
                        /
                        /TEST SKP SZL
00420   744000                  CLL             /LINK = 0
00421   741400                  SKP!SZL
00422   740040          E57     HALT            /ERROR: SKP!SZL FAILED TO SKIP
                        /
                        /TEST SZL SNA
00423   750000                  CLA             /AC = 0
00424   744002                  CLL!CML         /LINK = 1
00425   741600                  SZL!SNA
00426   741000                  SKP
00427   740040          E58     HALT            /ERROR: SZL!SNA SKIPPED
                        /
                        /TEST SZL SPA
00430   750000                  CLA             /AC = 0
00431   744002                  CLL!CML         /LINK = 1
00432   741500                  SZL!SPA
00433   741000                  SKP
00434   740040          E59     HALT            /ERROR: SZL!SPA SKIPPED
                        /
                        /TEST CLA CLL CML
00435   754002                  CLA!CLL!CML     /AC = 0,        LINK = 1
00436   741400                  SZL
00437   741000                  SKP
00440   740040          E60     HALT            /ERROR: LINK NOT 1
                        /
                        /TEST CLA CLL CML
00441   754002                  CLA!CLL!CML     /AC = 0, LINK = 1
00442   740200                  SZA
00443   740040          E61     HALT            /ERROR: AC NOT 0
                        /
                        /TEST SNL SZA
00444   754002                  CLA!CLL!CML     /AC = 0, LINK = 1
00445   740600                  SNL!SZA
00446   740040          E62     HALT            /ERROR: SNL!SZA FAILED TO SKIP
                        /
                        /TEST SNL SMA
00447   754002                  CLA!CLL!CML     /AC = 0, LINK = 1
00450   740500                  SNL!SMA
00451   740040          E63     HALT            /ERROR: SNL!SMA FAILED TO SKIP
                                .EJECT
```

```
                        /TEST SNL SZA SMA
00452   754002                  CLA!CLL!CML     /AC = 0, LINK = 1
00453   740700                  SNL!SZA!SMA
00454   740040          E64     HALT            /ERROR; SNL!SZA!SMA FAILED TO SKIP
                        /
                        /TEST CMA CLA
00455   750000                  CLA             /AC = 0
00456   740001                  CMA             /AC = ONES
00457   750000                  CLA
00460   741200                  SNA
00461   741000                  SKP
00462   740040          E65     HALT            /ERROR; CLA FAILED TO CLEAR AC
                        /
                        /TEST CMA SPA
00463   750000                  CLA             /AC = 0
00464   740001                  CMA             /AC = ONES
00465   741100                  SPA
00466   741000                  SKP
00467   740040          E66     HALT            /ERROR; SPA SKIPPED OR
                                                /CMA FAILED TO SET AC BIT 0
                        /
                        /TEST CMA SNA
00470   750000                  CLA             /AC = 0
00471   740001                  CMA             /AC = ONES
00472   741200                  SNA
00473   740040          E67     HALT            /ERROR; SNA FAILED TO SKIP
                                                /OR CMA FAILED TO SET ANY AC BIT
                        /
                        /TEST CMA
00474   750000                  CLA             /AC = 0
00475   740001                  CMA             /AC = ONES
00476   740001                  CMA             /AC = 0
00477   741200                  SNA
00500   741000                  SKP
00501   740040          E68     HALT            /ERROR; CMA FAILED TO
                                                /COMPLEMENT AC TO 0
                        /
                        /TEST CLA CMA
00502   750001                  CLA!CMA         /AC = ONES
00503   741200                  SNA
00504   740040          E69     HALT            /ERROR; CLA!CMA FAILED TO
                                                /SET ANY AC BIT
                                .EJECT
```

```
                        /TEST SZA
00505   750001          CLA!CMA         /AC = ONES
00506   740200          SZA
00507   741000          SKP
00510   740040  E70     HALT            /ERROR; SZA SKIPPED
                        /
                        /TEST SMA
00511   750001          CLA!CMA         /AC = ONES
00512   740100          SMA
00513   740040  E71     HALT            /ERROR; SMA FAILED TO SKIP
                        /
                        /TEST SKP SPA
00514   750001          CLA!CMA         /AC = ONES
00515   741100          SKP!SPA
00516   741000          SKP
00517   740040  E72     HALT            /ERROR; SKP!SPA SKIPPED
                        /
                        /TEST SKP SNA
00520   750001          CLA!CMA         /AC = ONES
00521   741200          SKP!SNA
00522   740040  E73     HALT            /ERROR; SKP!SNA FAILED TO SKIP
                        /
                        /TEST SPA SNA
00523   750001          CLA!CMA         /AC = ONES
00524   741300          SPA!SNA
00525   741000          SKP
00526   740040  E74     HALT            /ERROR; SPA!SNA SKIPPED
                        /
                        /TEST SKP SNA SPA
00527   754003          CLA!CMA!CLL!CML /AC = ONES, LINK = 1
00530   741700          SNA!SPA!SKP!SZL
00531   741000          SKP
00532   740040  E75     HALT            /ERROR; SKP!SNA!SPA!SZL SKIPPED
                        /
                        /TEST SMA!SZA
00533   750001          CLA!CMA         /AC = ONES
00534   740300          SMA!SZA
00535   740040  E76     HALT            /ERROR; SMA!SZA FAILED TO SKIP
                        /
                        /TEST SMA SZA SNL
00536   754003          CLA!CMA!CLL!CML /AC = ONE, LINK = 1
00537   740700          SMA!SZA!SNL
00540   740040  E77     HALT            /ERROR; SMA!SZA!SNL
                        /
                        /TEST NOP
00541   750001          CLA!CMA         /AC = ONES
00542   740000          NOP
00543   740001          CMA             /AC = 0
00544   740200          SZA
00545   740040  E78     HALT            /ERROR; NOP ALTERED THE AC
                        /
                        .EJECT
```

```
                    /TEST NOP
00546   750000              CLA             /AC = 0
00547   740000              NOP
00550   740200              SZA
00551   740040      E79     HALT            /ERROR; NOP SET AN AC BIT
                    /
                    /TEST NOP
00552   744002              CLL!CML         /LINK = 1
00553   740000              NOP
00554   740400              SNL
00555   740040      E80     HALT            /ERROR; NOP CLEARED THE LINK
                    /
                    /TEST NOP
00556   744000              CLL             /LINK = 0
00557   740000              NOP
00560   741400              SZL
00561   740040      E81     HALT            /ERROR; NOP SET THE LINK
                    /
                    /TEST SZA CMA
00562   750000              CLA             /AC = 0
00563   740201              SZA!CMA         /AC = ONES
00564   740040      E82     HALT            /ERROR; SZA FAILED TO SKIP
                    /
                    /TEST SZA CLA
00565   750001              CLA!CMA         /AC = ONES
00566   750200              SZA!CLA         /AC = 0
00567   741000              SKP
00570   740040      E83     HALT            /ERROR; SZA SKIPPED
                    /
                    /TEST SZL CML
00571   744000              CLL             /LINK = 0
00572   741402              SZL!CML
00573   740040      E84     HALT            /ERROR; SZL FAILED TO SKIP
                    /
                    /TEST SZL CLL
00574   744002              CLL!CML         /LINK = 1
00575   745400              SZL!CLL
00576   741000              SKP
00577   740040      E85     HALT            /ERROR; SZL SKIPPED
                    /
                    /TEST SKP SZL SPA LA CLL
00600   754003              CLA!CMA!CLL!CML /AC = ONES, LINK = 1
00601   755500              SKP!SZL!SPA!CLA!CLL     /AC = 0, LINK = 0
00602   741000              SKP
00603   740040      E86     HALT            /ERROR; SKP!SZL!SPA SKIPPED
                            ,EJECT
```

```
                        /TEST SZA SNL CMA CLL
00604   754002                  CLA!CLL!CML     /AC = 0, LINK = 1
00605   744601                  SZA!SNL!CMA!CLL /AC=ONES, LINK =?
00606   740040          E87     HALT            /ERROR, SZA!SNL FAILED TO SKP
                        /
                        /TEST CLA SKP
00607   750001                  CLA!CMA         /AC = ONES
00610   751000                  SKP!CLA         /AC = 0
00611   740000                  NOP
00612   740200                  SZA
00613   740040          E88     HALT            /ERROR, CLA FAILED TO CLEAR AC
                        /
                        /TEST SKP CLA CMA
00614   750000                  CLA             /AC = 0
00615   751001                  SKP!CLA!CMA     /AC = ONES
00616   740000                  NOP
00617   740001                  CMA
00620   740200                  SZA
00621   740040          E89     HALT            /ERROR, CLA!CMA FAILED TO
                                                /COMPLEMENT THE AC
                        /
                        /TEST SKP CLL CML
00622   744000                  CLL             /LINK = 0
00623   745002                  SKP!CLL!CML     /LINK = 1
00624   740000                  NOP
00625   740400                  SNL
00626   740040          E90     HALT            /ERROR, CLL!CML FALED TO SET THE LINK
                        /
                        /TEST CMA SERIES
00627   750001                  CLA!CMA         /AC = ONES
00630   740001                  CMA             /AC = 0
00631   740001                  CMA             /AC = ONES
00632   740001                  CMA             /AC = 0
00633   740001                  CMA             /AC = ONES
00634   740001                  CMA             /AC = 0
00635   740200                  SZA
00636   740040          E91     HALT            /ERROR, AC NOT 0 CMA FAILED
                        /
                        /TEST CML SERIES
00637   744002                  CLL!CML         /LINK = 1
00640   740002                  CML             /LINK = 0
00641   740002                  CML             /LINK = 1
00642   740002                  CML             /LINK = 0
00643   740002                  CML             /LINK = 1
00644   740002                  CML             /LINK = 0
00645   741400                  SZL
00646   740040          E92     HALT            /ERROR, LINK NOT 0 CML FAILED
                        /
00647   447517                  ISZ WORK3               /CHECK DONE LOOPING
00650   600260                  JMP OPERAT              /LOOP
00651   106336                  JMS GENRAN              /GET NO. FOR NEXT LOOP
00652   106362                  JMS CKNO
                                .EJECT
```

```
                        /
                        /TEST RAR SERIES AND LINK
00653   754002  RTAT    CLA!CLL!CML     /AC = 0, LINK = 1
00654   740020          RAR
00655   740020          RAR
00656   740020          RAR
00657   740020          RAR
00660   740020          RAR
00661   740020          RAR
00662   740020          RAR
00663   740020          RAR
00664   740020          RAR
00665   740020          RAR
00666   740020          RAR
00667   740020          RAR
00670   740020          RAR
00671   740020          RAR
00672   740020          RAR
00673   740020          RAR
00674   740020          RAR
00675   740020          RAR
00676   741600          SNA!SZL
00677   740040  E113    HALT            /ERROR: AC BIT 17 NOT 1, OR LINK = 1
                                        /AFTER ROTATE SERIES
                        .EJECT
```

```
                        /TEST RAL SERIES AND LINK
00700   754002          CLA!CLL!CML     /AC = 0, LINK = 1
00701   740010          RAL
00702   740010          RAL
00703   740010          RAL
00704   740010          RAL
00705   740010          RAL
00706   740010          RAL
00707   740010          RAL
00710   740010          RAL
00711   740010          RAL
00712   740010          RAL
00713   740010          RAL
00714   740010          RAL
00715   740010          RAL
00716   740010          RAL
00717   740010          RAL
00720   740010          RAL
00721   740010          RAL
00722   740010          RAL
00723   741600          SNA!SZL
00724   740040  E114    HALT            /ERROR; AC BIT 0 NOT 1, OR LINK = 1
                                        /AFTER ROTATE SERIES
                        /
                        /TEST RTL SERIES AND LINK
00725   754002          CLA!CLL!CML     /AC = 0, LINK = 1
00726   742010          RTL
00727   742010          RTL
00730   742010          RTL
00731   742010          RTL
00732   742010          RTL
00733   742010          RTL
00734   742010          RTL
00735   742010          RTL
00736   742010          RTL
00737   741600          SNA!SZL
00740   740040  E115    HALT            /ERROR; AC BIT 0 NOT 1, OR LINK = 1
                                        /AFTER ROTATE SERIES
                        /
                        /TEST RTR SERIES AND LINK
00741   754002          CLA!CLL!CML     /AC = 0, LINK = 1
00742   742020          RTR
00743   742020          RTR
00744   742020          RTR
00745   742020          RTR
00746   742020          RTR
00747   742020          RTR
00750   742020          RTR
00751   742020          RTR
00752   742020          RTR
00753   741600          SNA!SZL
00754   740040  E116    HALT            /ERROR; AC BIT 17 NOT 1, OR LINK = 1
                                        /AFTER ROTATE SERIES
                        .EJECT
```

```
                        /PDP-15 BASIC EXERCISER - TAPE 2
                        /
                        /RAR SERIES
00755   754001  RTSS    CLA!CMA!CLL     /AC = ONES, LINK = 0
00756   740020          RAR;    RAR;    RAR;    RAR
00757   740020
00760   740020
00761   740020
00762   740020          RAR;    RAR;    RAR;    RAR
00763   740020
00764   740020
00765   740020
00766   740020          RAR;    RAR;    RAR;    RAR
00767   740020
00770   740020
00771   740020
00772   740020          RAR;    RAR;    RAR;    RAR
00773   740020
00774   740020
00775   740020
00776   740020          RAR;    RAR
00777   740020
01000   740003          CMA!CML         /AC = 000001, LINK = 0
01001   741600          SNA!SZL
01002   740040  E140    HALT            /ERROR; AC BIT 17 NOT 1, OR LINK = 0
                                        /AFTER ROTATE SERIES
                        /
                        /
                        /TEST RAL SERIES TEST
01003   754001          CLA!CMA!CLL     /AC = ONES, LINK = 0
01004   740010          RAL;    RAL;    RAL;    RAL
01005   740010
01006   740010
01007   740010
01010   740010          RAL;    RAL;    RAL;    RAL
01011   740010
01012   740010
01013   740010
01014   740010          RAL;    RAL;    RAL;    RAL
01015   740010
01016   740010
01017   740010
01020   740010          RAL;    RAL;    RAL;    RAL
01021   740010
01022   740010
01023   740010
01024   740010          RAL;    RAL;    CML     /AC = 377777, LINK = 0
01025   740010
01026   740002
01027   741500          SPA!SZL
01030   740040  E141    HALT            /ERROR; AC BIT 0 NOT 0, OR LINK = 0
                                        /AFTER ROTATE SERIES
                        .EJECT
```

```
                        /TEST RTL SERIES
    01031   754001              CLA!CMA!CLL     /AC = ONES, LINK = 0
    01032   742010              RTL;    RTL;    RTL;    RTL
    01033   742010
    01034   742010
    01035   742010
    01036   742010              RTL;    RTL;    RTL;    RTL
    01037   742010
    01040   742010
    01041   742010
    01042   742010              RTL;    CML     /LINK = 0
    01043   740002
    01044   741500              SPA!SZL
    01045   740040      E142    HALT            /ERROR; AC BIT 0 NOT 0, OR LINK = 0
                                                /AFTER ROTATE SERIES
                        /
                        /TEST RTR SERIES
    01046   754001              CLA!CMA!CLL     /AC = ONES, LINK = 0
    01047   742020              RTR;    RTR;    RTR;    RTR
    01050   742020
    01051   742020
    01052   742020
    01053   742020              RTR;    RTR;    RTR;    RTR
    01054   742020
    01055   742020
    01056   742020
    01057   742020              RTR
    01060   740003              CMA!CML         /AC = 000001, LINK = 0
    01061   741600              SNA!SZL
    01062   740040      E143    HALT            /ERROR; AC BIT 17 NOT 1, OR LINK = 0
                                                /AFTER ROTATE SERIES
                                .EJECT
```

```
                        /
                        /TEST RAL!SNA
01063   754002                  CLA!CLL!CML     /AC = 0, LINK = 1
01064   741210                  RAL!SNA
01065   741000                  SKP
01066   740040          E162    HALT            /ERROR; SNA SKIPPED
                        /
                        /TEST RAR!SNA
01067   754002                  CLA!CLL!CML     /AC = 0, LINK = 1
01070   741220                  RAR!SNA
01071   741000                  SKP
01072   740040          E163    HALT            /ERROR; SNA SKIPPED
                        /
                        /TEST RTL"SNA
01073   754002                  CLA!CLL!CML     /AC = 0, LINK = 1
01074   743210                  RTL!SNA
01075   741000                  SKP
01076   740040          E164    HALT            /ERROR; SNA SKIPPED
                        /
                        /TEST RTR!SNA
01077   754002                  CLA!CLL!CML     /AC = 0, LINK = 1
01100   743220                  RTR!SNA
01101   741000                  SKP
01102   740040          E165    HALT            /ERROR; SNA SKIPPED
                        /
                        /TEST RAL!SNA
01103   754002                  CLA!CLL!CML     /AC = 0, LINK = 1
01104   740020                  RAR             /AC = 400000
01105   741210                  SNA!RAL
01106   740040          E166    HALT            /ERROR, SNA FAILED TO SKIP
                        /
                        /TEST RAR!SNA
01107   754002                  CLA!CLL!CML     /AC = 0, LINK = 1
01110   740010                  RAL             /AC = 000001
01111   741220                  SNA!RAR
01112   740040          E167    HALT            /ERROR; SNA FAILED TO SKIP
                                .EJECT
```

```
                        /TEST RTL!SNA
01113   754002                  CLA!CLL!CML     /AC = 0, LINK = 1
01114   742020                  RTR             /AC = 200000
01115   743210                  SNA!RTL
01116   740040          E168    HALT            /ERROR: SNA FAILED TO SKIP
                        /
                        /TEST RTR!SNA
01117   754002                  CLA!CLL!CML     /AC = 0, LINK = 1
01120   742010                  RTL
01121   743220                  SNA!RTR
01122   740040          E169    HALT            /ERROR: SNA FAILED TO SKIP
                        /
                        /TEST CLL!SNA!RAR
01123   754001                  CLA!CMA!CLL     /AC = ONES, LINK = 0
01124   751220                  CLA!SNA!RAR
01125   740040          E170    HALT            /ERROR: SNA FAILED TO SKIP
01126   447517                  ISZ WORK3               /CHECK DONE LOOPING
01127   600653                  JMP RTAT                /LOOP
01130   106336                  JMS GENRAN              /GET NO FOR NEXT LOOP
01131   106362                  JMS CKNO
                        /
                                .EJECT
```

```
                        /
                        /TEST LAW 760000
01132   754000  TLAW    CLA!CLL         /AC = 0
01133   760000          LAW 00000               /AC = 760000
01134   740010          RAL             /AC = 740000
01135   744400          SNL!CLL         /LINK = 1
01136   740040  E206    HALT            /ERROR; AC NOT 0 NOT A 1,
                                        /LAW 760000 FAILED
01137   740010          RAL             /AC = 700000
01140   744400          SNL!CLL         /LINK = 1
01141   740040  E207    HALT            /ERROR; AC BIT 1 NOT A 1
                                        /LAW 760000 FAILED
01142   740010          RAL             /AC = 600000
01143   744400          SNL!CLL         /LINK = 1
01144   740040  E208    HALT            /ERROR; AC BIT 2 NOT A 1
                                        /LAW 760000 FAILED
01145   740010          RAL             /AC = 400000
01146   744400          SNL!CLL         /LINK = 1
01147   740040  E209    HALT            /ERROR; AC BIT 3 NOT A 1
                                        /LAW 760000 FAILED
01150   740010          RAL             /AC = 000000
01151   744400          SNL!CLL         /LINK = 1
01152   740040  E210    HALT            /ERROR; AC BIT 4 NOT A 1
                                        /LAW 760000 FAILED
01153   740200          SZA             /AC = 000000
01154   740040  E211    HALT            /ERROR; AC BITS 5=17 NOT 0
                                        /LAW 760000 FAILED
                        /
                        /TEST LAW 760000, AC = ONES
01155   754001          CLA!CMA!CLL     /AC = ONES, LINK = 0
01156   760000          LAW 00000               /AC = 760000
01157   741400          SZL
01160   740040  E212    HALT            /ERROR; LINK NOT A 0, LAW SET LINK
01161   740010          RAL             /AC = 740000
01162   744400          SNL!CLL         /LINK = 1
01163   740040  E213    HALT            /ERROR; AC BIT 0 NOT A 1,
                                        /LAW 760000 FAILED
01164   740010          RAL             /AC = 700000
01165   744400          SNL!CLL         /LINK = 1
01166   740040  E214    HALT            /ERROR; AC BIT 1 NOT A 1
                                        /LAW 760000 FAILED
                        /
01167   740010          RAL             /AC = 600000
01170   744400          SNL!CLL         /LINK = 1
01171   740040  E215    HALT            /ERROR; AC BIT 2 NOT A 1
                                        /LAW 760000 FAILED
01172   740010          RAL             /AC = 400000
01173   744400          SNL!CLL         /LINK = 1
01174   740040  E216    HALT            /ERROR; AC BIT 3 NOT A 1, LAW 760000 FAILED
01175   740010          RAL             /AC = 000000
01176   744400          SNL!CLL         /LINK = 1
01177   740040  E217    HALT            /ERROR; AC BIT 4 NOT A 1, LAW 760000 FAILED
01200   740200          SZA             /AC = 000000
01201   740040  E218    HALT            /ERROR; AC BITS 5=17 NOT 0
                                        /LAW 760000 FAILED
```

```
                                ,EJECT
```

```
                        /TEST LAW 777777, AC=0, L=0
01202   754000                  CLA!CLL             /AC = 0
01203   777777                  LAW 17777                   /AC = 760200
01204   740001                  CMA
01205   740200                  SZA
01206   740040          E219    HALT                /ERROR, AC NOT 0
                                                    /LAW 17777 FAILED
01207   741400                  SZL                 /AC = 400760
01210   740040          E220            HALT                /LINK NOT 0
                        /
                        /TEST LAW 777777, AC=0, L=1
01211   754002                  CLA!CLL!CML         /AC = 0
01212   777777                  LAW 17777
01213   740001                  CMA
01214   740200                  SZA
01215   740040          E221    HALT                /ERROR, LINK NOT 0
01216   740400                  SNL
01217   740040          E222    HALT                /ERROR, LINK NOT 0
                        /
                        /TEST LAW 777777, AC=1, L=0
01220   754001                  CLA!CMA!CLL         /AC = 0
01221   777777                  LAW 17777
01222   740001                  CMA
01223   740200                  SZA
01224   740040          E223    HALT                /ERROR, AC NOT 0
01225   741400                  SZL                 /AC = 100760
01226   740040          E224    HALT                /ERROR, LINK NOT 0
                                ,EJECT
```

```
                        /TEST LAW 777777, AC=1, L=1
01227   754003                  CLA!CMA!CLL!CML /AC = 0
01230   777777                  LAW 17777
01231   740001                  CMA
01232   740200                  SZA
01233   740040          E225    HALT            /ERROR, AC NOT 0
01234   740400                  SNL
01235   740040          E226    HALT            /ERROR, LINK NOT 1
01236   447517                  ISZ WORK3               /CHECK DONE LOOPING
01237   601132                  JMP TLAW                /LOOP
01240   106336                  JMS GENRAN              /GET NO. FOR NEXT LOOP
01241   106362                  JMS CKNO
                                .EJECT
```

```
                        /TEST LAC 0'S
                        /
01242   754000  LACK    CLA!CLL         /AC = 0, LINK = ?
01243   207411          LAC K0          /000000
01244   740200          SZA
01245   740040  E258    HALT            /ERROR,  AC NOT ? AFTER LAC K?
01246   741400          SZL
01247   740040  E259    HALT            /ERROR; LINK NOT 0 AFTER LAC K?
                        /
01250   754002          CLA!CLL!CML     /AC = 0, LINK = 1
01251   207411          LAC K0
01252   740200          SZA
01253   740040  E260    HALT            /ERROR; AC NOT 0
01254   740400          SNL
01255   740040  E261    HALT            /ERROR,  LINK NOT 1 AFTER LAC K0
                        /
01256   754001          CLA!CMA!CLL     /AC = 1'S, LIN = 0
01257   207411          LAC K0
01260   740200          SZA
01261   740040  E262    HALT            /ERROR,  AC NOT ? AFTER LAC K0
01262   741400          SZL
01263   740040  E263    HALT            /ERROR,  LINK NOT 0 AFTER LAC K0
                        /
01264   754003          CLA!CMA!CLL!CML /AC = 1'S, LINK = 1
01265   207411          LAC K0
01266   740200          SZA
01267   740040  E264    HALT            /ERROR,  AC NOT 0
01270   740400          SNL
01271   740040  E265    HALT            /ERROR, LINK NOT 1
                        /
                        /TEST LAC 1'S
                        /
01272   754000          CLA!CLL         /AC = 0, LINK = 0
01273   207454          LAC K7S         /777777
01274   740001          CMA
01275   740200          SZA
01276   740040  E266    HALT            /ERROR,  AC NOT 0 LAC K7S FAILED
01277   741400          SZL
01300   740040  E267    HALT            /ERROR,  LINK NOT 0 AFTER LAC K7S
                        /
01301   754002          CLA!CLL!CML     /AC = 0, LINK = 1
01302   207454          LAC K7S
01303   740001          CMA
01304   740200          SZA
01305   740040  E268    HALT            /ERROR, AC NOT 0
01306   740400          SNL
01307   740040  E269    HALT            /ERROR, LINK NOT 1 AFTER LAC K7S
                        .EJECT
```

```
01310  754001           CLA!CMA!CLL      /AC = 1'S, LINK = 0
01311  207454           LAC K7S
01312  740001           CMA
01313  740200           SZA
01314  740040    E270   HALT             /ERROR, AC NOT 0, LAC K7S FAILED
01315  741400           SZL
01316  740040    E271   HALT             /ERROR,  LINK NOT 1 AFTER LAC K7S
                        /
01317  754003           CLA!CMA!CLL!CML  /AC = 1'S, LINK = 1
01320  207454           LAC K7S
01321  740001           CMA
01322  740200           SZA
01323  740040    E272   HALT             /ERROR,  AC NOT 0
01324  740400           SNL
01325  740040           HALT             /ERROR,  LINK NOT 1 AFTER LAC K7S
                        /
01326  750000           CLA
01327  207467           LAC K101                 /AC = 525252
01330  207466           LAC K010                 /AC = 252525
01331  207454           LAC K7S          /AC = 777777
01332  740001           CMA
01333  740200           SZA
01334  740040    E273   HALT             /ERROR, AC NOT 0
01335  447517           ISZ WORK3                /CHECK FOR DONE LOOPING
01336  601242           JMP LACK                 /LOOP
01337  106336           JMS GENRAN       /GET NO, FOR LOOP
01340  106362           JMS CKNO
                        /
                        /TEST AND
                        /
01341  750000    ANDAC  CLA              /AC = 0
01342  507411           AND K0
01343  740200           SZA
01344  740040    E274   HALT             /ERROR, AC NOT 0 AFTER AND K0
                        /
01345  750001           CLA!CMA          /AC = 1'S
01346  507411           AND K0
01347  740200           SZA
01350  740040    E275   HALT             /ERROR, AC NOT 0 AFTER AND K0
                        /
01351  750000           CLA              /AC = 0
01352  507454           AND K7S
01353  740200           SZA
01354  740040    E276   HALT             /ERROR, AC NOT 0 AFTER AND K7S
                        /
01355  750001           CLA!CMA          /AC = 1'S
01356  507454           AND K7S
01357  740001           CMA
01360  740200           SZA
01361  740040    E277   HALT             /ERROR, AC NOT 0 AFTER AND K7S
                        .EJECT
```

```
                        /SEQUENTIAL AND
                        /
01362   754002          CLA!CLL!CML     /AC = 0, LINK = 1
01363   507411          AND K0
01364   507454          AND K7S
01365   507467          AND K101
01366   507466          AND K010
01367   740001          CMA
01370   507411          AND K0
01371   507454          AND K7S
01372   507467          AND K101
01373   507466          AND K010
01374   740200          SZA
01375   740040  E278    HALT            /ERROR,  AC NOT 0
01376   740400          SNL
01377   740040  E279    HALT            /ERROR,  LINK NOT 1
01400   447517          ISZ WORK3               /CHECK FOR DONE LOOPING
01401   601341          JMP ANDAC               /LOOP
01402   106336          JMS GENRAN      /GET NO, FOR NEXT LOOP
01403   106362          JMS CKNO
                        /
                        /TEST XOR
                        /
01404   750000  XORAC   CLA             /AC = 0
01405   247411          XOR K0
01406   740200          SZA
01407   740040  E280    HALT            /ERROR,  AC NOT 0 AFTER XOR K0
                        /
01410   750001          CLA!CMA         /AC = 1'S
01411   247411          XOR K0
01412   740001          CMA
01413   740200          SZA
01414   740040  E281    HALT            /ERROR,  AC NOT 0
                        /
01415   750000          CLA             /AC = 0
01416   247454          XOR K7S         /777777
01417   740001          CMA
01420   740200          SZA
01421   740040  E282    HALT            /ERROR,  AC NOT 0 AFTER XOR K7S
                        /
01422   750001          CLA!CMA         /AC = 1'S
01423   247454          XOR K7S
01424   740200          SZA
01425   740040  E283    HALT            /ERROR,  AC NOT 0 AFTER XOR K7S
                        ,EJECT
```

```
                        /SEQUENTIAL XOR
                        /
01426   750000          CLA             /AC = 0
01427   247467          XOR K101                /525252
01430   247466          XOR K0101               /252525
01431   247411          XOR K0          /000000
01432   247454          XOR K7S         /777777
01433   247466          XOR K0101
01434   247467          XOR K101
01435   247467          XOR K101
01436   247466          XOR K0101
01437   740200          SZA
01440   740040  E284    HALT            /ERROR, AC NOT 0
                        /
01441   447517          ISZ WORK3               /CHECK FOR DONE LOOPING
01442   601404          JMP XORAC               /LOOP
01443   106336          JMS GENRAN      /GET NO, FOR NEXT LOOP
01444   106362          JMS CKNO
                        /
                        /TEST TAD
                        /
01445   754000  TADAC   CLA!CLL         /AC = 0, LINK = 0
01446   347411          TAD K0
01447   740200          SZA
01450   740040  E285    HALT            /ERROR,  AC NOT 0 AFTER TAD K0
01451   741400          SZL
01452   740040  E286    HALT            /ERROR,  LINK NOT 0 AFTER TAD K0
                        /
01453   754001          CLA!CMA!CLL     /AC = 1'S, LINK = 0
01454   347411          TAD K0
01455   740001          CMA
01456   740200          SZA
01457   740040  E287    HALT            /ERROR,AC NOT 0
01460   741400          SZL
01461   740040  E288    HALT            /ERROR,  LINK NOT 0
                        /
01462   754002          CLA!CLL!CML     /AC = 0,  LINK = 1
01463   347454          TAD K7S         /777777
01464   740001          CMA
01465   740200          SZA
01466   740040  E289    HALT            /ERROR, TAD K7S FAILED
01467   740400          SNL
01470   740040  E290    HALT            /ERROR,  CARRY OUT OR OVERFLOW
                                        /FAILED,  LINK NOT 0
                        /
01471   754001          CLA!CMA!CLL     /AC = 1'S, LINK = 0
01472   347454          TAD K7S
01473   740020          RAR
01474   740001          CMA
01475   740200          SZA
01476   740040  E291    HALT            /ERROR,  TAD K7S TO 1'S FAILED
01477   741400          SZL
01500   740040  E292    HALT            /ERROR,  LINK NOT 0
                        ,EJECT
```

```
                        /TEST OVERFLOW
                        /
01501   754001          CLA!CMA!CLL     /AC = 1'S,  LINK = 0
01502   347412          TAD K1          /000001
01503   740200          SZA
01504   740040  E293    HALT            /ERROR,  AC NOT 2 AFTER TAD K1
01505   740400          SNL
01506   740040  E294    HALT            /ERROR,  LINK NOT 1 OVERFLOW FAILED
                        /
01507   754003          CLA!CMA!CLL!CML /AC = 1'S, LINK = 1
01510   347412          TAD K1
01511   740200          SZA
01512   740040  E295    HALT            /ERROR,  AC NOT 0
01513   741400          SZL
01514   740040  E296    HALT            /ERROR, LINK NOT 0 OVERFLOW FAILED
                        /
                        /TAD 525252, AC = 252525, LINK = 0
                        /
01515   754000          CLA!CLL
01516   347466          TAD K010
01517   347467          TAD K101                /AC = 1'S
01520   740001          CMA
01521   740200          SZA
01522   740040  E297    HALT            /ERROR,  AC NOT 0
01523   741400          SZL
01524   740040  E298    HALT            /ERROR,  LINK NOT 0
                        /
                        /TAD 252525, AC = 525252, LINK = 1
                        /
01525   754002          CLA!CLL!CML
01526   347467          TAD K101
01527   347466          TAD K010                /AC = 1'S
01530   740001          CMA
01531   740200          SZA
01532   740040  E299    HALT            /ERROR,  AC NOT 0
01533   740400          SNL
01534   740040  E300    HALT            /ERROR,  LINK NOT 0
                        /
                        /SEQUENTIAL LAC, TAD, XOR
                        /
01535   754000          CLA!CLL         /AC = 0, LINK = 0
01536   207466          LAC K010
01537   347467          TAD K101                /AC = 1'S
01540   247466          XOR K010
01541   347466          TAD K010                /AC = 1'S
01542   347412          TAD K1
01543   740400          SNL
                        .EJECT
```

```
01544  740040  E301  HALT            /ERROR,  LINK NOT 1
01545  207467        LAC K101
01546  247454        XOR K7S
01547  347467        TAD K101
01550  247454        XOR K7S
01551  740200        SZA
01552  740040  E302  HALT            /ERROR,  AC NOT 0
01553  447517        ISZ WORK3       /CHECK DONE LOOPING
01554  601445        JMP TADAC               /LOOP
01555  106336        JMS GENRAN      /GET NO, FOR NEXT LOOP
01556  106362        JMS CKNO
                     /
                     /
                     /TEST ADD
                     /TEST ADD K1S TO K6S, LINK = 0
01557  754000  ADDAC CLA!CLL         /AC = 0, LINK = 0
01560  307446        ADD K1S         /111111
01561  307453        ADD K6S         /666666
01562  740001        CMA             /AC = 0
01563  740200        SZA
01564  740040  E303  HALT            /ERROR; ADD K1S TO K6S FAILED
01565  741400        SZL
01566  740040  E304  HALT            /ERROR; LINK NOT A0
                     /
                     /TEST ADD K2S TO K5S, LINK = 0
01567  754000        CLA!CLL         /AC , LINK = 0
01570  307447        ADD K2S         /22222
01571  307452        ADD K5S         /555555
01572  740001        CMA             /AC = 0
01573  740200        SZA
01574  740040  E305  HALT            /ERROR; ADD K2S TO K5S FAILED
01575  741400        SZL
01576  740040  E306  HALT            /ERROR; LINK NOT A 0
                     /
                     /TEST ADD K3S TO K4S, LINK = 0
01577  754000        CLA!CLL         /AC, LINK =0
01600  307450        ADD K3S         /33333
01601  307451        ADD K4S         /444444
01602  740001        CMA             /AC = 0
01603  740200        SZA
01604  740040  E307  HALT            /ERROR; ADD K3S TO K4S FAILED
01605  741400        SZL
01606  740040  E308  HALT            /ERROR; LINK NOT A0
                     /
                     /TEST ADD K4S TO K3S, LINK = 0
01607  754000        CLA!CLL         /AC, LINK =0
01610  307451        ADD K4S         /444444
01611  307450        ADD K3S         /333333
01612  740001        CMA             /AC = 0
01613  740200        SZA
01614  740040  E309  HALT            /ERROR; AND K4S TO K3S FAILED
01615  741400        SZL
01616  740040  E310  HALT            /ERROR; LINK NOT A0
                     .EJECT
```

```
                        /TEST ADD K5S TO K2S, LINK = 0
01617   754000          CLA!CLL         /AC, LINK = 0
01620   307452          ADD K5S         /555555
01621   307447          ADD K2S         /222222
01622   740001          CMA             /AC = 0
01623   740200          SZA
01624   740040  E311    HALT            /ERROR; ADD K5S TO K2S FAILED
01625   741400          SZL
01626   740040  E312    HALT            /ERROR; LINK NOT A0
                        /
                        /TEST AND K6S TO K1S, LINK = 0
01627   754000          CLA!CLL         /AC, LINK = 0
01630   307453          ADD K6S         /666666
01631   307446          ADD K1S         /111111
01632   740001          CMA             /AC = 0
01633   740200          SZA
01634   740040  E313    HALT            /ERROR; ADD K6S TO K1S FAILED
01635   741400          SZL
01636   740040  E314    HALT            /ERROR; LINK NOT A 0
                        /
                        /TEST ADD K7S TO K0S, LINK = 0
01637   754000          CLA!CLL         /AC, LINK = 0
01640   307454          ADD K7S         /777777
01641   307411          ADD K0          /000000
01642   740001          CMA             /AC = 0
01643   740200          SZA
01644   740040  E315    HALT            /ERROR; ADD K7S TO K0S FAILED
01645   741400          SZL
01646   740040  E316    HALT            /ERROR; LINK NOT A 0
                        /
                        /TEST ADD 252525, AC = 525252, LINK = 0
01647   754001          CLL!CLA!CMA     /AC = ONES, LINK = 0
01650   207467          LAC K101                /AC = 525252
01651   307466          ADD K010                /AC = 252525
01652   740001          CMA             /AC = 0
01653   740200          SZA
01654   740040  E317    HALT            /ERROR; ADD K101 TO K010 FAILED
01655   741400          SZL
01656   740040  E318    HALT            /ERROR; LINK NOT A 0
                        /
                        /TEST ADD 525252, AC = 252525, LINK = 0
01657   744000          CLL             /LINK = 0
01660   207466          LAC K010                /AC = 252525
01661   307467          ADD K101                /525252
01662   740001          CMA             /AC = 0
01663   740200          SZA
01664   740040  E319    HALT            /ERROR; ADD K010 TO K101 FAILED
01665   741400          SZL
01666   740040  E320    HALT            /ERROR; LINK NOT A0
                        ,EJECT
```

```
                        /TEST ADD K7S, AC = K400K, LINK = 0
01667   754001                  CLA!CMA!CLL     /AC = ONES, LINK = 0
01670   207435                  LAC K400K               /AC = 400K
01671   307454                  ADD K7S         /ONES
01672   507454                  AND K7S         /AC = 400K
01673   247435                  XOR K400K
01674   740200                  SZA             /AC = 0
01675   740040          E321    HALT            /ERROR; ADD=0 TO K400K FAILED
01676   741400                  SZL
01677   740040          E322    HALT            /ERROR; LINK NOT A 0, CARRY FAILED
                        /
                        /TEST ADD K200K, AC = K200K, LINK = 0
01700   754001                  CLA!CMA!CLL     /AC = ONES, LINK = 0
01701   207441                  LAC K200K               /AC = 200K
01702   307441                  ADD K200K               /ONES
01703   507454                  AND K7S         /AC = 400K
01704   247435                  XOR K400K
01705   740200                  SZA             /AC = 0
01706   740040          E323    HALT            /ERROR; ADD K200K TO K200K FAILED
01707   740400                  SNL
01710   740040          E324    HALT            /ERROR; LINK NOT A ONES, CARRY FAILED
                        /
                        /TEST ADD K7S, AC = K100K, LINK = 1
01711   754003                  CLA!CMA!CLL!CML /AC = ONES, LINK = 1
01712   207343                  LAC K100K               /AC = 100K
01713   307454                  ADD K7S         /ONES
01714   507454                  AND K7S         /AC = 100K
01715   247343                  XOR K100K
01716   740200                  SZA             /AC = 0
01717   740040          E325    HALT            /ERROR; ADD=0 TO K100K FAILED
01720   740400                  SNL
01721   740040          E326    HALT            /ERROR; LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K7S, AC = K40K, LINK = 0
01722   754001                  CLA!CMA!CLL     /AC = ONES, LINK = 0
01723   207434                  LAC K40K                /AC = 40K
01724   307454                  ADD K7S         /ONES
01725   507454                  AND K7S         /AC = 40K
01726   247434                  XOR K40K
01727   740200                  SZA             /AC = 0
01730   740040          E327    HALT            /ERROR; ADD=0 TO K40K FAILED
01731   741400                  SZL
01732   740040          E328    HALT            /ERROR; LINK NOT A ZERO, CARRY FAILED
                                .EJECT
```

```
                        /TEST ADD K7S, AC = K20K, LINK = 0
01733   754001                  CLA!CMA!CLL     /AC = ONES, LINK = 0
01734   207440                  LAC K20K                /AC = 20K
01735   307454                  ADD K7S         /ONES
01736   507454                  AND K7S         /AC = 20K
01737   247440                  XOR K20K
01740   740200                  SZA             /AC = 0
01741   740040          E329    HALT            /ERROR: ADD=0 TO K20K FAILED
01742   741400                  SZL
01743   740040          E330    HALT            /ERROR: LINK NOT A ZERO, CARRY FAILED
                        /
                        /TEST AND K7S, AC = K10K, LINK = 0
01744   754001                  CLA!CMA!CLL     /AC = ONES, LINK = 0
01745   207437                  LAC K10K                /AC = 10K
01746   307454                  ADD K7S         /ONES
01747   507454                  AND K7S         /AC = 10K
01750   247437                  XOR K10K
01751   740200                  SZA             /AC = 0
01752   740040          E331    HALT            /ERROR: ADD=0 TO K10K FAILED
01753   741400                  SZL
01754   740040          E332    HALT            /ERROR: LINK NOT A ZERO, CARRY FAILED
                        /
                        /TEST ADD K7S, AC = K4K, LINK = 0
01755   754001                  CLA!CMA!CLL     /AC = ONES, LINK = 0
01756   207430                  LAC K4K         /AC = 4K
01757   307454                  ADD K7S         /ONES
01760   507454                  AND K7S         /AC = 4K
01761   247430                  XOR K4K
01762   740200                  SZA             /AC = 0
01763   740040          E333    HALT            /ERROR: ADD=0 TO K4K FAILED
01764   741400                  SZL
01765   740040          E334    HALT            /ERROR: LINK NOT A ZERO, CARRY FAILED
                        /
                        /TEST ADD K7S, AC = K2K, LINK = 0
01766   754001                  CLA!CMA!CLL     /AC = ONES, LINK = 0
01767   207426                  LAC K2K         /AC = 2K
01770   307454                  ADD K7S         /ONES
01771   507454                  AND K7S         /AC = 2K
01772   247426                  XOR K2K
01773   740200                  SZA             /AC = 0
01774   740040          E335    HALT            /ERROR: ADD=0 TO K2K2 FAILED
01775   741400                  SZL
01776   740040          E336    HALT            /ERROR: LINK NOT A ZERO, CARRY FAILED
                                .EJECT
```

```
                        /TEST ADD K7S, AC = K1K, LINK = 0
01777   754001                  CLA!CMA!CLL     /AC = ONES, LINK = 0
02000   207424                  LAC K1K         /AC = 1K
02001   307454                  ADD K7S         /ONES
02002   507454                  AND K7S         /AC = 1K
02003   247424                  XOR K1K
02004   740200                  SZA             /AC = 0
02005   740040          E337    HALT            /ERROR; ADD=0 TO K1K FAILED
02006   741400                  SZL
02007   740040          E338    HALT            /ERROR; LINK NOT A ZERO, CARRY FAILED
                        /
                        /TEST ADD K7S, AC = K400, LINK = 0
02010   754001                  CLA!CMA!CLL     /AC = ONES, LINK = 0
02011   207425                  LAC K400                /AC = 400
02012   307454                  ADD K7S         /ONES
02013   507454                  AND K7S         /AC = 400
02014   247425                  XOR K400
02015   740200                  SZA             /AC = 0
02016   740040          E339    HALT            /ERROR; ADD=0 TO K400 FAILED
02017   741400                  SZL
02020   740040          E340    HALT            /ERROR; LINK NOT A ZERO, CARRY FAILED
02021   447517                  ISZ WORK3               /CHECK DONE LOOPING
02022   601557                  JMP ADDAC               /LOOP
02023   106336                  JMS GENRAN              /GET NO. FOR NEXT LOOP
02024   106362                  JMS CKNO
                                .EJECT
```

```
                        /TEST ADD K7S, AC = K20, LINK = 0
02025   754001  ADDAC1  CLA!CMA!CLL       /AC = ONES, LINK = 0
02026   207421          LAC K20           /AC = 20
02027   307454          ADD K7S           /ONES
02030   507421          AND K20           /AC = 20
02031   247421          XOR K20
02032   740200          SZA               /AC = 0
02033   740040  E347    HALT              /ERROR;  ADD =0 TO K20 FAILED
02034   741400          SZL
02035   740040  E348    HALT              /ERROR; LINK NOT A ZERO, CARRY FAILED
                        /
                        /TEST ADD K7S, AC = K10, LINK = 0
02036   754001          CLA!CMA!CLL       /AC = ONES, LINK = 0
02037   207415          LAC K10           /AC = 10
02040   307454          ADD K7S           /ONES
02041   507454          AND K7S           /AC = 10
02042   247415          XOR K10
02043   740200          SZA               /AC = 0
02044   740040  E349    HALT              /ERROR; ADD = 0 TO K10 FAILED
02045   741400          SZL
02046   740040  E350    HALT              /ERROR; LINK NOT A ZERO CARRY FAILED
                        /
                        /TEST ADD K7S, AC = 4, LINK = 0
02047   754001          CLA!CMA!CLL       /AC = ONES, LINK = 0
02050   207414          LAC K4            /AC = 4
02051   307454          ADD K7S           /ONES
02052   507454          AND K7S           /AC = 4
02053   247414          XOR K4
02054   740200          SZA               /AC = 0
02055   740040  E351    HALT              /ERROR; ADD =0 TO K4 FAILED
02056   741400          SZL
02057   740040  E352    HALT              /ERROR; LINK NOT A ZERO, CARRY FAILED
                        /
                        /TEST ADD K7S, AC = K2, LINK = 0
02060   754001          CLA!CMA!CLL       /AC = ONES, LINK = 0
02061   207413          LAC K2            /AC = 2
02062   307454          ADD K7S           /ONES
02063   507454          AND K7S           /AC = 2
02064   247413          XOR K2
02065   740200          SZA               /AC = 0
02066   740040  E353    HALT              /ERROR; ADD =0 TO K2 FAILED
02067   741400          SZL
02070   740040  E354    HALT              /ERROR; LINK NOT A ZERO, CARRY FAILED
                        /
                        /TEST ADD K7S, AC = K1, LINK = 0
02071   754001          CLA!CMA!CLL       /AC = ONES, LINK = 0
02072   207412          LAC K1            /AC = 1
02073   307454          ADD K7S           /ONES
02074   507454          AND K7S           /AC = 1
02075   247412          XOR K1
02076   740200          SZA               /AC = 0
02077   740040  E355    HALT              /ERROR;  ADD =0 TO K1 FAILED
02100   741400          SZL
02101   740040  E356    HALT              /ERROR; LINK NOT A ZERO, CARRY FAILED
                        .EJECT
```

```
                        /TEST ADD K400K, AC = ONES, LINK = 0
02102   744000                  CLL             /LINK = 0
02103   777777                  LAW 17777               /AC = ONES
02104   507454                  AND K7S         /AC = ONES
02105   307435                  ADD K400K               /400K
02106   247435                  XOR K400K
02107   740200                  SZA             /AC = 0
02110   740040          E357    HALT            /ERROR: ADD K400K TO  -0 FAILED
02111   741400                  SZL
02112   740040          E358    HALT            /ERROR: LINK NOT A ZERO, CARRY FAILED
                        /
                        /TEST ADD K200K, AC = ONES, LINK = 1
02113   744002                  CLL!CML         /LINK = 1
02114   777777                  LAW 17777               /AC = ONES
02115   507454                  AND K7S         /AC = ONES
02116   307441                  ADD K200K               /200K
02117   247441                  XOR K200K
02120   740200                  SZA             /AC = 0
02121   740040          E359    HALT            /ERROR: ADD K200K TO -0 FAILED
02122   740400                  SNL
02123   740040          E360    HALT            /ERROR: LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K100K, AC = ONES, LINK = 1
02124   744002                  CLL!CML         /LINK = 1
02125   777777                  LAW 17777               /AC = ONES
02126   507454                  AND K7S         /AC = ONES
02127   307343                  ADD K100K               /100K
02130   247343                  XOR K100K
02131   740200                  SZA             /AC = 0
02132   740040          E361    HALT            /ERROR: ADD K100K TO -0 FAILED
02133   740400                  SNL
02134   740040          E362    HALT            /ERROR: LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K40K, AC = ONES, LINK = 1
02135   744002                  CLL!CML         /LINK = 1
02136   777777                  LAW 17777               /AC = ONES
02137   507454                  AND K7S         /AC = ONES
02140   307434                  ADD K40K                /40K
02141   247434                  XOR K40K
02142   740200                  SZA             /AC = 0
02143   740040          E363    HALT            /ERROR: ADD K40K TO -0 FAILED
02144   740400                  SNL
02145   740040          E364    HALT            /ERROR: LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K20K, AC = ONES, LINK = 1
02146   744002                  CLL!CML         /LINK = 1
02147   777777                  LAW 17777               /AC = ONES
02150   507454                  AND K7S         /AC = ONES
02151   307440                  ADD K20K                /20K
02152   247440                  XOR K20K
02153   740200                  SZA             /AC = 0
02154   740040          E365    HALT            /ERROR: ADD K20K TO -0 FAILED
02155   740400                  SNL
02156   740040          E366    HALT            /ERROR: LINK NOT A ONE, LINK RESET
                        /PDP-15 BASIC EXERCISER - TAPE 3
```

```
                        /TEST ADD K10K, AC = ONES, LINK = 1
02157   744002                  CLL!CML         /LINK = 1
02160   777777                  LAW 17777               /AC = ONES
02161   507454                  AND K7S         /AC = ONES
02162   307437                  ADD K10K                /10K
02163   247437                  XOR K10K
02164   740200                  SZA             /AC = 0
02165   740040          E367    HALT            /ERROR; ADD K10, TO -0 FAILED
02166   740400                  SNL
02167   740040          E368    HALT            /ERROR; LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K4K, AC = ONES, LINK = 1
02170   744002                  CLL!CML         /LINK = 1
02171   777777                  LAW 17777               /AC = ONES
02172   507454                  AND K7S         /AC = ONES
02173   307430                  ADD K4K         /4K
02174   247430                  XOR K4K
02175   740200                  SZA             /AC = 0
02176   740040          E369    HALT            /ERROR; ADD K4K TO -0 FAILED
02177   740400                  SNL
02200   740040          E370    HALT            /ERROR; LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K2K, AC = ONES, LINK = 1
02201   744002                  CLL!CML         /LINK = 1
02202   777777                  LAW 17777               /AC = ONES
02203   507454                  AND K7S         /AC = ONES
02204   307426                  ADD K2K         /2K
02205   247426                  XOR K2K
02206   740200                  SZA             /AC = 0
02207   740040          E371    HALT            /ERROR; AC K2K TO -0 FAILED
02210   740400                  SNL
02211   740040          E372    HALT            /ERROR; LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K1K, AC = ONES, LINK = 1
02212   744002                  CLL!CML         /LINK = 1
02213   777777                  LAW 17777               /AC = ONES
02214   507454                  AND K7S         /AC = ONES
02215   307424                  ADD K1K         /1K
02216   247424                  XOR K1K
02217   740200                  SZA             /AC = 0
02220   740040          E373    HALT            /ERROR; ADD K1K TO -0 FAILED
02221   740400                  SNL
02222   740040          E374    HALT            /ERROR; LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K400, AC = ONES, LINK = 1
02223   744002                  CLL!CML         /LINK = 1
02224   777777                  LAW 17777               /AC = ONES
02225   507454                  AND K7S         /AC = ONES
02226   307425                  ADD K400                /400
02227   247425                  XOR K400
02230   740200                  SZA             /AC = 0
02231   740040          E375    HALT            /ERROR; ADD K400 TO -0 FAILED
02232   740400                  SNL
02233   740040          E376    HALT            /ERROR; LINK NOT A ONE, LINK RESET
                        .EJECT
```

```
                        /TEST ADD K200, AC = ONES, LINK = 1
02234   744002                  CLL!CML         /LINK = 1
02235   777777                  LAW 17777               /AC = ONES
02236   507454                  AND K7S         /AC = ONES
02237   307432                  ADD K200                /200
02240   247432                  XOR K200
02241   740200                  SZA             /AC = 0
02242   740040          E377    HALT            /ERROR; ADD K200 TO =0 FAILED
02243   740400                  SNL
02244   740040          E378    HALT            /ERROR; LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K100, AC = ONES, LINK = 1
02245   744002                  CLL!CML         /LINK = 1
02246   777777                  LAW 17777               /AC = ONES
02247   507454                  AND K7S         /AC = ONES
02250   307420                  ADD K100                /100
02251   247420                  XOR K100
02252   740200                  SZA             /AC = 0
02253   740040          E379    HALT            /ERROR; ADD K100 TO =0 FAILED
02254   740400                  SNL
02255   740040          E380    HALT            /ERROR; LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K40, AC = ONES, LINK = 1
02256   744002                  CLL!CML         /LINK = 1
02257   777777                  LAW 17777               /AC = ONES
02260   507454                  AND K7S         /AC = ONES
02261   307423                  ADD K40         /40
02262   247423                  XOR K40
02263   740200                  SZA             /AC = 0
02264   740040          E381    HALT            /ERROR; ADD K40 TO =0 FAILED
02265   740400                  SNL
02266   740040          E382    HALT            /ERROR; LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K20, AC = ONES, LINK = 1
02267   744002                  CLL!CML         /LINK = 1
02270   777777                  LAW 17777               /AC = ONES
02271   507454                  AND K7S         /AC = ONES
02272   307421                  ADD K20         /20
02273   247421                  XOR K20
02274   740200                  SZA             /AC = 0
02275   740040          E383    HALT            /ERROR; ADD K20 TO =0 FAILED
02276   740400                  SNL
02277   740040          E384    HALT            /ERROR; LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K10, AC = ONES, LINK = 1
02300   744002                  CLL!CML         /LINK = 1
02301   777777                  LAW 17777               /AC = ONES
02302   507454                  AND K7S         /AC = ONES
02303   307415                  ADD K10
02304   247415                  XOR K10
02305   740200                  SZA             /AC = 0
02306   740040          E385    HALT            /ERROR; ADD K10 TO =0 FAILED
02307   740400                  SNL
02310   740040          E386    HALT            /ERROR; LINK NOT A ONE, LINK RESET
                                .EJECT
```

```
                        /TEST ADD K4, AC = ONES, LINK = 1
02311   744002                  CLL!CML         /LINK = 1
02312   777777                  LAW 17777               /AC = ONES
02313   507454                  AND K7S         /AC = ONES
02314   307414                  ADD K4          /4
02315   247414                  XOR K4
02316   740200                  SZA             /AC = 0
02317   740040          E387    HALT            /ERROR; ADD K4 TO -0 FAILED
02320   740400                  SNL
02321   740040          E388    HALT            /ERROR; LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K2, AC = ONES, LINK = 1
02322   744002                  CLL!CML         /LINK = 1
02323   777777                  LAW 17777               /AC = ONES
02324   507454                  AND K7S         /AC = ONES
02325   307413                  ADD K2          /2
02326   247413                  XOR K2
02327   740200                  SZA             /AC = 0
02330   740040          E389    HALT            /ERROR; ADD K2 TO -0 FAILED
02331   740400                  SNL
02332   740040          E390    HALT            /ERROR; LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K1, AC = ONES, LINK = 1
02333   744002                  CLL!CML         /LINK = 1
02334   777777                  LAW 17777               /AC = ONES
02335   507454                  AND K7S         /AC = ONES
02336   307412                  ADD K1          /1
02337   247412                  XOR K1
02340   740200                  SZA             /AC = 0
02341   740040          E391    HALT            /ERROR; ADD K1 TO -0 FAILED
02342   740400                  SNL
02343   740040          E392    HALT            /ERROR; LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD K7S, AC = ONES, LINK = 0
02344   744000                  CLL             /LINK = 0
02345   207454                  LAC K7S         /AC = ONES
02346   307454                  ADD K7S         /ONES
02347   740001                  CMA             /AC = ONES
02350   740200                  SZA             /AC = 0
02351   740040          E393    HALT            /ERROR; ADD K7S TO ALL ONES FAILED
02352   741400                  SZL
02353   740040          E394    HALT            /ERROR; LINK NOT A ONE, LINK RESET
                        /
                        /TEST ADD 525253, AC = 252525, LINK = 1
02354   744002                  CLL!CML         /LINK = 1
02355   207466                  LAC K010                /AC = 252525
02356   307470                  ADD K53         /525253
02357   247412                  XOR K1          /000001
02360   740200                  SZA             /AC = 0
02361   740040          E395    HALT            /ERROR; ADD K5253 TO K5252 FAILED
02362   740400                  SNL
02363   740040          E396    HALT            /ERROR; LINK NOT A ONE, LINK RESET
                                .EJECT
```

```
                        /TEST ADD 252525, AC = 525253, LINK RESET
02364   744000                  CLL             /LINK = 0
02365   207470                  LAC K53         /AC = 525253
02366   307466                  ADD K010                /252525
02367   247412                  XOR K1          /000001
02370   740200                  SZA             /AC = 0
02371   740040          E397    HALT            /ERROR: ADD K2525 TO K5253 FAILED
02372   741400                  SZL
02373   740040          E398    HALT            /ERROR: LINK NOT A ZERO, CARRY FAILED
                        /
                        /TEST ADD SERIES
02374   754000                  CLA!CLL         /LINK = 0, AC = 0
02375   307446                  ADD K1S         /AC = 111111
02376   307447                  ADD K2S         /AC = 333333
02377   307450                  ADD K3S         /AC = 666666
02400   307451                  ADD K4S         /AC = 333333, LINK = 1
02401   307452                  ADD K5S         /AC = 111111
02402   307453                  ADD K6S         /AC = 777777
02403   307454                  ADD K7S         /AC = 777777
02404   740001                  CMA             /AC = 0
02405   740200                  SZA
02406   740040          E399    HALT            /ERROR: ADD SERIES FAILED
02407   740400                  SNL
02410   740040          E400    HALT            /ERROR: LINK NOT A 1
02411   447517                  ISZ WORK3               /CHECK DONE LOOPING
02412   602025                  JMP ADDAC1              /LOOP
02413   106336                  JMS GENRAN      /GET NO. FOR NEXT LOOP
02414   106362                  JMS CKNO
                                .EJECT
```

```
                        /ADD RANDOM PAIRS TEST
                        /
02415   106336  RANADD  JMS GENRAN              /GET RANDOM NUMBER
02416   741100          SPA                 /+ NO
02417   740001          CMA                 /= MAKE IT +
02420   741200          SNA                 /0 NOT ALLOWED
02421   602415          JMP RANADD
02422   043051          DAC APOS                    /IT IS + A
02423   740001          CMA                 /1 COMPLEMENT
02424   043052  MINUSA  DAC ANEG                    /IT IS -A
02425   106336          JMS GENRAN                  /GET NEXT RANDOM
02426   741100          SPA                 /+ NO
02427   740001          CMA                 /= MAKE +
02430   741200          SNA                 /0 NOT ALLOWED
02431   602425          JMP MINUSA+1
02432   043053          DAC BPOS                    /IT IS + B
02433   740001          CMA                 /MAKE 1'S COMP
02434   043054  MINUSB  DAC BNEG                    /IT IS - B
02435   777777          LAW -1
02436   043062          DAC PASS2
02437   744000          CLL
02440   203054          LAC BNEG                    /RESTART HERE TO REGENERATE NEW COMPARES
02441   343052          TAD ANEG                    /-B -A
02442   741400          SEL                 /EOC IF ADD
02443   347412          TAD K1              /YES MAKE CARRY
02444   043055  MINSAB  DAC SUMNEG         /SAVE -A -B
                        /
                        /NOW GENERATE A + B
02445   203051          LAC APOS                    /GET +A
02446   744000          CLL
02447   343053          TAD BPOS                    /+B
02450   741400          SEL                 /EOC IF ADD
02451   347412          TAD K1              /YES ADD CARRY
02452   043056  APLUSB  DAC SUMPOS
                        .EJECT
```

```
                        /NOW GENERATE B-A
02453   203053                  LAC BPOS                /GET B
02454   744000                  CLL
02455   343052                  TAD ANEG                /B-A
02456   741400                  SZL             /EOC
02457   347412                  TAD K1          /YES ADD CARRY
02460   043057          BMINSA  DAC BMASUM       /SAVE B-A
                        /
                        /NOW GENERATE A-B
02461   203051                  LAC APOS                /GET A
02462   744000                  CLL
02463   343054                  TAD BNEG                /-B
02464   741400                  SZL             /EOC
02465   347412                  TAD K1          /YES ADD CARRY
02466   043060          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
                        /
02467   203056                  LAC SUMPOS              /GET A+B
02470   751100                  SPA!CLA         /STILL POS RESULT
02471   207537                  LAC KSNL                /NEG RESULT IS OVERFLOW
02472   741200                  SNA             /AC = SNL IS OVERFLOW
02473   207536                  LAC KSZL                /+ RESULT IS NO OVERFLOW
02474   042517                  DAC OFLCK1              /SET UP ALL OFLOW
02475   042545                  DAC OFLCK3              /TESTS WHERE OFLOW
02476   042662                  DAC OFLCH1              /MAY OR MAY NOT OCCUR
02477   042677                  DAC OFLCH2              /AC = SNL IS A+B OFLOW
02500   042715                  DAC OFLCH3              /AC = SZL IS A+B NOT OFLOW
02501   042734                  DAC OFLCH4              /IF A+B OFLOW -A-B DOES ALSO
02502   042754                  DAC OFLCH5              /IF A+B NOT OFLOW
02503   042775                  DAC OFLCH6              /THEN NONE OF THESE
02504   043017                  DAC OFLCH7              /ADDS CAN OVERFLOW
02505   042573                  DAC OFLCK5
02506   042621                  DAC OFLCK7
                                .EJECT
```

```
                    /NOW DO A COMPLETE SERIES OF
                    /ONES COMP ADDITIONS
                    /SHOULD GET THE SAME RESULTS AS
                    /THE TAD'S WITH EOC TAD (1
                    /
                    /FIRST TEST A+B
                    /
02507   744000      APLSBT  CLL             /FOR OVERFLOW CHECK
02510   203051              LAC APOS                /GET A
02511   303053              ADD BPOS                /A+B
02512   543056              SAD SUMPOS      /SHOULD = PREVIOUS A+B
02513   602517              JMP .+4         /OK
02514   740040      E401    HLT             /DISPLAY 1'S A+B
02515   203056              LAC SUMPOS      /GET 2'S COMP GEN
02516   740040              HLT             /DISPLAY 2'S A+B
02517   741400      OFLCK1  SZL             /OR SNL IF OVERFLOW
02520   740040      E402    HLT             /LINK OR OVERFLOW FAILED
02521   762507              LAW APLSBT              /MAKE JUMP FOR SCOPE LOOP
                    .EJECT
```

```
                        /2ND TEST -B+A
    02522   744000      AMNSBT  CLL
    02523   203054              LAC BNEG                /GET A
    02524   303051              ADD APOS                /A-B
    02525   543060              SAD AMBSUM      /SHOULD = PREVIOUS A-B
    02526   602532              JMP .+4         /OK
    02527   740040      E403    HLT             /DISPLAY 1'S A=B
    02530   203060              LAC AMBSUM
    02531   740040              HLT             /DISPLAY 2'S A=B
    02532   741400      OFLCK2  SZL             /SHOULD NOT OVERFLOW
    02533   740040      E404    HLT
    02534   762522              LAW AMNSBT              /MAKE JMP FOR SCOPE
                        /
                        /NOW 3RD TEST IS -A -B
    02535   744000      MAPLMB  CLL
    02536   203052              LAC ANEG                /GET -A
    02537   303054              ADD BNEG                /PLS -B
    02540   543055              SAD SUMNEG      /SHOULD = PREVIOUS -A-B
    02541   602545              JMP .+4         /OK
    02542   740040      E405    HLT             /DISPLAY 1'S -A-B
    02543   203055              LAC SUMNEG
    02544   740040              HLT             /DISPLAY 2'S -A-B
    02545   741400      OFLCK3  SZL             /OR SNL
    02546   740040      E406    HLT             /LINK FAILED
    02547   762535              LAW MAPLMB              /MAKE JMP FOR SCOPE
                        /
                        /FOURTH TEST IN THIS SERIES
                        /IS TEST B=A
    02550   744000      BMNSAT  CLL
    02551   203053              LAC BPOS                /GET B
    02552   303052              ADD ANEG                /ADD -A
    02553   543057              SAD BMASUM      /SHOULD = PREVIOUS B=A
    02554   602560              JMP .+4         /OK
    02555   740040              HLT             /DISPLAY 1'S B=A
    02556   203057              LAC BMASUM
    02557   740040              HLT             /DISPLAY 2'S B=A
    02560   741400              SZL             /CAN NOT OVERFLOW
    02561   740040              HLT             /OVERFLOW FAILED
    02562   762550              LAW BMNSAT              /MAKE JMP FOR SCOPE
                        .EJECT
```

```
                        /FIFTH TEST IN THIS SERIES
                        /IS TEST (A+B)-A = B
02563   744000  ABMATS  CLL
02564   203056          LAC SUMPOS
02565   303052          ADD ANEG
02566   543053          SAD BPOS
02567   602573          JMP .+4
02570   740040  E407    HLT
02571   203053          LAC BPOS
02572   740040          HLT
02573   741400  OFLCK5  SZL             /CAN OVERFLOW SNL IF A+B OVERFLOW
02574   740040  E408    HLT             /ILLEGAL LINK
02575   762563          LAW ABMATS              /MAKE JMP FOR SCOPE
                        /
                        /SIXTH TEST IN THIS SERIES
                        /IS TEST (B-A)-B = -A
02576   744000  BMAMBT  CLL
02577   203057          LAC BMASUM
02600   303054          ADD BNEG
02601   543052          SAD ANEG
02602   602606          JMP .+4
02603   740040  E409    HLT
02604   203052          LAC ANEG
02605   740040          HLT
02606   741400  OFLCK6  SZL             /CAN NOT OVERFLOW
02607   740040  E410    HLT
02610   762576          LAW BMAMBT              /MAKE JMP FOR SCOPE
                        /
                        /SEVENTH TEST IN THIS SERIES
                        /IS (-A-B)+A = -B
02611   744000  MABPAT  CLL
02612   203055          LAC SUMNEG
02613   303051          ADD APOS
02614   543054          SAD BNEG
02615   602621          JMP .+4
02616   740040  E411    HLT
02617   203054          LAC BNEG
02620   740040          HLT
02621   741400  OFLCK7  SZL             /CAN BE OVERFLOW IF A+B OVERFLOW THEN IS SNL
02622   740040  E412    HLT             /ILLEGAL LINK
02623   762611          LAW MABPAT              /MAKE JMP FOR SCOPE
                        .EJECT
```

```
                        /EIGHTH TEST OF THE SERIES
                        /IS (A-B) +B = A
02624   744000  AMBPBT  CLL
02625   203060          LAC AMBSUM
02626   303053          ADD BPOS
02627   543051          SAD APOS
02630   602634          JMP .+4
02631   740040  E413    HLT
02632   203051          LAC APOS
02633   740040          HLT
02634   741400  OFLCK8  SZL             /CAN NOT OVERFLOW
02635   740040  E414    HLT
02636   762624          LAW AMBPBT              /MAKE JMP FOR SCOPE
                        /
                        /9TH TEST OF SERIES
                        /NOW TEST AC = 777777 + A = A
                        /
02637   754001  M0ACPA  CLL!CLA!CMA     /SET AC = 777777
02640   303051          ADD APOS                /+ A
02641   543051          SAD APOS                /SHOULD = A
02642   602646          JMP .+4         /TEST LINK
02643   740040  E415    HLT             /FAILED RESULTS
02644   203051          LAC APOS
02645   740040          HLT             /DISPLAY A
02646   741400  OFLCK9  SZL             /CANNOT OVERFLOW
02647   740040  E416    HLT             /OVERFLOW FAILED L = 1
02650   762637          LAW M0ACPA              /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 APLSBT OR M0ACPA
                        /NOW TRY A+B-A = B
02651   754001  SERS01  CLL!CLA!CMA
02652   303051          ADD APOS
02653   303053          ADD BPOS
02654   303052          ADD ANEG
02655   543053          SAD BPOS
02656   602662          JMP .+4
02657   740040  E417    HLT
02660   203053          LAC BPOS
02661   740040          HLT
02662   741400  OFLCH1   SZL             /OR SNL IF A+B OVERFLOW
02663   740040  E418    HLT             /LINK FAILURE
02664   762651          LAW SERS01              /MAKE JMP FOR SCOPE
                        /
                        /HAVE TESTED B-A PREVIOUS
                        /SEE BMNSAT FOR SHORTER TEST
                        /NOW TRY A+B-A-A = B-A
02665   754001  SERS02  CLL!CLA!CMA
02666   303051          ADD APOS
02667   303053          ADD BPOS
02670   303052          ADD ANEG
02671   303052          ADD ANEG
02672   543057          SAD BMASUM
02673   602677          JMP .+4
02674   740040  E419    HLT
02675   203057          LAC BMASUM
02676   740040          HLT
02677   740400  OFLCH2   SNL             /OR SZL IF NO OVERFLOW
02700   740040  E420    HLT
02701   762665          LAW SERS02              /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
02702   754001          SERS03  CLL!CLA!CMA
02703   303051                  ADD APOS
02704   303053                  ADD BPOS
02705   303052                  ADD ANEG
02706   303052                  ADD ANEG
02707   303054                  ADD BNEG
02710   543052                  SAD ANEG
02711   602715                  JMP .+4
02712   740040          E421    HLT
02713   203052                  LAC ANEG
02714   740040                  HLT
02715   741400          OFLCH3  SZL             /SNL IF A+B OVERFLOW
02716   740040          E422    HLT             /OVERFLOW FAILED
02717   762702                  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
02720   754001          SERS04  CLL!CLA!CMA
02721   303051                  ADD APOS
02722   303053                  ADD BPOS
02723   303052                  ADD ANEG
02724   303052                  ADD ANEG
02725   303054                  ADD BNEG
02726   303054                  ADD BNEG
02727   543055                  SAD SUMNEG
02730   602734                  JMP .+4
02731   740040          E423    HLT
02732   203055                  LAC SUMNEG
02733   740040                  HLT
02734   741400          OFLCH4  SZL             /SNL IF A+B OVERFLOW
02735   740040          E424    HLT             /OVERFLOW FAILED OR LINK FAILED
02736   762720                  LAW SERS04              /MAKE JMP FOR SCOPE LOOP
                                .EJECT
```

```
                        /HAVE TESTED (-A-B)*A = -B NOW A*B-A-A-B-B*A = -B
                        /USE MABPAT FOR SHORTER TEST
02737   754001  SERS05  CLL!CLA!CMA
02740   303051          ADD APOS
02741   303053          ADD BPOS
02742   303052          ADD ANEG
02743   303052          ADD ANEG
02744   303054          ADD BNEG
02745   303054          ADD BNEG
02746   303051          ADD APOS
02747   543054          SAD BNEG
02750   602754          JMP .+4
02751   740040  E425    HLT
02752   203054          LAC BNEG
02753   740040          HLT
02754   740400  OFLCH5   SNL             /OR SZL IF A*B DO NOT OVERFLOW
02755   740040  E426    HLT             /LINK OR OVERFLOW FAILED
02756   762737          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
02757   754001  SERS06  CLL!CLA!CMA
02760   303051          ADD APOS
02761   303053          ADD BPOS
02762   303052          ADD ANEG
02763   303052          ADD ANEG
02764   303054          ADD BNEG
02765   303054          ADD BNEG
02766   303051          ADD APOS
02767   303051          ADD APOS
02770   543060          SAD AMBSUM
02771   602775          JMP .+4
02772   740040  E427    HLT
02773   203060          LAC AMBSUM
02774   740040          HLT
02775   741400  OFLCH6   SZL             /OR SNL IF A*B OVERFLOW
02776   740040  E428    HLT             /OVERFLOW OR LINK FAILED
02777   762757          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 FST
03000   754001  SERS07  CLL!CLA!CMA
03001   303051          ADD APOS
03002   303053          ADD BPOS
03003   303052          ADD ANEG
03004   303052          ADD ANEG
03005   303054          ADD BNEG
03006   303054          ADD BNEG
03007   303051          ADD APOS
03010   303051          ADD APOS
03011   303053          ADD BPOS
03012   543051          SAD APOS
03013   603017          JMP .+4
03014   740040  E429     HLT
03015   203051          LAC APOS
03016   740040          HLT
03017   742400  OFLCH7   SNL                 /OR SZL IF A+B NOT OVERFLOW
03020   740040  E430     HLT                 /LINK OR OVERFLOW FAILED
03021   763000          LAW SERS07                  /MAKE JMP FOR SCOPE LOOP
                        /
                        /AFTER ONE PASS
                        /MAKE ALL B CONSTANTS A
                        /AND MAKE ALL A CONSTANTS B
                        /
03022   443062  CONCHG  ISZ PASS2                   /2ND PASS
03023   603044          JMP CKLP                    /YES DONE 2ND
03024   203051          LAC APOS                    /A
03025   043053          DAC BPOS                    /IS NOW B
03026   203054          LAC BNEG                    /BNEG
03027   043052          DAC ANEG                    /IS ANEG
03030   740001          CMA
03031   043051          DAC APOS                    /B IS A
03032   203053          LAC BPOS
03033   740001          CMA                 /ANEG
03034   043054          DAC BNEG                    /IS  NEG
03035   203057          LAC BMASUM
03036   040010          DAC 10
03037   203060          LAC AMBSUM                  /A=B
03040   043057          DAC BMASUM                  /IS NOW A=B
03041   200010          LAC 10              /B=A
03042   043060          DAC AMBSUM                  /IS NOW A=B
03043   602507          JMP APLSBT                  /OVERFLOW SERUP
                        .EJECT
```

```
03044  447517   CKLP   ISZ WORK3              /CHECK DONE LOOPING
03045  602415          JMP RANADD             /LOOP
03046  106336          JMS GENRAN             /GET NO. FOR NEXT LOOP
03047  106362          JMS CKNO
03050  603063          JMP ADEOON
                /
                /
03051  000000   APOS   0        /A
03052  000000   ANEG   0        /-A
03053  000000   BPOS   0        /B
03054  000000   BNEG   0        /-B
03055  000000   SUMNEG 0        /-A+(-B)
03056  000000   SUMPOS 0        /A+B
03057  000000   BMASUM 0        /B+(-A)
03060  000000   AMBSUM 0        /A+(-B)
                /
03061  000000   MSKBIT 0
                .EJECT
```

```
03062   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
                        /
03063   106336          ADEDON  JMS GENRAN              /GET RANDOM NUMBER
03064   043051                  DAC APOS                /SAVE IT
03065   740001                  CMA             /MAKE ONES COMPLEMENT
03066   043052                  DAC ANEG                /AND SAVE IT
                        /
                        /THE FIRST BIT TO BE ALTERED IS 0 THEN CONTINUE TO 17
03067   207435                  LAC K400K
03070   043061                  DAC MSKBIT
                        /
                        /SET UP NEXT BIT TO TEST = ALTERED NUMBER GOES TO BPOS
03071   203051          BISETU  LAC APOS
03072   503061                  AND MSKBIT
03073   740200                  SZA             /DOES APOS BIT = 0
03074   603103                  JMP MODNEG              /NO ALTER ANEG
03075   203051                  LAC APOS
03076   243061                  XOR MSKBIT
03077   043053                  DAC BPOS                /MODIFIED NUMBER GOES TO APOS
03100   203052                  LAC ANEG
03101   043054                  DAC BNEG                /UNMOD NUMBER GOES TO BNEG
03102   603110                  JMP BITTS1
                        /
                        /THE ONES COMP NUMBER HAS THE 0 BIT MODIFY IT
03103   203052          MODNEG  LAC ANEG
03104   243061                  XOR MSKBIT
03105   043053                  DAC BPOS                /MOD NUMBER TO BPOS
03106   203051                  LAC APOS
03107   043054                  DAC BNEG                /UNMOD NUMBER TO BNEG
                        /
                        /COMPLEMENTED BIT TEST1 (AC) = MODIFIED NUMBER AT ADD
                        /
03110   744000          BITTS1  CLL
03111   203053                  LAC BPOS                /GET MODIFIED NUMBER
03112   303054                  ADD BNEG                /ADD UNMODIFIED
03113   543061                  SAD MSKBIT              /RESULT SHOULD = BIT CHANGED
03114   603120                  JMP .+4
03115   740040          E431    HLT             /DISPLAY INCORRECT RESULTS
03116   203061                  LAC MSKBIT
03117   740040                  HLT             /DISPLAY BIT ALTERED AND EXP
03120   741400          OFLCH8  SZL             /NO OVERFLOW
03121   740040          E432    HLT             /OVERFLOW NOT ALLOWED
03122   763110                  LAW BITTS1              /MAKE JMP FOR SCOPE LOOP
                                ,EJECT
```

```
                        /COMP BIT TEST 2 (MB) = MODIFIED NUMBER AT ADD
                        /
03123   744000  BITTS2  CLL
03124   203054          LAC BNEG                /GET UNMODIFIED NUMBER
03125   303053          ADD BPOS                /ADD MODIFIER
03126   543061          SAD MSKBIT              /RESULT SHOULD = BIT CHANGED
03127   603133          JMP .+4         /OK
03130   740040  E433    HLT             /DISPLAY INCORRECT RESULTS
03131   203061          LAC MSKBIT
03132   740040          HLT             /DISPLAY BIT ALTERED AND EXP
03133   741400  OFLCH9  SZL             /SHOULD NOT OVERFLOW
03134   740040  E434    HLT
03135   763123          LAW BITTS2              /MAKE JMP FOR SCOPE LOOP
                        /
                        /POSITION MASK BIT OVER 1 PLACE
                        /IF 17 HAS BEEN DONE CONTINUE
                        /
03136   203061          LAC MSKBIT              /GET LAST
03137   744020          RCR             /POSITION
03140   043061          DAC MSKBIT              /SAVE
03141   740200          SZA             /DONE ALL BITS
03142   603071          JMP BISETU              /DO FOR NEXT BIT
                        /
                        /END OF TEST SEQUENCE
                        /
03143   447517          ISZ WORK3               /CHECK DONE LOOPING
03144   603063          JMP ADEDON              /LOOP
03145   106336          JMS GENRAN              /GET NO. FOR NEXT LOOP
03146   106362          JMS CKNO
03147   750004          LAS             /CHECK FOR CONTINUOUS LOOP
03150   742010          RTL             /CK ACS 2
03151   741100          SPA
03152   602415          JMP RANADD              /LOOP
                        /PDP-15 BASIC EXERCISER - TAPE 4
                        /TEST SAD
                        /
03153   207411  SADAC   LAC K0          /AC = 0
03154   547411          SAD K0
03155   741000          SKP
03156   740040  E435    HALT            /ERROR, SAD K0 SKIPPED
                        /
03157   207411          LAC K0          /AC = 0
03160   547454          SAD K7S
03161   740040  E436    HALT            /ERROR, SAD K7S FAILED TO SKIP
                        /
03162   207454          LAC K7S         /AC = 1'S
03163   547411          SAD K0
03164   740040  E437    HALT            /ERROR, SAD K0 FAILED TO SKIP
                        /
03165   207454          LAC K7S         /AC = 1'S
03166   547454          SAD K7S
03167   741000          SKP
03170   740040  E438    HALT            /ERROR, SAD K7S SKIPPED
                        /
                        /SAD, TAD
```

```
                        /
03171   750000          CLA             /AC = 0
03172   347411          TAD K0
03173   547411          SAD K0
03174   741000          SKP
03175   740040  E439    HALT            /ERROR, SAD K0 SKIPPED
                        /
03176   750000          CLA             /AC = 0
03177   347411          TAD K0
03200   547454          SAD K7S
03201   740040  E440    HALT            /ERROR, SAD K7S FAILED TO SKIP
                        /
03202   750000          CLA             /AC = 0
03203   347454          TAD K7S
03204   547411          SAD K0
03205   740040  E441    HALT            /ERROR, SAD K0 FAILED TO SKIP
                        /
03206   750000          CLA             /AC = 0
03207   347454          TAD K7S
03210   547454          SAD K7S
03211   741000          SKP
03212   740040  E442    HALT            /ERROR, SAD K7S SKIPPED
                        /
                        .EJECT
```

```
                        /SEQUENTIAL SAD
                        /
03213   207411                  LAC K0          /AC = 0
03214   547454                  SAD K7S
03215   760001                  LAW 1           /760001
03216   547454                  SAD K7S
03217   760002                  LAW 2           /760002
03220   547454                  SAD K7S
03221   760004                  LAW 4           /760004
03222   547454                  SAD K7S
03223   760010                  LAW 10          /760010
03224   547454                  SAD K7S
03225   760020                  LAW 20          /760020
03226   547454                  SAD K7S
03227   760040                  LAW 40          /760040
03230   740200                  SZA
03231   740040          E443    HALT            /ERROR,  AC NT 0,  CONTENTS OF
                                                /AC = LAST SAD THAT FAILED
                        /
                        /TEST SAD, SKP SERIES
                        /
03232   750000                  CLA             /AC = 0
03233   547454                  SAD K7S
03234   760001                  LAW 1           /760001
03235   741000                  SKP
03236   760002                  LAW 2           /760002
03237   547454                  SAD K7S
03240   760004                  LAW 4           /760004
03241   741000                  SKP
03242   760010                  LAW 10          /760010
03243   547454                  SAD K7S
03244   760020                  LAW 20          /760020
03245   741000                  SKP
03246   760040                  LAW 40          /760040
03247   740200                  SZA
03250   740040          E444    HALT            /ERROR, AC NOT 0, CONTSNTS
                                                /OF AC = LAST SAD OR SKP
                        /
03251   447517                  ISZ WORK3               /CHECK DONE LOOPING
03252   603153                  JMP SADAC               /LOOP
03253   106336                  JMS GENRAN      /GET NO, FOR NEXT LOOP
03254   106362                  JMS CKNO
                        /
                                .EJECT
```

```
                        /TEST DZM
                        /
03255   207533  DZMAC   LAC KHALT               /AC = 740040
03256   151111          DZM 11111               /ADDR 1111 OR 01111
03257   211111          LAC 11111
03260   740200          SZA
03261   740040  E445    HALT                    /ERROR, DZM FAILED AT 11111
                                                /OR 01111
                        /
03262   207533          LAC KHALT               /AC = 740040
03263   152222          DZM 12222
03264   212222          LAC 12222
03265   740200          SZA
03266   740040  E446    HALT                    /ERROR, DZM FAILED AT 1222 OR
                                                /02222
                        /
03267   207533          LAC KHALT               /AC = 740040
03270   153333          DZM 13333
03271   213333          LAC 13333
03272   740200          SZA
03273   740040  E447    HALT                    /ERROR, DZM FAILED AT 13333 OR
                                                /03333
                        /
03274   207533          LAC KHALT               /AC = 740040
03275   154444          DZM 14444
03276   214444          LAC 14444
03277   740200          SZA
03300   740040  E448    HALT                    /ERROR,  DZM FAILED AT 14444
                                                /OR 04444
                        /
03301   207533          LAC KHALT               /AC = 740040
03302   155555          DZM 15555
03303   215555          LAC 15555
03304   740200          SZA
03305   740040  E449    HALT                    /ERROR,  DZM FAILED AT 15555
                                                /OR 05555
                        /
03306   207533          LAC KHALT               /AC = 740040
03307   156666          DZM 16666
03310   216666          LAC 16666
03311   740200          SZA
03312   740040  E450    HALT                    /ERROR,  DZM FAILED AT 16666
                                                /OR 06666
                        /
03313   207533          LAC KHALT               /AC = 740040
03314   157777          DZM 17777
03315   217777          LAC 17777
03316   740200          SZA
03317   740040  E451    HALT                    /ERROR, DZM FAILED AT 17777
                                                /OR 07777
                        .EJECT
```

```
                        /
03320   207533          LAC KHALT               /AC = 740040
03321   152525          DZM 12525
03322   212525          LAC 12525
03323   740200          SZA
03324   740040  E452    HALT            /ERROR,  DZM FAILED AT 12525
                                /OR 02525
                        /
03325   207533          LAC KHALT               /AC = 740040
03326   155252          DZM 15252
03327   215252          LAC 15252
03330   740200          SZA
03331   740040  E453    HALT            /ERROR,  DZM FAILED AT 15252 OR 05252
                        /
                        /
                        /TEST AC AFTER A DZM
                        /
03332   207454          LAC K7S         /AC = 777777
03333   157777          DZM 17777
03334   740001          CMA
03335   740200          SZA
03336   740040  E454    HALT            /ERROR, AC CHANGED AFTER A DZM
                        /
                        //TEST AC, LINK, ADR, 17777 OR 07777 AFTER A DZM
                        /
03337   754001          CLA!CMA!CLL     /AC = 1'S, LINK = 0
03340   307454          ADD K7S
03341   157777          DZM 17777
03342   740001          CMA
03343   740200          SZA
03344   740040  E455    HALT            /ERROR,  AC NOT 1'S AFTER A DZM
03345   741400          SZL
03346   740040  E456    HALT            /ERROR,  LINK NOT 0
03347   217777          LAC 17777
03350   740200          SZA
03351   740040  E457    HALT            /ERROR,  DZM FAILED AT 177777 OR 07777
                        /
                        /
                        /SEQUENTIAL DZM
                        /
03352   207454          LAC K7S         /AC = 1'S
03353   152525          DZM 12525
03354   155252          DZM 15252
03355   157777          DZM 17777
03356   150000          DZM 10000
03357   740001          CMA             /AC = 0
03360   750200          CLA!SZA
03361   740040  E458    HALT            /ERROR,  AC NOT 1'S AFTER
                                        /DZM SERIES
                        .EJECT
```

```
03362   352525          TAD 12525
03363   355252          TAD 15252
03364   357777          TAD 17777
03365   350000          TAD 10000
03366   740200          SZA
03367   740040  E459    HALT            /ERROR, DZM FAILED
                /
03370   447517          ISZ WORK3               /CHECK DONE LOOPING
03371   603255          JMP DZMAC               /LOOP
03372   106336          JMS GENRAN      /GET NO. FOR NEXT LOOP
03373   106362          JMS CKNO
                /
                /
                /TEST DAC
                /
03374   207455  DACAC   LAC K51S                /AC = 11111
03375   051111          DAC 11111
03376   551111          SAD 11111
03377   741000          SKP
03400   740040  E460    HALT            /ERROR, DAC ADR CONTENTS NOT EQUAL
                                        /TO AC, DAC FAILED
03401   207456          LAC K12S                /AC = 122222
03402   052222          DAC 12222
03403   552222          SAD 12222
03404   741000          SKP
03405   740040  E461    HALT            /ERROR, 122222 OR 022222 CONTENTS
                                        /NOT = TO AC,  DAC FAILED
03406   207457          LAC K13S                /AC = 13333
03407   053333          DAC 13333
03410   553333          SAD 13333
03411   741000          SKP
03412   740040  E462    HALT            /ERROR, 13333 OR 03333 CONTENTS
                                        /NOT = TO AC DAC FAILED
03413   207460          LAC K14S                /AC = 14444
03414   054444          DAC 14444
03415   554444          SAD 14444
03416   741000          SKP
03417   740040  E463    HALT            /ERROR, 14444 OR 03333 CONTENTS
                                        /NOT = TO AC,  DAC FAILED
03420   207461          LAC K15S                /AC = 15555
03421   055555          DAC 15555
03422   555555          SAD 15555
03423   741000          SKP
03424   740040  E464    HALT            /ERROR,  15555 OR 05555 CONTENTS
                                        /NO = AC,  DAC FAILED
                        .EJECT
```

```
03425   207462          LAC K16S                /AC = 166666
03426   056666          DAC 16666
03427   556666          SAD 16666
03430   741000          SKP
03431   740040  E465    HALT                    /ERROR,  16666 OR 06666 CONTENTS
                                                /NOT = AC,  DAC FAILED
03432   207463          LAC K17S                /AC = 17777
03433   057777          DAC 17777
03434   557777          SAD 17777
03435   741000          SKP
03436   740040  E466    HALT                    /ERROR,  17777 OR 07777 CONTENTS
                                                /NOT = AC,  DAC FAILED
03437   207466          LAC K010                /AC = 252525
03440   052525          DAC 12525
03441   552525          SAD 12525
03442   741000          SKP
03443   740040  E467    HALT                    /ERROR,  12525 OR 02525 CONTENTS
                                                /AC = AC,  DAC FAILED
03444   207467          LAC K101                /AC = 525252
03445   055252          DAC 15252
03446   555252          SAD 15252
03447   741000          SKP
03450   740040  E468    HALT                    /ERROR,  15252 OR 05252 CONTENTS
                                                /NOT = AC,  DAC FAILED
                /
                /
                /SEQUENTIAL DAC
                /
03451   744000          CLL                     /L = 0
03452   207454          LAC K7S                 /AC = 1'S
03453   052525          DAC 12525
03454   055252          DAC 15252
03455   057777          DAC 17777
03456   051000          DAC 11000
03457   051111          DAC 11111
03460   740001          CMA                     /AC = 0
03461   750200          CLA!SZA
03462   740040  E469    HALT                    /ERROR,  AC NOT 1'S AFTER DAC SERIES
03463   312525          ADD 12525               /ONES
03464   315252          ADD 15252               /ONES
03465   317777          ADD 17777               /ONES
03466   311000          ADD 11000               /ONES
03467   311111          ADD 11111               /ONES
03470   740001          CMA                     /AC = 0
03471   740200          SZA
03472   740040  E470    HALT                    /ERROR,  DAC FAILED,  ONE OR MORE
                                                /ADDRESSES NOT ONES
                /
03473   447517          ISZ WORK3               /CHECK DONE LOOPING
03474   603374          JMP DACAC               /LOOP
03475   106336          JMS GENRAN              /GET NO, FOR NEXT LOOP
03476   106362          JMS CKNO
                        .EJECT
```

```
                        /TEST ISZ
                        /
03477   207411  ISZAC   LAC K0          /AC = 0
03500   250100          DAC 10100
03501   450100          ISZ 10100
03502   751001          SKP!CLA!CMA
03503   740040  E471    HALT            /ERROR,  ISZ SKIPPED
03504   507412          AND K1          /AC = 1
03505   550100          SAD 10100
03506   741000          SKP
03507   740040  E472    HALT            /ERROR,  10100 OR 00100 NOT 1
                                        /ISZ FAILED
03510   207511          LAC M400K               /AC = 377777
03511   250100          DAC 10100
03512   450100          ISZ 10100
03513   751001          SKP!CLA!CMA
03514   740040  E473    HALT            /ERROR,  ISZ SKIPPED
03515   507435          AND K400K
03516   550100          SAD 10100
03517   741000          SKP
03520   740040  E474    HALT            /ERROR,  10100 OR 00100 NOT 400000
                                        /ISZ FAILED
03521   207503          LAC M1          /AC = 777776
03522   250100          DAC 10100
03523   450100          ISZ 10100
03524   751001          SKP!CLA!CMA
03525   740040  E475    HALT            /ERROR,  ISZ SKIPPED
03526   507454          AND K7S
03527   550100          SAD 10100
03530   741000          SKP
03531   740040  E476    HALT            /ERROR,  10100 OR 00100 NOT 777777
                                        /ISZ FAILED
03532   207503          LAC M1          /AC = 777776
03533   057777          DAC 17777
03534   457777          ISZ 17777
03535   751001          SKP!CLA!CMA
03536   740040  E477    HALT            /ERROR,  ISZ SKIPPED
03537   507454          AND K7S
03540   557777          SAD 17777
03541   741000          SKP
03542   740040  E478    HALT            /ERROR,  1777 OR 07777 NOT 777777
                                        /ISZ FAILED
03543   207511          LAC M400K               /AC = 377777
03544   057777          DAC 17777
03545   457777          ISZ 17777
03546   751001          SKP!CLA!CMA
03547   740040  E479    HALT            /ERROR,  ISZ SKIPPED
03550   507435          AND K400K
03551   557777          SAD 17777
03552   741000          SKP
                        .EJECT
```

```
03553  740040  E480  HALT          /ERROR, 17777 OR 0777 NTOT 400000
                                   /ISZ FAILED
03554  207411        LAC K2
03555  057777        DAC 17777
03556  457777        ISZ 17777
03557  751001        SKP!CLA!CMA
03560  740040  E481  HALT          /ERROR,  ISZ SKIPPED
03561  507412        AND K1
03562  557777        SAD 17777
03563  741000        SKP
03564  740040  E482  HALT          /ERROR, 17777 OR 07777 NOT 1
                                   /ISZ FAILED
03565  750000        CLA           /AC = 0
03566  247454        XOR K7S       /AC = 1'S
03567  051111        DAC 11111
03570  451111        ISZ 11111
03571  740040  E483  HALT          /ERROR,  ISZ FAILED TO SKIP
03572  211111        LAC 11111
03573  740200        SZA
03574  740040  E484  HALT          /ERROR,  11111 OR 01111 NOT 0
                                   /ISZ FAILED
03575  750000        CLA           /AC = 0
03576  247454        XOR K7S       /AC = 1'S
03577  052222        DAC 12222
03600  452222        ISZ 12222
03601  740040  E485  HALT          /ERROR,  ISZ FAILED TO SKIP
03602  212222        LAC 12222
03603  740200        SZA
03604  740040  E486  HALT          /ERROR, 12222 OR 02222 NOT 0
                                   /ISZ FAILED
03605  750000        CLA
03606  247454        XOR K7S       /AC = 1'S
03607  053333        DAC 13333
03610  453333        ISZ 13333
03611  740040  E487  HALT          /ERROR,  ISZ DID NOT SKIP
03612  213333        LAC 13333
03613  740200        SZA
03614  740040  E488  HALT          /ERROR, 13333 OR 03333 NOT 0
                                   /ISZ FAILED
03615  750000        CLA
03616  247454        XOR K7S       /AC = 1'S
03617  054444        DAC 14444
03620  454444        ISZ 14444
03621  740040  E489  HALT          /ERROR,  ISZ DID NOT SKIP
03622  214444        LAC 14444
03623  740200        SZA
03624  740040  E490  HALT          /ERROR,  14444 OR 04444 NOT 0
                                   /ISZ FAILED
                      .EJECT
```

```
03625   750000              CLA
03626   247454              XOR K7S         /AC = 1'S
03627   055555              DAC 15555
03630   455555              ISZ 15555
03631   740040   E491       HALT            /ERROR,  ISZ DID NOT SKIP
03632   215555              LAC 15555
03633   740200              SZA
03634   740040   E492       HALT            /ERROR,  15555 OR 05555 NOT 0
                                             /ISZ FAILED
03635   750000              CLA
03636   247454              XOR K7S         /AC = 1'S
03637   056666              DAC 16666
03640   456666              ISZ 16666
03641   740040   E493       HALT            /ERROR,  ISZ DID NOT SKIP
03642   216666              LAC 16666
03643   740200              SZA
03644   740040   E494       HALT            /ERROR,  16666 OR 06666 NOT 0
                                             /ISZ FAILED
03645   750000              CLA
03646   247454              XOR K7S         /AC = 1'S
03647   057777              DAC 17777
03650   457777              ISZ 17777
03651   740040   E495       HALT            /ERROR,  ISZ DID NOT SKIP
03652   217777              LAC 17777
03653   740200              SZA
03654   740040   E496       HALT            /ERROR,  17777 OR 07777 NOT 0
                                             /ISZ FAILED
03655   750000              CLA
03656   247454              XOR K7S         /AC = 1'S
03657   052525              DAC 12525
03660   452525              ISZ 12525
03661   740040   E497       HALT            /ERROR,  ISZ DID NOT SKIP
03662   212525              LAC 12525
03663   740200              SZA
                    /
03664   740040   E498       HALT            /ERROR,  12525 OR 02525 NOT 0
                                             /ISZ FAILED
03665   750000              CLA
03666   247454              XOR K7S         /AC = 1'S
03667   055252              DAC 15252
03670   455252              ISZ 15252
03671   740040   E499       HALT            /ERROR,  ISZ DID NOT SKIP
03672   215252              LAC 15252
03673   740200              SZA
03674   740040   E500       HALT            /ERROR, 15252 OR 05252 NOT 0
                                             /ISZ FAILED
                            .EJECT
```

```
                        /TEST ISZ, SKP
                        /
03675   207454          LAC K7S         /AC = 1'S
03676   052525          DAC 12525               /12525 OR 02525
03677   055252          DAC 15252               /15252 OR 05252
03700   057777          DAC 17777               /17777 OR 07777
03701   051000          DAC 11000               /11000 OR 01000
03702   050100          DAC 10100               /10100 OR 00100
03703   452525          ISZ 12525
03704   741000          SKP
03705   455252          ISZ 15252
03706   741000          SKP
03707   457777          ISZ 17777
03710   741000          SKP
03711   451000          ISZ 11000
03712   741000          SKP
03713   450100          ISZ 10100
03714   740040  E501    HALT            /ERROR,  ISZ DID NOT SKIP
03715   312525          ADD 12525
03716   315252          ADD 15252
03717   317777          ADD 17777
03720   311000          ADD 11000
03721   310100          ADD 10100
03722   740001          CMA
03723   740200          SZA
03724   740040  E502    HALT            /ERROR, ALL ADRS, NOT 0
                        /
                        /
                        /SEQUENTIAL ISZ, NO-SKIP
                        /
03725   207511          LAC M400K               /AC = 377777
03726   052525          DAC 12525               /OR 02525
03727   055252          DAC 15252               /OR 05252
03730   057777          DAC 17777               /OR 07777
03731   051000          DAC 11000               /OR 01000
03732   050100          DAC 10100               /OR 00100
03733   452525          ISZ 12525
03734   455252          ISZ 15252
03735   457777          ISZ 17777
03736   451000          ISZ 11000
03737   450100          ISZ 10100
03740   750000          CLA             /AC = 0
03741   312525          ADD 12525
03742   315252          ADD 15252
03743   317777          ADD 17777
03744   311000          ADD 11000
03745   310100          ADD 10100
03746   247436          XOR K402K               /RESULT = 400002
03747   740200          SZA
03750   740040  E503    HALT            /ERROR,  ALL ADDRS, NOT 400000
                        .EJECT
```

```
                    /TEST ISZ=SKP, SKIP
                    /
03751   207454              LAC K7S         /AC = 1'S
03752   055252              DAC 15252
03753   455252              ISZ 15252
03754   741000              SKP
03755   741000              SKP
03756   740040      E504    HALT            /ERROR,  ISZ=SKIP DID NOT SKIP
                    /
                    /TEST SKP=ISZ, SKIP
                    /
03757   207454              LAC K7S         /AC = 17S
03760   055252              DAC 15252
03761   741000              SKP
03762   740000              NOP
03763   455252              ISZ 15252
03764   740040      E505    HALT            /ERROR,  SKP=ISZ DID NOT SKIP
                    /
                    /TEST SKP=ISZ, NO=SKIP
                    /
03765   207411              LAC K0          /AC = 0
03766   055252              DAC 15252
03767   741000              SKP
03770   740000              NOP
03771   455252              ISZ 15252
03772   741000              SKP
03773   740040      E506    HALT            /ERROR,  SKP=ISZ SKIPPED
                    /
03774   447517              ISZ WORK3               /CHECK DONE LOOPING
03775   603477              JMP ISZAC               /LOOP
03776   106336              JMS GENRAN              /GET NO. FOR NEXT LOOP
03777   106362              JMS CKNO
                    .EJECT
```

```
                        /TEST JMP
                        /
04000   207552          INIT4K  LAC JMPRET
04001   740200                  SZA
04002   740040          E507    HALT            /ERROR JMP .-7, .+4 OR .+5 FAILED
04003   204163                  LAC JMPSEQ
04004   047552                  DAC JMPRET              /LOAD 4K WITH JMP TO 70
04005   204005                  LAC .
04006   507437                  AND K10K                /SEE IF IN UPPER 4K NOW
04007   740200                  SZA
04010   604014                  JMP .+4         /IN UPPER 4K
04011   207437                  LAC K10K                /LOWER 4K
04012   047513                  DAC RJCNT
04013   604020                  JMP .+5
04014   207421                  LAC K20
04015   047513                  DAC RJCNT
04016   741000                  SKP
04017   147552                  DZM JMPRET              /CLEAR ERROR TABLE
04020   204163                  LAC JMPSEQ
04021   067513                  DAC* RJCNT              /STORE JMP 70
04022   447513                  ISZ RJCNT               /INCR, ADDRESS
04023   207513                  LAC RJCNT
04024   546007                  SAD K17777              /WILL = SAD 07777 WHEN IN
04025   741000                  SKP             /  UPPER 4K
04026   604017                  JMP .-7
04027   207552                  LAC JMPRET
04030   740200                  SZA
04031   740040          E508    HALT            /ERROR,  JMPP,+4, .+5 OR .-7 FAILED
04032   204164                  LAC MOD         /PRESS CONTINUE TO DETERMINE
04033   044000                  DAC E507-2              /JMP FAILURE
04034   740000          MODX    NOP
                        /
04035   207553                  LAC J111
04036   740200                  SZA
04037   740040          E509    HALT            /ERROR,  RJMP OR JMP TO 11111
                                                /OR 01111 FAILED
04040   204165                  LAC RJ111
04041   047553                  DAC J111                /STORE JMP ADDRESS IN TABLE
04042   051111                  DAC 11111
04043   611111                  JMP 11111               /JMP TO 11111 OR 01111
04044   741000                  SKP
04045   147553          RJMP1   DZM J111                /CLEAR ERROR WORD TABLE
04046   207554                  LAC J222
04047   740200                  SZA
04050   740040          E510    HALT            /ERROR,  RJMP OR JMP TO 12222
                                                /OR 02222 FAILED
04051   204166                  LAC RJ222
04052   047554                  DAC J222
04053   052222                  DAC 12222
04054   612222                  JMP 12222               /JMP 1222 OR 02222
04055   741000                  SKP
04056   147554          RJMP2   DZM J222                /CLEAR ERROR TABLE
                                ,EJECT
```

```
04057   207555          LAC J333
04060   740200          SZA
04061   740040  E511    HALT            /ERROR,  RJMP OR JMP TO 13333
                                        /OR 03333 FAILED
04062   204167          LAC RJ333
04063   047555          DAC J333
04064   053333          DAC 13333
04065   613333          JMP 13333               /JMP TO 13333 OR 03333
04066   741000          SKP
04067   147555  RJMP3   DZM J333                /CLEAR ERROR TABLE
                /
04070   207556          LAC J444
04071   740200          SZA
04072   740040  E512    HALT            /ERROR,  RJMP OR JMP TO 14444
                                        /OR 04444 FAILED
04073   204170          LAC RJ444
04074   047556          DAC J444
04075   054444          DAC 14444
04076   614444          JMP 14444               /JMP TO 14444 OR 04444
04077   741000          SKP
04100   147556  RJMP4   DZM J444                /CLEAR ERROR TABLE
                /
04101   207557          LAC J555
04102   740200          SZA
04103   740040  E513    HALT            /ERROR, RJMP OR JMP TO 15555
                                        /OR 05555 FAILED
04104   204171          LAC RJ555
04105   047557          DAC J555
04106   055555          DAC 15555
04107   615555          JMP 15555               /JMP TO 15555 OR 05555
04110   741000          SKP
04111   147557  RJMP5   DZM J555                /CLEAR ERROR TABLE
                /
04112   207560          LAC J666
04113   740200          SZA
04114   740040  E514    HALT            /ERROR, RJMP OR JMP TO 16666
                                        /OR 06666 FAILED
04115   204172          LAC RJ666
04116   047560          DAC J666
04117   056666          DAC 16666
04120   616666          JMP 16666               /JMP TO 16666 OR 06666
04121   741000          SKP
04122   147560  RJMP6   DZM J666                /CLEAR ERROR TABLE
                /
                        .EJECT
```

```
04123   207561          LAC J777
04124   740200          SZA
04125   740040  E515    HALT            /ERROR, RJMP OR JMP TO 17777
                                        /OR 07777 FAILED
04126   204173          LAC RJ777
04127   047561          DAC J777
04130   057777          DAC 17777
04131   617777          JMP 17777               /JMP TO 17777 OR 07777
04132   741000          SKP
04133   147561  RJMP7   DZM J777                /CLEAR ERROR TABLE
                /
04134   207563          LAC J252
04135   740200          SZA
04136   740040  E516    HALT            /ERROR, RJMP OR  MP TO 12525
                                        /OR 02525 FAILED
04137   204174          LAC RJ252
04140   047563          DAC J252
04141   052525          DAC 12525
04142   612525          JMP 12525               /JMP TO 12525 OR 02525
04143   741000          SKP
04144   147563  RJMP8   DZM J252                /CLEAR ERROR TABLE
                /
04145   207562          LAC J525
04146   740200          SZA
04147   740040  E517    HALT            /ERROR, RJMP OR JMP TO 15252
                                        /OR 05252 FAILED
04150   204175          LAC RJ525
04151   047562          DAC J525
04152   055252          DAC 15252
04153   615252          JMP 15252               /JMP TO 15252 OR 05252
04154   741000          SKP
04155   147562  RJMP9   DZM J525                /CLEAR ERROR TABLE
                /
04156   447517          ISZ WORK3               /CHECK DONE LOOPING
04157   604035          JMP MODX+1              /LOOP
04160   106336          JMS GENRAN              /GET NO. FOR NEXT LOOP
04161   106362          JMS CKNO
04162   604176          JMP TSCAL               /TEST CAL
                /
                /JMP CONSTANTS. THESE ARE MODIFIED WHEN IN HI 4K
                /
04163   600112  JMPSEQ  JMP SEQUEN
04164   604035  MOD     JMP MODX+1
04165   604045  RJ111   JMP RJMP1
04166   604056  RJ222   JMP RJMP2
04167   604067  RJ333   JMP RJMP3
04170   604100  RJ444   JMP RJMP4
04171   604111  RJ555   JMP RJMP5
04172   604122  RJ666   JMP RJMP6
04173   604133  RJ777   JMP RJMP7
04174   604144  RJ252   JMP RJMP8
04175   604155  RJ525   JMP RJMP9
                .EJECT
```

```
                        /TEST CAL
                        /
04176   207564  TSCAL   LAC CAL0
04177   740200          SZA
04200   740040  E518    HALT            /ERROR, CAL FROM 17757 OR 07757
04201   707704          LEM             /CLEAR EXTEND MODE
04202   754000          CLA!CLL         /AC = 0, LINK = 0
04203   770020          LAW 10020               /AC = 770020
04204   150704          DZM 10704               /CAL AT 10704 OR 00704
04205   207444          LAC K2021
04206   047564          DAC CAL0                /STORE ERROR CODE 2021
04207   204252          LAC RCAL0
04210   040021          DAC 21          /RJMP FROM CAL
04211   610704          JMP 10704               /JMP TO 10704 OR 00704
04212   147564  RCALS0  DZM CAL0                /CLEAR ERROR TABLE
04213   200020          LAC 20
04214   544253          SAD KCAL0               /10705 OR 00705
04215   741000          SKP
04216   740040  E519    HALT            /ERROR, (20) NOT 210705 OR 200705
04217   210704          LAC 10704
04220   740200          SZA
04221   740040  E519A   HALT            /ERROR (10704 OR 00704) NOT 0
                        /
                        /TEST CAL  LINK = 1
                        /
04222   207565          LAC CAL1
04223   740200          SZA
04224   740040  E520    HALT            /ERROR,  CAL FROM 10704 OR 00704
04225   744002          CLL!CML         /LINK = 1
04226   207445          LAC K2120
04227   047565          DAC CAL1                /STORE ERROR CODE 2120
04230   204254          LAC RCAL1
04231   040021          DAC 21          /RJMP FROM CAL
04232   610704          JMP 10704               /JMP TO 10704 OR 00704
04233   147565  RCALS1  DZM CAL1                /CLEAR ERROR TABLE
04234   200020          LAC 20
04235   544255          SAD KCAL1               /410705 OR 400705
04236   741000          SKP
04237   740040  E521    HALT            /ERROR,  (20) NOT 610705 OR 600705
04240   210704          LAC 10704
04241   740200          SZA
04242   740040  E521A   HALT            /ERROR (10704 OR 00704) NOT 0
                        /
04243   207533          LAC KHALT
04244   040021          DAC 21
04245   447517          ISZ WORK3               /CHECK DONE LOOPING
04246   604176          JMP TSCAL               /LOOP
04247   106336          JMS GENRAN              /GET NO. FOR NEXT LOOP
04250   106362          JMS CKNO
04251   604256          JMP TSJMS               /TEST JMS
                        /
                        .EJECT
```

```
                    /CAL CONSTANTS,  THESE ARE MODIFIED WHEN IN HI 4K
                    /
04252   604212      RCAL0   JMP RCALS0
04253   210705      KCAL0   210705
04254   604233      RCAL1   JMP RCALS1
04255   610705      KCALE   610705
                            ,EJECT
```

```
                        /TEST JMS
                        /
04256   207566  TSJMS   LAC JSM71
04257   740200          SZA
04260   740040  E522    HALT            /ERROR,  JMS FROM 07777 TO 11111
                                        /OR FROM 17777 TO 01111
04261   744000          CLL             /LINK = 0
04262   204543          LAC RJSM71              /JMP TO RJMS71
04263   051112          DAC 11112               /RJMP FROM JMS DEST'N
04264   204544          LAC RSM71               /JMS 11111
04265   047777          DAC 07777
04266   047566          DAC JSM71
04267   771112          LAW 11112               /AC = 771112
04270   607777          JMP 07777
04271   147566  RJMS71  DZM JSM71               /CLEAR ERROR TABLE
04272   211111          LAC 11111
04273   544602          SAD K210K
04274   741000          SKP
04275   740040  E523    HALT            /ERROR, (11111 OR 01111) NOT
                                        /210000 OR 200000
04276   207567          LAC JSM72
04277   740200          SZA
04300   740040  E524    HALT            /ERROR,  JMS FROM 07776 TO 12222
                                        /OR FROM 17776 TO 02222
04301   707704          LEM
04302   744000          CLL
04303   204546          LAC RJSM72              /JMP TO RJMS72
04304   052223          DAC 12223
04305   204547          LAC RSM72               /JMS 12222
04306   047776          DAC 07776
04307   047567          DAC JSM72
04310   772223          LAW 12223               /AC = 772223
04311   607776          JMP 07776
04312   147567  RJMS72  DZM JSM72               /CLEAR ERROR TABLE
04313   212222          LAC 12222
04314   544603          SAD K277
04315   741000          SKP
04316   740040  E525    HALT            /ERROR, (12222 OR 02222) NOT
                                        /207777 OR 217777
04317   207570          LAC JSM73
04320   740200          SZA
04321   740040  E526    HALT            /ERROR, JMS FROM 07775 TO 13333
                                        /OR FROM 17775 TO 03333
04322   707704          LEM
04323   744000          CLL
04324   204551          LAC RJSM73              /JMP TO RJMS73
04325   053334          DAC 13334
04326   204552          LAC RSM73               /JMS 13333
04327   047775          DAC 07775
04330   047570          DAC JSM73
04331   773334          LAW 13334               /AC = 773334
04332   607775          JMP 07775
                        .EJECT
```

```
04333   147570      RJMS73  DZM JSM73               /CLEAR ERROR TABLE
04334   213333              LAC 13333
04335   544604              SAD K276
04336   741000              SKP
04337   740040      E527    HALT                    /ERROR, (13333 OR 03333) NOT
                                                    /207776 OR 217776
04340   207571              LAC JSM74
04341   740200              SZA
04342   740040      E528    HALT                    /ERROR,  JMS FROM 07774 TO 14444
                                                    /OR FROM 17774 TO 04444
04343   707704              LEM
04344   744000              CLL
04345   204554              LAC RJSM74              /JMP RJMS74
04346   054445              DAC 14445
04347   204555              LAC RSM74               /JMS 14444
04350   047774              DAC 07774
04351   047571              DAC JSM74
04352   774445              LAW 14445               /AC = 774445
04353   607774              JMP 07774
04354   147571      RJMS74  DZM JSM74               /CLEAR ERROR TABLE
04355   214444              LAC 14444
04356   544605              SAD K275
04357   741000              SKP
04360   740040      E529    HALT                    /ERROR, (14444 OR 04444) NOT
                                                    /207775 OR 217775
04361   207572              LAC JSM75
04362   740200              SZA
04363   740040      E530    HALT                    /ERROR, JMS FROM 07773 TO 15555
                                                    /OR FROM 17773 TO 05555
04364   707704              LEM
04365   744000              CLL
04366   204557              LAC RJSM75              /JMP TO RJMS75
04367   055556              DAC 15556
04370   204560              LAC RSM75               /JMS 15555
04371   047773              DAC 07773
04372   047572              DAC JSM75
04373   775556              LAW 15556               /AC = 775556
04374   607773              JMP 07773
04375   147572      RJMS75  DZM JSM75               /CLEAR ERROR TABLE
04376   215555              LAC 15555
04377   544606              SAD K274
04400   741000              SKP
04401   740040      E531    HALT                    /ERROR, (15555 OR 05555) NOT
                                                    /207774 OR 217774
04402   207573              LAC JSM76
04403   740200              SZA
04404   740040      E532    HALT                    /ERROR, JMS FROM 07772 TO 16666
                                                    /OR 17772 TO 06666
                            .EJECT
```

```
04405   707704              LEM
04406   744000              CLL
04407   204562              LAC RJSM76              /JMP TO RJMS76
04410   056667              DAC 16667
04411   204563              LAC RSM76               /JMS 16666
04412   047772              DAC 07772
04413   047573              DAC JSM76
04414   776667              LAW 16667               /AC = 776667
04415   607772              JMP 07772
04416   147573    RJMS76    DZM JSM76               /CLEAR ERROR TABLE
04417   216666              LAC 16666
04420   544607              SAD K273
04421   741000              SKP
04422   740040    E533      HALT                    /ERROR, (16666 OR 06666) NOT
                                                    /207773 OR 217773
04423   207575              LAC JS252
04424   740200              SZA
04425   740040    E536      HALT                    /ERROR, JMS FROM 12525 TO 15252
                                                    /OR FROM 02525 TO 05252
                          .EJECT
```

```
04426   744002              CLLICML         /LINK = 1
04427   204567              LAC RJSM25              /JMP TO RJMS14
04430   055253              DAC 15253
04431   204570              LAC RSM25               /JMS 15252
04432   052525              DAC 12525
04433   047575              DAC JS252
04434   775253              LAW 15253               /AC = 775253
04435   612525              JMP 12525
04436   147575      RJMS14  DZM JS252               /CLEAR ERROR TABLE
04437   215252              LAC 15252
04440   544610              SAD K626                /612526 OR 602526
04441   741000              SKP
04442   740040      E537    HALT            /ERROR, (15252 OR 05252) NOT
                            /612526 OR 602526
04443   207576              LAC JS525
04444   740200              SZA
04445   740040      E538    HALT            /ERROR, JMS FROM 15252 TO 12525
                            /OR 05252 TO 02525
04446   744002              CLLICML         /LINK = 1
04447   204572              LAC RJSM52              /RJMP TO RJMS15
04450   052526              DAC 12526
04451   204573              LAC RSM52               /JMS 12525
04452   055252              DAC 15252
04453   047576              DAC JS525
04454   772526              LAW 12526               /AC = 772526
04455   615252              JMP 15252
04456   147576      RJMS15  DZM JS525               /CLEAR ERROR TABLE
04457   212525              LAC 12525
04460   544611              SAD K615                /615253 OR 605253
04461   741000              SKP
04462   740040      E539    HALT            /ERROR, (12525 OR 02525) NOT
                            /615253 OR 605253
                    /PDP-15 BASIC EXERCISER -  TAPE 5
                    /TEST JMS SERIES
                    /
04463   207577              LAC JSSS
04464   740200              SZA
04465   740040      E540    HALT            /ERROR, JMS SERIES FAILED
                    /
04466   744002              CLLICML         /LINK = 1
04467   104470      JS1     JMS .+1
04470   740040      E541    HALT            /ERROR,  JMS SERIES
04471   104472      JS2     JMS .+1
04472   740040      E542    HALT            /ERROR,  JMS SERIES
04473   104474      JS3     JMS .+1
04474   740040      E543    HALT            /ERROR,  JMS SERIES
04475   707704              LEM
04476   744000              CLL
04477   104500      JS4     JMS .+1
04500   740040      E544    HALT            /ERROR,  JMS SERIES
04501   147577      RJMSS   DZM JSSS                /CLEAR ERROR TABLE
04502   204576              LAC KJS1                /TEST JS1, LINK = 1
04503   347442              TAD K600K
04504   740001              CMA
04505   344470              TAD JS1+1
```

```
04506   740001          CMA
04507   740200          SZA
04510   740040  E545    HALT            /ERROR, JS1+1
04511   204577          LAC KJS2                /TEST JS2, LINK = 1
04512   347442          TAD K600K
04513   740001          CMA
04514   344472          TAD JS2+1
04515   740001          CMA
04516   740200          SZA
04517   740040  E546    HALT            /ERROR, JS2+1
04520   204600          LAC KJS3                /TEST JS3, LINK = 1
04521   347442          TAD K600K
04522   740001          CMA
04523   344474          TAD JS3+1
04524   740001          CMA
04525   740200          SZA
04526   740040  E547    HALT            /ERROR, JS3+1
04527   204601          LAC KJS4                /TEST JS4, EXT = 0, LINK = 0
04530   347441          TAD K200K
04531   740001          CMA
04532   344500          TAD JS4+1
04533   740001          CMA
04534   740200          SZA
04535   740040  E548    HALT            /ERROR, JS4+1
                /
04536   447517          ISZ WORK3               /CHECK DONE LOOPING
04537   604256          JMP TSJMS               /LOOP
04540   106336          JMS GENRAN              /GET NO. FOR NEXT LOOP
04541   106362          JMS CKNO
04542   604613          JMP TSXCT               /TEST XCT
                .EJECT
```

```
                        /CONSTANTS FOR JMS,  MODIFIED WHEN IN HI 4K
                        /
04543   604271          RJSM71  JMP RJMS71
04544   111111          RSM71   JMS 11111
04545   010000          K10000  10000
04546   604312          RJSM72  JMP RJMS72
04547   112222          RSM72   JMS 12222
04550   007777          K77     07777
04551   604333          RJSM73  JMP RJMS73
04552   113333          RSM73   JMS 13333
04553   007776          K76     07776
04554   604354          RJSM74  JMP RJMS74
04555   114444          RSM74   JMS 14444
04556   007775          K75     07775
04557   604375          RJSM75  JMP RJMS75
04560   115555          RSM75   JMS 15555
04561   007774          K74     07774
04562   604416          RJSM76  JMP RJMS76
04563   116666          RSM76   JMS 16666
04564   007773          K73     07773
04565   117777          RSM77   JMS 17777
04566   007772          K72     07772
04567   604436          RJSM25  JMP RJMS14
04570   115252          RSM25   JMS 15252
04571   412526          K426    412526
04572   604456          RJSM52  JMP RJMS15
04573   112525          RSM52   JMS 12525
04574   007771          K71     07771
04575   415253          K415    415253
04576   004470          KJS1    JS1+1
04577   004472          KJS2    JS2+1
04600   004474          KJS3    JS3+1
04601   004500          KJS4    JS4+1
04602   210000          K210K   210000
04603   207777          K277    207777
04604   207776          K276    207776
04605   207775          K275    207775
04606   207774          K274    207774
04607   207773          K273    207773
04610   612526          K626    612526
04611   615253          K615    615253
04612   215253          K2152   215253
                        /
                                .EJECT
```

```
                        /TEST XCT
                        /
04613   754003  TSXCT   CLA!CMA!CLL!CML /AC = ONES, LINK = 0
04614   404615          XCT .+1         /NOP
04615   740000          NOP
04616   740400          SNL
04617   740040  E549    HALT            /ERROR; XCT NOP; LINK WAS RESET
04620   740001          CMA
04621   740200          SZA
04622   740040  E550    HALT            /ERROR; XCT NOP; AC NOT ONES
                        /
                        /TEST EXECUTE NOP, AC = 0, LINK = 0
04623   754000          CLA!CLL         /AC = 0, LINK = 0
04624   404625          XCT .+1
04625   740000          NOP
04626   741400          SZL
04627   740040  E551    HALT            /ERROR; XCT NOP; LINK WAS SET
04630   740200          SZA
04631   740040  E552    HALT            /ERROR; XCT NOP; AC NOT 0
                        /
                        /TEST XCT SKP
04632   407501          XCT KSKP                /SKIP
04633   740040  E553    HALT            /ERROR; XCT SKP FAILED
04634   750001          CLA!CMA         /AC = ONES
04635   407502          XCT KCLA                /CLA
04636   740200          SZA
04637   740040  E554    HALT            /ERROR; XCT CLA FAILED
                        /
                        /TEST XCT LAW
04640   750000          CLA             /AC = 0
04641   407454          XCT K7S         /LAW = 17777
04642   740001          CMA             /AC = 0
04643   740200          SZA
04644   740040  E555    HALT            /ERROR; XCT LAW FAILED
                        /TEST XCT ISZ
04645   750001          CLA!CMA         /AC = ONES
04646   057777          DAC 17777
04647   405066          XCT XCTISZ              /ISZ 17777
04650   740040  E556    HALT            /ERROR; XCT ISZ FAILED TO SKP
                        /
                        /TEST XCT TAD
04651   744002          CLL!CML         /LINK = 1
04652   777777          LAW 17777               /AC = ONES
04653   057777          DAC 17777               /17777=777777
04654   405070          XCT XCTTAD              /TAD K1
04655   740200          SZA
04656   740040  E557    HALT            /ERROR; XCT TAD FAILED, AC NOT 0
04657   741400          SZL
04660   740040  E558    HALT            /ERROR; XCT TAD FAILED LINK
                        .EJECT
```

```
                        /TEST XCT RAL, AC = ONES, LINK = 1
04661   754003                  CLA!CMA!CLL!CML /AC = ONES, LINK = 1
04662   407524                  XCT XCTRAL              /RAL
04663   740001                  CMA             /AC = 0
04664   740200                  SZA
04665   740040          E559    HALT            /ERROR: XCT RAL FAILED AC DROPPED A BIT
04666   744400                  SNL!CLL
04667   740040          E560    HALT            /ERROR: XCTRAL FAILED LINK DROPPED
                        /
                        /TEST XCT DAC
04670   207450                  LAC K3S         /AC = 333333
04671   405067                  XCT XCTDAC              /DAC 17777
04672   347451                  TAD K4S         /AC = 777777
04673   740001                  CMA             /AC = 0
04674   740200                  SZA
04675   740040          E561    HALT            /ERROR: XCT DAC FAILED, K3S
                                                /NOT STORED AT 17777
                                .EJECT
```

```
                    /TEST XCT JMS
                    /
04676   207600              LAC XCT11
04677   740200              SZA
04700   740040      E562    HALT            /ERROR,  XCT (16666 O R 06666)
                            /FROM 11111 OR 01111
04701   205044              LAC XT11S               /XCT (16666 OR 06666)
04702   047600              DAC XCT11
04703   051111              DAC 11111               /OR 01111
04704   205045              LAC XTR11               /JMS 11111 OR 01111
04705   056666              DAC 16666               /OR 06666
04706   205046              LAC XT1R                /RJMP TO RXCT1
04707   051112              DAC 11112               /OR 01112
04710   611111              JMP 11111               /OR 01111 AND XCT (16666 OR 06666)
04711   147600      RXCT1   DZM XCT11               /CLEAR ERROR TABLE
04712   211111              LAC 11111               /OR 01111
04713   545047              SAD K12
04714   741000              SKP
04715   740040      E563    HALT            /ERROR,  RJMP ADR, NOT 211112
                            /OR 201112
04716   207601              LAC XCT12
04717   740200              SZA
04720   740040      E564    HALT            /ERROR, XCT (15555 OR 05555)
                            /FROM 12222 OR 02222
04721   205050              LAC XT12S               /XCT (15555 OR 05555)
04722   047601              DAC XCT12
04723   052222              DAC 12222
04724   205051              LAC XTR12               /JMS 12222 OR 02222
04725   055555              DAC 15555
04726   205052              LAC XT2R                /RJMP TO RXCT2
04727   052223              DAC 12223
04730   612222              JMP 12222
04731   147601      RXCT2   DZM XCT12               /CLEAR ERROR TABLE
04732   212222              LAC 12222
04733   545053              SAD K23
04734   741000              SKP
04735   740040      E565    HALT            /ERROR,  RJMP NOT 212223
                            /OR 202223
04736   207602              LAC XCT13
04737   740200              SZA
04740   740040      E566    HALT            /ERROR, XCT (14444 OR 04444)
                            /FROM 13333 OR 03333
                            .EJECT
```

```
04741   205054          LAC XT13S               /XCT (14444 OR 04444)
04742   047602          DAC XCT13
04743   053333          DAC 13333
04744   205055          LAC XTR13               /JMS 13333 OR 23333
04745   054444          DAC 14444
04746   205056          LAC XT3R                /RJMP TO RXCT3
04747   053334          DAC 13334
04750   613333          JMP 13333
04751   147602  RXCT3   DZM XCT13               /CLEAR ERROR TABLE
04752   213333          LAC 13333
04753   545057          SAD K34
04754   741000          SKP
04755   740040  E567    HALT            /ERROR,  RJMP NOT 213334 OR 223334
04756   207603          LAC XCT17
04757   740200          SZA
04760   740040  E568    HALT            /ERROR,  XCT (17776 OR 07776)
                                        /FROM 07776 OR 17776
04761   205060          LAC XT17S               /XCT (17776 OR 07776)
04762   047603          DAC XCT17
04763   047776          DAC 07776               /OR 17776
04764   205061          LAC XTR17               /JMS 07776 OR 17776
04765   057776          DAC 17776               /OR 07776
04766   205062          LAC XT4R                /RJMP TO RXCT4
04767   047777          DAC 07777               /OR 17777
04770   607776          JMP 07776               /OR 17776
04771   147603  RXCT4   DZM XCT17               /CLEAR ERROR TABLE
04772   207776          LAC 07776               /FOR 17776
04773   544603          SAD K277
04774   741000          SKP
04775   740040  E569    HALT            /ERROR, RJMP NOT 207777 OR 217777
04776   207604          LAC XCT125
04777   740200          SZA
05000   740040  E570    HALT            /ERROR, XCT (12525 OR 02525)
                                        /FROM 15252 OR 05252
05001   205063          LAC XCT12S
05002   047604          DAC XCT125              /XCT (12525 OR 02525)
05003   055252          DAC 15252               /OR 05252
05004   205064          LAC XCTR12
05005   052525          DAC 12525               /JMS 15252 OR 05252
05006   205065          LAC XT5R                /RJMP TO RXCT5
05007   055253          DAC 15253
05010   615252          JMP 15252
05011   147604  RXCT5   DZM XCT125             /CLEAR ERROR TABLE
05012   215252          LAC 15252
05013   544612          SAD K2152
05014   741000          SKP
05015   740040  E571    HALT            /ERROR, RJMP NOT 215253 OR 205253
                        .EJECT
```

```
                        /TEST XCT SERIES
                        /
05016   754003                  CLA!CMA!CLL!CML /AC = ONES, LINK = 1
05017   405020                  XCT .+1;        XCT .+1;        XCT .+1
05020   405021
05021   405022
05022   405023                  XCT .+1;        XCT .+1;        XCT .+1
05023   405024
05024   405025
05025   405026                  XCT .+1;        XCT .+1;        XCT .+1
05026   405027
05027   405030
05030   405031                  XCT .+1
05031   740000                  NOP
05032   740001                  CMA
05033   740200                  SZA
05034   740040          E572    HALT            /ERROR, XCT SERIES FAILED AC NOT ONES
05035   740400                  SNL
05036   740040          E573    HALT            /ERROR,  LINK CHANGED
05037   447517                  ISZ WORK3               /CHECK DONE LOOPING
05040   604613                  JMP TSXCT               /LOOP
05041   106336                  JMS GENRAN              /GET NO FOR NEXT LOOP
05042   106362                  JMS CKNO
05043   605071                  JMP LACIN               /TEST LAC INDIRECT
                        /
                        /XCT CONSTANTS, MODIFIED WHEN IN UPPER 4K
                        /
05044   416666          XT11S   XCT 16666
05045   111111          XTR11   JMS 11111
05046   604711          XT1R    JMP RXCT1
05047   211112          K12     211112
05050   415555          XT12S   XCT 15555
05051   112222          XTR12   JMS 12222
05052   604731          XT2R    JMP RXCT2
05053   212223          K23     212223
05054   414444          XT13S   XCT 14444
05055   113333          XTR13   JMS 13333
05056   604751          XT3R    JMP RXCT3
05057   213334          K34     213334
05060   417776          XT17S   XCT 17776
05061   107776          XTR17   JMS 07776
05062   604771          XT4R    JMP RXCT4
05063   412525          XCT12S  XCT 12525
05064   115252          XCTR12  JMS 15252
05065   605011          XT5R    JMP RXCT5
05066   457777          XCTISZ  ISZ 17777
05067   057777          XCTDAC  DAC 17777
05070   347412          XCTTAD  TAD K1
                                .EJECT
```

```
                    /TEST LAC INDIRECT
                    /
05071   204550      LACIN   LAC K77
05072   057777              DAC 17777           /(17777 OR 07777) = 07777 OR 17777
05073   207511              LAC M400K           /377777
05074   047777              DAC 07777           /OR 17777
05075   237777              LAC* 17777      /OR 07777
05076   347435              TAD K400K           /AC = 777777
05077   740001              CMA
05100   740200              SZA
05101   740040      E584    HALT            /ERROR,  LAC* 17777 OR 07777 FAILED
                    /
05102   204553              LAC K76
05103   056666              DAC 16666           /(16666 OR 06666) = 07776 OR 17776
05104   207510              LAC M40K            /737777
05105   047776              DAC 07776
05106   236666              LAC* 16666      /AC = 737777
05107   347434              TAD K40K            /AC = 777777
05110   740001              CMA
05111   740200              SZA
05112   740040      E585    HALT            /ERROR, LAC* 16666 OR 06666 FAILED
                    /
05113   204556              LAC K75
05114   055555              DAC 15555           /(15555 OR 05555) = 07775 OR 17775
05115   207507              LAC M4K         /AC = 773777
05116   047775              DAC 07775
05117   235555              LAC* 15555      /AC = 773777
05120   347430              TAD K4K         /AC = 777777
05121   740001              CMA
05122   740200              SZA
05123   740040      E586    HALT            /ERROR, LAC* 15555 OR 05555 FAILED
                    /
05124   204561              LAC K74
05125   054444              DAC 14444           /(14444 OR 04444) = 07774 OR 17774
05126   207506              LAC M400            /AC = 777377
05127   047774              DAC 07774
05130   234444              LAC* 14444      /AC = 777377
05131   347425              TAD K400            /AC = 777777
05132   740001              CMA
05133   740200              SZA
05134   740040      E587    HALT            /ERROR, LAC* 14444 OR 04444 FAILED
                    /
05135   204564              LAC K73
05136   053333              DAC 13333           /(13333 OR 03333) = 07773 OR 17773
05137   207505              LAC M40         /AC = 777737
05140   047773              DAC 07773
05141   233333              LAC* 13333      /AC = 777737
05142   347423              TAD K40         /AC = 77777
05143   740001              CMA
05144   740200              SZA
05145   740040      E588    HALT            /ERROR, LAC* 13333 OR 03333 FAILED
                            .EJECT
```

```
05146   204566          LAC K72
05147   052222          DAC 12222               /(12222 OR 02222) = 07772 OR 17772
05150   207504          LAC M4          /AC = 777773
05151   047772          DAC 07772
05152   232222          LAC* 12222      /AC = 777773
05153   347414          TAD K4          /AC = 777777
05154   740001          CMA
05155   740200          SZA
05156   740040  E589    HALT            /ERROR, LAC* 12222 OR 02222 FAILED
                /
05157   204574          LAC K71
05160   051111          DAC 11111               /(11111 OR 01111) = 07771 OR 17771
05161   207503          LAC M1          /AC = 777776
05162   047771          DAC 07771
05163   231111          LAC* 11111      /AC = 777776
05164   347412          TAD K1          /AC = 777777
05165   740001          CMA
05166   740200          SZA
05167   740040  E590    HALT            /ERROR, LAC* 11111 OR 01111 FAILED
                /
05170   205326          LAC INK52
05171   055252          DAC 15252               /(15252 OR 05252) = 02525 OR 12525
05172   207467          LAC K101                /AC = 525252
05173   052525          DAC 12525
05174   235252          LAC* 15252      /AC = 525252
05175   347466          TAD K010                /AC = 777777
05176   740001          CMA
05177   740200          SZA
05200   740040  E591    HALT            /ERROR, LAC* 15252 OR 05252 FAILED
                /
05201   447517          ISZ WORK3               /CHECK DONE LOOPING
05202   605071          JMP LACIN               /LOOP
05203   106336          JMS GENRAN      /GET NO, FOR NEXT LOOP
05204   106362          JMS CKNO
                .EJECT
```

```
                        /TEST XCT JMS INDIRECT
                        /
05205   744000  XTJMSI  CLL
05206   750000          CLA
05207   547605          SAD JST77
05210   741000          SKP
05211   740040  E592    HALT            /ERROR, JMS DEST'N ERROR
                        /
05212   206006          LAC K17776      /DIRECT ADDRESS
05213   047777          DAC 07777
05214   205327          LAC JMSI1               /JMS* 07777 OR 17777
05215   047605          DAC JST77               /ERROR TABLE
05216   055252          DAC 15252
05217   205330          LAC RJMI1               /JMP RJSI1
05220   057777          DAC 17777
05221   415252          XCT 15252               /XCT TEST
05222   741000          SKP
05223   147605  RJSI1   DZM JST77
05224   217776          LAC 17776
05225   504550          AND K77
05226   545331          SAD RJSI1X      /RJSI1X = RJSI1+1
05227   751000          CLA!SKP
05230   740040  E593    HALT                    /ERROR (17776 OR 07776) NOT =
                                                /TO RJSI1+1
                        /
                        /
                        /TEST JMS INDIRECT
                        /
05231   744002          STL
05232   750000          CLA
05233   547606          SAD JST66
05234   741000          SKP
05235   740040  E594    HALT            /ERROR, JMS DEST'N ERROR
                        /
05236   206023          LAC K11111      /DIRECT ADR, 11111 OR 01111
05237   056666          DAC 16666               /OR 06666
05240   205332          LAC JSI66               /JMS* 16666 OR 06666
05241   047606          DAC JST66
05242   055252          DAC 15252               /JMS* 16666 OR 06666 AT 15252
                                        /OR 05252
05243   205333          LAC RJMI2               /JMP RJSI2
05244   051112          DAC 11112       /OR 01112
05245   615252          JMP 15252               /OR 05252
05246   741000          SKP
05247   147606  RJSI2   DZM JST66               /CLEAR ERROR TABLE
05250   211111          LAC 11111
05251   544611          SAD K615
05252   751000          CLA!SKP
05253   740040  E595    HALT                    /ERROR, RJMP ADR, (11111 OR 01111)
                                                /NOT 615253 OR 605253
                        .EJECT
```

```
05254   750000          CLA
05255   547607          SAD JST55
05256   741000          SKP
05257   740040  E596    HALT            /ERROR, JMS DEST'N ERROR
05260   206021          LAC K12222      /DIRECT ADR, 12222 OR 02222
05261   055555          DAC 15555       /OR 055555
05262   205335          LAC JSI55               /JMS* 15555 OR 05555
05263   047607          DAC JST55
05264   055252          DAC 15252               /JMS* 15555 OR 05555 AT
                                        /15252 OR 05252
05265   205336          LAC RJMI3               /JMP RJSI3
05266   052223          DAC 12223               /OR 02223
05267   615252          JMP 15252               /OR 05252
05270   741000          SKP
05271   147607  RJSI3   DZM JST55               /CLEAR ERROR TABLE
05272   212222          LAC 12222               /OR 02222
05273   544611          SAD K615
05274   751000          CLA!SKP
05275   740040  E597    HALT            /ERROR, RJMP ADR, (12222 OR 02222)
                                        /NOT 615253 OR 605253
05276   750000          CLA
05277   547610          SAD JST44
05300   741000          SKP
05301   740040  E598    HALT            /ERROR, JMS DEST'N ERROR
                /
05302   206017          LAC K13333      /DIRECT ADR, 13333 OR 03333
05303   054444          DAC 14444               /OR 04444
05304   205337          LAC JSI44               /JMS* 14444 OR 04444
05305   047610          DAC JST44
05306   055252          DAC 15252               /OR 05252
05307   205340          LAC RJMI4
05310   053334          DAC 13334               /OR 03334
05311   615252          JMP 15252               /OR 05252
05312   741000          SKP
05313   147610  RJSI4   DZM JST44               /CLEAR ERROR TABLE
05314   213333          LAC 13333               /OR 03333
05315   544611          SAD K615
05316   751000          CLA!SKP
05317   740040  E599    HALT            /ERROR, RJMP ADR (13333 OR 03333)
                                        /NOT 615253 OR 605253
05320   447517          ISZ WORK3               /CHECK DONE LOOPING
05321   605205          JMP XTJMSI      /LOOP
05322   106336          JMS GENRAN      /GET NO, FOR NEXT LOOP
05323   106362          JMS CKNO
05324   700004          CLOF
05325   605341          JMP XTXCT               /TEST XCT INDIRECTS
                        .EJECT
```

```
                        /CONSTANTS FOR LAC*, XCT JMS* MODIFIED
                        /WHEN IN UPPER 4K
                        /
05326   012525          INK52   12525
05327   127777          JMSI1   JMS* 07777
05330   605223          RJMI1   JMP RJSI1
05331   005222          RJSI1X  RJSI1-1
05332   136666          JSI66   JMS* 16666
05333   605247          RJMI2   JMP RJSI2
05334   015253          K15253  15253
05335   135555          JSI55   JMS* 15555
05336   605271          RJMI3   JMP RJSI3
05337   134444          JSI44   JMS* 14444
05340   605313          RJMI4   JMP RJSI4
                        /PDP-15 BASIC EXERCISER -       TAPE 6
                        /TEST XCT INDIRECT
                        /
05341   700002          XTXCT   IOF     /PI OFF FOR XCT* TO USE
                                /LOCATION 0
05342   207411                  LAC K0
05343   057777                  DAC 17777       /OR 07777
05344   205412                  LAC XCTDZM
05345   040000                  DAC 0   /DZM 12525 OR 02525
05346   777777                  LAW 17777
05347   052525                  DAC 12525               /(12525 OR 02525) = 777777
05350   437777                  XCT* 17777      /OR 07777
05351   212525                  LAC 12525               /OR 02525
05352   740200                  SZA
05353   740040          E600    HALT                    /ERROR, XCT* A DZM FAILED
                                                        /(12525 OR 02525) NOT 777777
                        /
                        /TEST ISZ INDIRECT,     PI IS OFF
                        /
05354   207411                  LAC K0
05355   057777                  DAC 17777               /OR 07777
05356   777777                  LAW 17777
05357   040000                  DAC 0           /(0) = 777777
05360   477777                  ISZ* 17777
05361   740040          E601    HALT            /ERROR ISZ* FAILED TO SKIP/
                                .EJECT
```

```
                    /TEST XCT* ADD* PI IS OFF
                    /
05362   777777              LAW -1
05363   040017              DAC 17          /C(17) = 777777
05364   040010              DAC 10
05365   205413              LAC ADDI                /ADD* 10
05366   040000              DAC 0           /AND* 17776 OR 07776
05367   740031              CMA!IAC         /AC = 457770 (COMPLEMENT OF AND* 10).
05370   420017              XCT* 17         /ADD ADD* 10 WITH ITS COMPLEMENT
05371   547412              SAD K1          /AC MUST EQUAL OCTAL 1
05372   741000              SKP
05373   740040      E602    HALT            /ERROR, XCT* 17
                                            /FOLLOWED BY ADD* 10 FAILED,
05374   447517              ISZ WORK3               /CHECK DONE LOOPING
05375   605341              JMP XTXCT               /LOOP
05376   106336              JMS GENRAN      /GET NO, FOR NEXT LOOP
05377   106362              JMS CKNO
05400   207501              LAC KSKP
05401   040001              DAC 1           /RESTORE LOC 1
05402   750004              LAS
05403   740010              RAL
05404   740100              SMA
05405   700042              ION             /PI BACK ON
05406   507440              AND K20K
05407   741200              SNA             /TEST ACS5
05410   106614              JMS SETCLK              /CLOCK BACK ON
05411   605414              JMP AUTOIN              /TEST INDEX REGISTERS
                            .EJECT
```

```
                        /CONSTANTS FOR PRECEDING LOOPS, MODIFIED WHEN IN UPPER 4K
                        /
05412   152525          XCTDZM  DZM 12525
05413   320010          ADDI    ADD* 10
                        /
                        /
                        /TEST AUTO-INDEX (XOR* 10)
                        /
05414   206006          AUTOIN  LAC K17776
05415   040010                  DAC 10          /(10) = 17776 OR 07776
05416   207446                  LAC K1S         /AC = 11111
05417   057777                  DAC 17777               /OR 07777
05420   260010                  XOR* 10
05421   740200                  SZA
05422   740040          E603    HALT            /ERROR, XOR* 10 FAILED
                                                /AC NOT 111111
05423   200010                  LAC 10
05424   546007                  SAD K17777
05425   741000                  SKP
05426   740040          E604    HALT            /ERROR, (10) NOT INCREMENTED+1
                        /
05427   206010                  LAC K16665
05430   040010                  DAC 10          /(10) = 16665 OT 06665
05431   207447                  LAC K2S         /AC = 22222
05432   056666                  DAC 16666               /OR 06666
05433   260010                  XOR* 10
05434   740200                  SZA
05435   740040          E605    HALT            /ERROR, XOR* 10 FAILED
                                                /AC NOT 22222
05436   200010                  LAC 10
05437   546011                  SAD K16666
05440   741000                  SKP
05441   740040          E606    HALT            /ERROR, (10) NOT INCREMENTED+1
                        /
05442   206012                  LAC K15554
05443   040010                  DAC 10          /(10) = 15554 OR 05554
05444   207450                  LAC K3S         /AC = 333333
05445   055555                  DAC 15555
05446   260010                  XOR* 10
05447   740200                  SZA
05450   740040          E607    HALT            /ERROR, XOR* 10 FAILED, AC NOT 333333
05451   200010                  LAC 10
05452   546013                  SAD K15555
05453   741000                  SKP
05454   740040          E608    HALT            /ERROR, (10) NOT INCREMENTED +1
                                ,EJECT
```

```
05455   206014          LAC K14443
05456   040010          DAC 10          /(10) = 14443 OR 04443
05457   207451          LAC K4S         /AC = 444444
05460   054444          DAC 14444
05461   260010          XOR* 10
05462   740200          SZA
05463   740040  E609    HALT            /ERROR, XOR* 10 FAILED AC NOT 444444
05464   200010          LAC 10
05465   546015          SAD K14444
05466   741000          SKP
05467   740040  E610    HALT            /ERROR, (10) NOT INCREMENTED +1
05470   206016          LAC K13332
05471   040010          DAC 10          /(10) = 13332 OR 03332
05472   207452          LAC K5S         /AC = 55555
05473   053333          DAC 13333
05474   260010          XOR* 10
05475   740200          SZA
05476   740040  E611    HALT            /ERROR, XOR* 10 FAILED AC NOT 555555
05477   200010          LAC 10
05500   546017          SAD K13333
05501   741000          SKP
05502   740040  E612    HALT            /ERROR, (10) NOT INCREMENTED+1
                        /
05503   206020          LAC K12221
05504   040010          DAC 10          /(10) = 12221 OR 02221
05505   207453          LAC K6S         /AC = 666666
05506   052222          DAC 12222
05507   260010          XOR* 10
05510   740200          SZA
05511   740040  E613    HALT            /ERROR, XOR* 10 FAILED, AC NOT 666666
05512   200010          LAC 10
05513   546021          SAD K12222
05514   741000          SKP
05515   740040  E614    HALT            /ERROR, (10 NOT INCREMENTED+1
05516   206022          LAC K11110
05517   040010          DAC 10          /(10) = 11110 OR 01110
05520   207454          LAC K7S         /AC = 777777
05521   051111          DAC 11111
05522   260010          XOR* 10
05523   740200          SZA
05524   740040  E615    HALT            /ERROR, XOR* 10 FAILED, AC NOT 777777
05525   200010          LAC 10
05526   546023          SAD K11111
05527   741000          SKP
05530   740040  E616    HALT            /ERROR, (10) NOT INCREMENTED +1
                        .EJECT
```

```
                        /TEST ISZ* 11
                        /
05531   206024                  LAC K15252
05532   040011                  DAC 11          /(11) = 15252 OR 05252
05533   207454                  LAC K7S
05534   055253                  DAC 15253               /OR 05253
05535   460011                  ISZ* 11
05536   740040          E617    HALT            /ERROR, ISZ FAILED TO SKIP
                                                /AUTO-INDEX 11 FAILED
05537   215253                  LAC 15253
05540   740200                  SZA
05541   740040          E618    HALT            /ERROR, (15253 OR 05253) NOT 0
                                                /ISZ FAILED
05542   200011                  LAC 11
05543   545334                  SAD K15253
05544   741000                  SKP
05545   740040          E619    HALT            /ERROR, (11) NOT INCREMENTED+1
                        /
                        /AUTON-INDEX    JMP* 12,
                        /
05546   207611                  LAC AUTJMP
05547   740200                  SZA
05550   740040          E620    HALT            /ERROR, JMP* 12 FAILED TO REACH 15253
05551   207534                  LAC JMPAUT      /JMP* 12
05552   047611                  DAC AUTJMP
05553   206025                  LAC AUTRET      /RJMP TO AUTR
05554   055253                  DAC 15253
05555   206024                  LAC K15252
05556   040012                  DAC 12          /(12) = 15252
05557   620012                  JMP* 12
05560   741000                  SKP
05561   147611          AUTR    DEM AUTJMP      /CLEAR ERROR TABLE
05562   200012                  LAC 12
05563   545334                  SAD K15253
05564   741000                  SKP
05565   740040          E621    HALT            /ERROR, (12) NOT INCREMENTED+1
                        /
                        /AUTO-INDEX (DAC* 13),
                        /
05566   204553                  LAC K76
05567   040013                  DAC 13          /(13) = 07776 OR 17776
05570   204553                  LAC K76
05571   047777                  DAC 07777               /(07777) = 07776
05572   207411                  LAC K0
05573   060013                  DAC* 13
05574   207777                  LAC 07777
05575   740200                  SZA
05576   740040          E622    HALT            /ERROR, (07777) NOT 0, DAC* 13 FAILED
05577   200013                  LAC 13
05600   544550                  SAD K77
05601   741000                  SKP
05602   740040          E623    HALT            /ERROR (13) NOT INCREMENTED+1
                                .EJECT
```

```
                        /AUTO-INDEX (XCT* 14),
                        /
05603   204574                  LAC K71
05604   040014                  DAC 14          /(14) = 07771
05605   207525                  LAC AUTCMA
05606   047772                  DAC 07772               /(07772) = CMA
05607   750001                  CLA!CMA
05610   420014                  XCT* 14
05611   740200                  SZA
05612   740040          E624    HALT            /ERROR, AC NOT 0 (XCT* 14) A CMA
05613   200014                  LAC 14
05614   544566                  SAD K72
05615   741000                  SKP
05616   740040          E625    HALT            /ERROR, (14) NOT INCREMENTED+1
                        /
                        /AUTO-INDEX (TAD* 15),
                        /
05617   206006                  LAC K17776
05620   040015                  DAC 15          /(15) = 17776 OR 07776
05621   207412                  LAC K1
05622   057777                  DAC 17777               /OR 07777
05623   754001                  CLL!CLA!CMA
05624   360015                  TAD* 15
05625   740200                  SZA
05626   740040          E626    HALT            /ERROR, AC NOT 0 (TAD* 15)
05627   740400                  SNL
05630   740040          E627    HALT            /ERROR, LINK NOT 1 (TAD* 15)
05631   200015                  LAC 15
05632   546007                  SAD K17777
05633   741000                  SKP
05634   740040          E628    HALT            /ERROR, (15) NOT INCREMENTED+1
05635   217777                  LAC 17777
05636   547412                  SAD K1
05637   741000                  SKP
05640   740040          E629    HALT            /ERROR, (17777 OR 07777) NOT 1
                        /
                        /AUTO-INDEX (SAD* 16),
                        /
05641   204561                  LAC K74
05642   040016                  DAC 16          /(16) = 07774
05643   207465                  LAC K5252
05644   047775                  DAC 07775               /(07775) = 5252
05645   560016                  SAD* 16
05646   741000                  SKP
05647   740040          E630    HALT            /ERROR, SAD SKIPPED (SAD* 16)
05650   207775                  LAC 07775
05651   547465                  SAD K5252
05652   741000                  SKP
05653   740040          E631    HALT            /ERROR, (07775) NOT 5252
05654   200016                  LAC 16
05655   544556                  SAD K75
05656   741000                  SKP
05657   740040          E632    HALT            /ERROR, (16) NOT INCREMENTED+1
                                .EJECT
```

```
                        /AUTO-INDEX (JMS* 17).
                        /
05660   207612                  LAC AUTJMS
05661   744200                  SZA!CLL
05662   740040          E633    HALT            /ERROR, ERROR TABLE NOT 0
05663   206026                  LAC AUTRJM
05664   047773                  DAC 07773               /JMP AUTRE1
05665   204574                  LAC K71
05666   040017                  DAC 17          /(17) = 07771
05667   207532                  LAC JMSAUT
05670   047612                  DAC AUTJMS      /JMS* 17 IN ERROR TABLE
05671   120017                  JMS* 17
05672   741000                  SKP
05673   147612          AUTRE1  DZM AUTJMS      /CLEAR ERROR TABLE
05674   207772                  LAC 07772
05675   504550                  AND K77
05676   546027                  SAD AURJMP
05677   741000                  SKP
05700   740040          E634    HALT            /ERROR, (07772) STORED WRONG
                                                /(07772) SHOULD = AUTRE1+1
05701   200017                  LAC 17
05702   544566                  SAD K72
05703   741000                  SKP
05704   740040          E635    HALT            /ERROR, (17) NOT INCREMENTED+1
                        /
                        /AUTO-INDEX (ISZ* 10) (10) = 10.
                        /
05705   207415                  LAC K10
05706   040010                  DAC 10
05707   207454                  LAC K7S
05710   040011                  DAC 11          /(11) = 777777
05711   460010                  ISZ* 10
05712   740040          E636    HALT            /ERROR, ISZ FAILED TO SKIP
05713   200010                  LAC 10
05714   547416                  SAD K11
05715   741000                  SKP
05716   740040          E637    HALT            /ERROR, (10) NOT 11
05717   200011                  LAC 11
05720   740200                  SZA
05721   740040          E638    HALT            /ERROR, (11) NOT 0
                        /
                        /AUTO-INDEX (ISZ* 11) (11) = 10.
                        /
05722   207415                  LAC K10
05723   040011                  DAC 11          /(11) = 10
05724   460011                  ISZ* 11
05725   200011                  LAC 11
05726   547417                  SAD K12A
05727   741000                  SKP
05730   740040          E639    HALT            /ERROR, ISZ* 11 FAILED TO
                                                /INCREMENT +2 (11)
                                .EJECT
```

```
                    /AUTO-INDEX (XCT* 15),
                    /
05731   204564              LAC K73
05732   040015              DAC 15              /(15) = 07773
05733   207530              LAC LAWAUT
05734   047774              DAC 07774                   /(07774) = XCT* 15
05735   207531              LAC LAWFUL
05736   047775              DAC 07775                   /(07775) = LAW 17777
05737   750000              CLA                 /AC = 0
05740   420015              XCT* 15
05741   740001              CMA
05742   740200              SZA
05743   740040      E640    HALT                /ERROR, AC NOT ONES
                                                /LAW 1777 DID NOT OCCUR
05744   200015              LAC 15
05745   544556              SAD K75
05746   741000              SKP
05747   740040      E641    HALT                /ERROR, (15) NOT 7775 (XCT* 15)
05750   447517              ISE WORK3           /CHECK DONE LOOPING
05751   605414              JMP AUTOIN          /LOOP
05752   106336              JMS GENRAN
05753   106362              JMS CKNO
                            ,EJECT
```

```
                        /
                        /TEST LAW X WITH TAD, AC SHO LD ALWAYS
                        /BE CLEAR AFTER THE TAD, LAW -1 TO
                        /LAW -20000 ARE USED, AND THE PROPER BIT IS
                        /ALWAYS ADDED TO GIVE OVERFLOW.
                        /
05754   207412  LAWD    LAC K1
05755   046004          DAC BITN                /START WITH BIT 17
05756   777777  LAWS    LAW -1          /THIS LAW WILL ROTATE LEFT
05757   346004          TAD BITN                /SHOULD OVERFLOW + AC = 0
05760   741200          SNA
05761   605764          JMP .+3         /OK
05762   740040  ER1     HALT            /ERROR, AC NOT 0 AFTER A
05763   605756          JMP LAWS                /DO SAME TAD AGAIN,
                        /
05764   206004          LAC BITN
05765   744010          RCL             /NEXT BIT POSITION,
05766   046004          DAC BITN
05767   405756          XCT LAWS
05770   744010          RCL             /2'S COMPLEMENT OF C(BITN)
05771   245756          DAC LAWS
05772   546005          SAD KNOP                /DONE IF = A NOP
05773   741000          SKP
05774   605756          JMP LAWS                /TEST NEXT BIT POSITION
05775   777777          LAW -1
05776   045756          DAC LAWS                /RESTORE LAWS
05777   447517          ISZ WORK3
06000   605754          JMP LAWD                /LOOP
06001   106336          JMS GENRAN
06002   106362          JMS CKNO
06003   606030          JMP TIAC                /TEST IAC
                        /
06004   000000  BITN    0
06005   740000  KNOP    740000
                        .EJECT
```

```
                        /CONSTANTS FOR AUTO-INDEXING.   MODIFIED WHEN IN HI 4K
                        /
06006   017776          K17776  17776
06007   017777          K17777  17777
06010   016665          K16665  16665
06011   016666          K16666  16666
06012   015554          K15554  15554
06013   015555          K15555  15555
06014   014443          K14443  14443
06015   014444          K14444  14444
06016   013332          K13332  13332
06017   013333          K13333  13333
06020   012221          K12221  12221
06021   012222          K12222  12222
06022   011110          K11110  11110
06023   011111          K11111  11111
06024   015252          K15252  15252
06025   605561          AUTRET  JMP AUTR
06026   605673          AUTRJM  JMP AUTRE1
06027   005672          AURJMP  AUTRE1-1
                                ,EJECT
```

```
                        /
                        /TEST   IAC
                        /
06030   750000  TIAC    CLA             /AC = 0
06031   740032          IAC             /AC+1
06032   547412          SAD K1
06033   741000          SKP
06034   740040  EX01    HALT            /ERROR, AC NOT = 000001
                        /
06035   744000          CLL             /L = 0
06036   777777          LAW -1          /AC = 777777
06037   740030          IAC             /AC OVERFLOW
06040   740200          SZA
06041   740040  EX02    HALT            /ERROR, AC NOT ZERO
06042   740400          SNL             /L MUST BE 1
06043   740040  EX03    HALT            /ERROR, LINK NOT COMPLEMENTED
                        /
06044   744002          STL             /LINK = 1
06045   777777          LAW -1          /AC = 777777
06046   740030          IAC             /OVERFLOW THE AC
06047   740200          SZA
06050   740040  EX04    HALT            /ERROR, AC NOT ZERO
06051   741400          SZL
06052   740040  EX05    HALT            /ERROR, L NOT COMPLEMENTED
                        /
                        /TEST IAC WITH MICROPROGRAMMING
                        /
06053   207412          LAC K1
06054   740031          CMA!IAC         /AC = 777776 + 1
06055   740001          CMA
06056   741200          SNA             /AC MUST = 0
06057   606062          JMP .+3
06060   740001          CMA
06061   740040  EX06    HALT            /ERROR, CMA!IAC FAILED
                        /
06062   754031          CLL!CLA!CMA!IAC /L = 0, AC = 777777 + 1
06063   740400          SNL
06064   740040  EX07    HALT            /ERROR, LINK OR IAC FAILED
06065   740200          SZA
06066   740040  EX10    HALT            /ERROR, AC OR IAC FAILED
                        /
06067   750000          CLA             /AC = 0
06070   740230          SZA!IAC
06071   740040  EX13    HALT            /ERROR, SZA!IAC FAILED
                        /
06072   760000          LAW             /AC = 760000
06073   740230          SZA!IAC
06074   741000          SKP
                        .EJECT
```

```
06075   740040      EX14    HALT            /ERROR, SZA!IAC FAILED
06076   741230              SNA!IAC
06077   740040      EX15    HALT            /ERROR, SNA!IAC FAILED
                    /
06100   447517              ISZ WORK3
06101   606030              JMP TIAC        /LOOP
06102   106336              JMS GENRAN
06103   106362              JMS CKNO
                    /
                    /TEST SWHA
                    /
                    /
06104   777000      TSWH    LAW 17000       /AC = 777000
06105   742030              SWHA            /AC = 000777
06106   547347              SAD K777
06107   741000              SKP
06110   740040      EX16    HALT            /ERROR, SWHA FAILED WITH
                                            /AC = 777000,
                    /
06111   207464              LAC K2525       /AC = 002525
06112   742030              SWHA
06113   547472              SAD K502        /AC SHOULD BE 525002
06114   741000              SKP             /OK
06115   740040      EX17    HALT            /ERROR, SWHA FAILED WITH
                                            /AC = 002525,
                    /
                    /TEST CONDITIONAL SKIPS WITH SWHA
                    /
06116   207435              LAC K400K       /AC = 400000
06117   742130              SMA!SWHA        /SHOULD SKIP, THEN SWAP
06120   740040      EX18    HALT            /ERROR, SMA!SWHA DIDN'T SKIP
06121   743130              SPA!SWHA
06122   740040      EX19    HALT            /ERROR, SPA!SWHA FAILED, C(AC)
                                            /SHOULD BE 000001 IF IT IS
                                            /STILL 400000 MAYBE SMA!SWHA
                                            /ABOVE FAILED,
06123   547435              SAD K400K       /SHOULD AGAIN = 400000
06124   741000              SKP             /OK
06125   740040      EX20    HALT            /ERROR, ONE OF THE TWO
                                            /PREVIOUS SWHA'S FAILED,
                    /
06126   447517              ISZ WORK3
06127   606104              JMP TSWH        /LOOP
06130   106336              JMS GENRAN
06131   106362              JMS CKNO
                    /
                            .EJECT
```

```
                        /
                        /TEST INDEX GROUP INSTRUCTIONS
                        /
                        /XG DEFINITIONS
                        /
          720000        AAS=720000              /ADD TO AC; SKIP IF = OR > LR
          721000        PAX=721000              /PLACE AC IN XR
          722000        PAL=722000              /PLACE AC IN LR
          723000        AAC=723000              /ADD TO AC
          724000        PXA=724000              /PLACE XR IN AC
          725000        AXS=725000              /ADD TO XR; SKIP IF = OR > LR
          726000        PXL=726000              /PLACE XR IN LR
          730000        PLA=730000              /PLACE LR IN AC
          731000        PLX=731000              /PLACE LR IN XR
          734000        CLAC=734000             /CLEAR AC
          735000        CLX=735000              /CLEAR XR
          736000        CLLR=736000             /CLEAR LR
          737000        AXR=737000              /ADD TO XR
          707764        EBA=707764              /ENTER 9 MODE (BANK ADDRESS)
          707762        EPA=707762              /ENTER 15 MODE (4K PAGES)
          707761        SBA=707761              /SKIP IF IN 9 MODE
          707741        EXBA=707741             /SKIP IF A PDP=15
                        /
                        /TEST XG IN 9 MODE TO MAKE SURE THE AC OR
                        /LINK DOES NOT CHANGE
                        /
06132     754000  TSXG  CLA!CLL                 /AC, LINK = 0
06133     720000        AAS                     /ADD TO AC; COMPARE TO LR
06134     740200        SZA
06135     740040  EX21  HALT                    /ERROR, AAS CHANGED C(AC)...
                                                /...WHILE IN 9 MODE.
06136     741400        SZL
06137     740040  EX22  HALT                    /ERROR, AAS CHANGED C(L)...
                                                /... WHILE IN 9 MODE.
                        /
                        /TRY PAX IN 9 MODE
                        /
06140     754000        CLA!CLL                 /AC, LINK = 0
06141     721000        PAX
06142     740200        SZA
06143     740040  EX23  HALT                    /ERROR, PAX CHANGED C(AC)...
                                                /...WHILE I 9 MODE
06144     741400        SZL
06145     740040  EX24  HALT                    /ERROR, PAX CHANGED C(L)...
                                                /...WHILE IN 9 MODE
                        /
                        /TRY PAL IN 9 MODE
                        /
06146     754000        CLA!CLL                 /AC, LINK = 0
06147     722000        PAL
06150     740200        SZA
06151     740040  EX25  HALT                    /ERROR, PAL CHANGED C(AC)...
                                                /...WHILE IN 9 MODE
06152     741400        SZL
06153     740040  EX26  HALT                    /ERROR, PAL CHANGED C(L)...
```

/...WHILE IN 9 MODE

/

.EJECT

```
                        /AAC IN 9 MODE
                        /
06154   754000          CLA!CLL
06155   723000          AAC
06156   740200          SZA
06157   740040  EX27    HALT            /ERROR, AAC+000 CHANGED C(AC)...
                                        /... IN 9 MODE
06160   741400          SZL
06161   740040  EX28    HALT            /ERROR, AAC+000 CHANGED C(L)...
                                        /...WHILE IN 9 MODE
                        /
                        /PXA IN 9 MODE, XR SHOULD INITIALLY BE 0.
                        /
06162   754001          CLA!CMA!CLL
06163   724000          PXA
06164   740200          SZA
06165   740040  EX29    HALT            /ERROR, PXA CHANGED C(AC)...
                                        /...IN 9 MODE
06166   741400          SZL
06167   740040  EX30    HALT            /ERROR, PXA CHANGED C(L)...
                                        /...IN 9 MODE
                        /
                        /AXS IN 9 MODE, XR SHOULD INITIALLY BE 0.
                        /
06170   754000          CLA!CLL
06171   725000          AXS             /SHOULDN'T SKIP
06172   740040  EX31    HALT            /AXS DID NOT SKIP IN 9 MODE
06173   740200          SZA
06174   740040  EX32    HALT            /AXS CHANGED AC IN 9 MODE
06175   741400          SZL
06176   740040  EX33    HALT            /AXS CHANGED LINK IN 9 MODE
                        /
                        /PXL IN 9 MODE, XR SHOULD INITIALLY BE 0.
                        /
06177   754001          CLA!CLL!CMA
06200   726000          PXL
06201   740001          CMA
06202   740200          SZA
06203   740040  EX34    HALT            /ERROR, PXL CHANGED C(AC)...
                                        /...IN 9 MODE
06204   741400          SZL
06205   740040  EX35    HALT            /ERROR, PXL CHANGED C(L)...
                                        /...IN 9 MODE
                        .EJECT
```

```
                        /
                        /PLA IN 9 MODE, LR SHOULD INITIALLY BE 7.
                        /
06206   754001                  CLA!CMA!CLL
06207   730000                  PLA
06210   740200                  SZA
06211   740040          EX36    HALT            /ERROR, PLA CHANGED C(AC)...
                                                /...IN 9 MODE
06212   741400                  SZL
06213   740040          EX37    HALT            /ERROR, PLA CHANGED C(L)...
                                                /...IN 9 MODE
                        /
                        /PLX IN 9 MODE, XR, LR SHOULD INITIALLY BE 0.
                        /
06214   754000                  CLA!CLL
06215   731000                  PLX
06216   740200                  SZA
06217   740040          EX38    HALT            /ERROR, PLX CHANGED C(AC)...
                                                /...IN 9 MODE
06220   741400                  SZL
06221   740040          EX39    HALT            /ERROR, PLX CHANGED C(L)...
                                                /...IN 9 MODE
                        /
                        /CLAC IN 9 MODE
                        /
06222   754001                  CLA!CMA!CLL
06223   734000                  CLAC
06224   740200                  SZA
06225   740040          EX40    HALT            /ERROR, CLAC WORKED IN 9 MODE
06226   741400                  SZL
06227   740040          EX41    HALT            /ERROR, CLAC CHANGED C(L)...
                        /                       /...IN 9 MODE
                        /CLX IN 9 MODE
                        /
06230   754001                  CLA!CMA!CLL
06231   735000                  CLX
06232   740001                  CMA
06233   740200                  SZA
06234   740040          EX42    HALT            /ERROR, CLX CHANGED C(AC)...
                                                /...IN 9 MODE
06235   741400                  SZL
06236   740040          EX43    HALT            /ERROR, CLX CHANGED C(L)...
                                                /...IN 9 MODE
                        /
                        /CLLR IN 9 MODE
                        /
06237   754001                  CLA!CMA!CLL
06240   736000                  CLLR
06241   740001                  CMA
06242   740200                  SZA
                                .EJECT
```

```
06243   740040      EX44    HALT            /ERROR, CLLR CHANGED C(AC)...
                                            /...IN 9 MODE
06244   741400              SZL
06245   740040      EX45    HALT            /ERROR, CLLR CHANGED C(L)...
                                            /...IN 9 MODE
                    /
                    /AXR IN 9 MODE
                    /
06246   754000              CLA!CLL
06247   737777              AXR+777
06250   724000              PXA             /XR TO AC
06251   547454              SAD K7S
06252   741000              SKP
06253   740040      EX46    HALT            /ERROR, AXR FAILED...
                                            /...IN 9 MODE
06254   741400              SZL
06255   740040      EX47    HALT            /ERROR, AXR CHANGED C(L)...
                                            /...IN 9 MODE
06256   735000              CLX             /CLEAR XR
                    /
                    /TEST SBA (SKIP IF BANK MODE)
                    /
06257   754001              CLA!CMA!CLL
06260   707761              SBA
06261   740040      EX48    HALT            /ERROR, SBA DID NOT SKIP...
                                            /...CP SHOULD BE IN 9 MODE
06262   740001              CMA
06263   740200              SZA
06264   740040      EX49    HALT            /ERROR, SBA CHANGED C(AC).
06265   741400              SZL
06266   740040      EX50    HALT            /ERROR, SBA CHANGED C(L).
                    /
                    /TEST EXBA (SKIP IF PDP-15) AND EPA (ENTER 15 MODE)
                    /
06267   754000              CLA!CLL
06270   707741              EXBA
06271   740040      EX51    HALT            /ERROR, EXBA DIDN'T SKIP...
                                            /...IS THIS A PDP-15?
06272   700002              IOF
06273   707762              EPA             /ENTER 15 MODE
06274   707761              SBA             /SKIP IF IN 9 MODE
06275   741000              SKP
06276   740040      EX52    HALT            /ERROR, SBA SKIPPED AFTER...
                                            /AN EPA WAS ISSUED.
06277   707764              EBA             /BACK TO 9 MODE
06300   707761              SBA
06301   740040      EX53    HALT            /ERROR, SBA DIDN'T SKIP...
                                            /...AFTER AN EBA.
                    /
06302   750004              LAS
06303   740010              RAL
06304   740100              SMA
06305   700042              ION
06306   447517              ISZ     WORK3
06307   606132              JMP     TSXG    /LOOP
```

```
                        /
                        /TEST IOT 3341 (SKIP IF PC24/5) IF ACS 9 = 1
                        /
06310   752004  PC05    LAS
06311   507425          AND     K400            /CHECK ACS 9
06312   741223          SNA
06313   606320          JMP     .+5             /ACS 9 = 0 (NO PC15)
06314   703341          703341                  /SKIP IF PC15 INSTALLED,
06315   606322          JMP     .+5
06316   740040  EX54    HALT                    /ERROR, ACS 9 IS SET, INDICATING
                                                /NO PC15, BUT 703341 SKIPPED.
06317   606314          JMP     .-3
06320   703341          703341                  /SHOULD SKIP
06321   740040  EX55    HALT                    /ERROR, PC15 INSTALLED, BUT
                        /                       /703341 DIDN'T SKIP
06322   700002          IOF             /PI OFF
06323   750004          LAS
06324   507440          AND     K20K
06325   741200          SNA             /SKIP = DON'T RELOCATE
06326   606410          JMP     ENTST
06327   760207          LAW     207
06330   107237          JMS     TLSSF   /BELL FOR ONE PASS
06331   750004          LAS
06332   507433          AND K207
06333   740202          SZA
06334   107303          JMS     PINOT   /PI INHIBITED
06335   600112          JMP     SEQUEN  /START OVER
                        .EJECT
```

```
                        /RANDOM NUMBER GENERATORS
                        /
06336   000000  GENRAN  0
06337   206357          LAC RANDEX
06340   546360          SAD ENDTBL              /CHECK FOR END OF TABLE
06341   741000          SKP             /END
06342   606352          JMP RANTAD-1    /GENERATE RANDOM
06343   206361          LAC TBLTOP
06344   046357          DAC RANDEX      /RESET INDEX TO FIRST
06345   207540          LAC RANCON      /POSITION MODIFIER
06346   744010          CLL!RAL         /1 LEFT
06347   741400          SZL             /WAS BIT 0 A 1
06350   347412          TAD K1          /YES MAKE 17 A 1
06351   047540          DAC RANCON      /RESTORE MODIFIER
06352   226357          LAC* RANDEX     /GET FIRST CONTROL
06353   347540  RANTAD  TAD RANCON      /ADD MODIFIER
06354   066357          DAC* RANDEX     /NEW CONTROL = RANDOM
06355   446357          ISZ RANDEX      /STEP POINTER
06356   626336          JMP* GENRAN     /EXIT
                        /
06357   007551  RANDEX  RANTBL-10
06360   007551  ENDTBL  RANTBL-10
06361   007541  TBLTOP  RANTBL
                        /
06362   000000  CKNO    0
06363   507471          AND K37S                /MAKE 65K OR LESS
06364   740001          CMA
06365   047517          DAC WORK3               /LOOP COUNTER
06366   626362          JMP* CKNO               /EXIT
                        /
06367   000000  RANGEN  0
06370   206357          LAC RANDEX
06371   546360          SAD ENDTBL              /CHECK FOR TABLE END
06372   741000          SKP             /END
06373   606403          JMP TADRAN-1    /GENERATE RANDOM
06374   206361          LAC TBLTOP
06375   046357          DAC RANDEX              /RESET INDEX TO FIRST
06376   207540          LAC RANCON              /POSITION MODIFIER
06377   744010          CLL!RAL         /1 LEFT
06400   741400          SZL             /WAS BIT 0 A 1
06401   347412          TAD K1          /MAKE 17 A 1
06402   047540          DAC RANCON              /RESTORE MODIFIER
06403   226357          LAC* RANDEX     /GET FIRST CONTROL
06404   347540  TADRAN  TAD RANCON              /ADD MODIFIER
06405   066357          DAC* RANDEX     /NEW CONTROL = RANDOM
06406   740000          NOP
06407   626367          JMP* RANGEN     /EXIT
                        ,EJECT
```

```
                        /PDP-15 BASIC EXERCISER -       TAPE 7
                        /
                        /ROUTINE FOR PROGRAM RELOCATION
                        /
06410   700002  ENTST   IOF             /PI OFF DURING RELOCATION
06411   206411          LAC .
06412   507437          AND K10K
06413   740200          SZA             /SEE IF IN LO OR HI 4K
06414   606503          JMP MVBK                /HI 4K
06415   740001          CMA
06416   047516          DAC WORK2               /SOURCE ADDRESS
06417   207342          LAC K7777               /DEST'N ADR, TO HI 4K
06420   047517          DAC WORK3
06421   207516  MOVE    LAC WORK2
06422   047337          DAC MOVES
06423   207517          LAC WORK3
06424   047340          DAC MOVED
06425   447337  RFROM   ISZ MOVES
06426   227337          LAC* MOVES      /SOURCE ADR,
06427   047517          DAC WORK3               /SAVE INSTRUCTION
06430   507443          AND K700K
06431   247443          XOR K700K
06432   740200          SZA             /OPERATE INST, IF 0
06433   606510          JMP MRINS               /MEMORY REF
06434   207517          LAC WORK3
06435   447340  MVRTN   ISZ MOVED
06436   067340          DAC* MOVED      /STORE IN OPPOSITE 4K
06437   547327          SAD LIMITA      /DONE WITH INST, IF EQUAL
06440   741000          SKP             /MOVE CONSTANT TABLES
06441   606425          JMP RFROM               /MOVE ANOTHER INST,
06442   147517          DZM WORK3
06443   447337  MVCST   ISZ MOVES
06444   227337          LAC* MOVES      /SOURCE
06445   447340          ISZ MOVED
06446   067340          DAC* MOVED      /DEST'N
06447   207337          LAC MOVES
06450   546707          SAD ENDOUT
06451   741000          SKP
06452   606443          JMP MVCST
                        .EJECT
```

```
26453   204602          LAC K210K
26454   247437          XOR K17K
26455   054602          DAC K210K+10000
26456   204545          LAC K170000
26457   247437          XOR K17K
26460   054545          DAC K170000+10000
26461   207352          LAC TTIN
26462   247437          XOR K17K
26463   057352          DAC TTIN+10000
26464   207351          LAC TTOUT
26465   247437          XOR K17K
26466   057351          DAC TTOUT+10000
26467   750004          LAS             /LOWER
26470   507433          AND K207
26471   740200          SZA             /CHECK FOR INHIBIT PI
26472   107303          JMS PINOT               /INHIBITED
                        .EJECT
```

```
06473   206473      BGNAGN  LAC .
06474   507437              AND K10K
06475   740200              SZA             /SEE WHICH 4K
06476   741000              SKP
06477   627333              JMP* BGNHI      /START OVER IN HI 4K
06500   760207              LAW 207         /BELL
06501   107237              JMS TLSSF
06502   627332              JMP* BGNLO              /START IN LOW 4K
                    /
                    /SETUP TO MOVE TO LOW 4K
                    /
06503   777777      MVBK    LAW 17777               /DESTIN
06504   047517              DAC WORK3
06505   207342              LAC K7777               /SOURCE
06506   047337              DAC MOVES
06507   606423              JMP MOVE+2      /MOVE PROGRAM
                    /
                    /
                    /ADJUST MEMORY REF. INSTRUCTIONS. DO NOT ADJUST IF
                    /ADR. PORTION=ANY ADR. FROM 0 TO 21.
                    /
06510   147335      MRINS   DZM WDCNT               /ADR. COMPARE WORD
06511   207517              LAC WORK3               /INST. TO BE MODIFIED
06512   507342              AND K7777               /CLEAR BITS 0-5
06513   047516              DAC WORK2               /SAVE
06514   207335              LAC WDCNT
06515   547422              SAD K22         /DONE IF EQUAL TO 22
06516   606523              JMP .+5
06517   547516              SAD WORK2               /COMPARE
06520   606434              JMP MVRTN-1     /ADR. IS SOME REG. FROM 2
                                            /TO 21. MOVE WITHOUT ADJUSTING
06521   447335              ISZ WDCNT               /ADR. COUNT+1
06522   606514              JMP .-6
06523   207437              LAC K10K                /10000
06524   247517              XOR WORK3               /ADJUST INST. BY 10000
06525   606435              JMP MVRTN               /MOVE
                    /
06526   047526      SAV3    DAC SAVAC               /THESE ARE MODIFIED FOR
06527   047527      SAV5    DAC RJMP                /RELOCATION
06530   606531      SAV6    JMP SRVINT
                            .EJECT
```

```
                        /
                        /SERVICE ALL INTERRUPTS
                        /
06531   750004  SRVINT  LAS             /READ ACS
06532   507437          AND K10K        /BIT 5
06533   740200          SZA             /CHECK BIT 5
06534   606543          JMP NOCLK       /CHECK CLOCK FLAG
06535   200007          LAC 7           /RTC REGISTER
06536   741100          SPA             /RTC OVERFLOW IF SKIP
06537   606546          JMP E642A+1     /NO OVERFLOW YET
06540   700001          CLSF            /CLSF SHOULD SKIP
06541   740040  E642    HLT             /CLOCK REG. SAYS OFERFLOW, BUT
                                        /RTC FLAG NOT SET.
06542   606606          JMP CLKINT      /SERVICE CLOCK
                        /
06543   700001  NOCLK   CLSF            /SHOULD NOT SKIP
06544   741000          SKP             /OK
06545   740040  E642A   HLT             /RTC FLAG IS SET.  IT WAS
                                        /NEVER SELECTED BY THE PROGRAM.
06546   700301          KSF
06547   741000          SKP
06550   606572          JMP RTNIT
06551   700314          IORS
06552   741100          SPA             /STATUS WORD BIT 0 MUST = 0
06553   740040  E643    HALT            /ERROR, BIT 0 SET,      PI OFF
06554   207514          LAC WORK
06555   740010          RAL
06556   741100          SPA             /SEE IF TTY IN USE AT TIME
                                        /OF PI
06557   606646          JMP TTYINT      /CONTINUE PRINTING
06560   700314          IORS            /I/O STATUS WORD
06561   507344          AND K1400
06562   740200          SZA             /CHECK FOR NO TAPE FLAGS
06563   107167          JMS RNFLG               /EITHER READER OR PUNCH NO TAPE
06564   700101          RSF             /CHECK FOR PI FROM READER
06565   741000          SKP
06566   607020          JMP READA               /READ MORE
06567   700201          PSF             /CHECK PUNCH PI
06570   606572          JMP RTNIT               /SOME OTHER DEVICE
06571   627001          JMP* GOPNCH     /PUNCH MORE
                        /
                        /SETUP TO RETURN TO INSTRUCTION TEST
                        /
06572   744000  RTNIT   CLL
06573   700312          KRB
06574   207527          LAC RJMP                /C(0) AT PI
06575   741100          SPA             /CHECK LINK
06576   744002          STL             /RESTORE LINK
06577   507463          AND K17S
06600   546605          SAD ILINT
06601   740040  E644    HALT            /ERROR, PI OCCURRED AFTER LAC SAVAC
                                        /INSTEAD OF JMP * RJMP,
06602   207526          LAC SAVAC               /AC AT TIME OF PI
06603   700042  PION    ION             /PI ON
06604   627527          JMP* RJMP               /CONTENTS OF (0) AFTER PI
```

```
                        /
    06605   006603      ILINT   PION
                        /
    06606   700004      CLKINT  CLOF            /RTC OFF; CLEAR RTC FLAG
    06607   700001              CLSF
    06610   741000              SKP
    06611   740040      E644A   HLT                     /CLOCK FLAG STILL SET
                                                        /AFTER A CLOF
    06612   106631              JMS CLKSET              /RESET CLOCK TO RANDOM VALUE
    06613   606572              JMP RTNIT               /RETURN TO INST. TEST
                        .EJECT
```

```
                    /
                    /SETUP CLOCK VALUES
                    /
06614   000000      SETCLK  0
06615   106336              JMS GENRAN      /GET A NO, FOR CLOCK
06616   047335              DAC WDCNT               /SAVE
06617   507347              AND K777                /MAX, TIME = 9 SECS,
06620   047335              DAC WDCNT               /SAVE
06621   347350              TAD M167                /MIN, TIME = 2 SEC,
06622   741100              SPA             /POS,=2 SECS, OR MORE
06623   606615              JMP SETCLK+1    /NEG = LESS THAN 2 SEC,
06624   207335              LAC WDCNT
06625   740001              CMA
06626   040007              DAC 7           /PUT VALUE IN (7)
06627   700044              CLON            /CLOCK ON
06630   626614              JMP* SETCLK     /EXIT
                    /
06631   000000      CLKSET  0
06632   106367              JMS RANGEN              /GET A NO, FOR CLOCK
06633   047335              DAC WDCNT               /SAVE
06634   507347              AND K777                /MAX, TIME = 9 SECS,
06635   047335              DAC WDCNT               /SAVE
06636   347350              TAD M167                /MIN, TIME = 2 SECS,
06637   741100              SPA             /POS, = 2 SECS, OR MORE
06640   606632              JMP CLKSET+1    /NEG, = LESS THAN 2 SECS,
06641   207335              LAC WDCNT
06642   740001              CMA
06643   040007              DAC 7           /PUT VALUE IN (7)
06644   700044              CLON            /CLOCK ON
06645   626631              JMP* CLKSET     /EXIT
                    ,EJECT
```

```
                        /SETUP FOR READ, PUNCH, OR PRINT
                        /
06646   207351  TTYINT  LAC TTOUT
06647   546707          SAD ENDOUT              /IF EQUAL GO PUNCH AND READ
06650   606665          JMP PREADY
06651   207441          LAC K200K
06652   047514          DAC WORK
06653   700101          RSF
06654   741000          SKP
06655   740040  E645    HALT                    /ERROR, READ FLAG UP
06656   700201          PSF
06657   741000          SKP
06660   740040  E646    HALT                    /ERROR, PUNCH FLAG UP
06661   447351          ISZ TTOUT               /TTOUT = CHAR, BIN POINTER
06662   227351          LAC* TTOUT              /GET CHAR, FROM TTY BIN
06663   700406          TLS                     /PRINT ONE CHARACTER
06664   606572          JMP RTNIT               /RETURN TO INST, TEST
                        /
06665   147514  PREADY  DZM WORK
06666   147353          DZM CNTA
06667   147354          DZM CNTB
06670   700402          TCF                     /CLEAR TTY FLAG
06671   750004          LAS
06672   507424          AND K1K
06673   741200          SNA                     /TEST ACS 8 A 1
06674   606677          JMP .+3
06675   700104          RSA                     /SELECT READER
06676   606572          JMP RTNIT               /RETURN TO INST, TEST
06677   207001          LAC GOPNCH
06700   741200          SNA                     /0=1ST TIME THRU
06701   606710          JMP PNSTRT              /START SEQUENCE
06702   700104          RSA                     /SELECT READER
06703   627001          JMP* GOPNCH             /CONTINUE SEQUENCE
                        /
06704   007612  DATABL  TTBUFA-1
06705   007676  ENDBIN  TTBUFA+63
06706   007676  OUTTOP  TTBUFA+63
06707   007762  ENDOUT  TTBUFA+147
                        ,EJECT
```

```
                        /
                        /PUNCH DATA
                        /
06710   127273  PNSTRT  JMS CRLF                   /CR,LF
06711   750004          LAS
06712   507425          AND K400
06713   740200          SZA
06714   606727          JMP PNXT-2      /TTY ONLY
06715   700402          TCF             /CLEAR TTY FLAG
06716   750004          LAS
06717   507427          AND K3K         /MASK ACS 7 AND 8
06720   741200          SNA             /IF EITHER IS A 1, DON'T PUNCH
06721   606724          JMP .+3         /PUNCH DATA
06722   700202          PCF             /CLEAR PUNCH FLAG, NO MORE
                                        /PI'S FROM PUNCH SHOULD OCCUR,
06723   606572          JMP RTNIT               /RETURN TO INST, TEST
06724   750000          CLA
06725   700104          RSA             /SELECT READER AND PUNCH
06726   107001          JMS GOPNCH      /TO INITIATE SEQUENCE
06727   207357          LAC K300
06730   047361          DAC STORE
06731   447361  PNXT    ISZ STORE
06732   207361          LAC STORE
06733   107001          JMS GOPNCH      /PUNCH CHAR, IN AC 10-17
06734   207362          LAC SPCE                /(SPCE)=240
06735   107001          JMS GOPNCH      /PUNCH SPACE
06736   207361          LAC STORE
06737   547363          SAD K332                /DONE WITH ALPHABET IF EQUAL
06740   741000          SKP
06741   606731          JMP PNXT                /PUNCH MORE CHARS,
06742   207355          LAC K257
06743   047361          DAC STORE
06744   447361  PNXTA   ISZ STORE
06745   207361          LAC STORE
06746   107001          JMS GOPNCH
06747   207362          LAC SPCE
06750   107001          JMS GOPNCH
06751   207361          LAC STORE
06752   547356          SAD K271
06753   741000          SKP
06754   606744          JMP PNXTA
06755   207364          LAC KCRLF               /(KCRLF)=CR,LF
06756   047361          DAC STORE
06757   107001          JMS GOPNCH      /PUNCH CR
06760   207361          LAC STORE
06761   107264          JMS ROTAT9      /ROTATE 9 RIGHT
06762   107001          JMS GOPNCH      /PUNCH LF
06763   777770          LAW -10
06764   047361          DAC STORE
06765   750001          CLA!CMA         /AC = 777777
06766   700010          700010          /CLEAR AC WITH MB 14
06767   740200          SZA
06770   740040  E647    HALT            /ERROR, EVENT TIME 1 DIDN'T
                                        /CLEAR AC,
06771   750004          LAS
```

```
06772   507425          AND K400
06773   740200          SZA
06774   606727          JMP PNXT-2      /TTY ONLY
06775   107001          JMS GOPNCH              /PUNCH 8 FRAMES OF 1'S
06776   447361          ISZ STORE
06777   606765          JMP E647-3
07000   606727          JMP PNXT-2      /START NEW LINE
                        .EJECT
```

```
07001  000000  GOPNCH  0
07002  606663          JMP E646+3      /PRINT
07003  700204          PSA
07004  700201          PSF
07005  741007          SKP
07006  740040  E647A   HLT             /PUNCH FLAG SET
07007  750004          LAS
07010  507430          AND K4K         /MASK ACS 6
07011  740200          SZA             /IF A 1, DON'T USE CNTA OR CNTB
07012  606572          JMP RTNIT               /RETURN TO INST. TEST
07013  447353          ISZ CNTA                /CNTA=PUNCH SELECTED
07014  207354          LAC CNTB
07015  740200          SZA             /0=WAIT FOR PI
07016  607053          JMP SUB1                /1=SELECT READER AGAIN
07017  606572          JMP RTNIT               /RETURN TO INST. TEST
                       /READ PUNCHED INFO
                       /
07020  750004  READA   LAS
07021  507427          AND K3K         /MASK ACS 7 AND 8
07022  740200          SZA             /IF EITHER IS A 1, READ FULL SPEED
07023  607135          JMP READB
07024  750004          LAS
07025  507430          AND K4K         /MASK ACS 6
07026  741200          SNA             /IF A 1, CLEAR READER FLAG, NO
                                       /MORE PI'S FROM READER
07027  607032          JMP .+3
07030  700112          RRB             /CLEAR READER FLAG
07031  606572          JMP RTNIT               /RETURN TO INST. TEST AND
                                       /WAIT FOR PUNCH PI
07032  700112          RRB             /READ ONE
07033  740200          SZA             /0=NO DATA IN READER YET
07034  607041          JMP ZRONOT
07035  207353          LAC CNTA                /SEE IF PUNCH IS SELECTED
07036  740200          SZA
07037  607053          JMP SUB1                /YES, SUBTRACT FROM CNTA
07040  607051          JMP TADD1               /READER SELECTED
07041  447352  ZRONOT  ISZ TTIN                /STORE CHAR. IN TTY BIN
07042  067352          DAC* TTIN
07043  207352          LAC TTIN
07044  546705          SAD ENDBIN              /CHECK FOR 52 CHARACTERS STORED
07045  607061          JMP SETTY               /DONE, SETUP TO PRINT
07046  207353          LAC CNTA
07047  740200          SZA
07050  607053          JMP .+3
                       /
07051  447354  TADD1   ISZ CNTB
07052  606572          JMP RTNIT               /RETURN TO INST. TEST
07053  777777  SUB1    LAW -1
07054  347353          TAD CNTA                /(CNTA)-1
07055  047353          DAC CNTA
07056  147354          DZM CNTB
07057  700104          RSA
07060  606572          JMP RTNIT               /RETURN TO INST. TEST
                       /
                       .EJECT
```

```
07061   700201   SETTY   PSF              /WAIT FOR PUNCH
07062   607061           JMP .-1
07063   700202           PCF              /CLEAR PUNCH FLAG
07064   700402           TCF              /CLEAR TTY FLAG
07065   207334           LAC BREAK
07066   547417           SAD K12A
07067   607112           JMP PUN6
07070   447334           ISZ BREAK
07071   206704           LAC DATABL       /RESTORE INPUT/OUTPUT POINTERS
07072   047352           DAC TTIN                 /READER TO BIN
07073   206706           LAC OUTTOP
07074   047351           DAC TTOUT                /BIN TO TTY
07075   447352   XFR1    ISZ TTIN                 /TRANSFER BUFFER A TO BUFFER B
07076   227352           LAC* TTIN
07077   447351           ISZ TTOUT
07100   067351           DAC* TTOUT
07101   207351           LAC TTOUT
07102   546707           SAD ENDOUT               /DONE IF EQUAL TO TTBUFB+63
07103   741000           SKP
07104   607075           JMP XFR1                 /TRANSFER ANOTHER
07105   206704           LAC DATABL               /RESTORE BUFFER POINTERS
07106   047352           DAC TTIN
07107   206706           LAC OUTTOP               /TTBUFB-1
07110   047351           DAC TTOUT
07111   606651           JMP TTYINT+3     /BEGIN PRINTING
                 /
07112   207001   PUN6    LAC GOPNCH
07113   507463           AND K17S
07114   547134           SAD K647         /PUNCH 0'S ONLY AT END OF BLOCK
07115   741000           SKP
07116   607071           JMP XFR1-4       /(GOPNCH) NOT=GOPNCH-3
07117   777771           LAW -7
07120   047334           DAC BREAK        /FRAME COUNTER
07121   777777           LAW -1           /AC=777777
07122   700010           700010           /CLEAR AC WITH BIT 14
07123   740200           SZA
07124   740040   E648    HALT             /ERROR, MB14 DIDN'T CLEAR AC
07125   700204           PSA              /PUNCH BLANK FRAME
07126   700201           PSF
07127   607126           JMP .-1
07130   447334           ISZ BREAK
07131   607121           JMP E648-3
07132   700202           PCF              /CLEAR PUNCH FLAG
07133   607071           JMP XFR1-4       /SETUP TO PRINT
                 /
07134   006776   K647    GOPNCH-3
                 /
                         .EJECT
```

```
                        /READB ROUTINE IS USED ONLY WHEN PUNCH IS INHIBITED
                        /BY ACS 7 OR 8, OR BOTH, READER RUNS AT FULL SPEED.
                        /
07135   750004  READB   LAS
07136   507430          AND K4K         /MASK ACS 6
07137   741200          SNA             /IF A 1, DON'T READ
07140   607143          JMP .+3
07141   700112          RRB             /CLEAR READER FLAG
07142   606572          JMP RTNIT               /RETURN TO INST. TEST
07143   700112          RRB             /GET CHAR. FROM BUFFER.
07144   741200          SNA             /0 = NO DATA IN READER YET.
07145   607153          JMP SELECT              /SELECT READER AGAIN
07146   447352          ISZ TTIN                /BUFFER POINTER +1
07147   067352          DAC* TTIN               /STORE CHAR. IN TTBUFA
07150   207352          LAC TTIN
07151   546705          SAD ENDBIN              /CHECK FOR 52 CHARS. STORED
07152   607160          JMP .+6         /TTBUFA IS FULL
07153   700104  SELECT  RSA             /SELECT READER
07154   700101          RSF
07155   741000          SKP
07156   740040  E649    HLT             /READER FLAG SET
07157   606572          JMP RTNIT               /RETURN TO INST. TEST
                        /
07160   206704          LAC DATABL
07161   047352          DAC TTIN                /RESTORE TTBUFA POINTER
07162   750004          LAS
07163   507431          AND K6K         /MASK ACS 6 AND 7
07164   740200          SZA             /IF EITHER A 1, DON'T PRINT
07165   607153          JMP SELECT              /SELECT READER AGAIN
07166   607064          JMP SETTY+3     /SETUP TO PRINT
                        /
                        /SERVICE NO TAPE CONDITIONS
                        /
07167   000000  RNFLG   0
07170   507424          AND K1K         /CHECK FOR READER NO TAPE
07171   740200          SZA
07172   607177          JMP .+5         /READER
07173   760320          LAW 320         /PUNCH NO TAPE
07174   247365          XOR K520K
07175   047402          DAC NTFLG+1
07176   607201          JMP OUTFLG      /PRINT R OR P NO TAPE
07177   760322          LAW 322         /READER NO TAPE
07200   607174          JMP .+4
                        /
07201   207216  OUTFLG  LAC NTFL
07202   047335          DAC WDCNT
07203   107273          JMS CRLF                /CR,LF
07204   447335          ISZ WDCNT
07205   227335          LAC* WDCNT
07206   741200          SNA
07207   607214          JMP CLRFLG
07210   107237          JMS TLSSF
07211   107264          JMS ROTAT9
07212   107237          JMS TLSSF
07213   607204          JMP OUTFLG+3
```

```
07214   107273      CLRFLG  JMS CRLF                /CR,LF
07215   627167              JMP* RNFLG      /RETURN TO SEQUENCE
07216   007401      NTFL    NTFLG
                    .EJECT
```

```
                        /PUNCH LEADER
                        /
07217   000000  PNLEDR  ?
07220   777470          LAW -310
07221   047335          DAC WDCNT
07222   750000          CLA
07223   700204          PSA
07224   700201          PSF
07225   607224          JMP .-1
07226   447335          ISZ WDCNT
07227   607223          JMP .-4
07230   627217          JMP* PNLEDR
                        /
07231   000000  PNMARK  0
07232   777777          LAW -1
07233   700204          PSA
07234   700201          PSF
07235   607234          JMP .-1
07236   627231          JMP* PNMARK     /EXIT
                        .EJECT
```

```
                        /
                        /PRINT A CHARACTER
                        /
07237   000000  TLSSF   0
07240   047342          DAC MOVED
07241   207514          LAC WORK
07242   740010          RAL
07243   740100          SMA             /CHECK TTY FLAG
07244   607247          JMP .+3
07245   700401          TSF
07246   607245          JMP .-1         /WAIT FOR FLAG
07247   207340          LAC MOVED
07250   700406          TLS
07251   700401          TSF
07252   607251          JMP .-1
07253   207002          LAC GOPNCH+1
07254   547302          SAD KJMP
07255   607262          JMP .+5
07256   207514          LAC WORK                /CLEAR TTY IF BIT 1 = 0
07257   740010          RAL
07260   740100          SMA
07261   700402          TCF
07262   207340          LAC MOVED
07263   627237          JMP* TLSSF
                        /
                        /ROTATE 9 RIGHT
                        /
07264   000000  ROTAT9  0
07265   742020          RTR;    RTR;    RTR
07266   742020
07267   742020
07270   742020          RTR;    RAR
07271   740020
07272   627264          JMP*    ROTAT9
                        /
                        /CARRIAGE RETURN, LINEFEED
                        /
07273   000000  CRLF    0
07274   760215          LAW 215         /CR
07275   107237          JMS TLSSF
07276   547300          SAD .+2
07277   627273          JMP* CRLF               /EXIT
07300   760212          LAW 212         /LF
07301   607275          JMP CRLF+2
                        /
07302   606663  KJMP    JMP E646+3
                        /
                        .EJECT
```

```
                    /PRINT "COMPLETE"
                    /
07303   000000      PINOT   0
07304   207520              LAC WORK4               /PASS COUNTER
07305   547417              SAD K12A                /PRINT IF EQUAL TO 12
07306   741000              SKP
07307   627303              JMP* PINOT              /START PROGRAM
07310   147520              DZM WORK4
07311   157520              DZM WORK4+10000
07312   207326              LAC COMPA
07313   040014              DAC 14          /PRINT COMPLETE
07314   107273              JMS CRLF
07315   220014              LAC* 14
07316   741200              SNA             /DONE PRINTING IF 0
07317   607324              JMP .+5
07320   107237              JMS TLSSF               /PRINT 1 CHAR
07321   107264              JMS ROTAT9
07322   107237              JMS TLSSF               /PRINT 2ND
07323   607315              JMP .-6         /GET NEXT PAIR
07324   107273              JMS CRLF                /CR, LF
07325   627303              JMP* PINOT
                    /
07326   007373      COMPA   COMP
                    .EJECT
```

```
                        /CONSTANT TABLE FOR CHECKERBOARD AND PI
                        /SERVICE ROUTINES
                        /
07327   752525          LIMITA  752525          /DELIMITER
07330   000000          PATR    0
07331   000000          PATWD   0
07332   000112          BGNLO   SEQUEN
07333   010112          BGNHI   SEQUEN+10000
07334   000000          RREAK   0
07335   000000          WDCNT   0
07336   777776          WC256   777776
07337   000000          MOVES   0
07340   000000          MOVED   0
07341   777777          BITSUP  777777
07342   007777          K7777   7777
07343   100000          K100K   100000
07344   001400          K1400   1400
07345   003400          K3400   3400
07346   500000          K500K   500000
07347   000777          K777    777
07350   777611          M167    777611
07351   000000          TTOUT   0
07352   000000          TTIN    0
07353   000000          CNTA    0
07354   000000          CNTB    0
07355   000257          K257    257
07356   000271          K271    271
07357   000300          K300    300
07360   000301          K301    301
07361   000000          STORE   0
07362   000240          SPCE    240
07363   000332          K332    332
07364   212215          KCRLF   212215
07365   520000          K520K   520000
07366   000000          LWR     0
07367   000000          UPR     0
07370   000000          WC02    0
07371   000000          WC04    0
07372   000000          WC32    0
                        .EJECT
```

```
                        /
                        /PRINT ROUTINE CONSTANTS
                        /"COMPLETE"
                        /
 27373   007373 COMP    .
 27374   317303         317303; 320315; 305314; 305324; 0
 27375   320315
 27376   305314
 27377   305324
 27400   000000
                        /
                        /R OR P NO TAPE
                        /
 27401   007401 NTFLG   .
 27402   000000         0
 27403   317316         317316; 324240; 320301
 27404   324240
 27405   320301
 27406   240305         240305; 207207
 27407   207207
 27410   000000         0
                        /CONSTANT AND ERROR TABLES.     NOT MODIFIED WHEN IN HI 4K
                        /
 27411   000000 K0      0
 27412   000001 K1      1
 27413   000002 K2      2
 27414   000004 K4      4
 27415   000010 K10     10
 27416   000011 K11     11
 27417   000012 K12A    12
 27420   000100 K100    100
 27421   000020 K20     20
 27422   000022 K22     22
 27423   000040 K40     40
 27424   001000 K1K     1000
 27425   000400 K400    400
 27426   002000 K2K     2000
 27427   003000 K3K     3000
 27430   004000 K4K     4000
 27431   006000 K6K     6000
 27432   000200 K200    200
 27433   207400 K207    207400
 27434   040000 K40K    40000
 27435   400000 K400K   400000
 27436   400002 K402K   400002
 27437   010000 K10K    10000
 27440   020000 K20K    20000
 27441   200000 K200K   200000
 27442   600000 K600K   600000
 27443   700000 K700K   700000
 27444   002021 K2021   2021
 27445   002120 K2120   2120
 27446   111111 K1S     111111
 27447   222222 K2S     222222
 27450   333333 K3S     333333
```

```
07451   444444      K4S     444444
07452   555555      K5S     555555
07453   666666      K6S     666666
07454   777777      K7S     777777
07455   011111      K51S    11111
07456   012222      K12S    12222
07457   013333      K13S    13333
07460   014444      K14S    14444
07461   015555      K15S    15555
07462   016666      K16S    16666
07463   017777      K17S    17777
07464   002525      K2525   2525
07465   005252      K5252   5252
07466   252525      K010    252525
07467   525252      K101    525252
07470   525253      K53     525253
07471   077777      K37S    077777
07472   525002      K502    525002
                            .EJECT
```

```
07473   700042      K7X42   700042
07474   700002      K7XX2   700002
07475   760002      K76X2   760002
07476   100002      K1XX2   100002
07477   604002      K6X42   604002
07500   344002      K344X2  344002
07501   741000      KSKP    SKP
07502   750000      KCLA    CLA
07503   777776      M1      777776
07504   777773      M4      777773
07505   777737      M40     777737
07506   777377      M400    777377
07507   773777      M4K     773777
07510   737777      M40K    737777
07511   377777      M400K   377777
07512   000377      K377    377
                    /
07513   000000      RJCNT   0
07514   000000      WORK    0
07515   000000      WORK1   0
07516   000000      WORK2   0
07517   000000      WORK3   0
07520   000000      WORK4   0
07521   000000      IIADR   0
07522   000000      AUTNOT  0
07523   000000      TCLK    0
07524   740010      XCTRAL  RAL
07525   740001      AUTCMA  CMA
07526   000000      SAVAC   0
07527   000000      RJMP    0
07530   420015      LAWAUT  XCT* 15
07531   777777      LAWFUL  LAW 17777
07532   120015      JMSAUT  JMS* 15
07533   740040      KHALT   740040
07534   620012      JMPAUT  JMP* 12
07535   200000      SAV4    LAC 0
07536   741400      KSZL    741400
07537   740400      KSNL    740400
07540   123456      RANCON  123456
07541   654321      RANTBL  654321
07542   361416              361416
07543   055363              055363
07544   546060              546060
07545   243035              243035
07546   762572              762572
07547   453237              453237
07550   150214              150214
07551   000000              0
                            .EJECT
```

```
                    /ERROR TABLES
                    /
07552   000000      JMPRET  0       /JMP 22
07553   000000      J111    0       /JMP 11111 (E509)
07554   000000      J222    0       /JMP 12222 (E510)
07555   000000      J333    0       /JMP 13333 (E5111)
07556   000000      J444    0       /JMP 14444 (E512)
07557   000000      J555    0       /JMP 15555 (E513)
07560   000000      J666    0       /JMP 16666 (E514)
07561   000000      J777    0       /JMP 17777 (E515)
07562   000000      J525    0       /JMP 15252 (E516)
07563   000000      J252    0       /JMP 12525 (E517)
07564   000000      CAL0    0       /CAL FROM 17757 EXT, LINK = 0 (E518)
07565   000000      CAL1    0       /CAL FROM 17757, LINK = 1 (E520)
07566   000000      JSM71   0       /JMS FROM 07777 TO 11111 (E522)
07567   000000      JSM72   0       /JMS FROM 07776 TO 12222 (E524)
07570   000000      JSM73   0       /JMS FROM 07775 TO 13333 (E526)
07571   000000      JSM74   0       /JMS FROM 07774 TO 14444 (E528)
07572   000000      JSM75   0       /JMS FROM 07773 TO 15555 (E530)
07573   000000      JSM76   0       /JMS FROM 07772 TO 16666 (E532)
07574   000000      JSM77   0       /JMS FROM 07771 TO 17777 (E534)
07575   000000      JS252   0       /JMS FROM 12525 TO 15252 (E536)
07576   000000      JS525   0       /JMS FROM 15252 TO 12525 (E538)
07577   000000      JSSS    0       /JMS SERIES TEST (E540)
                    /
07600   000000      XCT11   0       /XCT JMS, FROM 11111 XCT (16666) (E562)
07601   000000      XCT12   0       /XCT JMS, FROM 12222 XCT (15555) (E564)
07602   000000      XCT13   0       /XCT JMS, FROM 13333 XCT (14444) (E566)
07603   000000      XCT17   0       /XCT J,S FROM 07776 XCT (17776) (E568)
07604   000000      XCT125  0       /XCT JMS, FROM 12525 XCT (15252)
                    /
07605   000000      JST77   0       /JMS* 07777 (E592)
07606   000000      JST66   0       /JMS* 16666 (E594)
07607   000000      JST55   0       /JMS* 15555 (E596)
07610   000000      JST44   0       /JMS* 14444 (E598)
07611   000000      AUTJMP  0       /JMP* 12 (AUTO-INDEX) (E620)
07612   000000      AUTJMS  0       /JMS* 17 (AUTO-INDEX) (E633)
07613   000000      TTBUFA  0
07614   752525              752525
        000000              .END
            SIZE=07615      NO ERROR LINES
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AAC      723000
AAS      720000
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ADDAC     01557
ADDAC1    02025
ADDI      05413
ADEDON    03063
AMBPBT    02624
AMBSUM    03060
AMINSB    02466
AMNSBT    02522
ANDAC     01341
ANEG      03052
APLSBT    02507
APLUSB    02452
APOS      03051
AURJMP    06027
AUTCMA    07525
AUTJMP    07611
AUTJMS    07612
AUTNOT    07522
AUTOIN    05414
AUTR      05561
AUTRET    06025
AUTRE1    05673
AUTRJM    06026
AXR      737000
AXS      725000
BEGIN     00022
BGNAGN    06473
BGNHI     07333
BGNLO     07332
BISETU    03071
BITN      06004
BITSUP    07341
BITTS1    03110
BITTS2    03123
BMAMBT    02576
BMASUM    03057
BMINSA    02460
BMNSAT    02550
BNEG      03054
BPOS      03053
BREAK     07334
CAL0      07564
CAL1      07565
CKLP      03044
CKNO      06362
CLAC     734000
CLKINT    06606
CLKSET    06631
CLLR     736000
CLOF     700004
CLON     700044
CLRFLG    07214
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CLX     735000
CNTA     07353
CNTB     07354
COMP     07373
COMPA    07326
CONCHG   03022
CRLF     07273
DACAC    03374
DATABL   06704
DBRX     00237
DBRXX    00242
DBRXXX   00250
DZMAC    03255
EBA     707764
ENDBIN   06705
ENDOUT   06707
ENDTBL   06360
ENTST    06410
EPA     707762
ER1      05762
EXBA    707741
EX01     06034
EX02     06041
EX03     06043
EX04     06050
EX05     06052
EX06     06061
EX07     06064
EX10     06066
EX13     06071
EX14     06075
EX15     06077
EX16     06110
EX17     06115
EX18     06120
EX19     06122
EX20     06125
EX21     06135
EX22     06137
EX23     06143
EX24     06145
EX25     06151
EX26     06153
EX27     06157
EX28     06161
EX29     06165
EX30     06167
EX31     06172
EX32     06174
EX33     06176
EX34     06203
EX35     06205
EX36     06211
EX37     06213
```

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EX39	06221
EX40	06225
EX41	06227
EX42	06234
EX43	06236
EX44	06243
EX45	06245
EX46	06253
EX47	06255
EX48	06261
EX49	06264
EX50	06266
EX51	06271
EX52	06276
EX53	06301
EX54	06316
EX55	06321
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E116	00754
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E141	01030
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E212	01160
E213	01163
E214	01166
E215	01171
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E221	01215
E222	01217
E223	01224
E224	01226
E225	01233

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E262      01261
E263      01263
E264      01267
E265      01271
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E269      01307
E27       00173
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E271      01316
E272      01323
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E274      01344
E275      01350
E276      01354
E277      01361
E278      01375
E279      01377
E28       00217
E280      01407
E281      01414
E282      01421
E283      01425
E284      01440
E285      01450
E286      01452
E287      01457
E288      01461
E289      01466
E29       00223
E290      01470
E291      01476
E292      01500
E293      01504
E294      01506
E295      01512
E296      01514
E297      01522
E298      01524
E299      01532
E30       00227
E300      01534
E301      01544
E302      01552
E303      01564
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E304 01566
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E306 01576
E307 01604
E308 01606
E309 01614
E31 00233
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E315 01644
E316 01646
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E338 02007
E339 02016
E34 00271
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E348 02035
E349 02044
E35 00274
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E351 02055
E352 02057
E353 02066
E354 02070
E355 02077
E356 02101
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E36 00300
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E363 02143
E364 02145
E365 02154
E366 02156
E367 02165
E368 02167
E369 02176
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E375 02231
E376 02233
E377 02242
E378 02244
E379 02253
E38 00307
E380 02255
E381 02264
E382 02266
E383 02275
E384 02277
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E386 02310
E387 02317
E388 02321
E389 02330
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E391 02341
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E393 02351
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E397 02371
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E407 02570
E408 02574
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E435 03156
E436 03161
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E438 03170
E439 03175
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E455 03344
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E459 03367

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E467      03443
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E469      03462
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E473      03514
E474      03520
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E476      03531
E477      03536
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E496      03654
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E567      04755
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E569      04775
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E572      05034
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E585      05112
E586      05123
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E588      05145
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E601      05361
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E607      05450
E608      05454
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E618      05541
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E644A     06611
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E647      06770
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E649      07156
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E79       00551
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E82       00564
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E91       00636
E92       00646
GENRAN    06336
GOPNCH    07001
HALT     740040
IAC      740030
IIADR     07521
ILINT     06605
INHIT     00150
INITPI    00147
INIT4K    04003
INK52     05326
IOTST     00154
ISZAC     03477
JMPAUT    07534
JMPRET    07552
JMPSEQ    04163
JMSAUT    07532
JMSI1     05327
JSI44     05337
JSI55     05335
JSI66     05332
JSM71     07566
JSM72     07567
JSM73     07570
JSM74     07571
JSM75     07572
JSM76     07573
JSM77     07574
JSSS      07577
JST44     07610
JST55     07607
JST66     07606
JST77     07605
JS1       04467
JS2       04471
JS252     07575
JS3       04473
JS4       04477
JS525     07576
J111      07553
J222      07554
J252      07563
J333      07555
J444      07556
J525      07562
J555      07557
```

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J666      07560
J777      07561
KCALE     04255
KCAL0     04253
KCLA      07502
KCRLF     07364
KHALT     07533
KJMP      07302
KJS1      04576
KJS2      04577
KJS3      04600
KJS4      04601
KNOP      06005
KRB      700312
KSF      700301
KSKP      07501
KSNL      07537
KSZL      07536
K0        07411
K010      07466
K1        07412
K1K       07424
K1S       07446
K1XX2     07476
K10       07415
K10K      07437
K100      07420
K100K     07343
K10000    04545
K101      07467
K11       07416
K11110    06022
K11111    06023
K12       05047
K12A      07417
K12S      07456
K12221    06020
K12222    06021
K13S      07457
K13332    06016
K13333    06017
K14S      07460
K1400     07344
K14443    06014
K14444    06015
K15S      07461
K15252    06024
K15253    05334
K15554    06012
K15555    06013
K16S      07462
K16665    06010
K16666    06011
K17S      07463
K17776    06006
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K17777   06007
K2       07413
K2K      07426
K2S      07447
K20      07421
K20K     07440
K200     07432
K200K    07441
K2021    07444
K207     07433
K210K    04602
K2120    07445
K2152    04612
K22      07422
K23      05053
K2525    07464
K257     07355
K271     07356
K273     04607
K274     04606
K275     04605
K276     04604
K277     04603
K3K      07427
K3S      07450
K300     07357
K301     07360
K332     07363
K34      05057
K3400    07345
K344X2   07500
K37S     07471
K377     07512
K4       07414
K4K      07430
K4S      07451
K40      07423
K40K     07434
K400     07425
K400K    07435
K402K    07436
K415     04575
K426     04571
K5S      07452
K500K    07346
K502     07472
K51S     07455
K520K    07365
K5252    07465
K53      07470
K6K      07431
K6S      07453
K6X42    07477
K600K    07442
K615     04611
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K626      04610
K647      07134
K7S       07454
K7XX2     07474
K7X42     07473
K700K     07443
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K72       04566
K73       04564
K74       04561
K75       04556
K76       04553
K76X2     07475
K77       04550
K777      07347
K7777     07342
LACIN     05071
LACK      01242
LAWAUT    07530
LAWD      05754
LAWFUL    07531
LAWS      05756
LEM      707704
LIMITA    07327
LWR       07366
MABPAT    02611
MAPLMB    02535
MINSAB    02444
MINUSA    02424
MINUSB    02434
MOD       04164
MODNEG    03103
MODX      04034
MOVE      06421
MOVED     07340
MOVES     07337
MRINS     06510
MSKBIT    03061
MVBK      06503
MVCST     06443
MVRTN     06435
M0ACPA    02637
M1        07503
M167      07350
M4        07504
M4K       07507
M40       07505
M40K      07510
M400      07506
M400K     07511
NOCLK     06543
NOP1     740000
NOP2     740000
NOP3     740000
NTFL      07216
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NTFLG    07401
OFLCH1   02662
OFLCH2   02677
OFLCH3   02715
OFLCH4   02734
OFLCH5   02754
OFLCH6   02775
OFLCH7   03017
OFLCH8   03120
OFLCH9   03133
OFLCK1   02517
OFLCK2   02532
OFLCK3   02545
OFLCK5   02573
OFLCK6   02606
OFLCK7   02621
OFLCK8   02634
OFLCK9   02646
OPERAT   00260
OPRAT    00256
OUTFLG   07201
OUTTOP   06706
PAL     722000
PASS2    03062
PATR     07330
PATWD    07331
PAX     721000
PCF     700202
PC05     06310
PINOT    07303
PION     06603
PLA     730000
PLX     731000
PNLEDR   07217
PNMARK   07231
PNSTRT   06710
PNXT     06731
PNXTA    06744
PREADY   06665
PSA     700204
PSB     700244
PSF     700201
PUN6     07112
PXA     724000
PXL     726000
RANADD   02415
RANCON   07540
RANDEX   06357
RANGEN   06367
RANTAD   06353
RANTBL   07541
RCALS0   04212
RCALS1   04233
RCAL0    04252
RCAL1    04254
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RCF      700102
READA     07020
READB     07135
RFROM     06425
RJCNT     07513
RJMI1     05330
RJMI2     05333
RJMI3     05336
RJMI4     05340
RJMP      07527
RJMP1     04045
RJMP2     04056
RJMP3     04067
RJMP4     04100
RJMP5     04111
RJMP6     04122
RJMP7     04133
RJMP8     04144
RJMP9     04155
RJMSS     04501
RJMS14    04436
RJMS15    04456
RJMS71    04271
RJMS72    04312
RJMS73    04333
RJMS74    04354
RJMS75    04375
RJMS76    04416
RJSI1     05223
RJSI1X    05331
RJSI2     05247
RJSI3     05271
RJSI4     05313
RJSM25    04567
RJSM52    04572
RJSM71    04543
RJSM72    04546
RJSM73    04551
RJSM74    04554
RJSM75    04557
RJSM76    04562
RJ111     04165
RJ222     04166
RJ252     04174
RJ333     04167
RJ444     04170
RJ525     04175
RJ555     04171
RJ666     04172
RJ777     04173
RNFLG     07167
ROTAT9    07264
RRB      700112
RSA      700104
RSB      700144
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RSF      700101
RSM25     04570
RSM52     04573
RSM71     04544
RSM72     04547
RSM73     04552
RSM74     04555
RSM75     04560
RSM76     04563
RSM77     04565
RTAT      00653
RTNIT     06572
RTSS      00755
RXCT1     04711
RXCT2     04731
RXCT3     04751
RXCT4     04771
RXCT5     05011
SADAC     03153
SAVAC     07526
SAV3      06526
SAV4      07535
SAV5      06527
SAV6      06530
SBA      707761
SELECT    07153
SEQUEN    00112
SERS01    02651
SERS02    02665
SERS03    02702
SERS04    02720
SERS05    02737
SERS06    02757
SERS07    03000
SETCLK    06614
SETTY     07061
SPCE      07362
SRVINT    06531
STORE     07361
SUB1      07053
SUMNEG    03055
SUMPOS    03056
SWHA     742030
TADAC     01445
TADD1     07051
TADRAN    06404
TBLTOP    06361
TCF      700402
TCLK      07523
TELLY     00076
TIAC      06030
TLAW      01132
TLS      700406
TLSSF     07237
TSCAL     04176
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TSDBR    22214
TSF     700401
TSJMS    24256
TSWH     26124
TSXCT    24613
TSXG     36132
TTBUFA   27613
TTIN     27352
TTOUT    27351
TTYINT   26646
UPR      27367
WC02     27370
WC04     27371
WC256    27336
WC32     27372
WDCNT    27335
WORK     27514
WORK1    27515
WORK2    27516
WORK3    27517
WORK4    27520
XCTDAC   25067
XCTDZM   25412
XCTISZ   25066
XCTRAL   27524
XCTR12   25064
XCTTAD   25070
XCT11    27600
XCT12    27601
XCT12S   25063
XCT125   27604
XCT13    27602
XCT17    27603
XFR1     27075
XORAC    21404
XTJMSI   25205
XTR11    25045
XTR12    25051
XTR13    25055
XTR17    25061
XTXCT    25341
XT1R     25046
XT11S    25044
XT12S    25050
XT13S    25054
XT17S    25060
XT2R     25052
XT3R     25056
XT4R     25062
XT5R     25065
ZRONOT   27041
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E67	00473
E68	00501
E69	00524
E70	00510
E71	00513
E72	00517
E73	00522
E74	00526
E75	00532
E76	00535
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E78	00545
E79	00551
E80	00555
E81	00561
E82	00564
E83	00570
E84	00573
E85	00577
E86	00603
E87	00606
E88	00613
E89	00621
E90	00626
E91	00636
E92	00646
RTAT	00653
E113	00677
E114	00724
E115	00740
E116	00754
RTSS	00755
E140	01002
E141	01030
E142	01045
E143	01062
E162	01066
E163	01072
E164	01076
E165	01102
E166	01106
E167	01112
E168	01116
E169	01122
E170	01125
TLAW	01132
E206	01136
E207	01141
E208	01144
E209	01147
E210	01152
E211	01154
E212	01160
E213	01163

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E214    01166
E215    01171
E216    01174
E217    01177
E218    01201
E219    01206
E220    01210
E221    01215
E222    01217
E223    01224
E224    01226
E225    01233
E226    01235
LACK    01242
E258    01245
E259    01247
E260    01253
E261    01255
E262    01261
E263    01263
E264    01267
E265    01271
E266    01276
E267    01300
E268    01305
E269    01307
E270    01314
E271    01316
E272    01323
E273    01334
ANDAC   01341
E274    01344
E275    01350
E276    01354
E277    01361
E278    01375
E279    01377
XORAC   01404
E280    01407
E281    01414
E282    01421
E283    01425
E284    01440
TADAC   01445
E285    01450
E286    01452
E287    01457
E288    01461
E289    01466
E290    01470
E291    01476
E292    01500
E293    01504
E294    01506
E295    01512
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E298      01524
E299      01532
E300      01534
E301      01544
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ADDAC     01557
E303      01564
E304      01566
E305      01574
E306      01576
E307      01604
E308      01606
E309      01614
E310      01616
E311      01624
E312      01626
E313      01634
E314      01636
E315      01644
E316      01646
E317      01654
E318      01656
E319      01664
E320      01666
E321      01675
E322      01677
E323      01706
E324      01710
E325      01717
E326      01721
E327      01730
E328      01732
E329      01741
E330      01743
E331      01752
E332      01754
E333      01763
E334      01765
E335      01774
E336      01776
E337      02005
E338      02007
E339      02016
E340      02020
ADDAC1    02025
E347      02033
E348      02035
E349      02044
E350      02046
E351      02055
E352      02057
E353      02066
E354      02070
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E355      02077
E356      02101
E357      02110
E358      02112
E359      02121
E360      02123
E361      02132
E362      02134
E363      02143
E364      02145
E365      02154
E366      02156
E367      02165
E368      02167
E369      02176
E370      02200
E371      02207
E372      02211
E373      02220
E374      02222
E375      02231
E376      02233
E377      02242
E378      02244
E379      02253
E380      02255
E381      02264
E382      02266
E383      02275
E384      02277
E385      02306
E386      02310
E387      02317
E388      02321
E389      02330
E390      02332
E391      02341
E392      02343
E393      02351
E394      02353
E395      02361
E396      02363
E397      02371
E398      02373
E399      02406
E400      02410
RANADD    02415
MINUSA    02424
MINUSB    02434
MINSAB    02444
APLUSB    02452
BMINSA    02460
AMINSB    02466
APLSBT    02507
E[illegible]1      02514
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OFLCK1   02517
E402     02520
AMNSBT   02522
E403     02527
OFLCK2   02532
E404     02533
MAPLMB   02535
E405     02542
OFLCK3   02545
E406     02546
BMNSAT   02550
ABMATS   02563
E407     02570
OFLCK5   02573
E408     02574
BMAMBT   02576
E409     02603
OFLCK6   02606
E410     02607
MABPAT   02611
E411     02616
OFLCK7   02621
E412     02622
AMBPBT   02624
E413     02631
OFLCK8   02634
E414     02635
M0ACPA   02637
E415     02643
OFLCK9   02646
E416     02647
SERS01   02651
E417     02657
OFLCH1   02662
E418     02663
SERS02   02665
E419     02674
OFLCH2   02677
E420     02700
SERS03   02702
E421     02712
OFLCH3   02715
E422     02716
SERS04   02720
E423     02731
OFLCH4   02734
E424     02735
SERS05   02737
E425     02751
OFLCH5   02754
E426     02755
SERS06   02757
E427     02772
OFLCH6   02775
E428     02776
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E461      03405
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E463      03417
E464      03424
E465      03431
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E467      03443
E468      03450
E469      03462
E470      03472
ISZAC     03477
E471      03503
E472      03507
E473      03514
E474      03520
E475      03525
E476      03531
E477      03536
E478      03542
E479      03547
E480      03553
E481      03560
E482      03564
E483      03571
E484      03574
E485      03601
E486      03604
E487      03611
E488      03614
E489      03621
E490      03624
E491      03631
E492      03634
E493      03641
E494      03644
E495      03651
E496      03654
E497      03661
E498      03664
E499      03671
E500      03674
E501      03714
E502      03724
E503      03750
E504      03756
E505      03764
E506      03773
E507      04002
INIT4K    04003
E508      04031
MODX      04034
E509      04037
RJMP1     04045
E510      04050
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RJMP2    04056
E511     04061
RJMP3    04067
E512     04072
RJMP4    04100
E513     04103
RJMP5    04111
E514     04114
RJMP6    04122
E515     04125
RJMP7    04133
E516     04136
RJMP8    04144
E517     04147
RJMP9    04155
JMPSEQ   04163
MOD      04164
RJ111    04165
RJ222    04166
RJ333    04167
RJ444    04170
RJ555    04171
RJ666    04172
RJ777    04173
RJ252    04174
RJ525    04175
TSCAL    04176
E518     04200
RCALS0   04212
E519     04216
E519A    04221
E520     04224
RCALS1   04233
E521     04237
E521A    04242
RCAL0    04252
KCAL0    04253
RCAL1    04254
KCALE    04255
TSJMS    04256
E522     04260
RJMS71   04271
E523     04275
E524     04300
RJMS72   04312
E525     04316
E526     04321
RJMS73   04333
E527     04337
E528     04342
RJMS74   04354
E529     04360
E530     04363
RJMS75   04375
E531     04401
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E532      04404
RJMS76    04416
E533      04422
E536      04425
RJMS14    04436
E537      04442
E538      04445
RJMS15    04456
E539      04462
E540      04465
JS1       04467
E541      04470
JS2       04471
E542      04472
JS3       04473
E543      04474
JS4       04477
E544      04500
RJMSS     04501
E545      04510
E546      04517
E547      04526
E548      04535
RJSM71    04543
RSM71     04544
K10000    04545
RJSM72    04546
RSM72     04547
K77       04550
RJSM73    04551
RSM73     04552
K76       04553
RJSM74    04554
RSM74     04555
K75       04556
RJSM75    04557
RSM75     04560
K74       04561
RJSM76    04562
RSM76     04563
K73       04564
RSM77     04565
K72       04566
RJSM25    04567
RSM25     04570
K426      04571
RJSM52    04572
RSM52     04573
K71       04574
K415      04575
KJS1      04576
KJS2      04577
KJS3      04600
KJS4      04601
K210K     04602
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K276      04604
K275      04605
K274      04606
K273      04607
K626      04610
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K2152     04612
TSXCT     04613
E549      04617
E550      04622
E551      04627
E552      04631
E553      04633
E554      04637
E555      04644
E556      04650
E557      04656
E558      04660
E559      04665
E560      04667
E561      04675
E562      04700
RXCT1     04711
E563      04715
E564      04720
RXCT2     04731
E565      04735
E566      04740
RXCT3     04751
E567      04755
E568      04760
RXCT4     04771
E569      04775
E570      05000
RXCT5     05011
E571      05015
E572      05034
E573      05036
XT11S     05044
XTR11     05045
XT1R      05046
K12       05047
XT12S     05050
XTR12     05051
XT2R      05052
K23       05053
XT13S     05054
XTR13     05055
XT3R      05056
K34       05057
XT17S     05060
XTR17     05061
XT4R      05062
XCT12S    05063
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XCTR12   05064
XT5R     05065
XCTISZ   05066
XCTDAC   05067
XCTTAD   05070
LACIN    05071
E584     05101
E585     05112
E586     05123
E587     05134
E588     05145
E589     05156
E590     05167
E591     05200
XTJMSI   05205
E592     05211
RJSI1    05223
E593     05230
E594     05235
RJSI2    05247
E595     05253
E596     05257
RJSI3    05271
E597     05275
E598     05301
RJSI4    05313
E599     05317
INK52    05326
JMSI1    05327
RJMI1    05330
RJSI1X   05331
JSI66    05332
RJMI2    05333
K15253   05334
JSI55    05335
RJMI3    05336
JSI44    05337
RJMI4    05340
XTXCT    05341
E600     05353
E601     05361
E602     05373
XCTDZM   05412
ADDI     05413
AUTOIN   05414
E603     05422
E604     05426
E605     05435
E606     05441
E607     05450
E608     05454
E609     05463
E610     05467
E611     05476
E612     05502
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E613      05511
E614      05515
E615      05524
E616      05530
E617      05536
E618      05541
E619      05545
E620      05550
AUTR      05561
E621      05565
E622      05576
E623      05602
E624      05612
E625      05616
E626      05626
E627      05630
E628      05634
E629      05640
E630      05647
E631      05653
E632      05657
E633      05662
AUTRE1    05673
E634      05700
E635      05704
E636      05712
E637      05716
E638      05721
E639      05730
E640      05743
E641      05747
LAWD      05754
LAWS      05756
ER1       05762
BITN      06004
KNOP      06005
K17776    06006
K17777    06007
K16665    06010
K16666    06011
K15554    06012
K15555    06013
K14443    06014
K14444    06015
K13332    06016
K13333    06017
K12221    06020
K12222    06021
K11110    06022
K11111    06023
K15252    06024
AUTRET    06025
AUTRJM    06026
AURJMP    06027
TLAC      06030
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EX01    06034
EX02    06041
EX03    06243
EX04    06050
EX05    06052
EX06    06061
EX07    06064
EX10    06066
EX13    06071
EX14    06075
EX15    06077
TSWH    06104
EX16    06110
EX17    06115
EX18    06120
EX19    06122
EX20    06125
TSXG    06132
EX21    06135
EX22    06137
EX23    06143
EX24    06145
EX25    06151
EX26    06153
EX27    06157
EX28    06161
EX29    06165
EX30    06167
EX31    06172
EX32    06174
EX33    06176
EX34    06203
EX35    06205
EX36    06211
EX37    06213
EX38    06217
EX39    06221
EX40    06225
EX41    06227
EX42    06234
EX43    06236
EX44    06243
EX45    06245
EX46    06253
EX47    06255
EX48    06261
EX49    06264
EX50    06266
EX51    06271
EX52    06276
EX53    06301
PC05    06310
EX54    06316
EX55    06321
GENRAN  06336
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RANTAD  06353
RANDEX  06357
ENDTBL  06360
TBLTOP  06361
CKNO    06362
RANGEN  06367
TADRAN  06404
ENTST   06410
MOVE    06421
RFROM   06425
MVRTN   06435
MVCST   06443
BGNAGN  06473
MVBK    06503
MRINS   06510
SAV3    06526
SAV5    06527
SAV6    06530
SRVINT  06531
E642    06541
NOCLK   06543
E642A   06545
E643    06553
RTNIT   06572
E644    06601
PION    06603
ILINT   06605
CLKINT  06606
E644A   06611
SETCLK  06614
CLKSET  06631
TTYINT  06646
E645    06655
E646    06660
PREADY  06665
DATABL  06704
ENDBIN  06705
OUTTOP  06706
ENDOUT  06707
PNSTRT  06710
PNXT    06731
PNXTA   06744
E647    06770
GOPNCH  07001
E647A   07006
READA   07020
ZRONOT  07041
TADD1   07051
SUB1    07053
SETTY   07061
XFR1    07075
PUN6    07112
E648    07124
K647    07134
READR   07135
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SELECT   07153
E649     07156
RNFLG    07167
OUTFLG   07201
CLRFLG   07214
NTFL     07216
PNLEDR   07217
PNMARK   07231
TLSSF    07237
ROTAT9   07264
CRLF     07273
KJMP     07302
PINOT    07303
COMPA    07326
LIMITA   07327
PATR     07330
PATWD    07331
BGNLO    07332
BGNHI    07333
BREAK    07334
WDCNT    07335
WC256    07336
MOVES    07337
MOVED    07340
BITSUP   07341
K7777    07342
K100K    07343
K1400    07344
K3400    07345
K500K    07346
K777     07347
M167     07350
TTOUT    07351
TTIN     07352
CNTA     07353
CNTB     07354
K257     07355
K271     07356
K300     07357
K301     07360
STORE    07361
SPCE     07362
K332     07363
KCRLF    07364
K520K    07365
LWR      07366
UPR      07367
WC02     07370
WC04     07371
WC32     07372
COMP     07373
NTFLG    07401
K0       07411
K1       07412
K2       07413
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K4          07414
K10         07415
K11         07416
K12A        07417
K100        07420
K20         07421
K22         07422
K40         07423
K1K         07424
K400        07425
K2K         07426
K3K         07427
K4K         07430
K6K         07431
K200        07432
K207        07433
K40K        07434
K400K       07435
K402K       07436
K10K        07437
K20K        07440
K200K       07441
K600K       07442
K700K       07443
K2021       07444
K2120       07445
K1S         07446
K2S         07447
K3S         07450
K4S         07451
K5S         07452
K6S         07453
K7S         07454
K51S        07455
K12S        07456
K13S        07457
K14S        07460
K15S        07461
K16S        07462
K17S        07463
K2525       07464
K5252       07465
K010        07466
K101        07467
K53         07470
K37S        07471
K502        07472
K7X42       07473
K7XX2       07474
K76X2       07475
K1XX2       07476
K6X42       07477
K344X2      07500
KSKP        07501
K[redacted]A      [redacted]7502
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M1          07503
M4          07504
M42         07505
M400        07506
M4K         07507
M40K        07510
M400K       07511
K377        07512
RJCNT       07513
WORK        07514
WORK1       07515
WORK2       07516
WORK3       07517
WORK4       07520
IIADR       07521
AUTNOT      07522
TCLK        07523
XCTRAL      07524
AUTCMA      07525
SAVAC       07526
RJMP        07527
LAWAUT      07530
LAWFUL      07531
JMSAUT      07532
KHALT       07533
JMPAUT      07534
SAV4        07535
KSZL        07536
KSNL        07537
RANCON      07540
RANTBL      07541
JMPRET      07552
J111        07553
J222        07554
J333        07555
J444        07556
J555        07557
J666        07560
J777        07561
J525        07562
J252        07563
CAL0        07564
CAL1        07565
JSM71       07566
JSM72       07567
JSM73       07570
JSM74       07571
JSM75       07572
JSM76       07573
JSM77       07574
JS252       07575
JS525       07576
JSSS        07577
XCT11       07600
XCT12       07601
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XCT13    07602
XCT17    07603
XCT125   07604
JST77    07605
JST66    07606
JST55    07607
JST44    07610
AUTJMP   07611
AUTJMS   07612
TTBUFA   07613
CLSF    700001
CLOF    700004
CLON    700044
RSF     700101
RCF     700102
RSA     700104
RRB     700112
RSB     700144
PSF     700201
PCF     700202
PSA     700204
PSB     700244
KSF     700301
KRB     700312
TSF     700401
TCF     700402
TLS     700406
LEM     707704
EXBA    707741
SBA     707761
EPA     707762
EBA     707764
AAS     720000
PAX     721000
PAL     722000
AAC     723000
PXA     724000
AXS     725000
PXL     726000
PLA     730000
PLX     731000
CLAC    734000
CLX     735000
CLLR    736000
AXR     737000
NOP1    740000
NOP2    740000
NOP3    740000
IAC     740030
HALT    740040
SWHA    742030
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IDENTIFICATION

PRODUCT CODE:	MAINDEC-15-D7**B**C-DN
PRODUCT NAME:	PDP-15 8K BASIC EXERCISER ADDENDUM
DATE CREATED:	AUGUST 7, 1970
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	J. W. RICHARDSON

The purpose of the 8K Basic Exerciser is to exercise the PDP-15 Central Processor and I/O Control logic by running an instruction test and alternately selecting the teletype and PC15.

The method of feeding the paper tape directly from the high speed punch to the high speed reader is unorthodox, but necessary. Due to the tension placed on the reader, the paper tape may sometimes skew causing a punched character to be misread. This will appear as a misprint on the teletype.

The frequency of misprinting will vary, but will generally appear no more than once every several lines of print. The misprint is <u>not</u> due to a reader or teletype fault.

A user may determine definitely if a real error exists by allowing the program to punch for a period of time, removing the tape and placing it in the reader hopper. The reader will then read the tape directly from the hopper. The main document lists the AC switch settings which will enable the program to operate in this manner.