IDENTIFICATION

Product Code: Maindec-08-D3BB-D

Product Name: TC01 Basic Exerciser (Maindec 850)

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1. ABSTRACT

The TC01 Basic Exerciser is a series of test programs that may be used to gain a high degree of confidence in the data handling ability of a TC01 DECtape Control and one to eight TU55 DECtape Transports. The Basic Exerciser consists of several basic routines that may be individually selected; each routine will operate on any configuration of one to eight drives. These routines include a Basic Motion Routine, Search Find All Blocks Test, Basic Search Routine, Start/Stop/Turnaround Test, Basic Write/Read Data Test with eight selectable patterns, and a Parity Generation and Checking Test. The operation of the Basic Motion Routine and the Baisc Search Routine are controlled by keyboard input. Also, a Write Data Scope Loop, Read Data Scope Loop, and a Search Scope Loop are provided to keep the tape moving from end zone to end zone.

2. REQUIREMENTS

2.1 Equipment

PDP-8 (standard)

TC01 DECtape Control

One to eight TU55 DECtape Transports

2.2 Storage

The program occupies most of memory from address 0000 to 6377 and utilizes three buffer areas as follows:

Address	Function
6774-7174	Output buffer Program storage for Motion Test (0200) Block Number storage for Basic Search (0202)
7175-7375	INPUT buffer 1
7376-7576	INPUT buffer 2

2.3 Preliminary Programs (None)

3. LOADING PROCEDURE

3.1 Method

Use normal binary loading procedures from paper tape.

4. STARTING PROCEDURE

4.1 Control Switch Settings

Any configuration of one to eight drives may be selected in SWITCH REGISTER bits 0 to 7. Each bit is a master bit for selection of a drive. When the switch is a 1 the drive is selected; when a 0 the drive is not selected.

Switch	Drive
0	8
1	1
2	2
3	3
4	4
5	5
6	6
7	7

4.2 Starting Addresses of Routines

Address	Routine	Paragraph
0200	Basic Motion Routine	9.1
0201	Search Find All Blocks	9.2
0202	Basic Search Routine	9.3
0203	Start/Stop/Turnaround	9.4
0204	Write/Read Data Test	9.5
0205	Parity Generation Test	9.6
0206	Write Data Scope Loop	9.7
0207	Read Data Scope Loop	9.8
0210	Search Scope Loop	9.9

4.3 Program and/or Operator Action

a. Place the select address for the routine desired in the SWITCH REGISTER and press LOAD ADDRESS.

b. Set SWITCH REGISTER bits 0 to 7 to select drives. (Any configuration except all 0s is valid.)

c. Press START. The processor halts at address 0223 with bits 0 to 7 of the SWITCH REGISTER displayed in the AC.

d. A halt at address 0311 indicates bits 0 to 7 were all 0s. Select drives and press CONTINUE to recover.

e. Set all SWITCH REGISTER bits to 0, or as desired according to paragraph 5.1, and press CONTINUE.

A detailed description of how the routines can be used to initially check out the control and drives can be found in paragraph 5.3.

5. OPERATING PROCEDURE

5.1 Operational Switch Settings

5.1.1 Routines with no Switch Settings - Four of the routines require different switch settings to control program flow. The routines that have no switch settings are:

0200	Basic Motion Routine
0202	Basic Search Routine
0205	Parity Generation
0207	Read Scope Loop
0210	Search Scope Loop

5.1.2 Search Find All Blocks - The Search Find All Blocks Routine (0201) has one switch setting. Setting SW11 to 1 deletes the halt at the end of test.

5.1.3 Write/Read Data Test - The Write/Read Data Test (0204) utilizes switches 3 to 11 to control pattern selection and program flow as follows:

Switch	Operation
3	Delete all error detection where the motion bit in status A remains 1 (parity, data compare errors, and WC (word count register) not equal to 0).
4	Run patterns sequentially; i.e., After making one complete pass the length of tape with pattern 5, the next pass is made with pattern 6.
5	Read data only (after the first write pass).
6	Write data only (SW5 overrides SW6).
7	Write and read sequence, one block at a time.
8	Write and read sequence, 32 blocks at a time. (SW7 overrides SW8, when both switches = 0, the write and read sequence occurs for the length of the tape).

Switch	Operation
9, 10, and 11	Indicate pattern selection as follows:

000	All 0s
001	All 1s
010	Alternate words of 0s and 1s
011	Words of 2525
100	Words of 5252
101	Words of 0707
110	Words of 7070
111	Alternate words of 2525 and 5252

5.1.4 Write Scope Loop - The Write Scope Loop (0206) utilizes switches 9, 10, and 11 for pattern selection in the same manner as the Write Data/Read Data Test.

5.1.5 Start/Stop/Turnaround - The Start/Stop/Turnaround Test (0203) uses switch 1 to delete stop after error, and halt at end of test.

5.2 Subroutine Aspects (None)

5.3 Program and/or Operator Action

This series of routines is designed for initial check-out of a TC01 DECtape Control and its associated drives, or maintenance and repair of the control and drives after installation.

The following procedure is used for initial check-out of the control and drives and can be followed to repair malfunctions once the control and drives have been operating:

5.3.1 Operation Check - The first routine utilized is the Basic Motion Routine (0200). It is used to visually verify the following operations with the use of an oscilloscope, the indicators on the TC01 indicator panel, and by watching the motion of the tape on the DECtape drive.

5.3.1.1 Initial Control State - When power is initially applied to the TC01 Control, status A, the error and DECtape flags, and the data flag can come up in any state. A short manual procedure will prevent erasing DECtapes and having to reload programs.

Set the SWITCH REGISTER to 0.

Press LOAD ADDRESS.

Select SINGLE STEP.

Press DEPOSIT.

Press LOAD ADDRESS.

Press START (to generate a POWER CLEAR).

Now examine the TC01 indicator panel, the following indicators should all be off, indicating a 0.

DTF (DECtape flag)
DF (data flag)
All ERROR flags
W (WREN write enable)
Status A bit 4 (motion)
US (up to speed)
C0 to C3 can be in any stable state (not counting)
All state register bits except I should be 0, and bit I should be a 1 (state idle)

5.3.1.2 Clear and Load Status A (IOT 762, 764, and 766) - The basic operation and existence of these DECtape IOTs can be verified as follows:

Start the Basic Motion Routine with all drives SWITCH REGISTER selected and off line. Type the following program:

```
"F" WD
"W" AIT  0100
"C" HNG
"R" PT  0002
"D" O
```

Now, watch the status A indicators 0, 1, and 2. They should go to 0_8 and remain there for slightly more than a second, then proceed to 1_8, 2_8, 3_8 etc., up to 7_8, and return to 0_8 and repeat the process. In addition, a select error should be generated for each drive selection and the MOTION bit should be set to 0. By increasing the "W"AIT count or restarting the program with each drive individually selected, the decoding of the drive number to a single select line can be monitored with an oscilloscope; or the selection indicators over the rotary select switch on the TU55s may be used by placing the drives on line and including a "S"TOP command after the "F"WD.

5.3.1.3 Tape Motion and Timing Pulse Generation - Put one drive on line and start the Basic Motion Routine with that drive SWITCH REGISTER selected. To verify basic operations of the control and drive motion controls: type the following series of short programs:

```
"F"WD
"D"O
```

The tape on the selected drive should start moving forward (off the left-hand reel and onto the right-hand reel). A select error should not be generated and bit 4 of status A should remain 1 unless end zone is reached and detected. C0 to C3 should appear to be counting, indicating timing pulse generation; US (up to speed) should set to 1 within a short period after tape starts moving. The DTF should not set. Now type:

```
"S"TOP
"D"O
```

Forward tape motion on the selected drive should stop. (Bit 4 of status A should go to 0). The left-hand brake on the drive should be set and the right-hand reel should be free with a small amount of torque holding the tape tight . Again, no select error occurs. Now type:

```
"B"KWD
"D"O
```

The tape on the selected drive should start moving backwards (off the right-hand reel and onto the left). Status A bit 3 should be 1 (BKWD). All other indicator observations for forward should be true. Again type:

```
"S"TOP
"D"O
```

Backward tape motion should stop. Bit 3 of status A should remain 1 and bit 4 should go to 0. The right-hand drive brake should be set and the left-hand reel should be free with only enough torque to hold the tape tight.

5.3.1.4 New U + M Delay - The new unit and motion delay can be generated by any of several short programs, but its operation must be monitored with an oscilloscope. Since the delay time could change at a later date (for some currently unknown reason), the time will not be mentioned here; but it can be determined from the TC01 logic diagrams. An example of a program that could be used is:

Manually move the tape until approximately an even amount of tape is on both reels and type:

```
"F"WD
"W"AIT  0020
"B"KWD
"W"AIT  0020
"R"PT  0040 (or a shorter or longer count as desired)
"D"O
```

5.3.1.5 End Zone Detection - The program can be used to determine if the end zone is being detected by starting the tape in either direction and watching whether or not the tape runs off the reel. Also watch the end bit in the error status. If the END indicator lights and the tape does not stop, error stop in the control is not being generated. In either case, return the tape to the reel a short distance from the start of the reel (less than 10 feet of tape on right hand reel) and use following program to scope the end-zone detection.

```
"F"WD
"W"AIT 0020
"B"KWD
"W"AIT 0016
"R"PT 0040 (or may be made longer or shorter as desired)
"S"TOP
"D"O
```

The forward wait count can be decreased if the tape rocks forward or increased if the end zone approaches too quickly or if the tape runs off the reel. (At that end of the reel, the tape will move backward faster than forward.)

5.3.2 Check End-Zone Detection - For the next sequence of operations, any of the three search routines (0201, 0202, or 0210) could be used; but the Search Scope Loop (0210) is the most practical and least complicated. When the routine is initiated, the tape starts forward until the end zone is detected and then runs backward until end zone is again detected and then forward again.

If the tape runs off the reel, either the end zone was not detected or bit 2 of status B (END) did not read to the processor accumulator during a Read Status B IOT. As the tape is moving forward, make the following observations:

C0 to C3 should appear to be incrementing, indicating timing pulses are being generated.

US (up to speed) should indicate a 1 shortly after the tape starts moving and should stay on.

The STATE REGISTER should circulate and appear to remain mainly in state data.

The DECtape flag indicator should glow visibly, dim, and glow again as the tape moves forward (The program does not monitor DTF but simply waits in an ISZ loop and periodically monitors END and MOTION).

No error statuses should be generated except end zone.

The processor accumulator should appear to be incrementing by 1 as each successive block number is read from tape and displayed.

The timing in the control should be monitored with an oscilloscope with reference to the DECtape TC01 timing diagrams.

With the DECtape searching backward, the same observations may be made as forward except the processor accumulator should appear to decrement.

5.3.3 Correct Block Number - At this point it is suggested that the Search Find All Blocks Routine starting at 0201 be used to prove that the control will correctly read block numbers. The Basic Search Routine starting at 0202 may be used to gain more information if 0201 does not run without error typeouts.

5.3.4 Check Read Data Timing - The next step should be to verify the Read Data Timing with an oscilloscope utilizing the Read Scope Loop (0207) and the TC01 timing diagrams.

5.3.5 Check Write Data Timing - Next, the Write Scope Loop (0206) may be run and the Write Data timing verified. This routine changes to Search Between Blocks as an effort to keep from writing over block numbers. (Recheck the tape with 0201 or 0202 to verify this).

The different data patterns may be utilized visually as follows, (W (WREN) should indicate 1 for all patterns).

Pattern 0
(all 0s)

DATA BUFFER bit indicators 6, 7, and 8 should glow dimly and the rest of the DATA BUFFER should appear to be 0s.

RWB bits 3, 4, and 5 should appear to remain 0s.

RWB bits 0, 1, and 2 should be complementing and should glow fairly brightly but not solidly.

The LPB should complement every six bits and will glow dimly.

Pattern 1
(all 1s)

DATA BUFFER bits 6, 7, and 8 should glow dimly and the rest of the DATA BUFFER should appear to be steady 1s.

RWB bits 3, 4, and 5 should appear to remain steady 1s; bits 0, 1, and 2 should complement and glow fairly brightly but not solidly.

The LPB contents are not predictable but the rate of change should be fairly slow and discernable. (The LPB only complements on 0s and will contain the complement of the reverse checksum of the block it is passing over).

Pattern 2
(alternate words
of 0s and 1s)

All bits in the DATA BUFFER, RWB, and LPB should glow dimly.

Pattern 3
(2525)

The even numbered bits of the buffers should act as pattern 0 and the odd numbered bits as pattern 1 .

Pattern 4
(5252)

The even numbered bits of the buffers should act as pattern 1 and the odd numbered bits as pattern 0.

Pattern 5
(0707)

The rightmost three bits (of each six bits) should appear as pattern 1 and the leftmost as pattern 0.

Pattern 6 (7070) — The leftmost three bits (of each six bits) should appear as pattern 1 and the rightmost as pattern 0.

Pattern 7 (2525 alternate with 5252) — Should appear as pattern 2. No steady states discernible in the buffers.

5.3.6 Prepare Tape for Read - The Write Scope Loop may now be used to prepare a tape for the Read Scope Loop and for a further visual verification. Patterns 3, 4, 5, and 6 appearing in the BUFFER(s) indicators should read the same in either direction.

Note that the DATA BUFFER bits 6, 7, and 8 appear to be in a steady state and not to complement. Patterns 0 and 1 should be complemented when read in the direction opposite that in which they were written. No steady states should be discernible with patterns 2 and 7.

5.3.7 Check Correct Data - Run the Write/Read Data Test to verify that data is correctly read and written. Utilize the different switch configurations (see paragraph 5.1) for a complete test or to scope loop the reads or writes. This routine does not change to search between blocks, thus the possibility that block numbers may be written over is greater than that of the Write Data Scope Loop.

5.3.8 Check Checksum Generation - The Parity Generation Test verifies that checksums are being generated properly and that parity errors will be detected if they occur.

5.3.9 Check Turnaround Function - Run the Start/Stop/Turnaround Test (0203). All of the other routines are designed to eliminate the possibility of a turnaround error, but this routine tests this function to a much tighter limit.

6. ERRORS

Almost all hardware malfunctions detected by the program result in an error message typed on the Teletype. Each error message includes drive number, operation, direction, mode, error status, block being operated on, and correct and incorrect data, if applicable.

6.1 Error Typeout Descriptions

6.1.1 Search Error Typeouts - The Search Error Typeouts are in several formats. The Search Routine used by the Parity Test and Write/Read Data Test uses the following format:

```
DRIVE X                                                  (A)
SEARCH FWD (or BKWD)                                     (B)
XXXX BLOCK WANTED FWD (or BKWD)                          (C)
XXXX BLOCK FOUND                                         (D)
XXXX LAST BLOCK (if BLOCKS READ ≥ 002)                   (E )
XXXX BLOCKS READ                                         (F)
XXXX STAT B                                              (G)
```

A. This will be the first line of every typeout. Drive X is the drive that was being operated at the time of the error.

B. The second line of every typeout indicates the DECtape function, direction and mode. (Typeout will be C MODE for continuous mode).

C. This is the block number that the search routine should find as an end result and the direction that the block should be found in. If the direction in line B is the same as the direction in line C, the turnaround for finding the block has already been made. If the two directions are different, the error occurred before turnaround.

D. This is the contents of symbolic register BLKFND and could indicate one of the following:

1. Should be ignored if BLOCKS READ = 0000 and the directions in line B and C disagree. It could indicate the turnaround block, if the directions are the same and BLOCKS READ = 0000.

2. That the DECtape did not turn around in two PDP-8 block lengths, if BLOCKS READ = 0001, STAT B = 0001, and the directions indicated are the same.

3. The BLOCK in error, if BLOCKS READ does not = 0000 and STAT B is an error status (i.e.,6000 MARK TRACK ERROR) other than END ZONE (5000).

E. This line of the typeout is included only if two or more block numbers have been received since the search operation was started, or since the direction bit in status A was complemented for turnaround. Examine STAT B and if it does not equal 0001 ignore this line. If STAT B does = 0001, LAST BLOCK compared against BLOCK FOUND will indicate that the last two block numbers read were not sequential.

F. The number of block numbers received since the search operation was initiated or since turnaround.

G. This is the DECtape status B register; if STAT B does not = 0001, this is the error condition that caused the typeout. If STAT B equals 5000 (end-zone interrupt), and the directions in lines B and C are the same, it means that the drive made one turnaround and went the length of the tape without finding the block that the search routine was looking for. An end-zone error before turnaround indicates that at least one block number had been read, and that the block wanted was two or more blocks from end zone in the direction opposite the search. (i.e., BLOCK 3 WANTED FWD or BLOCK 2677 WANTED BKWD.)

The Start/Stop Turnaround Test has two formats for search error typeouts:

```
DRIVE 1
SEARCH BKWD
0005 BLOCK (Tape should have been up to speed by this block)
0006 FWD LAST POS (Last known tape position)
0004 FOUND (Block number in error)
0001 STAT B (If not 0001 indicates error was a status error)
```

In this case, notice that the difference between BLOCK and LAST POSITION is 1 and that the operations were in opposite directions. This indicates a turnaround error. If these lines differ by more than 1, the error would have been on a start-up.

The other error typeout format occurs if block numbers are not sequential.

```
DRIVE 1
SEARCH FWD
BLK # ERROR
0010 BLOCK
0006 LAST (Block 6 should have been followed by block 7)
0010 THIS (Not by block 10)
0001 STAT B
```

6.1.2 Read Data Status Error Typeouts - The first three lines of the read-data typeouts are in the same format as the search typeouts. The first two lines contain drive number, operation and direction, and the third line is the block being operated on. Again, depending upon which test routine is being run, one of several typeouts could occur.

```
DRIVE 1
READ DATA FWD
0046 BLOCK
4301 STAT B
```

(Combination parity error and timing error)

```
DRIVE 2
READ DATA BKWD
0100 BLOCK
4201 STAT B
7757
```

(This typeout is used by the Parity Generation Test. The last line of this typeout indicates the data pattern written to test parity. In this case, the reverse checksum is 20; CHECKSUM going forward was 75. The LPB at the end of a block in read data should always be 77 for normal operation).

```
DRIVE 2
READ DATA FWD
0100 BLOCK
PARITY ERROR EXPECTED
0001 STAT B
0200
```

(This typeout is also used by the Parity Generation Test and could follow the one above. The typeout indicates that a parity error should have been generated, but was not received. Again, the last line of the typeout indicates the data pattern written to test the parity circuitry. Notice the complement obverse relationship between the two data typeouts. In this case, the CHECKSUM has been rewritten to 02 in WRITE ALL, it was 75 after WRITE DATA, and the LPB should have been 00 after reading the block. READ DATA and STATE CHECK going to 0 and LPB not equal to 77 is 1 to PARITY ERROR. See paragraph 9.6 for a complete description of the parity test.)

```
DRIVE 4
READ DATA FWD
0077 BLOCK
0001 STAT B
7777 WC
```

In the read data typeouts, the contents of the word count register (address 7754) are included only if the WC did not go to 0. Or if the DECtape status B was normal (0001) and the WC did not go to 0, the above typeout would occur.

6.1.3 Checksum Error Typeouts - The Parity Generation Test writes various data patterns in the first and second characters of each block. Since the reverse checksum is written to 00, the checksum generate by the TC01 should either be the complement of the first character in the block or if the first two characters are written should equal 77. The following typeouts could occur if the parity generation is failing.

```
DRIVE 1
CKSUM ERROR
2000 DATA                   (First word of block, as read from tape)
7700 CK SUM                 (As read from tape in READ ALL, in this case should
                            equal 5700).

DRIVE 1
CKSUM ERROR
5757 DATA                   (As read from tape)
5700 CK SUM                 (As read from tape in READ ALL, in this case should
                            be 7700)
```

6.1.4 Write Data Status Error Typeouts - Write data error typeouts also include drive, operation and direction, block being operated on, and the error status.

```
DRIVE 6                     (This typeout indicates a mark-track error while doing
WRITE DATA FWD              a Write Data Forward on block 0765. The WC type-
0765 BLOCK                  out indicates that the error occurred with 13$_8$ words
6000 STAT B                 left to be written.)
7715 WC

DRIVE 7                     (If STAT B indicates a normal block interrupt (0001)
WRITE DATA BKWD             and the WC has not gone to 0, this typeout occurs.)
1000 BLOCK
0001 STAT B
7777 WC
```

6.1.5 Data Error Typeouts - A data error may or may not follow a parity error typeout; it could also occur without a parity error. Again, the first three lines of the typeout are the same as for search errors: drive, operation and direction, and block number.

```
DRIVE 4
READ DATA BKWD DATA ERROR
0325 BLOCK

0000 KNOWN                  (Data written)
7773 UNKNOWN                (Data read)
7000 ADDRS KNOWN            (Buffer Address of data written)
```

6.1.6 Error Halts - The cause of any error halt not accompanying a typeout can be found by examining the program listing at the address of the halt. These may be caused by:

a. A status other than EZ while in MOVE TAPE.

b. The AC not being cleared after an IOT766 or 764.

c. AC bits 0 to 7 equal to all 0s when initially starting.

d. Program interrupt and no DECtape skip.

e. No program interrupt for 45 seconds.

6.2 Error Recovery

There ar e no manual error-recovery procedures. In the cases of read data and read errors in the Parity Test, the programs proceed to the next sequential block in an effort to gain more information about the failure. For search (except 0201) or write errors, the same operation is attempted again.

In Search Test 0201, the program attempts to pick up the next block in sequence.

Any error halt that occurs without a typeout may indicate a completely non-logical type of failure. Examine the program listing to determine the meaning of the halt.

9. PROGRAM DESCRIPTION

9.1 Basic Motion Routine (0200)

This routine is a visual verification of the operation of the DECtape drives and some sections of the TC01 Control. The sequence of operations is selected by keyboard input from the Teletype. The keys that may be typed to select operations are "F," "B," "S," "C," "W," "R," and "D." All other keys will cause the execute table to be reset and previous selections to be lost. The operations selected by the individual keys are as follows:

Key	Operation
F FWD (Typeout)	Start moving tape on the currently selected drive in the forward direction.
B BKWD (Typeout)	Start moving tape on the currently selected drive in the backward direction.
S STOP (Typeout)	Stop tape on the currently selected drive.
C CHNG (Typeout)	Change drive selection and repeat from the beginning of the execute table or from the last "C."
W WAIT (Typeout)	Wait a variable number of blocks. The number of blocks to wait is typed in, immediately following the typeout "WAIT," and is a 4-digit number from 0000 to 7777. NOTE: The program does not actually count blocks but sits in an ISZ loop 18 msec for every increment typed in.

Key	Operation
R RPT (Typeout)	Repeat the sequence of operations from the start of the execute table or from the last "R." Again, the number of times to repeat is typed in immediately following the typeout "RPT" and is a 4-digit octal number from 0000 to 7777.
D DO (Typeout)	Causes the sequence of operations previously typed in to be executed NOTE: "D" can only be typed in as the first character after a sequence of operations has once been executed. This is true each time that the routine is restarted from address 0200. Typing a "D" as the first character causes the last sequence of operations to be executed.

9.2 Search Find All Blocks (0201)

Before a program can verify that the DECtape system can write correctly, it must prove that the system can read correctly. Since a DECtape with a, so-called, virgin tape pattern is not always readily available and DECtape with correctly written block numbers is usually available, the first verification of read operations must be a Search Test. Search Find All Blocks moves the DECtape backward into the end zone, reads the tape forward and verifies that blocks are numbered 0000 to 2701; then moves the tape into forward end zone, reverses the tape and tests that blocks are numbered 2701 to 0000. If SW11 is 0, the processor halts; press CONTINUE, and the program will repeat. If SW11 is 1, the processor will not halt and the program will repeat.

9.3 Basic Search Routine (0202)

In this routine, the tape is searched in either direction until a series of 129 block numbers is read and stored. (Or until end zone is reached or some error status is generated). The decision is made to either type out all of the block numbers or to have the program verify that the block numbers read are sequential. When started the program types:

```
DRIVE 8 (or whichever drive is selected)
TYPE IN F FOR FORWARD
ALL OTHERS BACKWARD
```

At this point, type in an "F" to search forward or any other key to search backwards. The program will search in the direction selected until an error status or end zone occurs, or until 129 block numbers have been read and stored in memory. It then types:

```
XXXX STAT B            (If an error status and then repeat the initial typeout)
END ZONE               (If the tape went into end zone before 129 blocks were
                       read)
NO BLOCKS              (If no block numbers were read)
XXXX FIRST BLOCK       (First block number read)
TYPE C FOR COMPARE
ALL OTHERS PRINT
```

To have the program verify that the block numbers are sequential, type in a "C." Any other character typed in causes the program to type out the complete series of block numbers. If a "C" is typed, the program types out block numbers that are not sequential. The program always types the last block number read as follows:

XXXX LAST

9.4 Start/Stop/Turnaround Test (0203)

When the ability to correctly read block numbers has been established, a more thorough test of the DECtape motion controls can be given. The Start/Stop/Turnaround Test verifies the following operations:

TURN AROUND Both directions on BLOCK 0
Start FORWARD/STOP
Start BACKWARD/STOP
Start FORWARD/Wait UP TO SPEED/Turnaround
Start BACKWARD/Wait UP TO SPEED/Turnaround

The sequence is repeated for the length of tape. Turnaround occurs in both directions on block 2701.

Since the tape is up to full speed before turnaround, the tape must be up to speed again by the time it returns to that same point on the tape.

9.5 Write/Read Data Test (0204)

The search routines establish a minimum capability to read known data from tape. This routine establishes the ability to write data and further establishes the ability to read data. The test includes eight selectable data patterns and three selectable modes of operation. The basic sequence of operation is write forward, read backward, read forward, write backward, read forward, read backward. The sequence may be selected for 1 block at a time, 32 blocks at a time, or the length of tape. The program recycles and runs until STOP is depressed. At the end of each complete sequence (the length of tape), the program types out the pattern number and END. The eight write patterns are as follows:

0	0000
1	7777
2	0000, 7777, 0000
3	2525
4	5252
5	0707
6	7070
7	2525, 5252, 2525

The pattern to be written is selected in SWITCH REGISTER bits 9, 10, and 11. Place the number of the pattern desired in these switches.

Switches 7 and 8 are used to select the sequence of operation as follows:

SW7	SW8	Operation
0	0	Write and read sequence the length of the tape.
0	1	Write and read sequence in 32 block increments.
1 or 1	0 1	Write and read sequence one block at a time.
SW4 = 0		Take the next pattern to be exericsed from SWs 9, 10, and 11.
SW4 = 1		Exercise sequentially through the patterns; i.e., after one complete sequence the length of tape with pattern number 3, exercise pattern number 4, after exercising 4 go to 5. Patterns are not changed until block 2701 has been written backwards.
SW3 = 0		Type out parity error information and data errors.
SW3 = 1		Ignore parity and data errors. Mark track, timing, and select errors are not ignored.
SW6 = 0		Sequence from write to read data.
SW6 = 1		Write data only.
SW5 = 0		Sequence from read data to write data.
SW5 = 1		Read data only (SW5 overrides SW6).

9.6 Parity Generation and Checking Test (0205)

The complete test of parity generation and checking requires several passes over a series of blocks. The steps that the program takes for a complete test of the parity circuitry are as follows:

STEP 1 Write reverse checksums to 0 (Actually written to 77 going backward and should equal 00 going forward).

STEP 2 Write data patterns
Various data patterns are written in the first and second characters of each block and the rest of the block is written to zeros (Note: the checksums generated are either the complement of the first character or 77_8, if the first two characters are written).

STEP 3 Read/Verify checksums
The checksums are read back and verified to be the complement of the first character in the block or 77, if the first two characters of block are non-zero.

STEP 4 Test no parity errors
The blocks are read in both directions and no parity errors should be generated.

STEP 5 Write blocks to wrong parity
The checksums are written to be the same as the first character in the block so that the LPB will not equal 77 when the block is read.

STEP 6 Test for parity errors
The blocks are read in both directions and parity errors should be generated.

The program then repeats from step 1 and will run until STOP is depressed.

If an error typeout is generated indicating PARITY ERROR EXPECTED, the contents of the LPB can be determined by the following procedure:

a. The typeout includes the first data word of the block if read forward or the last word of the block if read backward (acutally same word but complement obverse if read backward).

b. This word will contain either one or two non-zero 6-bit characters, (FWD); or one or two characters that do not equal 77 (BKWD).

c. If there is only one 6-bit character, the LPB should be all 0s at the time it is strobed for parity error. This is true whether read occurred in a forward of a backward direction.

d. If the read direction is forward and there are two non-zero characters in the first word, the LPB should be equal to one of the characters at the time it is strobed for parity error; i.e., WORD = 0202, LPB = 02.

e. If the read direction is backward and there are two characters not equal to 77, the LPB should be equaled the complement of one of the characters when it was strobed for parity error; i.e., WORD = 5757, LPB = 20.

9.7 Write Data Scope Loop (0206)

This routine starts forward in search. When a block number is found, the program changes to write data for one block, then back to search and then to write data again. The program continues in that mode until end zone. Upon reaching end zone the tape is started backwards in search and is again changed to write data when a block is found. Each time an end zone interrupt is received, the tape direction is reversed. For any other error status, the function is reset to search and tape direction is not reversed. Any of the eight data patterns in the Write/Read Data Test may be selected by placing the pattern number in switches 9, 10, 11. (See paragraph (5.1.3). The routine has to be restarted from 0207 to change pattern selection. This routine contains error halts if the AC is not cleared after an IOT764 or 766.

9.8 Read Scope Loop (0207)

This routine starts forward in read data and reads in 129-word blocks. When end zone is reached the tape is run backwards in read data. For any other error, the tape continues in read data in the same direction. Each time an end zone is reached, tape direction is reversed. This routine also contains error halts that indicate the accumulator was not cleared after an IOT766 or 764.

9.9 Search Scope Loop (0210)

This routine starts forward in search function and reverses direction at end zones. The DECtape flag and all error statuses except end zone are ignored. The program starts forward in search and displays the last block number received in the AC while doing an ISZ/JMP .-1 loop for approximately 13 msec. At completion of the ISZ loop, the program tests for end-zone status and complements the direction bit if end zone was reached. If end zone was not reached, search enables are reset and the motion bit in status A is set to a 1 if it was cleared. This routine contains error halts if the AC is not cleared after an IOT766 or 764 and if the motion bit is not cleared by EZ.

10. LISTING

```
                /TCØ1 BASIC EXERCISER TAPE 1
                /PAGE Ø CONSTANTS AND TEMP STORAGE
                IOT=6ØØØ
                BUFFRS=6774

                BUFFR2=BUFFRS+2Ø1
                BUFFR3=BUFFR2+2Ø1

                *1
ØØØ1  54Ø2         JMP I 2           /FOR INTERRUPTS

                *2Ø

ØØ2Ø  ØØØØ      RECORD,       Ø                   /BLOCK OPERATED ON
ØØ21  ØØØØ      BLKFND,       Ø                   /BLOCK FOUND BY SEARCH
ØØ22  ØØØØ      POSITN,       Ø                   /TO GET TAPE POSITION
ØØ23  ØØØØ      DIRECT,       Ø                   /TO GET LAST DIRECTION
ØØ24  ØØØØ      LSTBLK,       Ø                   /TO GET LAST BLOCK WRITTEN
ØØ25  ØØ21      IDCON,        BLKFND              /FOR SRCH CA
ØØ26  ØØ2Ø      RECRDK,       RECORD              /FOR TYPEOUTS

                /ADDRESSES FOR INDIRECT TAD AND DCA

ØØ27  7754      WCLOC,        7754
ØØ3Ø  7755      CALOC,        7755
ØØ31  6774      BF1WD1,       BUFFRS
ØØ32  6773      BF1LOC,       BUFFRS-1
ØØ33  7174      BF2LOC,       BUFFR2-1
ØØ34  7375      BF3LOC,       BUFFR3-1

                /SUBROUTINE ADDRESS
ØØ35  Ø6ØØ      SRCHIT,       SEARCH
ØØ36  Ø4ØØ      REWIND,       REPOSI
ØØ37  Ø437      NEWDRV,       CHNGDR
ØØ4Ø  Ø234      WAITI,        WTINT
ØØ41  Ø313      WTHALF,       WT5ØØ
ØØ42  5ØØØ      DATACO,       CODATA
ØØ43  41ØØ      SAVPAD,       DAPSAV
ØØ44  131Ø      ERRSTP,       ERSTP
ØØ45  1511      DRIVTY,       TYDRV
ØØ46  1424      RDATTY,       TYRDAT
ØØ47  1316      SBTYPE,       TSTATB
ØØ5Ø  1442      WDATTY,       TYWDAT
```

```
ØØ51   1261   TYPCON,      TYCONT
ØØ52   1411   SRCHTY,      TYSRCH
ØØ53   4ØØØ   ERSSTA,      SSTAER
ØØ54   36ØØ   SSTFWD,      SSTAFW
ØØ55   3651   SSTBKW,      SSTABW
ØØ56   12ØØ   TYPTEX,      TYTEXT

              /TEMP STORAGE FOR DRIVE SELECTION

ØØ57   ØØØØ   CDRIVE,      Ø                    /DRIVE NUMBER AND
ØØ6Ø   ØØØØ   UNFUNC,      Ø                    /POSITIONED FOR STAT
ØØ61   ØØØØ   MSBITS,      Ø                    /DRIVES SELECTED
ØØ62   ØØØØ   COMBIT,      Ø

              /OTHER CONSTANTS

ØØ63   776Ø   K776Ø,       776Ø
ØØ64   7577   K7577,       7577
ØØ65   Ø6Ø4   KØ6Ø4,       Ø6Ø4
ØØ66   4ØØØ   K4ØØØ,       4ØØØ
ØØ67   7767   K7767,       7767
ØØ7Ø   77ØØ   K77ØØ,       77ØØ
ØØ71   ØØ77   KØØ77,       77
ØØ72   Ø24Ø   KØ24Ø,       24Ø

ØØ73   ØØØ7   KØØØ7,       7
ØØ74   ØØ2Ø   KØØ2Ø,       2Ø
ØØ75   Ø2ØØ   KØ2ØØ,       2ØØ
ØØ76   ØØØ3   KØØØ3,       3
ØØ77   5Ø77   K5Ø77,       5Ø77
Ø1ØØ   27Ø1   K27Ø1,       27Ø1
Ø1Ø1   Ø614   KØ614,       614
Ø1Ø2   Ø4ØØ   KØ4ØØ,       4ØØ

Ø1Ø3   Ø214   KØ214,       214
Ø1Ø4   ØØ16   SFAFK,       16
Ø1Ø5   ØØØ6   SFABK,       6
Ø1Ø6   7763   SBABK,       7763
Ø1Ø7   7772   SBAFK,       7772
Ø11Ø   1ØØØ   EZBIT,       1ØØØ

Ø111   ØØØØ   POSSAV,      Ø
Ø112   ØØØØ   DIRSAV,      Ø
Ø113   ØØØØ   BLKINC,      Ø
Ø114   ØØØØ   DIRFLG,      Ø
Ø115   ØØ5Ø   KØØ5Ø,       5Ø
Ø116   ØØ3Ø   KØØ3Ø,       3Ø

Ø117   ØØ3Ø   BLKBTS,      ØØ3Ø
Ø12Ø   ØØ2Ø   BLKBIT,      ØØ2Ø
Ø121   ØØ4Ø   KØØ4Ø,       4Ø
Ø122   Ø17Ø   KØ17Ø,       17Ø
Ø123   Ø1ØØ   KØ1ØØ,       1ØØ
Ø124   Ø1Ø1   KØ1Ø1,       1Ø1
Ø125   Ø2Ø4   KØ2Ø4,       2Ø4
Ø126   5Ø76   K5Ø76,       5Ø76
Ø127   ØØ37   KØØ37,       37
Ø13Ø   ØØ1Ø   KØØ1Ø,       1Ø
```

```
                /SELECT AND START TESTS
                /SWITCHES = MASTER BIT SELECTION
                /FOR TAPES

                *200
0200  4211          JMS CIPHER
0201  4211          JMS CIPHER
0202  4211          JMS CIPHER
0203  4211          JMS CIPHER
0204  4211          JMS CIPHER
0205  4211          JMS CIPHER
0206  4211          JMS CIPHER
0207  4211          JMS CIPHER
0210  4211          JMS CIPHER

0211  0000      CIPHER,     Ø
0212  7404          OSR
0213  0063          AND K776Ø
0214  7440          SZA
0215  5220          JMP .+3
0216  7402          HLT
0217  5212          JMP CIPHER+1
0220  3061          DCA MSBITS
0221  6774          IOT 774         /CLR STATUS B MEM FIELD

0222  1061          TAD MSBITS
0223  7402          HLT
0224  7200          CLA
0225  1211          TAD CIPHER
0226  1064          TAD K7577                 /-2Ø1
0227  1277          TAD TSTTBL
0230  3232          DCA .+2
0231  4633          JMS I .+2
0232  5700          JMP I TSTTBL+1  /GO TO TEST SELECTED
0233  0417          RSFDRV
                /ABOVE JMP I IS CHANGED TO JMP I TST TBL+1 + THE
                /TEST NUMBER SELECTED
0234  5234      WTINT,      JMP .
0235  1272          TAD WTIJMP
0236  3001          DCA 1
0237  1273          TAD WTIJMP+1
0240  3002          DCA 2
0241  3274          DCA WTIJMP+2
0242  1276          TAD K4215
0243  3275          DCA WTIJMP+3
0244  6001          ION
0245  2274          ISZ WTIJMP+2    /WAIT A MAXIMJM
0246  5245          JMP .-1         /OF 35 SECONDS
0247  2275          ISZ WTIJMP+3    /FOR AN INTERRUPT
0250  5245          JMP .-3
0251  6002          IOF
0252  7402          HLT
0253  5252          JMP .-1
```

```
Ø254  6771  IRECD,     IOT 771         /DIF OR DTEF = 1
Ø255  741Ø      SKP
Ø256  5261      JMP .+3
Ø257  74Ø2      HLT
Ø26Ø  5254      JMP IRECD
Ø261  6772      IOT 772
Ø262  3274      DCA WTIJMP+2
Ø263  1634      TAD I WTINT

Ø264  7Ø4Ø      CMA
Ø265  Ø274      AND WTIJMP+2
Ø266  765Ø      SNA CLA
Ø267  2234      ISZ WTINT
Ø27Ø  2234      ISZ WTINT
Ø271  5634      JMP I WTINT
Ø272  54Ø2  WTIJMP,    JMP I 2

Ø273  Ø254      IRECD
Ø274  ØØØØ      Ø
Ø275  ØØØØ      Ø
Ø276  4215  K4215,     4215

Ø277  57ØØ  TSTTBL,    JMP I .+1

            /STARTING ADDRESSES OF TESTS
Ø3ØØ  2ØØØ      MVTEST
Ø3Ø1  24ØØ      SRCH1
Ø3Ø2  26ØØ      SERCH2
Ø3Ø3  32ØØ      SSTRNA
Ø3Ø4  44ØØ      WRTTST
Ø3Ø5  56ØØ      PARTST
Ø3Ø6  16ØØ      WRSCOP
Ø3Ø7  1667      RDSCOP
Ø31Ø  1734      SRSCOP

Ø311  74Ø2  HLTNS,     HLT             /TEST SELECTED
Ø312  5311      JMP .-1          /NOT AVAILABLE
Ø313  5313  WT5ØØ,     JMP .
Ø314  72ØØ      CLA
Ø315  3274      DCA WTIJMP+2           /TIME OUT
Ø316  1325      TAD KM25
Ø317  3275      DCA WTIJMP+3           /APPROX 5ØØ MSEC
Ø32Ø  2274      ISZ WTIJMP+2
Ø321  532Ø      JMP .-1
Ø322  2275      ISZ WTIJMP+3
Ø323  532Ø      JMP .-3
Ø324  5713      JMP I WT5ØØ
Ø325  7747  KM25,      7747
```

```
                /REWIND ALL DRIVES SELECTED
                /TO END ZONE AT START OF TAPE

                *4ØØ
Ø4ØØ    52ØØ    REPOSI,     JMP .
Ø4Ø1    4217        JMS RSFDRV       /RESET POINTRS TO FIRST DRIVE
Ø4Ø2    1Ø65        TAD KØ6Ø4        /MOVE BACKWARDS
Ø4Ø3    1Ø6Ø        TAD UNFUNC       /*POSITIONED UNIT NO
Ø4Ø4    6766        IOT 766          /SET STATUS A
Ø4Ø5    444Ø        JMS I WAITI
Ø4Ø6    5ØØ1        5ØØ1             /INDICATE EXPECT END
Ø4Ø7    74Ø2        HLT              /NOT STATUS EXPECTED

Ø41Ø    724Ø        CLA CMA
Ø411    3422        DCA I POSITN     /INDICATE END ZONE
Ø412    724Ø        CLA CMA
Ø413    3423        DCA I DIRECT     /INDICATE BACKWARDS
Ø414    4237        JMS CHNGDR       /SET UP NEXT DRIVE
Ø415    52Ø2        JMP REPOSI*2     /REWIND NEXT DRIVE
Ø416    56ØØ        JMP I REPOSI     /GOT ALL DRIVES, EXIT


                /RESET CURRENT DRIVE POINTERS TO
                /FIRST DRIVE SELECTED
Ø417    5217    RSFDRV,     JMP .
Ø42Ø    72ØØ        CLA
Ø421    3Ø57        DCA CDRIVE       /SET INITIALLY TO Ø
Ø422    1Ø66        TAD K4ØØØ
Ø423    3Ø62        DCA COMBIT
Ø424    1Ø61        TAD MSBITS

Ø425    ØØ62        AND COMBIT
Ø426    764Ø        SZA CLA          /THIS DRIVE SELECTED
Ø427    5235        JMP RSFDR1       /YES, SET POINTER
Ø43Ø    1Ø62        TAD COMBIT
Ø431    711Ø        CLL RAR
Ø432    3Ø62        DCA COMBIT                /MOVE COMPARE BIT
Ø433    2Ø57        ISZ CDRIVE                /INCREMENT DRIVE NUM.
Ø434    5224        JMP RSFDRV+5


                /HAVE FOUND FIRST DRIVE SELECTED
Ø435    4261    RSFDR1,     JMS GNPTRS        /GENERATE CONTROL POINTERS
Ø436    5617        JMP I RSFDRV              /EXIT
```

```
                /SELECT NEXT DRIVE OR
                /RESET TO FIRST DRIVE AND SKIP
Ø437   5237     CHNGDR,      JMP .
Ø44Ø   72ØØ          CLA
Ø441   1Ø62          TAD COMBIT           /GET DRIVE COMPARE BIT
Ø442   711Ø          CLL RAR              /MOVE IT TO NEXT
Ø443   ØØ67          AND K7767
Ø444   744Ø          SZA                  /LAST DRIVE NJM 7
Ø445   5251          JMP .+4              /NO
Ø446   4217          JMS RSFDRV           /RESET TO FIRST

Ø447   2237          ISZ CHNGDR           /INCR. EXIT, SKIP
Ø45Ø   5637          JMP I CHNGDR         /EXIT
Ø451   3Ø62          DCA COMBIT
Ø452   2Ø57          ISZ CDRIVE
Ø453   1Ø62          TAD COMBIT
Ø454   ØØ61          AND MSBITS
Ø455   765Ø          SNA CLA              /THIS DRIVE SELECTED
Ø456   524Ø          JMP CHNGDR+1         /NO

Ø457   4261          JMS GNPTRS           /GENERATE DRIVE POINTERS
Ø46Ø   5637          JMP I CHNGDR

                /GENERATE LAST RECORD,
                /DIRECTION AND UNIT NUMBER POINTERS
                /FOR DECTAPE FUNCTIONS

Ø461   5261     GNPTRS,      JMP .
Ø462   1Ø57          TAD CDRIVE           /DRIVE NUMBER
Ø463   7112          CLL RTR
Ø464   7Ø12          RTR                  /POSITION TO BITS Ø,1,2
Ø465   3Ø6Ø          DCA UNFUNC
Ø466   1Ø57          TAD CDRIVE           /DRIVE NUMBER
Ø467   13ØØ          TAD PNTRS            /+ POS. PNTR ADDRS.
Ø47Ø   3Ø22          DCA POSITN           /FOR INDIRECTS

Ø471   1Ø57          TAD CDRIVE
Ø472   1311          TAD PNTRS+11         /+ DIRECTION PNTR
Ø473   3Ø23          DCA DIRECT           /FOR INDIRECTS
Ø474   1322          TAD PNTRS+22
Ø475   1Ø57          TAD CDRIVE
Ø476   3Ø24          DCA LSTBLK
Ø477   5661          JMP I GNPTRS
```

```
Ø5ØØ  Ø5Ø1  PNTRS,     .+1          /TO GET LAST RECORD NUMBER

Ø5Ø1  ØØØØ      Ø           /FOR DRIVE 8
Ø5Ø2  ØØØØ      Ø           /1
Ø5Ø3  ØØØØ      Ø           /2
Ø5Ø4  ØØØØ      Ø           /3
Ø5Ø5  ØØØØ      Ø           /4
Ø5Ø6  ØØØØ      Ø           /5
Ø5Ø7  ØØØØ      Ø           /6
Ø51Ø  ØØØØ      Ø           /7

Ø511  Ø512      .+1         /TO GET LAST DIRECTION
Ø512  ØØØØ      Ø           /DIRECTION - UNIT 8
Ø513  ØØØØ      Ø           /1
Ø514  ØØØØ      Ø           /2
Ø515  ØØØØ      Ø           /3
Ø516  ØØØØ      Ø           /4
Ø517  ØØØØ      Ø           /5
Ø52Ø  ØØØØ      Ø           /6
Ø521  ØØØØ      Ø           /7

Ø522  Ø523      .+1         /TO GET LAST WRITTEN
Ø523  ØØØØ      Ø           /8
Ø524  ØØØØ      Ø           /1
Ø525  ØØØØ      Ø           /2
Ø526  ØØØØ      Ø           /3
Ø527  ØØØØ      Ø           /4
Ø53Ø  ØØØØ      Ø           /5
Ø531  ØØØØ      Ø           /6
Ø532  ØØØØ      Ø           /7
```

```
                /SEARCH ROUTINE
                /FIND BLOCK IN (RECORD) IN
                /DIRFLG=7777 BKWD =Ø FWD

                *6ØØ

Ø6ØØ   52ØØ     SEARCH,     JMP .
Ø6Ø1   1114         TAD DIRFLG
Ø6Ø2   71ØØ         CLL
Ø6Ø3   764Ø         SZA CLA
Ø6Ø4   712Ø         STL
Ø6Ø5   1Ø76         TAD KØØØ3                 /MAKE=3 IF FWD
Ø6Ø6   742Ø         SNL
Ø6Ø7   7Ø41         CMA IAC         /MAKE 3 IF BKWD
Ø61Ø   1Ø2Ø         TAD RECORD      /BLOCK + OR - 2 FOR TA
Ø611   3351         DCA TAPONT
Ø612   1114         TAD DIRFLG
Ø613   765Ø         SNA CLA         /FORWARD IS
Ø614   11Ø2         TAD KØ4ØØ                 /START BACKWARD
Ø615   11Ø3         TAD KØ214
Ø616   1Ø6Ø         TAD UNFUNC      /+DRIVE NUMBER
Ø617   6766         IOT 766

Ø62Ø   7Ø4Ø         CMA
Ø621   3347         DCA BLKFLG
Ø622   1Ø25         TAD IDCON
Ø623   343Ø         DCA I CALOC
Ø624   444Ø         JMS I WAITI     /WAIT FOR NORMAL
Ø625   ØØØ1         1
Ø626   5321         JMP SREZTS      /COULD BE EZ
Ø627   4255         JMS SRCNCK      /FOUND TURN AROUND

Ø63Ø   5234         JMP SRTAFN      /YES, TURN AROUND
Ø631   5234         JMP SRTAFN      /PAST IT, TURN AROUND
Ø632   6764         IOT 764         /NOT REACHED YET
Ø633   5224         JMP .-7

Ø634   1Ø2Ø     SRTAFN,     TAD RECORD
Ø635   3351         DCA TAPONT
Ø636   6761         IOT 761
Ø637   7Ø4Ø         CMA
Ø64Ø   ØØ75         AND KØ2ØØ                 /IN CASE MOTION=Ø
Ø641   11Ø2         TAD KØ4ØØ
Ø642   6764         IOT 764         /CHANGE DIRECTION
Ø643   7Ø4Ø         CMA
Ø644   3347         DCA BLKFLG
Ø645   444Ø         JMS I WAITI

Ø646   ØØØ1         1               /HAS TO BE NORMAL
Ø647   5746         JMP I SRCHER    /OR ERROR
Ø65Ø   4255         JMS SRCNCK
Ø651   56ØØ         JMP I SEARCH    /FOUND BLOCK, EXIT
Ø652   5746         JMP I SRCHER    /WENT PAST, ERROR
Ø653   6764         IOT 764         /NOT THERE YET
Ø654   5245         JMP .-7
```

```
Ø655   5255   SRCNCK,    JMP .
Ø656   2347      ISZ BLKFLG       /FIRST BLOCK IN
Ø657   741Ø      SKP              /NO
Ø66Ø   5274      JMP SBCONS
Ø661   6761      IOT 761
Ø662   Ø1Ø2      AND KØ4ØØ
Ø663   764Ø      SZA CLA          /BACKWARD IS
Ø664   7Ø4Ø      CMA              /-1

Ø665   745Ø      SNA              /FORWARD IS
Ø666   7ØØ1      IAC              /+1
Ø667   135Ø      TAD PREBLK
Ø67Ø   7Ø41      CMA IAC
Ø671   1Ø21      TAD BLKFND       /BLOCKS SEQUENTIAL
Ø672   764Ø      SZA CLA
Ø673   5746      JMP I SRCHER     /NO, ERROR

Ø674   1351   SBCONS,    TAD TAPONT
Ø675   7Ø41      CMA IAC
Ø676   1Ø21      TAD BLKFND
Ø677   745Ø      SNA              /FIND BLOCK YET
Ø7ØØ   5655      JMP I SRCNCK     /YES, TA OR EXIT
Ø7Ø1   2255      ISZ SRCNCK       /STEP ADDRS
Ø7Ø2   71ØØ      CLL
Ø7Ø3   771Ø      SPA CLA
Ø7Ø4   712Ø      STL              /L=1 IS BLK FND LESS
Ø7Ø5   6761      IOT 761
Ø7Ø6   Ø1Ø2      AND KØ4ØØ
Ø7Ø7   764Ø      SZA CLA          /FORWARD
Ø71Ø   5316      JMP .+6          /NO BACKWARD
Ø711   743Ø      SZL              /FORWARD AND BLKFND
Ø712   2255      ISZ SRCNCK       /LESS IS NOT THERE YET
Ø713   1Ø21      TAD BLKFND
Ø714   335Ø      DCA PREBLK
Ø715   5655      JMP I SRCNCK
Ø716   742Ø      SNL              /BACKWARD AND BLKFND
Ø717   2255      ISZ SRCNCK       /LESS IS GONE PAST
Ø72Ø   5313      JMP .-5
```

```
Ø721  6772  SREZTS,     IOT 772
Ø722  Ø11Ø      AND EZBIT
Ø723  765Ø      SNA CLA
Ø724  5746      JMP I SRCHER    /NOT END ZONE, ERROR
Ø725  1351      TAD TAPONT
Ø726  751Ø      SPA

Ø727  5333      JMP .+4         /BLOCK Ø OR 1
Ø73Ø  1126      TAD K5Ø76
Ø731  771Ø      SPA CLA         /BLOCK 27ØØ OR 27Ø1
Ø732  5342      JMP .+1Ø
Ø733  72ØØ      CLA
Ø734  1Ø75      TAD KØ2ØØ
Ø735  6764      IOT 764         /SET MOTION
Ø736  444Ø      JMS I WAITI     /WAIT FOR EZ AGAIN
Ø737  5ØØØ      5ØØØ
Ø74Ø  5746      JMP I SRCHER
Ø741  5234      JMP SRTAFN      /DO TURN AROUND
Ø742  1347      TAD BLKFLG      /IF EZ WAS
Ø743  77ØØ      SMA CLA         /FIRST INT WAS VALID
Ø744  5746      JMP I SRCHER    /IF NOT FIRS IS INVALID
Ø745  5234      JMP SRTAFN
Ø746  1ØØØ  SRCHER,     SRHERR
Ø747  ØØØØ  BLKFLG,     Ø
Ø75Ø  ØØØØ  PREBLK,     Ø
Ø751  ØØØØ  TAPONT,     Ø


            /SEARCH ERROR TYPEOUT

            *1ØØØ
1ØØØ  4444  SRHERR,     JMS I ERRSTP
1ØØ1  4452      JMS I SRCHTY
1ØØ2  1Ø26      TAD RECRDK
1ØØ3  4451      JMS I TYPCON    /TYPE BLOCK SEARCHED
1ØØ4  4456      JMS I TYPTEX
1ØØ5  ØØ42      42
1ØØ6  5457      5457
1ØØ7  4353      4353
1Ø1Ø  ØØ67      67
1Ø11  4156      4156
1Ø12  6445      6445
1Ø13  44ØØ      44ØØ
1Ø14  77ØØ      77ØØ
1Ø15  1114      TAD DIRFLG
1Ø16  765Ø      SNA CLA
1Ø17  5222      JMP .+3
1Ø2Ø  4675      JMS I BACKTY
1Ø21  741Ø      SKP
1Ø22  4676      JMS I FORDTY
1Ø23  1Ø25      TAD IDCON
1Ø24  4451      JMS I TYPCON    /TYPE BLOCK FOUND
1Ø25  4456      JMS I TYPTEX
1Ø26  ØØ42      42
1Ø27  5457      5457
1Ø3Ø  4353      4353
```

```
1031  ØØ46        46
1032  5765        5765
1033  5644        5644
1034  77ØØ        77ØØ
1035  7Ø4Ø        CMA
1036  1671        TAD I SEKONS     /BLKFLG
1037  771Ø        SPA CLA          /MORE THAN 1 3LOCK
1Ø4Ø  5252        JMP .+12                 /NO
1Ø41  1272        TAD SEKONS+1     /PREBLK
1Ø42  4451        JMS I TYPCON     /TYPE LAST BLJCK
1Ø43  4456        JMS I TYPTEX     /FOUND
1Ø44  ØØ54        54
1Ø45  4163        4163
1Ø46  64ØØ        64ØØ
1Ø47  4254        4254
1Ø5Ø  5743        5743
1Ø51  5377        5377
1Ø52  2671        ISZ I SEKONS
1Ø53  7ØØØ        NOP
1Ø54  1271        TAD SEKONS
1Ø55  4451        JMS I TYPCON     /TYPE NUMBER JF
1Ø56  4456        JMS I TYPTEX     /BLKS NUM REAJ
1Ø57  ØØ42        42
1Ø6Ø  5457        5457
1Ø61  4353        4353
1Ø62  63ØØ        63ØØ
1Ø63  6245        6245
1Ø64  4144        4144
1Ø65  77ØØ        77ØØ
1Ø66  4447        JMS I SBTYPE
1Ø67  567Ø        JMP I .+1
1Ø7Ø  Ø6Ø1        SEARCH+1
1Ø71  Ø747  SEKONS,     BLKFLG
1Ø72  Ø75Ø        PREBLK
1Ø73  1Ø74        .+1
1Ø74  ØØØØ        Ø
1Ø75  1545  BACKTY,     TYBKW
1Ø76  1555  FORDTY,     TYFWD
```

```
                /TYPE TEXT ROUTINE

                *1200
1200   5200     TYTEXT,     JMP .
1201   7200         CLA
1202   1600         TAD I TYTEXT         /GET NEXT 2 CHARACTERS
1203   7040         CMA                  /MAKE -
1204   3307         DCA TXSTOR
1205   2200         ISZ TYTEXT
1206   1307         TAD TXSTOR
1207   7440         SZA                  /CARRIAGE RETURN - LINE FEED
1210   5213         JMP .+3              /NO

1211   4242         JMS CRLFLF           /CR LF
1212   5201         JMP TYTEXT+1         /GET NEXT
1213   0070         AND K7700                    /CLEAR TO UPR CHAR
1214   7450         SNA                  /END OF MESSAGE
1215   5600         JMP I TYTEXT         /YES
1216   7012         RTR                  /MOVE
1217   7012         RTR                  /OVER
1220   7012         RTR                  /6 PLACES
1221   4230         JMS TYCHAR           /OUTPUT
1222   1307         TAD TXSTOR
1223   0071         AND K0077
1224   7450         SNA                  /END OF MESSAGE
1225   5600         JMP I TYTEXT         /YES EXIT

1226   4230         JMS TYCHAR           /OUTPUT
1227   5201         JMP TYTEXT+1         /GET NEXT 2

1230   5230     TYCHAR,     JMP .
1231   7040         CMA                  /MAKE + AGAIN
1232   0071         AND K0077                    /CLEAR TO LOWER 6
1233   1072         TAD K0240                    /MAKE ASCII
1234   6046         TLS                  /OUTPUT
1235   6041         TSF                  /WAIT FLAG
1236   5235         JMP .-1
1237   7200         CLA
1240   6042         TCF                  /CLEAR FLAG
1241   5630         JMP I TYCHAR         /DO NEXT

1242   5242     CRLFLF,     JMP .
1243   1257         TAD K0215                    /CARRIAGE RETURN
1244   6046         TLS
1245   6041         TSF
1246   5245         JMP .-1
1247   7200         CLA
1250   1260         TAD K0212                    /LINE FEED
1251   6046         TLS
1252   6041         TSF
1253   5252         JMP .-1
1254   6042         TCF
1255   7200         CLA
1256   5642         JMP I CRLFLF
1257   0215     K0215,      215
1260   0212     K0212,      212
```

```
                /TYPE CONTENTS OF ADDRESS IN AC

1261  5261  TYCONT,     JMP .
1262  3307      DCA TXSTOR        /SAVE ADDRESS
1263  1707      TAD I TXSTOR      /GET CONTENTS
1264  3307      DCA TXSTOR
1265  4242      JMS CRLFLF        /CARRIAGE RETJRN - LINE FEED
1266  4273      JMS TYCOVR        /TYPE UPPER OCTAL
1267  4273      JMS TYCOVR
1270  4273      JMS TYCOVR
1271  4273      JMS TYCOVR
1272  5661      JMP I TYCONT

1273  5273  TYCOVR,     JMP .
1274  1307      TAD TXSTOR
1275  7006      RTL
1276  7004      RAL
1277  3307      DCA TXSTOR
1300  1307      TAD TXSTOR
1301  7004      RAL
1302  0073      AND K0007
1303  1074      TAD K0020
1304  7040      CMA               /MAKE - FOR
1305  4230      JMS TYCHAR        /OUTPUT
1306  5673      JMP I TYCOVR
1307  0000  TXSTOR,     0

            /STOP TAPE ON ERROR, LEAVE FLAGS SET
1310  5310  ERSTP,      JMP .
1311  6761      IOT 761
1312  0075      AND K0200
1313  1076      TAD K0003
1314  6764      IOT 764
1315  5710      JMP I ERSTP
1316  5316  TSTATB,     JMP .
1317  6772      IOT 772
1320  3331      DCA SBRECV
1321  1332      TAD SBRECV+1
1322  4451      JMS I TYPCON
1323  4456      JMS I TYPTEX
1324  0063      63
1325  6441      6441
1326  6400      6400
1327  4277      4277
1330  5716      JMP I TSTATB
1331  0000  SBRECV,     0
1332  1331      .-1
```

```
                *1400
                /TYPE MOVE AND DIRECTION
1400   5200     TYMOVE,      JMP .
1401   4311         JMS TYDRV
1402   4456         JMS I TYPTEX
1403   7777         7777
1404   5557         5557
1405   6645         6645
1406   0077         0077
1407   4336         JMS TYDIR
1410   5600         JMP I TYMOVE


                /TYPE SEARCH DIRECTION AND MODE
1411   5211     TYSRCH,      JMP .
1412   4311         JMS TYDRV
1413   4456         JMS I TYPTEX
1414   7777         7777
1415   6345         6345
1416   4162         4162
1417   4350         4350
1420   0077         0077
1421   4336         JMS TYDIR
1422   4363         JMS TYMODE
1423   5611         JMP I TYSRCH


                /TYPE READ DATA DIRECTION AND MODE
1424   5224     TYRDAT,      JMP .
1425   4311         JMS TYDRV
1426   4260         JMS TYREAD
1427   4275         JMS TYDATA
1430   4336         JMS TYDIR
1431   4363         JMS TYMODE
1432   5624         JMP I TYRDAT


                /TYPE READ ALL DIRECTION AND MODE
1433   5233     TYRALL,      JMP .
1434   4311         JMS TYDRV
1435   4260         JMS TYREAD
1436   4303         JMS TYALL
1437   4336         JMS TYDIR
1440   4363         JMS TYMODE
1441   5633         JMP I TYRALL
```

```
                  /TYPE WRITE DATA DIRECTION AND MOJE
1442   5242       TYWDAT,     JMP .
1443   4311           JMS TYDRV
1444   4266           JMS TYWRIT
1445   4275           JMS TYDATA
1446   4336           JMS TYDIR
1447   4363           JMS TYMODE
1450   5642           JMP I TYWDAT


                  /TYPE WRITE ALL DIRECTION AND MODEL
1451   5251       TYWALL,     JMP .
1452   4311           JMS TYDRV
1453   4266           JMS TYWRIT
1454   4303           JMS TYALL
1455   4336           JMS TYDIR
1456   4363           JMS TYMODE
1457   5651           JMP I TYWALL


                  /TYPE READ
1460   5260       TYREAD,     JMP .
1461   4456           JMS I TYPTEX
1462   6245           6245
1463   4144           4144
1464   0077           0077
1465   5660           JMP I TYREAD

                  /TYPE WRITE
1466   5266       TYWRIT,     JMP .
1467   4456           JMS I TYPTEX
1470   6762           6762
1471   5164           5164
1472   4500           4500
1473   7700           7700
1474   5666           JMP I TYWRIT


                  /TYPE DATA
1475   5275       TYDATA,     JMP .
1476   4456           JMS I TYPTEX
1477   4441           4441
1500   6441           6441
1501   0077           0077
1502   5675           JMP I TYDATA
```

```
                 /TYPE ALL
1503    5303     TYALL,       JMP .
1504    4456         JMS I TYPTEX
1505    4154         4154
1506    54ØØ         54ØØ
1507    77ØØ         77ØØ
151Ø    57Ø3         JMP I TYALL


                 /TYPE DRIVE AND NUMBER
1511    5311     TYDRV,       JMP .
1512    4456         JMS I TYPTEX
1513    7777         7777
1514    7777         7777
1515    4462         4462
1516    5166         5166
1517    45ØØ         45ØØ
152Ø    ØØ77         ØØ77
1521    1Ø57         TAD CDRIVE
1522    745Ø         SNA
1523    113Ø         TAD KØØ1Ø
1524    1335         TAD K26Ø
1525    6Ø46         TLS
1526    6Ø41         TSF
1527    5326         JMP .-1
153Ø    72ØØ         CLA
1531    4456         JMS I TYPTEX

1532    7777         7777
1533    77ØØ         77ØØ
1534    5711         JMP I TYDRV
1535    Ø26Ø     K26Ø,        26Ø


                 /TYPE FORWARDS OR BACKWARD
1536    5336     TYDIR,       JMP .
1537    6761         IOT 761
154Ø    Ø1Ø2         AND KØ4ØØ
1541    765Ø         SNA CLA
1542    5353         JMP TYFWD-2
1543    4345         JMS TYBKW
1544    5736         JMP I TYDIR
1545    5345     TYBKW,       JMP .
1546    4456         JMS I TYPTEX
1547    4253         4253
155Ø    6744         6744
1551    ØØ77         ØØ77
1552    5745         JMP I TYBKW

1553    4355         JMS TYFWD
1554    5736         JMP I TYDIR
1555    5355     TYFWD,       JMP .
1556    4456         JMS I TYPTEX
1557    4667         4667
156Ø    44ØØ         44ØØ
1561    77ØØ         77ØØ
1562    5755         JMP I TYFWD
```

```
                  /TYPE CONTINUOUS IF NOT NORMAL MODE
1563    5363      TYMODE,    JMP .
1564    6761          IOT 761
1565    Ø123          AND KØ1ØØ
1566    765Ø          SNA CLA
1567    5763          JMP I TYMODE
157Ø    4456          JMS I TYPTEX
1571    43ØØ          43ØØ
1572    5557          5557
1573    4445          4445
1574    ØØ77          ØØ77
1575    5763          JMP I TYMODE

                  PAUSE

                  /TCØ1 EXERCISER - TAPE 2
                  /BASIC MOTION TEST, DECIPHER KEYBOARD INPUT
                  /SETUP EXECUTE TABLE, START DO LOOP
                  /ON FIRST CHARACTER IF A(D)

                  *2ØØØ
2ØØØ    4456      MVTEST,    JMS I TYPTEX
2ØØ1    7777          7777              /CR LF
2ØØ2    7777          7777              /CR LF
2ØØ3    77ØØ          77ØØ
2ØØ4    1Ø32          TAD BF1LOC                 /SA OF EXECTUE TABLE
2ØØ5    3Ø1Ø          DCA 1Ø            /FOR INDIRECTS
2ØØ6    1Ø1Ø          TAD 1Ø
2ØØ7    7ØØ1          IAC
2Ø1Ø    3Ø11          DCA 11            /FOR RESET ON RPT LOOP
2Ø11    7Ø4Ø          CMA
2Ø12    3Ø13          DCA 13            /FOR 1ST D
2Ø13    1Ø11          TAD 11
2Ø14    3Ø12          DCA 12            /FOR RESET ON CHNG DRIVES
2Ø15    424Ø          JMS WAITIN        /WAIT FOR INPUT
2Ø16    4247          JMS MVEQUL
2Ø17    Ø3Ø4          3Ø4               /1ST IN = D
2Ø2Ø    3Ø13      MVREST,    DCA 13              /Ø TO CHAR COUNTER
2Ø21    4247          JMS MVEQUL
2Ø22    Ø3Ø6          3Ø6               /= F FORWARD
2Ø23    4247          JMS MVEQUL
2Ø24    Ø3Ø2          3Ø2               /= B BACKWARD
2Ø25    4247          JMS MVEQUL
2Ø26    Ø323          323               /= S STOP
2Ø27    4247          JMS MVEQUL
2Ø3Ø    Ø3Ø3          3Ø3               /= C CHANGE
2Ø31    4247          JMS MVEQUL
2Ø32    Ø327          327               /= W WAIT
2Ø33    4247          JMS MVEQUL
2Ø34    Ø322          322               /= R REPEAT
2Ø35    4247          JMS MVEQUL
2Ø36    Ø3Ø4          3Ø4               /= D DO LOOP
2Ø37    52ØØ          JMP MVTEST

                  /WAIT KEYBOARD INPUT
2Ø4Ø    524Ø      WAITIN,    JMP .
2Ø41    6Ø31          KSF
2Ø42    5241          JMP .-1
```

```
2Ø43   6Ø36        KRB
2Ø44   7Ø41        CMA IAC
2Ø45   3Ø14        DCA 14          /14 = 2'S COMPLEMENT OF IN
2Ø46   564Ø        JMP I WAITIN
```

```
                /TEST FOR WHICH CHARACTER IN
2Ø47  5247      MVEQUL,    JMP .
2Ø5Ø  1Ø14          TAD 14
2Ø51  1647          TAD I MVEQUL
2Ø52  2247          ISZ MVEQUL
2Ø53  765Ø          SNA CLA         /RIGHT CHAR
2Ø54  526Ø          JMP .+4         /FOUND WHICH CHAR
2Ø55  2Ø13          ISZ 13          /INC POINTER
2Ø56  7ØØØ          NOP
2Ø57  5647          JMP I MVEQUL    /TEST NEXT CHAR
2Ø6Ø  1Ø13          TAD 13
2Ø61  7Ø4Ø          CMA             /FIRST IN = D
2Ø62  765Ø          SNA CLA
2Ø63  5712          JMP I DOTHEM    /FIRST = D DO LAST
2Ø64  1Ø13          TAD 13
2Ø65  71Ø4          CLL RAL         /NUMBER TIMES 2
2Ø66  1273          TAD MVRTBL      /FORM ADDRESS
2Ø67  3Ø14          DCA 14          /FOR INDIRECTS
2Ø7Ø  1414          TAD I 14                /GET ROUTINE ADDRESS
2Ø71  341Ø          DCA I 1Ø                /TO EXECUTE TABLE
2Ø72  5414          JMP I 14                /GO TO TYPEOUT

2Ø73  2Ø73      MVRTBL,    .
2Ø74  2216          MVFWD           /START TAPE FORWARD
2Ø75  5313          JMP MVGFWD
2Ø76  2223          MVBKWD          /START BACKWARD
2Ø77  5321          JMP MVGBKW
21ØØ  223Ø          MVSTOP          /STOP TAPE
21Ø1  5327          JMP MVGSTP
21Ø2  2274          MVCHNG          /CHANGE DRIVES
21Ø3  5335          JMP MVGCHG
21Ø4  2246          MVWAIT          /WAIT, MARK TIME
21Ø5  5347          JMP MVGWAT
21Ø6  2257          MVRPT           /REPEAT X TIMES
21Ø7  5356          JMP MVGRPT
211Ø  23Ø5          MVEND           /END OF DO LOOP
2111  5712          JMP I .+1
2112  22ØØ      DOTHEM,    DOLOOP           /TO GET TO EXECUTE LOOP


                /TYPE FORWARD
2113  4456      MVGFWD,    JMS I TYPTEX
2114  7777          7777
2115  4667          4667
2116  4477          4477
2117  424Ø          JMS WAITIN
212Ø  522Ø          JMP MVREST
```

```
                /TYPE BACKWARD
2121  4456      MVGBKW,     JMS I TYPTEX
2122  7777          7777
2123  4253          4253
2124  6744          6744
2125  7700          7700
2126  5317          JMP MVGFWD+4


                /TYPE STOP
2127  4456      MVGSTP,     JMS I TYPTEX
2130  7777          7777
2131  6364          6364
2132  5760          5760
2133  7700          7700
2134  5317          JMP MVGFWD+4


                /TYPE CHANGE
2135  4456      MVGCHG,     JMS I TYPTEX
2136  7777          7777
2137  4350          4350
2140  4777          4777
2141  1012          TAD 12
2142  3410          DCA I 10                  /PUT WHERE TO REPEAT
2143  1010          TAD 10          /FROM ON CHANGING DRIVES
2144  7001          IAC
2145  3012          DCA 12
2146  5317          JMP MVGFWD+4

                /TYPE WAIT
2147  4456      MVGWAT,     JMS I TYPTEX
2150  7777          7777
2151  6741          6741
2152  5164          5164
2153  0077          0077
2154  4772          JMS I GET4IN    /GET WAIT CONSTANT
2155  5317          JMP MVGFWD+4


                /TYPE REPEAT
2156  4456      MVGRPT,     JMS I TYPTEX
2157  7777          7777
2160  6260          6260
2161  6400          6400
2162  0077          0077
2163  4772          JMS I GET4IN    /GET REPEAT CONSTANT
2164  1011          TAD 11          /GET REPEAT FROM ADDRESS
2165  3410          DCA I 10                  /TO EXECUTE TABLE
2166  1010          TAD 10
2167  7001          IAC
2170  3011          DCA 11          /FOR NEXT REPEAT
2171  5317          JMP MVGFWD+4

2172  2310      GET4IN,     GETMIN          /TO GET 4 CHARACTERS
```

```
                /DO LOOP, EXECUTE SELECTED SEQUENCE
                *22ØØ
22ØØ   4456     DOLOOP,     JMS I TYPTEX     /TYPE DO
22Ø1   7777         7777
22Ø2   4457         4457
22Ø3   7777         7777
22Ø4   77ØØ         77ØØ
22Ø5   1Ø32         TAD BF1LOC                    /SET ROUTINE POINTER TO START
22Ø6   3Ø1Ø         DCA 1Ø
22Ø7   3Ø11         DCA 11          /TO COUNT RPTS
221Ø   141Ø         TAD I 1Ø                      /GET ROUTINE ADDRESS
2211   3214         DCA .+3         /FOR JMS I
2212   4614         JMS I .+2                     /EXECUTE ROUTINE
2213   521Ø         JMP .-3         /DO NEXT
2214   2214         .
2215   5215         JMP .


                /BASIC MOTION TEST
                /FORWARD, BACKWARD, STOP, WAIT
                /REPEAT AND CHANGE DRIVE ROUTINES

                /START FORWARD MOTION
2216   5216     MVFWD,      JMP .
2217   1Ø75         TAD KØ2ØØ                     /MOVE TAPE FORWARD
222Ø   1Ø6Ø         TAD UNFUNC      /+ DRIVE NUMBER
2221   6766         IOT 766
2222   5616         JMP I MVFWD


                /START BACKWARD MOTION
2223   5223     MVBKWD,     JMP .
2224   1344         TAD KØ6ØØ                     /MOVE BACKWARD
2225   1Ø6Ø         TAD UNFUNC      /+ DRIVE NUMBER
2226   6766         IOT 766
2227   5623         JMP I MVBKWD


                /STOP TAPE
223Ø   523Ø     MVSTOP,     JMP .
2231   6761         IOT 761         /READ STAT A
2232   Ø345         AND K7ØØØ                     /CLEAR TO DRIVE NUM
2233   7Ø41         CMA IAC
2234   1Ø6Ø         TAD UNFUNC
2235   764Ø         SZA CLA         /SAME DRIVE
2236   5243         JMP .+5         /NOT SAME AS STAT A
2237   6761         IOT 761
224Ø   ØØ75         AND KØ2ØØ                     /CLEAR AC TO MOTION BIT
2241   6764         IOT 764         /CLEAR MOTION IF NOT READY
2242   563Ø         JMP I MVSTOP    /EXIT
2243   1Ø6Ø         TAD UNFUNC
2244   6766         IOT 766
2245   563Ø         JMP I MVSTOP
```

```
                /WAIT AND DO NOTHING FOR A NUMBER OF BLOCKS
2246   5246     MVWAIT,     JMP .
2247   3Ø16         DCA 16
225Ø   141Ø         TAD I 1Ø
2251   3Ø17         DCA 17
2252   2Ø16         ISZ 16
2253   5252         JMP .-1
2254   2Ø17         ISZ 17
2255   5252         JMP .-3
2256   5646         JMP I MVWAIT


                /REPEAT X TIMES LOOP
2257   5257     MVRPT,      JMP .
226Ø   2Ø11         ISZ 11          /RPT COUNT+1
2261   1Ø11         TAD 11
2262   141Ø         TAD I 1Ø                /+ (-RPT CONSTANT)
2263   764Ø         SZA CLA         /DONE X TIMES
2264   527Ø         JMP .+4         /NO
2265   Ø41Ø         AND I 1Ø                /INC EXECUTE ADDRES
2266   3Ø11         DCA 11
2267   5657         JMP I MVRPT     /EXIT
227Ø   7Ø4Ø         CMA             /RESET EXECUTE ADDRESS
2271   141Ø         TAD I 1Ø
2272   3Ø1Ø         DCA 1Ø
2273   5657         JMP I MVRPT


                /CHANGE DRIVES AND REPEAT OR
                /IF BACK TO FIRST DRIVE CONTINUE
2274   5274     MVCHNG,     JMP .
2275   4437         JMS I NEWDRV
2276   53Ø1         JMP .+3
2277   Ø41Ø         AND I 1Ø
23ØØ   5674         JMP I MVCHNG
23Ø1   7Ø4Ø         CMA
23Ø2   141Ø         TAD I 1Ø
23Ø3   3Ø1Ø         DCA 1Ø
23Ø4   5674         JMP I MVCHNG


                /END OF ROUTINE TYPED IN
23Ø5   53Ø5     MVEND,      JMP .
23Ø6   57Ø7         JMP I .+1
23Ø7   2ØØØ         MVTEST
```

```
                  /MAKE - CONSTANT OF 4 INPUTS
2310  5310  GETMIN,     JMP .
2311  7201        CLA IAC          /+1 WHEN L=1 GOT 4
2312  3013        DCA 13
2313  6031        KSF              /WAIT KEYBOARD
2314  5313        JMP .-1
2315  6036        KRB              /READ KEYBOARD
2316  6046        TLS              /OUTPUT
2317  6041        TSF
232Ø  5317        JMP .-1
2321  7Ø4Ø        CMA              /MAKE -
2322  ØØ73        AND KØØØ7               /OCTAL
2323  3Ø14        DCA 14
2324  1Ø13        TAD 13           /MOVE 1 CHARACTER
2325  71Ø4        CLL RAL
2326  7ØØ6        RTL
2327  1Ø14        TAD 14           /ASSEMBLE
233Ø  3Ø13        DCA 13
2331  742Ø        SNL              /SKIP = DONE 4
2332  5313        JMP GETMIN+3     /NOT 4 YET
2333  1Ø13        TAD 13
2334  7ØØ1        IAC              /MAKE 2'S COMPLEMENT
2335  745Ø        SNA
2336  7Ø4Ø        CMA              /MUST BE AT LEAST -1
2337  341Ø        DCA I 1Ø                /TO EXECUTE TABLE
234Ø  4456        JMS I TYPTEX
2341  7777        7777
2342  77ØØ        77ØØ
2343  571Ø        JMP I GETMIN
2344  Ø6ØØ  KØ6ØØ,      6ØØ
2345  7ØØØ  K7ØØØ,      7ØØØ
```

```
                /BASIC SEARCH ROUTINE 1
                /FORCE TAPE INTO END ZONE
                /FAR ENOUGH TO GUARANTEE BLOCK 0 FORWARD
                /VERIFY BLOCKS 0000 TO 2701 THEN REVERSE

                *2400
2400    4436    SRCH1,      JMS I REWIND
2401    4436        JMS I REWIND    /INTO EZ TWICE
2402    3114        DCA DIRFLG
2403    3020        DCA RECORD      /RECORD 0
2404    4435        JMS I SRCHIT    /FIND IT
2405    5221        JMP SCH1ST      /YES
2406    4444        JMS I ERRSTP            /NO
2407    4452        JMS I SRCHTY
2410    1026        TAD RECRDK              /BLOCK LOOKED FOR
2411    4451        JMS I TYPCON
2412    1025        TAD IDCON               /BLOCK FOUND
2413    4451        JMS I TYPCON
2414    6772        IOT 772         /RD STAT B
2415    3021        DCA BLKFND
2416    1025        TAD IDCON
2417    4451        JMS I TYPCON    /TYPE STAT B
2420    5202        JMP SRCH1+2

2421    3422    SCH1ST,     DCA I POSITN    /FOUND 0
2422    3423        DCA I DIRECT    /FORWARD
2423    2020        ISZ RECORD      /RECORD LOOKED FOR +1
2424    7040        CMA
2425    3427        DCA I WCLOC     /SET WC TO -1
2426    6764        IOT 764         /SET WC ENABLES
2427    4440        JMS I WAITI
2430    0001        1
2431    7410        SKP
2432    5244        JMP SCH1OK              /INTERRUPT OK
2433    6772    SCH1ER,     IOT 772
2434    0110        AND EZBIT
2435    7650        SNA CLA         /END ZONE
2436    5206    JMP SRCH1+6 /NO TYPE ERROR
2437    1020        TAD RECORD
2440    1077        TAD K5077
2441    7700        SMA CLA         /DONE ALL BLOCKS
2442    5261        JMP SCH1ND      /YES
2443    5206    JMP SRCH1+6 /NO, ERROR


2444    1021    SCH1OK,     TAD BLKFND              /GET BLOCK NUMBER READ
2445    7041        CMA IAC         /MAKE -
2446    1020        TAD RECORD
2447    7640        SZA CLA         /RIGHT BLOCK
2450    5253        JMP .+3         /NO
2451    2422        ISZ I POSITN    /NEW POSITION
2452    5223        JMP SCH1ST+2    /TEST NEXT BLOCK
2453    4365        JMS SIERRO
```

```
2454  2422        ISZ I POSITN
2455  2Ø2Ø        ISZ RECORD
2456  4435        JMS I SRCHIT    /RESYNC ON NEXT BLOCK
2457  5244        JMP SCH1OK              /FOUND OK
246Ø  5233        JMP SCH1ER      /TEST FOR END ZONE
2461  4437    SCH1ND,     JMS I NEWDRV
2462  52Ø2        JMP SRCH1+2     /RPT NEXT DRIVE
2463  7Ø4Ø        CMA
2464  3Ø2Ø        DCA RECORD
2465  1125        TAD KØ2Ø4
2466  1Ø6Ø        TAD UNFUNC
2467  6766        IOT 766         /MOVE DRIVE INTO EZ
247Ø  444Ø        JMS I WAITI
2471  5ØØ1        5ØØ1
2472  7ØØØ        NOP
2473  4437        JMS I NEWDRV
2474  5265        JMP SCH1ND+4
2475  2Ø2Ø        ISZ RECORD              /DONE ALL TWICE
2476  741Ø        SKP             /YES

2477  5265        JMP SCH1ND+4    /MAKE 2ND MOVE INTO EZ
25ØØ  11ØØ    SRCH2,      TAD K27Ø1
25Ø1  3Ø2Ø        DCA RECORD
25Ø2  11Ø1        TAD KØ614               /SRCH BACKWARD
25Ø3  1Ø6Ø        TAD UNFUNC              /+ DRIVE NUMBER
25Ø4  6766        IOT 766
25Ø5  7Ø4Ø        CMA
25Ø6  3427        DCA I WCLOC
25Ø7  444Ø        JMS I WAITI
251Ø  ØØØ1        1
2511  741Ø        SKP
2512  5325        JMP SCH2OK
2513  4365    SCH2ER,     JMS SIERRO
2514  724Ø        CLA CMA
2515  1Ø2Ø        TAD RECORD
2516  3Ø2Ø        DCA RECORD
2517  1Ø2Ø        TAD RECORD
252Ø  771Ø        SPA CLA
2521  5356        JMP SIERRO-7
2522  7Ø4Ø        CMA
2523  3114        DCA DIRFLG
2524  4435        JMS I SRCHIT
```

```
2525  1020  SCH2OK,    TAD RECORD      /BLOCK LOOKED FOR
2526  7041       CMA IAC          /MAKE -
2527  1021       TAD BLKFND       /+ BLOCK FOUND
2530  7640       SZA CLA          /RIGHT ONE
2531  5313       JMP SCH2ER       /NO
2532  6764       IOT 764          /RESET WC ENABLE
2533  7040       CMA
2534  3427       DCA I WCLOC
2535  1020       TAD RECORD       /LAST BLOCK -1
2536  3422       DCA I POSITN
2537  7040       CMA
2540  1020       TAD RECORD
2541  3020       DCA RECORD
2542  4440       JMS I WAITI
2543  0001       1
2544  7410       SKP
2545  5325       JMP SCH2OK       /STATUS WAS NORMAL
2546  6772       IOT 772          /READ STATB
2547  0110       AND EZBIT
2550  7650       SNA CLA          /EZ INT
2551  5313       JMP SCH2ER       /NO, ERROR
2552  1020       TAD RECORD
2553  7040       CMA
2554  7640       SZA CLA          /EXPECT END ZONE
2555  5313       JMP SCH2ER              /NO, ERROR
2556  4437       JMS I NEWDRV     /GET NEXT DRIVE
2557  5300       JMP SRCH2               /REPEAT
2560  7604       CLA OSR
2561  7010       RAR
2562  7620       SNL CLA          /REPEAT TEST
2563  7402       HLT              /NO, HALT
2564  5200       JMP SRCH1               /START OVER
2565  5365  SIERRO,    JMP .
2566  4444       JMS I ERRSTP
2567  4452       JMS I SRCHTY
2570  1026       TAD RECRDK
2571  4451       JMS I TYPCON
2572  1025       TAD IDCON
2573  4451       JMS I TYPCON
2574  4447       JMS I SBTYPE
2575  5765       JMP I SIERRO
```

```
                  /SEARCH ROUTINE 2
                  /READ A SERIES OF 129 BLOCKS OR UNTIL END ZONE
                  /COMPARE FOR INCREMENTING OR DEC.

                  /1ST KEY (F) SEARCH FORWARD
                  /ALL OTHERS BACKWARD
                  /2ND KEY (C) COMPARE BLOCKS
                  /ALL OTHERS DUMP TO 129 ON PRINTER

                  *26ØØ
26ØØ  4743        SERCH2,    JMS I DRVTYP      /TYPE DRIVE AND NUMBER
26Ø1  4333            JMS TYINTX       /TYPE TYPE IN
26Ø2  4456            JMS I TYPTEX
26Ø3  ØØ46            ØØ46             /F FOR FWD
26Ø4  ØØ46            ØØ46
26Ø5  5762            5762
26Ø6  ØØ46            ØØ46
26Ø7  6744            6744
261Ø  77ØØ            77ØØ
2611  4321            JMS OTHRTX       /TYPE ALL OTHERS
2612  4456            JMS I TYPTEX
2613  4253            4253             /BACKWARD
2614  6744            6744
2615  ØØ77            ØØ77
2616  6Ø31            KSF              /WAIT K
2617  5216            JMP .-1
262Ø  6Ø36            KRB
2621  6Ø46            TLS
2622  6Ø41            TSF
2623  5222            JMP .-1
2624  6Ø42            TCF
2625  1273            TAD K7472
2626  764Ø            SZA CLA          /=F
2627  11Ø2            TAD KØ4ØØ                 /NO PREP BACKWARD
263Ø  11Ø3            TAD KØ214

2631  1Ø6Ø            TAD UNFUNC
2632  6766            IOT 766          /START SEARCH
2633  1Ø32            TAD BF1LOC
2634  3Ø1Ø            DCA 1Ø
2635  1Ø64            TAD K7577
2636  3Ø11            DCA 11
2637  7Ø4Ø        SER2ST,    CMA               /WC = -1
264Ø  3427            DCA I WCLOC
2641  1Ø25            TAD IDCON                 /TO BLKFND
2642  343Ø            DCA I CALOC
2643  444Ø            JMS I WAITI
2644  ØØØ1            1
2645  5255            JMP SEREZ                 /NO  NORMAL INT
```

```
2646  1021        TAD BLKFND                    /STORE BLOCK NUMBER
2647  3410        DCA I 10
2650  2011        ISZ 11
2651  7410        SKP
2652  5720        JMP I SER2AI      /DONE 129
2653  6764        IOT 764           /RESET WCE
2654  5237        JMP SER2ST        /REPT

2655  6772  SEREZ,      IOT 772             /READ B
2656  0110        AND EZBIT
2657  7640        SZA CLA           /END ZONE
2660  5274        JMP SER2NZ        /YES
2661  6772        IOT 772
2662  3020        DCA RECORD                    /TYPE STATUS B
2663  1026        TAD RECRDK
2664  4451        JMS I TYPCON
2665  4456        JMS I TYPTEX
2666  0063        0063
2667  6441        6441
2670  6400        6400
2671  4277        4277
2672  5200        JMP SERCH2        /START OVER
2673  7472  K7472,      7472
```

```
                    /TYPE END ZONE
2674    4456    SER2NZ,     JMS I TYPTEX
2675    7777        7777
2676    4556        4556
2677    44ØØ        44ØØ
27ØØ    7257        7257
27Ø1    5645        5645
27Ø2    77ØØ        77ØØ
27Ø3    1Ø11        TAD 11
27Ø4    7Ø41        CMA IAC
27Ø5    1Ø64        TAD K7577
27Ø6    764Ø        SZA CLA         /READ ANY AT ALL
27Ø7    572Ø        JMP I SER2AI    /YES
271Ø    4456        JMS I TYPTEX    /TYPE NO BLOC<S
2711    7777        7777
2712    5657        5657
2713    ØØ42        ØØ42
2714    5457        5457
2715    4353        4353
2716    6377        6377
2717    52ØØ        JMP SERCH2
272Ø    3ØØØ    SER2AI,     SER2A               /TO GET TO REST OF PROGRAM


                    /TYPE ALL OTHERS
2721    5321    OTHRTX,     JMP .
2722    4456        JMS I TYPTEX
2723    7777        7777
2724    4154        4154
2725    54ØØ        54ØØ
2726    5764        5764
2727    5Ø45        5Ø45
273Ø    6263        6263
2731    ØØ77        ØØ77
2732    5721        JMP I OTHRTX


                    /TYPE TYPE IN
2733    5333    TYINTX,     JMP .
2734    4456        JMS I TYPTEX
2735    7777        7777
2736    6471        6471
2737    6Ø45        6Ø45
274Ø    ØØ51        ØØ51
2741    5677        5677
2742    5733        JMP I TYINTX

2743    1511    DRVTYP,     TYDRV
```

```
                /REST OF SEARCH ROUTINE 2

                *3ØØØ
3ØØØ   6761     SER2A,      IOT 761
3ØØ1   ØØ75         AND KØ2ØØ
3ØØ2   6764         IOT 764           /STOP TAPE
3ØØ3   1Ø11         TAD 11
3ØØ4   7Ø41         CMA IAC
3ØØ5   1Ø64         TAD K7577
3ØØ6   3Ø11         DCA 11            /NUMBER OF BLJCKS READ
3ØØ7   1Ø32         TAD BF1LOC
3Ø1Ø   3Ø1Ø         DCA 1Ø            /TO GET FIRST BLOCK
3Ø11   1Ø1Ø         TAD 1Ø
3Ø12   7ØØ1         IAC
3Ø13   3Ø12         DCA 12            /TO GET 2ND B_OCK
3Ø14   1Ø12         TAD 12
3Ø15   4451         JMS I TYPCON      /TYPE FIRST
3Ø16   4456         JMS I TYPTEX      /BLOCK NO REA)
3Ø17   ØØ46         ØØ46
3Ø2Ø   5162         5162
3Ø21   6364         6364
3Ø22   77ØØ         77ØØ
3Ø23   4625         JMS I .+2                  /TYPE TYPE IN
3Ø24   741Ø         SKP
3Ø25   2733         TYINTX
3Ø26   4456         JMS I TYPTEX      /C FOR COMPARE
3Ø27   ØØ43         ØØ43
3Ø3Ø   ØØ46         ØØ46
3Ø31   5762         5762
3Ø32   ØØ43         ØØ43
3Ø33   5755         5755
3Ø34   6Ø41         6Ø41
3Ø35   6245         6245
3Ø36   77ØØ         77ØØ
3Ø37   4641         JMS I .+2                  /ALL JTHERS
3Ø4Ø   7441Ø        SKP
3Ø41   2721         OTHRTX
3Ø42   4456         JMS I TYPTEX
3Ø43   6Ø62         6Ø62              /PRINT
3Ø44   5156         5156
3Ø45   64ØØ         64ØØ
3Ø46   77ØØ         77ØØ
3Ø47   6Ø31         KSF               /WAIT KEY
3Ø5Ø   5247         JMP .-1
3Ø51   6Ø36         KRB
3Ø52   6Ø46         TLS
3Ø53   6Ø41         TSF
3Ø54   5253         JMP .-1
3Ø55   6Ø42         TCF
3Ø56   1331         TAD K7475
3Ø57   764Ø         SZA CLA           /=C
3Ø6Ø   5323         JMP SER2TY        /NO, PRINT AL_
```

```
3Ø61  6761       IOT 761
3Ø62  Ø1Ø2       AND KØ4ØØ
3Ø63  764Ø       SZA CLA         /FORWARDS
3Ø64  7Ø4Ø       CMA             /NO MAKE -1
3Ø65  745Ø       SNA             /BACKWARDS
3Ø66  7ØØ1       IAC             /NO MAKE +1
3Ø67  3Ø14       DCA 14
                /COMPARE BLOCKS FOR INCREMENTING OR DEC
3Ø7Ø  2Ø11      SERCMP,     ISZ 11         /COMPARED ALL
3Ø71  741Ø       SKP             /NO
3Ø72  5311       JMP SER2LS      /TYPE LAST BLOCK
3Ø73  1Ø14       TAD 14          /+ OR -
3Ø74  141Ø       TAD I 1Ø                  /+ FIRST BLOCK
3Ø75  7Ø41       CMA IAC         /MAKE -
3Ø76  1412       TAD I 12                  /+ NEXT BLOCK
3Ø77  765Ø       SNA CLA         /SHOULD BE Ø
31ØØ  527Ø       JMP SERCMP      /DO NEXT
31Ø1  4456       JMS I TYPTEX
31Ø2  7777       7777
31Ø3  77ØØ       77ØØ
31Ø4  1Ø1Ø       TAD 1Ø
31Ø5  4451       JMS I TYPCON    /TYPE 1ST
31Ø6  1Ø12       TAD 12
31Ø7  4451       JMS I TYPCON    /TYPE 2ND
311Ø  527Ø       JMP SERCMP      /DO NEXT


                /TYPE OUT LAST BLOCK READ
3111  1Ø12      SER2LS,     TAD 12
3112  4451       JMS I TYPCON    /TYPE BLOCK NUMBER
3113  4456       JMS I TYPTEX
3114  ØØ54       ØØ54            /LAST
3115  4163       4163
3116  6477       6477
3117  4437       JMS I NEWDRV
312Ø  7ØØØ       NOP
3121  5722       JMP I .+1
3122  26ØØ       SERCH2          /REPEAT FOR NEXT DRIVE


                /PRINT ALL BLOCKS READ
3123  1Ø12      SER2TY,     TAD 12         /ADDRESS
3124  4451       JMS I TYPCON    /TYPE BLOCK NUMBER
3125  2Ø12       ISZ 12
3126  2Ø11       ISZ 11          /DONE ALL
3127  5323       JMP SER2TY      /NO
313Ø  5313       JMP SER2LS+2    /YES, DO NEXT DRV
3131  7475      K7475,      7475


                PAUSE

                /TCØ1 BASIC EXCERCISER TAPE 3
                /START STOP TURN AROUND TEST
                /1 TO 8 DRIVES IN ANY COMBINATION
                /TESTS TA ON BLOCK Ø BOTH DIRECTIONS
                /S/S/TA LENGTH OF TAPE AND TA ON BLOCK 27Ø1
                /MOVE ALL DRIVES INTO REVERSE END ZONE
                *3200

3200   4436     SSTRNA,     JMS I REWIND
3201   4436         JMS I REWIND    /MOVE INTO EZ 2
3202   4441         JMS I WTHALF    /WAIT HALF SECOND
3203   4443         JMS I SAVPAD


                /TEST TURN AROUND ON BLOCK Ø FIND 1 FWD
3204   7201         CLA IAC
3205   3020         DCA RECORD
3206   4454         JMS I SSTFWD    /FIND BLOCK 1 FWD
3207   5214         JMP GBKW1
3210   4366     SSTER1,     JMS EZERR
3211   7000         NOP
3212   4453         JMS I ERSSTA
3213   5204         JMP .-7


                /TURN AROUND FIND Ø BACKWARDS
3214   3020     GBKW1,      DCA RECORD
3215   7001         IAC
3216   3422         DCA I POSITN
3217   3423         DCA I DIRECT
3220   4455         JMS I SSTBKW
3221   5225         JMP .+4
3222   5210         JMP SSTER1
3223   5211         JMP SSTER1+1


                /WAIT FOR EZ TA FIND Ø FWD
3224   5211         JMP SSTER1+1
3225   3422         DCA I POSITN
3226   7040         CMA
3227   3423         DCA I DIRECT
3230   1065         TAD KØ6Ø4
3231   1060         TAD UNFUNC
3232   6766         IOT 766
3233   4440         JMS I WAITI
3234   5001         5ØØ1
3235   5210         JMP SSTER1
3236   7040         CMA
3237   3422         DCA I POSITN
3240   4454         JMS I SSTFWD
3241   5245         JMP .+4
3242   5210         JMP SSTER1
3243   7000         NOP
3244   5211         JMP SSTER1+1
```

```
3245   3422   DCA I POSITN
3246   3423        DCA I DIRECT
3247   1075        TAD KØ2ØØ
325Ø   6764        IOT 764
3251   4437        JMS I NEWDRV
3252   52Ø4        JMP SSTRNA+4
3253   4441        JMS I WTHALF


              /TEST FORWARD START AFTER FORWARD
3254   4443   SSTAN1,      JMS I SAVPAD
3255   1422        TAD I POSITN
3256   11Ø4        TAD SFAFK
3257   3Ø2Ø        DCA RECORD
326Ø   4454        JMS I SSTFWD
3261   5267        JMP SSTA1A
3262   5666        JMP I .+4
3263   7ØØØ        NOP
3264   4453        JMS I ERSSTA
3265   5254        JMP SSTAN1
3266   3437        SSTAEZ

3267   1Ø2Ø   SSTA1A,      TAD RECORD
327Ø   3422        DCA I POSITN
3271   3423        DCA I DIRECT
3272   1Ø75        TAD KØ2ØØ
3273   6764        IOT 764
3274   4437        JMS I NEWDRV
3275   5254        JMP SSTAN1
3276   4441        JMS I WTHALF

              /TEST BACKWARD START AFTER FORWARD
3277   4443   SSTAN2,      JMS I SAVPAD
33ØØ   1422        TAD I POSITN
33Ø1   11Ø7        TAD SBAFK
33Ø2   3Ø2Ø        DCA RECORD
33Ø3   4455        JMS I SSTBKW
33Ø4   5311        JMP SSTA2A
33Ø5   4366        JMS EZERR
33Ø6   7ØØØ        NOP
33Ø7   4453        JMS I ERSSTA
331Ø   5277        JMP SSTAN2
3311   1Ø2Ø   SSTA2A,      TAD RECORD
3312   3422        DCA I POSITN
3313   7Ø4Ø        CMA
3314   3423        DCA I DIRECT
3315   1Ø75        TAD KØ2ØØ
3316   6764        IOT 764
3317   4437        JMS I NEWDRV
332Ø   5277        JMP SSTAN2
3321   4441        JMS I WTHALF
```

```
                  /TEST START FORWARD AFTER BACKWARD
3322   4443       SSTAN3,     JMS I SAVPAD
3323   1422           TAD I POSITN
3324   11Ø5           TAD SFABK
3325   3Ø2Ø           DCA RECORD
3326   4454           JMS I SSTFWD
3327   5334           JMP SSTA3A
333Ø   4366           JMS EZERR
3331   7ØØØ           NOP

                  /THEN TEST FORWARD TO BACKWARD TURN AROUND
3332   4453           JMS I ERSSTA
3333   5322           JMP SSTAN3
3334   1Ø2Ø       SSTA3A,     TAD RECORD
3335   3422           DCA I POSITN
3336   3423           DCA I DIRECT
3337   7Ø4Ø           CMA
334Ø   3427           DCA I WCLOC
3341   6764           IOT 764
3342   444Ø           JMS I WAITI
3343   5ØØ1           5ØØ1
3344   5331           JMP SSTAN3+7
3345   2422           ISZ I POSITN
3346   4455           JMS I SSTBKW
3347   5353           JMP SSTA3B
335Ø   533Ø           JMP SSTAN3+6
3351   7ØØØ           NOP
3352   5331           JMP SSTAN3+7
3353   1Ø2Ø       SSTA3B,     TAD RECORD
3354   3422           DCA I POSITN
3355   7Ø4Ø           CMA
3356   3423           DCA I DIRECT
3357   1Ø75           TAD KØ2ØØ
336Ø   6764           IOT 764
3361   4437           JMS I NEWDRV
3362   5322           JMP SSTAN3
3363   4441           JMS I WTHALF
3364   5765           JMP I .+1
3365   34ØØ           SSTAN4
3366   5366       EZERR,      JMP
3367   724Ø           CMA CLA
337Ø   3Ø21           DCA BLKFND
3371   5766           JMP I EZERR

                  *34ØØ

                  /TEST BACKWARD START AFTER BACKWARDS
34ØØ   4443       SSTAN4,     JMS I SAVPAD
34Ø1   1422           TAD I POSITN
34Ø2   11Ø6           TAD SBABK
34Ø3   3Ø2Ø           DCA RECORD
34Ø4   4455           JMS I SSTBKW
34Ø5   5212           JMP SSTA4A
34Ø6   4636           JMS I EZERRA
34Ø7   7ØØØ           NOP
```

```
                 /THEN TEST BACKWARD TO FORWARD TURN AROUND
3410   4453           JMS I ERSSTA
3411   5200           JMP SSTAN4
3412   1020      SSTA4A,      TAD RECORD
3413   3422           DCA I POSITN
3414   7040           CMA
3415   3423           DCA I DIRECT
3416   2020           ISZ RECORD
3417   4454           JMS I SSTFWD
3420   5224           JMP SSTA4B

3421   5206           JMP SSTAN4+6
3422   7000           NOP
3423   5207           JMP SSTAN4+7
3424   1020      SSTA4B,      TAD RECORD
3425   3422           DCA I POSITN
3426   3423           DCA I DIRECT
3427   1075           TAD K0200
3430   6764           IOT 764
3431   4437           JMS I NEWDRV
3432   5200           JMP SSTAN4
3433   4441           JMS I WTHALF
3434   5635           JMP I .+1
3435   3254           SSTAN1

3436   3366      EZERRA,      EZERR
```

```
               /END ZONE HAS BEEN REACHED FWD
               /TEST TURN AROUND ON 27Ø1

3437   1Ø2Ø    SSTAEZ,      TAD RECORD
3440   1Ø77       TAD K5Ø77
3441   75ØØ       SMA                /DONE TO END ZONE
3442   5245       JMP .+3            /YES
3443   5644       JMP I .+1                 /FALSE END ZONE
3444   3264       SSTAN1+1Ø
3445   4437       JMS I NEWDRV       /RESET TO FIRST DRV
3446   5245       JMP .-1

               /MOVE ALL DRIVES INTO END ZONE
3447   7Ø4Ø       CMA
345Ø   3Ø2Ø       DCA RECORD         /TO COUNT TWO EZ PASSES
3451   1125       TAD KØ2Ø4
3452   1Ø6Ø       TAD UNFUNC
3453   6766       IOT 766
3454   444Ø       JMS I WAITI
3455   5ØØ1       5ØØ1
3456   7ØØØ       NOP                /IGNORE OTHER INTERRUPTS
3457   7Ø4Ø       CMA
346Ø   3422       DCA I POSITN
3461   3423       DCA I DIRECT
3462   4437       JMS I NEWDRV
3463   5254       JMP .-7
3464   2Ø2Ø       ISZ RECORD         /2 PASSES
3465   741Ø       SKP                /YES
3466   5263       JMP .-3
3467   4441       JMS I WTHALF
347Ø   134Ø    SSTEZA,      TAD K27ØØ
3471   3Ø2Ø       DCA RECORD
3472   4443    JMS I SAVPAD
3473   4455       JMS I SSTBKW       /GO BACKWARD TO 27ØØ


3474   53Ø1       JMP SSTEZ1         /REACHED 27ØØ OK
3475   7ØØØ       NOP
3476   7ØØØ       NOP
3477   4453       JMS I ERSSTA
35ØØ   527Ø       JMP SSTEZA
35Ø1   1Ø2Ø    SSTEZ1,      TAD RECORD
35Ø2   3422       DCA I POSITN       /BLOCK 27ØØ
35Ø3   7Ø4Ø       CMA                /BACKWARD
35Ø4   3423       DCA I DIRECT
35Ø5   2Ø2Ø       ISZ RECORD         /27ØØ TO 27Ø1
35Ø6   4454       JMS I SSTFWD       /FIND 27Ø1 FORWARD
35Ø7   5313       JMP .+4            /OK
```

```
3510  4636       JMS I EZERRA      /EZ INT. ERROR
3511  7000       NOP
3512  5274       JMP SSTEZA+4
3513  1125       TAD K0204
3514  1060       TAD UNFUNC
3515  6766       IOT 766
3516  4440       JMS I WAITI       /WAIT FOR EZ
3517  5001       5001
3520  7000       NOP
3521  4455       JMS I SSTBKW      /FIND 2701 BACKWARD
3522  5326       JMP .+4           /OK

3523  7000       NOP
3524  7000       NOP
3525  5274       JMP SSTEZA+4
3526  1075       TAD K0200
3527  6764       IOT 764
3530  4437       JMS I NEWDRV      /TESTED ALL DRIVES
3531  5335       JMP .+4           /NO
3532  7604       CLA OSR
3533  7006       RTL
3534  7420       SNL               /DELETE END OF TEST HALT

3535  7402       HLT               /HLT END OF TEST
3536  5737       JMP I .+1                   /REPEAT TEST
3537  3201       SSTRNA+1
3540  2700  K2700,       2700
```

```
                /START STOP TURN AROUND TEST
                /SEARCH FORWARD ROUTINE

                *36ØØ
36ØØ   52ØØ     SSTAFW,     JMP .
36Ø1   724Ø        CLA CMA
36Ø2   337Ø        DCA BLOCKK
36Ø3   11Ø3        TAD KØ214
36Ø4   1Ø6Ø        TAD UNFUNC
36Ø5   6766        IOT 766          /START TAPE FORWARD
36Ø6   7Ø4Ø        CMA
36Ø7   3427        DCA I WCLOC      /SET WC = -1
361Ø   1Ø25        TAD IDCON
3611   343Ø        DCA I CALOC
3612   444Ø        JMS I WAITI
3613   ØØØ1        1
3614   5232        JMP SSTFSE       /STATUS B ERROR
3615   237Ø        ISZ BLOCKK
3616   5242        JMP SSTFBE+2
3617   1Ø21     SSTFR,      TAD BLKFND
362Ø   3371        DCA BLOCKK+1
3621   1Ø21        TAD BLKFND
3622   7Ø41        CMA IAC
3623   1Ø2Ø        TAD RECORD
3624   765Ø        SNA CLA          /RIGHT BLOCK
3625   56ØØ        JMP I SSTAFW     /YES, EXIT
3626   771Ø        SPA CLA          /BLOCK FOUND LESSER
3627   524Ø        JMP SSTFBE       /NO, ERROR
363Ø   6764        IOT 764          /RESET WC ENABLE
3631   52Ø6        JMP SSTAFW+6

3632   6772     SSTFSE,     IOT 772
3633   Ø11Ø        AND EZBIT
3634   765Ø        SNA CLA
3635   22ØØ        ISZ SSTAFW       /END ZONE  EXIT
3636   22ØØ        ISZ SSTAFW       /ONLY 1 ISZ
3637   56ØØ        JMP I SSTAFW
364Ø   22ØØ     SSTFBE,     ISZ SSTAFW
3641   5235        JMP .-4
3642   1371        TAD BLOCKK+1
3643   7Ø4Ø        CMA
3644   1Ø21        TAD BLKFND
3645   765Ø        SNA CLA
3646   5217        JMP SSTFR
3647   4322        JMS BNOTCN
365Ø   52Ø1        JMP SSTAFW+1
```

```
                /START STOP TURN AROUND TEST
                /SEARCH BACKWARD ROUTINE

3651   5251     SSTABW,     JMP .
3652   724Ø         CLA CMA
3653   337Ø         DCA BLOCKK
3654   11Ø1         TAD KØ614
3655   1Ø6Ø         TAD UNFUNC
3656   6766         IOT 766
3657   7Ø4Ø         CMA
366Ø   3427         DCA I WCLOC
3661   1Ø25         TAD IDCON
3662   343Ø         DCA I CALOC
3663   444Ø         JMS I WAITI
3664   ØØØ1         1
3665   53Ø3         JMP SSTBSE
3666   237Ø         ISZ BLOCKK
3667   5313         JMP SSTBBE+2
367Ø   1Ø21     SSTBR,      TAD BLKFND
3671   3371         DCA BLOCKK+1
3672   1Ø2Ø         TAD RECORD
3673   7Ø41         CMA IAC
3674   1Ø21         TAD BLKFND
3675   745Ø         SNA
3676   5651         JMP I SSTABW    /FOUND BLOCK EXIT
3677   771Ø         SPA CLA
37ØØ   5311         JMP SSTBBE
37Ø1   6764         IOT 764
37Ø2   5257         JMP SSTABW+6
37Ø3   6772     SSTBSE,     IOT 772
37Ø4   Ø11Ø         AND EZBIT
37Ø5   765Ø         SNA CLA
37Ø6   2251         ISZ SSTABW
37Ø7   2251         ISZ SSTABW
371Ø   5651         JMP I SSTABW
3711   2251     SSTBBE,     ISZ SSTABW
3712   53Ø6         JMP .-4
3713   1Ø21         TAD BLKFND
3714   7Ø4Ø         CMA
3715   1371         TAD BLOCKK+1
3716   765Ø         SNA CLA
3717   527Ø         JMP SSTBR
372Ø   4322         JMS BNOTCN
3721   5252         JMP SSTABW+1
```

```
                /BLOCK NUMBERS ARE NOT
                /CONSECUTIVE ON START UP OR TURN AROUND

3722   5322     BNOTCN,     JMP .
3723   4444         JMS I ERRSTP
3724   4452         JMS I SRCHTY
3725   1Ø26         TAD RECRDK
3726   4451         JMS I TYPCON
3727   4456         JMS I TYPTEX
373Ø   7777         7777            /TYPE BLOCK NUMBER ERR.
3731   4254         4254

3732   53ØØ         53ØØ
3733   Ø3ØØ         Ø3ØØ
3734   4562         4562
3735   6277         6277
3736   1372         TAD BLOCKK+2
3737   4451         JMS I TYPCON
374Ø   4456         JMS I TYPTEX    /TYPE LAST
3741   ØØ54         ØØ54

3742   4163         4163
3743   6477         6477
3744   1Ø25         TAD IDCON
3745   4451         JMS I TYPCON    /TYPE CURRENT
3746   4456         JMS I TYPTEX    /BLOCK NUMBER
3747   ØØ64         64
375Ø   5Ø51         5Ø51
3751   6377         6377

3752   137Ø         TAD BLOCKK
3753   7ØØ1         IAC
3754   337Ø         DCA BLOCKK
3755   1373         TAD BLOCKK+3
3756   4451         JMS I TYPCON    /TYPE OUT BLOCK
3757   4456         JMS I TYPTEX    /COUNTER
376Ø   ØØ43         43
3761   5664         5664
3762   6277         6277
3763   76Ø4         CLA OSR
3764   7Ø12         RTR
3765   762Ø         SNL CLA         /STOP ON ERROR
3766   74Ø2         HLT             /YES
3767   5722         JMP I BNOTCN
377Ø   ØØØØ     BLOCKK,     Ø
3771   ØØØØ         Ø
3772   3771         .-1

3773   377Ø         .-3
```

```
                /START STOP TURN AROUND TEST
                /ERROR TYPE OUT AND RESYNC ROUTINE
                *4ØØØ

4ØØØ  52ØØ      SSTAER,    JMP .
4ØØ1  4444          JMS I ERRSTP      /STOP TAPE L8 STATB
4ØØ2  4452          JMS I SRCHTY      /TYPE SEARCH
4ØØ3  1422          TAD I POSITN
4ØØ4  7Ø4Ø          CMA
4ØØ5  764Ø          SZA CLA           /TAPE WAS WHERE
4ØØ6  5211          JMP .+3           /NOT END ZONE
4ØØ7  4267          JMS EZTYPE                /TYPE END ZONE
4Ø1Ø  5213          JMP .+3
4Ø11  1Ø22          TAD POSITN
4Ø12  4451          JMS I TYPCON      /TYPE LAST BLOCK
4Ø13  1423          TAD I DIRECT
4Ø14  764Ø          SZA CLA           /DIRECTION WAS
4Ø15  522Ø          JMP .+3           /BACKWARD
4Ø16  4711          JMS I FWDTYP      /TYPE FORWARD
4Ø17  5221          JMP .+2
4Ø2Ø  471Ø          JMS I BKWTYP      /TYPE BACKWARD
4Ø21  4456          JMS I TYPTEX      /TYPE (LAST POS)
4Ø22  ØØ54          ØØ54
4Ø23  4163          4163
4Ø24  64ØØ          64ØØ
4Ø25  6Ø57          6Ø57
4Ø26  6377          6377
4Ø27  1Ø26          TAD RECRDK
4Ø3Ø  4451          JMS I TYPCON      /TYPE BLOCK1 LOOKED FOR
4Ø31  4456          JMS I TYPTEX      /TYPE (SEARCHED)
4Ø32  ØØ63          ØØ63
4Ø33  4541          4541
4Ø34  6243          6243
4Ø35  5Ø45          5Ø45
4Ø36  4477          4477
4Ø37  1Ø21          TAD BLKFND
4Ø4Ø  7Ø4Ø          CMA
4Ø41  764Ø          SZA CLA           /WAS A BLOCK NUMBER
4Ø42  5245          JMP .+3           /YES
4Ø43  4267          JMS EZTYPE                /TYPE END ZONE
4Ø44  5247          JMP .+3
4Ø45  1Ø25          TAD IDCON                 /TYPE BLOCK NUMBER
4Ø46  4451          JMS I TYPCON
4Ø47  4456          JMS I TYPTEX              /TYPE (FOUND)
4Ø5Ø  ØØ46          ØØ46
4Ø51  5765          5765
4Ø52  5644          5644
4Ø53  77ØØ          77ØØ
4Ø54  4447          JMS I SBTYPE
4Ø55  76Ø4          CLA OSR
4Ø56  7ØØ6          RTL
4Ø57  763Ø          SZL CLA           /DELETE STOP AFTER ERROR
4Ø6Ø  5263          JMP .+3           /NO ERROR STOP
```

```
4Ø61   12ØØ       TAD SSTAER
4Ø62   74Ø2       HLT                /DISPLAY ADDRESS
4Ø63   72ØØ       CLA
4Ø64   47Ø7       JMS I SYNCRE
4Ø65   4441       JMS I WTHALF
4Ø66   56ØØ       JMP I SSTAER

               /TYPE (END ZONE)
4Ø67   5267    EZTYPE,     JMP .
4Ø7Ø   4456       JMS I TYPTEX
4Ø71   7777       7777
4Ø72   4556       4556
4Ø73   44ØØ       44ØØ
4Ø74   7257       7257
4Ø75   5645       5645
4Ø76   77ØØ       77ØØ
4Ø77   5667       JMP I EZTYPE
               /SAVE POSITION AND DIRECTION POINTERS
41ØØ   53ØØ    DAPSAV,     JMP .
41Ø1   72ØØ       CLA
41Ø2   1422       TAD I POSITN
41Ø3   3111       DCA POSSAV
41Ø4   1423       TAD I DIRECT
41Ø5   3112       DCA DIRSAV
41Ø6   57ØØ       JMP I DAPSAV
41Ø7   42ØØ    SYNCRE,     RESYNC
411Ø   1545    BKWTYP,     TYBKW
4111   1555    FWDTYP,     TYFWD
```

```
                /PUT TAPE BACK TO LAST KNOWN POSITION

                *4200

4200  5200      RESYNC,   JMP .
4201  1111          TAD POSSAV
4202  7040          CMA
4203  7650          SNA CLA
4204  5354          JMP RESYEZ
4205  1112          TAD DIRSAV
4206  7640          SZA CLA
4207  5276          JMP RESBKW
4210  1101          TAD K0614                     /TAPE GOES BACKWARD
4211  1060          TAD UNFUNC                    /FIRST TO RESYNC
4212  6766          IOT 766             /FORWARD
4213  7040      RESFWD,   CMA
4214  3427          DCA I WCLOC         /-1 TO WC
4215  4440          JMS I WAITI
4216  0001          1
4217  5260          JMP RESFEZ
4220  1021          TAD BLKFND
4221  7041          CMA IAC
4222  1111          TAD POSSAV
4223  1374          TAD K7772
4224  7700          SMA CLA
4225  5231          JMP .+4
4226  7200          CLA
4227  6764          IOT 764
4230  5213          JMP RESFWD
4231  1102          TAD K0400
4232  6764      RESFWF,   IOT 764
4233  7040          CMA
4234  3427          DCA I WCLOC
4235  4440          JMS I WAITI
4236  0001          1
4237  5201          JMP RESYNC+1
4240  1111          TAD POSSAV
4241  7041          CMA IAC
4242  1021          TAD BLKFND
4243  7450          SNA
4244  5250          JMP .+4
4245  7710          SPA CLA
4246  5232          JMP RESFWF
4247  5201          JMP RESYNC+1
```

```
4250  1075  RESXIT,     TAD K0200                /STOP TAPE
4251  6764      IOT 764
4252  1111      TAD POSSAV      /RESET POSITION
4253  3422      DCA I POSITN    /AND DIRECTION
4254  1112      TAD DIRSAV      /POINTERS
4255  3423      DCA I DIRECT
4256  4441      JMS I WTHALF
4257  5600      JMP I RESYNC

4260  6772  RESFEZ,     IOT 772
4261  0110      AND EZBIT
4262  7650      SNA CLA         /END ZONE
4263  5201      JMP RESYNC+1    /NO, SOME OTHER, RESYNC
4264  1065      TAD K0604
4265  1060      TAD UNFUNC
4266  6766      IOT 766         /MOVE FARTHER
4267  4440      JMS I WAITI     /INTO EZ
4270  5001      5001
4271  5264      JMP .-5
4272  1103      TAD K0214
4273  1060      TAD UNFUNC
4274  6766      IOT 766         /NOW START FORWARD
4275  5233      JMP RESFWF+1

4276  1103  RESBKW,     TAD K0214                /TO RESYNC BKWD
4277  1060      TAD UNFUNC              /TAPE MUST FIRST
4300  6766      IOT 766         /GO FORWARD
4301  7040      CMA
4302  3427      DCA I WCLOC
4303  4440      JMS I WAITI
4304  0001      1
4305  5336      JMP RESBEZ      /TEST FOR END ZONE
4306  1373      TAD K0006
4307  1111      TAD POSSAV
4310  7041      CMA IAC
4311  1021      TAD BLKFND
4312  7700      SMA CLA         /REACH POSITION +6 YET
4313  5317      JMP .+4         /YES
4314  7200      CLA
4315  6764      IOT 764         /GO FORWARD MORE
4316  5301      JMP RESBKW+3
4317  1102      TAD K0400               /CHANGE TO BACKWARD
4320  6764  RESBKB,     IOT 764
4321  7040      CMA
4322  3427      DCA I WCLOC
4323  4440      JMS I WAITI
4324  0001      1
4325  5201      JMP RESYNC+1    /NOT NORMAL STAT, TRY AGAIN
```

```
4326  1Ø21        TAD BLKFND
4327  7Ø41        CMA IAC
433Ø  1111        TAD POSSAV
4331  745Ø        SNA                   /IN POSITION YET
4332  525Ø        JMP RESXIT            /YES
4333  77ØØ        CLA SMA               /GO PAST AGAIN
4334  52Ø1        JMP RESYNC+1          /YES, TRY AGAIN
4335  532Ø        JMP RESBKB            /NO, WAIT FOR NEXT BLOCK

4336  6772  RESBEZ,       IOT 772
4337  Ø11Ø        AND EZBIT
434Ø  765Ø        SNA CLA               /END ZONE
4341  52Ø1        JMP RESYNC+1          /NO, TRY AGAIN
4342  1125        TAD KØ2Ø4
4343  1Ø6Ø        TAD UNFUNC
4344  6766        IOT 766               /MOVE INTO EZ AGAIN
4345  444Ø        JMS I WAITI
4346  5ØØ1        5ØØ1
4347  52Ø1        JMP RESYNC+1
435Ø  11Ø1        TAD KØ614
4351  1Ø6Ø        TAD UNFUNC            /NOW START BACKWARDS
4352  6766        IOT 766
4353  5321        JMP RESBKB+1


            /PUT TAPE BACK INTO END ZONE
            /LEZ OR TEZ
4354  1112  RESYEZ,       TAD DIRSAV
4355  764Ø        SZA CLA               /BACKWARD = NO SKIP
4356  11Ø2        TAD KØ4ØØ                   /YES BACKWARD
4357  1125        TAD KØ2Ø4
436Ø  1Ø6Ø        TAD UNFUNC
4361  6766        IOT 766
4362  444Ø        JMS I WAITI
4363  5ØØ1        5ØØ1
4364  5354        JMP RESYEZ
4365  1Ø75        TAD KØ2ØØ
4366  6764        IOT 764               /MOVE INTO EZ TWICE
4367  444Ø        JMS I WAITI
437Ø  5ØØ1        5ØØ1
4371  5365        JMP .-4
4372  5251        JMP RESXIT+1
4373  ØØØ6  KØØØ6,        6
4374  7772  K7772,        7772

            PAUSE

            /TCØ1 BASIC EXERCISER - TAPE 3A
            /WRITE BASIC DATA PATTERNS
            /READ VERIFY WRITE FORWARD
            /READ BACKWARD, FORWARD, WRITE BACKWARD
            /READ FORWARD, BACKWARD

            *44ØØ
44ØØ  76Ø4  WRTTST,       LAS                   /GET SWITCHES
44Ø1  ØØ73        AND KØØØ7                   /MASK PATTERN NUM
44Ø2  337Ø        DCA PATNUM
44Ø3  137Ø        TAD PATNUM
44Ø4  1365        TAD PATTBL
```

```
4405  3363          DCA TEMP1                       /ADDRESS TO GET
4406  1763          TAD I TEMP1     /ROUTINE ADDRESS
4407  3363          DCA TEMP1
4410  4763          JMS I TEMP1     /GENERATE PATTERN

4411  7Ø4Ø          CMA
4412  3424          DCA I LSTBLK
4413  3422          DCA I POSITN
4414  4437          JMS I NEWDRV
4415  5211          JMP .-4
4416  3114          DCA DIRFLG
4417  7ØØ1          IAC
442Ø  3113          DCA BLKINC
4421  1113      WRTLP1,     TAD BLKINC
4422  751Ø          SPA
4423  72ØØ          CLA
4424  1424          TAD I LSTBLK
4425  3Ø2Ø          DCA RECORD
4426  4435          JMS I SRCHIT
4427  1115          TAD KØØ5Ø
443Ø  6764          IOT 764
4431  1Ø32          TAD BF1LOC
4432  343Ø          DCA I CALOC
4433  1Ø64          TAD K7577
4434  3427          DCA I WCLOC
4435  4761          JMS I WRTSLP    /CHECK 1,32 OR 27Ø1 OPTIONS
4436  523Ø          JMP WRTLP1+7    /RETURN, NOT DONE ALL
4437  4437          JMS I NEWDRV    /RETURN, DONE ALL
444Ø  5221          JMP WRTLP1
4441  1114          TAD DIRFLG                      /SAVE WRITE DIR
4442  3771          DCA I PATNUM+1  /FOR ERROR TYPEOUTS
4443  1114          TAD DIRFLG      /MAKE 1ST RD PASS
4444  7Ø4Ø          CMA             /GO OTHER DIRECTION
4445  3114          DCA DIRFLG
4446  1113          TAD BLKINC      /MAKE BLOCK
4447  7Ø41          CMA IAC         /INCREMENTER
445Ø  3113          DCA BLKINC      /COMPLIMENT
```

```
                /TEST READ COMPARE OPTION
                /EXAMINE SWITCHES
4451   76Ø4     RDCOMP,     LAS
4452   Ø121         AND KØØ4Ø
4453   764Ø         SZA CLA
4454   5344         JMP RDSEND+13
4455   7Ø4Ø         CMA
4456   3364         DCA RDCPAS
4457   1422         TAD I POSITN
446Ø   3Ø2Ø         DCA RECORD
4461   4435         JMS I SRCHIT     /FIND BLOCK
4462   1116         TAD KØØ3Ø
4463   6764         IOT 764          /CHANGE TO READ DATA
4464   1Ø33         TAD BF2LOC
4465   343Ø         DCA I CALOC
4466   1Ø64         TAD K7577
4467   3427         DCA I WCLOC
447Ø   4762     RDCLP1,     JMS I RDSWLP     /WAIT FOR READ INTERRUPT
4471   5315         JMP RDCEND
4472   6764         IOT 764          /RESET ENABLES
4473   1Ø34         TAD BF3LOC
4474   343Ø         DCA I CALOC
4475   1Ø64         TAD K7577
4476   3427         DCA I WCLOC
4477   4442         JMS I DATACO     /VERIFY DATA PATTERN
45ØØ   7175         BUFFR2
45Ø1   4767         JMS I RERFLG

45Ø2   4762         JMS I RDSWLP
45Ø3   5315         JMP RDCEND       /DONE ALL
45Ø4   6764         IOT 764          /RESET ENABLES AGAIN
45Ø5   1Ø33         TAD BF2LOC
45Ø6   343Ø         DCA I CALOC
45Ø7   1Ø64         TAD K7577
451Ø   3427         DCA I WCLOC
4511   4442         JMS I DATACO     /VERIFY DATA READ
4512   7376         BUFFR3
4513   4767         JMS I RERFLG
4514   527Ø         JMP RDCLP1
```

```
4515  6772  RDCEND,     IOT 772
4516  Ø11Ø     AND EZBIT
4517  764Ø     SZA CLA
452Ø  5331     JMP RDSEND      /END ZONE INTERRUPT
4521  1427     TAD I WCLOC
4522  764Ø     SZA CLA
4523  5331     JMP RDSEND
4524  143Ø     TAD I CALOC
4525  1366     TAD K76ØØ               /FORM BUFFER ADDRESS
4526  333Ø     DCA .+2
4527  4442     JMS I DATACO
453Ø  7175     BUFFR2          /OR BUFFR3
4531  4437  RDSEND,     JMS I NEWDRV
4532  5257     JMP RDCOMP+6
4533  1114     TAD DIRFLG
4534  7Ø4Ø     CMA
4535  3114     DCA DIRFLG      /GO OTHER DIRECTION

4536  1113     TAD BLKINC      /MAKE BLOCK INCREMENTER
4537  7Ø41     CMA IAC         /OTHER DIRECTION
454Ø  3113     DCA BLKINC
4541  2364     ISZ RDCPAS      /READ BOTH DIRECTIONS
4542  741Ø     SKP             /YES
4543  5257     JMP RDCOMP+6    /READ OTHER DIRECTION
4544  76Ø4     CLA OSR
4545  Ø123     AND KØ1ØØ
4546  764Ø     SZA CLA
4547  5255     JMP RDCOMP+4
455Ø  1424     TAD I LSTBLK
4551  1Ø77     TAD K5Ø77
4552  764Ø     SZA CLA         /WRITTEN 27Ø1 YET
4553  5221     JMP WRTLP1      /WRITE NEXT SET
4554  1114     TAD DIRFLG
4555  764Ø     SZA CLA
4556  5221     JMP WRTLP1
4557  576Ø     JMP I .+1
456Ø  5161     WRRDND

4561  52ØØ  WRTSLP,     WRTSWS          /TO TEST SWITCHES FOR WRITE
4562  54ØØ  RDSWLP,     RDSWS           /TO TEST SWITCHES FOR READ
4563  ØØØØ  TEMP1,      Ø               /READ PASS SWITCH
4564  ØØØØ  RDCPAS,     Ø               /-1 PASS 1 Ø PASS 2

            /ROUTINE ADDRESS FOR PATTERNS
4565  4724  PATTBL,     PTABLE
4566  76ØØ  K76ØØ,      76ØØ
4567  4734  RERFLG,     REFLGS
457Ø  ØØØØ  PATNUM,     Ø
4571  5157     WRDIR
```

```
                /PATTERN GENERATION FOR
                /INITIAL WRITE TEST

                *46ØØ
46ØØ  ØØØØ      GNPATØ,     Ø
46Ø1  73ØØ          CLA CLL
46Ø2  4251          JMS GNSTRA
46Ø3  56ØØ          JMP I GNPATØ

46Ø4  ØØØØ      GNPAT1,     Ø
46Ø5  734Ø          CLA CMA CLL
46Ø6  4251          JMS GNSTRA
46Ø7  56Ø4          JMP I GNPAT1

461Ø  ØØØØ      GNPAT2,     Ø
4611  732Ø          CLA STL
4612  4251          JMS GNSTRA
4613  561Ø          JMP I GNPAT2

4614  ØØØØ      GNPAT3,     Ø
4615  1221          TAD .+4
4616  71ØØ          CLL
4617  4251          JMS GNSTRA
462Ø  5614          JMP I GNPAT3
4621  2525          2525

4622  ØØØØ      GNPAT4,     Ø
4623  1227          TAD .+4
4624  71ØØ          CLL
4625  4251          JMS GNSTRA
4626  5622          JMP I GNPAT4
4627  5252          5252

463Ø  ØØØØ      GNPAT5,     Ø
4631  1235          TAD .+4
4632  71ØØ          CLL
4633  4251          JMS GNSTRA
4634  563Ø          JMP I GNPAT5
4635  Ø7Ø7          Ø7Ø7

4636  ØØØØ      GNPAT6,     Ø
4637  1243          TAD .+4
464Ø  71ØØ          CLL
4641  4251          JMS GNSTRA
4642  563Ø          JMP I GNPAT5
4643  7Ø7Ø          7Ø7Ø

4644  ØØØØ      GNPAT7,     Ø
4645  1221          TAD GNPAT4-1
4646  712Ø          STL
4647  4251          JMS GNSTRA
465Ø  5644          JMP I GNPAT7
```

```
                /STORE AC CONTENTS IN BF1LOC
                /OR IF L=1 COMPLIMENT EVERY OTHER

4651   ØØØØ   GNSTRA,      Ø
4652   3Ø1Ø       DCA 1Ø
4653   1Ø32       TAD BF1LOC
4654   3Ø11       DCA 11
4655   1Ø64       TAD K7577
4656   3Ø12       DCA 12
4657   1Ø1Ø       TAD 1Ø
466Ø   3411       DCA I 11

4661   2Ø12       ISZ 12
4662   741Ø       SKP
4663   5651       JMP I GNSTRA
4664   742Ø       SNL
4665   5257       JMP GNSTRA+6
4666   1Ø1Ø       TAD 1Ø
4667   7Ø4Ø       CMA
467Ø   3Ø1Ø       DCA 1Ø
4671   5257       JMP GNSTRA+6

4672   Ø1ØØ   PARTAB,      Ø1ØØ
4673   Ø2ØØ       Ø2ØØ
4674   Ø4ØØ       Ø4ØØ
4675   1ØØØ       1ØØØ
4676   2ØØØ       2ØØØ
4677   4ØØØ       4ØØØ
47ØØ   Ø1Ø1       Ø1Ø1
47Ø1   Ø2Ø2       Ø2Ø2
47Ø2   Ø4Ø4       Ø4Ø4
47Ø3   1Ø1Ø       1Ø1Ø
47Ø4   2Ø2Ø       2Ø2Ø
47Ø5   4Ø4Ø       4Ø4Ø
47Ø6   76ØØ       76ØØ
47Ø7   75ØØ       75ØØ
471Ø   73ØØ       73ØØ
4711   67ØØ       67ØØ
4712   57ØØ       57ØØ
4713   37ØØ       37ØØ
4714   77ØØ       77ØØ
4715   7676       7676
4716   7575       7575
4717   7373       7373
472Ø   6767       6767
4721   5757       5757
4722   3737       3737
4723   7777       7777

4724   46ØØ   PTABLE,      GNPATØ
4725   46Ø4       GNPAT1
4726   461Ø       GNPAT2
4727   4614       GNPAT3
473Ø   4622       GNPAT4
4731   463Ø       GNPAT5
4732   4636       GNPAT6
4733   4644       GNPAT7

                /TEST READ ERRORS
                /AND RESYNC NEXT BLOCK

4734  5334      REFLGS,     JMP .
4735  2742          ISZ I .+5
4736  5744          JMP I .+6
4737  2743          ISZ I .+4
474Ø  5744          JMP I .+4
4741  5734          JMP I REFLGS
4742  515Ø          COFLAG
4743  5526          NOSERR
4744  4461          RDCOMP+1Ø
```

```
                /COMPARE DATA SUBROUTINE FOR
                /WRITE / READ BASIC DATA PATTERNS

                *5ØØØ
5ØØØ   52ØØ     CODATA,     JMP .
5ØØ1   72ØØ         CLA
5ØØ2   1Ø31         TAD BF1WD1              /GET KNOWN DATA
5ØØ3   3345         DCA KNDATA      /ADDRESS
5ØØ4   16ØØ         TAD I CODATA    /UNKNOWN DATA
5ØØ5   3346         DCA UKDATA      /ADDRESS
5ØØ6   22ØØ         ISZ CODATA
5ØØ7   7Ø4Ø         CMA
5Ø1Ø   335Ø         DCA COFLAG      /SET ERR COUNT FLAG
5Ø11   1Ø64         TAD K7577
5Ø12   3347         DCA NUMWRD      /NUMBER OF WORDS
                /TST FOR DELETE COMPARE
5Ø13   76Ø4         LAS
5Ø14   Ø1Ø2         AND KØ4ØØ
5Ø15   764Ø         SZA CLA
5Ø16   56ØØ         JMP I CODATA
5Ø17   1745     COLOOP,     TAD I KNDATA
5Ø2Ø   7Ø41         CMA IAC
5Ø21   1746         TAD I UKDATA
5Ø22   764Ø         SZA CLA         /WORDS =
5Ø23   5231         JMP COCOMP      /NO TEST COMPLIMENT

5Ø24   2345     COINCR,     ISZ KNDATA
5Ø25   2346         ISZ UKDATA
5Ø26   2347         ISZ NUMWRD      /DONE ALL
5Ø27   5217         JMP COLOOP
5Ø3Ø   56ØØ         JMP I CODATA    /EXIT

5Ø31   1745     COCOMP,     TAD I KNDATA
5Ø32   745Ø         SNA             /WORD = Ø'S
5Ø33   5237         JMP .+4         /YES, TRY COMPLIMENT
5Ø34   7Ø4Ø         CMA
5Ø35   764Ø         SZA CLA         /WORD=1'S
5Ø36   5251         JMP COERRO      /NO DATA ERROR
5Ø37   1745         TAD I KNDATA
5Ø4Ø   7ØØ1         IAC             /MAKE 2'S COMP

5Ø41   1746         TAD I UKDATA
5Ø42   764Ø         SZA CLA         /COMPLIMENTS =
5Ø43   5251         JMP COERRO      /NO ERROR
5Ø44   2345         ISZ KNDATA
5Ø45   2346         ISZ UKDATA
5Ø46   2347         ISZ NUMWRD
5Ø47   5237         JMP COCOMP+6    /STAY IN TEST COMP
5Ø5Ø   56ØØ         JMP I CODATA
```

```
                /DATA ERROR TYPEOUT

5Ø51  235Ø      COERRO,     ISZ COFLAG        /FIRST ERROR
5Ø52  53Ø7         JMP COERR1        /NO HDR ALREADY TYPED
5Ø53  4444         JMS I ERRSTP      /STOP TAPE
5Ø54  4446         JMS I RDATTY
5Ø55  4456         JMS I TYPTEX
5Ø56  ØØ44         44
5Ø57  4164         4164
5Ø6Ø  41ØØ         41ØØ
5Ø61  4562         4562
5Ø62  6257         6257
5Ø63  6277         6277
5Ø64  1Ø22         TAD POSITN
5Ø65  4451         JMS I TYPCON
5Ø66  4456         JMS I TYPTEX      /TYPE BLOCK
5Ø67  ØØ42         42
5Ø7Ø  5457         5457
5Ø71  4353         4353
5Ø72  ØØ67         67
5Ø73  6251         6251
5Ø74  6464         6464
5Ø75  4556         4556
5Ø76  ØØ77         ØØ77
5Ø77  1357         TAD WRDIR                 /TYPE DIRECTION
51ØØ  765Ø         SNA CLA           /BLOCK WAS WRITTEN
51Ø1  53Ø6         JMP .+5
51Ø2  47Ø4         JMS I .+2
51Ø3  53Ø7         JMP COERR1
51Ø4  1545         TYBKW
51Ø5  1555         TYFWD
51Ø6  47Ø5         JMS I .-1
```

```
5107  4456  COERR1,     JMS I TYPTEX    /LINE FEED TO
5110  7777      7777            /SEPARATE ERRORS
5111  77ØØ      77ØØ
5112  1345      TAD KNDATA
5113  4451      JMS I TYPCON    /TYPE GOOD DATA

5114  4456      JMS I TYPTEX
5115  ØØ53      53
5116  5657      5657
5117  6756      6756
512Ø  77ØØ      77ØØ
5121  1346      TAD  UKDATA     /TYPE DATA READ
5122  4451      JMS I TYPCON
5123  4456      JMS I TYPTEX
5124  ØØ65      65
5125  5653      5653
5126  5657      5657
5127  6756      6756
513Ø  77ØØ      77ØØ
5131  1344      TAD KNDATA-1
5132  4451      JMS I TYPCON    /TYPE ADDRESS OF
5133  4456      JMS I TYPTEX    /KNOW DATA
5134  ØØ41      41
5135  4444      4444
5136  6263      6263
5137  ØØ53      53
514Ø  5657      5657
5141  6756      6756
5142  77ØØ      77ØØ
5143  5224      JMP COINCR
5144  5145      .+1

5145  ØØØØ  KNDATA,     Ø
5146  ØØØØ  UKDATA,     Ø
5147  ØØØØ  NUMWRD,     Ø
515Ø  ØØØØ  COFLAG,     Ø
5151  5351  WAETYP,     JMP .
5152  4444      JMS I ERRSTP
5153  4756      JMS I .+3
5154  4447      JMS I SBTYPE
5155  5751      JMP I WAETYP
5156  1451      TYWALL

5157  ØØØØ  WRDIR,      Ø
            STPERR=ERRSTP
```

```
5160  4570        PATNUM
5161  1360  WRRDND,      TAD .-1
5162  4451        JMS I TYPCON      /TYPE PATTERN NUMBER
5163  4456        JMS I TYPTEX
5164  ØØ45        45
5165  5644        5644
5166  77ØØ        77ØØ
5167  76Ø4        CLA OSR
5170  ØØ75        AND KØ2ØØ
5171  765Ø        SNA CLA           /DO NEXT PATTERN
5172  5777        JMP I .+5                 /NO USE SWS
5173  176Ø        TAD I WRRDND=1
5174  7ØØ1        IAC               /PATNUM+1
5175  5776        JMP I .+1
5176  44Ø1        WRTTST+1
5177  44ØØ        WRTTST
```

```
                /WAIT FOR WRITE INTERRUPT
                /AND TEST SWITCHES FOR NUM BLOCKS

                *52ØØ

52ØØ   52ØØ     WRTSWS,     JMP .
52Ø1   444Ø         JMS I WAITI      /WAIT NORMAL INT
52Ø2   ØØØ1         1
52Ø3   5235         JMP WRTEZT       /TEST FOR END ZONE
52Ø4   1427         TAD I WCLOC
52Ø5   764Ø         SZA CLA          /WC GO TO Ø
52Ø6   5241         JMP WRTEZT+4     /NO ERROR
52Ø7   76Ø4         CLA OSR
521Ø   Ø117         AND BLKBTS
5211   745Ø         SNA              /INDICATE 1 OR 32 BLOCKS
5212   5221         JMP .+7          /NO DO ALL
5213   Ø12Ø         AND BLKBIT
5214   765Ø         SNA CLA          /BLOCK
5215   5312         JMP WRT32                /NO TEST 32 BLOCKS
5216   22ØØ         ISZ WRTSWS       /INC EXIT ADDRESS
5217   1Ø75         TAD KØ2ØØ
522Ø   6764         IOT 764          /STOP TAPE
5221   1Ø2Ø         TAD RECORD
5222   3422         DCA I POSITN
5223   1Ø2Ø         TAD RECORD
5224   1113         TAD BLKINC
5225   3Ø2Ø         DCA RECORD
5226   1114     WRTSWA,     TAD DIRFLG
5227   764Ø         SZA CLA          /GOING FORWARD
523Ø   56ØØ         JMP I WRTSWS     /BACKWARD EXIT
5231   1424         TAD I LSTBLK
5232   7ØØ1         IAC              /INCREMENT LAST
5233   3424         DCA I LSTBLK     /BLOCK WRITTEN
5234   56ØØ         JMP I WRTSWS

5235   6772     WRTEZT,     IOT 772
5236   Ø11Ø         AND EZBIT
5237   764Ø         SZA CLA
524Ø   53Ø1         JMP WRTEZA
5241   6761         IOT 761
5242   ØØ75         AND KØ2ØØ                /IF TAPE NOT STOPPED
5243   765Ø         SNA CLA
5244   5251         JMP .+5          /IF SW3=1
5245   76Ø4         LAS
5246   Ø1Ø2         AND KØ4ØØ
5247   764Ø         SZA CLA
525Ø   52Ø7         JMP WRTSWS+7
5251   4444         JMS I ERRSTP
5252   445Ø         JMS I WDATTY
5253   1Ø26         TAD RECRDK
5254   4451         JMS I TYPCON
```

```
5255  4456          JMS I TYPTEX
5256  0042          42
5257  5457          5457
5260  4353          4353
5261  7700          7700
5262  4447          JMS I SBTYPE
5263  1027          TAD WCLOC
5264  4451          JMS I TYPCON     /TYPE WHATS LEFT OF WC
5265  4456          JMS I TYPTEX
5266  0067          67
5267  1643          1643
5270  1677          1677
5271  4435          JMS I SRCHIT
5272  1115          TAD K0050
5273  6764          IOT 764

5274  1032          TAD BF1LOC
5275  3430          DCA I CALOC
5276  1064          TAD K7577
5277  3427          DCA I WCLOC
5300  5201          JMP WRTSWS+1

5301  1020    WRTEZA,      TAD RECORD
5302  1126          TAD K5076
5303  7650          SNA CLA
5304  5310          JMP .+4
5305  1020          TAD RECORD
5306  7700          SMA CLA
5307  5241          JMP WRTEZT+4
5310  2200          ISZ WRTSWS
5311  5600          JMP I WRTSWS

5312  1020    WRT32,       TAD RECORD
5313  3422          DCA I POSITN
5314  1020          TAD RECORD
5315  1113          TAD BLKINC
5316  3020          DCA RECORD
5317  1114          TAD DIRFLG
5320  7041          CMA IAC
5321  1020          TAD RECORD
5322  0127          AND K0037
5323  7640          SZA CLA
5324  5226          JMP WRTSWA
5325  1075          TAD K0200
5326  6764          IOT 764
5327  2200          ISZ WRTSWS
5330  5226          JMP WRTSWA
```

```
                /WAIT FOR READ INTERRUPT AND
                /TEST SWITCHES FOR NUMBER OF BLOCKS

                *54ØØ
54ØØ   52ØØ     RDSWS,     JMP .
54Ø1   444Ø        JMS I WAITI      /WAIT NORMAL INTERRUPT
54Ø2   ØØØ1        1
54Ø3   5252        JMP TSRDEZ              /TEST FOR END ZONE
54Ø4   1427        TAD I WCLOC
54Ø5   764Ø        SZA CLA
54Ø6   53Ø2        JMP RDSERR
54Ø7   7Ø4Ø        CMA
541Ø   3326        DCA NOSERR
5411   76Ø4        CLA OSR
5412   Ø117        AND BLKBTS
5413   745Ø        SNA              /1 OR 32 BLOCKS
5414   5225     JMP .+11    /NO,ALL

5415   Ø12Ø        AND BLKBIT
5416   765Ø        SNA CLA          /1 BLOCK
5417   5234        JMP RDSW32       /NO, 32 BLOCKS
542Ø   1Ø75        TAD KØ2ØØ
5421   6764        IOT 764          /1 BLOCK, STOP TAPE
5422   1Ø2Ø        TAD RECORD
5423   3422        DCA I POSITN
5424   56ØØ        JMP I RDSWS
5425   1Ø2Ø        TAD RECORD
5426   3422        DCA I POSITN     /NEW POSITION
5427   1Ø2Ø        TAD RECORD
543Ø   1113        TAD BLKINC       /NEXT BLOCK
5431   3Ø2Ø        DCA RECORD
5432   22ØØ        ISZ RDSWS
5433   56ØØ        JMP I RDSWS

5434   1Ø2Ø     RDSW32,     TAD RECORD
5435   3422        DCA I POSITN
5436   1Ø2Ø        TAD RECORD
5437   1113        TAD BLKINC       /+ OR - 1
544Ø   3Ø2Ø        DCA RECORD
5441   1114        TAD DIRFLG
5442   7Ø41        CMA IAC
5443   1Ø2Ø        TAD RECORD
5444   Ø127        AND KØØ37
5445   764Ø        SZA CLA          /DONE AN INC OF 32
5446   5232        JMP RDSW32-2
5447   1Ø75        TAD KØ2ØØ
545Ø   6764        IOT 764          /32 BLOCKS, STOP TAPE
5451   56ØØ        JMP I RDSWS
```

```
5452  6772  TSRDEZ,    IOT 772
5453  Ø11Ø       AND EZBIT
5454  765Ø       SNA CLA        /END ZONE INT
5455  53Ø2       JMP RDSERR     /NO, ERROR
5456  1Ø2Ø       TAD RECORD
5457  1126       TAD K5Ø76              /BLOCK 27Ø2
546Ø  765Ø       SNA CLA
5461  5265       JMP .+4        /27Ø2 DOESN'T EXIST
5462  1Ø2Ø       TAD RECORD
5463  77ØØ       SMA CLA        /BLOCK-1
5464  53Ø2       JMP RDSERR     /NO, EZ STAT IN ERROR
5465  56ØØ       JMP I RDSWS    /EXIT

5466  5266  PARRSE,    JMP .                /STOP TAPE
5467  4444       JMS I ERRSTP
547Ø  4446       JMS I RDATTY   /READ AND DIRECTION
5471  1Ø26       TAD RECRDK
5472  4451       JMS I TYPCON   /TYPE BLOCK
5473  4456       JMS I TYPTEX
5474  ØØ42       42
5475  5457       5457
5476  4353       4353
5477  77ØØ       77ØØ
55ØØ  4447       JMS I SBTYPE
55Ø1  5666       JMP I PARRSE
55Ø2  6761  RDSERR,    IOT 761
55Ø3  ØØ75       AND KØ2ØØ
55Ø4  765Ø       SNA CLA
55Ø5  5312       JMP .+5
55Ø6  76Ø4       LAS
55Ø7  Ø1Ø2       AND KØ4ØØ
551Ø  764Ø       SZA CLA
5511  52Ø7       JMP RDSWS+7
5512  4266       JMS PARRSE
5513  3326       DCA NOSERR

5514  1427       TAD I WCLOC
5515  765Ø       SNA CLA        /WC GO TO Ø
5516  5211       JMP RDSWS+11   /YES
5517  1Ø27       TAD WCLOC
552Ø  4451       JMS I TYPCON
5521  4456       JMS I TYPTEX   /TYPE WORD COUNT
5522  ØØ67       67
5523  1643       1643
5524  1677       1677
5525  5211       JMP RDSWS+11
5526  ØØØØ  NOSERR,    Ø
```

```
                /WRITE DATA SCOPE LOOP
                /NO ERROR CHECKING BOUNCES OFF EZ
                /PATTERN SELECTION BITS 9, 1Ø, 11

                *16ØØ
16ØØ   76Ø4     WRSCOP,     LAS
16Ø1   ØØ73         AND K0ØØ7
16Ø2   1371         TAD PATTBA             /PAT NUM + TABLE ADRS
16Ø3   337Ø         DCA TEMPY
16Ø4   177Ø         TAD I TEMPY
16Ø5   337Ø         DCA TEMPY
16Ø6   477Ø         JMS I TEMPY      /GENERATE PATTERN
16Ø7   11Ø3         TAD KØ214              /SEARCH +
161Ø   1Ø6Ø         TAD UNFUNC             /DRIVE
1611   6766         IOT 766
1612   744Ø         SZA
1613   74Ø2         HLT              /IOT 766 OR 754 DID NOT CLEAR AC
1614   1Ø25         TAD IDCON
1615   343Ø         DCA I CALOC
1616   6773         IOT 773          /WAIT FOR FLAG
1617   5216         JMP .-1
162Ø   771Ø         SPA CLA
1621   5255         JMP WRTSEZ             /ERROR STATUS
1622   1115         TAD KØØ5Ø
1623   6764         IOT 764          /CHANGE TO WRITE
1624   744Ø         SZA
1625   74Ø2         HLT              /IOT 764 DID NOT CLEAR AC
1626   1Ø32         TAD BF1LOC
1627   343Ø         DCA I CALOC
163Ø   1Ø64         TAD K7577
1631   3427         DCA I WCLOC
1632   6761         IOT 761
1633   ØØ75         AND KØ2ØØ
1634   765Ø         SNA CLA
1635   5243         JMP WRSCO1
1636   1427         TAD I WCLOC
1637   765Ø         SNA CLA
164Ø   5243         JMP .+3
1641   6771         IOT 771          /WAIT FOR FLAG
1642   5232         JMP .-1Ø
1643   1375     WRSCO1,     TAD K773Ø
1644   337Ø         DCA TEMPY
1645   6771         IOT 771
1646   741Ø         SKP
1647   5252         JMP .+3
165Ø   237Ø         ISZ TEMPY
1651   5245         JMP .-4
1652   1376         TAD KØØ52              /LEAVE ERROR FLAGS SET
1653   6764         IOT 764
1654   5212         JMP WRSCOP+12
1655   6772     WRTSEZ,     IOT 772
1656   Ø374         AND K1ØØØ
1657   765Ø         SNA CLA          /END ZONE
166Ø   5265         JMP .+5          /NO START SEARCH AGAIN
1661   6761         IOT 761          /END ZONE SET
1662   7Ø4Ø         CMA              /CHANGE DIRECTION
1663   Ø1Ø2         AND KØ4ØØ
1664   52Ø7         JMP WRSCOP+7
1665   6761         IOT 761
```

```
1666  5263         JMP  .-3
```

```
                /READ DATA SCOPE LOOP
                /IGNORES ALL ERRORS
                /BOUNCES OFF END ZONE

1667  1372      RDSCOP,    TAD K022Ø                  /READ DATA
167Ø  1Ø6Ø        TAD UNFUNC                 /+ DRIVE
1671  6766        IOT 766
1672  744Ø        SZA
1673  74Ø2        HLT                 /IOT 764 DID NOT CLEAR AC
1674  1Ø33        TAD BF2LOC
1675  343Ø        DCA I CALOC
1676  1Ø64        TAD K7577
1677  3427        DCA I WCLOC
17ØØ  6761        IOT 761             /MONITOR MOTION
17Ø1  ØØ75        AND KØ2ØØ                  /BIT IN CASE IT=Ø
17Ø2  765Ø        SNA CLA
17Ø3  5311        JMP .+6
17Ø4  1427        TAD I WCLOC         /MONITOR WORD K
17Ø5  765Ø        SNA CLA
17Ø6  5311        JMP .+3
17Ø7  6771        IOT 771             /AND FLAGS
171Ø  53Ø4        JMP .-4
1711  1375        TAD K773Ø
1712  337Ø        DCA TEMPY
1713  6773        IOT 773             /MONITOR FLAG
1714  741Ø        SKP                 /FOR 2ØØ MICRO SEC.
1715  532Ø        JMP .+3
1716  237Ø        ISZ TEMPY
1717  5313        JMP .-4
172Ø  Ø374        AND K1ØØØ
1721  764Ø        SZA CLA             /END ZONE SET
1722  533Ø        JMP .+6             /YES, REVERSE
1723  6761      RDSCO1,     IOT 761
1724  7Ø4Ø        CMA
1725  ØØ75        AND KØ2ØØ                   /IN CASE GO=Ø
1726  6764        IOT 764             /RESET ENABLES
1727  5272        JMP RDSCOP+3
173Ø  6761        IOT 761
1731  7Ø4Ø        CMA
1732  Ø1Ø2        AND KØ4ØØ                   /CHANGE DIRECTION
1733  5267        JMP RDSCOP
```

```
                /SEARCH SCOPE LOOP IGNORES ERRORS
                /BOUNCES OFF END ZONES
                /DISPLAYS LAST BLOCK IN AC

1734  1103      SRSCOP,     TAD K0214                     /SEARCH
1735  1060         TAD UNFUNC                    /+ DRIVE
1736  6766         IOT 766
1737  7440         SZA
1740  7402         HLT              /IOT 764 DID NOT CLEAR AC
1741  1377         TAD K3500
1742  3010         DCA 10
1743  1031         TAD BF1WD1
1744  3430         DCA I CALOC
1745  1431         TAD I BF1WD1     /DISPLAY BLOCK
1746  2010         ISZ 10           /WAIT 1 BLOCK
1747  5346         JMP .-1          /APPROX
1750  7200         CLA
1751  6772         IOT 772
1752  0374         AND K1000                 /READ B
1753  7640         SZA CLA          /END ZONE
1754  5362         JMP .+6          /YES REVERSE
1755  6761         IOT 761
1756  7040         CMA              /IN CASE GO=0
1757  0075         AND K0200
1760  6764         IOT 764
1761  5337         JMP SRSCOP+3
1762  6761         IOT 761
1763  0075         AND K0200
1764  7640         SZA CLA
1765  7402         HLT              /EZ DID NOT ZERO MOTION
1766  1373         TAD K0600A
1767  5360         JMP .-7          /COMPLEMENT DIRECTION

1770  0000      TEMPY,      0
1771  4724      PATTRA,     PTABLE
1772  0220      K0220,      220
1773  0600      K0600A,     600
1774  1000      K1000,      1000
1775  7730      K7730,      7730
1776  0052      K0052,      52
1777  3500      K3500,      3500
```

```
                PAUSE


                /TAPE 4 OF TCØ1 BASIC EXERCISER
                /PARITY GENERATION TEST
                /IS CORRECT PARITY GENERATED
                /BEGIN BY WRITING REV CKSUMS TO Ø
                /BACKWARD IS 77*ØØ FWD
                *56ØØ
56ØØ  11ØØ      PARTST,     TAD K27Ø1
56Ø1  3Ø2Ø          DCA RECORD      /FIND 27Ø1
56Ø2  7Ø4Ø          CMA
56Ø3  3114          DCA DIRFLG      /BACKWARDS
56Ø4  4435          JMS I SRCHIT
56Ø5  1116          TAD KØØ3Ø               /SEARCH TO READ DATA
56Ø6  6764          IOT 764
56Ø7  1Ø32          TAD BF1LOC

561Ø  343Ø          DCA I CALOC
5611  1357          TAD K76ØØB              /DUMMY INPUT
5612  3427          DCA I WCLOC
5613  1427          TAD I WCLOC
5614  765Ø          SNA CLA         /WAIT FOR WCTJ=-1
5615  5221          JMP .+4
5616  6771          IOT 771         /FLAG SET
5617  5213          JMP .-4         /COULD BE END ZONE
562Ø  5242          JMP PAREZ1
5621  7ØØ1          IAC
5622  7Ø4Ø          CMA
5623  3427          DCA I WCLOC     /2 WORDS

5624  1Ø32          TAD BF1LOC
5625  343Ø          DCA I CALOC
5626  1122          TAD KØ17Ø               /TO WRITE ALL CONTINUOUS
5627  6764          IOT 764
563Ø  7Ø4Ø          CMA
5631  3431          DCA I BF1WD1
5632  444Ø          JMS I WAITI
5633  ØØØ1          1
5634  5237          JMP .+3
5635  1122          TAD KØ17Ø               /BACK TO READ DATA
5636  52Ø6          JMP PARTST+6
5637  4641          JMS I .+2
564Ø  52ØØ          JMP PARTST
5641  5151          WAETYP
5642  6772      PAREZ1,     IOT 772
5643  Ø11Ø          AND EZBIT               /END ZONE INT.
5644  764Ø          SZA CLA
5645  5251          JMP .+4
5646  465Ø          JMS I .+2
5647  52ØØ          JMP PARTST
565Ø  5466          PARRSE

5651  4437          JMS I NEWDRV
5652  52ØØ          JMP PARTST      /PREPARE NEXT DRIVE
```

```
5653  1356  PARWL1,    TAD PARLOC
5654  3Ø1Ø      DCA 1Ø
5655  3114      DCA DIRFLG
5656  3Ø2Ø      DCA RECORD
5657  3422      DCA I POSITN
566Ø  4435      JMS I SRCHIT     /FIND BLOCK Ø FWD
5661  1115      TAD KØØ5Ø
5662  6764      IOT 764          /WRITE DATA
5663  141Ø      TAD I 1Ø
5664  3431      DCA I BF1WD1
5665  1Ø32      TAD BF1LOC

5666  343Ø      DCA I CALOC      /ONLY WRITE 1 WD
5667  7Ø4Ø      CMA
567Ø  3427      DCA I WCLOC      /REST OF BLOCK SHOULD
5671  444Ø      JMS I WAITI      /GO TO ZERO'S
5672  ØØØ1      1
5673  5344      JMP PARWER
5674  1431      TAD I BF1WD1
5675  7Ø4Ø      CMA
5676  765Ø      SNA CLA          /DO ALL ONES YET?
5677  53Ø3      JMP .+4          /YES
57ØØ  2Ø2Ø      ISZ RECORD
57Ø1  2422      ISZ I POSITN     /COUNT BLOCKS
57Ø2  5262      JMP PARWL1+7

            /INCREMENTING PARITY PATTERNS
            /Ø1ØØ TO 77ØØ AND Ø1Ø1 TO 7777
57Ø3  3431  PARWL2,    DCA I BF1WD1
57Ø4  6764      IOT 764
57Ø5  7Ø4Ø      CMA
57Ø6  3427      DCA I WCLOC
57Ø7  1Ø32      TAD BF1LOC
571Ø  343Ø      DCA I CALOC
5711  1431      TAD I BF1WD1     /UPPER +1
5712  1123      TAD KØ1ØØ

5713  3431      DCA I BF1WD1
5714  1431      TAD I BF1WD1
5715  745Ø      SNA              /UPPER GONE TO Ø
5716  5323      JMP .+5          /YES, SET WORD TO Ø1Ø1
5717  ØØ71      AND KØØ77
572Ø  764Ø      SZA CLA          /INCREMENTING LWR
5721  2431      ISZ I BF1WD1     /ADD 1 TO LOWER
5722  5325      JMP .+3

5723  1124      TAD KØ1Ø1                /DONE UPPER TO 77ØØ
5724  3431      DCA I BF1WD1     /START BOTH EQUAL
5725  444Ø      JMS I WAITI
5726  ØØØ1      1
5727  5344      JMP PARWER       /SHOULD GET NO ERROR STATUS
573Ø  2422      ISZ I POSITN
5731  2Ø2Ø      ISZ RECORD
5732  1431      TAD I BF1WD1
5733  7Ø4Ø      CMA
5734  764Ø      SZA CLA
5735  53Ø4      JMP PARWL2+1
```

```
5736  1Ø75        TAD KØ2ØØ
5737  6764        IOT 764
574Ø  4437        JMS I NEWDRV
5741  5253        JMP PARWL1
5742  5743        JMP I .+1                 /READ AND CHECK
5743  62ØØ        PARTS1          /FOR CORRECT CKSUMS

5744  4444  PARWER,     JMS I ERRSTP
5745  445Ø        JMS I WDATTY
5746  1Ø26        TAD RECRDK
5747  4451        JMS I TYPCON
575Ø  ØØ42        42
5751  5457        5457
5752  4353        4353

5753  77ØØ        77ØØ
5754  4447        JMS I SBTYPE
5755  5253        JMP PARWL1

5756  4671  PARLOC,     PARTAB-1
5757  76ØØ  K76ØØB,     76ØØ
```

```
                /WRITE BLOCKS TO WRONG
                /PARITY AND VERIFY PARTITY ERRORS
                /GENERATED (GOING BACKWARD REWRITE REV, CKSUM)
                *6ØØØ

6ØØØ   3Ø2Ø     PARTS4,     DCA RECORD
6ØØ1   3114         DCA DIRFLG
6ØØ2   4435         JMS I SRCHIT      /FIND LAST BLOCK BKWD
6ØØ3   1355         TAD KØ14Ø                   /CHNG TO WRITE ALL
6ØØ4   6764         IOT 764
6ØØ5   1122         TAD KØ17Ø                   /TO READ DATA

6ØØ6   6764         IOT 764
6ØØ7   1Ø32         TAD BF1LOC
6Ø1Ø   343Ø         DCA I CALOC
6Ø11   1375         TAD K76ØØA
6Ø12   3427         DCA I WCLOC
6Ø13   1427         TAD I WCLOC
6Ø14   765Ø         SNA CLA           /WAIT FOR LAST
6Ø15   5221         JMP .+4           /WORD IN

6Ø16   6771         IOT 771
6Ø17   5213         JMP .-4
6Ø2Ø   5356         JMP PARRE3                  /NO FLAGS FOR READ DATA
6Ø21   1Ø32         TAD BF1LOC                  /WRITE CHECKSUM TO FIRST WORD
6Ø22   343Ø         DCA I CALOC
6Ø23   7ØØ1         IAC
6Ø24   7Ø4Ø         CMA
6Ø25   3427         DCA I WCLOC
6Ø26   1122         TAD KØ17Ø
6Ø27   6764         IOT 764           /WRITE ALL
6Ø3Ø   1431         TAD I BF1WD1
6Ø31   7Ø4Ø         CMA
6Ø32   765Ø         SNA CLA
6Ø33   3431         DCA I BF1WD1
6Ø34   444Ø         JMS I WAITI       /WRITE ALL CONTINUOUS
6Ø35   ØØØ1         1
6Ø36   5311         JMP PRWAE                   /WRITE ALL STATUS ERR
6Ø37   4361         JMS PR4INC
6Ø4Ø   52Ø5         JMP PARTS4+5

6Ø41   1Ø75         TAD KØ2ØØ
6Ø42   6764         IOT 764
6Ø43   4437         JMS I NEWDRV
6Ø44   52ØØ         JMP PARTS4
```

```
                /READ BLOCKS FORWARD AND
                /EXPECT PARITY ERRORS THEN BACKWARDS
6Ø45  3Ø2Ø      PARTS5,     DCA RECORD
6Ø46  3114          DCA DIRFLG
6Ø47  4435          JMS I SRCHIT      /FIND Ø FWD OR LAST
6Ø5Ø  1116          TAD KØØ3Ø
6Ø51  6764          IOT 764           /READ DATA
6Ø52  1Ø32          TAD BF1LOC
6Ø53  343Ø          DCA I CALOC

6Ø54  1Ø64          TAD K7577
6Ø55  3427          DCA I WCLOC
6Ø56  444Ø          JMS I WAITI       /EXPECT PARITY
6Ø57  42Ø1          42Ø1              /ERROR
6Ø6Ø  5277          JMP PRT5EZ
6Ø61  6772          IOT 772
6Ø62  ØØ75          AND KØ2ØØ
6Ø63  765Ø          SNA CLA           /PARITY ERROR SET

6Ø64  5314          JMP PARRE4        /NO
6Ø65  4361          JMS PR4INC
6Ø66  5251          JMP PARTS5+4

6Ø67  1Ø75          TAD KØ2ØØ
6Ø7Ø  6764          IOT 764           /STOP TAPE
6Ø71  4437          JMS I NEWDRV      /CHANGE DRIVES
6Ø72  5245          JMP PARTS5
```

```
                /READ BLOCKS BACKWARDS AND EXPECT
                /PARITY ERRORS
6Ø73  1422      PARTS6,     TAD I POSITN     /LAST BLOCK
6Ø74  3Ø2Ø          DCA RECORD
6Ø75  7Ø4Ø          CMA                  /BACKWARDS
6Ø76  5246          JMP PARTS5+1

6Ø77  1114      PRT5EZ,     TAD DIRFLG
61ØØ  77ØØ          SMA CLA              /GOING BACKWARD
61Ø1  5314          JMP PARRE4           /NO, ERROR
61Ø2  1Ø2Ø          TAD RECORD
61Ø3  77ØØ          SMA CLA              /DONE BLOCK Ø
61Ø4  5314          JMP PARRE4           /NO, ERROR
61Ø5  4437          JMS I NEWDRV
61Ø6  5273          JMP PARTS6
61Ø7  571Ø          JMP I .+1
611Ø  56ØØ          PARTST

6111  4713      PRWAE,      JMS I .+2
6112  52Ø2          JMP PARTS4+2
6113  5151          WAETYP

6114  4444      PARRE4,     JMS I ERRSTP
6115  4446          JMS I RDATTY
6116  1Ø26          TAD RECRDK
6117  4451          JMS I TYPCON
612Ø  4456          JMS I TYPTEX

6121  ØØ42          42
6122  5457          5457
6123  4353          4353
6124  7777          7777
6125  6Ø41          6Ø41
6126  6251          6251
6127  6471          6471
613Ø  ØØ45          45
6131  6262          6262
6132  5762          5762
6133  ØØ45          45
6134  7Ø6Ø          7Ø6Ø
6135  4543          4543
6136  6445          6445
6137  4477          4477

614Ø  4447          JMS I SBTYPE
```

```
6141  1114          TAD DIRFLG
6142  764Ø          SZA CLA
6143  1Ø75          TAD KØ2ØØ
6144  1Ø31          TAD BF1WD1
6145  4451          JMS I TYPCON
6146  4361          JMS PR4INC
6147  741Ø          SKP
615Ø  5271          JMP PARTS6-2
6151  1Ø2Ø          TAD RECORD
6152  771Ø          SPA CLA
6153  53Ø5          JMP PRWAE-4
6154  5247          JMP PARTS5+2
6155  Ø14Ø   KØ14Ø,       14Ø
6156  476Ø   PARRE3,      JMS I  .+2
6157  52Ø2          JMP PARTS4+2
616Ø  5466          PARRSE

6161  5361   PR4INC,      JMP .
6162  1114          TAD DIRFLG
6163  745Ø          SNA
6164  2Ø2Ø          ISZ RECORD
6165  1Ø2Ø          TAD RECORD
6166  3Ø2Ø          DCA RECORD
6167  1422          TAD I POSITN
617Ø  7Ø4Ø          CMA
6171  1Ø2Ø          TAD RECORD
6172  765Ø          SNA CLA
6173  2361          ISZ PR4INC
6174  5761          JMP I PR4INC
6175  76ØØ   K76ØØA,      76ØØ
```

```
              /READ THE GENERATED CKSUMS BACK
              /AND VERIFY THAT THEY ARE CORRECT
              *6200
6200   3020   PARTS1,      DCA RECORD
6201   3114         DCA DIRFLG
6202   4435         JMS I SRCHIT      /FIND BLOCK 0
6203   7040         CMA               /CA = 7777 IN CASE
6204   3430         DCA I CALOC       /R ALL BREAKS BEFORE DATA
6205   1074         TAD K0020
6206   6764         IOT 764
6207   1130         TAD K0010

6210   6764         IOT 764           /READ ALL TO RD DATA
6211   1032         TAD BF1LOC
6212   3430         DCA I CALOC
6213   1064         TAD K7577
6214   3427         DCA I WCLOC
6215   1427         TAD I WCLOC
6216   7650         SNA CLA           /WAIT FOR WC TO =0
6217   5223         JMP .+4

6220   6771         IOT 771           /IN CASE READ ERROR
6221   5215         JMP .-4
6222   5342         JMP PARRE1
6223   7040         CMA
6224   3427         DCA I WCLOC
6225   1130         TAD K0010
6226   6764         IOT 764           /RD DATA TO RD ALL
6227   4440         JMS I WAITI
6230   0001         1
6231   5342         JMP PARRE1        /WAIT FOR CKSJM IN

6232   1431         TAD I BF1WD1
6233   0071         AND K0077               /TEST FOR 2 CHAR
6234   7640         SZA CLA           /IN FIRST WORD
6235   5240         JMP .+3           /CKSUM SHOULD =7700
6236   1431         TAD I BF1WD1
6237   0070         AND K7700
6240   1756         TAD I CKSLOC
6241   1123         TAD K0100

6242   7640         SZA CLA           /CKSUM CORRECT
6243   5310         JMP CKSERR        /NO
6244   4755         JMS I PR2INC
6245   5207         JMP PARTS1+7      /NO

6246   1075         TAD K0200
6247   6764         IOT 764           /STOP TAPE
6250   4437         JMS I NEWDRV
6251   5200         JMP PARTS1        /DO NEXT DRIVE
```

```
                /READ BLOCKS BKWD FOR NO PARITY
                /ERRORS
6252  1422      PARTS2,    TAD I POSITN
6253  3020          DCA RECORD
6254  7040          CMA
6255  3114          DCA DIRFLG
6256  4435          JMS I SRCHIT              /FIND LAST BLOCK BKWDS
6257  1116          TAD KØØ3Ø
626Ø  6764          IOT 764
6261  1Ø32          TAD BF1LOC

6262  343Ø          DCA I CALOC
6263  1Ø64          TAD K7577
6264  3427          DCA I WCLOC
6265  444Ø          JMS I WAITI
6266  ØØØ1          1
6267  5273          JMP PARREZ                /TEST FOR END ZONE
627Ø  4755          JMS I PR2INC
6271  526Ø          JMP PARTS2+6
6272  53Ø2          JMP PARTS3+2
6273  1Ø2Ø      PARREZ,    TAD RECORD
6274  77ØØ          SMA CLA         /DONE BLOCK Ø
6275  5345          JMP PARRE2                /NO, ERROR STATUS
6276  4437          JMS I NEWDRV              /DONE ALL DRIVES
6277  5252          JMP PARTS2                /DO NEXT

                /READ BLOCKS FORWARD FOR NO
                /PARITY ERRORS
63ØØ  3Ø2Ø      PARTS3,    DCA RECORD
63Ø1  5255          JMP PARTS2+3              /BLOCK Ø FWD
```

```
63Ø2  1Ø75        TAD KØ2ØØ
63Ø3  6764        IOT 764 /STOP TAPE
63Ø4  4437        JMS I NEWDRV    /ALL DRIVES
63Ø5  53ØØ        JMP PARTS3      /NOPE
63Ø6  57Ø7        JMP I .+1                /WRITE TO WRONG
63Ø7  6ØØØ        PARTS4          /PARITY AND TEST ERROR

631Ø  4444  CKSERR,     JMS I ERRSTP
6311  4445        JMS I DRIVTY
6312  4456        JMS I TYPTEX
6313  ØØ43        43
6314  5363        5363
6315  6555        6555
6316  ØØ45        45
6317  6262        6262
632Ø  5762        5762
6321  77ØØ        77ØØ

6322  1Ø31        TAD BF1WD1
6323  4451        JMS I TYPCON
6324  4456        JMS I TYPTEX
6325  ØØ44        44
6326  4164        4164
6327  4177        4177
633Ø  1356        TAD CKSLOC
6331  4451        JMS I TYPCON
6332  4456        JMS I TYPTEX
6333  ØØ43        43
6334  53ØØ        53ØØ
6335  6365        6365
6336  5577        5577
6337  4755        JMS I PR2INC
634Ø  52Ø2        JMP PARTS1+2
6341  525Ø        JMP PARTS2-2

6342  4744  PARRE1,     JMS I .+2
6343  52Ø2        JMP PARTS1+2
6344  5466        PARRSE

6345  4744  PARRE2,     JMS I .-1
6346  4755        JMS I PR2INC
6347  741Ø        SKP
635Ø  53Ø4        JMP PARTS3+4
6351  1Ø2Ø        TAD RECORD
6352  771Ø        SPA CLA
6353  5276        JMP PARTS3-2
6354  5256        JMP PARTS2+4
6355  6161  PR2INC,     PR4INC
6356  7175  CKSLOC,     BUFFRS+2Ø1
```

```
BACKTY  1Ø75
BF1LOC  Ø332
BFINDI  Ø331
BF2LOC  Ø333
BF3LOC  Ø334
BKWTYP  411Ø
BLKBIT  Ø12Ø
BLKBTS  Ø117
BLKFLG  Ø747
BLKFND  ØØ21
BLKINC  Ø113
BLOCKK  377Ø
BNOTCN  3722
BUFFRS  6774
BUFFR2  7175
BUFFR3  7376
CALOC   ØØ3Ø
CDRIVE  ØØ57
CHNGDR  Ø437
CIPHER  Ø211
CKSERR  631Ø
CKSLOC  6356
COCOMP  5Ø31
CODATA  5ØØØ
COERRO  5Ø51
COERR1  51Ø7
COFLAG  515Ø
COINCR  5Ø24
COLOOP  5Ø17
COMBIT  ØØ62
CRLFLF  1242
DAPSAV  41ØØ
DATACO  ØØ42
DIRECT  ØØ23
DIRFLG  Ø114
DIRSAV  Ø112
DOLOOP  22ØØ
DOTHEM  2112
DRIVTY  ØØ45
DRVTYP  2743
ERRSTP  ØØ44
ERSSTA  ØØ53
ERSTP   131Ø
EZBIT   Ø11Ø
EZERR   3366
EZERRA  3436
EZTYPE  4Ø67
FORDTY  1Ø76
FWDTYP  4111
GBKWI   3214
GETMIN  231Ø
GET4IN  2172
GNPATØ  46ØØ
GNPAT1  46Ø4
GNPAT2  461Ø
GNPAT3  4614
GNPAT4  4622
GNPAT5  463Ø
GNPAT6  4636
GNPAT7  4644
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GNPTRS  4461
GNSTRA  4651
HLTNS   Ø311
IDCON   ØØ25
IOT     63ØØ
IRECD   Ø254
KM25    Ø325
KNDATA  5145
KØØØ3   ØØ76
KØØØ6   4373
KØØØ7   ØØ73
KØØ1Ø   Ø13Ø
KØØ2Ø   ØØ74
KØØ3Ø   Ø116
KØØ37   Ø127
KØØ4Ø   Ø121
KØØ5Ø   Ø115
KØØ52   1776
KØØ77   ØØ71
KØ1ØØ   Ø123
KØ1Ø1   Ø124
KØ14Ø   6155
KØ17Ø   Ø122
KØ2ØØ   ØØ75
KØ2Ø4   Ø125
KØ212   126Ø
KØ214   Ø1Ø3
KØ215   1257
KØ22Ø   1772
KØ24Ø   ØØ72
KØ4ØØ   Ø1Ø2
KØ6ØØ   2344
KØ6ØØA  1773
KØ6Ø4   ØØ65
KØ614   Ø1Ø1
K1ØØØ   1774
K26Ø    1535
K27ØØ   354Ø
K27Ø1   Ø1ØØ
K35ØØ   1777
K4ØØØ   ØØ66
K4215   Ø276
K5Ø76   Ø126
K5Ø77   ØØ77
K7ØØØ   2345
K7472   2673
K7475   3131
K7577   ØØ64
K76ØØ   4566
K76ØØA  6175
K76ØØB  5757
K77ØØ   ØØ7Ø
K773Ø   1775
K776Ø   ØØ63
K7767   ØØ67
K7772   4374
LSTBLK  ØØ24
MSBITS  ØØ61
MVBKWD  2223
MVCHNG  2274
```

```
MVEND   23Ø5
MVFTBL  2347
MVFWD   2216
MVGBKW  2121
MVGCHG  2135
MVGFWD  2113
MVGRPT  2156
MVGSTP  2127
MVGWAT  2147
MVREST  2Ø27
MVRPT   2257
MVRTBL  2Ø73
MVSTOP  223Ø
MVTEST  2ØØØ
MVWAIT  2246
NEWDRV  ØØ37
NOSERR  5526
NUMWRD  5147
OTHRIX  2721
PAREZ1  5642
PARLOC  5756
PARREZ  6273
PARRE1  6342
PARRE2  6345
PARRE3  6156
PARRE4  6114
PARRSE  5466
PARTAB  4672
PARTST  56ØØ
PARTS1  62ØØ
PARTS2  6252
PARTS3  63ØØ
PARTS4  6ØØØ
PARTS5  6Ø45
PARTS6  6Ø73
PARWER  5744
PARWL1  5653
PARWL2  57Ø3
PATNUM  457Ø
PATTBA  1771
PATTBL  4565
PNTRS   Ø5ØØ
POSITN  ØØ22
POSSAV  Ø111
PREBLK  Ø75Ø
PRT5EZ  6Ø77
PRWAE   6111
PR2INC  6355
PR4INC  6161
PTABLE  4724
RDATTY  ØØ46
RDCEND  4515
RDCLP1  447Ø
RDCOMP  4451
RDCPAS  4564
RDSCOP  1667
RDSCO1  1723
RDSEND  4531
RDSERR  55Ø2
RDSWLP  4562
```

```
RDSWS   5400        SRCHER  0746        TYBKW   1545
RDSW32  5434        SRCHIT  0035        TYCHAR  1230
RECORD  0020        SRCHTY  0052        TYCONT  1261
RECRDK  0026        SRCH1   2400        TYCOVR  1273
REFLGS  4734        SRCH2   2500        TYDATA  1475
REPOSI  0400        SRCNCK  0655        TYDIR   1536
RERFLG  4567        SREZTS  0721        TYDRV   1511
RESBEZ  4336        SRHERR  1000        TYFWD   1555
RESBKB  4320        SRSCOP  1734        TYINTX  2733
RESBKW  4276        SRTAFN  0634        TYMODE  1563
RESFEZ  4260        SSTABW  3651        TYMOVE  1400
RESFWD  4213        SSTAER  4000        TYPCON  0051
RESFWF  4232        SSTAEZ  3437        TYPTEX  0056
RESXIT  4250        SSTAFW  3600        TYRALL  1433
RESYEZ  4354        SSTAN1  3254        TYRDAT  1424
RESYNC  4200        SSTAN2  3277        TYREAD  1460
REWIND  0036        SSTAN3  3322        TYSRCH  1411
RSFDRV  0417        SSTAN4  3400        TYTEXT  1200
RSFDR1  0435        SSTA1A  3267        TYWALL  1451
SAVPAD  0043        SSTA2A  3311        TYWDAT  1442
SBABK   0106        SSTA3A  3334        TYWRIT  1466
SBAFK   0107        SSTA3B  3353        UKDATA  5146
SBCONS  0674        SSTA4A  3412        UNFUNC  0063
SBRECV  1331        SSTA4B  3424        WAETYP  5151
SBTYPE  0047        SSTBBE  3711        WAITI   0040
SCH1ER  2433        SSTBKW  0055        WAITIN  2040
SCH1ND  2461        SSTBR   3670        WCLOC   0027
SCH1OK  2444        SSTBSE  3703        WDATTY  0050
SCH1ST  2421        SSTER1  3210        WRDIR   5157
SCH2ER  2513        SSTEZA  3470        WRRDND  5161
SCH2OK  2525        SSTEZ1  3501        WRSCOP  1600
SEARCH  0600        SSTFBE  3640        WRSCO1  1643
SEKONS  1071        SSTFR   3617        WRTEZA  5301
SERCH2  2600        SSTFSE  3632        WRTEZT  5235
SERCMP  3070        SSTFWD  0054        WRTLP1  4421
SEREZ   2655        SSTRNA  3200        WRTSEZ  1655
SER2A   3000        STPERR  0044        WRTSLP  4561
SER2AI  2720        SYNCRE  4107        WRTSWA  5226
SER2LS  3111        TAPONT  0751        WRTSWS  5200
SER2NZ  2674        TEMPY   1770        WRTTST  4400
SER2ST  2637        TEMP1   4563        WRT32   5312
SER2TY  3123        TSRDEZ  5452        WTHALF  0041
SFABK   0105        TSTATB  1316        WTIJMP  0272
SFAFK   0104        TSTTBL  0277        WTINT   0234
SIERRO  2565        TXSTOR  1307        WT500   0313
                    TYALL   1503
```