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## IDENTIFICATION

| | |
|---|---|
| PRODUCT CODE: | MAINDEC-Ø8-DITCA-A-D<br>REPLACES MAINDEC-Ø8-D3BD |
| PRODUCT NAME: | TC0~~1~~8* BASIC EXERCISER |
| DATE: | MAY 31, 1972 |
| MAINTAINER: | DIAGNOSTIC GROUP |
| AUTHOR: | JOHN VROBEL |

TCØ8BE

## 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<br>Program storage for Motion Test (0200)<br>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.

*This program can also be used on the TCØ8 DECtape control. All tests are applicable, merely substitue "TCØ8" for "TCØ1 in text.

## 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 |

- CAUSE AC to COUNT
from 0 to 2701 (BLOCKS)
BACK AND forth.

### 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 static register test will be run on status register A. and B. The processor should halt at address 0223 with bits 0 to 7 of the switch register displayed in the AC. For all error halts other than mentioned in 4.3 section D, consult the listing.

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:<br>000 All 0s<br>001 All 1s<br>010 Alternate words of 0s and 1s<br>011 Words of 2525<br>100 Words of 5252<br>101 Words of 0707<br>110 Words of 7070<br>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 <u>New U + M Delay</u> - 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 <u>End Zone Detection</u> - 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

'F'WD  or  'B'KWD
'D'O  'D'O

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.

```
    at start of tape            at end of Tape
        "F"WD                   'B'KWD
        "W"AIT  0020            'W'AIT   0020
        "B"KWD                  'F'WD
        "W"AIT  ~~0016~~ 0040   'W'AIT   0040
        "R"PT  0040 (or may be made longer or shorter as desired)
        "S"TOP
        "D"O
```

This program eventually moves the tape away from End Zone. If BKWD Wait is longer than FWD Wait it will move back to the midpoint.

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.) which means if the waits are equal it will not move away from the end zone. (Wrong again)

5.3.2 Check End-Zone Detection - For the next sequenee 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 indicaies 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 generated 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<br>FWD (Typeout) | Start moving tape on the currently selected drive in the forward direction. |
| B<br>BKWD (Typeout) | Start moving tape on the currently selected drive in the backward direction. |
| S<br>STOP (Typeout) | Stop tape on the currently selected drive. |
| C<br>CHNG (Typeout) | Change drive selection and repeat from the beginning of the execute table or from the last "C." |
| W<br>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<br>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<br>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 4440 |
| 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<br>or<br>1 | 0<br><br>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.

## 9.10 Static Register Test

This test is run automatically prior to all the tests listed above 9.1-9.9. The static register test verifies the ability of status register A and status register B to accept various Data Patterns, IOT 766 to load AC to status register A, IOT 774 to load AC to status register B, IOT 764 to XOR AC to status register A, IOT 761 to "OR" information from status register A to the AC, IOT 772 to "OR" information from status register B to the AC, and IOTS 774, 764, and 766 to clear the AC after their execution.

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

      7175      BUFFR2=BUFFRS+2Ø1
      7376      BUFFR3=BUFFR2+2Ø1

      ØØØ1      *1
ØØØ1  54Ø2              JMP I 2         /FOR INTERRUPTS

      ØØ2Ø      *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  Ø44Ø      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 A
          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
          Ø131  2525    K2525,  2525
          Ø132  ØØØØ    DTSAV,  Ø
          Ø133  ØØØØ    DTCNT,  Ø
          Ø134  7574    K7574,  7574
          Ø135  1Ø77    XDTCHK, DTCHK
          Ø136  2744    XCHKGO, CHKGO
```

```
        Ø137  5331     XCHKB,  CHKB
        Ø14Ø  ØØ7Ø     KØØ7Ø,  ØØ7Ø
        Ø141  76ØØ     Z76ØØ,  76ØØ
        Ø142  5ØØØ     K5ØØØ,  5ØØØ

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

              Ø2ØØ     *2ØØ
        Ø2ØØ  4211             JMS CIPHER
        Ø2Ø1  4211             JMS CIPHER
        Ø2Ø2  4211             JMS CIPHER
        Ø2Ø3  4211             JMS CIPHER
        Ø2Ø4  4211             JMS CIPHER
        Ø2Ø5  4211             JMS CIPHER
        Ø2Ø6  4211             JMS CIPHER
        Ø2Ø7  4211             JMS CIPHER
        Ø21Ø  4211             JMS CIPHER

        Ø211  ØØØØ     CIPHER, Ø
        Ø212  4535             JMS I XDTCHK    /STATIC REGISTER TEST ON STATUS A + B
        Ø213  74Ø4             OSR
        Ø214  ØØ63             AND K776Ø
        Ø215  744Ø             SZA
        Ø216  522Ø             JMP .+2
        Ø217  5311             JMP HLTNS
        Ø22Ø  3Ø61             DCA MSBITS
        Ø221  6774             IOT 774

        Ø222  1Ø61             TAD MSBITS
        Ø223  74Ø2             HLT
        Ø224  72ØØ             CLA
        Ø225  1211             TAD CIPHER
        Ø226  1Ø64             TAD K7577               /-2Ø1
        Ø227  1277             TAD TSTTBL
        Ø23Ø  3232             DCA .+2
        Ø231  4633             JMS I .+2
        Ø232  57ØØ             JMP I TSTTBL+1  /GO TO TEST SELECTED
        Ø233  Ø42Ø             RSFORV
                       /ABOVE JMP I IS CHANGED TO JMP I TST TBL+1 + THE
                       /TEST NUMBER SELECTED
        Ø234  5234     WTINT,  JMP .
        Ø235  1272             TAD WTIJMP
        Ø236  3ØØ1             DCA 1
        Ø237  1273             TAD WTIJMP+1
        Ø24Ø  3ØØ2             DCA 2
        Ø241  3274             DCA WTIJMP+2
        Ø242  1276             TAD K4215
        Ø243  3275             DCA WTIJMP+3
        Ø244  6ØØ1             ION
        Ø245  2274             ISZ WTIJMP+2    /WAIT A MAXIMUM
        Ø246  5245             JMP .-1         /OF 35 SECONDS
        Ø247  2275             ISZ WTIJMP+3    /FOR AN INTERRUPT
        Ø25Ø  5245            JMP .-3
        Ø251  6ØØ2            IOF
        Ø252  74Ø2            HLT
        Ø253  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  5212            JMP CIPHER +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

          Ø4ØØ    *4ØØ
    Ø4ØØ  52ØØ    REPOSI, JMP .
    Ø4Ø1  422Ø            JMS RSFDRV      /RESET POINTRS TO FIRST DRIVE
    Ø4Ø2  1Ø65            TAD KØ6Ø4       /MOVE BACKWARDS
    Ø4Ø3  1Ø6Ø            TAD UNFUNC      /+POSITIONED UNIT NO
    Ø4Ø4  6762            IOT 762         /CLEAR STATUS A
    Ø4Ø5  6764            IOT 764         /XOR STATUS A
    Ø4Ø6  444Ø            JMS I WAITI
    Ø4Ø7  5ØØ1            5ØØ1            /INDICATE EXPECT END
    Ø41Ø  74Ø2            HLT             /NOT STATUS EXPECTED

    Ø411  724Ø            CLA CMA
    Ø412  3422            DCA I POSITN    /INDICATE END ZONE
    Ø413  724Ø            CLA CMA
    Ø414  3423            DCA I DIRECT    /INDICATE BACKWARDS
    Ø415  424Ø            JMS CHNGDR      /SET UP NEXT DRIVE
    Ø416  52Ø2            JMP REPOSI+2    /REWIND NEXT DRIVE
    Ø417  56ØØ            JMP I REPOSI    /GOT ALL DRIVES, EXIT

                  /RESET CURRENT DRIVE POINTERS TO
                  /FIRST DRIVE SELECTED
    Ø42Ø  522Ø    RSFDRV, JMP .
    Ø421  72ØØ            CLA
    Ø422  3Ø57            DCA CDRIVE      /SET INITIALLY TO Ø
    Ø423  1Ø66            TAD K4ØØØ
    Ø424  3Ø62            DCA COMBIT
    Ø425  1Ø61            TAD MSBITS

    Ø426  ØØ62            AND COMBIT
    Ø427  764Ø            SZA CLA         /THIS DRIVE SELECTED
    Ø43Ø  5236            JMP RSFDR1      /YES, SET POINTER
    Ø431  1Ø62            TAD COMBIT
    Ø432  711Ø            CLL RAR
    Ø433  3Ø62            DCA COMBIT              /MOVE COMPARE BIT
    Ø434  2Ø57            ISZ CDRIVE              /INCREMENT DRIVE NUM.
    Ø435  5225            JMP RSFDRV+5

                  /HAVE FOUND FIRST DRIVE SELECTED
    Ø436  4262    RSFDR1, JMS GNPTRS      /GENERATE CONTROL POINTERS
    Ø437  562Ø            JMP I RSFDRV            /EXIT

                  /SELECT NEXT DRIVE OR
                  /RESET TO FIRST DRIVE AND SKIP
    Ø44Ø  524Ø    CHNGDR, JMP .
    Ø441  72ØØ            CLA
    Ø442  1Ø62            TAD COMBIT      /GET DRIVE COMPARE BIT
    Ø443  711Ø            CLL RAR         /MOVE IT TO NEXT
```

```
        Ø444  ØØ67              AND K7767
        Ø445  744Ø              SZA              /LAST DRIVE NUM 7
        Ø446  5252              JMP .+4          /NO
        Ø447  422Ø              JMS RSFDRV       /RESET TO FIRST

        Ø45Ø  224Ø              ISZ CHNGDR       /INCR, EXIT, SKIP
        Ø451  564Ø              JMP I CHNGDR     /EXIT
        Ø452  3Ø62              DCA COMBIT
        Ø453  2Ø57              ISZ CDRIVE
        Ø454  1Ø62              TAD COMBIT
        Ø455  ØØ61              AND MSBITS
        Ø456  765Ø              SNA CLA          /THIS DRIVE SELECTED
        Ø457  5241              JMP CHNGDR+1     /NO

        Ø46Ø  4262              JMS GNPTRS       /GENERATE DRIVE POINTERS
        Ø461  564Ø              JMP I CHNGDR

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

        Ø462  5262  GNPTRS, JMP .
        Ø463  1Ø57              TAD CDRIVE       /DRIVE NUMBER
        Ø464  7112              CLL RTR
        Ø465  7Ø12              RTR              /POSITION TO BITS Ø,1,2
        Ø466  3Ø6Ø              DCA UNFUNC
        Ø467  1Ø57              TAD CDRIVE       /DRIVE NUMBER
        Ø47Ø  13Ø1              TAD PNTRS        /+ POS. PNTR ADDRS.
        Ø471  3Ø22              DCA POSITN       /FOR INDIRECTS

        Ø472  1Ø57              TAD CDRIVE
        Ø473  1312              TAD PNTRS+11     /+ DIRECTION PNTR
        Ø474  3Ø23              DCA DIRECT       /FOR INDIRECTS
        Ø475  1323              TAD PNTRS+22
        Ø476  1Ø57              TAD CDRIVE
        Ø477  3Ø24              DCA LSTBLK
        Ø5ØØ  5662              JMP I GNPTRS


        Ø5Ø1  Ø5Ø2  PNTRS,  .+1              /TO GET LAST RECORD NUMBER

        Ø5Ø2  ØØØØ              Ø                /FOR DRIVE 8
        Ø5Ø3  ØØØØ              Ø                /1
        Ø5Ø4  ØØØØ              Ø                /2
        Ø5Ø5  ØØØØ              Ø                /3
        Ø5Ø6  ØØØØ              Ø                /4
        Ø5Ø7  ØØØØ              Ø                /5
        Ø51Ø  ØØØØ              Ø                /6
        Ø511  ØØØØ              Ø                /7

        Ø512  Ø513              .+1              /TO GET LAST DIRECTION
        Ø513  ØØØØ              Ø                /DIRECTION - UNIT 8
        Ø514  ØØØØ              Ø                /1
        Ø515  ØØØØ              Ø                /2
        Ø516  ØØØØ              Ø                /3
        Ø517  ØØØØ            Ø                  /4
        Ø52Ø  ØØØØ            Ø                  /5
        Ø521  ØØØØ            Ø                  /6
        Ø522  ØØØØ            Ø                  /7

        Ø523  Ø524            .+1                /TO GET LAST WRITTEN
        Ø524  ØØØØ            Ø                  /8
        Ø525  ØØØØ            Ø                  /1
        Ø526  ØØØØ            Ø                  /2
        Ø527  ØØØØ            Ø                  /3
        Ø53Ø  ØØØØ            Ø                  /4
        Ø531  ØØØØ            Ø                  /5
        Ø532  ØØØØ            Ø                  /6
        Ø533  ØØØØ            Ø                  /7

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

              Ø6ØØ    *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  3352            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  6762            IOT 762
        Ø62Ø  6764            IOT 764

        Ø621  7Ø4Ø            CMA
        Ø622  335Ø            DCA BLKFLG
        Ø623  1Ø25            TAD IDCON
        Ø624  343Ø            DCA I CALOC
        Ø625  444Ø            JMS I WAITI        /WAIT FOR NORMAL
        Ø626  ØØØ1            1
        Ø627  5322            JMP SREZTS         /COULD BE EZ
        Ø63Ø  4256            JMS SRCNCK         /FOUND TURN AROUND

        Ø631  5235            JMP SRTAFN         /YES, TURN AROUND
        Ø632  5235            JMP SRTAFN         /PAST IT, TURN AROUND
        Ø633  6764            IOT 764            /NOT REACHED YET
        Ø634  5225            JMP .-7

        Ø635  1Ø2Ø    SRTAFN, TAD RECORD
        Ø636  3352              DCA TAPONT
        Ø637  6761              IOT 761
        Ø64Ø  7Ø4Ø              CMA
        Ø641  ØØ75              AND KØ2ØØ               /IN CASE MOTION=Ø
        Ø642  11Ø2              TAD KØ4ØØ
        Ø643  6764              IOT 764         /CHANGE DIRECTION
        Ø644  7Ø4Ø              CMA
        Ø645  335Ø              DCA BLKFLG
        Ø646  444Ø              JMS I WAITI

        Ø647  ØØØ1              1               /HAS TO BE NORMAL
        Ø65Ø  5747              JMP I SRCHER    /OR ERROR
        Ø651  4256              JMS SRCNCK
        Ø652  56ØØ              JMP I SEARCH    /FOUND BLOCK, EXIT
        Ø653  5747              JMP I SRCHER    /WENT PAST, ERROR
        Ø654  6764              IOT 764         /NOT THERE YET
        Ø655  5246              JMP .-7


        Ø656  5256      SRCNCK, JMP .
        Ø657  235Ø              ISZ BLKFLG      /FIRST BLOCK IN
        Ø66Ø  741Ø              SKP             /NO
        Ø661  5275              JMP SBCONS
        Ø662  6761              IOT 761
        Ø663  Ø1Ø2              AND KØ4ØØ
        Ø664  764Ø              SZA CLA         /BACKWARD IS
        Ø665  7Ø4Ø              CMA             /-1

        Ø666  745Ø              SNA             /FORWARD IS
        Ø667  7ØØ1              IAC             /+1
        Ø67Ø  1351              TAD PREBLK
        Ø671  7Ø41              CMA IAC
        Ø672  1Ø21              TAD BLKFND      /BLOCKS SEQUENTIAL
        Ø673  764Ø              SZA CLA
        Ø674  5747              JMP I SRCHER    /NO, ERROR

        Ø675  1352      SBCONS, TAD TAPONT
        Ø676  7Ø41              CMA IAC
        Ø677  1Ø21              TAD BLKFND
        Ø7ØØ  745Ø              SNA             /FIND BLOCK YET
        Ø7Ø1  5656              JMP I SRCNCK    /YES, TA OR EXIT
        Ø7Ø2  2256              ISZ SRCNCK      /STEP ADDRS
        Ø7Ø3  71ØØ              CLL
        Ø7Ø4  771Ø              SPA CLA
        Ø7Ø5  712Ø              STL             /L=1 IS BLK FND LESS
        Ø7Ø6  6761              IOT 761
        Ø7Ø7  Ø1Ø2              AND KØ4ØØ
        Ø71Ø  764Ø              SZA CLA         /FORWARD
        Ø711  5317              JMP .+6         /NO BACKWARD
        Ø712  743Ø              SZL             /FORWARD AND BLKFND
        Ø713  2256              ISZ SRCNCK      /LESS IS NOT THERE YET
        Ø714  1Ø21              TAD BLKFND
        Ø715  3351              DCA PREBLK
        Ø716  5656              JMP I SRCNCK
        Ø717  742Ø              SNL             /BACKWARD AND BLKFND
        0720  2256             ISZ SRCNCK      /LESS IS GONE PAST
        0721  5314             JMP .-5


        0722  6772     SREZTS, IOT 772
        0723  0110             AND EZBIT
        0724  7650             SNA CLA
        0725  5747             JMP I SRCHER    /NOT END ZONE, ERROR
        0726  1352             TAD TAPONT
        0727  7510             SPA

        0730  5334             JMP .+4         /BLOCK 0 OR 1
        0731  1126             TAD K5076
        0732  7710             SPA CLA         /BLOCK 2700 OR 2701
        0733  5343             JMP .+10
        0734  7200             CLA
        0735  1075             TAD K0200
        0736  6764             IOT 764         /SET MOTION
        0737  4440             JMS I WAITI     /WAIT FOR EZ AGAIN
        0740  5000             5000
        0741  5747             JMP I SRCHER
        0742  5235             JMP SRTAFN      /DO TURN AROUND
        0743  1350             TAD BLKFLG      /IF EZ WAS
        0744  7700             SMA CLA         /FIRST INT WAS VALID
        0745  5747             JMP I SRCHER    /IF NOT FIRS IS INVALID
        0746  5235             JMP SRTAFN
        0747  1000     SRCHER, SRHERR
        0750  0000     BLKFLG, 0
        0751  0000     PREBLK, 0
        0752  0000     TAPONT, 0


               /SEARCH ERROR TYPEOUT

              1000     *1000
        1000  4444     SRHERR, JMS I ERRSTP
        1001  4452             JMS I SRCHTY
        1002  1026             TAD RECRDK
        1003  4451             JMS I TYPCON    /TYPE BLOCK SEARCHED
        1004  4456             JMS I TYPTEX
        1005  0042             42
        1006  5457             5457
        1007  4353             4353
        1010  0067             67
        1011  4156             4156
        1012  6445             6445
        1013  4400             4400
        1014  7700             7700
        1015  1114             TAD DIRFLG
        1016  7650             SNA CLA
        1017  5222             JMP .+3
        1020  4675             JMS I BACKTY
        1021  7410             SKP
        1022  4676             JMS I FORDTY
        1023  1025             TAD IDCON
        1Ø24  4451             JMS I TYPCON    /TYPE BLOCK FOUND
        1Ø25  4456             JMS I TYPTEX
        1Ø26  ØØ42             42
        1Ø27  5457             5457
        1Ø3Ø  4353             4353


        1Ø31  ØØ46             46
        1Ø32  5765             5765
        1Ø33  5644             5644
        1Ø34  77ØØ             77ØØ
        1Ø35  7Ø4Ø             CMA
        1Ø36  1671             TAD I SEKONS    /BLKFLG
        1Ø37  771Ø             SPA CLA         /MORE THAN 1 BLOCK
        1Ø4Ø  5252             JMP .+12                /NO
        1Ø41  1272             TAD SEKONS+1    /PREBLK
        1Ø42  4451             JMS I TYPCON    /TYPE LAST BLOCK
        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 OF
        1Ø56  4456             JMS I TYPTEX    /BLKS NUM READ
        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 $BTYPE
        1Ø67  567Ø             JMP I .+1
        1Ø7Ø  Ø6Ø1             SEARCH+1
        1Ø71  Ø75Ø    SEKONS,  BLKFLG
        1Ø72  Ø751             PREBLK
        1Ø73  1Ø74             .+1
        1Ø74  ØØØØ             Ø
        1Ø75  1545    BACKTY,  TYBKW
        1Ø76  1555    FORDTY,  TYFWD
                      /
                      /ROUTINE TO DO STATIC CHECK ON
                      /STATUS REGISTER A BITS 1-3 AND 5-9
                      /AND STATUS B BITS 6-8
                      /
        1Ø77  ØØØØ    DTCHK,   Ø
        11ØØ  73ØØ             CLA CLL
        11Ø1  3133             DCA DTCNT               /ZERO PASS COUNTER
        11Ø2  734Ø             CLA CLL CMA
        11Ø3  4322             JMS PATCHK              /CHECK ALL ONES PATTERN
        1104  4322            JMS PATCHK              /CHECK ALL ZEROS PATTERN
        1105  1131            TAD K2525
        1106  4322            JMS PATCHK              /CHECK PATTERN 2525
        1107  1131            TAD K2525
        111Ø  7Ø4Ø            CMA
        1111  4322            JMS PATCHK              /CHECK PATTERN 5252
        1112  2133            ISZ DTCNT               /DO 4Ø96 TIMES
        1113  53Ø2            JMP DTCHK +3            /LOOP
        1114  1133            TAD DTCNT
        1115  4322            JMS PATCHK              /DO ALL COMBINATIONS
        1116  2133            ISZ DTCNT               /FROM Ø-7777
        1117  5314            JMP .-3
        112Ø  4537            JMS I XCHKB             /CHECK STATUS B BITS
        1121  5677            JMP I DTCHK             /EXIT TO OTHER TESTS
                      /
                      /PATTERN CHECKER
                      /
        1122  ØØØØ    PATCHK, Ø
        1123  Ø134            AND K7574               /BITS 4,1Ø, AND 11 NOT USED
        1124  3132            DCA DTSAV               /STORE PATTERN
        1125  1132            TAD DTSAV
        1126  6766            IOT 766                 /LOAD STATUS A
        1127  744Ø            SZA                     /IOT 766 SHOULD CLEAR AC
        113Ø  74Ø2            HLT                     /IOT 766 DID NOT CLEAR AC
        1131  6761            IOT 761                 /"OR" STATIS A TO AC
        1132  7Ø41            CIA                     /THIS IS THE GOOD STATUS ANSWER
        1133  1132            TAD DTSAV               /WAS DTSAV EQUAL TO STATUS A
        1134  744Ø            SZA                     /STATUS A OR AC FAILED
        1135  74Ø2            HLT
        1136  1132            TAD DTSAV
        1137  7Ø4Ø            CMA
        114Ø  6761            IOT 761                 /"OR" STATUS A TO AC
        1141  7Ø4Ø            CMA                     /AC SHOULD NOW BE ZEROS
        1142  744Ø            SZA                     /DID STATUS A "OR" TO ALL ONES
        1143  74Ø2            HLT                     /STATUS A OR AC FAILED
        1144  6764            IOT 764                 /"XOR" AC TO STATUS A
        1145  6761            IOT 761                 /"OR" STATUS A TO AC
        1146  7Ø41            CIA
        1147  1132            TAD DTSAV
        115Ø  744Ø            SZA                     /DID STATUS CHANGE
        1151  74Ø2            HLT                     /STATUS A OR AC FAILED
        1152  1132            TAD DTSAV
        1153  6764            IOT 764                 /CLEAR STATUS A WITH XOR
        1154  744Ø            SZA                     /IOT 764 SHOULD CLEAR AC
        1155  74Ø2            HLT                     /AC OR STATUS A FAILED
        1156  724Ø            CLA CMA
        1157  6761            IOT 761                 /OR STATUS A TO AC
        116Ø  7Ø4Ø            CMA
        1161  744Ø            SZA                     /WAS STATUS A ZERO
        1162  74Ø2            HLT                     /STATUS A OR AC FAILED
        1163  1132            TAD DTSAV
        1164  6766            IOT 766                 /LOAD STATUS A
        1165  6762            IOT 762                 /CLEAR STATUS A
        1166  6761            IOT 761                 /GET STATUS A
        1167  744Ø            SZA                     /DID IO 76? CLEAR STATUS A
```

111 111 111 111
[illegible] 011
000 000 000 100

Read [illegible]
111 [illegible] 1001
000 010 [illegible] 100

```
        117Ø  74Ø2          HLT                     /STATUS A OR AC FAILED
        1171  73ØØ          CLA CLL
        1172  5722          JMP I PATCHK            /EXIT PATTERN O.K.
                      /


                      /TYPE TEXT ROUTINE

              12ØØ    *12ØØ
        12ØØ  52ØØ    TYTEXT, JMP .
        12Ø1  72ØØ          CLA
        12Ø2  16ØØ          TAD I TYTEXT    /GET NEXT 2 CHARACTERS
        12Ø3  7Ø4Ø          CMA             /MAKE -
        12Ø4  33Ø7          DCA TXSTOR
        12Ø5  22ØØ          ISZ TYTEXT
        12Ø6  13Ø7          TAD TXSTOR
        12Ø7  744Ø          SZA             /CARRIAGE RETURN - LINE FEED
        121Ø  5213          JMP .+3         /NO

        1211  4242          JMS CRLFLF      /CR LF
        1212  52Ø1          JMP TYTEXT+1    /GET NEXT
        1213  ØØ7Ø          AND K77ØØ               /CLEAR TO UPR CHAR
        1214  745Ø          SNA             /END OF MESSAGE
        1215  56ØØ          JMP I TYTEXT    /YES
        1216  7Ø12          RTR             /MOVE
        1217  7Ø12          RTR             /OVER
        122Ø  7Ø12          RTR             /6 PLACES
        1221  423Ø          JMS TYCHAR      /OUTPUT
        1222  13Ø7          TAD TXSTOR
        1223  ØØ71          AND KØØ77
        1224  745Ø          SNA             /END OF MESSAGE
        1225  56ØØ          JMP I TYTEXT    /YES EXIT

        1226  423Ø          JMS TYCHAR      /OUTPUT
        1227  52Ø1          JMP TYTEXT+1    /GET NEXT 2

        123Ø  523Ø    TYCHAR, JMP .
        1231  7Ø4Ø          CMA             /MAKE + AGAIN
        1232  ØØ71          AND KØØ77               /CLEAR TO LOWER 6
        1233  1Ø72          TAD KØ24Ø               /MAKE ASCII
        1234  6Ø46          TLS             /OUTPUT
        1235  6Ø41          TSF             /WAIT FLAG
        1236  5235          JMP .-1
        1237  72ØØ          CLA
        124Ø  6Ø42          TCF             /CLEAR FLAG
        1241  563Ø          JMP I TYCHAR    /DO NEXT

        1242  5242    CRLFLF, JMP .
        1243  1257          TAD KØ215               /CARRIAGE RETURN
        1244  6Ø46          TLS
        1245  6Ø41          TSF
        1246  5245          JMP .-1
        1247  72ØØ          CLA
        125Ø  126Ø          TAD KØ212               /LINE FEED
        1251  6Ø46          TLS
        1252  6Ø41              TSF
        1253  5252              JMP .-1
        1254  6Ø42              TCF
        1255  72ØØ              CLA
        1256  5642              JMP I CRLFLF
        1257  Ø215     KØ215,   215
        126Ø  Ø212     KØ212,   212

                       /TYPE CONTENTS OF ADDRESS IN AC

        1261  5261     TYCONT,  JMP .
        1262  33Ø7              DCA TXSTOR      /SAVE ADDRESS
        1263  17Ø7              TAD I TXSTOR    /GET CONTENTS
        1264  33Ø7              DCA TXSTOR
        1265  4242              JMS CRLFLF      /CARRIAGE RETURN - LINE FEED
        1266  4273              JMS TYCOVR      /TYPE UPPER OCTAL
        1267  4273              JMS TYCOVR
        127Ø  4273              JMS TYCOVR
        1271  4273              JMS TYCOVR
        1272  5661              JMP I TYCONT

        1273  5273     TYCOVR,  JMP .
        1274  13Ø7              TAD TXSTOR
        1275  7ØØ6              RTL
        1276  7ØØ4              RAL
        1277  33Ø7              DCA TXSTOR
        13ØØ  13Ø7              TAD TXSTOR
        13Ø1  7ØØ4              RAL
        13Ø2  ØØ73              AND KØØØ7
        13Ø3  1Ø74              TAD KØØ2Ø
        13Ø4  7Ø4Ø              CMA             /MAKE - FOR
        13Ø5  423Ø              JMS TYCHAR      /OUTPUT
        13Ø6  5673              JMP I TYCOVR
        13Ø7  ØØØØ     TXSTOR,  Ø

                       /STOP TAPE ON ERROR, LEAVE FLAGS SET
        131Ø  531Ø     ERSTP,   JMP .
        1311  6761              IOT 761
        1312  ØØ75              AND KØ2ØØ
        1313  1Ø76              TAD KØØØ3
        1314  6764              IOT 764
        1315  571Ø              JMP I ERSTP
        1316  5316     TSTATB,  JMP .
        1317  6772              IOT 772
        132Ø  3331              DCA SBRECV
        1321  1332              TAD SBRECV+1
        1322  4451              JMS I TYPCON
        1323  4456              JMS I TYPTEX
        1324  ØØ63              63
        1325  6441              6441
        1326  64ØØ              64ØØ
        1327  4277              4277
        133Ø  5716              JMP I TSTATB
        1331  ØØØØ    SBRECV, Ø
        1332  1331            .-1

              14ØØ    *14ØØ
                      /TYPE MOVE AND DIRECTION
        14ØØ  52ØØ    TYMOVE, JMP .
        14Ø1  4311            JMS TYDRV
        14Ø2  4456            JMS I TYPTEX
        14Ø3  7777            7777
        14Ø4  5557            5557
        14Ø5  6645            6645
        14Ø6  ØØ77            ØØ77
        14Ø7  4336            JMS TYDIR
        141Ø  56ØØ            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  435Ø            435Ø
        142Ø  ØØ77            ØØ77
        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  426Ø            JMS TYREAD
        1427  4275            JMS TYDATA
        143Ø  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  426Ø            JMS TYREAD
        1436  43Ø3            JMS TYALL
        1437  4336            JMS TYDIR
        144Ø  4363            JMS TYMODE
        1441  5633            JMP I TYRALL

                      /TYPE WRITE DATA DIRECTION AND MODE
        1442  5242    TYWDAT, JMP .
        1443  4311            JMS TYDRV
        1444  4266            JMS TYWRIT
        1445  4275               JMS TYDATA
        1446  4336               JMS TYDIR
        1447  4363               JMS TYMODE
        145Ø  5642               JMP I TYWDAT


                        /TYPE WRITE ALL DIRECTION AND MODE
        1451  5251      TYWALL, JMP .
        1452  4311               JMS TYDRV
        1453  4266               JMS TYWRIT
        1454  43Ø3               JMS TYALL
        1455  4336               JMS TYDIR
        1456  4363               JMS TYMODE
        1457  5651               JMP I TYWALL


                        /TYPE READ
        146Ø  526Ø      TYREAD, JMP .
        1461  4456               JMS I TYPTEX
        1462  6245               6245
        1463  4144               4144
        1464  ØØ77               ØØ77
        1465  566Ø               JMP I TYREAD

                        /TYPE WRITE
        1466  5266      TYWRIT, JMP .
        1467  4456               JMS I TYPTEX
        147Ø  6762               6762
        1471  5164               5164
        1472  45ØØ               45ØØ
        1473  77ØØ               77ØØ
        1474  5666               JMP I TYWRIT


                        /TYPE DATA
        1475  5275      TYDATA, JMP .
        1476  4456               JMS I TYPTEX
        1477  4441               4441
        15ØØ  6441               6441
        15Ø1  ØØ77               ØØ77
        15Ø2  5675               JMP I TYDATA


                        /TYPE ALL
        15Ø3  53Ø3      TYALL,  JMP .
        15Ø4  4456               JMS I TYPTEX
        15Ø5  4154               4154
        15Ø6  54ØØ               54ØØ
        15Ø7  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  0077              0077
        1575  5763              JMP I TYMODE

                        PAUSE


                        /TC01 EXERCISER - TAPE 2
                        /BASIC MOTION TEST, DECIPHER KEYBOARD INPUT
                        /SETUP EXECUTE TABLE, START DO LOOP
                        /ON FIRST CHARACTER IF A(D)

              2000      *2000
        2000  4456      MVTEST, JMS I TYPTEX
        2001  7777              7777            /CR LF
        2002  7777              7777            /CR LF
        2003  7700              7700
        2004  1032              TAD BF1LOC              /SA OF EXECTUE TABLE
        2005  3010              DCA 10          /FOR INDIRECTS
        2006  1010              TAD 10
        2007  7001              IAC
        2010  3011              DCA 11          /FOR RESET ON RPT LOOP
        2011  7040              CMA
        2012  3013              DCA 13          /FOR 1ST D
        2013  1011              TAD 11
        2014  3012              DCA 12          /FOR RESET ON CHNG DRIVES
        2015  4240              JMS WAITIN      /WAIT FOR INPUT
        2016  4247              JMS MVEQUL
        2017  0304              304             /1ST IN = D
        2020  3013      MVREST, DCA 13          /0 TO CHAR COUNTER
        2021  4247              JMS MVEQUL
        2022  0306              306             /= F FORWARD
        2023  4247              JMS MVEQUL
        2024  0302              302             /= B BACKWARD
        2025  4247              JMS MVEQUL
        2026  0323              323             /= S STOP
        2027  4247              JMS MVEQUL
        2030  0303              303             /= C CHANGE
        2031  4247              JMS MVEQUL
        2032  0327              327             /= W WAIT
        2033  4247              JMS MVEQUL
        2034  0322              322             /= R REPEAT
        2035  4247              JMS MVEQUL
        2036  0304              304             /= D DO LOOP
        2037  5200              JMP MVTEST


                        /WAIT KEYBOARD INPUT
        2040  5240      WAITIN, JMP .
        2041  6031              KSF
        2042  5241              JMP .-1
        2043  6036              KRB
        2044  7041              CMA IAC
        2045  3014              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  77ØØ              77ØØ
        2126  5317              JMP MVGFWD+4


                    /TYPE STOP
        2127  4456  MVGSTP, JMS I TYPTEX
        213Ø  7777              7777
        2131  6364              6364
        2132  576Ø              576Ø
        2133  77ØØ              77ØØ
        2134  5317              JMP MVGFWD+4


                    /TYPE CHANGE
        2135  4456  MVGCHG, JMS I TYPTEX
        2136  7777              7777
        2137  435Ø              435Ø
        214Ø  4777              4777
        2141  1Ø12              TAD 12
        2142  341Ø              DCA I 1Ø                /PUT WHERE TO REPEAT
        2143  1Ø1Ø              TAD 1Ø          /FROM ON CHANGING DRIVES
        2144  7ØØ1              IAC
        2145  3Ø12              DCA 12
        2146  5317              JMP MVGFWD+4

                    /TYPE WAIT
        2147  4456  MVGWAT, JMS I TYPTEX
        215Ø  7777              7777
        2151  6741              6741
        2152  5164              5164
        2153  ØØ77              ØØ77
        2154  4772              JMS I GET4IN    /GET WAIT CONSTANT
        2155  5317              JMP MVGFWD+4


                    /TYPE REPEAT
        2156  4456  MVGRPT, JMS I TYPTEX
        2157  7777              7777
        216Ø  626Ø              626Ø
        2161  64ØØ              64ØØ
        2162  ØØ77              ØØ77
        2163  4772              JMS I GET4IN    /GET REPEAT CONSTANT
        2164  1Ø11              TAD 11          /GET REPEAT FROM ADDRESS
        2165  341Ø              DCA I 1Ø                /TO EXECUTE TABLE
        2166  1Ø1Ø              TAD 1Ø
        2167  7ØØ1              IAC
        217Ø  3Ø11              DCA 11          /FOR NEXT REPEAT
        2171  5317              JMP MVGFWD+4

        2172  231Ø  GET4IN, GETMIN          /TO GET 4 CHARACTERS


                    /DO LOOP, EXECUTE SELECTED SEQUENCE
```

```
            22ØØ     *22ØØ
      22ØØ  4456     DOLOOP, JMS I TYPTEX    /TYPE DO
      22Ø1  7777             7777
      22Ø2  4457             4457
      22Ø3  7777             7777
      22Ø4  77ØØ             77ØØ
      22Ø5  1Ø32             TAD BFILOC              /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 .                                                   0075 = 0200
      2217  1Ø75             TAD KØ2ØØ               /MOVE TAPE FORWARD              0060 = 0000
      222Ø  1Ø6Ø             TAD UNFUNC      /+ DRIVE NUMBER                  JMS MVWAIT = 4246
      2221  6766             IOT 766
      2222  5616             JMP I MVFWD

                     /START BACKWARD MOTION
      2223  5223     MVBKWD, JMP .                                                   2344 = 0600
      2224  1344             TAD KØ6ØØ               /MOVE BACKWARD                  2345 = 7000
      2225  1Ø6Ø             TAD UNFUNC      /+ DRIVE NUMBER                  JMS MVWAIT = 4246
      2226  6766             IOT 766
      2227  5623             JMP I MVBKWD
                                                                             .7402
                     /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                                 7402
      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
 231Ø  531Ø    GETMIN, JMP .
 2311  72Ø1            CLA IAC          /+1 WHEN L=1 GOT 4
 2312  3Ø13            DCA 13
 2313  6Ø31            KSF              /WAIT KEYBOARD
 2314  5313            JMP .-1
 2315  6Ø36            KRB              /READ KEYBOARD
 2316  6Ø46            TLS              /OUTPUT
 2317  6Ø41            TSF
```

```
        2320  5317           JMP .-1
        2321  7040           CMA              /MAKE -
        2322  ØØ73           AND KØØØ7                /OCTAL
        2323  3014           DCA 14
        2324  1013           TAD 13           /MOVE 1 CHARACTER
        2325  7104           CLL RAL
        2326  7006           RTL
        2327  1014           TAD 14           /ASSEMBLE
        233Ø  3013           DCA 13
        2331  742Ø           SNL              /SKIP - DONE 4
        2332  5313           JMP GETMIN+3     /NOT 4 YET
        2333  1013           TAD 13
        2334  7001           IAC              /MAKE 2'S COMPLEMENT
        2335  745Ø           SNA
        2336  7040           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 Ø FORWARD
                       /VERIFY BLOCKS ØØØØ TO 27Ø1 THEN REVERSE

              24ØØ     *24ØØ
        24ØØ  4436     SRCH1, JMS I REWIND
        24Ø1  4436            JMS I REWIND     /INTO EZ TWICE
        24Ø2  3114            DCA DIRFLG
        24Ø3  3Ø2Ø            DCA RECORD       /RECORD Ø
        24Ø4  4435            JMS I SRCHIT     /FIND IT
        24Ø5  5221            JMP SCH1ST       /YES
        24Ø6  4444            JMS I ERRSTP             /NO
        24Ø7  4452            JMS I SRCHTY
        241Ø  1Ø26            TAD RECRDK               /BLOCK LOOKED FOR
        2411  4451            JMS I TYPCON
        2412  1Ø25            TAD IDCON                /BLOCK FOUND
        2413  4451            JMS I TYPCON
        2414  6772            IOT 772          /RD STAT B
        2415  3Ø21            DCA BLKFND
        2416  1Ø25            TAD IDCON
        2417  4451            JMS I TYPCON     /TYPE STAT B
        242Ø  52Ø2            JMP SRCH1+2

        2421  3422     SCH1ST, DCA I POSITN    /FOUND Ø
        2422  3423            DCA I DIRECT     /FORWARD
        2423  2Ø2Ø            ISZ RECORD       /RECORD LOOKED FOR +1
        2424  7Ø4Ø            CMA
        2425  3427            DCA I WCLOC      /SET WC TO -1
        2426  6764            IOT 764          /SET WC ENABLES
        2427  444Ø            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  5262              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  5254              JMP .+4         /NO
        2451  4536              JMS I XCHKGO    /CHECK GO BIT IF BLOCK 200-2000
        2452  2422              ISZ I POSITN    /NEW POSITION
        2453  5223              JMP SCH1ST+2    /TEST NEXT BLOCK
        2454  4366              JMS SIERRO


        2455  2422              ISZ I POSITN
        2456  2020              ISZ RECORD
        2457  4435              JMS I SRCHIT    /RESYNC ON NEXT BLOCK
        2460  5244              JMP SCH1OK             /FOUND OK
        2461  5233              JMP SCH1ER      /TEST FOR END ZONE
        2462  4437      SCH1ND, JMS I NEWDRV
        2463  5202              JMP SRCH1+2     /RPT NEXT DRIVE
        2464  7040              CMA
        2465  3020              DCA RECORD
        2466  1125              TAD K0204
        2467  1060              TAD UNFUNC
        2470  6766              IOT 766         /MOVE DRIVE INTO EZ
        2471  4440              JMS I WAITI
        2472  5001              5001
        2473  7000              NOP
        2474  4437              JMS I NEWDRV
        2475  5266              JMP SCH1ND+4
        2476  2020              ISZ RECORD             /DONE ALL TWICE
        2477  7410              SKP             /YES

        2500  5266              JMP SCH1ND+4    /MAKE 2ND MOVE INTO EZ
        2501  1100      SRCH2,  TAD K2701
        2502  3020              DCA RECORD
        2503  1101              TAD K0614              /SRCH BACKWARD
        2504  1060              TAD UNFUNC             /+ DRIVE NUMBER
        2505  6766              IOT 766
        2506  7040              CMA
        2507  3427              DCA I WCLOC
        2510  4440              JMS I WAITI
        2511  0001              1
        2512  7410              SKP
        2513  5326              JMP SCH2OK
        2514  4366    SCH2ER,   JMS SIERRO
        2515  7240              CLA CMA
        2516  1020              TAD RECORD
        2517  3020              DCA RECORD
        2520  1020              TAD RECORD
        2521  7710              SPA CLA
        2522  5357              JMP SIERRO-7
        2523  7040              CMA
        2524  3114              DCA DIRFLG
        2525  4435              JMS I SRCHIT

        2526  1020    SCH2OK,   TAD RECORD       /BLOCK LOOKED FOR
        2527  7041              CMA IAC          /MAKE -
        2530  1021              TAD BLKFND       /+ BLOCK FOUND
        2531  7640              SZA CLA          /RIGHT ONE
        2532  5314              JMP SCH2ER       /NO
        2533  6764              IOT 764          /RESET WC ENABLE
        2534  7040              CMA
        2535  3427              DCA I WCLOC
        2536  1020              TAD RECORD       /LAST BLOCK -1
        2537  3422              DCA I POSITN
        2540  7040              CMA
        2541  1020              TAD RECORD
        2542  3020              DCA RECORD
        2543  4440              JMS I WAITI
        2544  0001              1
        2545  7410              SKP
        2546  5326              JMP SCH2OK       /STATUS WAS NORMAL
        2547  6772              IOT 772          /READ STATB
        2550  0110              AND EZBIT
        2551  7650              SNA CLA          /EZ INT
        2552  5314              JMP SCH2ER       /NO, ERROR
        2553  1020              TAD RECORD
        2554  7040              CMA
        2555  7640              SZA CLA          /EXPECT END ZONE
        2556  5314              JMP SCH2ER               /NO, ERROR
        2557  4437              JMS I NEWDRV     /GET NEXT DRIVE
        2560  5301              JMP SRCH2                /REPEAT
        2561  7604              CLA OSR
        2562  7010              RAR
        2563  7620              SNL CLA          /REPEAT TEST
        2564  7402              HLT              /NO, HALT
        2565  5200              JMP SRCH1                /START OVER
        2566  5366    SIERRO,   JMP .
        2567  4444              JMS I ERRSTP
        2570  4452              JMS I SRCHTY
        2571  1026              TAD RECRDK
        2572  4451              JMS I TYPCON
        2573  1025              TAD IDCON
        2574  4451              JMS I TYPCON
        2575  4447              JMS I SBTYPE
        2576  5766              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
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  1Ø21              TAD BLKFND
2647  341Ø              DCA I 1Ø                /STORE BLOCK NUMBER
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        265Ø  2Ø11              ISZ 11
        2651  741Ø              SKP
        2652  572Ø              JMP I SER2AI    /DONE 129
        2653  6764              IOT 764         /RESET WCE
        2654  5237              JMP SER2ST      /REPT

        2655  6772      SEREZ,  IOT 772         /READ B
        2656  Ø11Ø              AND EZBIT
        2657  764Ø              SZA CLA         /END ZONE
        266Ø  5274              JMP SER2NZ      /YES
        2661  6772              IOT 772
        2662  3Ø2Ø              DCA RECORD              /TYPE STATUS B
        2663  1Ø26              TAD RECRDK
        2664  4451              JMS I TYPCON
        2665  4456              JMS I TYPTEX
        2666  ØØ63              ØØ63
        2667  6441              6441
        267Ø  64ØØ              64ØØ
        2671  4277              4277
        2672  52ØØ              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 BLOCKS
        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
        2730  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
                        /
                        /ROUTINE TO CHECK GO BIT
                        /
        2744  ØØØØ      CHKGO,  Ø
        2745  73ØØ              CLA CLL
        2746  1Ø21              TAD BLKFND              /GET BLOCK READ
        2747  1142              TAD K5ØØØ
        275Ø  763Ø              SZL CLA                 /WAS IT GREATER THAN BLOCK 2ØØØ
        2751  5744              JMP I CHKGO             /YES EXIT
        2752  1Ø21              TAD BLKFND              /GET BLOCK READ
        2753  1141              TAD Z76ØØ
        2754  762Ø              SNL CLA                 /WAS IT LESS THAN Ø2ØØ
        2755  5744              JMP I CHKGO             /YES EXIT
        2756  6761              IOT 761                 /GET GO BIT
        2757  ØØ75              AND KØ2ØØ               /MASK GO BIT
        276Ø  765Ø              SNA CLA                 /WAS GO BIT SET
        2761  74Ø2              HLT                     /STATUS A OR GO BIT FAILED
        2762  5744              JMP I CHKGO             /EXIT GO BIT O.K.
                        /


                        /REST OF SEARCH ROUTINE 2

              3ØØØ      *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 BLOCKS 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 BLOCK
        3Ø14  1Ø12              TAD 12
        3Ø15  4451              JMS I TYPCON    /TYPE FIRST
        3Ø16  4456              JMS I TYPTEX    /BLOCK NO READ
        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 OTHERS
        3Ø4Ø  741Ø             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 ALL


        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
        3103  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

              32ØØ      *32ØØ

        32ØØ  4436      SSTRNA, JMS I REWIND
        32Ø1  4436              JMS I REWIND    /MOVE INTO EZ 2
        32Ø2  4441              JMS I WTHALF    /WAIT HALF SECOND
        32Ø3  4443              JMS I SAVPAD


                /TEST TURN AROUND ON BLOCK Ø FIND 1 FWD
        32Ø4  72Ø1              CLA IAC
        32Ø5  3Ø2Ø              DCA RECORD
        32Ø6  4454              JMS I SSTFWD    /FIND BLOCK 1 FWD
        32Ø7  5214              JMP GBKW1
        321Ø  4366      SSTER1, JMS EZERR
        3211  7000            NOP
        3212  4453            JMS I ERSSTA
        3213  5204            JMP .-7


                      /TURN AROUND FIND 0 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 0 FWD
        3224  5211            JMP SSTER1+1
        3225  3422            DCA I POSITN
        3226  7040            CMA
        3227  3423            DCA I DIRECT
        3230  1065            TAD K0604
        3231  1060            TAD UNFUNC
        3232  6766            IOT 766
        3233  4440            JMS I WAITI
        3234  5001            5001
        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 K0200
        3250  6764            IOT 764
        3251  4437            JMS I NEWDRV
        3252  5204            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  1104            TAD SFAFK
        3257  3020            DCA RECORD
        3260  4454            JMS I SSTFWD
        3261  5267            JMP SSTA1A
        3262  5666            JMP I .+4
        3263  7000            NOP
        3264  4453            JMS I ERSSTA
        3265  5254            JMP SSTAN1
        3266  3437            SSTAEZ

        3267  1020    SSTA1A, TAD RECORD
        3270  3422            DCA I POSITN
        3271  3423            DCA I DIRECT
        3272  1075            TAD K0200
        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
        3300  1422            TAD I POSITN
        3301  1107            TAD SBAFK
        3302  3020            DCA RECORD
        3303  4455            JMS I SSTBKW
        3304  5311            JMP SSTA2A
        3305  4366            JMS EZERR
        3306  7000            NOP
        3307  4453            JMS I ERSSTA
        3310  5277            JMP SSTAN2
        3311  1020    SSTA2A, TAD RECORD
        3312  3422            DCA I POSITN
        3313  7040            CMA
        3314  3423            DCA I DIRECT
        3315  1075            TAD K0200
        3316  6764            IOT 764
        3317  4437            JMS I NEWDRV
        3320  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  1105            TAD SFABK
        3325  3020            DCA RECORD
        3326  4454            JMS I SSTFWD
        3327  5334            JMP SSTA3A
        3330  4366            JMS EZERR
        3331  7000            NOP

                      /THEN TEST FORWARD TO BACKWARD TURN AROUND
        3332  4453            JMS I ERSSTA
        3333  5322            JMP SSTAN3
        3334  1020    SSTA3A, TAD RECORD
        3335  3422            DCA I POSITN
        3336  3423            DCA I DIRECT
        3337  7040            CMA
        3340  3427            DCA I WCLOC
        3341  6764            IOT 764
        3342  4440            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    *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
        341Ø  4453            JMS I ERSSTA
        3411  52ØØ            JMP SSTAN4
        3412  1Ø2Ø    SSTA4A, TAD RECORD
        3413  3422            DCA I POSITN
        3414  7Ø4Ø            CMA
        3415  3423            DCA I DIRECT
        3416  2Ø2Ø            ISZ RECORD
        3417  4454            JMS I SSTFWD
        342Ø  5224            JMP SSTA4B

        3421  52Ø6            JMP SSTAN4+6
        3422  7ØØØ            NOP
        3423  52Ø7            JMP SSTAN4+7
        3424  1Ø2Ø    SSTA4B, TAD RECORD
        3425  3422            DCA I POSITN
        3426  3423            DCA I DIRECT
        3427  1Ø75            TAD KØ2ØØ
        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 2701

        3437  1020      SSTAEZ, TAD RECORD
        3440  1077              TAD K5077
        3441  7500              SMA             /DONE TO END ZONE
        3442  5245              JMP .+3         /YES
        3443  5644              JMP I .+1               /FALSE END ZONE
        3444  3264              SSTAN1+10
        3445  4437              JMS I NEWDRV    /RESET TO FIRST DRV
        3446  5245              JMP .-1

                        /MOVE ALL DRIVES INTO END ZONE
        3447  7040              CMA
        3450  3020              DCA RECORD      /TO COUNT TWO EZ PASSES
        3451  1125              TAD K0204
        3452  1060              TAD UNFUNC
        3453  6766              IOT 766
        3454  4440              JMS I WAITI
        3455  5001              5001
        3456  7000              NOP             /IGNORE OTHER INTERRUPTS
        3457  7040              CMA
        3460  3422              DCA I POSITN
        3461  3423              DCA I DIRECT
        3462  4437              JMS I NEWDRV
        3463  5254              JMP .-7
        3464  2020              ISZ RECORD      /2 PASSES
        3465  7410              SKP             /YES
        3466  5263              JMP .-3
        3467  4441              JMS I WTHALF
        3470  1340      SSTEZA, TAD K2700
        3471  3020              DCA RECORD
        3472  4443      JMS I SAVPAD
        3473  4455              JMS I SSTBKW    /GO BACKWARD TO 2700


        3474  5301              JMP SSTEZ1      /REACHED 2700 OK
        3475  7000              NOP
        3476  7000              NOP
        3477  4453              JMS I ERSSTA
        3500  5270              JMP SSTEZA
        3501  1020      SSTEZ1, TAD RECORD
        3502  3422              DCA I POSITN    /BLOCK 2700
        3503  7040              CMA             /BACKWARD
        3504  3423              DCA I DIRECT
        35Ø5  2Ø2Ø              ISZ RECORD      /27ØØ TO 27Ø1
        35Ø6  4454              JMS I SSTFWD    /FIND 27Ø1 FORWARD
        35Ø7  5313              JMP .+4         /OK


        351Ø  4636              JMS I EZERRA    /EZ INT, ERROR
        3511  7ØØØ              NOP
        3512  5274              JMP SSTEZA+4
        3513  1125              TAD KØ2Ø4
        3514  1Ø6Ø              TAD UNFUNC
        3515  6766              IOT 766
        3516  444Ø              JMS I WAITI     /WAIT FOR EZ
        3517  5ØØ1              5ØØ1
        352Ø  7ØØØ              NOP
        3521  4455              JMS I SSTBKW    /FIND 27Ø1 BACKWARD
        3522  5326              JMP .+4         /OK

        3523  7ØØØ              NOP
        3524  7ØØØ              NOP
        3525  5274              JMP SSTEZA+4
        3526  1Ø75              TAD KØ2ØØ
        3527  6764              IOT 764
        353Ø  4437              JMS I NEWDRV    /TESTED ALL DRIVES
        3531  5335              JMP .+4         /NO
        3532  76Ø4              CLA OSR
        3533  7ØØ6              RTL
        3534  742Ø              SNL             /DELETE END OF TEST HALT

        3535  74Ø2              HLT             /HLT END OF TEST
        3536  5737              JMP I .+1               /REPEAT TEST
        3537  32Ø1              SSTRNA+1
        354Ø  27ØØ      K27ØØ,  27ØØ


                        /START STOP TURN AROUND TEST
                        /SEARCH FORWARD ROUTINE

              36ØØ      *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  745Ø              SNA             /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
        3702  5257              JMP SSTABW+6
        3703  6772      SSTBSE, IOT 772
        3704  Ø11Ø              AND EZBIT
        3705  765Ø              SNA CLA
        3706  2251              ISZ SSTABW
        3707  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  7604                CLA OSR
        3764  7012                RTR
        3765  7620                SNL CLA         /STOP ON ERROR
        3766  7402                HLT             /YES    .
        3767  5722                JMP I BNOTCN
        3770  0000        BLOCKK, 0
        3771  0000                0
        3772  3771                .-1

        3773  3770                .-3


                          /START STOP TURN AROUND TEST
                          /ERROR TYPE OUT AND RESYNC ROUTINE
              4000        *4000

        4000  5200        SSTAER, JMP .
        4001  4444                JMS I ERRSTP    /STOP TAPE L8 STATB
        4002  4452                JMS I SRCHTY    /TYPE SEARCH
        4003  1422                TAD I POSITN
        4004  7040                CMA
        4005  7640                SZA CLA         /TAPE WAS WHERE
        4006  5211                JMP .+3         /NOT END ZONE
        4007  4267                JMS EZTYPE              /TYPE END ZONE
        4010  5213                JMP .+3
        4011  1022                TAD POSITN
        4012  4451                JMS I TYPCON    /TYPE LAST BLOCK
        4013  1423                TAD I DIRECT
        4014  7640                SZA CLA         /DIRECTION WAS
        4015  5220                JMP .+3         /BACKWARD
        4016  4711                JMS I FWDTYP    /TYPE FORWARD
        4017  5221                JMP .+2
        4020  4710                JMS I BKWTYP    /TYPE BACKWARD
        4021  4456                JMS I TYPTEX    /TYPE (LAST POS)
        4022  0054                0054
        4023  4163                4163
        4024  6400                6400
        4025  6057                6057
        4026  6377                6377
        4027  1026                TAD RECRDK
        4030  4451                JMS I TYPCON    /TYPE BLOCK1 LOOKED FOR
        4031  4456                JMS I TYPTEX    /TYPE (SEARCHED)   .
        4032  0063                0063
        4033  4541                4541
        4034  6243                6243
        4035  5045                5045
        4036  4477                4477
        4037  1021                TAD BLKFND
        4040  7040                CMA
        4041  7640                SZA CLA         /WAS A BLOCK NUMBER
        4042  5245                JMP .+3         /YES
        4043  4267                JMS EZTYPE              /TYPE END ZONE
        4044  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

              42ØØ      *42ØØ

        42ØØ  52ØØ      RESYNC, JMP .
        42Ø1  1111              TAD POSSAV
        42Ø2  7Ø4Ø              CMA
        42Ø3  765Ø              SNA CLA
        42Ø4  5354              JMP RESYEZ
        42Ø5  1112              TAD DIRSAV
        42Ø6  764Ø              SZA CLA
        4207  5276            JMP RESBKW
        421Ø  1101            TAD KØ614               /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  ØØØ1            1
        4217  526Ø            JMP RESFEZ
        422Ø  1Ø21            TAD BLKFND
        4221  7Ø41            CMA IAC
        4222  1111            TAD POSSAV
        4223  1374            TAD K7772
        4224  77ØØ            SMA CLA
        4225  5231            JMP .+4
        4226  72ØØ            CLA
        4227  6764            IOT 764
        423Ø  5213            JMP RESFWD
        4231  11Ø2            TAD KØ4ØØ
        4232  6764    RESFWF, IOT 764
        4233  7Ø4Ø            CMA
        4234  3427            DCA I WCLOC
        4235  444Ø            JMS I WAITI
        4236  ØØØ1            1
        4237  52Ø1            JMP RESYNC+1
        424Ø  1111            TAD POSSAV
        4241  7Ø41            CMA IAC
        4242  1Ø21            TAD BLKFND
        4243  745Ø            SNA
        4244  525Ø            JMP .+4
        4245  771Ø            SPA CLA
        4246  5232            JMP RESFWF
        4247  52Ø1            JMP RESYNC+1


        425Ø  1Ø75    RESXIT, TAD KØ2ØØ               /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  56ØØ            JMP I RESYNC

        426Ø  6772    RESFEZ, IOT 772
        4261  Ø11Ø            AND EZBIT
        4262  765Ø            SNA CLA         /END ZONE
        4263  52Ø1            JMP RESYNC+1    /NO, SOME OTHER, RESYNC
        4264  1Ø65            TAD KØ6Ø4
        4265  1Ø6Ø            TAD UNFUNC
        4266  6766            IOT 766         /MOVE FARTHER
        4267  444Ø            JMS I WAITI     /INTO EZ
        427Ø  5ØØ1            5ØØ1
        4271  5264            JMP .-5
        4272  11Ø3            TAD KØ214
        4273  1Ø6Ø             TAD UNFUNC
        4274  6766             IOT 766       /NOW START FORWARD
        4275  5233             JMP RESFWF+1

        4276  11Ø3      RESBKW, TAD KØ214            /TO RESYNC BKWD
        4277  1Ø6Ø             TAD UNFUNC           /TAPE MUST FIRST
        43ØØ  6766             IOT 766       /GO FORWARD
        43Ø1  7Ø4Ø             CMA
        43Ø2  3427             DCA I WCLOC
        43Ø3  444Ø             JMS I WAITI
        43Ø4  ØØØ1             1
        43Ø5  5336             JMP RESBEZ    /TEST FOR END ZONE
        43Ø6  1373             TAD KØØØ6
        43Ø7  1111             TAD POSSAV
        431Ø  7Ø41             CMA IAC
        4311  1Ø21             TAD BLKFND
        4312  77ØØ             SMA CLA       /REACH POSITION +6 YET
        4313  5317             JMP .+4       /YES
        4314  72ØØ             CLA
        4315  6764             IOT 764       /GO FORWARD MORE
        4316  53Ø1             JMP RESBKW+3
        4317  11Ø2             TAD KØ4ØØ            /CHANGE TO BACKWARD
        432Ø  6764      RESBKB, IOT 764
        4321  7Ø4Ø             CMA
        4322  3427             DCA I WCLOC
        4323  444Ø             JMS I WAITI
        4324  ØØØ1             1
        4325  52Ø1             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
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
44Ø5  3363              DCA TEMP1               /ADDRESS TO GET
44Ø6  1763              TAD I TEMP1     /ROUTINE ADDRESS
44Ø7  3363              DCA TEMP1
441Ø  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
        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  5636              JMP I GNPAT6
        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
        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

        51Ø7  4456  COERR1, JMS I TYPTEX    /LINE FEED TO
        511Ø  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
        5120  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
              ØØ44      STPERR=ERRSTP


        516Ø  457Ø              PATNUM
        5161  136Ø      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
        517Ø  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    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  ØØ42              42
        5257  5457              5457
        526Ø  4353              4353
        5261  77ØØ              77ØØ
        5262  4447              JMS I SBTYPE
        5263  1Ø27              TAD WCLOC
        5264  4451              JMS I TYPCON    /TYPE WHATS LEFT OF WC
        5265  4456              JMS I TYPTEX
        5266  ØØ67              67
        5267  1643              1643
        527Ø  1677              1677
        5271  4435              JMS I SRCHIT
        5272  1115              TAD KØØ5Ø
        5273  6764              IOT 764

        5274  1Ø32              TAD BF1LOC
        5275  343Ø              DCA I CALOC
        5276  1Ø64              TAD K7577
        5277  3427              DCA I WCLOC
        53ØØ  52Ø1              JMP WRTSWS+1

        53Ø1  1Ø2Ø      WRTEZA, TAD RECORD
        53Ø2  1126              TAD K5Ø76
        53Ø3  765Ø              SNA CLA
        53Ø4  531Ø              JMP .+4
        53Ø5  1Ø2Ø              TAD RECORD
        53Ø6  77ØØ              SMA CLA
        53Ø7  5241              JMP WRTEZT+4
        531Ø  22ØØ              ISZ WRTSWS
        5311  56ØØ              JMP I WRTSWS

        5312  1Ø2Ø      WRT32,  TAD RECORD
        5313  3422              DCA I POSITN
        5314  1Ø2Ø              TAD RECORD
        5315  1113              TAD BLKINC
        5316  3Ø2Ø              DCA RECORD
        5317  1114              TAD DIRFLG
        532Ø  7Ø41              CMA IAC
        5321  1Ø2Ø              TAD RECORD
        5322  Ø127              AND KØØ37
        5323  764Ø              SZA CLA
        5324  5226              JMP WRTSWA
        5325  1Ø75              TAD KØ2ØØ
        5326  6764              IOT 764
        5327  22ØØ              ISZ WRTSWS
        533Ø  5226              JMP WRTSWA
                        /
                        /RUOTINE TO CHECK STATUS B BITS 6-8
                        /
        5331  ØØØØ      CHKB,   Ø
        5332  734Ø              CLA CLL CMA
        5333  4352              JMS GOB                 /CHECK PATTERN 7777
        5334  4352              JMS GOB                 /CHECK PATTERN ØØØØ
        5335  1131              TAD K2525
        5336  4352              JMS GOB                 /CHECK PATTERN 2525
        5337  1131              TAD K2525
        5340  7040              CMA
        5341  4352              JMS GOB                 /CHECK PATTERN 5252
        5342  2133              ISZ DTCNT               /DO 4Ø96 TIMES
        5343  5332              JMP CHKB +1             .
        5344  1133              TAD DTCNT
        5345  4352              JMS GOB                 /DO ALL COMBINATIONS
        5346  2133              ISZ DTCNT
        5347  5344              JMP .-3
        535Ø  73ØØ              CLA CLL
        5351  5731              JMP I CHKB              /EXIT STATUS B O.K.
                        /
        5352  ØØØØ      GOB,    Ø
        5353  Ø14Ø              AND KØØ7Ø
        5354  3132              DCA DTSAV
        5355  1132              TAD DTSAV
        5356  6774              IOT 774                 /LOAD STATUS B
        5357  744Ø              SZA                     /DID IOT 774 CLEAR AC
        536Ø  74Ø2              HLT                     /IOT 774 DID NOT CLEAR AC
        5361  6772              IOT 772                 /GET STATUS B
        5362  Ø14Ø              AND KØØ7Ø               /MASK 6-8
        5363  7Ø41              CIA
        5364  1132              TAD DTSAV               /THIS IS THE GOOD STATUS WORD
        5365  744Ø              SZA                     /WAS STATUS B O.K.
        5366  74Ø2              HLT                     /STATUS B OR AC FAILED
        5367  724Ø              CLA CMA
        537Ø  6772              IOT 772                 /GET STATUS B
        5371  7Ø4Ø              CMA
        5372  744Ø              SZA                     /DID OR WORK
        5373  74Ø2              HLT                     /STATUS B OR AC FAILED
        5374  5752              JMP I GOB               /EXIT PATTERN O.K.
                        /


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

              54ØØ      *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
        5502  6761    RDSERR, IOT 761
        5503  ØØ75            AND KØ2ØØ
        5504  765Ø            SNA CLA
        5505  5312            JMP .+5
        5506  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
        16ØØ  76Ø4    WRSCOP, LAS
        16Ø1  ØØ73            AND KØØØ7
        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 764 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 KØ22Ø               /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 22Ø 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  11Ø3  SRSCOP, TAD KØ214               /SEARCH
        1735  1Ø6Ø          TAD UNFUNC              /+ DRIVE
        1736  6766          IOT 766
        1737  744Ø          SZA
        174Ø  74Ø2          HLT             /IOT 764 DID NOT CLEAR AC
        1741  1377          TAD K35ØØ
        1742  3Ø1Ø          DCA 1Ø
        1743  1Ø31          TAD BF1WD1
        1744  343Ø          DCA I CALOC
        1745  1431          TAD I BF1WD1    /DISPLAY BLOCK
        1746  2Ø1Ø          ISZ 1Ø          /WAIT 1 BLOCK
        1747  5346          JMP .-1         /APPROX
        175Ø  72ØØ          CLA
        1751  6772          IOT 772
        1752  Ø374          AND K1ØØØ               /READ B
        1753  764Ø          SZA CLA         /END ZONE
        1754  5362          JMP .+6         /YES REVERSE
        1755  6761          IOT 761
        1756  7Ø4Ø          CMA             /IN CASE GO=Ø
        1757  ØØ75          AND KØ2ØØ
        176Ø  6764          IOT 764
        1761  5337          JMP SRSCOP+3
        1762  6761          IOT 761
        1763  ØØ75          AND KØ2ØØ
        1764  764Ø          SZA CLA
        1765  74Ø2          HLT             /EZ DID NOT ZERO MOTION
        1766  1373          TAD KØ6ØØA
        1767  536Ø          JMP .-7         /COMPLEMENT DIRECTION

        177Ø  ØØØØ  TEMPY,  Ø
        1771  4724  PATTBA, PTABLE
        1772  Ø22Ø     KØ22Ø,  22Ø
        1773  Ø6ØØ     KØ6ØØA, 6ØØ
        1774  1ØØØ     K1ØØØ,  1ØØØ
        1775  773Ø     K773Ø,  773Ø
        1776  ØØ52     KØØ52,  52
        1777  35ØØ     K35ØØ,  35ØØ


                       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
        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 WCTO=-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

        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
              62ØØ      *62ØØ
        62ØØ  3Ø2Ø      PARTS1, DCA RECORD
        62Ø1  3114              DCA DIRFLG
        62Ø2  4435              JMS I SRCHIT     /FIND BLOCK Ø
        62Ø3  7Ø4Ø              CMA              /CA = 7777 IN CASE
        62Ø4  343Ø              DCA I CALOC      /R ALL BREAKS BEFORE DATA
        62Ø5  1Ø74              TAD KØØ2Ø
        62Ø6  6764              IOT 764
        62Ø7  113Ø              TAD KØØ1Ø

        621Ø  6764              IOT 764          /READ ALL TO RD DATA
        6211  1Ø32              TAD BF1LOC
        6212  343Ø              DCA I CALOC
        6213  1Ø64              TAD K7577
        6214  3427              DCA I WCLOC
        6215  1427              TAD I WCLOC
        6216  765Ø              SNA CLA          /WAIT FOR WC TO =Ø
        6217  5223              JMP .+4

        622Ø  6771              IOT 771          /IN CASE READ ERROR
        6221  5215              JMP .-4
        6222  5342              JMP PARRE1
        6223  7Ø4Ø              CMA
        6224  3427              DCA I WCLOC
        6225  1130              TAD KØØ1Ø
        6226  6764              IOT 764         /RD DATA TO RD ALL
        6227  4440              JMS I WAITI
        623Ø  ØØØ1              1
        6231  5342              JMP PARRE1      /WAIT FOR CKSUM IN

        6232  1431              TAD I BF1WD1
        6233  ØØ71              AND KØØ77               /TEST FOR 2 CHAR
        6234  764Ø              SZA CLA         /IN FIRST WORD
        6235  524Ø              JMP .+3         /CKSUM SHOULD =77ØØ
        6236  1431              TAD I BF1WD1
        6237  ØØ7Ø              AND K77ØØ
        624Ø  1756              TAD I CKSLOC
        6241  1123              TAD KØ1ØØ

        6242  764Ø              SZA CLA         /CKSUM CORRECT
        6243  531Ø              JMP CKSERR      /NO
        6244  4755              JMS I PR2INC
        6245  52Ø7              JMP PARTS1+7    /NO

        6246  1Ø75              TAD KØ2ØØ
        6247  6764              IOT 764         /STOP TAPE
        625Ø  4437              JMS I NEWDRV
        6251  52ØØ              JMP PARTS1      /DO NEXT DRIVE


                        /READ BLOCKS BKWD FOR NO PARITY
                        /ERRORS
        6252  1422      PARTS2, TAD I POSITN
        6253  3Ø2Ø              DCA RECORD
        6254  7Ø4Ø              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
                      $
```

```
0000  01000000  00000000  11111111  11111111  11111111  11111111  11111111  11111111
0100  11111111  11111111  11111111  11111111  11100000  00000000  00000000  00000000

0200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0300  11111111  11111111  11111100  00000000  00000000  00000000  00000000  00000000

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0500  11111111  11111111  11111111  11110000  00000000  00000000  00000000  00000000

0600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0700  11111111  11111111  11111111  11111111  11111111  11100000  00000000  00000000


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1100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11100000

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1300  11111111  11111111  11111111  11100000  00000000  00000000  00000000  00000000

1400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111100

1600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111


2000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11100000

2200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2300  11111111  11111111  11111111  11111111  11111100  00000000  00000000  00000000

2400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111110

2600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2700  11111111  11111111  11111111  11111111  11111111  11111111  11100000  00000000


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3100  11111111  11111111  11111111  11000000  00000000  00000000  00000000  00000000

3200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11000000

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3500  11111111  11111111  11111111  11111111  10000000  00000000  00000000  00000000

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3700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11110000
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```
4000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4100  11111111  11000000  00000000  00000000  00000000  00000000  00000000  00000000

4200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111000

4400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11000000

4600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4700  11111111  11111111  11111111  11111111  11111000  00000000  00000000  00000000


5000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
5100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

5200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
5300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111000

5400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
5500  11111111  11111111  11111110  00000000  00000000  00000000  00000000  00000000

5600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
5700  11111111  11111111  11111111  11111111  11111111  11111111  00000000  00000000


6000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
6100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111100

6200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
6300  11111111  11111111  11111111  11111111  11111111  11111110  00000000  00000000
6400
6500

6600
6700


7000
7100

7200
7300

7400
7500

7600
7700
```

```
        BACKTY  1075          FORDTY  1076          K27Ø1   Ø1ØØ          PARRSE  5466
        BF1LOC  ØØ32          FWDTYP  4111          K35ØØ   1777          PARTAB  4672
        BF1WD1  ØØ31          GBKW1   3214          K4ØØØ   ØØ66          PARTS1  62ØØ
        BF2LOC  ØØ33          GET4IN  2172          K4215   Ø276          PARTS2  6252
        BF3LOC  ØØ34          GETMIN  231Ø          K5ØØØ   Ø142          PARTS3  63ØØ
        BKWTYP  411Ø          GNPATØ  46ØØ          K5Ø76   Ø126          PARTS4  6ØØØ
        BLKBIT  Ø12Ø          GNPAT1  46Ø4          K5Ø77   ØØ77          PARTS5  6Ø45
        BLKBTS  Ø117          GNPAT2  461Ø          K7ØØØ   2345          PARTS6  6Ø73
        BLKFLG  Ø75Ø          GNPAT3  4614          K7472   2673          PARTST  56ØØ
        BLKFND  ØØ21          GNPAT4  4622          K7475   3131          PARWER  5744
        BLKINC  Ø113          GNPAT5  463Ø          K7574   Ø134          PARWL1  5653
        BLOCKK  377Ø          GNPAT6  4636          K7577   ØØ64          PARWL2  57Ø3
        BNOTCN  3722          GNPAT7  4644          K76ØØ   4566          PATCHK  1122
        BUFFR2  7175          GNPTRS  Ø462          K76ØØA  6175          PATNUM  457Ø
        BUFFR3  7376          GNSTRA  4651          K76ØØB  5757          PATTBA  1771
        BUFFRS  6774          GOB     5352          K77ØØ   ØØ7Ø          PATTBL  4565
        CALOC   ØØ3Ø          HLTNS   Ø311          K773Ø   1775          PNTRS   Ø5Ø1
        CDRIVE  ØØ57          IDCON   ØØ25          K776Ø   ØØ63          POSITN  ØØ22
        CHKB    5331          IOT     6ØØØ          K7767   ØØ67          POSSAV  Ø111
        CHKGO   2744          IRECD   Ø254          K7772   4374          PR2INC  6355
        CHNGDR  Ø44Ø          KØØØ3   ØØ76          KM25    Ø325          PR4INC  6161
        CIPHER  Ø211          KØØØ6   4373          KNDATA  5145          PREBLK  Ø751
        CKSERR  631Ø          KØØØ7   ØØ73          LSTBLK  ØØ24          PRT5EZ  6Ø77
        CKSLOC  6356          KØØ1Ø   Ø13Ø          MSBITS  ØØ61          PRWAE   6111
        COCOMP  5Ø31          KØØ2Ø   ØØ74          MVBKWD  2223          PTABLE  4724
        CODATA  5ØØØ          KØØ3Ø   Ø116          MVCHNG  2274          RDATTY  ØØ46
        COERR1  51Ø7          KØØ37   Ø127          MVEND   23Ø5          RDCEND  4515
        COERRO  5Ø51          KØØ4Ø   Ø121          MVEQUL  2Ø47          RDCLP1  447Ø
        COFLAG  515Ø          KØØ5Ø   Ø115          MVFWD   2216          RDCOMP  4451
        COINCR  5Ø24          KØØ52   1776          MVGBKW  2121          RDCPAS  4564
        COLOOP  5Ø17          KØØ7Ø   Ø14Ø          MVGCHG  2135          RDSCO1  1723
        COMBIT  ØØ62          KØØ77   ØØ71          MVGFWD  2113          RDSCOP  1667
        CRLFLF  1242          KØ1ØØ   Ø123          MVGRPT  2156          RDSEND  4531
        DAPSAV  41ØØ          KØ1Ø1   Ø124          MVGSTP  2127          RDSERR  55Ø2
        DATACO  ØØ42          KØ14Ø   6155          MVGWAT  2147          RDSW32  5434
        DIRECT  ØØ23          KØ17Ø   Ø122          MVREST  2Ø2Ø          RDSWLP  4562
        DIRFLG  Ø114          KØ2ØØ   ØØ75          MVRPT   2257          RDSWS   54ØØ
        DIRSAV  Ø112          KØ2Ø4   Ø125          MVRTBL  2Ø73          RECORD  ØØ2Ø
        DOLOOP  22ØØ          KØ212   126Ø          MVSTOP  223Ø          RECRDK  ØØ26
        DOTHEM  2112          KØ214   Ø1Ø3          MVTEST  2ØØØ          REFLGS  4734
        DRIVTY  ØØ45          KØ215   1257          MVWAIT  2246          REPOSI  Ø4ØØ
        DRVTYP  2743          KØ22Ø   1772          NEWDRV  ØØ37          RERFLG  4567
        DTCHK   1Ø77          KØ24Ø   ØØ72          NOSERR  5526          RESBEZ  4336
        DTCNT   Ø133          KØ4ØØ   Ø1Ø2          NUMWRD  5147          RESBKB  432Ø
        DTSAV   Ø132          KØ6ØØ   2344          OTHRTX  2721          RESBKW  4276
        ERRSTP  ØØ44          KØ6ØØA  1773          PAREZ1  5642          RESFEZ  426Ø
        ERSSTA  ØØ53          KØ6Ø4   ØØ65          PARLOC  5756          RESFWD  4213
        ERSTP   131Ø          KØ614   Ø1Ø1          PARRE1  6342          RESFWF  4232
        EZBIT   Ø11Ø          K12ØØ   1774          PARRE2  6345          RESXIT  425Ø
        EZERR   3366          K2525   Ø131          PARRE3  6156          RESYEZ  4354
        EZERRA  3436          K26Ø    1535          PARRE4  6114          RESYNC  42ØØ
        EZTYPE  4Ø67          K27ØØ   354Ø          PARREZ  6273          REWIND  ØØ36
        RSFDR1  3436            SSTBBE  3711            WRSCO1  1643
        RSFDRV  Ø42Ø            SSTBKW  ØØ55            WRSCOP  16ØØ
        SAVPAD  ØØ43            SSTBR   367Ø            WRT32   5312
        SBABK   Ø1Ø6            SSTBSE  37Ø3            WRTEZA  53Ø1
        SBAFK   Ø1Ø7            SSTER1  321Ø            WRTEZT  5235
        SBCONS  Ø675            SSTEZ1  35Ø1            WRTLP1  44Ø1
        SBRECV  1331            SSTEZA  347Ø            WRTSEZ  1655
        SBTYPE  ØØ47            SSTFBE  364Ø            WRTSLP  4561
        SCH1ER  2433            SSTFR   3617            WRTSWA  5226
        SCH1ND  2462            SSTFSE  3632            WRTSWS  52ØØ
        SCH1OK  2444            SSTFWD  ØØ54            WRTTST  44ØØ
        SCH1ST  2421            SSTRNA  32ØØ            WT5ØØ   Ø313
        SCH2ER  2514            STPERR  ØØ44            WTHALF  ØØ41
        SCH2OK  2526            SYNCRE  41Ø7            WTIJMP  Ø272
        SEARCH  Ø6ØØ            TAPONT  Ø752            WTINT   Ø234
        SEKONS  1Ø71            TEMP1   4563            XCHKB   Ø137
        SER2A   3ØØØ            TEMPY   177Ø            XCHKGO  Ø136
        SER2AI  272Ø            TSRDEZ  5452            XDTCHK  Ø135
        SER2LS  3111            TSTATB  1316            Z76ØØ   Ø141
        SER2NZ  2674            TSTTBL  Ø277
        SER2ST  2637            TXSTOR  13Ø7
        SER2TY  3123            TYALL   15Ø3
        SERCH2  26ØØ            TYBKW   1545
        SERCMP  3Ø7Ø            TYCHAR  123Ø
        SEREZ   2655            TYCONT  1261
        SFABK   Ø1Ø5            TYCOVR  1273
        SFAFK   Ø1Ø4            TYDATA  1475
        SIERRO  2566            TYDIR   1536
        SRCH1   24ØØ            TYDRV   1511
        SRCH2   25Ø1            TYFWD   1555
        SRCHER  Ø747            TYINTX  2733
        SRCHIT  ØØ35            TYMODE  1563
        SRCHTY  ØØ52            TYMOVE  14ØØ
        SRCNCK  Ø656            TYPCON  ØØ51
        SREZTS  Ø722            TYPTEX  ØØ56
        SRHERR  1ØØØ            TYRALL  1433
        SRSCOP  1734            TYRDAT  1424
        SRTAFN  Ø635            TYREAD  146Ø
        SSTA1A  3267            TYSRCH  1411
        SSTA2A  3311            TYTEXT  12ØØ
        SSTA3A  3334            TYWALL  1451
        SSTA3B  3353            TYWDAT  1442
        SSTA4A  3412            TYWRIT  1466
        SSTA4B  3424            UKDATA  5146
        SSTABW  3651            UNFUNC  ØØ6Ø
        SSTAER  4ØØØ            WAETYP  5151
        SSTAEZ  3437            WAITI   ØØ4Ø
        SSTAFW  36ØØ            WAITIN  2Ø4Ø
        SSTAN1  3254            WCLOC   ØØ27
        SSTAN2  3277            WDATTY  ØØ5Ø
        SSTAN3  3322            WRDIR   5157
        SSTAN4  34ØØ            WRRDND  5161
```

```
ERRORS DETECTED: Ø

LINKS GENERATED: Ø

RUN-TIME: 23 SECONDS

3K CORE USED
```