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User's Guide for Test Pattern Tools for the Personal Computer

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13. ABSTRACT (Maximum 200 words)
The test pattern tools include: vertical sequence search, overwrite up to 10 unique vertical sequences simultaneously in any one column or column group, view-print-save a specified block within the pattern, 2-3-4 bit hexadecimal to binary number conversion (and vice versa), 32-bit binary sequence generation, and waveform display using a pattern window of up to 73 columns by 400 lines. There are more than 30 editing and utility routines. Pattern files as large as 1050 columns by more than 10x10E6 lines can be analyzed. Pattern sequences of up to 1050 characters can be edited in either the horizontal or vertical direction. The pattern tools require the IBM or IBM-compatible XT, AT or PS/2, DOS 2.1 or later, a hard disk, and approximately 400K of memory for the main program and support files. The tools are PUBLIC DOMAIN. The FREE software is obtained as follows: send two floppy disks and a suitable postage-paid mailer to the Electronics Technology and Devices Laboratory, Reliability, Testability and Quality Assurance Branch, ATTN: SLCET-RR, Fort Monmouth, New Jersey 07703-5000. For more information, call John M. Erickson at (908) 544-4840 or DSN 995-4840.

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TRADEMARKS

MS-DOS is a trademark of Microsoft Corporation.

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1.0 INTRODUCTION

These pattern tools were developed to modify or create test patterns required in microcircuit device testing. The tools are also useful for analysis of vector sequencing and timing edges.

There are more than 30 editing and utility routines. They include vertical sequence search, overwrite up to 10 unique vertical sequences in any column or column group, view/print/save a specified pattern block, convert hexadecimal code (2 to 4 bits wide) into binary (and vice versa), generate 32-bit binary sequences, resequence columns or lines, and display pattern waveforms up to 73 columns by 400 lines. Edit pattern files up to 1050 columns and greater than 10x10E6 lines. Edit sequence lengths up to 1050 characters in either the horizontal or vertical direction.

Personal computer requirements are the IBM or IBM-compatible XT, AT or PS/2, DOS 2.1 or later, a hard disk, and approximately 400K of memory for the main program and support files. TEST PATTERN TOOLS software is public domain. For a free copy, send two 360K floppy disks and a postage-paid mailer to the Electronics Technology and Devices Laboratory, Reliability, Testability and Quality Assurance Branch, ATTN: SLCET-RR, Fort Monmouth, New Jersey 07703-5000. For more information, call John M. Erickson at (908) 544-4840 or DSN 995-4840.

2.0 TOOLS FEATURES

2.1 Editing:

- Search for a horizontal sequence and display, replace or delete.
- Search for a vertical sequence and display.
- Overwrite, insert or delete either horizontal or vertical sequences.
- Sequence columns or lines.
- Unwrap or wrap lines.
- Copy or move blocks of lines.
- Combine files.
- Convert hexadecimal to binary or binary to hexadecimal.
- Overwrite checkerboard, diagonal or binary sequences.
- Modify input-output symbols.
- Add line numbers (hexadecimal/decimal).

2.2 Utilities:

- File setup information.
- View input or other file.
- View/print any pattern block.
- Copy file.
- Swap input and output files.
- Count pattern or header lines.
- Generate a single character or random character field.
- Display pattern waveform.
- Highlight edited changes in either color or monochrome (inverse video).
- Call executable files from a DOS shell.
- Date Stamp.

Figure 2-1 shows the Main Menu. Command keys at the bottom of each screen provide pop-up help, restart or interrupt of the current routine or exit to the Main Menu. Illegal data item entries and illegal file names are detected for correction at the keyboard. Table 2-1 shows typical execution times.

TEST PATTERN TOOLS software comprises four program files; i.e., TPT.EXE (the main program), README.TXT (additional file setup information and examples of test pattern generation using these pattern tools), TPT.TXT (the essentials of this user's guide in ASCII format), and HD.EXE (a handy routine for hexadecimal and decimal conversions). Access HD.EXE using DOS SHELL. Other support files include drivers for printing and graphics. The display mode, color or monochrome, is established automatically at startup.

EDIT

A Search/replace
B Insert or Delete
C Reorder pattern
D Convert Hex/Binary
E Modify I/O symbols
F Combine files
G Generate sequences
H Number lines

UTILITY

I View input file
J View other files
K View/Print/Save block
L Copy file
M Swap I and O files
N Count lines
O Pattern field
P Waveform display
Q DOS Shell

R File setup

\ Exit Editor

M A I N   M E N U

F1-Help menu

Figure 2-1. Main Menu

Table 2-1. Execution times

Menu Item	Edit routine	PC Microprocessor		
(Pattern: 200 cols x 1800 lines)		Elapsed time (min:sec)		
		6Mhz 8088	12Mhz 80286	20Mhz 80386
O	Create character field (200 columns x 1800 lines)	1:27	0:50	0:37
H	Add line numbers	2:25	1:30	0:45
A	Overwrite 10 vertical strings (one single clock column, one double clock column, and 8 columns of 'Z')	3:20	1:45	0:58
G	Create binary sequence (16 bits wide)	2:45	1:30	0:58
A	Search and replace 16 bit string (replace 16 bit sequence in last line)	5:05	2:30	0:50
K	View pattern block (view last 10 lines)	1:07	0:35	0:20
C	Sequence columns (switch pattern halves)	2:10	1:15	0:50
D	Binary to hexadecimal (convert 16 bit binary to hexadecimal)	2:40	1:20	0:60
F	Merge files (merge 2 files, each 200 cols x 1800 lines, side by side)	5:00	2:35	1:30

3.0 EDITING TOOLS

The first call to an edit routine prompts for a description of
the input file. Succeeding routines are accessed directly. Use
FILE SETUP to enter new file information or change the current
file description.

3.1 Search/Replace - Search for all occurrences of a horizontal
sequence in any pattern block. View and replace or delete. The
replacement sequence is longer, the same length, or shorter than
the searched sequence. Display each line containing the sequence
or display the entire pattern. The column number of the first
character of the first sequence in each line is displayed at the
right. Save either the line containing the searched sequence or
the entire edited pattern in the current output file. Search for
all occurrences of a vertical sequence in a specified column.
Display the searched vertical sequence, including line numbers
for each character of the sequence, or, display each line
containing the searched sequence with each sequence character
highlighted. Save the vertical sequence search. The search for
successive occurrences of a horizontal sequence starts at the
character immediately following the current sequence. The search
for successive occurrences of a vertical sequence starts at the
second character of the current sequence. Replace up to 10
unique horizontal or vertical sequences. Replace up to 10
vertical sequences in any one pattern block with each sequence
repeated at N line intervals, or, replace vertical sequences in
up to 10 pattern blocks with each sequence repeated at N line
intervals. Replace logic symbols 1 and 0 with H and L (and vice
versa) in up to 10 pattern blocks.

3.2 Insert or Delete - Insert up to 10 unique horizontal or
vertical sequences. Insert up to 10 unique vertical sequences in
any one pattern block with each sequence repeated at N line
intervals, or insert vertical sequences in up to 10 pattern
blocks with each sequence repeated at N line intervals. Insert
empty lines or column spaces. Delete up to 10 groups of columns
or column-line blocks, the pattern header, comment lines, or Date
Stamp.

3.3 Reorder Pattern - Sequence columns in up to 10 column groups
in any order. Sequence lines in up to 10 line groups in any
order. Numbers within a sequence must be ascending. Copy or
move a block of pattern lines N times into a new location forward
or backward. Unwrap pattern lines (requires a specified end of
line character). Wrap long pattern lines into two or more lines
at a specified column.

3.4 Convert Hexadecimal/Binary - Convert hexadecimal numbers to binary or binary to hexadecimal. Convert hexadecimal to a selected 2, 3 or 4 bit binary sequence. For example, the hexadecimal conversion code "3,H,2,HH,3H", specifies binary widths of 3, 4, 2, 4+4, 3, and 4, requiring 6 binary groups: col 1 (3 bit), col 3 (4 bit), col 5 (2 bit), col 7-8 (4 bit), col 10 (3 bit), and col 11 (4 bit). Characters X, Z and P are not changed when converting to binary and may be expanded to widths of 2 to 4 characters. Convert binary sequences of 1 or more bits to hexadecimal. Compress binary groups of X, Z and P into one or more characters. Edit up to 10 column groups with option to display both the edited and original pattern. Sequence start is the least significant character (right side). Upper or lower case hexadecimal numbers are valid in both conversions. Figures 3-1 and 3-2 show conversion examples.

3.5 Modify I/O Symbols - Overwrite with a specified mask or inhibit character in lines containing a specified control bit in up to 10 column groups. Change I/O output logic symbols from 1,0 to H,L in lines containing an I/O enable bit in up to any 10 column groups.

3.6 Combine Files - Combine pattern FILE B with the current pattern, FILE A. Add at the right side of FILE A, or merge FILE B into a specified block within FILE A.

3.7 Generate Sequence - Overwrite with checkerboard, diagonal or binary sequences. Repeat each line of a sequence N times. Specify up-count or down-count binary. Specify a left or right diagonal sequence in an optional background field. Comment lines are not edited.

3.8 Number Lines - Insert hexadecimal or decimal line numbers (or both) at the left or right of pattern. For decimal numbers, specify decimal field width and multiplier. Maximum hexadecimal is FFFFFF (16777215).

```
F,3,A,F8F,38          1111,11,1010,111110001111,111000
A,1,A,F7F,38          1010,01,1010,111101111111,111000
F,3,A,F6F,38          1111,11,1010,111101101111,111000
F,0,A,F9F,38          1111,00,1010,111110011111,111000
D,0,B,FAF,3A          1101,00,1011,111110101111,111010
F,3,B,FFF,38          1111,11,1011,111111111111,111000
C,3,B,FDF,38          1100,11,1011,111111011111,111000
F,3,C,FCF,3B          1111,11,1100,111111001111,111011
F,3,C,FCF,38          1111,11,1100,111111001111,111000
F,2,C,FCF,38          1111,10,1100,111111001111,111000
B,3,C,FFF,3C          1011,11,1100,111111111111,111100
F,3,F,FFF,38          1111,11,1111,111111111111,111000
3,3,F,F3F,38          0011,11,1111,111100111111,111000
F,1,F,FFF,30          1111,01,1111,111111111111,110000
```

Figure 3-1.   Hexadecimal (H,2,H,HHH,2H)
              converted to binary.


```
1111,11,1010,111110001111,111000          F,3,A,F8F,38
1010,01,1010,111101111111,111000          A,1,A,F7F,38
1111,11,1010,111101101111,111000          F,3,A,F6F,38
1111,00,1010,111110011111,111000          F,0,A,F9F,38
1101,00,1011,111110101111,111010          D,0,B,FAF,3A
1111,11,1011,111111111111,111000          F,3,B,FFF,38
1100,11,1011,111111011111,111000          C,3,B,FDF,38
1111,11,1100,111111001111,111011          F,3,C,FCF,3B
1111,11,1100,111111001111,111000          F,3,C,FCF,38
1111,10,1100,111111001111,111000          F,2,C,FCF,38
1011,11,1100,111111111111,111100          B,3,C,FFF,3C
1111,11,1111,111111111111,111000          F,3,F,FFF,38
0011,11,1111,111100111111,111000          3,3,F,F3F,38
1111,01,1111,111111111111,110000          F,1,F,FFF,30
```

Figure 3-2.   Binary (column groups 1-4, 6-7,
              9-12, 14-25, and 27-32) converted
              to hexadecimal.

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4.0 UTILITY TOOLS

The first call to a utility routine may prompt for a description
of the input file. Succeeding routines are accessed directly.

4.1 File Setup - Use to enter new file data, change the existing
file setup or change the current drive and directory. File names
and current drive and directory are displayed at the top of each
active edit screen.

1. INPUT-OUTPUT FILE NAMES.
2. Working drive/directory (A-E).
3. List files.
4. HEADER.
5. B&W monitor.
6. Color monitor.
7. COMMENT STATUS.
8. SUPPRESS DISPLAY of edited pattern.
9. Display edited pattern (DEFAULT).
A. Audible tone at end of Edit (DEFAULT).
B. No audible tone at end of Edit.
C. ADD/RENEW DATE STAMP while editing.
D. No change in DATE STAMP status (DEFAULT).
E. No change in setup.

4.2 View Input File - Display N lines or the entire input file.
N lines may be viewed repeatedly until the end of file.

4.3 View Other Files - Display N lines or the entire file.
Default is the current output file. N lines may be viewed
repeatedly until the end of file.

4.4 View/Print/Save Pattern Block - View a section of a pattern.
Display or suppress the pattern with option to save and/or print,
with or without a Date Stamp.

4.5 Copy File - Copy a pattern file using the DOS COPY command.
The new file becomes the current input file.

4.6 Swap I ⌐nd O Files - Swap input and output files. Use when
several edit routines are performed in succession.

4.7 Count Lines - Count header lines or pattern lines with
option to include comments.

4.8 Pattern Field - Generate a single character or random
character field of specified character width and column spacing
on which to overwrite pattern sequences. Maximum width is 1050
columns by more than 10x10E6 lines.

4.9 Waveform Display - Display up to 73 columns by 400 lines
from a test pattern file of 1050 columns by 10E6 lines. View a
simulation pattern with or without time stamps and a simulator
independent WAVE Level 1 External File converted to a typical
"report on change" simulation pattern. Display a split screen of
two column groups, such as columns 1-25 and 101-148. Logic
symbols u, X, Z, H and L are color highlighted. Logic symbols u,
X and Z are displayed at half amplitude. Magnify the horizontal
time axis 2, 5, 10 or 20 times. Compare timing edges between all
pattern lines using a moveable vertical trace superimposed on the
displayed pattern. Use the PAGE UP or PAGE DOWN key to display
column groups on either side of a non-split screen. View and
print single or batch pattern blocks in either portrait or
horizontal mode using EPSON, IBM, or HP LASERJET printers. The
screen density requirements are at least 348 vertical by 600
horizontal pixels (yields 53 columns by 400 lines) and can be as
large as 480 by 600 pixels (yields 73 columns by 400 lines
(VGA)). The installed graphics density is displayed on the
initial screen. Figure 4-1 is a block of 53 columns by 43 lines
from a typical ASIC simulation test pattern. Figure 4-2 shows a
53 column by 400 line waveform which includes the pattern block
in Figure 4-1.

4.10 DOS Shell - Temporarily exit to DOS to run an executable
file or DOS command.

4.11 Help Menu - When in the Main Menu, use the F1 function key
to display the Help Menu shown in Figure 4-3. When in an edit or
utility routine, use the F1 key to display a corresponding pop-up
help screen.

```
Time
Stamp                       Test Pattern

0        ZZZZZZZZZZZZZZZZZZZZZZZZZ00000000UUUUUUUUULLLLLLLLUZUZZZ
7500     01ZZZZZZZZZZZZZZZZZZZZZZZ00000000UUUUUUUUULLLLLLLLUZUZZZ
10000    00000111110111110000000000000000UUUUUUUUULLLLLLLLUZUZZZ
10046    00000111110111110000000000000000UUUUUUUUULLLLLLLLUZHZZZ
10047    00000111110111110000000000000000UUUUUUUUULLLLLLLLUZHZZZ
10048    00000111110111110000000000000000UUUUUUUUULLLLLLLLUZHZZZ
10050    00000111110111110000000000000000LLLLLLLLLLLLLLLLLZHZZZ
10051    00000111110111110000000000000000LLLLLLLLLLLLLLLLLZHLZZ
13500    10000111110111110000000000000000LLLLLLLLLLLLLLLLLZHLZZ
18500    00000111110111110000000000000000LLLLLLLLLLLLLLLLLZHLZZ
23500    10000111110111110000000000000000LLLLLLLLLLLLLLLLLZHLZZ
28500    00000111110111110000000000000000LLLLLLLLLLLLLLLLLZHLZZ
30000    01100111110111110000000000000000LLLLLLLLLLLLLLLLLZHLZZ
33500    11100111110111110000000000000000LLLLLLLLLLLLLLLLLZHLZZ
38500    01100111110111110000000000000000LLLLLLLLLLLLLLLLLZHLZZ
43500    11100111110111110000000000000000LLLLLLLLLLLLLLLLLZHLZZ
48500    01100111110111110000000000000000LLLLLLLLLLLLLLLLLZHLZZ
53500    11100111110111110000000000000000LLLLLLLLLLLLLLLLLZHLZZ
58500    01100111110111110000000000000000LLLLLLLLLLLLLLLLLZHLZZ
63500    11100111110111110000000000000000LLLLLLLLLLLLLLLLLZHLZZ
63561    11100111110111110000000000000000LLLLLLLLLLLLLLLLLZHLZZ
63575    11100111110111110000000000000000LLLLLLLLLLLLLLLLLHHLHH
63576    11100111110111110000000000000000LLLLLLLLLLLLLLLLLHHLHH
63577    11100111110111110000000000000000LLLLLLLLLLLLLLLLLHHLHH
68500    01100111110111110000000000000000LLLLLLLLLLLLLLLLLHHLHH
73500    11100111110111110000000000000000LLLLLLLLLLLLLLLLLHHLHH
78500    01100111110111110000000000000000LLLLLLLLLLLLLLLLLHHLHH
80000    01100111110111110001101100000001LLLLLLLLLLLLLLLLLHHLHH
80068    01100111110111110001101100000001LLLLLLLLLLLLLLLLLHHLHH
82500    01110111110111110001101100000001LLLLLLLLLLLLLLLLLHHLHH
82553    01110111110111110001101100000001LLLLLLLLHLLLLLLLLHHLHH
83500    11110111110111110001101100000001LLLLLLLLHLLLLLLLLHHLHH
87500    11100111110111110001101100000001LLLLLLLLHLLLLLLLLHHLHH
88500    01100111110111110001101100000001LLLLLLLLHLLLLLLLLHHLHH
90000    01100111110111110001101100001100LLLLLLLLHLLLLLLLLHHLHH
92500    01100101110111110001101100001100LLLLLLLLHLLLLLLLLHHLHH
92538    01100101110111110001101100001100LLLLLLLLHLLLLLLLLHHLHH
93500    11100101110111110001101100001100LLLLLLLLHLLLLLLLLHHLHH
97500    11100111110111110001101100001100LLLLLLLLHLLLLLLLLHHLHH
97538    11100111110111110001101100001100LLLLLLLLHLLLLLLLLHHLHH
98500    01100111110111110001101100001100LLLLLLLLHLLLLLLLLHHLHH
100000   01100111110111110001101100000000LLLLLLLLHLLLLLLLLHHLHH
102500   01110111110111110001101100000000LLLLLLLLHLLLLLLLLHHLHH
```

Figure 4-1.   Simulator test pattern (43 lines)
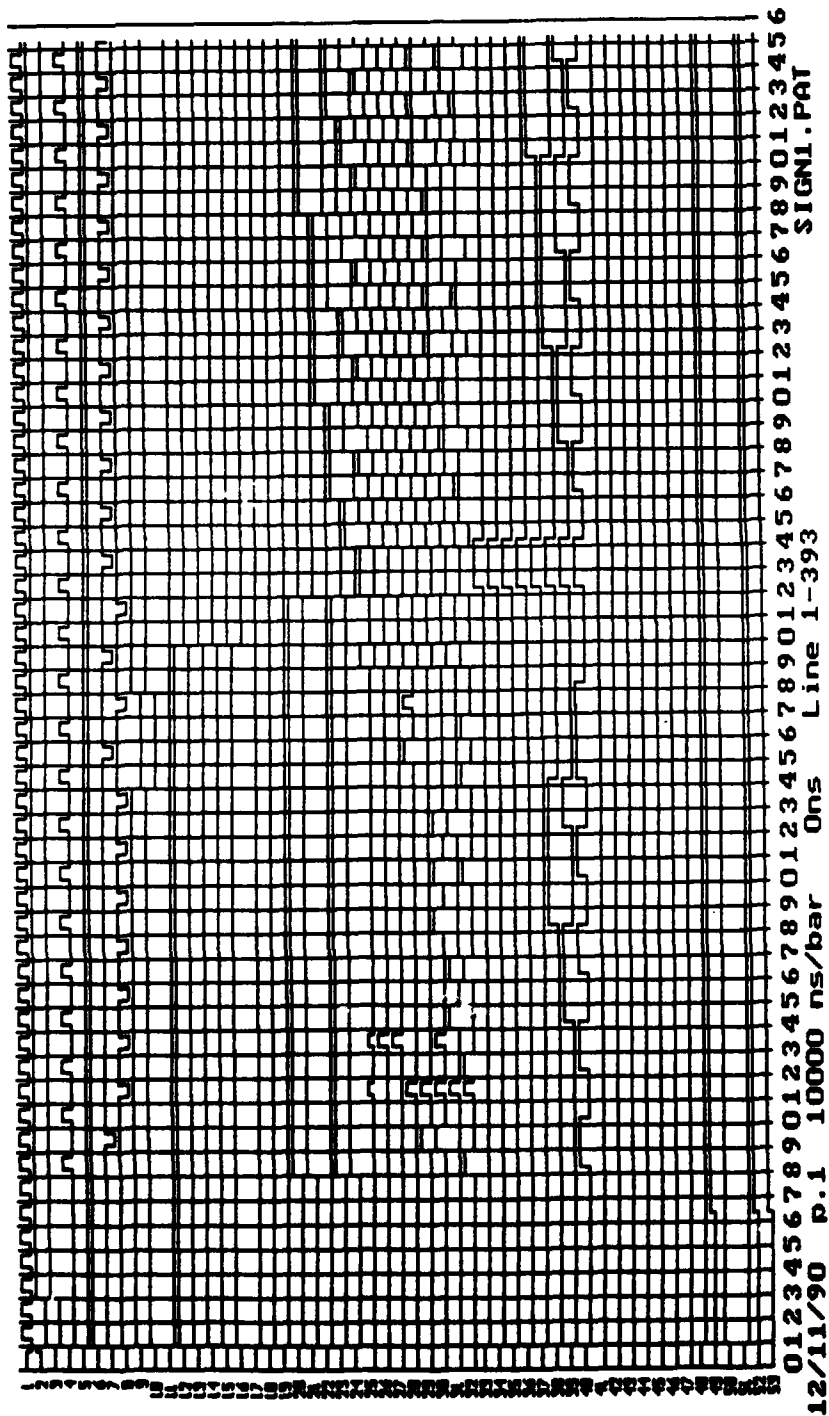
Figure 4-2. Pattern waveform (53 columns by 400 lines)

```
A  Search/replace        D  Convert Hex/Binary     G  Generate sequence
B  Insert or Delete      E  Modify I/O symbols     H  Number lines
C  Reorder pattern       F  Combine files          I  View input file

              H E L P   M E N U      F4 RETURN

J  View other files      N  Count lines            R  File setup
K  View/Print/Save block O  Pattern field
L  Copy file             P  Waveform display
M  Swap I and O files    Q  DOS shell
```

SEARCH/REPLACE - Search for horizontal or vertical sequences. View the searched horizontal sequence with option to replace or delete. A replaced sequence may be longer, the same length, or shorter than the searched sequence. Display lines containing sequences (highlighted) or display the entire pattern. The column number of the first character of the first sequence in each line is displayed at the right of the pattern. Save lines containing the sequence or the entire pattern in the current output file.
↓ (next page)

Figure 4-3.   Help Menu

5.0 MEMORY TEST PATTERNS

Use the pattern tools to generate test patterns. Two examples of
test pattern generation for a 1K x 8 static random access memory
are as follows:

5.1 WRITE-READ Test Pattern:

1. Set up a pattern of ZEROS in a field of 22 columns by
    4096 lines. Assign line numbers.

2. The device pin description is as follows:

Pin name	Pin
CS	1
CLOCK	2
READ	3
WRITE	4
ADDRESS	5-14
DATA	15-22

3. Fill the pattern field with a WRITE ONE and READ ONE
    sequence for all data and address bits:

    a. The CS pin column is ONE for chip select.
    b. The CLOCK pin column uses RZ timing. Enter a column
        of ONES.
    c. The WRITE column is ONE (WRITE) in lines 1-1024 and
        ZERO (NO WRITE) in lines 1025-2048.
    d. The READ column is ZERO (NO READ) in lines 1-1024
        and ONE (READ) in lines 1025-2048.
    e. The 10 address bits are sequenced from address
        0000000000 to 1111111111. The sequence repeats in
        lines 1025-2048.
    f. The 8 data bits are ONE in lines 1-1024 for WRITE to
        1024 address cells, and ONE in lines 1025-2048 for
        READ output from the same 1024 address cells.

4. Repeat the above using complementary data.

5. Combine the test pattern and a suitable header.

6. To summarize:

    Generate a pattern field and overwrite with pattern
    sequences. Create a pattern header. Swap input and
    output files until all pin patterns have been assigned.
    Repeat for a WRITE ZERO - READ ZERO test. Combine the
    pattern and header files.

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5.2 MARCH Test Pattern:

1. Set up a pattern of ZEROS in a field of 22 columns by 14336 lines. Assign line numbers.

2. At address 0000000000 to 1111111111, READ ZERO, WRITE ONE and READ ONE. Decrement the address with READ ONE, WRITE ZERO, and READ ZERO. Repeat to address 0000000000. Repeat these sequences using data complement.

3. Fill the pattern field as follows:

   a. The CS column is ONE for chip select.
   b. The CLOCK column uses RZ timing. Enter a column of ONES.
   c. The READ column is ZERO (NO READ) in lines 1-1024, and successive groups of 101 (READ, NO READ, READ) in lines 1025-7168.
   d. The WRITE column is ONE (WRITE) in lines 1-1024, and successive groups of 010 (NO WRITE, WRITE, NO WRITE) in lines 1025-7168.
   e. The address bits are incremented from the address 0000000000 to 1111111111 in lines 1-1024. Address bits are incremented again in lines 1025-4096 with each line repeated 3 times. The sequence is then decremented in lines 4097-7168 with each line repeated 3 times.
   f. The 8 data bits are ZERO in line 1-1024, 011 repeated 1024 times in lines 1025-4096, and 100 repeated 1024 times in lines 4097-7168.

4. Repeat the above using data complement.

5. Combine the test pattern file and a suitable header.

6. To summarize:

   Generate a pattern field and overwrite with pattern sequences. Create a pattern header. Swap input and output files until all pin groups have their correct pattern sequences. Repeat for data complement. Combine the pattern and header files.

7. The MARCH test pattern is shown in Figure 5-1.

$Q

$P CS,CLOCK,READ,WRITE,A0,A1,A2,A3,A4,A5,A6,A7,A8,A9,
D0,D1,D2,D3,D4,D5,D6,D7

$C B=Bidirectional, I=input

$F
I I I I IIIIIIIII BBBBBBBB
$D

(WRITE ZERO background)

```
1 1 0 1 0000000000 00000000    ;WRITE ZERO (line 1)
1 1 0 1 0000000001 00000000    ;WRITE ZERO
1 1 0 1 0000000010 00000000    ;WRITE ZERO
1 1 0 1 0000000011 00000000    ;WRITE ZERO
(continue increment to address 1111111111)
1 1 0 1 1111111111 00000000    ;WRITE ZERO (line 1024)
```

(READ ZERO - WRITE ONE - READ ONE)

```
1 1 1 0 0000000000 00000000    ;READ ZERO (line 1025)
1 1 0 1 0000000000 11111111    ;WRITE ONE
1 1 1 0 0000000000 11111111    ;READ ONE
1 1 1 0 0000000001 00000000    ;READ ZERO
1 1 0 1 0000000001 11111111    ;WRITE ONE
1 1 1 0 0000000001 11111111    ;READ ONE
(continue increment to address 1111111111)
1 1 1 0 1111111111 00000000    ;READ ZERO
1 1 0 1 1111111111 11111111    ;WRITE ONE
1 1 1 0 1111111111 11111111    ;READ ONE (line 4096)
```

(READ ONE - WRITE ZERO - READ ZERO)

```
1 1 1 0 1111111111 11111111    ;READ ONE (line 4097)
1 1 0 1 1111111111 00000000    ;WRITE ZERO
1 1 1 0 1111111111 00000000    ;READ ZERO
1 1 1 0 1111111110 11111111    ;READ ONE
1 1 0 1 1111111110 00000000    ;WRITE ZERO
1 1 1 0 1111111110 00000000    ;READ ZERO
(continue decrement to address 0000000000)
1 1 1 0 0000000000 11111111    ;READ ONE
1 1 0 1 0000000000 00000000    ;WRITE ZERO
1 1 1 0 0000000000 00000000    ;READ ZERO (line 7168)
```

(repeat using data complement. Total 14336 lines.)

Figure 5-1. MARCH memory test pattern

APPENDIX A

README.TXT **"Test Pattern Tools for the PC"**

1. TPT.TXT contains essentials of this User's Guide in ASCII text.
2. TPT.EXE is written in TURBO PASCAL, Version 5.0, for use in the IBM or IBM-compatible XT, AT or PS/2 personal computer. Screen mode (color or monochrome) and current graphics are set up automatically.
3. Make a backup copy of the input file. Use COPY FILE.
4. Maximum line width using keyboard or read file entry is 1050 characters. Maximum line depth is greater than 10x10E6. The input file must be in standard ASCII format and conform to the printable decimal 32 to 126 character set.
5. Command keys at the bottom of each screen are used for on-line help, restart of the current routine, return to the Main Menu, or interrupt of the current routine (interrupt is delayed until the end of a pattern line).
6. When in Main Menu, the F1 key is used to display the Help Menu. When in an edit or utility routine, the F1 key is used to display pop-up help.
7. The option to add or renew a Date Stamp is provided in FILE SETUP. The default is no change in Date Stamp status. When a Date Stamp is added, the header depth is automatically increased by 2.
8. Comment lines, if present, must be considered when setting up the input file. The first character in a comment line may be, e.g., (or * or ; or SPACE, and must not be the same as in a pattern line.
9. The line number specified for an end of pattern may exceed the actual last pattern line, and the column number specified for an end of line usually may exceed the actual end of line. This freedom from exact boundary information simplifies pattern block setups.
10. The screen display requires at least 80 columns by 25 lines. Select from 7 colors for both text and highlighting.
11. WAVEFORM DISPLAY requires at least 348 pixels vertically by 600 pixels horizontally. Graphics drivers provided include: EGAHI, Hercules, AT&T 6300 (400HI series), and VGAHI.
12. The caret (^) symbol is not to be used (program reserved).
13. Requires MS-DOS or PC-DOS, 2.1 or later, FILES=20 in the CONFIG.SYS file, and approximately 400K of memory for TPT.EXE and support files.
14. Examples of test pattern generation (these are the same as given in section 5.0).

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