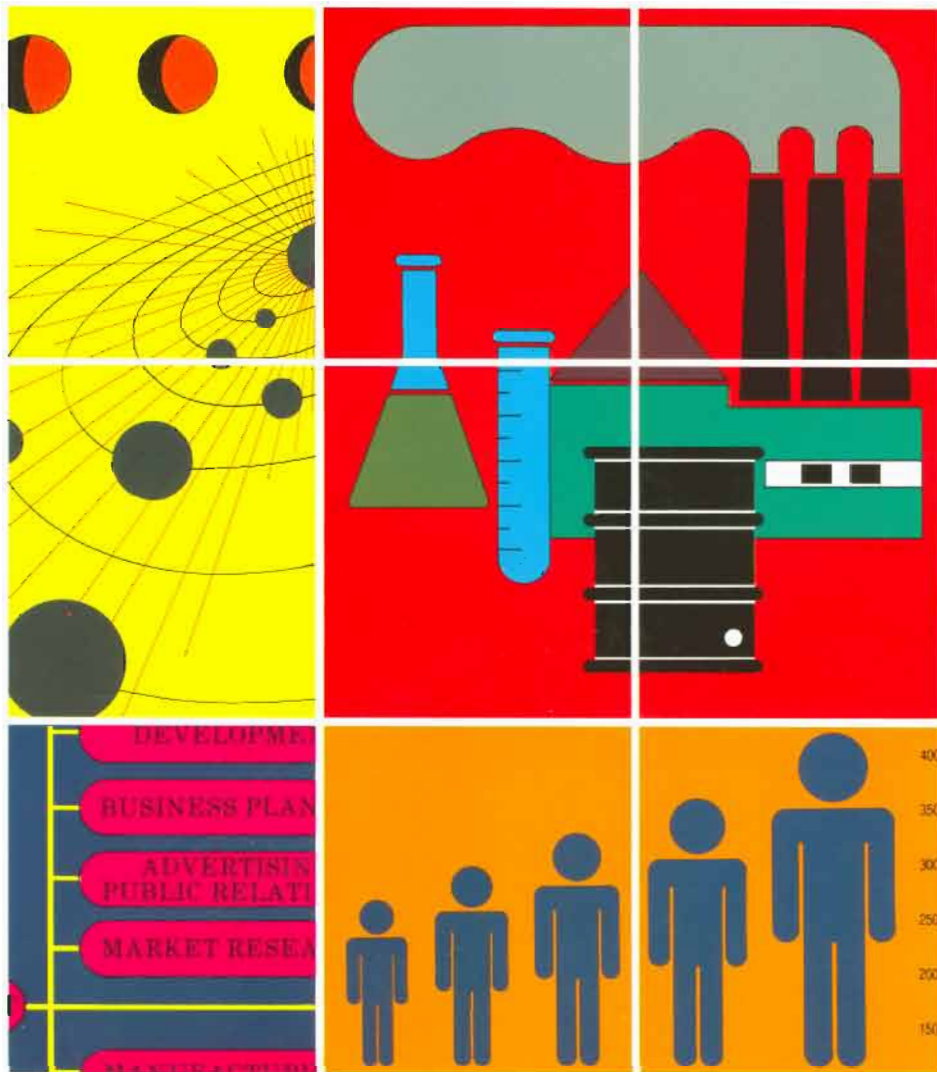
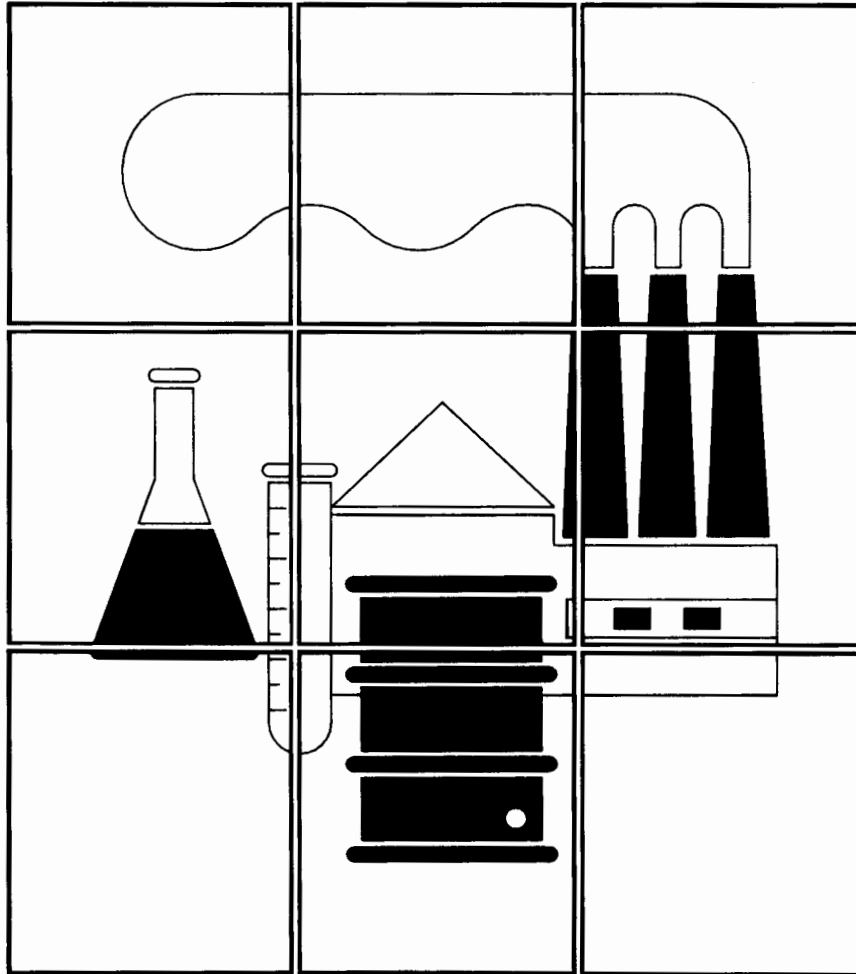


# diagraph<sup>tm</sup>



# diagraph<sup>tm</sup>



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### *ACKNOWLEDGEMENT*

*We express our appreciation to the Hewlett-Packard Company and its employees for their support and cooperation.*  
*CSC*

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# TABLE OF CONTENTS

	<i>page</i>
<b>Introduction</b>	
Welcome to Diagraph .....	4
Before You Start .....	4
Help .....	4
Multi-Level Function Keys .....	6
<b>Getting Started</b>	
Diagraph and the HP 150 .....	6
The Softlock System .....	7
Installation .....	7
Formatting Work Discs .....	7
Installing the Program Disc .....	8
Copying the Symbol and Pictorial Libraries .....	8
Diagraph and P.A.M. ....	10
Just for Practice .....	11
<b>Fundamental Concepts</b>	
The Lesson Plan .....	14
A Review of The Help Facility .....	15
Loading and Saving Files .....	15
Lesson 1 – Change Symbol .....	17
2 – Add/Delete Symbol .....	19
3 – Move/Size Symbol .....	22
4 – Copy Symbol .....	24
5 – Connect Symbol .....	28
6 – Insert Token .....	31
7 – Draw Lines .....	34
8 – Text Menu .....	38
9 – Move/Size Text .....	41
10 – Text Fonts .....	45
<b>Mini-Lessons</b> .....	49
<b>Application Exercises</b> .....	50
<b>The Symbol Libraries</b>	
Organization of the Libraries .....	51
Graphic Aids .....	52
Geometrics .....	66
Signs .....	76
Icons .....	78
Pictorials .....	83
Applications .....	91



## WELCOME TO DIAGRAPH


Diagraph is a powerful, multi-function graphics product that fully utilizes the touchscreen facility of the HP 150. You can use Diagraph to create a variety of “clip-art” presentation aids in addition to organizational charts, forms, signs, word charts and flow charts, even if you have little or no experience in graphic design.



A diagraph is a composition of symbols, text, and lines. You can choose from a library of more than 1500 symbols organized into categories including graphic aids, geometrics, signs, icons and pictorials. Any symbol can be moved, sized, stretched, rotated and copied. Simply touch the screen to select a symbol and position it. Connect symbols and draw freeform lines using the graphics cursor. Add text in any of the thirteen type fonts. You can size, stretch, rotate and move the text anywhere on the diagraph. And there's more but best of all . . . Diagraph is fun to use!

## BEFORE YOU START

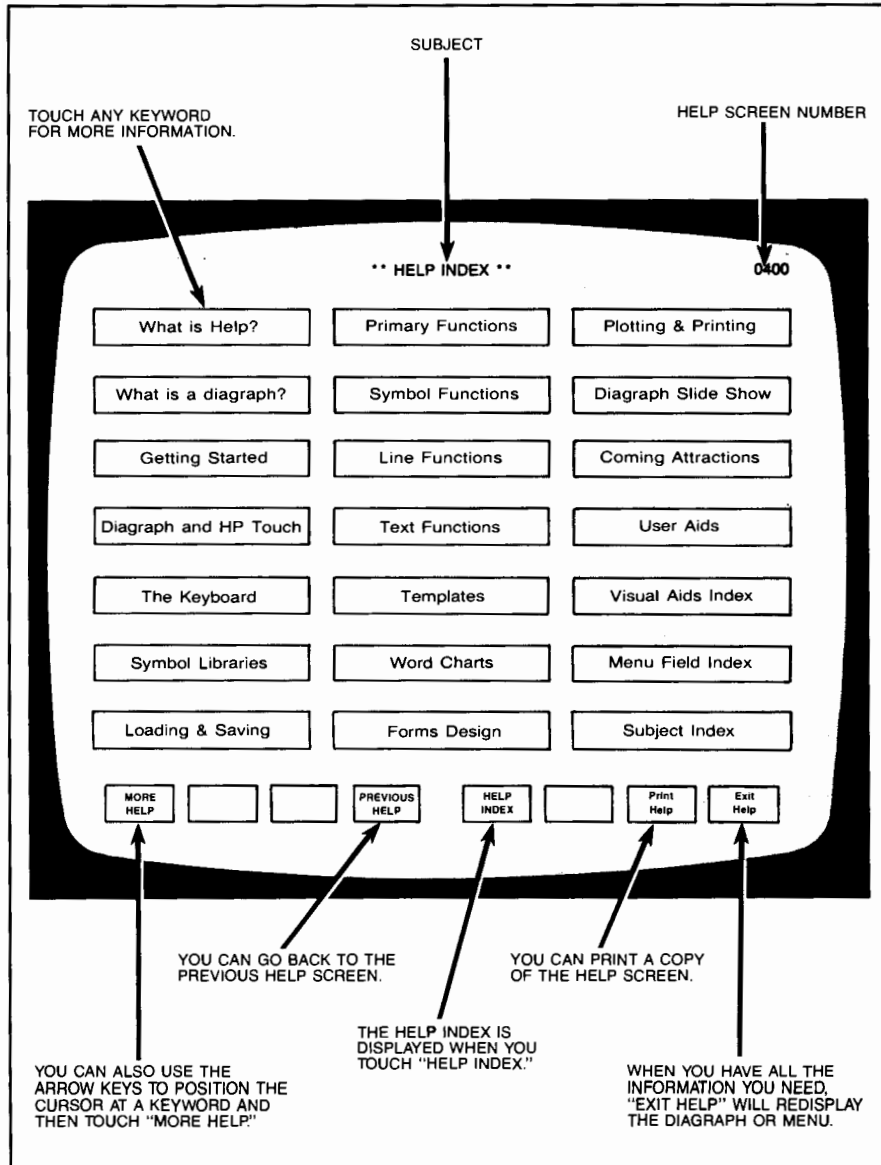
This handbook was designed to teach you quickly the fundamental concepts of Diagraph. It isn't necessary to read a 200 page manual to understand Diagraph; instead, we've provided ten lessons based on the principle of “learning by doing.” By working through each of the ten lessons in order, you'll quickly gain a “first-hand” understanding of how Diagraph works. Do not skip lessons or do them out of order. Investigate the Mini-Lessons and Application Exercises at the conclusion of the Lesson Plan to reinforce your understanding of the fundamental concepts. Please do not attempt to do the Mini-Lessons or Application Exercises until you have completed the ten lessons.

## HELP

One of the reasons Diagraph is so easy to use is that we have built in a HELP facility to answer your questions. Help screens are available simply by touching the  key. We've eliminated the need for a cumbersome reference manual and put the information at your fingertips.


The touchscreen has added another dimension to the way we communicate with the HP 150. For information about a field on one of the Diagraph menus, touch the field and then touch . There is also an Index of Help screens you can display by touching the  key. Touch a topic listed in the Help Index and more Help is displayed.

Keywords on related topics are highlighted in many of the Help screens. For more information about a topic, touch the keyword. You can then return to the previous Help screen by touching **PREVIOUS HELP**. Once you have the information you need, touch **Exit Help** to redisplay the diagraph.



## MULTI-LEVEL FUNCTION KEYS

As shown above in the picture of the Help Index screen, Diagraph uses the eight function keys at the bottom of the screen. Throughout this Handbook, we will instruct you to "touch" function keys based upon the labels shown on the screen for each key. If you prefer, you can press the corresponding function key on the keyboard (f1 to f8) instead of touching the screen.


The function keys communicate commands to Diagraph. Direct commands, such as DELETE SYMBOL, have an immediate impact on the diagraph. Higher level commands merely change the level of the function keys, giving you access to another set of commands. For instance, when you touch  :



the function keys will change and the Text functions will appear:



The current level is indicated by the first word in the message line at the top of the screen. The message line also displays generalized instructions that suggest what you should do next.

The f8 key at each level is the HELP key. For information about the functions at any level, touch .

## DIAGRAPH AND THE HP 150

Diagraph was designed for the HP 150 with 256K of memory. HP flexible and hard disc units are supported, as are the 2, 4, 6, and 8 pen HP plotters (either HP-IB or serial interface). You can also print a diagraph on the HP 150 internal printer or any of the other HP graphics printers.

Diagraph is supplied on 3½ inch micro-diskettes. The four master discs provided are labeled Program Disc, Symbol Library #1, Symbol Library #2 and Pictorial Library #1. Once you have installed the Program Disc and made copies of the Symbol and Pictorial Libraries, as explained in the installation procedure that follows, store the master copies in a safe place.



## THE SOFTLOCK SYSTEM

Your copy of Diagraph is protected from unauthorized use by CSC's SOFTKEY. Our approach to software security features a portable SOFTKEY which can be plugged in at the back of the computer or the plotter. Unlike some copy protection techniques, the SOFTKEY allows you to make archival copies of Diagraph and simplifies the installation of the software in a Winchester disc drive environment.

The SOFTKEY has NO effect on the operation of the equipment or on other software products and the SOFTKEY can be left attached to the computer. To prevent unauthorized use of the software, simply remove the SOFTKEY. But remember, Diagraph will NOT operate unless the SOFTKEY is in place.





## INSTALLATION


The installation procedure consists of installing the Program Disc on a formatted work disc or a Winchester disc drive and then making copies of the Symbol and Pictorial Libraries.

If you have a Winchester disc drive, proceed to INSTALLING THE PROGRAM DISC. When installing Diagraph in a dual disc environment, you must first format four blank work discs. The first disc is used to install the Diagraph program. The other three discs are used to make copies of the Symbol and Pictorial discs.

## FORMATTING WORK DISCS









The procedure for formatting the discs is summarized below and described in detail in Chapter 7 of your HP 150 Owner's Manual, entitled "Formatting a Disc."

1. Insert the HP-supplied Operating System disc containing the FORMAT program in one of your disc drives.
2. Touch  . Touch  . Touch  .
3. Place a new, blank disc in one of your disc drives and specify this disc drive by touching the corresponding letter on the FORMAT menu.
4. You will be prompted to enter a "label" of up to 11 characters. We suggest you use "Graphics" for each of the four discs. Press the Return key.
5. Touch  . Do NOT use the "Copy System" option of FORMAT as there is not enough room on the disc for both Diagraph and the MS-DOS Operating System.

6. When "Operation Complete" appears in the message line, remove the formatted disc, touch  and repeat steps 3 through 6 for each of the remaining three work discs.

## INSTALLING THE PROGRAM DISC














In order to access Diagraph from P.A.M., the HP 150 Personal Applications Manager, you must install the Diagraph Program Disc, containing the program and several data files, using the HP INSTALL utility as described below.

1. Place a copy of the HP-supplied "Disc Applications" in one of your disc drives. Touch . When the Selection Menu appears on the screen, touch "INSTALL" to select the application and then touch .
2. A new set of function keys will appear on the screen. Touch .
3. Place the master Diagraph Program Disc in any one of your drives and the formatted work disc in another. You must then specify the drive letter of the TO and FROM drives. The FROM drive contains the master Diagraph Program Disc and the TO drive contains the formatted work disc.
4. Touch . The application "DIAGRAPH" should appear. If the program name does not appear, touch .
5. Touch "DIAGRAPH" to select the application and then touch .
6. After the "INSTALL COMPLETE" message appears, touch . Remove the work disc and label it "Diagraph Program Disc." Replace the "HP Disc Applications" disc and touch .

## COPYING THE SYMBOL AND PICTORIAL LIBRARIES

After installing the Program Disc, you should make working copies of the Symbol and Pictorial Library discs using the HP COPY/BACKUP program as described below. If you are familiar with the COPY command under MS-DOS, you can "COPY A:\*.\* B:."



Several files appear, under the same names, on both the Symbol Library and Pictorial Library discs. These identical files have been duplicated to insure their availability if either of the discs is removed during a Diagraph session.

1. Touch "COPY/BACKUP" to select the application and then touch  .
2. You will be asked, "Where are the files coming from?" Insert the Symbol Library #1 disc in drive A, and the second work disc in drive B.  
  
NOTE: If installing on a Winchester disc drive, your destination drive must be the root directory, the same one you used to install the Diagraph Program Disc.
3. Type in the letter of the "FROM" (Symbol disc) drive, followed by a colon (for example, "A:"). Press return. A directory of the Symbol Library #1 disc will be displayed. Type in the letter of the "TO" (work disc) drive, followed by a colon (for example, "B:"). Press return.
4. Touch  . Touch  . Touch  .  
  
NOTE: If installing on Winchester drives, when you are asked to replace new files with existing ones, touch  . There are certain data files that are duplicated on the Program, Symbol, and Pictorial Discs.
5. Touch  when the copy operation is complete and switch discs:  
  
Replace the Symbol Library #1 disc with the Symbol Library #2 disc.  
Replace the work disc with your third work disc.  
  
It is a good idea to write-protect the work disc you just removed and label it "Symbol Library #1."
6. Touch  . Touch  . Touch  .
7. Touch  when the copy operation is complete and switch discs:  
  
Replace the Symbol Library #2 disc with the Pictorial Library #1 disc.  
Replace the work disc with your fourth work disc.  
  
Write-protect the work disc you just removed and label it "Symbol Library #2."
8. Touch  . Touch  . Touch  .
9. When the copy operation is finished, remove the discs. Write-protect the work disc and label it "Pictorial Library #1."

The installation procedure is now complete. Store the master copy of the Diagraph Program Disc and the Libraries in a safe place.

## DIAGRAPH AND P.A.M.

Once you have completed the installation of the Diagraph Program Disc, insert the Program Disc in drive A (left drive) unless you are using a Winchester disc drive.


The P.A.M. menu lists all of the applications that are installed under P.A.M. Among them should be "DIAGRAPH." If "DIAGRAPH" does not appear, touch . Touch "DIAGRAPH" and then touch  to load the Diagraph program. When the program has loaded, a message line at the top of the screen will prompt you to:

**"Please PRESS, then RELEASE the button on the SOFTKEY"**

The computer will beep, and unless the button is pressed within a reasonable period of time, the program will return to the P.A.M. menu.

Unless you are using a Winchester disc drive, another message will appear after you have pressed the button on the Softkey:

**Cannot find HELP file, insert the Symbol Library #1 Disc and press RETRY**


Remove the Program Disc and insert the Symbol Library #1 disc in the left drive and the Pictorial Library #1 disc in the right drive; then touch .

Diagraph will (load the defaults file and then) display a WELCOME screen with further instructions.


During a Diagraph session, you can replace the library discs with work discs for loading and saving files. As the Symbol Library #1 disc contains the Help files, if you remove it to load or save a diagraph, you should replace it once the Load/Save operation is complete.


If you replace one of the library discs with a work disc and load a diagraph that calls for a symbol or a special text font that is not present on the system, a message at the top of the screen will inform you which disc should be inserted to complete the loading process. For example:

**Cannot find 'Pictorial Library #1', CANCEL or insert disc and press RETRY**

As the diagraph file has already been read into memory, if the above message appears, remove the work disc, insert the library disc called for and touch .

## LEAVING DIAGRAPH AND RETURNING TO P.A.M.

If you have a standard HP 150 configuration (256K of memory and dual 3½ inch drives), replace the MS-DOS Operating System disc in drive A before you exit from Diagraph. When you touch , Diagraph will reload the operating system.

If you are using a Winchester disc drive, when you touch  the operating system will be reloaded automatically.

If your HP 150 has 384K of memory or more, Diagraph will not need any of P.A.M.'s memory and it will not be necessary to reload the operating system.

Notes for experienced MS<sup>TM</sup>-DOS users:


If you have 256K of memory you MUST run under P.A.M. (standard method) or boot up without P.A.M. (by modifying your CONFIG.SYS file or renaming it). You cannot run Diagraph if you exit to MS<sup>TM</sup>-COMMANDS from P.A.M. and type DIAGRAPH. There is not enough memory to run DIAGRAPH if P.A.M. and MS<sup>TM</sup>-COMMANDS are co-resident.

If you have 384K or more of memory you may elect not to run under P.A.M. by typing DIAGRAPH from the MS<sup>TM</sup>-DOS command line.

## JUST FOR PRACTICE

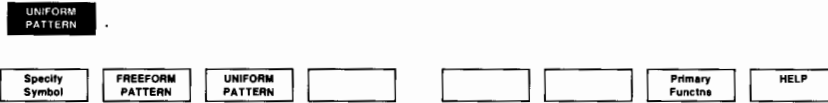
Now that you have installed and loaded Diagraph, the screen titled "WELCOME TO DIAGRAPH" will be displayed. If your HP 150 uses dual disc drives, Symbol Library #1 should be in the left drive and Pictorial Library #1 in the right drive.

The following exercise will acquaint you with a few of the fundamental concepts of Diagraph. Later exercises will examine in detail each of the functions so don't worry about missing anything while creating your first diagraph.

1. When you first load Diagraph or "Start Over" the function keys are displayed as shown below. Touch  to begin the exercise.



- The function keys change and an Initial Pattern Menu appears on the screen. We'll start with a "default" pattern, so just touch the function key labeled



- The large blinking rectangle extends almost to the border of the diagram. To change the blinking symbol from a rectangle to another symbol, first touch the function key labeled

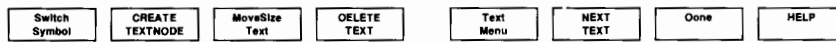


- The Symbol Menu appears at the top of the screen with the cursor positioned in the SYMBOL # field. Change the SYMBOL # from 1001 (a rectangle) to 4341. Touch Done to indicate that you have completed the change in the Symbol Menu. Diagraph reads the symbol from the Pictorial Library #1 disc and draws it on the screen.

- To add a line of text to the diagram, touch



The function keys change as shown below. Touch

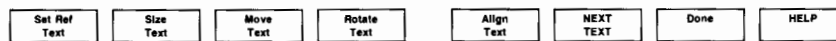


- The Text Menu appears on the screen with the cursor positioned on the top line. Type **DIAGRAPH OPENS NEW DOORS** in capital letters. Touch Done to indicate that you have completed the task. The text appears on the screen above the symbol.

- The last step is to enlarge the text. Touch



The function keys change as shown below. Touch



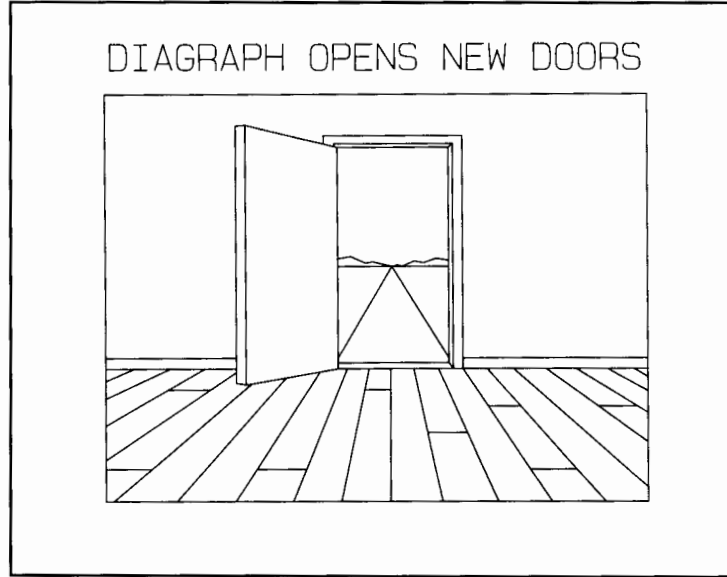
The text disappears temporarily but the blinking frame indicates the size and position of the text.

8. The function keys appear as shown below. Touch **LARGER TEXT** several times until the size of the frame seems appropriate.

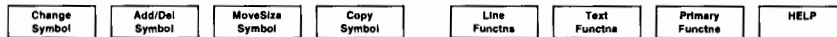


9. Touch **Done** and the text reappears on the screen. Touch **Done** two more times to return to the Design Diagram level.

Your first diagram should appear as pictured below.



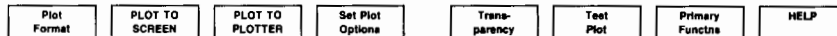
10. If you want to plot a copy of your first diagram, touch **Primary Functions**.



11. The Primary Functions appear as shown below. Touch **Plot Diagram**.



12. Make certain that your plotter is on and properly connected. Touch **PLOT TO PLOTTER**.



## THE LESSON PLAN

Now that you have completed your first diagraph, you have a better understanding of how Diagraph works and the process of creating a diagraph.

The Lesson Plan, consisting of ten lessons, was developed to further your understanding of Diagraph. The lessons are grouped by the three major functions. Following the last lesson in each group, there is a review session that summarizes the preceding lessons.

### **Symbol Functions**

1. Change Symbol
2. Add/Delete Symbol
3. MoveSize Symbol
4. Copy Symbol

### **Line Functions**

5. Connect Symbol
6. Insert Token
7. Draw Line

### **Text Functions**

8. Text Menu
9. MoveSize Text
10. Text Fonts

Each of the lessons builds on the information and skills acquired in previous lessons; therefore, to get the most out of the lessons, you should not skip lessons or do them out of sequence. You should resist the temptation to experiment and improvise during the lessons because each lesson is structured to cover specific points in the least possible time. Once you have completed the lessons, go back and experiment.

The object of each lesson is to produce a diagraph that is similar to that pictured at the end of each lesson. If you are interrupted at any point in a lesson and want to *resume* the lesson at a later time, simply save the diagraph following the procedures described in the next section "Loading and Saving Files."

If you want to *restart* a lesson, the arrangement of the symbols, connectors and text on the screen at the beginning of each lesson has been saved as a file on the Program Disc. The files are named LESSON1, LESSON2, etc. Just enter the appropriate filename in the Drive & Filename Menu for the lesson you wish to restart and load the diagraph file.

Following the ten lessons, a series of Mini-Lessons will reinforce your understanding of the fundamental concepts. Each Mini-Lesson is a diagraph that can be loaded from the Program Disc.

There are also five Application Exercises that utilize your new skills to create and develop an organizational chart, a form, a word chart, a bar chart and an office layout.




## A REVIEW OF THE HELP FACILITY

The lessons were designed to eliminate the question, "What do I do next?" Each step is clearly documented as to which key you should touch, what data should be typed in the menus, where to add symbols and text. However, there will be occasions when you may wonder, "What other choices do I have?" or "Is there any way to . . .?"

We were able to keep the printed text to a minimum because the Help facility is available to answer your questions about the use of the different functions and menu fields.


As the Help facility is such an important asset in the operation of Diagraph, you should review "What is Help" before proceeding with the first lesson.

The rightmost function key displayed on the screen is labeled HELP. Touch .

A help screen appears with the Help function keys displayed as shown below.

Touch .



Touch the entry "What is Help." When you complete your review of the Help facility, touch .


## LOADING AND SAVING FILES

A diagraph can be saved as a file in a format that allows you to load and alter it at a later time. You should be able to store approximately 100 diagraphs of average complexity on a 3½ inch diskette (single sided).

In addition to the diagraph files used to restart the lessons, the review sessions for the Symbol, Line and Text functions are also loaded from the Program Disc. The following exercise will explain how to load and save a diagraph.

From the Design Diagraph level touch . The function keys will change as shown below. To display the Drive and Filename Menu, touch .



If you are using dual disc drives, insert the Program Disc in the left drive and type **A:** in the Drive/Directory field. If you are using a Winchester disc drive, insert the Program Disc and type the drive designation (A–I). In either case, type **TESTLOAD** in the Filename field and touch .

Drive/Directory

**A:**


Filename




**TESTLOAD** .CSC (Chart) .CSG (Graphics)




To minimize the possibility of accidentally erasing a diagram by loading another diagram into memory, a message will appear at the top of the screen.

**File 'A:TESTLOAD.CSC' found, confirm Load (Touch YES or NO)**

Touch  to confirm the loading of the diagram which is then read from the Program Disc. The diagram stored as **TESTLOAD** will appear on the screen.


To save the diagram now displayed, remove the Program Disc from the left drive and insert a formatted work disc. Touch  and then . When the Drive and Filename Menu appears on the screen, change the filename to **TESTSAVE** and touch .

**IMPORTANT:** The following lessons use symbols that are stored on the Symbol Library #1 and Symbol Library #2 discs. Remove the work disc from the left drive and replace it with the Symbol Library #1 disc. Replace the Pictorial Library #1 disc. in the right drive with the Symbol Library #2 disc.

If you have any questions about loading and saving diagrams, touch .

## LESSON #1


TOPICS: Selecting symbols by touch. The *Change Symbol* function. The Symbol Menu including the SYMBOL # field, linetypes for drawing a symbol and how to shade symbols. The importance of the *Proportion Symbol* function.


Before starting Lesson 1, we'll "Start Over" to clear the screen. The Primary function keys should be displayed as shown below. Touch .



A message will appear at the top of the screen:



**Are you sure you want to Start Over? (Touch YES or NO)**

This precaution minimizes the possibility of erasing the diagraph on the screen by accident. Touch  to confirm the Start Over procedure. Diagraph clears the screen and then displays "WELCOME TO DIAGRAPH."

1. To begin Lesson 1, touch . The Initial Pattern Menu appears on the screen as it did when you created your first diagraph. This time we'll create a uniform pattern of two symbols across and three symbols down. Fill in the menu as shown below:

**the number of symbols across the screen 2**

**the number of symbols down the screen 3**

2. Touch . A pattern of six *rectangles* is drawn on the screen. The left symbol on the top row should blink. The blinking symbol is the "active" symbol. Touch one of the other symbols. The selected symbol blinks, indicating that it is now the active symbol.
3. Touch the right symbol on the top row. To alter the characteristics of the symbol, touch .



- A dotted *rectangle* frames the symbol to be changed. The Symbol Menu appears at the top of the screen with the cursor positioned in the SYMBOL # field. Change the SYMBOL # from **1001** to **1003**. Use the right arrow > key to move the cursor to the Linetype field and change the Linetype from **1** (solid line) to **2** (dashed line). Touch **HELP** for information about other line types.

SYMBOL # **1003** Pen **P** Linetype **2** Bold? **N** Frame? **N** Shading Pattern **0** Pen **S**

- Touch **Done** to draw the symbol in a dashed line.



The *rectangle* becomes a *triangle*. Note that the blinking frame surrounds the symbol but does not assume the shape of the symbol.

- Touch the left symbol of the middle row. Touch **Change Symbol**.



- Press the “home” arrow key (just above the up arrow) to move the cursor to the beginning of the SYMBOL # field. Change the SYMBOL # from **1001** to **2082**. Use the tab key to move the cursor to the Shading Pattern field and change the shading pattern from **0** (none) to **9** (solid). Touch **Done**.



- Touch the symbol directly to the right. Touch **Change Symbol**. Change the SYMBOL # from **1001** to **1009**. Move the cursor to the Shading Pattern field and change the shading pattern from **0** (none) to **61** (checkerboard). Touch **Done**.

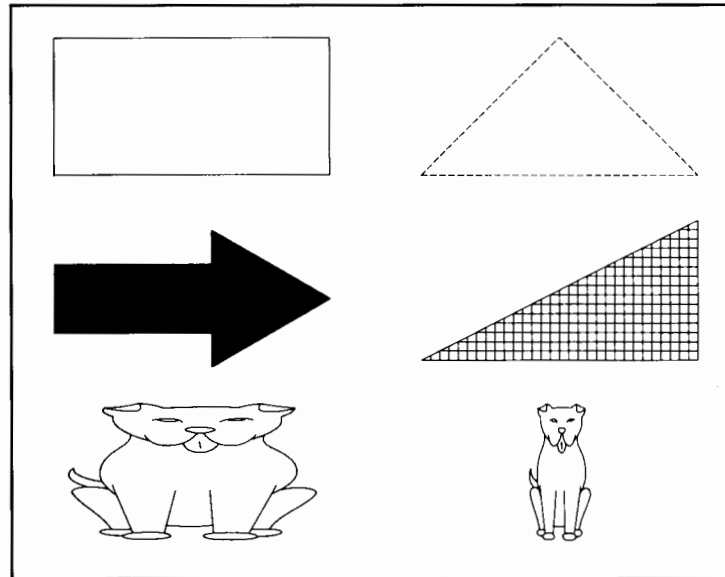
- Touch the left symbol on the bottom row. Change the SYMBOL # from **1001** to **2278**. Touch **Done**. The symbol fills the frame as expected but the image is distorted. Let’s try another approach.

- Touch the symbol directly to the right. Change the SYMBOL # to **2278** but this time indicate that the symbol has a special proportion by touching **Proportn Symbol**. An asterisk appears in the Proportn Symbol key. Touch **Done** to draw the symbol. The difference is apparent.

While both images on the bottom row are of the same height, the size of the frame surrounding the symbol on the left has been adjusted to maintain the proper

proportion of height to width. Generally, when you are working with symbols that have a special proportion, you should touch Proportion Symbol before touching Done.


The diagram on the screen should appear as pictured below.




## LESSON #2

TOPICS: The *Add Symbol*, *INSERT SYMBOL* and *DELETE SYMBOL* functions.  
The use of the arrow keys to control the graphics cursor. How the graphics cursor can be used to add a symbol at a specific location.



Begin Lesson 2 with the diagram displayed on the screen from Lesson 1. You should be at the Design Diagram level with the function keys displayed as shown below. If you restarted the lesson by loading "LESSON2," you will also be at the Design Diagram level.

1. Touch  to display the add and delete symbol functions.



- Note that the DELETE SYMBOL function key is in capital letters to indicate that the function will have an immediate effect on the diagraph versus changing function levels. Touch the *rectangle* on the top row and when it blinks, touch . Now delete the *triangle* on the top row.




- To add a symbol, touch . The Symbol Menu appears at the top of the screen. A dotted rectangle frames the symbol that will be used to determine the size, proportion and orientation of the symbol to be added. Type **2298** in the SYMBOL # field and touch .

SYMBOL # **2298** Pen P Linetype 1 Bold? N Frame? N Shading Pattern 0 Pen S


- A message will appear at the top of the screen:


**ADD — Touch the screen to add the symbol specified in the menu**

Touch the screen on the left of the top row to add a *house* in the space that was occupied by the *rectangle*.

- To add a different symbol, touch .



The Symbol Menu will appear at the top of the screen. Change the SYMBOL # from **2298** to **1002** (a *circle*). Touch .

- The ADD message will appear again at the top of the screen. Touch the screen to the right of the *arrow* to add the *circle*. The symbol is read from the Symbol Library #2 disc and an *ellipse* appears on the screen. Like the *dog* on the bottom row, a *circle* has a special proportion. Unless you specify that the symbol to be added has a special proportion, Diagraph uses the proportion of the symbol outlined by the dotted frame when the Symbol Menu is displayed on the screen.
- To correct the error, simply touch . The symbol you just added will disappear.



8. Touch **Specify Symbol** to restore the Symbol Menu and function keys. When the Symbol Menu appears, touch **Proportn Symbol\*** and then **Done**.



When the ADD message appears, touch the upper right hand corner to add a *circle*.

9. To add a symbol at a specific location with more precision than is possible by touching the screen, touch **Turn ON Cursor**.

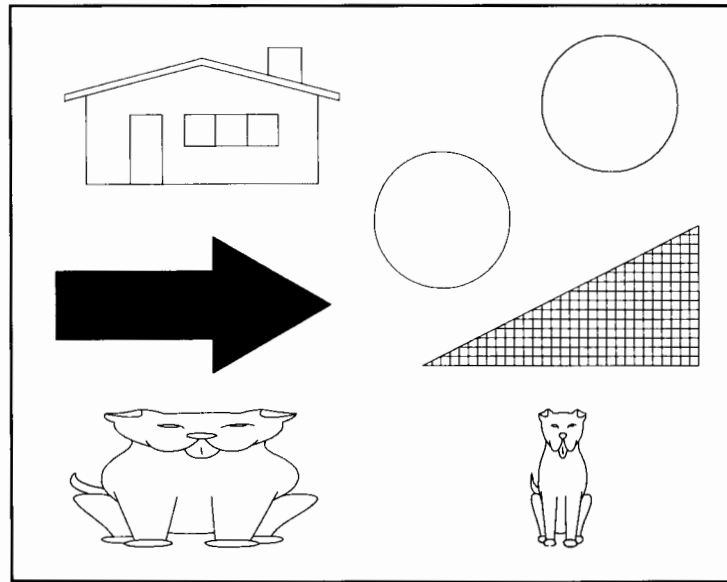


10. A crosshair cursor (+) appears in the center of the *circle*. Use the left arrow < and down arrow v keys to position the cursor in the area below and to the left of the *circle*. Touch **INSERT SYMBOL** to add another *circle* at the location indicated by the cursor.



Touch **Done** to indicate that you have finished adding symbols.

The diagram on the screen should be similar to the one pictured below.



## LESSON #3

TOPICS: The *Move*, *Size*, *Rotate* and *Flip Symbol* functions. The use of touch and the arrow keys to adjust the size, shape and orientation of the symbols displayed on the screen.

Begin Lesson 3 with the diagram displayed on the screen from Lesson 2. You should be at the Add/Delete level with the function keys displayed as shown below. If you restarted the lesson by loading "LESSON3," you will be at the Design Diagram level.

1. To provide extra room to maneuver the symbols, delete the *house* and two *circles*.



2. To move the *triangle*, touch it and then touch **MoveSize Symbol** to display the move and size symbol function keys. Touch **Move Symbol**.

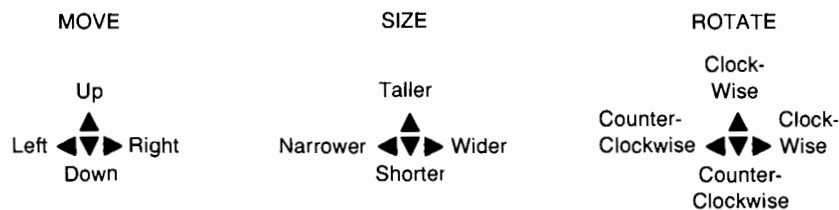


3. The symbol is temporarily erased from the screen but the blinking frame shows the height and width of the symbol. A message is displayed at the top of the screen.

### MOVE — Touch the screen at the desired location or use the arrow keys

Touch the screen just above the active (blinking) symbol. The symbol will move up and the blinking frame will be centered around the point you designated.

4. Depending upon the function selected, the arrow keys can be used to:



Press the right arrow > key once to move the symbol the minimum distance to the right (one pixel). If you hold the key down, the blinking frame will move



continuously in the direction of the arrow. Move the frame up and to the right until it is about  $\frac{1}{4}$  of an inch from the top and right margins of the diagram. Touch **Done** when you have completed the task.

5. Touch the solid-shaded *arrow*. Touch **Move Symbol**. Use the up arrow  $\wedge$  key to move the symbol so there is room to increase the height of the symbol in both both directions (up and down). To change the size of the symbol, touch **Size Symbol** and use the up arrow  $\wedge$  key to increase the height of the symbol. Use the left arrow  $<$  key to narrow the width of the symbol. Touch **Done** when the width of the symbol is about  $\frac{1}{2}$  the height.
6. To rotate the solid shaded *arrow*, touch **Rotate Symbol**. Press the right arrow  $>$  key to rotate the blinking frame clockwise. You can also touch the **CLOCK-WISE** and **COUNTER-CLOCKWISE** function keys. Touch **Done** when you have rotated the symbol 90 degrees.



7. Touch the *triangle*. Touch **Flip Symbol**. Press the left arrow  $<$  key to flip the image to the left or touch **FLIP  $\leftrightarrow$** . Note that flip is different from rotate and that you cannot rotate the triangle to reproduce the orientation of the flipped symbol. Press the right arrow  $>$  key or **FLIP  $\leftrightarrow$**  to restore the symbol and then the up arrow  $\wedge$  key or **FLIP  $\wedge\vee$**  to invert the symbol. Touch **Done**.

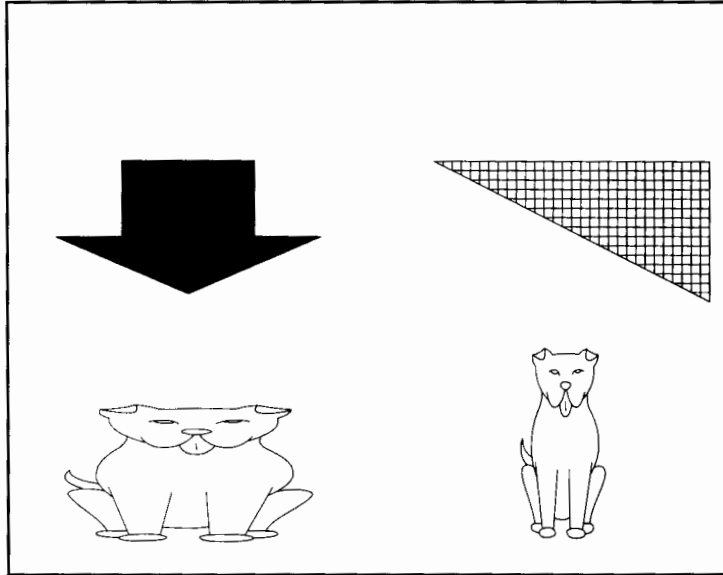


8. Touch the *dog* in the lower right hand corner. Touch **Move Symbol**. Move the symbol up so there is room to make it larger and then touch **Size Symbol**. Use the up arrow  $\wedge$  key to increase the height of the symbol. Touch **Done** and notice the distortion introduced by increasing the size of a proportional symbol in only one direction.
9. To correct the proportion, touch **Size Symbol** and then **PROPORTN SYMBOL**. Note that the frame assumes the standard proportion of the symbol. Now touch **LARGER SYMBOL** several times until the blinking frame is noticeably larger in both directions. Touch **Done** to redraw the symbol. LARGER SYMBOL and SMALLER SYMBOL maintain the current proportion of the symbol.

10. To precisely align one symbol with another symbol, touch **Align Symbol**. The function keys will change as shown below. Touch the *arrow* to select it as the *reference symbol* and then touch **Set Ref Symbol**. Touch the *triangle* and when the frame blinks, touch **ALIGN TOP**. The top of the *triangle* will now be in line with the top of the *arrow*. Touch **Done** to return to the MoveSize Symbol level.



The diagram on the screen should be similar to the one pictured below.



## LESSON #4

TOPICS: The *Copy* and *Switch Symbol* functions. The interaction of the *MoveSize* and *Add Symbol* functions when copying symbols. The use of the arrow keys and the *INSERT SYMBOL* function to copy symbols.

Begin Lesson 4 with the diagram displayed on the screen from Lesson 3. You should be at the MoveSize Symbol level with the function keys displayed as shown below. If you restarted the lesson by loading "LESSON4," you will be at the Design Diagram level.

1. To make room on the screen to copy symbols, touch the *arrow* and then **Size Symbol**. Reduce the size of the *arrow* and the *triangle* so that each is about one half of its current size. Touch **Done** twice to return to the Design Diagram level.



2. Touch the *triangle*. When it blinks, touch **Copy Symbol**.



3. A dotted rectangle frames the symbol to be copied. Touch the middle of the screen to make a copy of the *triangle*. Press the right arrow > key to make a copy immediately to the right. Touch **Turn ON Cursor**. When the cursor appears, move it to an area above the framed *triangle* and touch **INSERT SYMBOL**.

4. To make a copy of the *arrow*, you must “switch” the dotted frame that designates the symbol to be copied. Touch **Switch Symbol**. Touch the *arrow* and when the frame blinks, touch **Done**. The dotted frame now appears around the *arrow*. Move the cursor down and touch **Insert Symbol** to make a copy.

5. Touch **MoveSize Symbol**. Touch **Size Symbol** and reduce the size of the symbol as indicated by the frame that surrounds the *arrow*. Touch **Done** twice to return to the Copy level. Note that when you return to the Copy level, the dotted frame now surrounds the *arrow*. Move the cursor to the right and touch **INSERT SYMBOL**.

6. When arranging symbols on the screen you may find that a symbol you need isn't present and so you must “add” rather than “copy” the symbol. For that reason, the Add Symbol function is available at the Copy Symbol level as shown below. Touch **Add Symbol**.

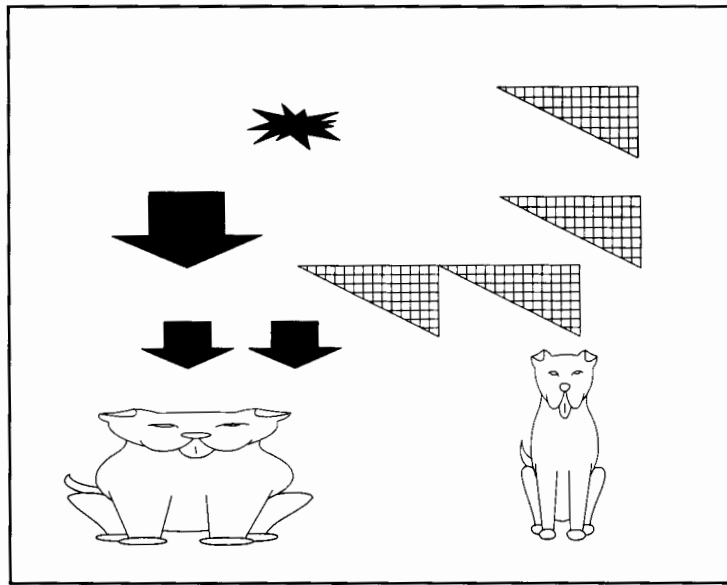


7. The Symbol Menu appears at the top of the screen. Change the SYMBOL # from **2082** to **1061**.



- Touch **Done**. Position the cursor above the *arrows* and to the left of the top *triangle*. Touch **INSERT SYMBOL** to add the new symbol.

The diagram on the screen should be similar to the one pictured below.



## REVIEW SESSION #1

A review of the fundamental concepts you learned in Lessons 1 to 4 is saved as a diagraph on the Program Disc. To begin the review session, you must first load "REVIEW1."

Touch **Done** twice to return to the Design Diagraph level. Remove the Symbol Library #1 disc from the left drive and replace it with the Program Disc. Touch **Primary Functions** and then **LoadSave Diagraph**.

The Drive/Filename Menu is displayed. Type an **A:** in the Drive field and **REVIEW1** in the Filename field. Touch **LOAD DIAGRAPH**.

Drive/Directory

**A:**

Filename

**REVIEW1** .CSC (Chart) .CSG (Graphics)

To minimize the possibility of accidentally erasing a diagraph by loading another diagraph, a message will appear at the top of the screen:

**File 'A:REVIEW1.CSC' found, confirm Load (Touch YES or NO)**








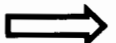




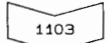




Touch **YES** to confirm the loading of the diagraph which is then read from the Program Disc. As the diagraph includes symbols that are stored on the Symbol Library #1 disc, another message will appear at the top of the screen:

**Cannot find 'Symbol Library #1', CANCEL or insert disc and press RETRY**

Since the diagraph has already been read into memory, remove the Program Disc from the left drive and replace it with the Symbol Library #1 disc. Touch **RETRY** and follow the instructions that appear on the screen.

When you complete the review session, the diagraph on the screen should appear as pictured below. Proceed to Lesson 5.

REVIEW SESSION #1

1. TOUCH THIS RECTANGLE  AND CHANGE IT TO AN ARROW  THEN A CIRCLE 
2. TOUCH THIS STAR  & CHANGE THE SHADING PATTERN TO  THEN 
3. HIGHLIGHT THESE SYMBOLS BY CHANGING THE SHADING PATTERN TO 





4. USE "ADD SYMBOL" TO ADD 3 NEW SYMBOLS TO THE RIGHT OF THE EXAMPLES SHOWN BELOW. REMEMBER, YOU CAN ADD A SYMBOL STARTING FROM ANY OTHER SYMBOL ON THE DIAGRAPH. USE MOVE, SIZE, FLIP & ROTATE TO REARRANGE THE SYMBOLS ADDED IN THE SPACE PROVIDED.
   



5. TOUCH THE SYMBOL BELOW AND MAKE 3 COPIES (USE RIGHT ARROW) . ADD SYMBOL 1846 TO THE RIGHT OF THE LAST COPY.
   

6. MAKE A COPY OF THE STAR IN #2 ABOVE AND USING THE CURSOR PLACE IT HERE ->  THEN PROCEED TO LESSON #5 IN THE HANDBOOK.



## LESSON #5

TOPICS: The *Connect Symbol*, *Specify Line*, *Move Node*, *SAVE SEGMENT*, and *Modify Line* functions. How to connect symbols using the cursor to create a connector of several segments. How to modify the characteristics of a connector including the addition of tokens.

Now that you can add, delete, move, size and copy symbols, the next three lessons will explain how to “connect” symbols, “insert” tokens and “draw” lines.

1. To begin Lesson 5, touch **Primary Functions** and **Start Over**. Touch **Design Diagram**. When the Initial Pattern Menu appears, create a uniform pattern of three symbols across by three down.
2. To connect the left symbol (blinking) on the top row to any other symbol, touch **Line Functions**.



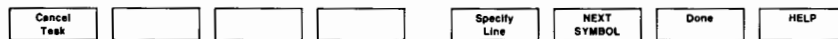
3. A dotted rectangle frames the symbol selected. To connect the framed symbol with another symbol, touch **Connect Symbol**.



4. A message appears at the top of the screen:

**SELECT SYMBOL — Touch the other symbol to be connected and then touch Done**

Touch the symbol below the framed symbol and then touch **Done**. If you make a mistake, touch Cancel Task and begin again.



5. Both of the symbols to be connected are now framed by dotted rectangles. A small square appears on the perimeter of the first symbol and marks the beginning of the connector. Touch **NEXT NODE** to proceed to the next of the prepositioned nodes arranged around the perimeter of the symbol. Touch **NEXT NODE** two more times until the node at the bottom of the symbol blinks. Touch **Done** to confirm that node as the starting point of the connector.

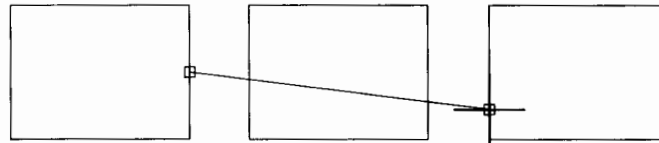
6. A blinking node appears on the perimeter of the second symbol. Touch **NEXT NODE** once and a node on top of the symbol blinks. Touch **Done** to select that node as the ending point of the connector.



7. A rubberband line appears connecting the first node to the second node. Touch **Done** to complete the connection and return to the Line Functions level.
8. To connect the framed symbol with another symbol, touch **Connect Symbol** and then touch the symbol in the top right corner. Touch **Done** to confirm the selection.
9. You can change the default values that will be used to draw the connector. Touch **Specify Line**. The Line/Connector Menu appears at the top of the screen. Change the Linetype from **1** (solid) to **2** (dashed). Change the TOKEN # fields from **0** to **1** in the "Start" field and from **0** to **2** in the "End" field. Touch **Done** to complete the specification of the connector to be drawn between the two framed symbols.

LINE/CONNECTOR Pen P Linetype **2** Bold? N TOKEN # Start **1** Middle **0** End **2**

10. Touch **NEXT NODE** twice until the prepositioned node on the right side of the symbol blinks and then touch **Done**. When the node on the left side of the second symbol blinks, touch **Move Node** to reposition the node. Use the down arrow  $\nabla$  key to move the node about half the distance to the corner of the symbol. Touch **Done** to complete the Move Node procedure. Touch **Done** again to confirm the node as the destination node.
11. A rubberband connector is drawn through the middle symbol on the top row, ending with a graphics cursor that appears as a "+" on the destination node.

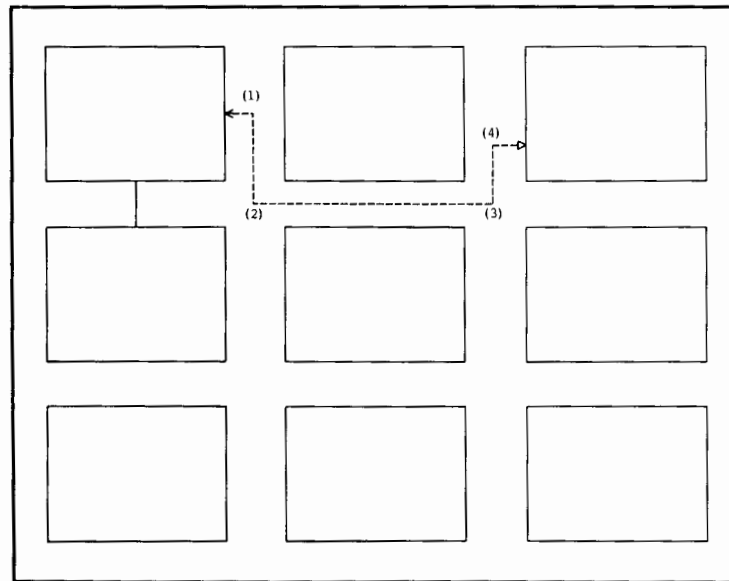


You can maneuver the graphics cursor using touch or the arrow keys. To form a “U” shaped connector of several segments, use the arrow keys to position the cursor at location (1). Touch **SAVE SEGMENT** to “freeze” the first segment, allowing you to change the direction of the connector.



12. Use the down arrow  $\nabla$  key to move the cursor down to location (2) and touch **SAVE SEGMENT**. Use the right arrow  $>$  key to move the cursor to location (3) and touch **SAVE SEGMENT**. Use the up arrow  $\wedge$  key to move the cursor to location (4) so that the right tip of the cursor intersects the midpoint of the destination node. Touch **SAVE SEGMENT**. Touch **Done** to complete the last segment. The last segment is automatically drawn from wherever the cursor is positioned to the destination node when you touch Done.

The diagram on the screen should appear as pictured below.



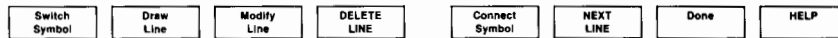


## LESSON #6

TOPICS: The *NEXT LINE*, *DELETE LINE*, *Modify Line*, *Move End of Line*, *Switch Symbol*, and *Insert Token* functions. The effect of moving symbols that are connected to other symbols. How to insert tokens at specific points on a connector.

Begin Lesson 6 with the diagraph displayed on the screen from Lesson 5. You should be at the Line Functions level with the function keys displayed as shown below. If you restarted the lesson by loading "LESSON6," you will be at the Design Diagraph level.

1. When you restructure a diagraph, it is often necessary to delete complex connectors. The short vertical connector should be blinking. To delete the "U" shaped connector, touch **NEXT LINE** to select the next connector associated with the framed symbol. The connector that blinks is the active connector and can be modified or deleted. When the first segment of the "U" shaped connector blinks, touch **DELETE LINE**.



2. To modify the characteristics of the remaining connector, touch **Modify Line**. The Line/Connector Menu appears at the top of the screen. Change the TOKEN # from 0 to 1 in the "End" field. Touch **Move End of Line**.

LINE/CONNECTOR Pen P Linetype 1 Bold? N TOKEN # Start 0 Middle 0 End 1



3. To adjust the location of the node at the end of the connector that is blinking, use the left arrow < key to move the node to the left corner of the symbol and touch **Done**.
4. The other end of the connector is associated with the symbol just below the framed symbol. To move that end of the connector, you must first switch the frame to the other symbol. Touch **Switch Symbol**. Touch the other symbol and then touch **Done**. Touch **Modify Line**. Touch **Move End of Line** and use the left arrow < key to move the node to the left corner of the symbol. Touch **Done**.

5. If you move, size or rotate a symbol, any connectors associated with the symbol will be affected. Touch **Done** to return to the Design Diagram level. Touch **MoveSize Symbol**. Touch the symbol in the upper left corner. Touch **Move Symbol**. Touch the screen at several locations and observe the movement of the connector. Touch **Size Symbol** and change the size of the symbol. Touch **Rotate Symbol** and rotate the symbol.
6. If you delete a symbol, any connectors that are associated with the symbol will be deleted. To return to the Design Diagram level, touch **Done** twice. Touch **Add/Del Symbol**. Touch **DELETE SYMBOL**. Touch the symbol in the upper right corner. Touch **DELETE SYMBOL**. Touch **Done**.
7. Touch the remaining symbol on the top row and when it blinks, touch **Line Functions**. Touch **Connect Symbol** and touch the left symbol on the middle row. Touch **Done** to confirm the selection. Touch **Specify Line**. The Line/Connector Menu appears at the top of the screen. Change the TOKEN # from **0** to **2** for the "Start," "Middle" and "End" fields. Touch **Done** to complete the specification.

**LINE/CONNECTOR Pen P Linetype 1 Bold? N TOKEN # Start 2 Middle 2 End 2**

8. When the node on the left side of the first symbol blinks, touch **Done**. Touch **NEXT NODE** once to select the node at the top of the second symbol and touch **Done**. A rubberband line will appear with the cursor positioned in the center of the second node. Use the up arrow  $\wedge$  key to move the cursor up until the rubberband line forms a horizontal line extending from the first symbol. Touch **SAVE SEGMENT**. Touch **Done** to draw the connector.



9. The tokens specified in the Line/Connector Menu appear at the midpoints of the segments and the end points of the connector. While the start, middle and end points of a connector are the most common locations for tokens, there are often occasions when you will need to insert tokens at specific points on a connector. Touch **Connect Symbol**. Touch the right symbol on the middle row. When it blinks, touch **Done**. Touch **NEXT NODE** once to select the right node on the first symbol and touch **Done** to confirm the selection. Touch **NEXT NODE** once to select the node at the top of the second symbol and touch **Done**. Use the

up arrow  $\wedge$  key to move the cursor up to form a horizontal line from the first symbol. Touch **Insert Token**.



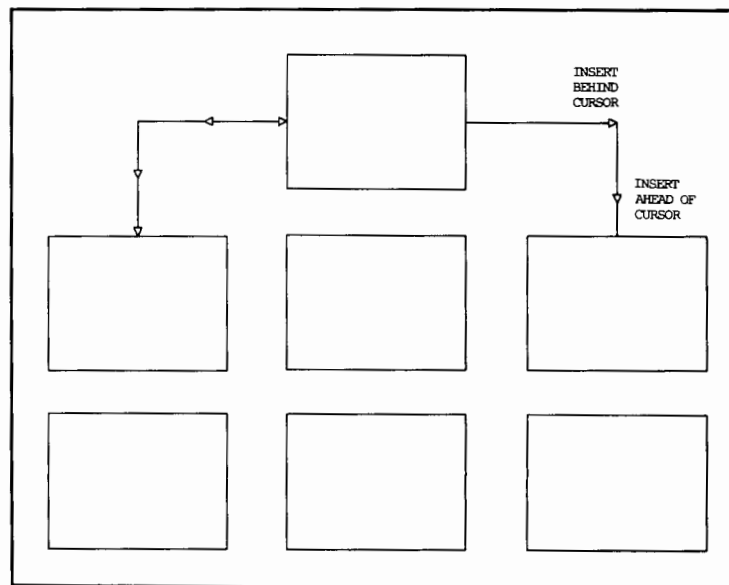
- As you can insert any one of many different tokens, you must specify the token to be inserted. Touch **Specify Token = 0**. The Insert Token Menu appears at the top of the screen followed by the TOKEN TABLE. Change the Token # to be inserted from 0 to 2.

### INSERT TOKEN — Enter the Token # to be inserted 2

Touch **Done** and note that the function key is updated from “=0” to “=2”.

- Tokens are inserted relative to the position of the cursor. Touch **BEHIND CURSOR** to insert the token and draw the first segment. Move the cursor down until it approximates the location shown in the diagram below and touch **AHEAD OF CURSOR**. The token is inserted ahead of the cursor and the cursor is then moved to the other side of the token. Touch **Done** to return to the Draw Connector level. Touch **Done** again to complete the connection.

The diagram on the screen should appear as pictured below.



## LESSON #7

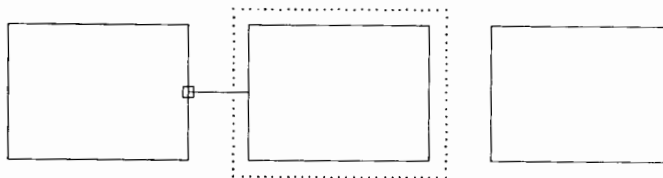
TOPICS: The *Draw Line*, *Turn ON Draw*, and *Turn OFF Draw* functions. The similarities and differences between connectors drawn using *Connect Symbol* and lines drawn using the *Draw Line* function.

Begin Lesson 7 with the diagram displayed on the screen from Lesson 6. You should be at the Line Functions level with the function keys displayed as shown below. If you restarted the lesson by loading "LESSON7," you will be at the Design Diagram level.

1. The diagram on the screen from Lesson 6 will help illustrate some of the differences between the Connect Symbol and Draw Line functions. To switch the dotted frame from the top symbol to the symbol directly below it, touch **Switch Symbol**. Touch the symbol in the center of the screen and touch **Done**. Touch **Draw Line**.

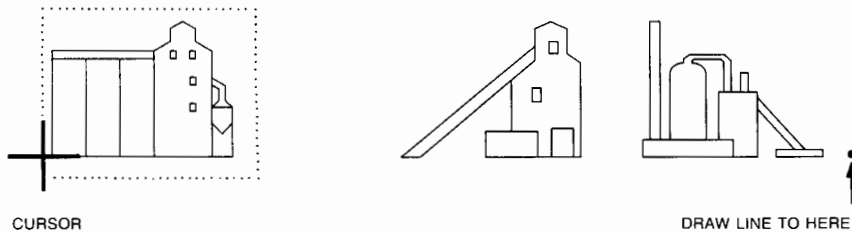


2. Just as you connected symbols using prepositioned nodes, you can draw lines from the prepositioned nodes on a symbol. This procedure is particularly convenient when the symbol has a curved or irregular outline. To confirm the prepositioned node on the left side of the symbol, touch **Done**. The cursor appears at the center of the node. Use the left arrow < key to move the cursor to the left until it is positioned on the perimeter of the symbol, as if the symbols were connected. Touch **Done** to draw the line.



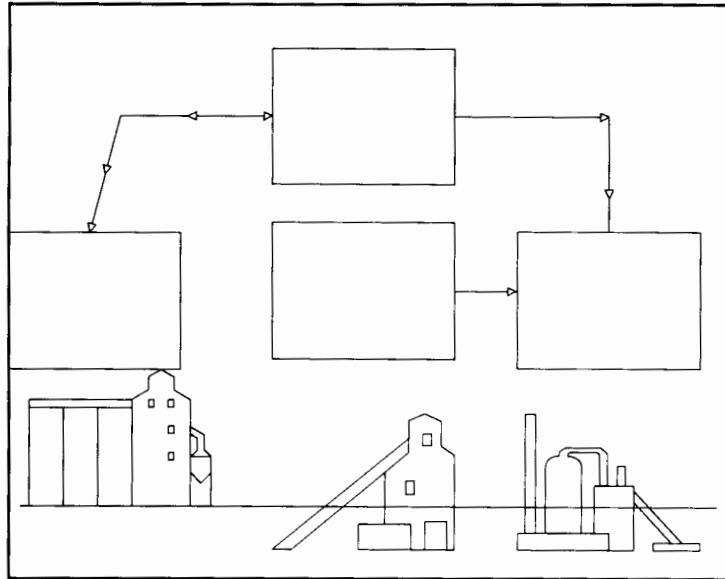
3. To modify the characteristics of the line that is blinking, touch **Modify Line**. The Line/Connector Menu appears at the top of the screen. Change the TOKEN # from 0 to 2 in the "End" field. Touch **Done**.

4. To illustrate the major difference between connectors and lines, touch **Done** to return to the Design Diagram level. Touch **MoveSize Symbol**. Touch the left symbol on the middle row. Touch **Move Symbol** and move the symbol to the left until it touches the border of the diagram. Note that the last segment of the connector from the symbol on the top row moves with the symbol, unlike the horizontal line.
5. A distinctive feature of the Draw Line function is that if you move a symbol with which a "line" is associated, both the first and last segments of the line will move with the symbol as a unit. For this reason, we recommend you use Connect Symbol, rather than Draw Line, to connect symbols you expect to rearrange later. Touch **Done** to return to the MoveSize level. Touch the symbol in the center of the screen. Touch **Move Symbol**. Press the up arrow  $\wedge$  key five times. Touch **Flip Symbol** and **FLIP  $\wedge \vee$**  to flip the symbol. Touch **Done**.
6. Touch the left symbol on the bottom row and touch **Change Symbol**. Change the three symbols on the bottom row to **2435**, **2436** and **2412** starting at the left. Touch the *grain elevators* (left symbol) and then touch **Line Functns**. Touch **Draw Line**. When the node appears in the middle of the symbol, touch **Done**. The cursor appears in the center of the node. Touch the screen anywhere on the diagram. To turn off the rubberband line, touch **Turn OFF Draw**. Move the cursor to the bottom left corner of the diagram so that the vertical portion of the cursor is aligned with the left side of the dotted frame and the horizontal portion coincides with the bottom of the grain elevators, as shown below. To draw a line at the base of the three symbols, touch **Turn ON Draw**, and use the right arrow  $>$  key to move the cursor to the right of the *oil refinery* (right symbol). Touch **Done** to draw the line.



7. Touch **Done** to return to the Design Diagram level. Touch **MoveSize Symbol**. Touch **Move Symbol** to move the *grain elevators*. Use the up arrow  $\wedge$  key to move the blinking frame up until the top of the frame coincides with the bottom of the symbol immediately above it. Touch **Done**.

The diagram on the screen should appear as pictured below.



## REVIEW SESSION #2

A review of the fundamental concepts you learned in Lessons 5 to 7 is saved as a diagraph on the Program Disc. To begin the review session, you must first load "REVIEW2."

Touch **Done** to return to the Design Diagraph level. Remove the Symbol Library #1 disc from the left drive and replace it with the Program Disc. Touch **Primary Functions** and then **LoadSave Diagraph**.

The Drive/Filename Menu is displayed. Type **A:** in the Drive field and **REVIEW2** in the Filename field. Touch **LOAD DIAGRAPH**.

Drive/Directory

**A:**

Filename

**REVIEW2** .CSC (Chart) .CSG (Graphics)

To minimize the possibility of accidentally erasing a diagram by loading another diagram, a message will appear at the top of the screen.

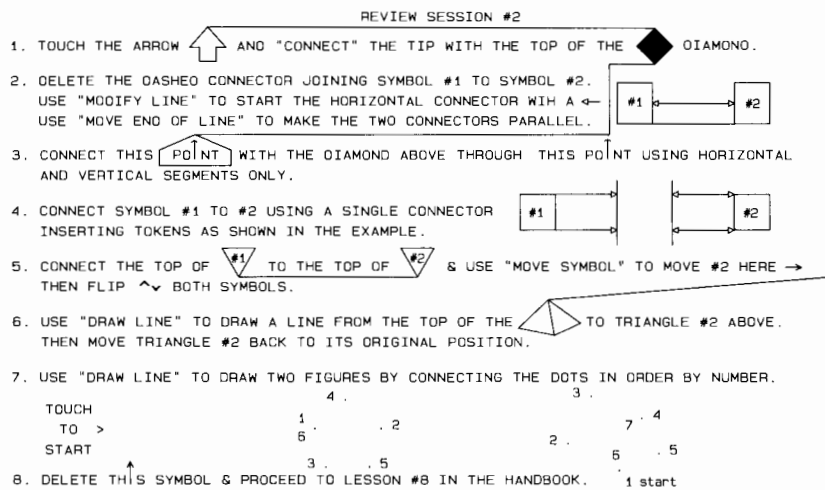
**File 'A:REVIEW2.CSC' found, confirm Load (Touch YES or NO)**

Touch **YES** to confirm the loading of the diagram which is then read from the Program Disc. As the diagram includes symbols that are stored on the Symbol Library #1 disc, another message will appear at the top of the screen advising you that the library required is not available.

**Cannot find "Symbol Library #1", CANCEL or insert disc and press RETRY**

Since the diagram has already been read into memory, remove the Program Disc from the left drive and replace it with the Symbol Library #1 disc. Touch **RETRY** and follow the instructions that appear on the screen.

When you complete the review session, the diagram on the screen should appear as pictured below. Proceed to Lesson 8.



## LESSON #8

TOPICS: The *Text Menu* and the fields on the menu that control the characteristics of each line of text. How to imbed highlighted words and phrases in a line of text for emphasis.

Now that you can create compositions of lines and symbols, the next three lessons will explain how to add text to a diagram using the Text Menu, text functions and a variety of text fonts.

1. To begin Lesson 8, touch **Primary Functions** and **Start Over**. Touch **Design Diagram**. When the Initial Pattern Menu appears, create a uniform pattern of two symbols across by two down.
2. To add a line of text to a symbol, touch the right symbol on the top row. When it blinks touch **Text Functions**.



3. A dotted rectangle frames the symbol selected and a small text node appears in the center. Touch **Text Menu** and type **LINE ONE** on the first line of the menu in caps.

**LINE ONE**                      TEXT                      P S J F B I  
P 3 C 1 N N

Touch **Done** and the text block appears, centered inside the symbol.



4. The size of the text block is determined by several factors, including amount of text (number of characters and lines) and the size of the characters. If you change any of these factors, you will affect the size of the text block. Touch **Text Menu**. Change the Size field "S" from **3** to **9**. Touch **Done**.
5. The specifications for the first line of text are used for each succeeding line of text entered in the menu unless another value is entered on a subsequent line. Thereafter, the new specification remains in effect until another change is encountered for that field. Touch **Text Menu**. Type **LINE TWO** on the second line.



Type **LINE THREE** on the third line. Change the entry in the Italics field "I" on the second line of the menu from **blank** to **Y**. Change the entry in the Italics field back to **N** on the third line. Change the entry in the Bold field "B" on the third line of the menu from **blank** to **Y**. Touch **Done** to plot the text on the screen.





	TEXT	P	S	J	F	B	I
LINE ONE		P	9	C	1	N	N
LINE TWO						Y	
LINE THREE						Y	N

6. The type of data entered in the Text Menu may affect the selection of the entry in the Justify field. Numeric data, entered in columns, is usually right justified, whereas text is usually left justified or centered. To illustrate how to use the Justify field "J" on the text menu, touch **Switch Symbol**. Touch the symbol to the left and when it blinks, touch **Done** to switch the dotted frame. Touch **Text Menu** and type **LINE ONE** on the first line of the menu, **LINE TWO** on the second line and **LINE THREE** on the third line. Change the Size field "S" from **3** to **9** on the first line. Change the Justify field "J" from **C** to **L** (flush Left) for the first line, from **blank** to **R** (flush Right) for the second line and from **blank** to **C** (Centered) for the third line. Touch **Done** to plot the text on the screen.

	TEXT	P	S	J	F	B	I
LINE ONE		P	9	L	1	N	N
LINE TWO				R			
LINE THREE				C			





7. When arranging text and numbers in columns in the same text block, it is often necessary to suppress all justification and to type the data in the menu exactly as it is to appear in the text block, including all leading blanks. Touch **Switch Symbol**. Touch the symbol directly below the blinking symbol and touch **Done**. Touch **Text Menu**. Change the Size field from **3** to **6**. Change the Justify field "J" from **C** (Centered) to **N** (None). Type the data as shown below and touch **Done**.

	TEXT	P	S	J	F	B	I
\$1,000.00 — U.S. FUNDS		P	6	N	1	N	N
27.40							
1.53							
147.35							

8. You can combine two or more lines of text that have different characteristics (pen, font, italics, bold) into a single line of text, thereby highlighting keywords or phrases. To illustrate how you can ‘Imbed’ text touch . Touch the symbol to the right and then touch . Touch . Type the text and change the menu fields as shown below. Touch .

USE THE TEXT FEATURE  
IMBED  
TO HIGHLIGHT WORDS

P	S	J	F	B	I
P	<b>6</b>	<b>N</b>	1	N	N
		<b>I</b>			<b>Y</b>
		<b>C</b>			<b>N</b>





9. Two of the parameters that affect the size of the text block are the % Space between Characters and the % Space between Lines of text. Touch  the left symbol on the top row. Touch . Touch . Change the % Space between Chars from **33** to **66**. Change the % Space between Lines from **50** to **100**. Touch  to plot the text block. Note the increase in spacing between the characters and lines of text.

LINE ONE  
LINE TWO  
LINE THREE

LINE ONE  
LINE TWO  
LINE THREE

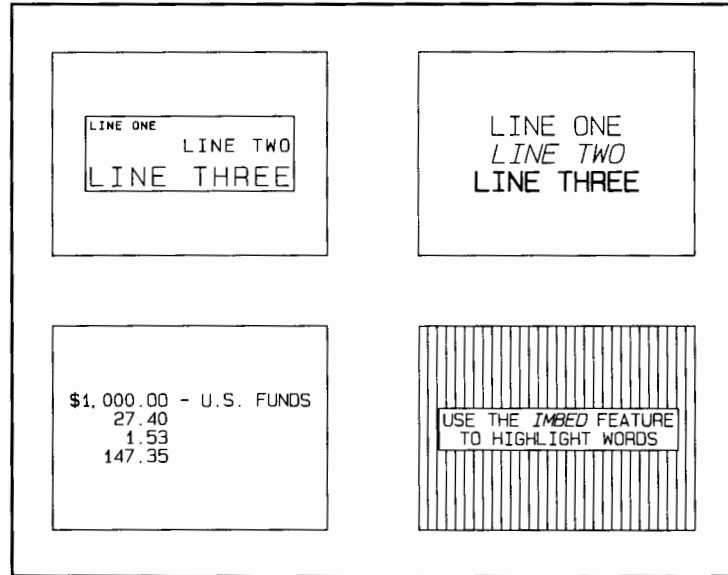
% SPACE BETWEEN CHARS = 33  
% SPACE BETWEEN LINES = 50

% SPACE BETWEEN CHARS = 66  
% SPACE BETWEEN LINES = 100

10. The size of each line of text can be varied. Touch . Change the Size field for the first line from **9** to **3**. Change the Size field for the second line from **blank** to **6**. Change the Size field of the third line from **blank** to **9**. Touch . The second line is approximately twice the size of the first line and the third line is three times the size of the first line. In the next lesson you will use the Size Text functions to change the size of the text block, thereby overriding the sizes specified in the Text Menu. However, the relative size of the characters in a text block will still be determined by the values specified in the Size field; e.g., the characters in line two (Size=6) will be twice the size of the characters in line one (Size=3).
11. To plot a frame around the block of text, touch . Change the Frame field from **N** to **Y**. Touch  replot the text within a frame.

12. You can also “window” text inside a shaded symbol. Touch **Done** to return to the Design Diagram level. Touch the right symbol on the bottom row. When it blinks, touch **Change Symbol**. Change the Shading Pattern from **0** to **4** and touch **Done**. Unless you specify a solid shading pattern, you should probably frame the windowed text. Touch **Text Funcns**. Touch **Text Menu** and change the Frame field from **N** to **Y**. Touch **Done** to replot the text.







































The diagram on the screen should appear as pictured below.



## LESSON #9

TOPICS: The *DELETE TEXT*, *NEXT TEXT*, *CREATE TEXTNODE*, and the *MoveSize Text* functions. The use of the arrow keys to change the height and width of the characters in a text block and how to restore the standard proportions. How to align two blocks of text.

Begin Lesson 9 with the diagram displayed on the screen from Lesson 8. You should be at the Text Functions level with the function keys displayed as shown below. If you restarted the lesson by loading “LESSON9,” you will be at the Design Diagram level.

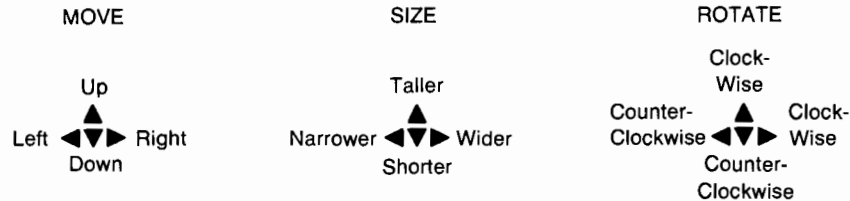
1. To make room on the diagram for new text blocks and to demonstrate other Text Functions, touch  , touch the right symbol on the top row and touch  . Touch  .  
       
2. To move a block of text, you must first activate the symbol with which the text is associated. Touch  . Touch the symbol to the left and then touch  . Touch  . Touch  . The block of text will temporarily disappear, but the blinking frame indicates the size and position of the text. Touch the center of the symbol to the right. Touch  .
3. Even though the text appears inside the symbol on the right, it belongs to the symbol on the left. To illustrate the association, touch  twice to return to the Design Diagram level. Touch  . Touch the symbol on the right and when it blinks, touch  . Because the symbol you deleted was not associated with the text, the text block remains unchanged.
4. Touch the remaining symbol on the top row and touch  . Touch  . All text that is associated with the symbol will move with the symbol as a unit. Touch the center of the screen and touch  .
5. As you might expect, if you delete a symbol, all text associated with the symbol will also be deleted. Touch  to return to the Add/Delete level. Touch  .
6. All symbols have at least one prepositioned text node. Many symbols have several text nodes that make it easy to add text at several locations in and around the symbol. To illustrate the use of prepositioned text nodes, touch  and change the SYMBOL # from **1001** to **1170**. Touch  . Touch the screen on the top row above the left symbol. Touch  twice to return to the Design Diagram level. Touch  . The first text node will blink. Touch  . Type **TEXT 1** and touch  . Touch  to activate the next text node. Touch  . Type **TEXT 2** and touch  . Touch  four more times until you return to the first node.
7. You can create text nodes and move them anywhere on the diagram. Touch  . Touch  . Touch  . Touch the screen in the center of the area to the right of the symbol. Touch  twice to return to the

Text Functions level. Touch **Text Menu**. Type **A LINE OF TEXT** on the first line of the Text Menu. Touch **Done**.

8. The MoveSize Text functions are similar in operation to the MoveSize Symbol functions. Touch **MoveSize Text**. Touch **Size Text**.



Depending upon the function selected, the arrow keys can be used to:



9. Press the up arrow  $\wedge$  key 5 times to increase the height and the right arrow  $\>$  key 5 times to increase the width of the text block. Touch **Done**. The arrow keys allow you to stretch or compress the text block, thereby changing the proportion of the characters: tall and skinny vs. short and fat. The special effects are often useful and you can always restore the proportion of the characters using the PROPORTN TEXT function.
10. The PROPORTN TEXT and PROPORTN SYMBOL functions operate in a similar fashion. Touch **Size Text**. Press the up arrow  $\wedge$  key and increase the height of the text block so that it is noticeably distorted. Touch **PROPORTN TEXT** to restore the characters to their standard proportions while maintaining the width of the text block. Touch **Done**. Touch **Size Text**. Touch **LARGER TEXT** three times to increase the size of the text block proportionally. Touch **Done** to plot the text on the screen.



11. To rotate the block of text to any angle, touch **Rotate Text**. Touch **CLOCK WISE** repeatedly or press the right arrow  $\<$  key and rotate the text approximately 45 degrees. Touch **Done**. Individual characters cannot be rotated on the screen at any angle other than 90 degrees if you specify Font 1 (Hardware Character Set). When plotted to a plotter, the text block will assume the angle indicated by the frame on the screen and the characters will be rotated at the appropriate

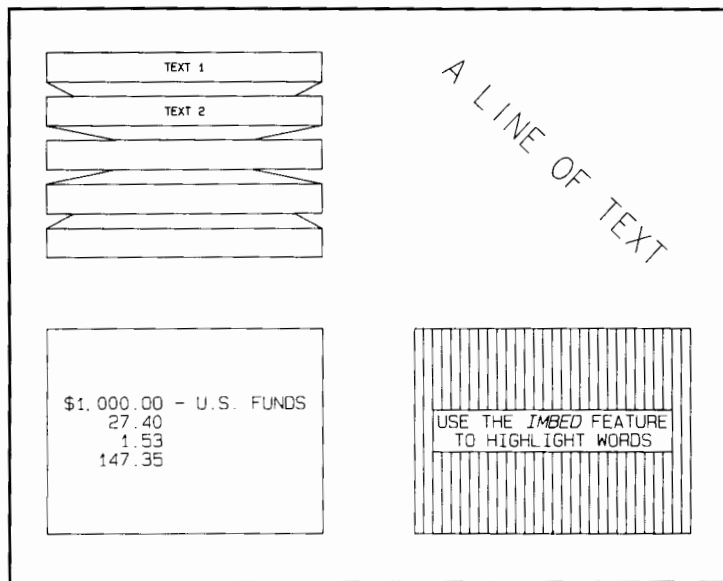
angle. If you select one of the software fonts (2-13), the characters will be rotated on the screen as well. Touch **Done** to return to the Text Functions level. Touch **Text Menu** and change the Font field "F" from 1 to 4. Touch **Done** to replot the text.

- To align one block of text with another, you must first establish the *reference text block* to which other text blocks will be aligned. Touch **Switch Symbol**. Touch the right symbol on the bottom row and then touch **Done**. Touch **MoveSize Text**. To designate the blinking text block as the *reference text block*, touch **Set Ref Text**.



- To align the text in the left symbol on the bottom row, touch **Done** and then **Switch Symbol**. Touch the symbol to the left and touch **Done**. Touch **MoveSize Text**. Touch **Align Text**. The *reference text block* is highlighted in inverse video. Touch **ALIGN TOP**. The top of the active text block will be perfectly aligned with the top of the *reference text block*. Touch **ALIGN BOTTOM**. Touch **ALIGN CENTER**. Touch **Done** twice to return to the Text Functions level.





The diagram on the screen should be similar to that pictured below.










## LESSON #10

TOPICS: Hardware and software text fonts. How proportional spacing improves the appearance of a line of text. How to use the script text font. The advantages of the hardware character set vs. the software fonts.

Begin Lesson 10 with the diagram displayed on the screen from Lesson 9. You should be at the Text Function level with the function keys displayed as shown below. If you restarted the lesson by loading "LESSON10," you will be at the Design Diagram level.

1. To make room on the diagram for examples of the different text fonts, touch . Touch the symbol on the top row and then touch . Touch  twice until the rotated line of text blinks. Touch .



2. To illustrate proportional spacing as it applies to the software fonts (2-13) touch  and then . Move the blinking text node to the right of the symbol. Touch  twice. Touch . Type a string of ten **IIIIIIIIII**'s on the first line and a string of ten **MMMMMMMMMM**'s on the second line. Change the Size field for the first line from **3** to **9**. Change the Font from **1** to **4** and touch .
3. Note that the letter "I" is assumed to be the same width as the letter "M". The effect is to create a lot of space between each of the I's in the string and very little space between each of the M's in the string on line 2. Touch . Change the Proportional Spacing field from **N** to **Y** and touch . The excess space between the I's is eliminated and additional space is provided between the M's. Thus, Proportional Spacing allocates space between characters based upon the real width of each character, resulting in a more pleasing appearance.

IIIIIIIIII  
MMMMMMMMMM

PROPORTIONAL SPACING = N

IIIIIIIIII  
MMMMMMMMMM

PROPORTIONAL SPACING = Y

4. Several of the software fonts have unique characteristics that require you to adjust the parameters on the Text Menu to achieve the most pleasing appearance. To use Simplex Script as an example, touch **CREATE TEXTNODE** . Touch **MoveSize Text** and then **Move Text** . Move the text node to the right of the symbol and under the other block of text. Touch **Done** twice to return to the Text Functions level. Touch **Text Menu** and type **A Line of Script** in upper/lower case letters on the first line. Change the Size field from **3** to **9**. Change the Font field from **1** to **9**. Change Proportional Spacing from **N** to **Y** and touch **Done** .
5. The line of script should be enlarged to about twice its present size so that you can clearly see the font plotted on the screen. Touch **MoveSize Text** and then **Size Text** . Touch **LARGER TEXT** five times. Touch **Done** twice to return to the Text Functions level. Note that Proportional Spacing does not eliminate the space between the letters. To eliminate the space, touch **Text Menu** and change % Space between Chars from **33** to **0**. Touch **Done** to plot the line of script.
6. Because the hardware character set is resident in the HP 150, it does not have to be loaded from the Symbol #2 or Pictorial #1 discs as do the software fonts. Moreover, because the hardware characters are simple in design, they are easier to read when the text is small and they plot up to ten times faster than the more complex software fonts.

To compare the hardware character set to a software font, touch **CREATE TEXTNODE** . Touch **MoveSize Text** . Touch **Move Text** . Move the text node to the right under the line of script. Touch **Done** twice. Touch **Text Menu** . Type **HARDWARE FONT** on line 1. Change the Size field from **3** to **9**. Type **TRIPLEX ROMAN** on line 2 and change the Font field from **blank** to **7**. Type **THIS IS A COMMENT** on line 3 and change the Justify field from **blank** to **X**. Change the Proportion Spacing field from **N** to **Y**. Touch **Done** .

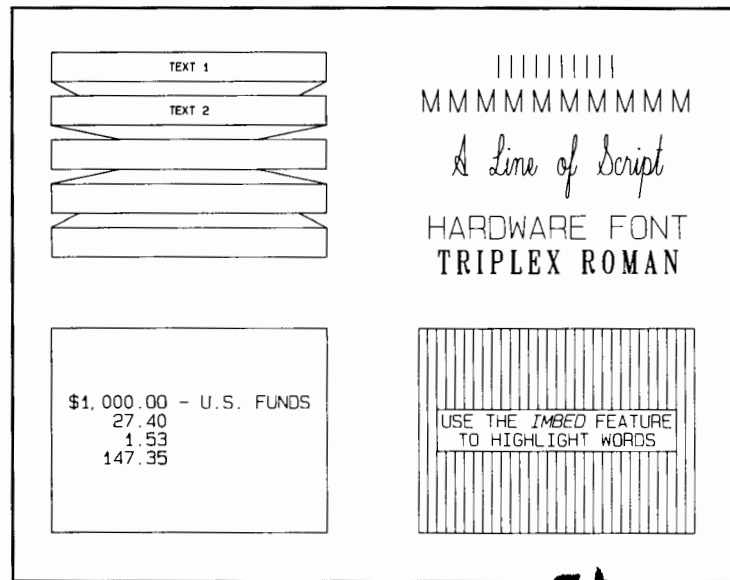
Observe that line 1 of the text block is drawn almost immediately, while it takes up to ten times as long to draw the two because the software font must first be loaded. Therefore, during the development of a diagraph, add the text in the final stages, particularly when using the software fonts.

The comment on line 3 is stored as part of the text block but it does not appear on the diagraph. The ability to add comments in a text block allows you to document changes, dates and other information as part of the diagraph.

The diagraph on the screen should appear as pictured below.



The diagram on the screen should appear as pictured below.



### REVIEW SESSION #3

A review of the fundamental concepts you learned in Lessons 8 to 10 is saved as a diagram on the Program Disc. To begin the review session, you must first load "REVIEW3."

Touch **Done** to return to the Design Diagram level. Remove the Symbol Library #1 disc from the left drive and replace it with the Program Disc. Touch **Primary Functions** and then **Load/Save Diagram**.

The Drive/Filename Menu is displayed. Type **A:** in the Drive field and **REVIEW3** in the Filename field. Touch **LOAD DIAGRAM**.

Drive/Directory


**A:**

Filename

**REVIEW3** .CSC (Chart) .CSG (Graphics)

To minimize the possibility of accidentally erasing a diagram by loading another diagram, a message will appear at the top of the screen:

**File 'A:REVIEW3.CSC' found, confirm Load (Touch YES or NO)**

Touch  to confirm the loading of the diagram which is then read from the Program Disc.

When you complete the review session, the diagram on the screen should appear as pictured below.

REVIEW SESSION #3


THE TEXT NODES FOR EACH STEP ARE ACTIVATED BY TOUCHING THE "INVISIBLE" SYMBOL SURROUNDING THE NUMBER AND THEN "TEXT FUNCTIONS".

- ENTER EACH WORD BELOW IN A TEXT NODE. USE THE FIELDS IN THE TEXT MENU AND THE "MOVESIZE TEXT" FUNCTIONS TO DUPLICATE THE EXAMPLES AS SHOWN.
 

TALL	TALL	FAT	ITALICS	FRAMED	BLOCK	ROTATED
TALL	TALL	FAT	ITALICS	FRAMED	BLOCK	ROTATED
- USE "PROPORTIONAL SPACING" AND FONTS 4 & 9 TO DUPLICATE THE EXAMPLES SHOWN BELOW.
 

King Richard III	DIAGRAPH	Your Name in Script
King Richard III	DIAGRAPH	Your Name in Script
- ENTER THREE LINES OF TEXT IN EACH NODE AND DUPLICATE THE EXAMPLES SHOWN BELOW.
 

3 LINES	3 LINES	3 LINES	3 LINES	LEFT	LEFT	LINE 1	LINE 1
CLOSE	CLOSE	FARTHER	FARTHER	RIGHT	RIGHT	LINE 2	LINE 2
TOGETHER	TOGETHER	APART	APART	CENTERED	CENTERED	LINE 3	LINE 3
- TOUCH THE SYMBOL BELOW AND ADD THE WORD "TEXT" IN THE CENTER OF THE SYMBOL.
 

SURPRISE!	THIS TEXT ALSO BELONGS TO THE SYMBOL		USE "MOVE SYMBOL" TO MOVE THE SYMBOL TO THE RIGHT BETWEEN THE [ ].
-----------	--------------------------------------	---	--
- USE THE "IMBED" FEATURE TO HIGHLIGHT THE UNDERLINED WORDS IN THE SENTENCE BELOW. CHANGE THE FIRST UNDERLINED PHRASE TO *ITALICS* AND **BOLD** THE WORDS THANK YOU. THIS IS THE END OF THE LESSON PLAN. **THANK YOU** FOR YOUR ATTENTION.

Now that you have completed the Lesson Plan, you should investigate the Mini-Lessons and Application Exercises which follow.

## MINI-LESSONS

The Mini-Lessons are stored on the Program Disc under the file names indicated below. These examples use symbols recorded on the Symbol Library #2 disc.

Insert the Program Disc in the left drive and the Symbol Library #2 disc in the right drive. Select a Mini-Lesson from the table below and use the LoadSave function to read the file from drive A.

<b>Filename</b>	<b>Title and Subject</b>
Mini-1	<i>NESTED SYMBOLS</i> — Use the Next key to reach “nested” symbols (symbols within symbols) which cannot always be activated by using touch or the arrow keys.
Mini-2	<i>ERASE BY REDRAW</i> — As it takes time to “erase” a symbol by redrawing it, you can turn off the Erase by Redraw option and take advantage of the hardware to clear the area occupied by the symbol.
Mini-3	<i>SECRET OF THE INNER SYMBOL</i> — Text inside a symbol is windowed when the symbol is shaded. You can create “empty windows” and insert other symbols inside the windows to achieve special effects.
Mini-4	<i>GOING ROUND WITH DIAGRAPH</i> — What happens when you rotate a symbol that has several blocks of text associated with it? If the text does not rotate, does it retain its position relative to the symbol?
Mini-5	<i>STACKED SYMBOLS</i> — Primitive symbols can be combined with other symbols to create complex objects. In this example, build a stack of coins using the Add Symbol function.
Mini-6	<i>SHADY BUSINESS</i> — Diagraph will often use a hardware function to quickly fill an area on the screen and at other times it will shade a symbol as if it were plotting the pattern line by line. This example will explain why.
Mini-7	<i>CLIPPED ART</i> — When you plot a diagraph, any portion of it that is outside the page border will be clipped. This feature can be used to create special effects and illusions.
Mini-8	<i>BOXES AND BORDERS</i> — The technique used to shade boxes and borders greatly reduces the amount of time it takes to plot a solid border, but you should understand the constraints this technique imposes on the use of boxes and borders.
Mini-9	<i>CUSTOM PAGE BORDERS</i> — If you need a border for an area that is a different proportion than $8\frac{1}{2} \times 11$ inches, you can build your own page borders, as shown in this example.

- Mini-10 *TEMPLATES* — This example is actually a master template from which you can build other templates to store symbols on-screen for easy access. The symbols can then be copied from the template to the diagraph at locations specified by the graphics cursor.
- Mini-11 *PULLING NODES OUT OF A HAT* — Many symbols have only a single text node in the center of the symbol. This example shows how you can add text blocks to a diagraph, using a single symbol as the source.
- Mini-12 *THE ‘IMBED’ TEXT OPTION* — Use the Imbed option to combine two or more lines of text with different characteristics into a single line of text.
- Mini-13 *FRAMED* — If all you need is a simple border around a block of text, you should use the Frame option on the Text Menu. You can alter the size of the frame relative to the text block and create windows of varying sizes within shaded symbols.
- Mini-14 *THE DIAGRAPH CONNECTION* — When you rotate and move symbols that are connected to other symbols, you will appreciate the ability of Diagraph to recalculate and redraw the connections automatically.
- Mini-15 *TWIN SIZED TEXT BLOCKS* — To create a twin block of text with characters of the same size and proportions, you should experiment with the Recall Size Text function.

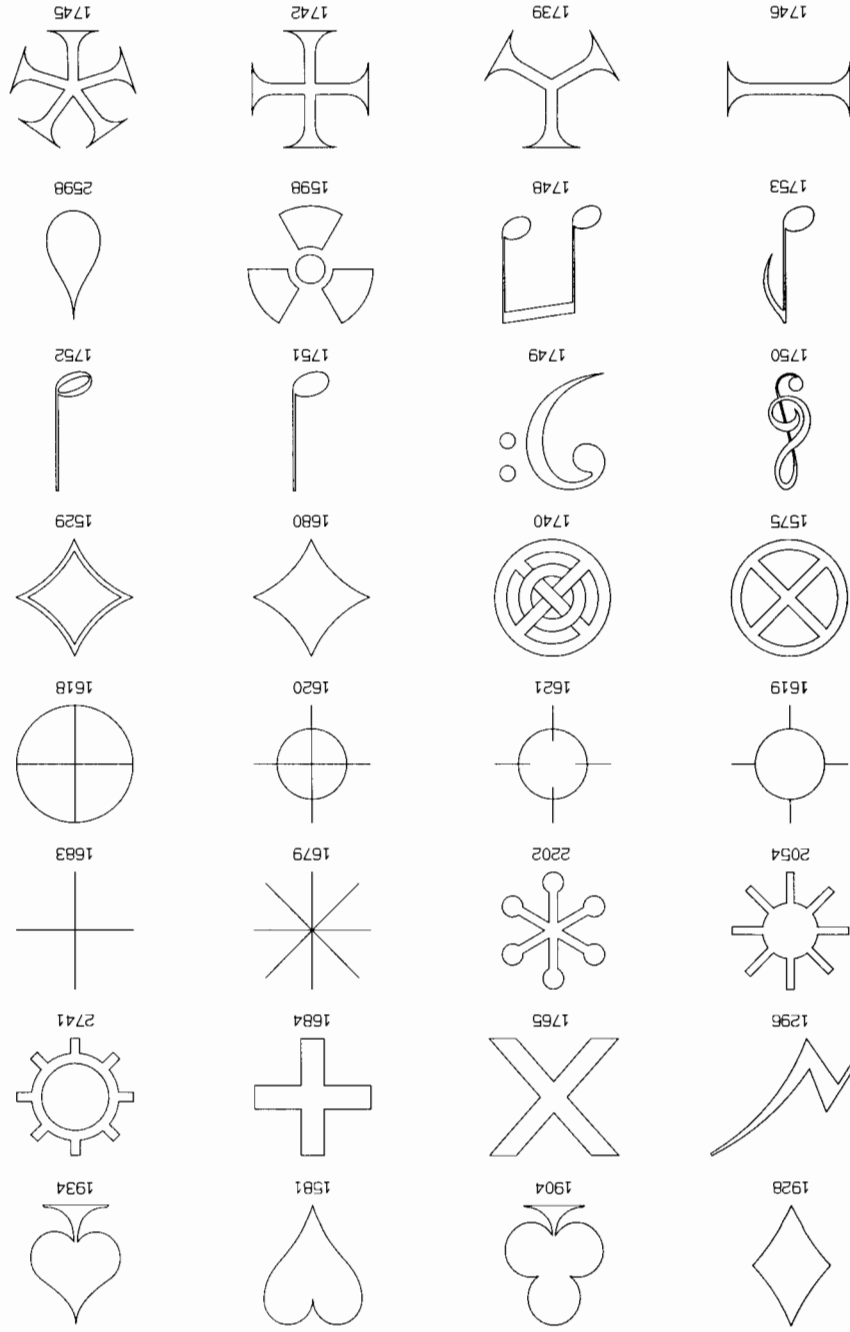
## APPLICATION EXERCISES

The Application Exercises are stored on the Program Disc under the filenames indicated below. These examples use symbols recorded on the Symbol Library #2 disc.

Insert the Program Disc in the left drive and the Symbol Library #2 disc in the right drive. Select an Application Exercise from the table below and use the LoadSave function to read the file from drive A.

<b>Filename</b>	<b>Application</b>
AE-1	Organizational Chart
AE-2	Form
AE-3	Word Chart
AE-4	Bar Chart
AE-5	Office Layout

Instructions and comments are included in text blocks that you access by touching the numbered squares and then Text Functions followed by Text Menu.



GRAPHIC AIDS - ACCENTS

## DIAGRAM SYMBOL LIBRARIES

Over 1500 symbols are included with your purchase of Diagram for the HP 150. Several thousand additional symbols will soon be available if you wish to expand your collection. The next two pages illustrate a few of the new symbols.

All of the symbols in the Index of Symbols are recorded on the three Diagram discs labeled Symbol Library #1, Symbol Library #2 and Pictorial Library #1. Many of the entries are cross-referenced so you can find the symbol number by looking under any one of several different descriptions. The letter "P" following the symbol number indicates that the symbol is a Pictorial.

### Symbol Library #1

- Graphic Aids
- Accents
- Arrows
- Arrowheads
- Banners
- Boxes
- Page Borders
- Splashes
- Stars
- Text Blocks
- Word Balloons

### Symbol Library #2

- Geometrics
- Primitives
- 2D
- 3D — Oblique
- 3D — Perspective
- Signs
- Notation
- Health & Safety
- Road

### Pictorial Library #1

- People
- Places
- Things
- Maps
- Transportation
- Office Equipment
- Landscapes
- Composition Aids

### Icons

- Applications
- Organizational Charts
- Pie, Bar & Line Charts
- Data Processing (Flowcharts)
- Communications (Flowcharts)
- Office Layout
- Networks

If you can't find a particular symbol or a library that is essential to your application, let us know. We will do our best to include your suggestions in a future edition of the symbol libraries.

Computer Support will also digitize custom libraries of symbols and company logos to your specifications. For an estimate of the one-time charge, send us a copy of your logo.

To receive updated copies of these pages, announcements of new symbol libraries and enhancements, mail your Diagram Registration card today.

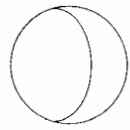
### COMPUTER SUPPORT CORPORATION

2215 Midway Road

Carrollton, Texas 75006

7 84

GRAPHIC AIDS - ACCENTS



2730



4086



2053



2052



1733



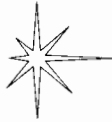
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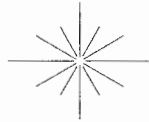
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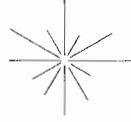
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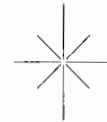
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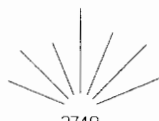
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2729



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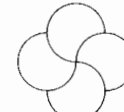
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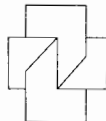
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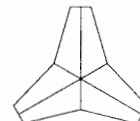
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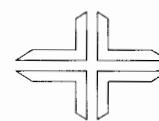
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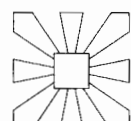
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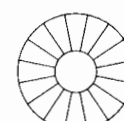
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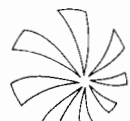
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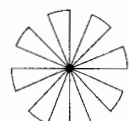
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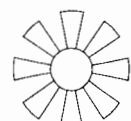
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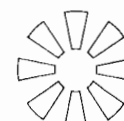
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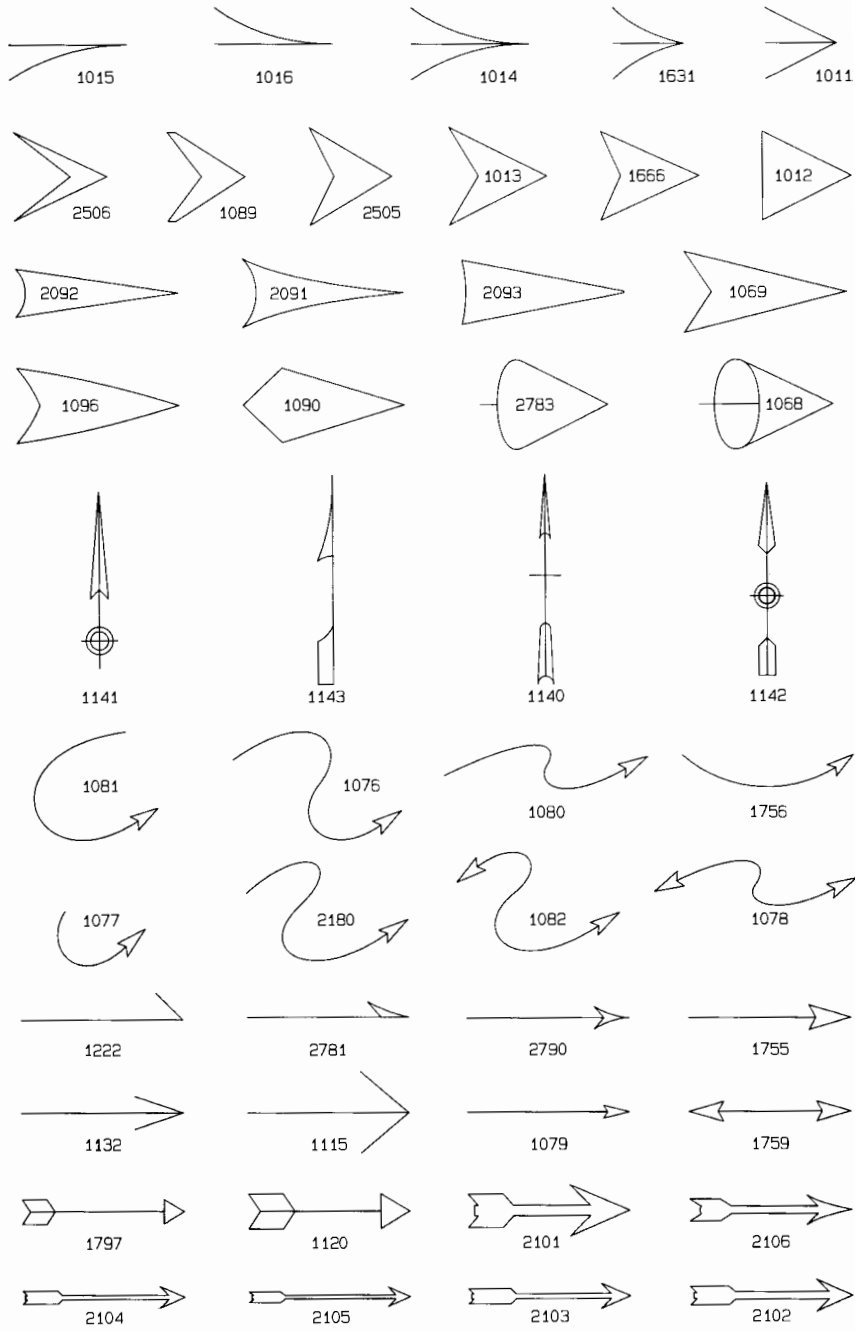


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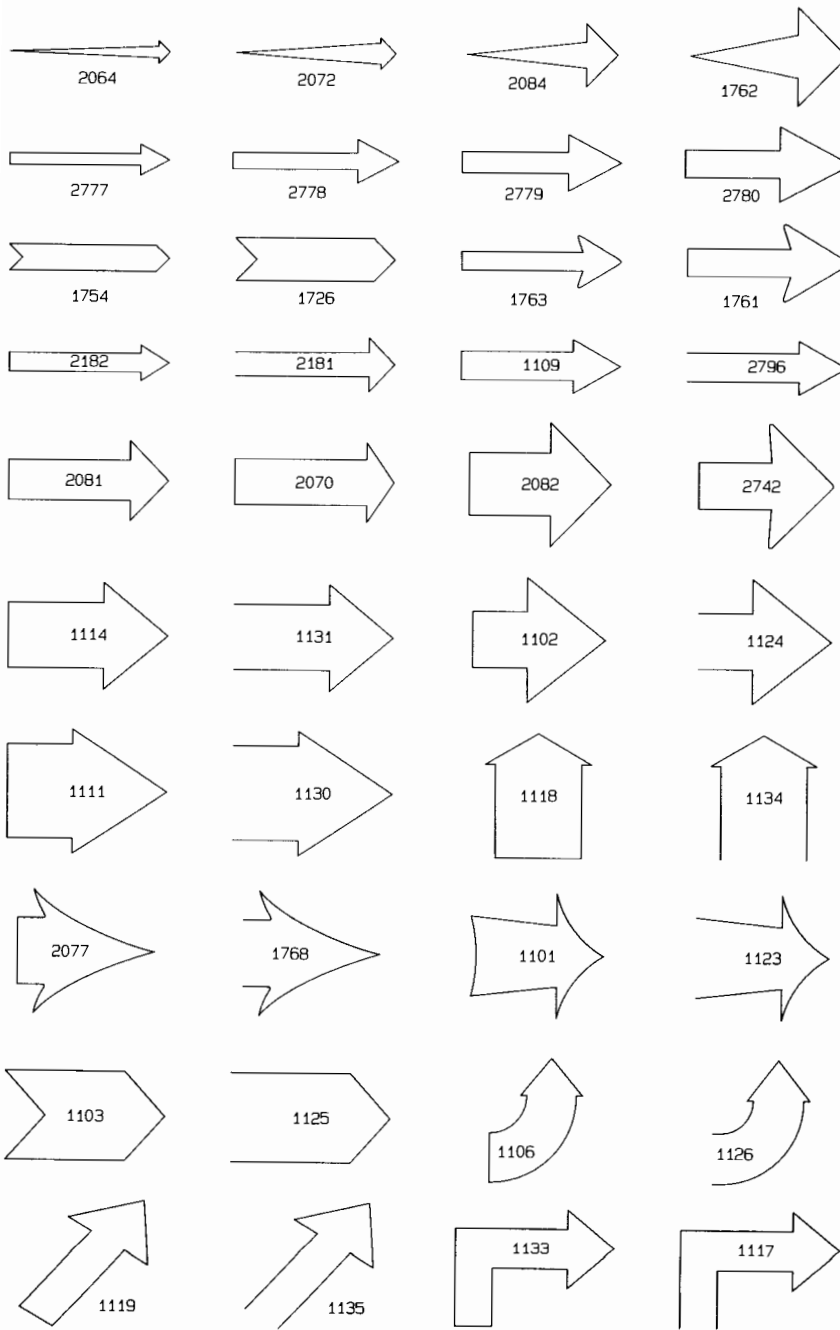
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GRAPHIC AIDS - ARROWS

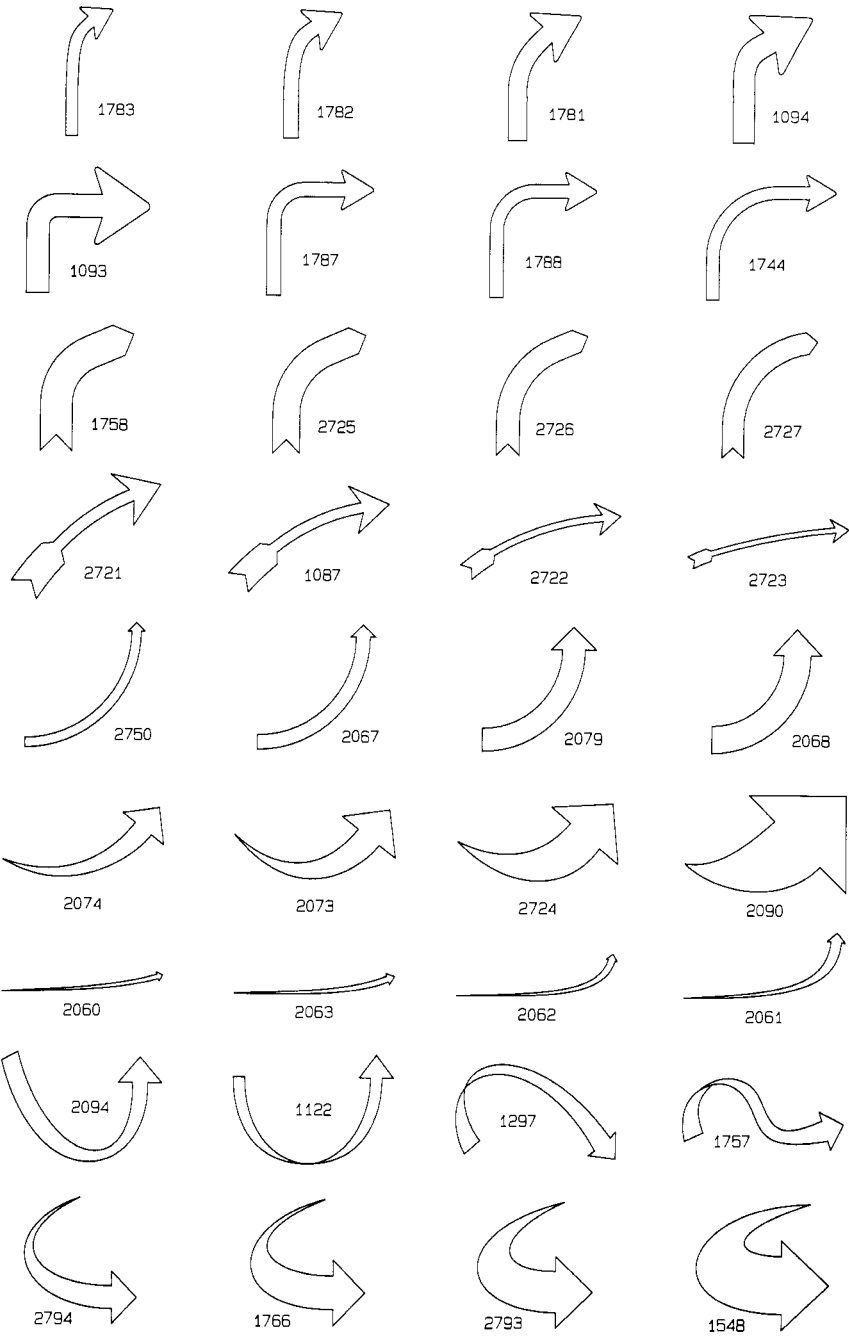




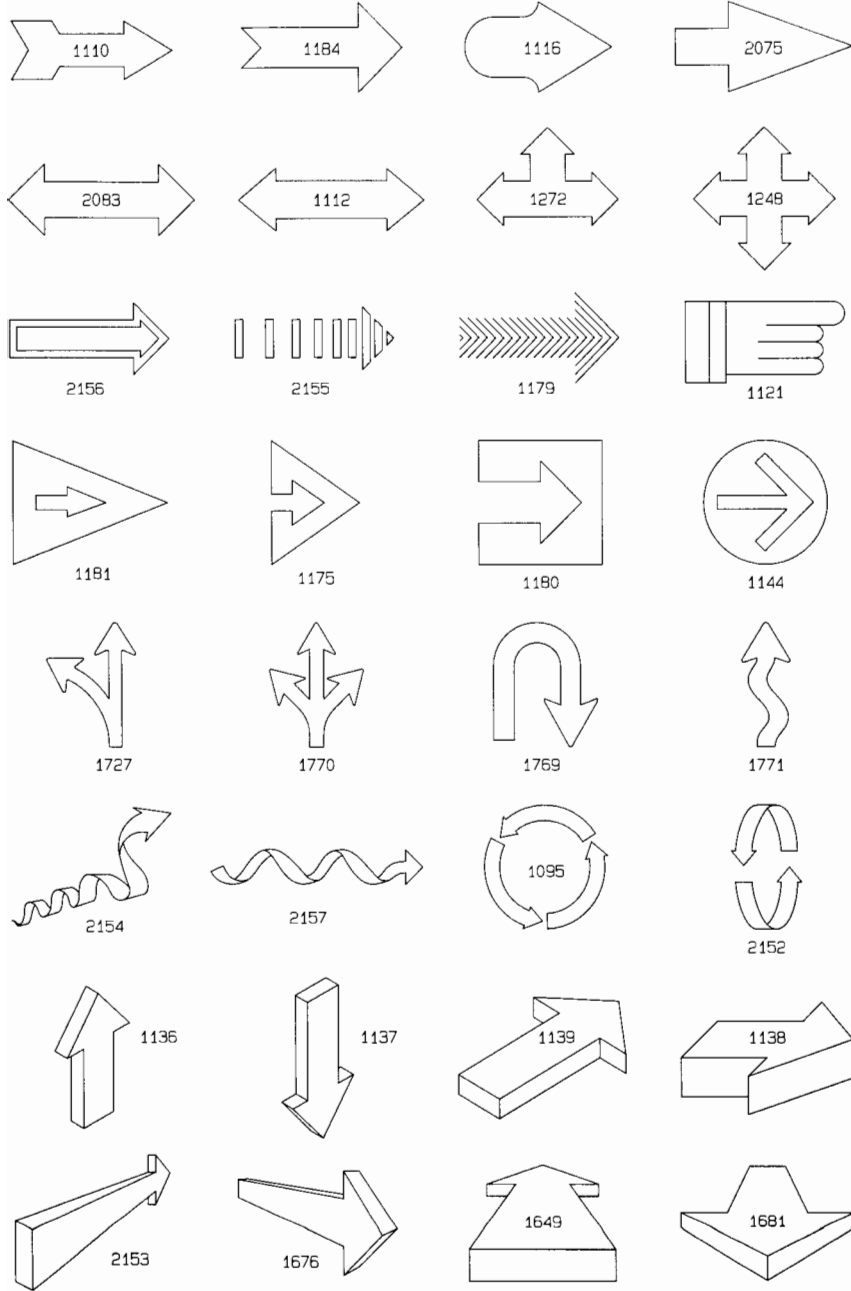
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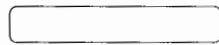
GRAPHIC AIDS - ARROWS



GRAPHIC AIDS - ARROWS



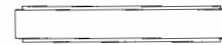
GRAPHIC AIDS - BANNERS



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2137



2140



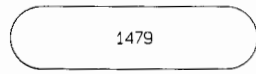
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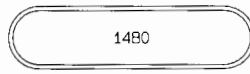
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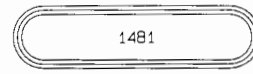
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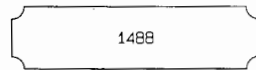
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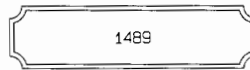
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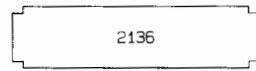
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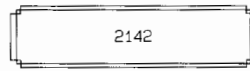
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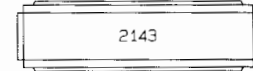
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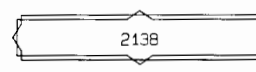
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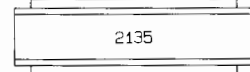
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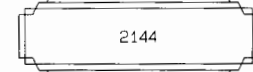
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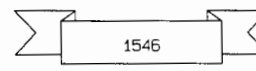
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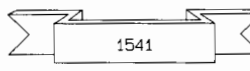
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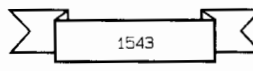
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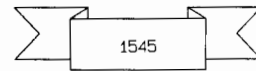
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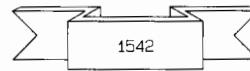
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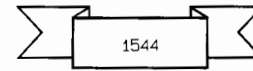
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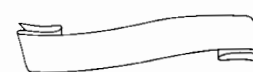
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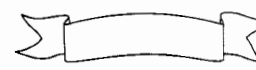
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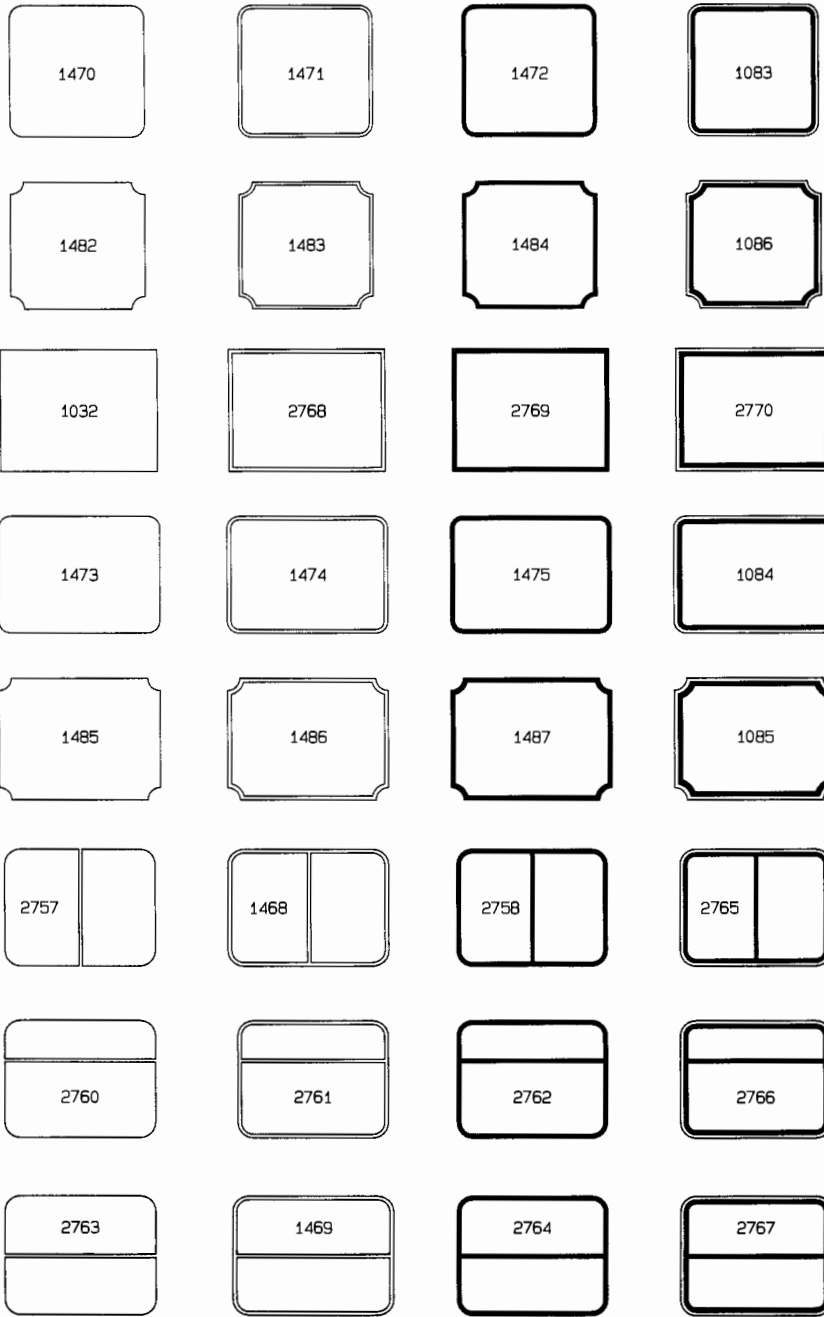


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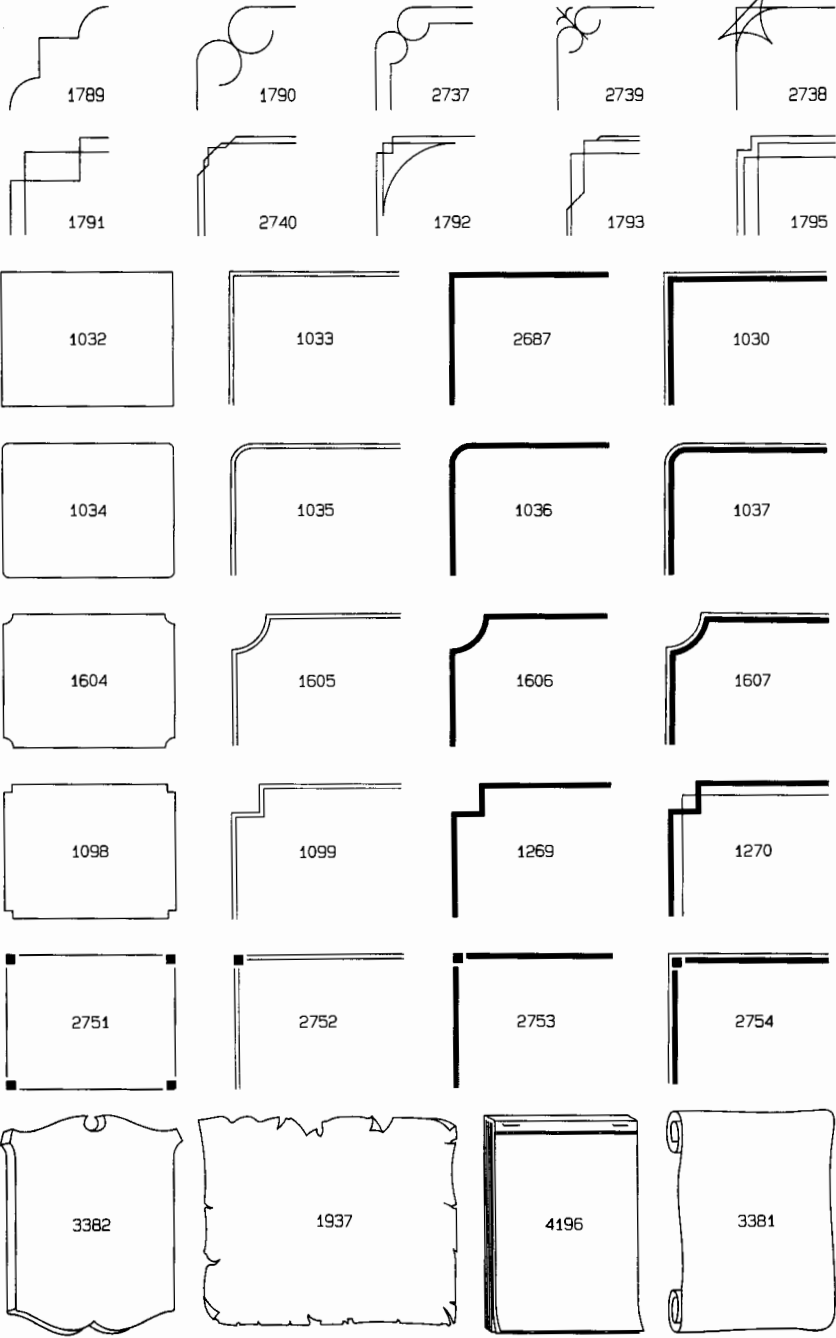


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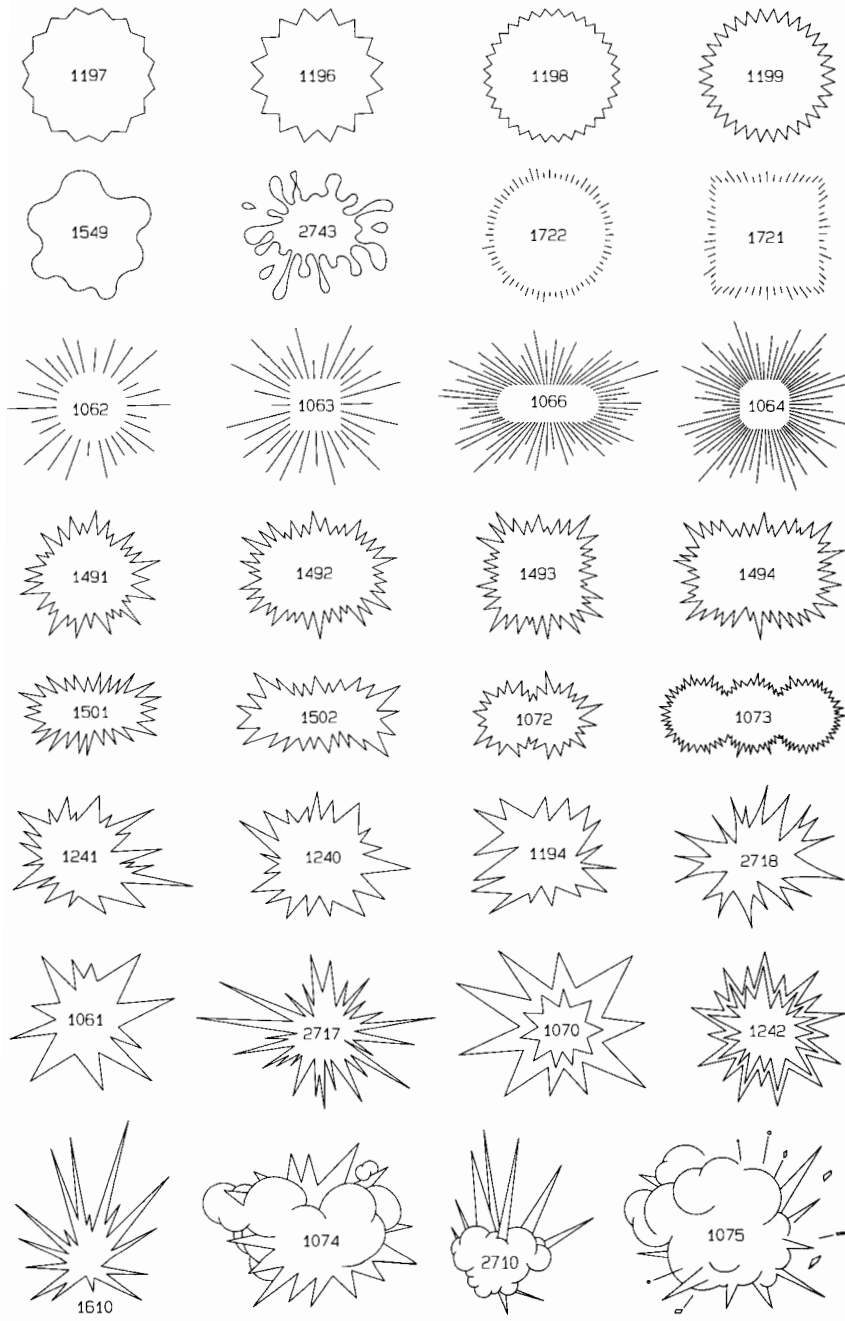
GRAPHIC AIDS - BOXES



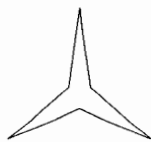
GRAPHIC AIDS - PAGE BORDERS



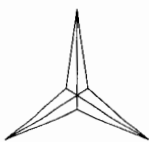
GRAPHIC AIDS - SPLASHES



GRAPHIC AIDS - STARS



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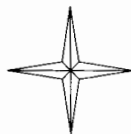
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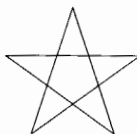
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2196



2188



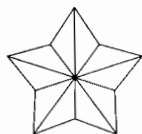
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2191



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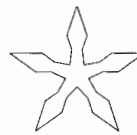
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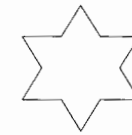
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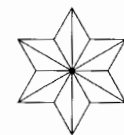
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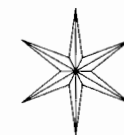
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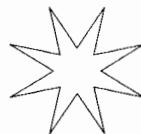
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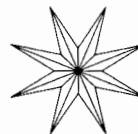
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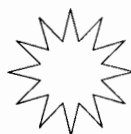
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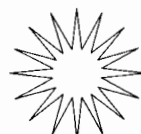
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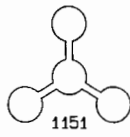
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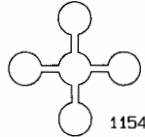
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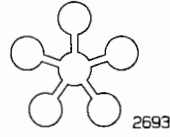
GRAPHIC AIDS - TEXT BLOCKS



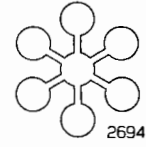
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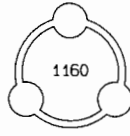
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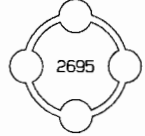
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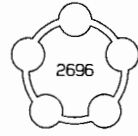
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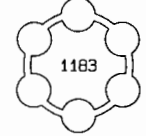
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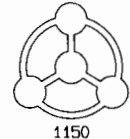
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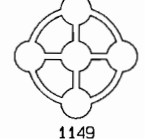
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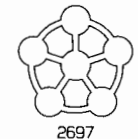
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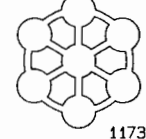
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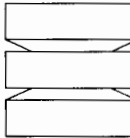
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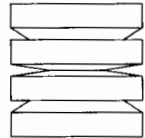
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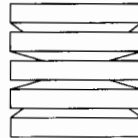
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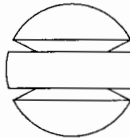
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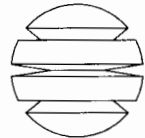
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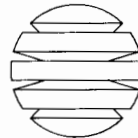
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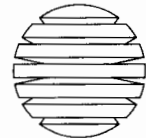
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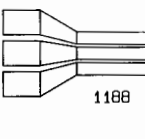
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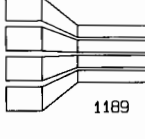
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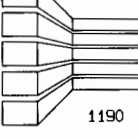
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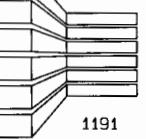
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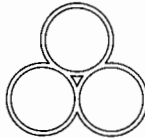
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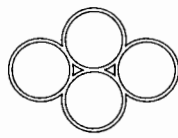
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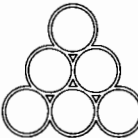
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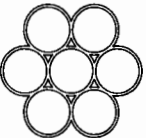
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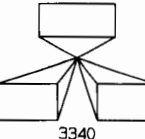
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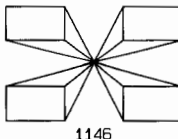
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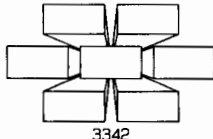
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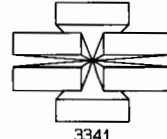
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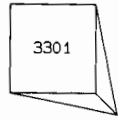


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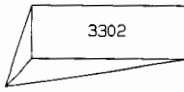


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GRAPHIC AIDS - TEXT BLOCKS



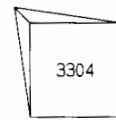
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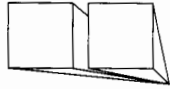
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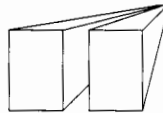
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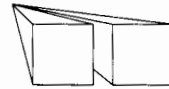
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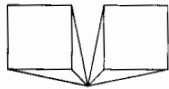
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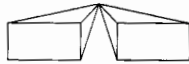
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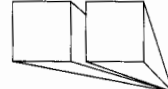
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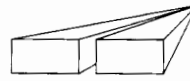
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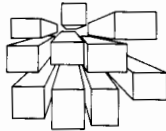
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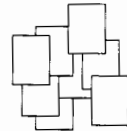
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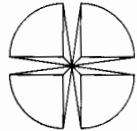
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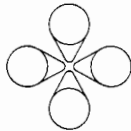
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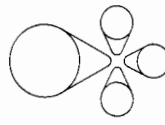
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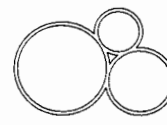
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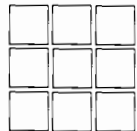
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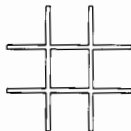
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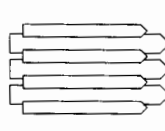
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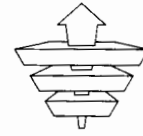
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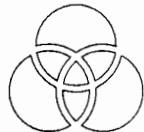
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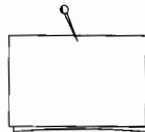
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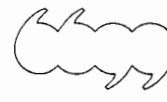
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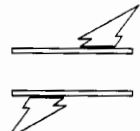
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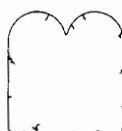
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2116



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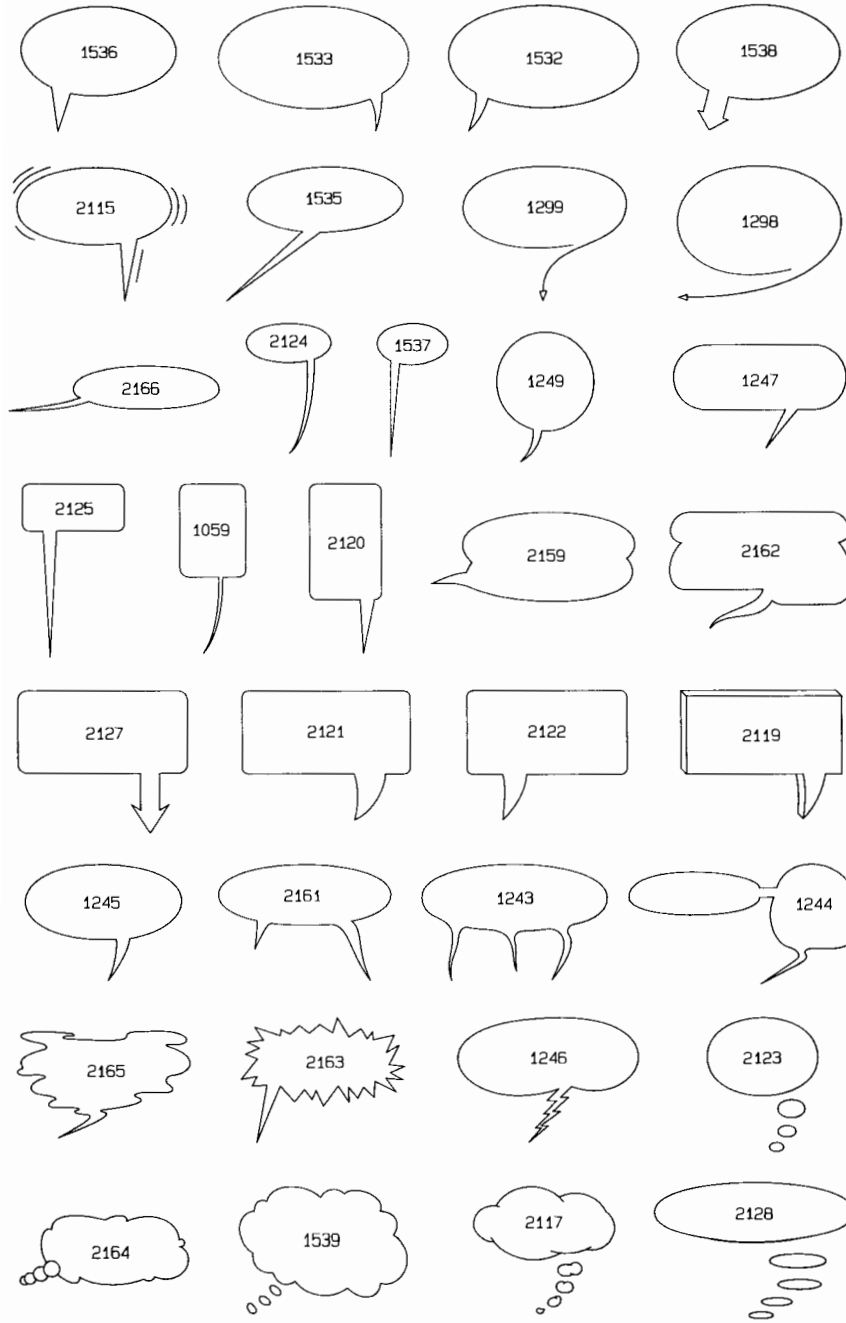


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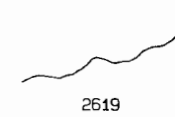
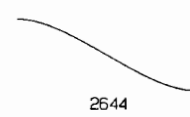
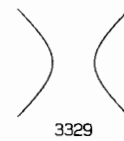
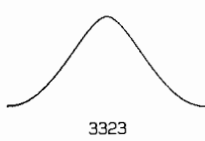
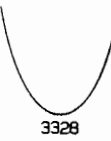
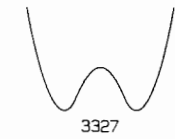
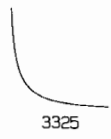
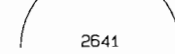
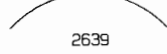
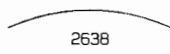
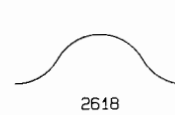
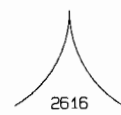
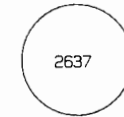
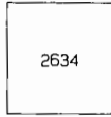
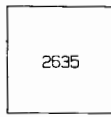
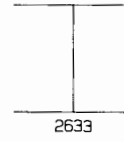
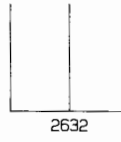
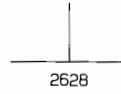
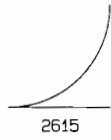
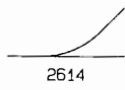
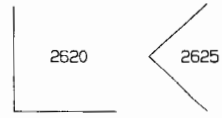
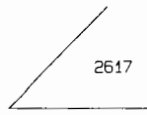
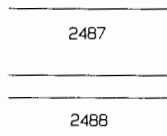
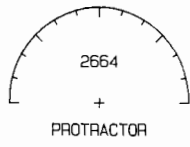


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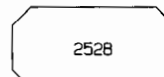
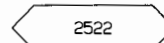
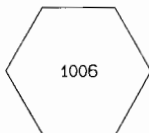
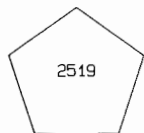
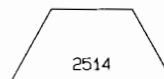
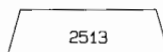
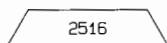
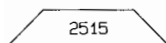
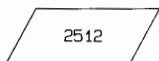
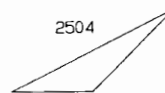
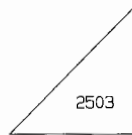
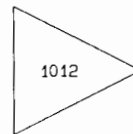
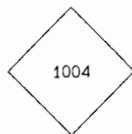
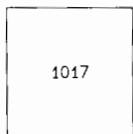
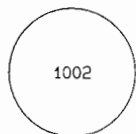
GRAPHIC AIDS - WORD BALLOONS



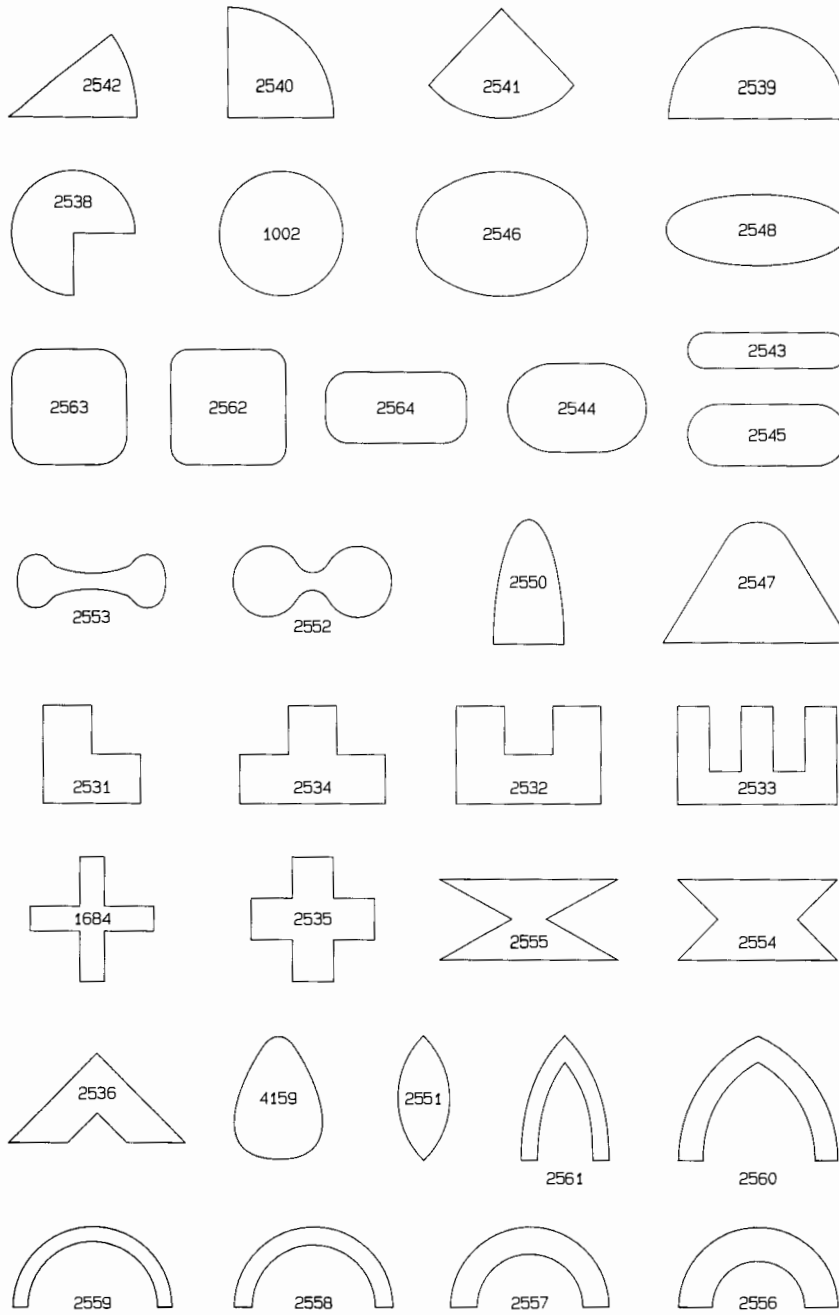
GEOMETRICS - PRIMITIVES



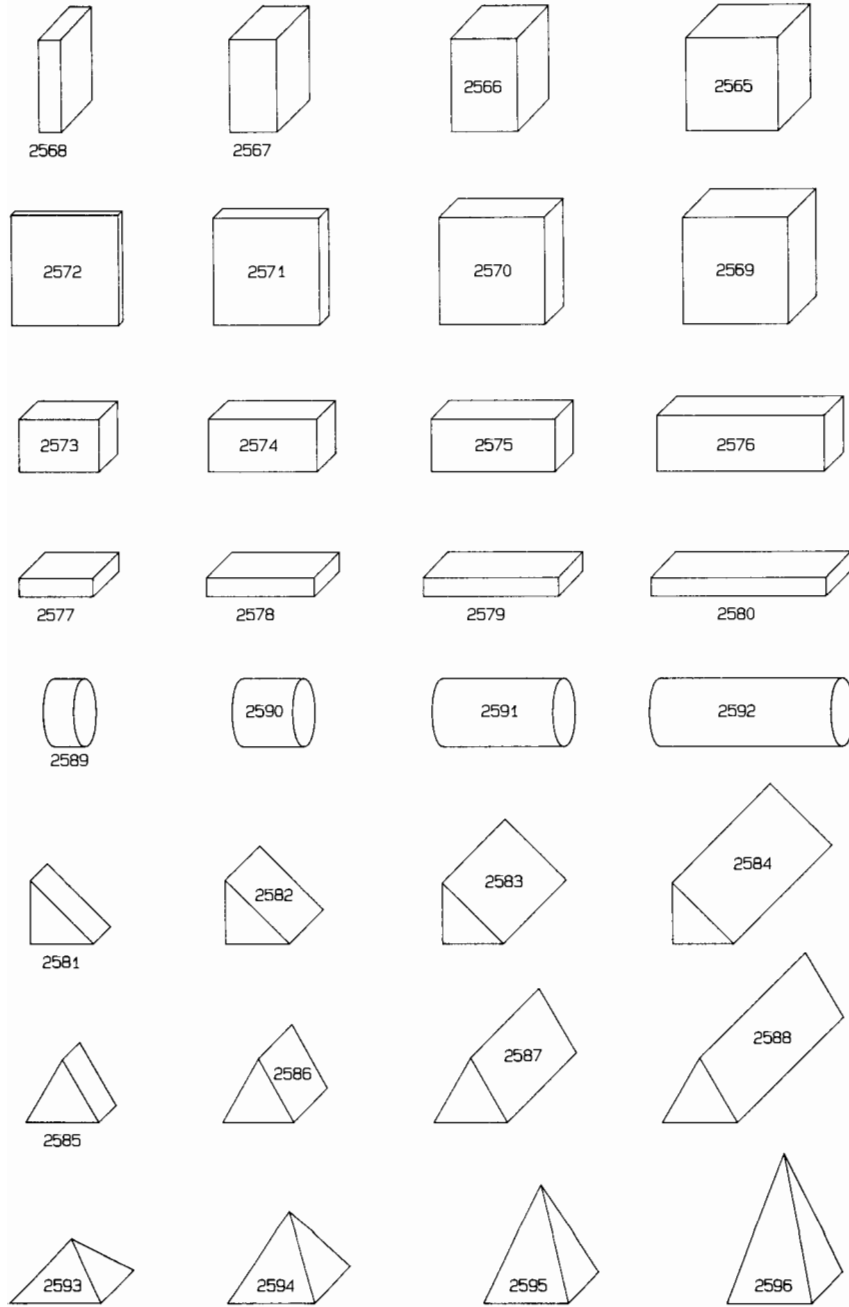
GEOMETRICS - 2D



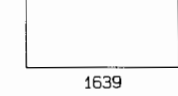
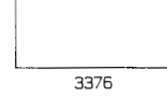
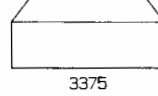
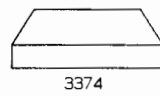
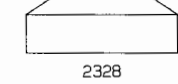
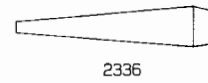
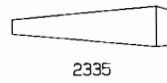
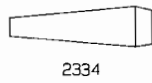
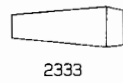
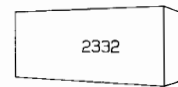
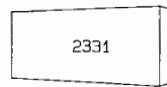
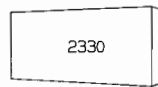
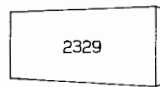
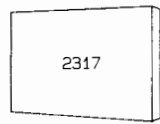
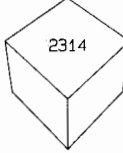
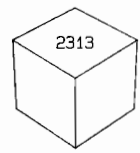
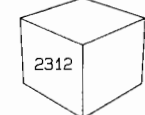
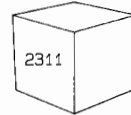
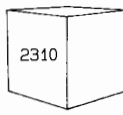
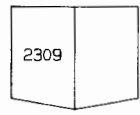
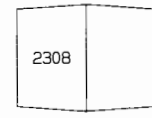
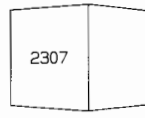
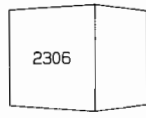
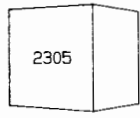
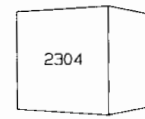
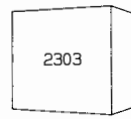
GEOMETRICS - 2D



GEOMETRICS - 3D OBLIQUE



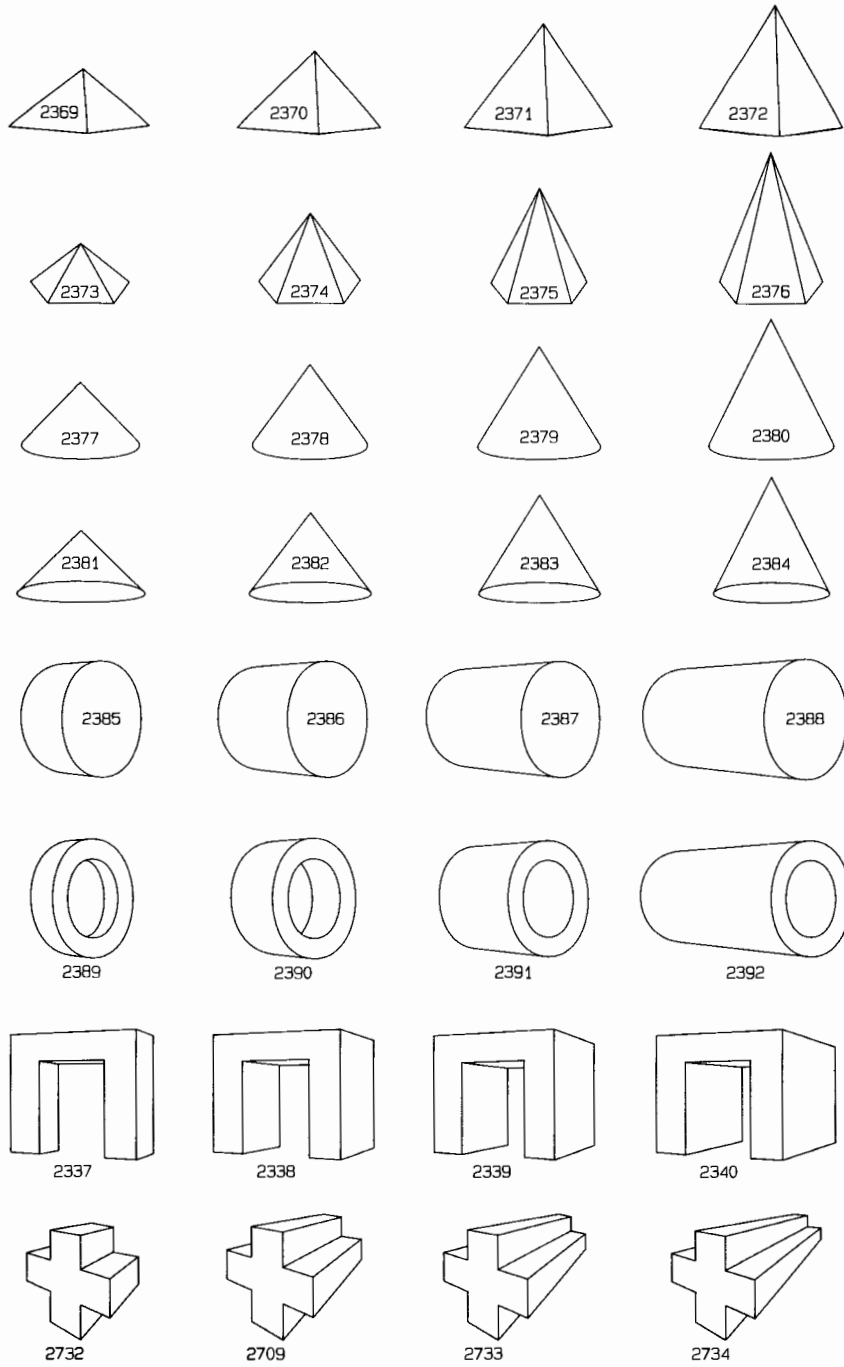
GEOMETRICS - 3D PERSPECTIVE



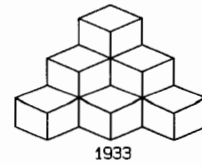
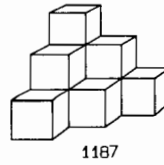
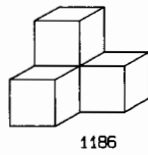
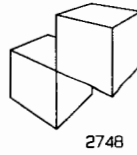
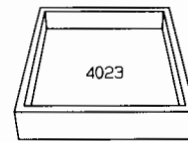
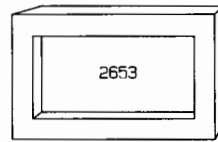
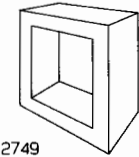
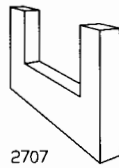
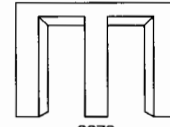
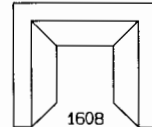
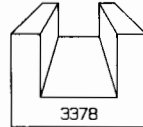
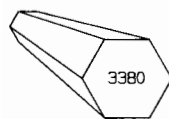
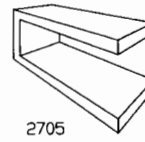
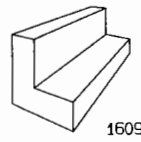
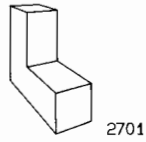
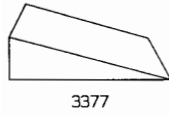
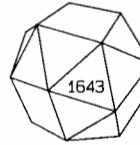
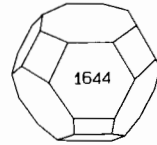
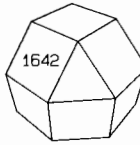
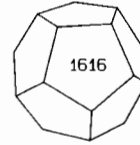
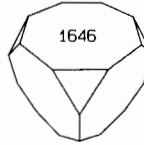
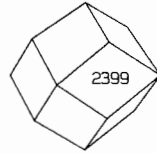
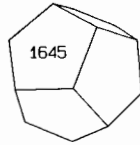
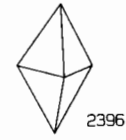
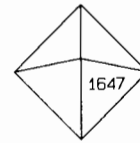
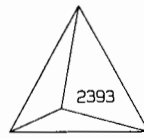
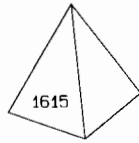
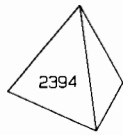




GEOMETRICS - 3D PERSPECTIVE



GEOMETRICS - 3D PERSPECTIVE



SIGNS - NOTATION

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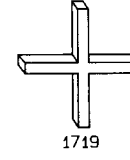
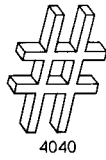
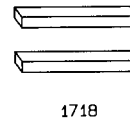
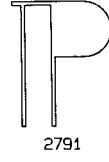
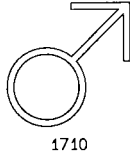
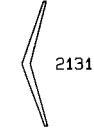
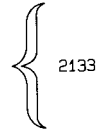
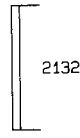
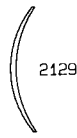
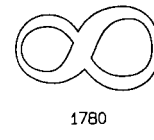
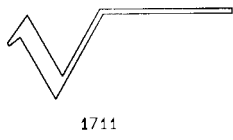
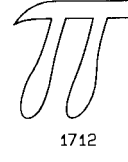
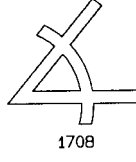
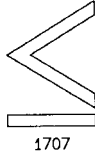
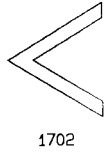
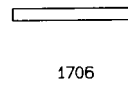
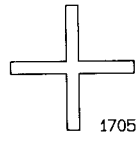
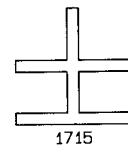
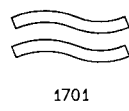
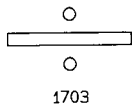
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SIGNS - NOTATION



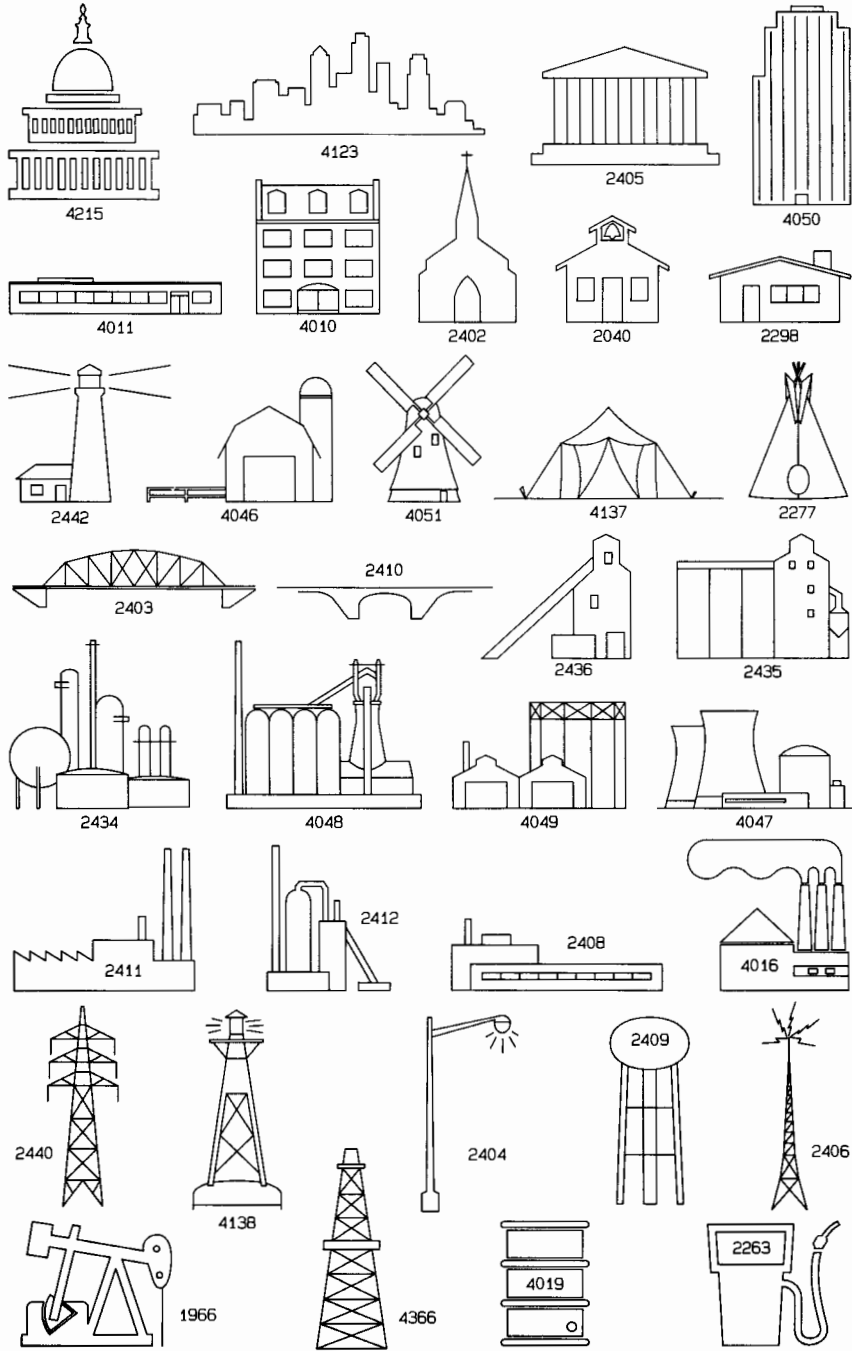
SIGNS - HEALTH AND SAFETY



SIGNS - ROAD

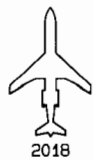
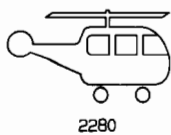
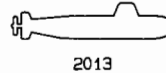
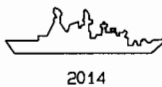
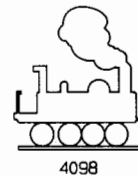
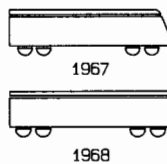
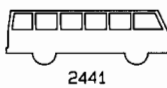
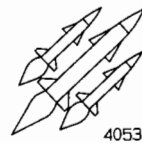
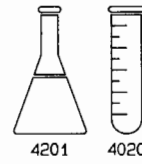
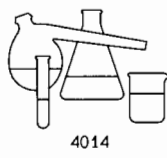
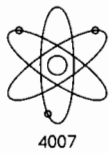
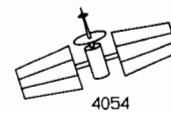
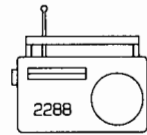
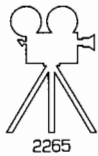
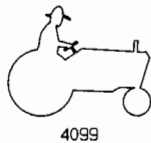
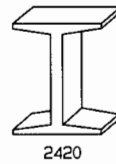
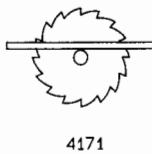
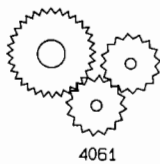


ICONS

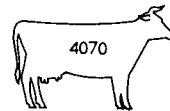
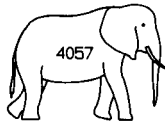
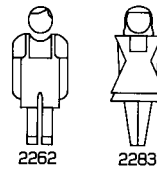
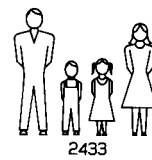
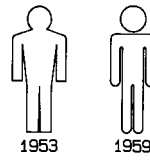
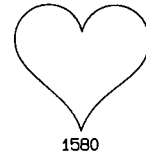
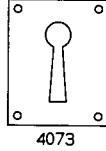
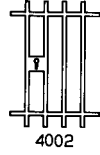
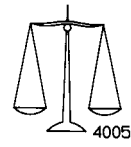
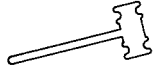
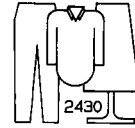




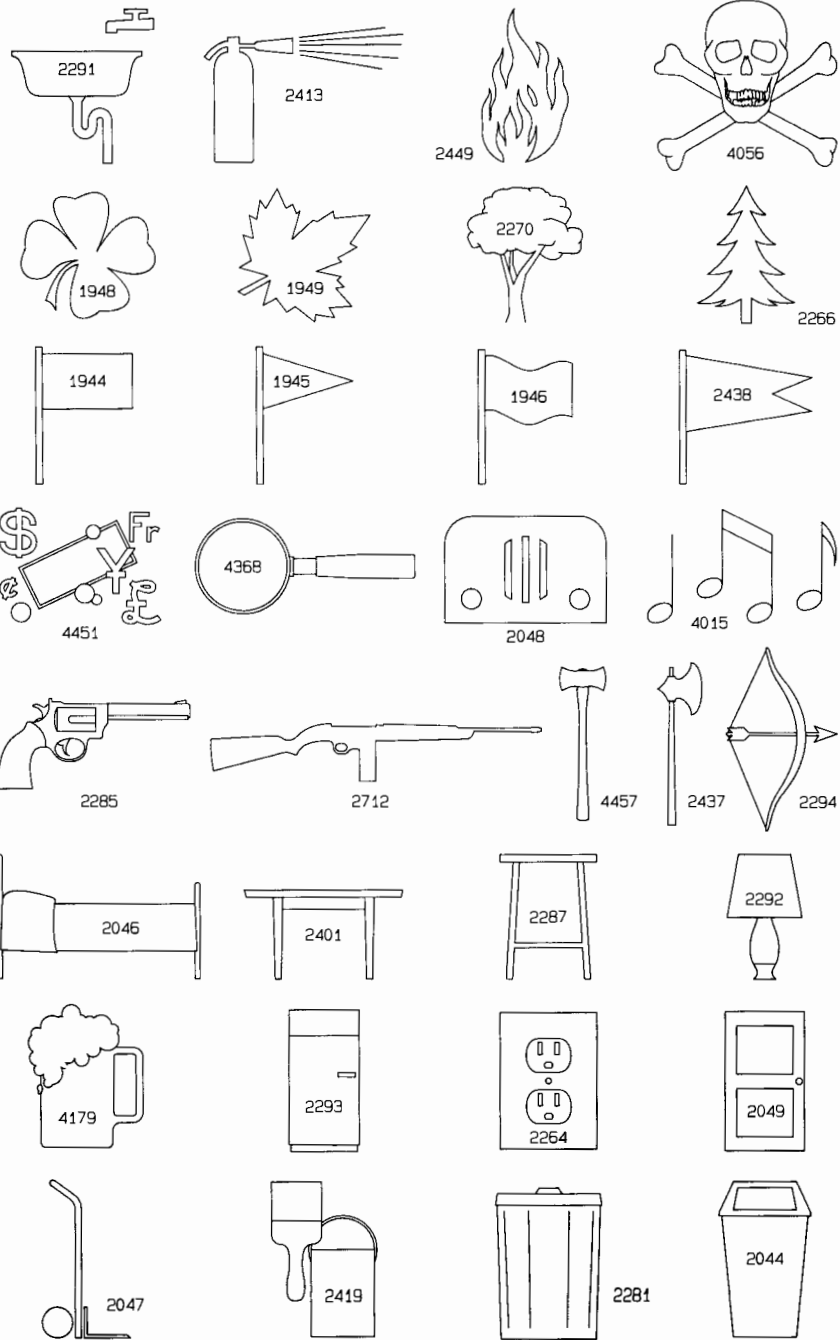
ICONS



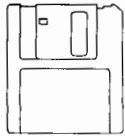
ICONS



ICONS



ICONS



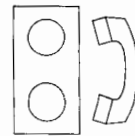
4439



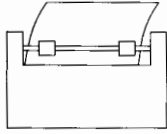
1974



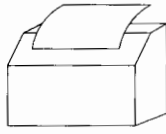
1972



1973



1977



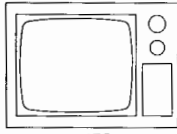
1978



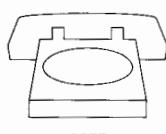
1971



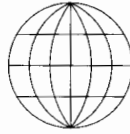
1970



4072



2275



4036



4037



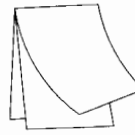
1495



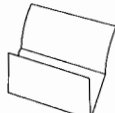
1982



1526



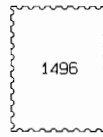
1979



4345



2295



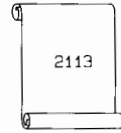
1496



2297



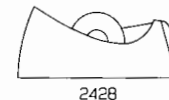
2296



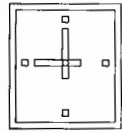
2113



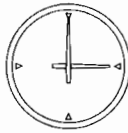
4374



2428



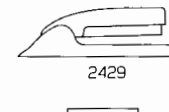
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2273



2289



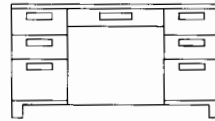
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3383



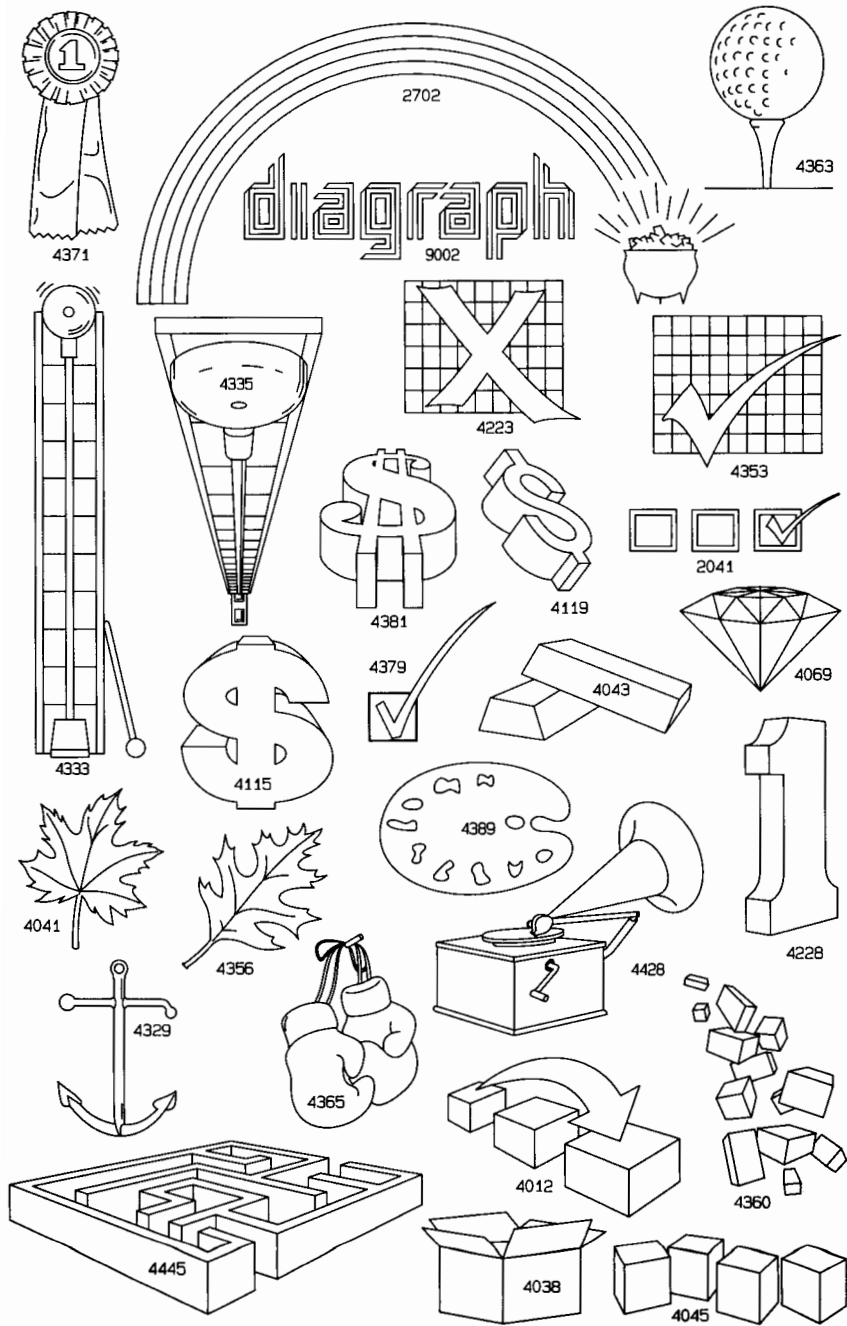
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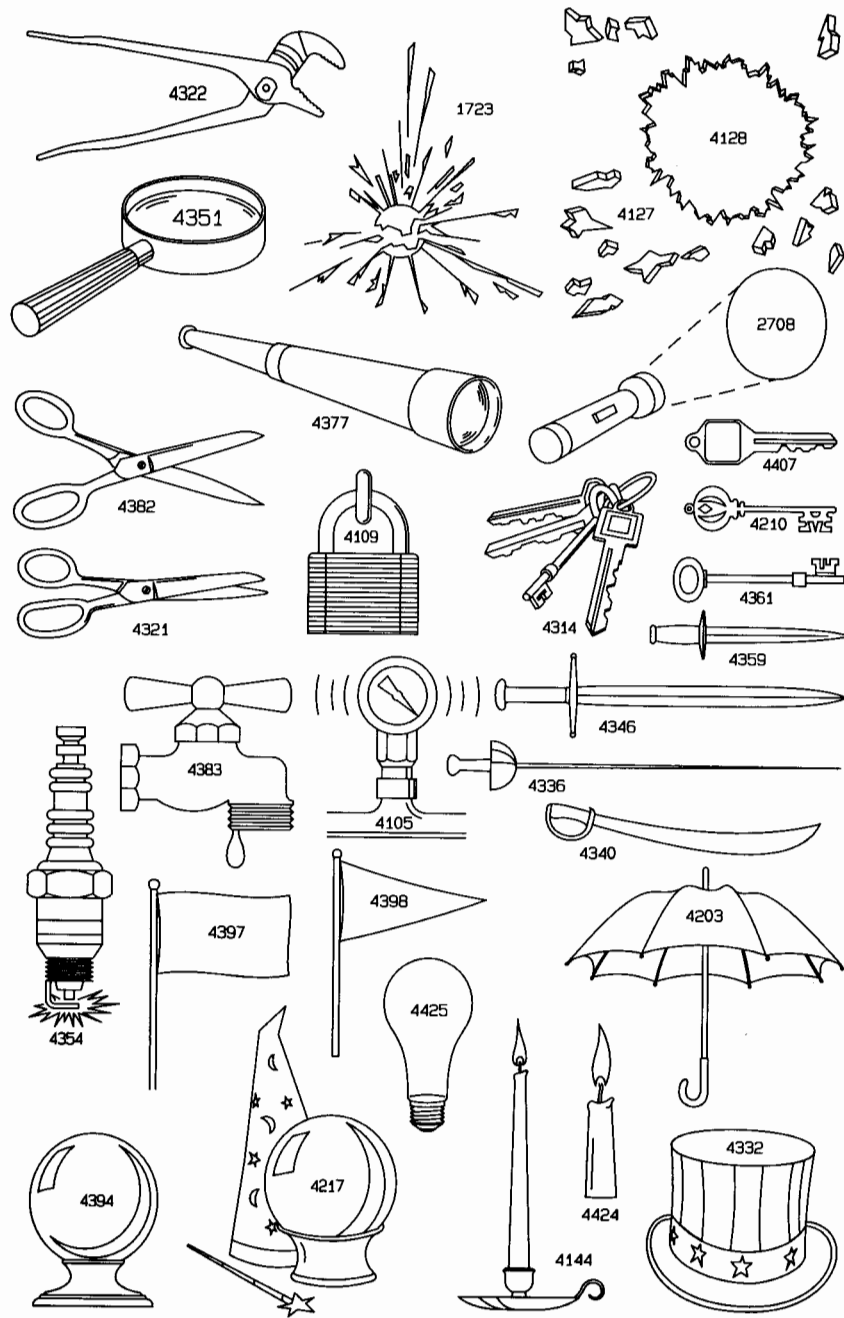
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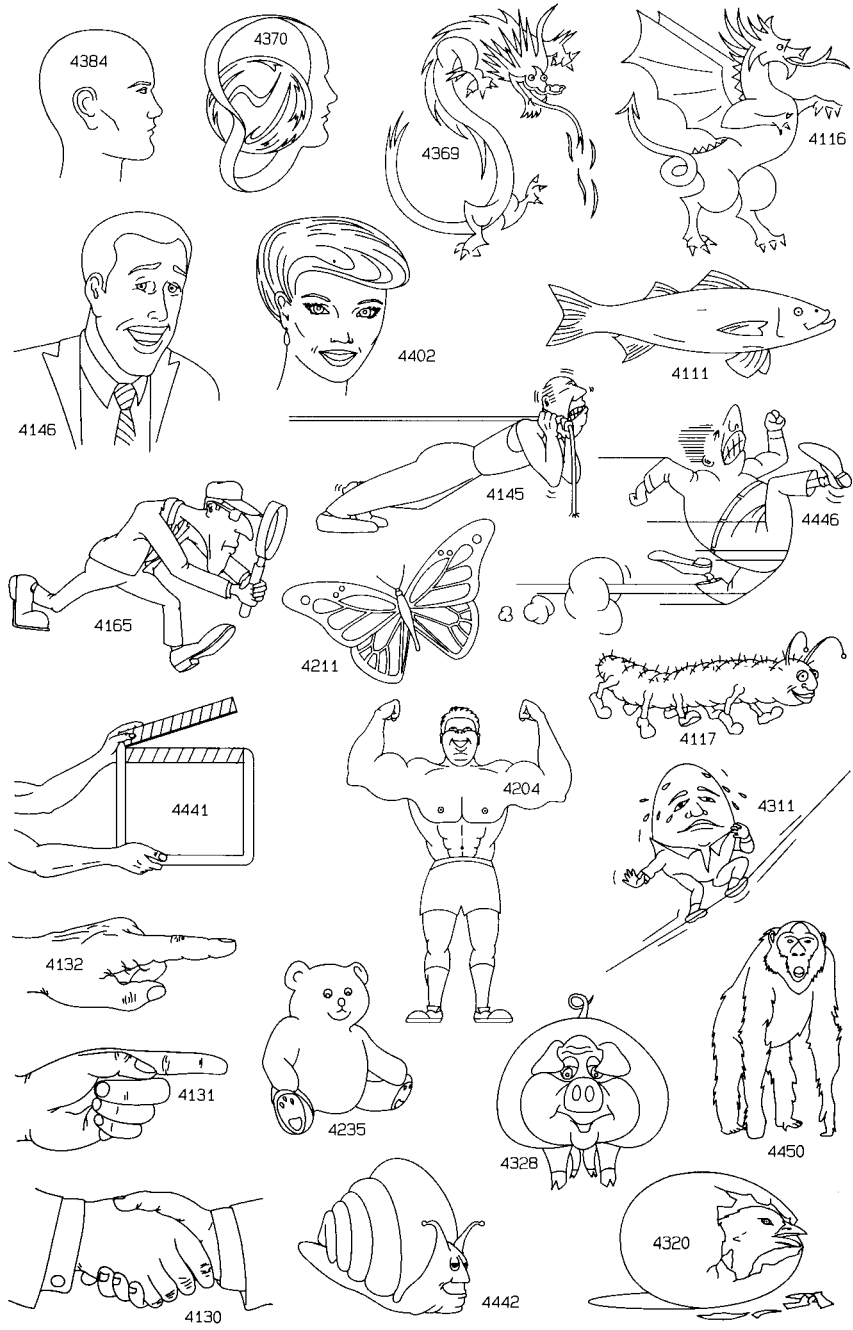
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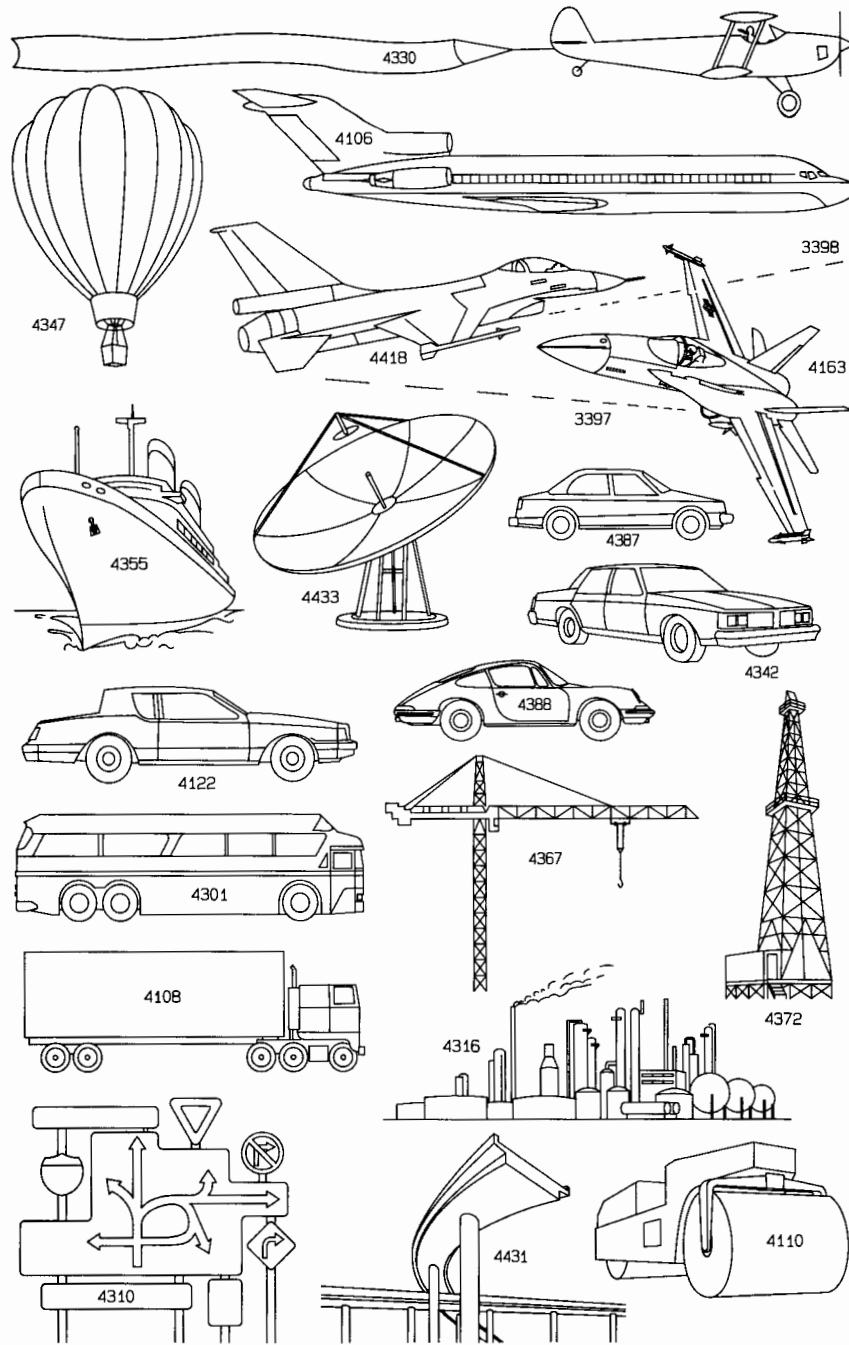
PICTORIALS



PICTORIALS

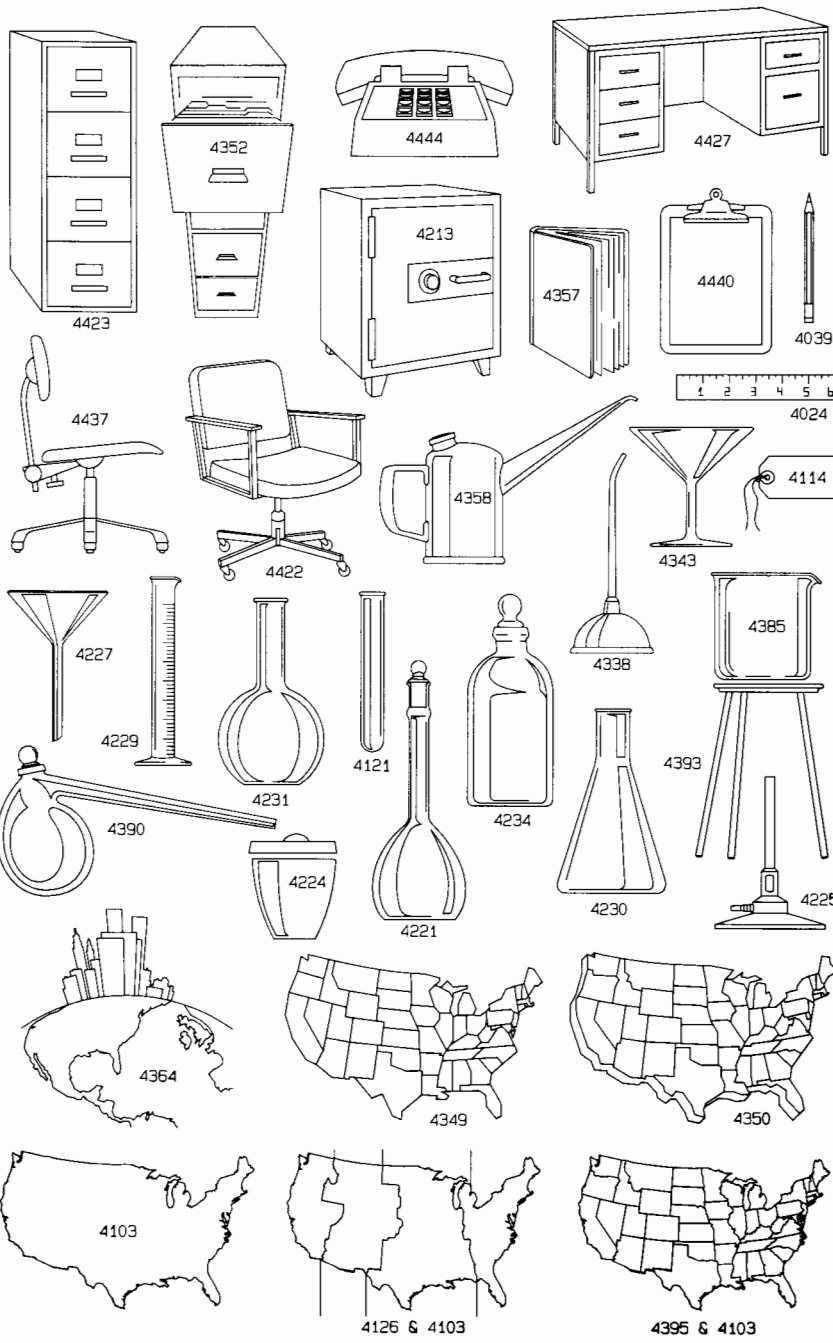


PICTORIALS

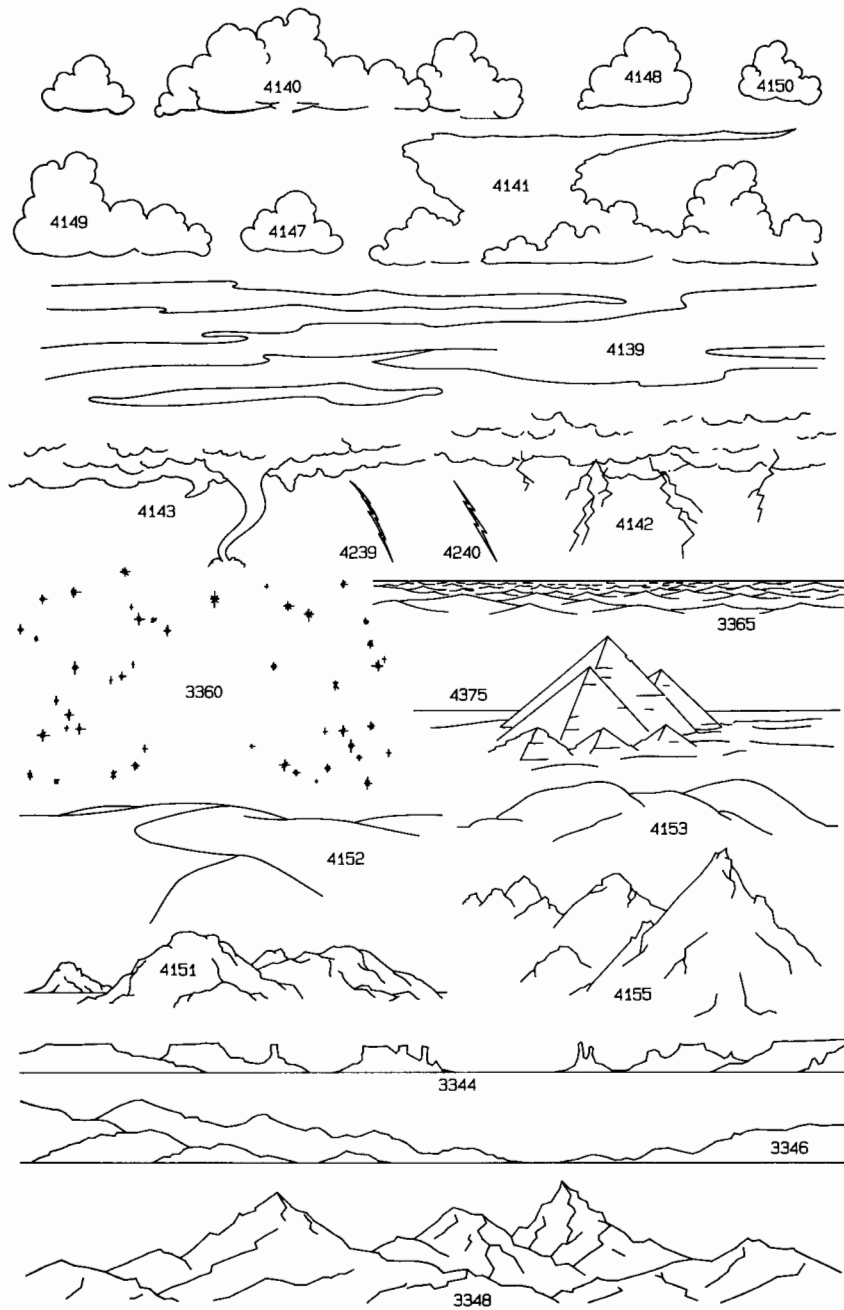




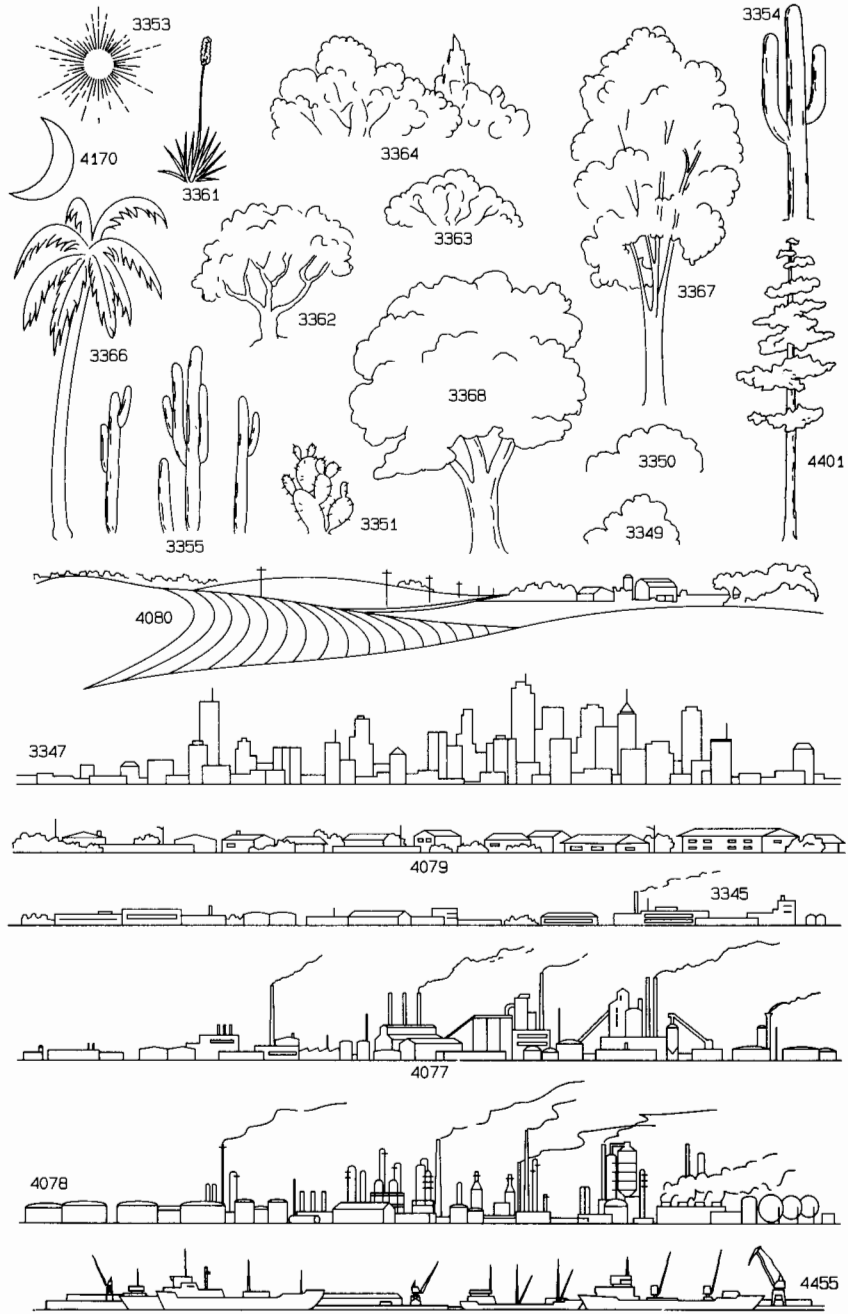
PICTORIALS



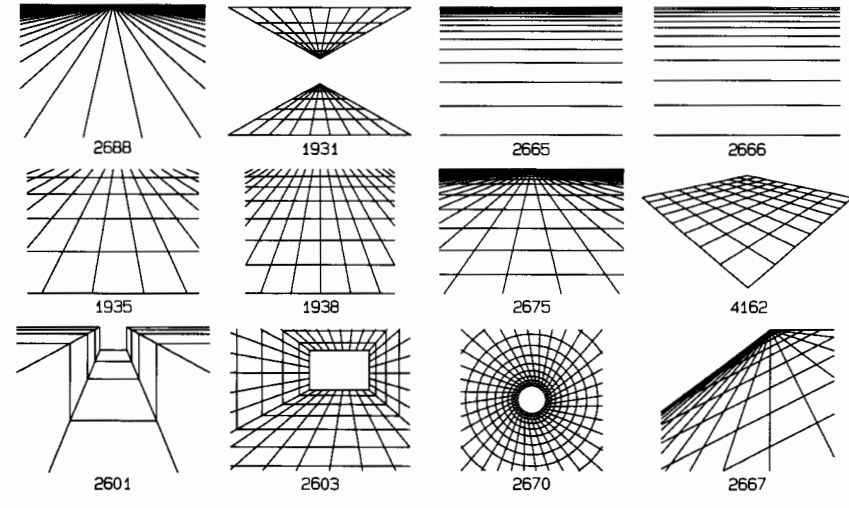
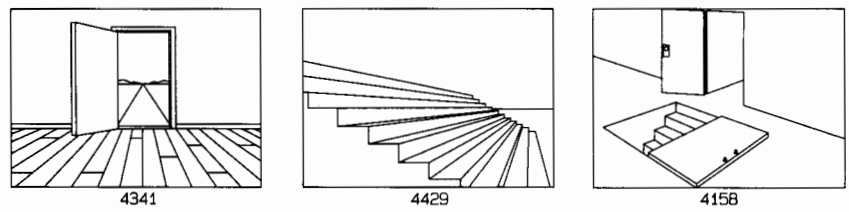
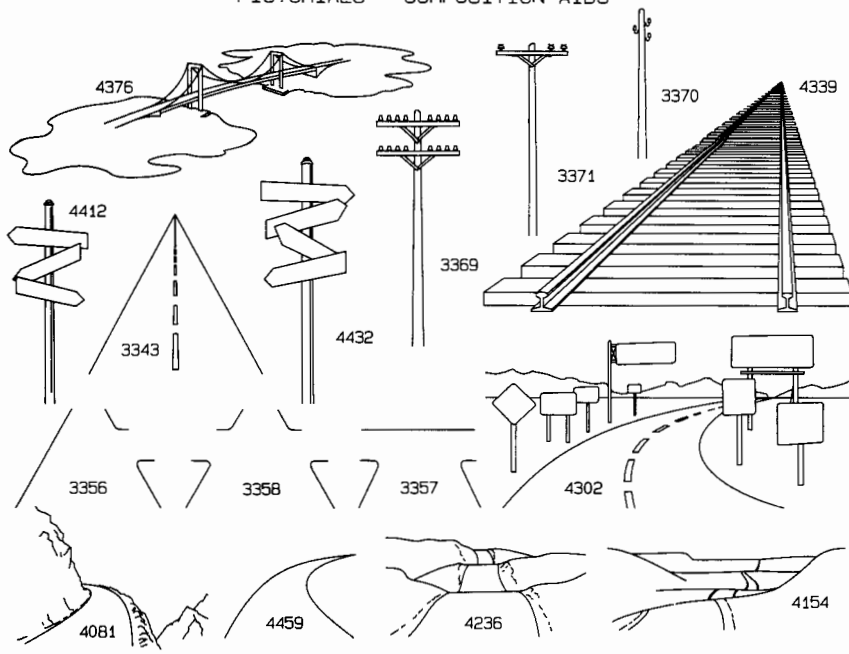
PICTORIALS - COMPOSITION AIDS



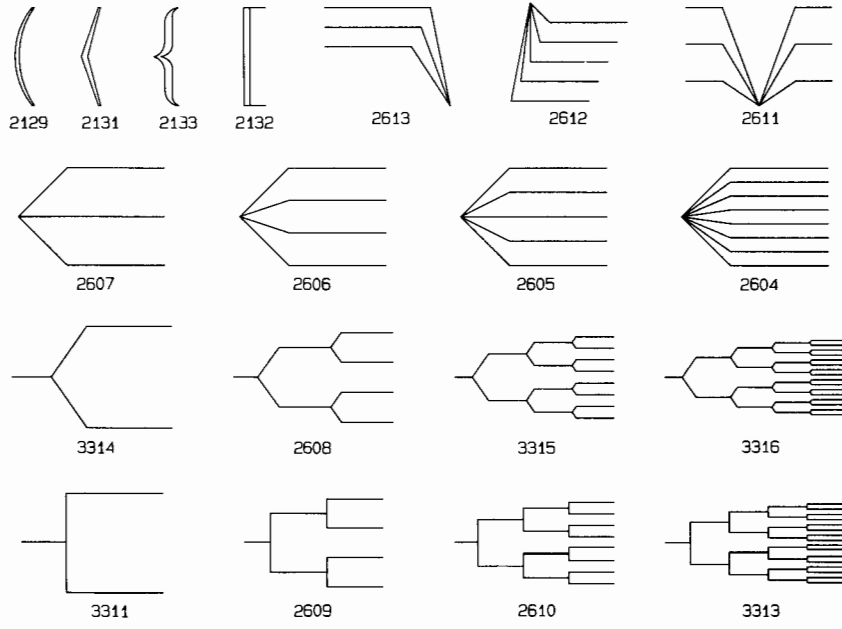
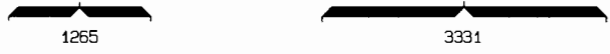
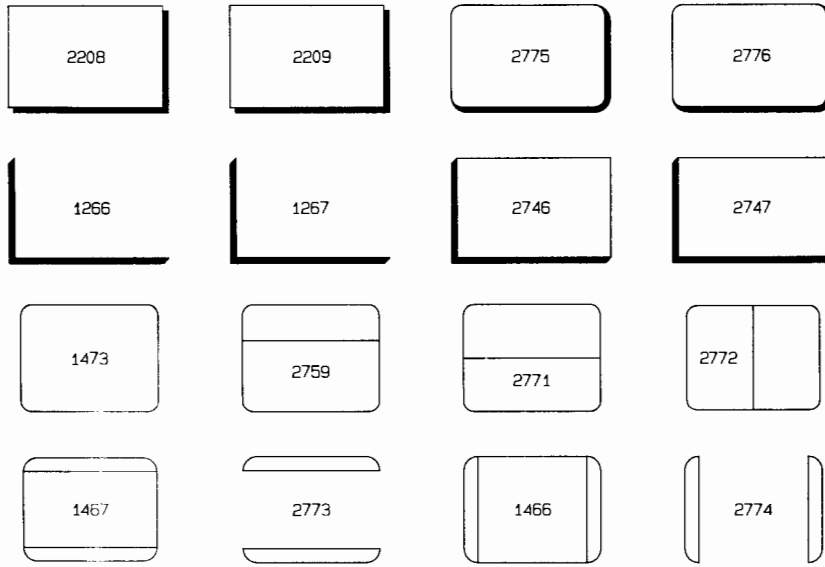
PICTORIALS - COMPOSITION AIDS



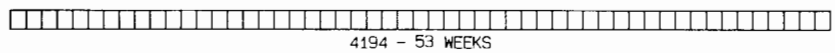
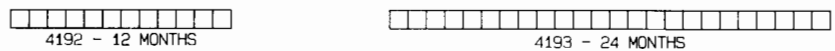
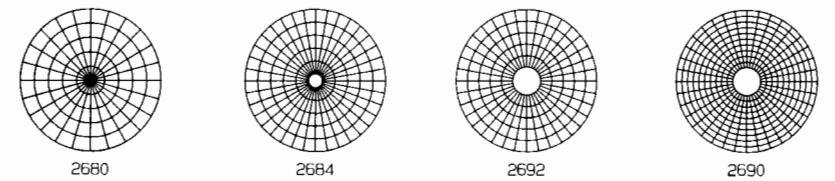
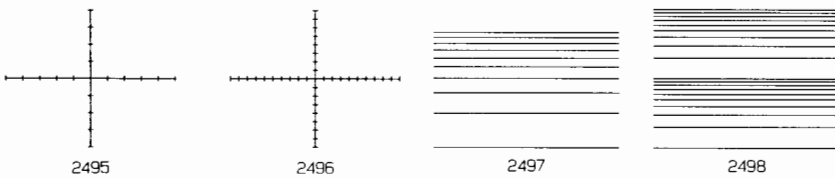
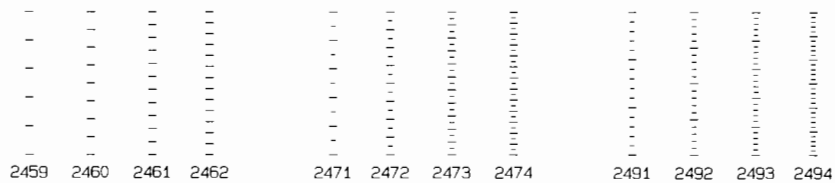
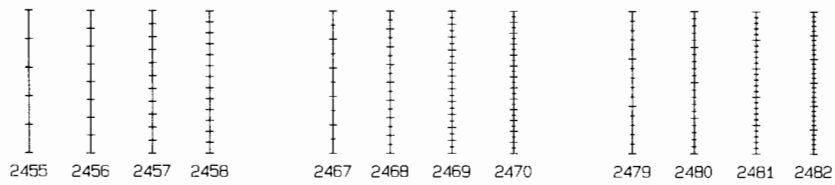
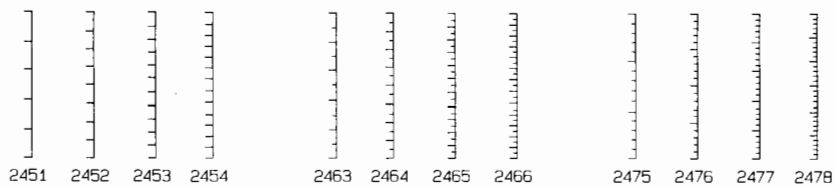
PICTORIALS - COMPOSITION AIDS



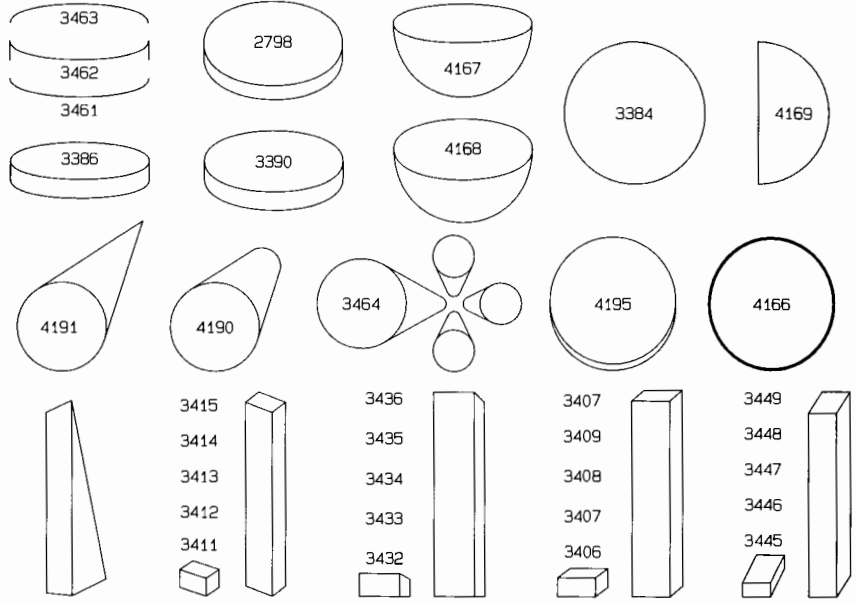
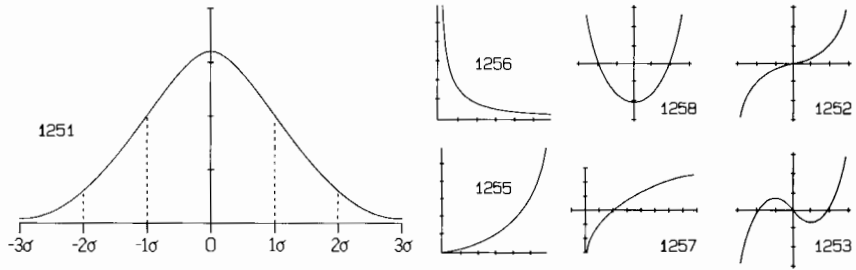
APPLICATIONS - ORGANIZATIONAL CHARTS



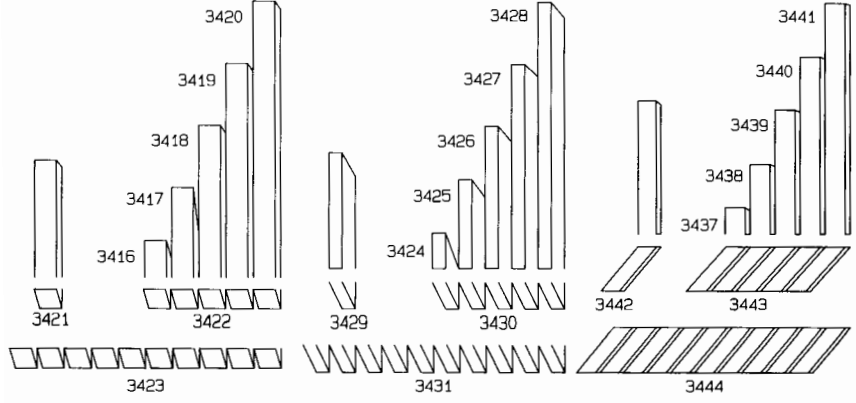
APPLICATIONS - PIE, BAR & LINE CHARTS



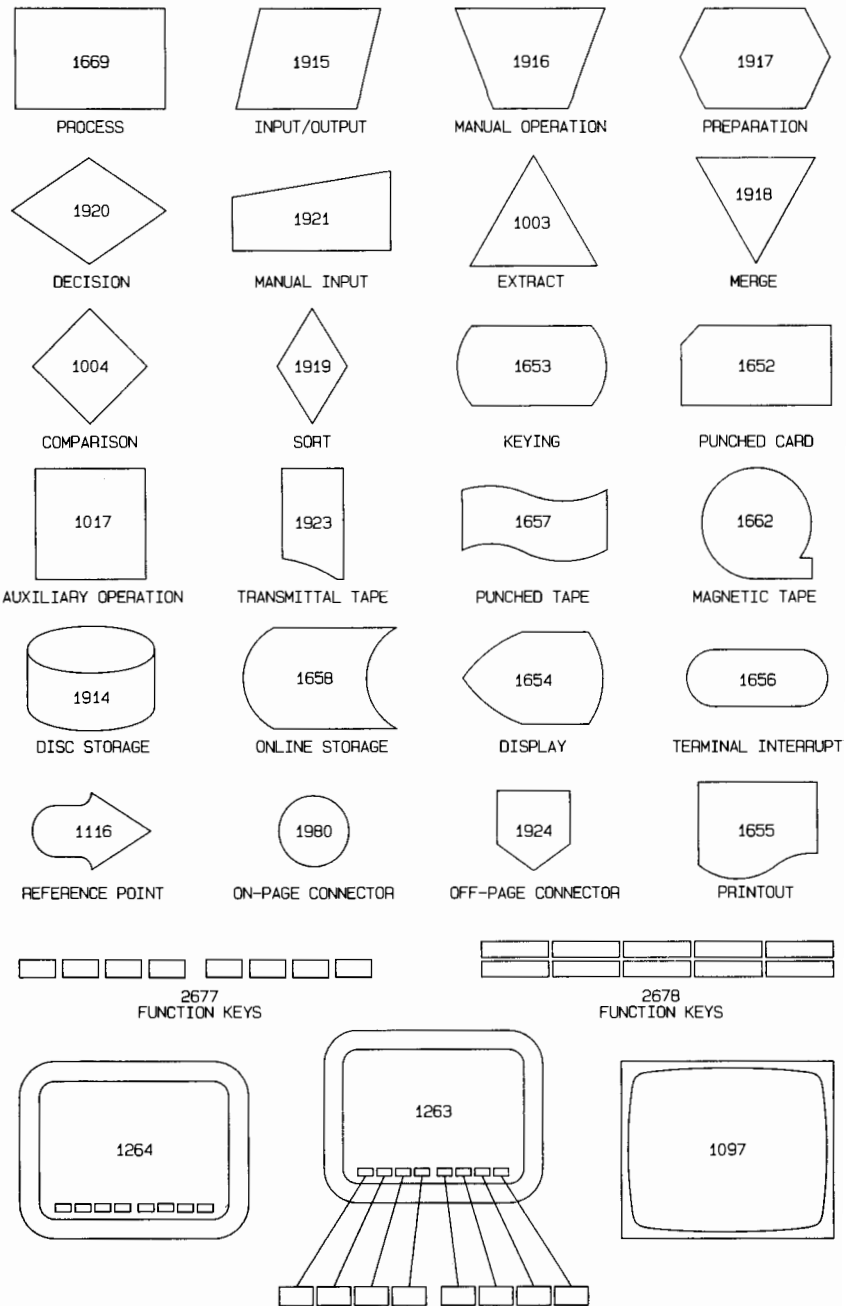
APPLICATIONS - PIE, BAR & LINE CHARTS



FIVE-BAR SETS (Lowest number is the smallest bar)



APPLICATIONS - DATA PROCESSING FLOWCHARTS

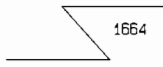




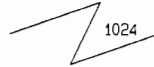
APPLICATIONS - COMMUNICATIONS FLOWCHARTS



1674  
ACOUSTIC COUPLER



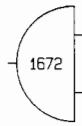
1664  
COMMUNICATION LINK



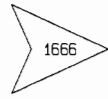
1024  
COMMUNICATION LINK



1633  
COMMUNICATION LINK



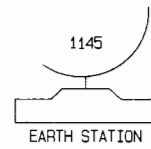
1672  
DATA ACCESS ARRGMNT



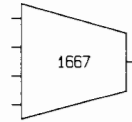
1666  
DIRECTION ARROW



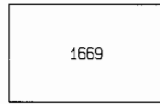
1922  
DISK STORAGE



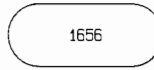
1145  
EARTH STATION



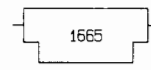
1667  
LINE CONCENTRATOR



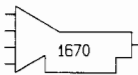
1669  
LINE SHARING



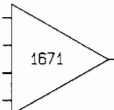
1656  
TEST EQUIPMENT



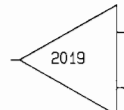
1665  
MODEM



1670  
MULTIPOINT MODEM



1671  
MULTIPLEXER



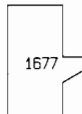
2019  
INVERSE MULTIPLEXER



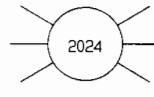
1980  
NODE



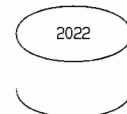
1001  
PACKET



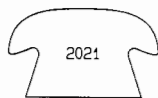
1677  
PBX



2024  
ROTARY



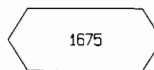
2022  
SATELLITE



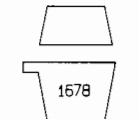
2021  
TELEPHONE



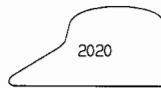
2023  
CRT DISPLAY TRML.



1675  
POLLED TERMINAL

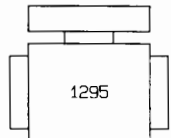


1678  
REMOTE BATCH TRML.



2020  
TELEPRINTER TRML.

APPLICATIONS - OFFICE LAYOUT



ARMCHAIR



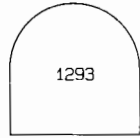
CONFERENCE CHAIR



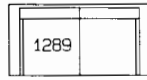
EXEC. SWIVEL CHAIR



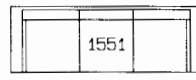
SECRETARY CHAIR



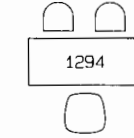
SIDE CHAIR



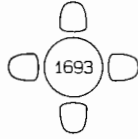
COUCH



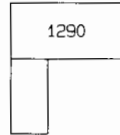
COUCH



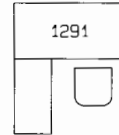
DESK ENSEMBLE



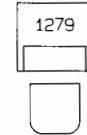
ROUND TABLE



SECRETARY'S DESK



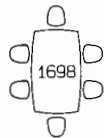
SECRETARY'S DESK



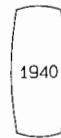
WORK STATION



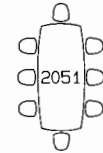
CONFERENCE TABLE



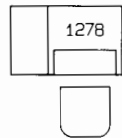
CONFERENCE TABLE



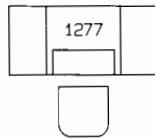
CONFERENCE TABLE



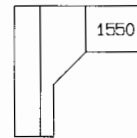
CONFERENCE TABLE



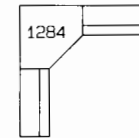
WORK STATION



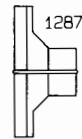
WORK STATION



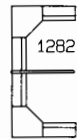
WORK STATION



WORK STATION



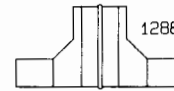
DUAL WORK STATION



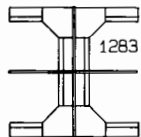
DUAL WORK STATION



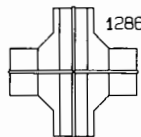
DUAL WORK STATION



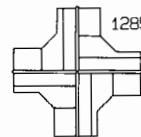
DUAL WORK STATION



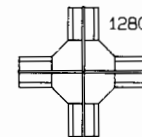
QUAD WORK STATION



QUAD WORK STATION

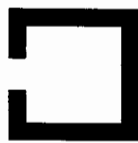


QUAD WORK STATION



QUAD WORK STATION

APPLICATIONS - NETWORKS



1851



1849



1848



1847



1846



1844



1843



1842



1860



1858



1857



1856



1865



1863



1862



1861



1850



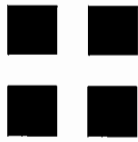
1845



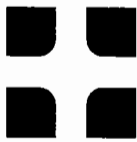
1859



1864



1807



1853



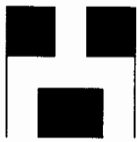
1852



2257



1826



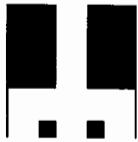
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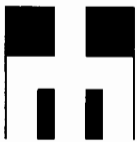
1828



3470



1836



1837



1838



3472



1854



1855



1857



1866



1829



1830



1831



3471



1821



1822



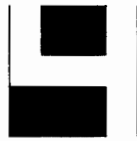
3468



1823



1818



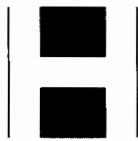
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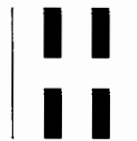
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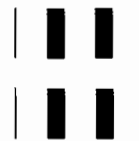
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2260



1814



2261



1873



1890



1872



1868



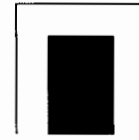
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1834



1832



3473



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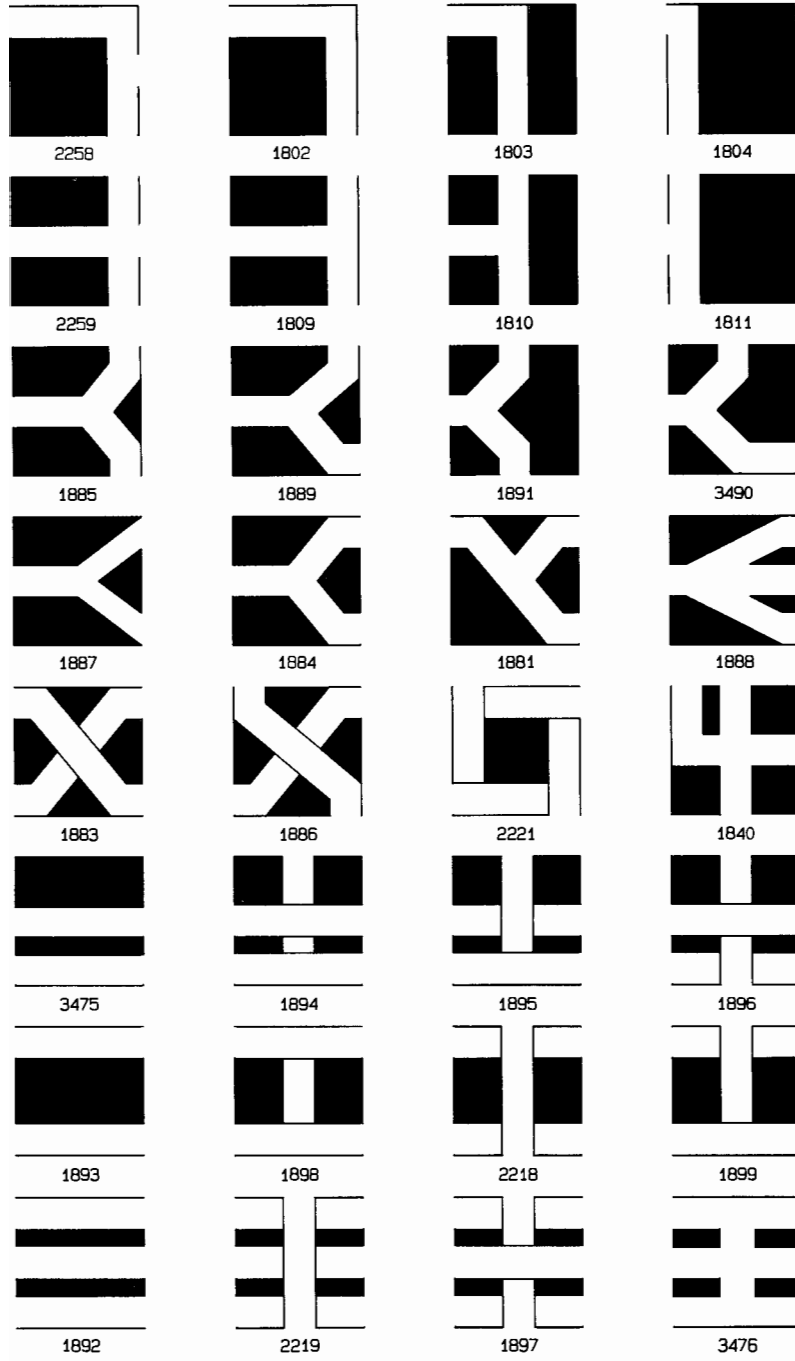


1871



1870

APPLICATIONS - NETWORKS



APPLICATIONS - NETWORKS



1874



1875



3485



1806



1805



1869



2223



2222



3481



1815



1816



3482



3478



3479



3480



1824



3477



1825



1817



1815



2211



2210



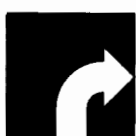
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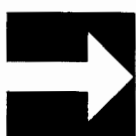
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2242



2214



2215



2250

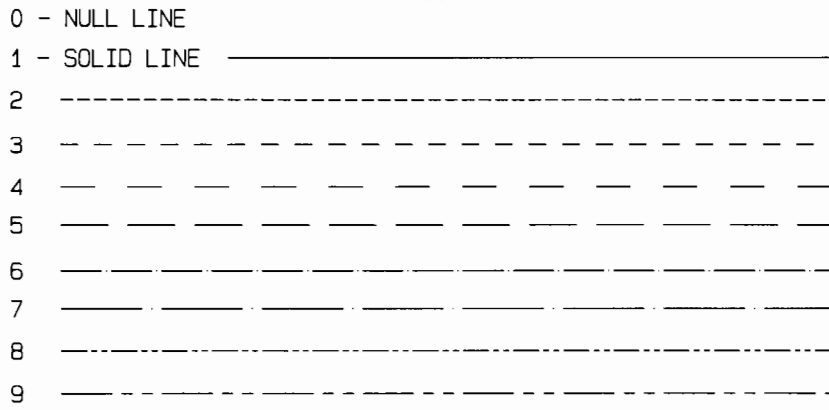


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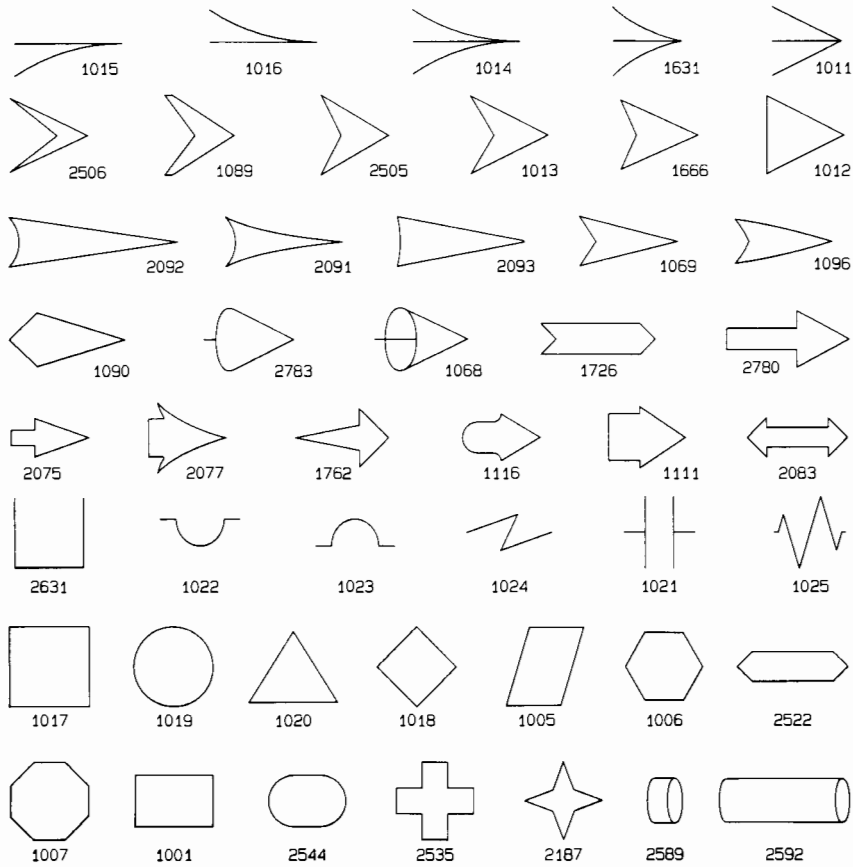
## APPENDIX



## Linetypes



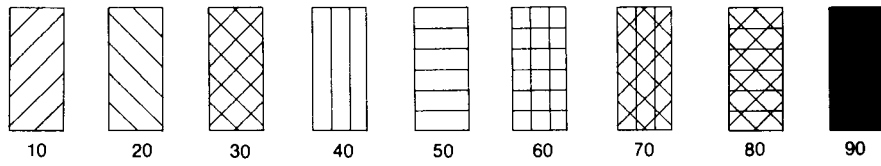
## Tokens



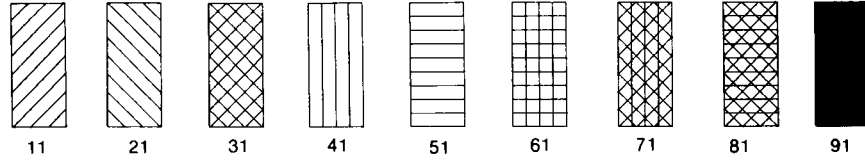


# Shading Patterns

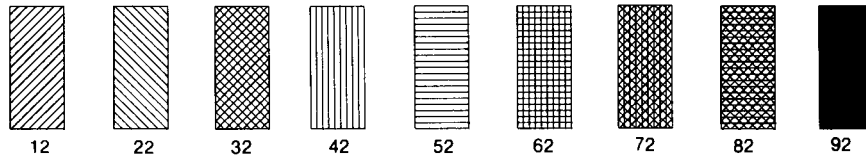
## LOW DENSITY PATTERNS



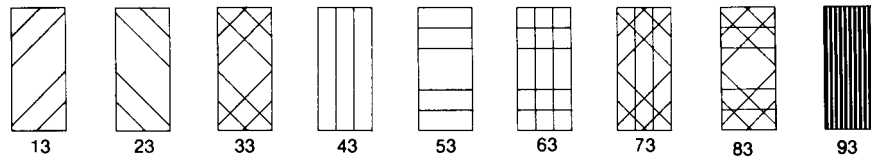
## MEDIUM DENSITY PATTERNS



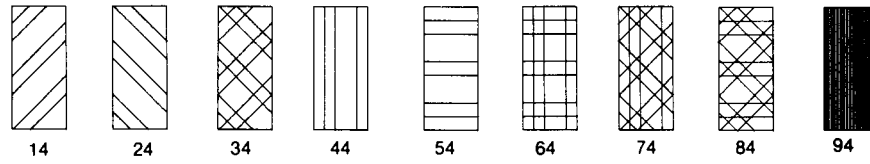
## HIGH DENSITY PATTERNS



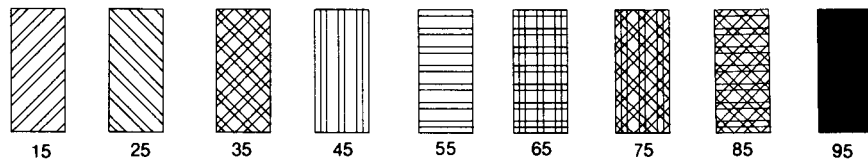
## LOW DENSITY PLAID PATTERNS



## MEDIUM DENSITY PLAID PATTERNS



## HIGH DENSITY PLAID PATTERNS



FONT 1 - HARWARE CHARACTER SET

This is the Hardware Character set  
 : ; " ' , . 1 2 3 4 5 6 7 8 9 0  
 ? ! \$ / # % & < > \* [ ] - + = ( ) @ ^ ~ ` \_ { } | \

FONT 2 - OUTLINE BLOCK

This is an example of Outline Block  
 : ; " ' , . 1 2 3 4 5 6 7 8 9 0  
 ? ! \$ / # % & < > \* [ ] - + =

FONT 3 - SOLID BLOCK

**This is an example of Solid Block**  
 : ; " ' , . 1 2 3 4 5 6 7 8 9 0  
 ? ! \$ / # % & < > \* [ ] - + =

FONT 4 - SIMPLEX ROMAN

This is an example of Simplex Roman  
 : ; " ' , . 1 2 3 4 5 6 7 8 9 0  
 ? ! \$ / # % & < > \* [ ] - + = ( )

FONT 5 - DUPLEX ROMAN

This is an example of Duplex Roman  
 : ; " ' , . 1 2 3 4 5 6 7 8 9 0  
 ? ! \$ / # % & < > \* [ ] - + = ( )

FONT 6 - COMPLEX ROMAN

This is an example of Complex Roman  
 : ; " ' , . 1 2 3 4 5 6 7 8 9 0  
 ? ! \$ / # % & < > \* [ ] - + = ( ) @ { }

FONT 7 - TRIPLEX ROMAN

This is an example of Triplex Roman

: ; " ' , . 1 2 3 4 5 6 7 8 9 0  
? ! \$ / # % & ( ) \* [ ] - + = ( ) @ { }

FONT 8 - SIMPLEX GREEK

A B Δ E H Γ Φ I K Λ M N O Π Ξ P Σ T Υ Θ Ω X Ψ Z  
α β δ ε η γ φ ι κ λ μ ν ο π ξ ρ σ τ υ θ ω χ ψ ζ

FONT 9 - SIMPLEX SCRIPT

*This is an example of Simplex Script*

: ; " ' , . 1 2 3 4 5 6 7 8 9 0  
? ! \$ / # % & ( ) \* [ ] - + = ( )

FONT 10 - COMPLEX SCRIPT

*This is an example of Complex Script*

: ; " ' , . 1 2 3 4 5 6 7 8 9 0  
? ! \$ / # % & ( ) \* [ ] - + = ( )

FONT 11 - GOTHIC ENGLISH

**This is an example of Gothic English**

: ; " ' , . 1 2 3 4 5 6 7 8 9 0  
? ! \$ / & \* - + = ( )

FONT 12 - COMPLEX ITALIC

*This is an example of Complex Italic*

: ; " ' , . 1 2 3 4 5 6 7 8 9 0  
? ! \$ / # % & ( ) \* [ ] - + = ( )

FONT 13 - TRIPLEX ITALIC

*This is an example of Triplex Italic*

: ; " ' , . 1 2 3 4 5 6 7 8 9 0  
? ! \$ / # % & ( ) \* [ ] - + = ( )



# ALPHABETIC SYMBOL INDEX

Description	Number	Page	Description	Number	Page
ACCENTS (Graphic Aids)		52	Bracket ( [ ] )	2132	75
Account Current (a/c)	2032	74	Bracket/Paranthesis ( ( ) )	2131	75
Acoustic Coupler	1674	95	Bridge, Simple	2410	78
AIRPLANES			Bridge, Trestle	2403	78
Biplane w/banner	4330P	86	Bridge w/Islands	4376P	90
Bomber	2015	79	Broadaxe	2437	81
Commercial Jet	4106P	86	Broadsword	4346P	84
Commercial Jet	2018	79	Broken Glass (Hole)	4128P	84
Fighter	2017	78	Broken Glass (Pieces)	4127P	84
Fighter, Side View	4418P	86	BUILDING		
Fighter, ¾ View	4153P	86	Barn	4046	78
Trainer	2016	79	Capitol	4215	78
Airport Sign	4067	76	Church	2402	78
Ampersand (&)	2669	74	Courthouse	2405	78
Anchor	4329P	83	Factory, Heavy Industry	2411	78
Angles		66	Factory, Light Industry	2408	78
Angle, Right	2620	66	Factory w/Smoke	4016	78
Angle (Notation)	1708	75	Grain Elevator	2435	78
Ape (Baboon)	4450P	85	House	2298	78
Approximately Equals (Notation)	1701	75	Lighthouse	2442	78
Arcs		66	Mine Head	2436	78
Arc (90 degrees)	2624	66	Nuclear Power Plant	4047	78
Arches		68	Office, One Story	4011	78
Armchair (Layout)	1295	96	Rowhouse	4010	78
Arrowheads		54	Schoolhouse	2040	78
ARROWS		54	Skyscraper	4050	78
Arrows, 3D		57	Windmill	4051	78
Arrows, Multidirectional		57	BUILDINGS		
Asterisk (*)	2029	74	City Skyline	4123	78
Asterisk (8 points)	2107	74	City Skyline (Horizon)	3347P	89
At (@)	2033	75	Light Industry (Horizon)	3345P	89
Atomic Power	4007	79	Refinery	2434	78
Atomic Power Plant	4047	78	Refinery Skyline (Horizon)	4078P	89
AUTOMOBILES			Suburbia (Horizon)	4079P	89
2-Door	4122P	86	Bunsen Burner	4225P	87
4-Door	4342P	86	Buoy w/Light	4138	78
Compact	4387P	86	Bus	4301P	86
Simple	1965	79	Bus	2441	79
Sports Car	4388P	86	Butterfly	4211P	85
Auxiliary Operation (Flowchart)	1017	94	Buzz Saw	4171	79
Axe	4457	81	Cacti	3355P	89
AXES		92	Cactus	3354P	89
Baboon	4450P	85	Cactus, Prickly	3351P	89
Balance Scale, Equal	4005	80	Caduceus	4052	80
Balance Scale, Unequal	4006	80	Camera, Movie	2265	79
Balloon, Hot Air	4347P	86	Candle	4424P	84
BALLOONS, WORD		65	Candle w/Holder	4144P	84
BANNERS		58	Capitol Building	4215	78
BAR CHARTS		93	Care Of (c/o)	2031	74
Barrel	4019	78	Cargo Ship	1947	79
Barrier (Road Signs)	4060	77	Cartesian Coordinate Axes		92
Bars, Jail	4002	80	Carton (Open)	4038P	83
Bars, Gold	4043P	83	Cat	2423	80
Bass Clef	1749	52	Caterpillar	4117P	85
Beaker	4385P	87	Cent Sign (¢)	2027	74
Bear, Teddy	4235P	85	CHAIR		
Bed	2046	81	Conference (Layout)	1692	96
Beer Mug	4179	81	Executive Swivel (Layout)	1292	96
Bell, Ring-The	4333P	83	Secretary's	2276	82
Bell, Ring-The (Top View)	4335P	83	Secretary's	4437P	87
Bell Curve	3323	66	Secretary's (Layout)	1552	96
Bell Curve w/Axes	1251	93	Side Chair (Layout)	1293	96
Bicycle	2271	79	Swivel	4422P	87
Biplane w/Banner	4330P	86	Champagne Glass	4343P	87
Blast Furnaces	4048	78	Channel-Lock Pliers	4322P	84
Book	4357P	87	CHARTS, PIE, BAR & LINE		92
Border (Curled Edge)	1547	64	CHARTS, ORGANIZATIONAL		91
Border (Parchment)	1937	60	Checkmark	1296	52
Border (Scroll)	3381	60	Checkmark in Grid	4353P	83
Border (Stamp)	1496	82	Checkmark in Square	4379P	83
BORDERS, PAGE		60	Checkmark in 3rd Box	2041P	83
Bow & Arrow	2294	81	Chemical Glassware	4014	79
Box, Open	4038P	83	Chemical Plant	2412	78
BOXES		59	Chemical Plant	4316P	86
Boxes, Four (Jumbled)	4045P	83	Chick in Egg	4320P	85
Boxes, Tumbling	4360P	83	Chicken	4071	80
Boxes w/Arrow	4012P	83	Child, Boy	2262	80
Boxing Gloves	4365P	83	Child, Girl	2283	80
Boy	2262	80	Church	2402	78
Brace ( { } )	2133	75	Circle	1002	68
Brace, (Long)	3331	91	Circles, Partial		66
Brace, (Short)	1265	91	City Skyline	4123	78

Description	Number	Page	Description	Number	Page
City Skyline w/Globe	4364P	87	Five-Drawer	4427P	87
City Skyline (Horizon)	3347P	89	Six-Drawer	2706	82
Clipboard (Movie)	4441P	85	Secretary's (Layout)	1290	96
Clipboard	4440P	87	Secretary's w/Chair (Layout)	1291	96
Clock, Alarm	2289	82	Destroyer (Ship)	2014	79
Clock, Round	2273	82	Diagraph Logo	9002P	83
Clock, Square	4042	82	Diamond (Jewel)	4069P	83
Clothing	2430	80	Diamond (Playing Card)	1928	52
CLOUDS			Diamonds (Accents)		52
Cumulus	4140P	88	Dingbats (Accents)		52
Funnel (Tornado)	4143P	88	Direction Arrow (Flowchart)	1666	95
Stratocumulus	4139P	88	Disc, 3 1/2 Inch	4439	82
Thunderhead	4141P	88	Disc, 5 1/4 Inch	1974	82
w/Lightning	4142P	88	Disc Drive	1972	82
Clover Leaf	1948	81	Disc Storage (Flowchart)	1914	94
Club (Playing Card)	1904	52	Dish Antenna	4433P	86
Commas		74	Display	1654	94
COMMUNICATIONS FLOWCHARTS		95	Division (-)	1703	75
Communication Links		95	Documents	1982	82
Compact Car	4387P	86	Dog, Puppy	2278	80
Compass Rose		54	Dog, Terrier	2272	80
Comparison (Flowchart)	1004	94	DOLLAR SIGNS		
COMPOSITION AIDS		88	One Bar	2025	74
Computer Terminal	1971	82	Two Bars	2026	74
Computer Paper	1495	82	3D, End View	4381P	83
Cones		72	3D, Front View	4115P	83
Conference Chair (Layout)	1692	96	3D, 3/4 View	4119P	83
Conference Table (Layout)	1940	96	Text Block	1057	64
Conference Table w/6 Chairs	1698	96	Dolly (Hand Truck)	2047	81
Conference Table w/8 Chairs	2051	96	Donkey	4058	80
Connector, Off-Page (Flowchart)	1924	94	Door	2049	81
Connector, On-Page (Flowchart)	1980	94	Door (Open, w/View)	4341P	90
Convex Lens	2551	68	Door (to Cellar)	4158P	90
Copyright (©)	2744	75	Double Dagger (Reference)	2037	74
Cosine/Sine Curve	3330	66	Dragon	4116P	85
Coupler, Acoustic (Flowchart)	1674	95	Dragon/Serpent	4369P	85
Courthouse	2405	78	Droplet	2598	52
Cow	4070	80	Drum (55 Gallon)	4019	78
Crane, Tower	4367P	86	Dumbbell	2553	68
Cross, Narrow	1684	68	Earth Station (Flowchart)	1145	95
Cross, Wide	2535	68	EDP Printout (Flowchart)	1655	94
Crosses, 3D		72	EDP FLOWCHARTS		94
Cross-Hairs		52	Egg (w/Baby Chick)	4320P	85
CRT			Eight Ball	3359	80
Communications (Flowchart)	2023	95	Eighth Note (Music)	1753	52
Display (Flowchart)	1654	94	Eighth Notes (Music)	1748	52
Personal Computer	1970	82	Electric Socket	2264	81
Screen	1097	94	Elephant	4057	80
W/Function Keys	1264	94	Ellipses		68
W/F-Keys Enlarged	1263	94	Engine, Steam	4098	79
Crucible	4224P	87	Engine, Modern	1967	79
Crystal Ball	4394P	84	Envelope (Back)	2295	82
Crystal Ball & Hat	4217P	84	Envelope (Front)	2297	82
CUBES			Equals (=)	2673	75
Four jumbled	4045P	83	Equals, 3D	1718	75
Oblique		69	Erlenmeyer Flask	4230P	87
Perspective		70	Erlenmeyer Flask	4201	79
Stacked		73	Exclamation Point, Round	2130	74
Tumbling	4360P	83	Exclamation Point, Block	1506	74
w/Arrow	4012P	83	Exclamation Point, 3D	1720	75
Cup, Trophy	4027	80	Executioner's Axe	2437	81
Curves		66	Explosion	1723P	84
Curves (see Functions)			Explosion Hole	4128P	84
Cutlass	4340P	84	Explosion Fragments	4127P	84
Cylinder, Graduated	4229P	87	Explosions		61
Cylinders, 3D Oblique		69	Exponential Curve	3324	66
Cylinders, 3D Perspective		72	Exponential w/Axes	1255	93
Dagger	4359P	84	Exponential, Inverse	3325	66
Dagger, Double (Notation)	2037	74	Exponential, Inv. w/Axes	1256	93
Dagger, Single (Notation)	2038	74	Extinguisher, Fire	2413	81
Dash (-)	1706	75	Extract (Flowchart)	1003	94
Data Access Arrangement	1672	95	Face (Smiling Man)	4146P	85
DATA COMMUNICATIONS			Face (Profile)	4384P	85
FLOWCHARTS		95	Face (Profile)	1969	80
Data Processing Flowcharts		95	Face (Profile w/Globe)	4370P	85
Dead-End Overpass	4431P	86	Face (Woman)	4402P	85
Decagon	2529	67	Faces (Cartoon Form)	4118	80
Decision (Flowchart)	1920	94	Family	2433	80
Deer	4082	80	Farm	4046	78
Desert/Mesas (Horizon)	3344P	88	Farm Scene	4080P	89
DESKS			Faucet	4383P	84
Ensemble (Layout)	1294	96	Female Symbol	1709	75

Description	Number	Page	Description	Number	Page
File Cabinet	2274	82	Hard Hat	2290	80
File Cabinet	4423P	87	Hat, Miner's	2424	80
File Cabinet, Open	4352P	87	Hat, Uncle Sam's	4332P	84
Fire	2449	81	Hat, Top	4237	80
Fire Extinguisher	2413	81	Head (Profile)	1969	80
Fish	4111P	85	Head (Profile)	4384P	85
Flag	1944	81	Head (Profile w/Globe)	4370P	85
Flag	4397P	84	Head (Smiling Man)	4146P	85
Flag, Waving	1946	81	Head (Woman)	4402P	85
Flame	2449	81	Heads, Cartoon	4118	80
Flashlight w/Spot	2708P	84	Heart	1580	80
Flask, Erlenmeyer	4230P	87	Heart (Playing Card)	1581	52
Flask, Florence	4221P	87	Heavy Industry	4077P	89
Flask, Volumetric	4231P	87	Helicopter	2280	79
Flasks	3324	87	Hen	4071	80
FLOWCHARTS, DP		94	Hexagons		67
Foil (Fencing)	4336P	84	Highlight (Whorl)	1932	53
Food Service Sign	4088	76	Highway	3343P	90
Foothills	3346P	88	Highway Overpass, Unfinished	4431P	86
Forms		82	Hills	4153P	88
Four Leaf Clover	1948	81	Hills/Mountains (Horizon)	3346P	88
Frames (Page Borders)		60	Hilly Road	4236P	90
Frames, 3D		73	Hole, Broken Glass	4128P	84
Frames, Sign		76	House	2298	78
Function Keys, Enlarged	1263	94	Hot Air Balloon	4347P	86
Function Keys On Screen	1264	94	Humpty Dumpty	4311P	85
Function Keys, 10	2678	94	Hyphen (-)	1706	75
Function Keys, 8	2677	94	I-Beam Cross-Section	2420	79
FUNCTIONS			ICONS		78
Bell	3323	66	In/Out Basket	3383	82
Cubic	3326	66	Infinity (Notation)	1780	75
Exponential	3324	66	Ingots	4043P	83
Hyperbolic	3329	66	Input, Manual (Flowchart)	1921	94
Inverse Exponential	3325	66	Input/Output (Flowchart)	1915	94
Parabolic	3328	66	Integral (Notation)	1714	75
Quartic	3327	66	Interrupt, Terminal (Flowchart)	1656	94
Sine/Cosine	3330	66	Inverse Multiplexer (Flowchart)	2019	95
Tangent	2644	66	Jail	4002	80
FUNCTIONS w/AXES			Jar, Gas Generating	4234P	87
Bell	1251	93	Jewel (Diamond)	4069P	83
Cubic	1253	93	Judge	4029	80
Cubic, Inflection	1252	93	Key, Common	4407P	84
Exponential	1255	93	Key, Old-Fashioned	4210P	84
Inverse Exponential	1256	93	Key, Skeleton	4361P	84
Logarithmic	1257	93	Keyhole	4073	80
Parabolic	1258	93	Keying (Flowchart)	1653	94
Funnel	4227P	87	Keys on Ring	4314P	84
Funnel Cloud (Tornado)	4143P	88	Ladle, Steel Mill	2407	79
Gas Plant	4049	78	Lamp	2292	81
Gas Generating Jar	4234P	87	Landscapes		88
Gasoline Pump	2263	78	LAYOUT, OFFICE		96
Gaussian Curve	3323	66	Leaf, Maple	4041P	83
Gaussian Curve w/Axes	1251	93	Leaf, Maple	1949	81
Gavel	2042	80	Leaf, Oak	4356P	83
Gears	4061	79	Lens, Convex	2551	68
GEOMETRICS		66	Less Than (Notation)	1702	75
Gibbons Moon	2730	53	Less Than or Equal To (Notation)	1707	75
Girl	2283	80	Light Beam	1799	53
Glass, Martini	4343P	87	Light Bulb	4425P	84
Globe w/Grid	4036	82	Lighted Buoy	4138	78
Globe w/Head	4370P	85	Lighthouse	2442	78
Globe w/Meridian Lines	4037	82	Lightning Bolt (Curved)	2053	53
Globe w/Skyline	4364P	87	Lightning Bolt (Straight)	2052	53
Gloves, Boxing	4365P	83	Lightning Storm	4142P	88
Gold Bars	4043P	83	LINE CHARTS		93
Golf Ball (on Tee)	4363P	83	Line Concentrator (Flowchart)	1667	95
Graduated Cylinder	4229P	87	Line Sharing (Flowchart)	1669	95
Grain Elevator	2435	78	Line, Single	2487	66
Gramophone	4428P	83	Lines, Parallel	2488	66
Grids (Circular)		92	Lines, Perpendicular		66
Grids (Composition Aids)		90	Links, Communications (Flowchart)		95
Gun (Pistol)	2285	81	Lock (Padlock)	4109P	84
Gun (Rifle)	2712	81	Lock, Keyhole	4073	80
Half Moon	4086	53	Locomotive, Steam	4098	79
Half Moon	4170P	89	Locomotive, Modern	1967	79
Half Note (Music)	1752	52	Logarithmic Curve w/Axes	1257	93
Hand, Pointing	1121	57	Logarithmic Grids		92
Hand, Pointing Palm Out	4131P	85	Loving Cup (Trophy)	4027	80
Hand, Pointing Palm Down	4132P	85	Lozenges		68
Hand Truck (Dolly)	2047	81	Magnet	1578	80
Hands, Shaking	4130P	85	Magnetic Tape (Flowchart)	1662	94
Harbor Scene	4455P	89	Magnifying Glass	4368	81

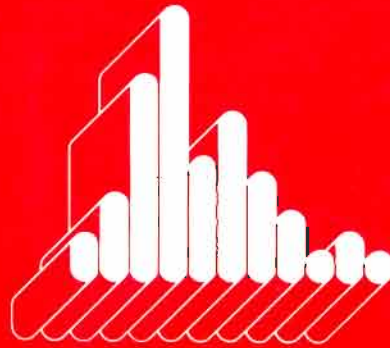
Description	Number	Page	Description	Number	Page
Magnifying Glass	4351P	84	Overpass, Unfinished	4431P	86
Male Symbol	1710	75	Packet (Flowchart)	1001	95
Man	2282	80	Pad of Paper (Border)	4196	60
Man (Pulling Rope)	4145P	85	Pad and Pencil	2296	82
Man (Smiling)	4146P	85	Padlock	4109P	84
Man (Weightlifter)	4204P	85	PAGE BORDERS		60
Man w/Magnifying Glass	4165P	85	Paint Brush and Can	2419	81
Manual Input (Flowchart)	1921	94	Palette	4389P	83
Manual Operation (Flowchart)	1916	94	Palm Tree	3366P	89
Map (Statelines for USA)	4395P	87	Pamphlet	1526	82
Map (Time Zones for USA)	4126P	87	PAPER		
Map (U.S.A. Outline)	4103P	87	Bent Corner	1547	64
Map (U.S.A. 3D)	4350P	87	Computer	1495	82
Map (U.S.A. w/States)	4349P	87	Folded	4345	82
Maple Leaf	4041P	83	Pad w/Pencil	2296	82
Maple Leaf	1949	81	Pages Lifted	1979	82
Martini Glass	4343P	87	Torn	4374	82
Maze	4445P	83	Parabola	3328	66
Medal	4004	80	Parabola w/Axes	1258	93
Medical Logo (Caduceus)	4052	80	Paragraph	2791	75
Merge (Flowchart)	1918	94	Parallelograms		67
Message (Bulletin Board)	2663	64	Parchment (Border)	1937	60
Microphone	2299	79	Parenthesis ( )	2129	75
Microscope	2043	79	Parenthesis/Bracket ( )	2131	75
Mine Head	2436	78	PBX (Flowchart)	1677	95
Miner's Helmet	2424	80	Pencil	4039P	87
Minus (Notation)	1706	75	Pennant	4398P	84
Missiles	4053	79	Pennant, One Point	1945	81
Modem (Flowchart)	1665	95	Pennant, Swallowtail	2438	81
Modem	1973	82	Pentagon, Irregular	2520	67
Modem, Multiport (Flowchart)	1670	95	Pentagon, Equilateral	2519	67
Money, International	4451	81	People		80
Moon	4170P	89	Per Thousand (0/00)	2035	74
Moon, First Quarter	4086	53	Percent (%)	2034	74
Moon, Third Quarter	2730	53	Perpendicular Lines		66
Mountain Curve	4081P	90	Person	1959	80
Mountain Peaks	4155P	88	PERSPECTIVE, 3D Geometrics		72
Mountain Scene	3348P	88	Phone	2275	82
Mountains/Hills (Horizon)	3346P	88	Phone	4444P	87
Movie Camera	2265	79	Phonograph	4428P	83
Mule	4058	80	Pi (Notation)	1712	75
Multiplexer (Flowchart)	1671	95	Pick and Shovel	2417	79
Multiplexer, Inverse (Flowchart)	2019	95	PICTORIALS		83
Multiplication (x)	1704	75	PIE CHARTS		95
Multiport Modem (Flowchart)	1670	95	Pig	4328P	85
Music	4015	81	Pinwheels		53
Musical Notes		52	Pistol	2285	81
NETWORKS		97	Planet w/Rings	1741	79
Node (Flowchart)	1980	95	Plane, Wood	2416	79
NOTATION		74	Pliers, Channel Lock	4322P	84
Not Equal ( $\neq$ )	2674	75	Plus (+)	1705	75
Note (Bulletin Board)	2663	64	Plus, 3D	1719	75
Notes, Music	4015	81	Plus or Minus ( $\pm$ )	1715	75
Notes, Music (Individual)		52	Polar Coordinate Axes		92
Nuclear Power Plant	4047	78	Polled Terminal (Flowchart)	1675	95
Number One, 3D	4228P	83	Polyhedra		73
Number (#)	2028	74	Polyhedron, 20-Sided	2447	73
Number (#), 3D	4040	75	Pound (lb.)	2036	74
Oak Leaf	4356P	83	Pound (#)	2028	74
OBLIQUE, 3D Geometrics		69	Pound (#), 3D	4040	75
Octagons		67	Pound Sterling (Notation)	2039	74
Octahedrons		73	Power Plant, Nuclear	4047	78
Off-Page Connector (Flowchart)	1924	94	Prairie	4152P	88
Office Bldg., 1-Story	4011	78	Preparation (Flowchart)	1917	94
Office Bldg., Skyscraper	4050	78	Prescription (Rx)	1716	75
OFFICE LAYOUT		96	Pressure Valve	4105P	84
Oil Can (Pour)	4358P	87	PRIMITIVES		66
Oil Can (Squirt)	4338P	87	Printer, Simple	1977	82
Oil Derrick	4366	78	Printer, 3D	1978	82
Oil Refinery	4078P	89	Printout (Flowchart)	1655	94
Oil Refinery	2434	78	Prisms, Oblique		69
Oil Rig	4366	78	Prisms, 3D		71
Oil Rig	4372P	86	Process	1669	94
Oil Pump	1966	78	Profile, Human Head	1969	80
On-Line Storage (Flowchart)	1658	94	Profile, Human Head	4384P	85
On-Page Connector (Flowchart)	1980	94	Profile w/Globe	4370P	85
One (Block)	4228P	83	Protractor	2864	66
Open Box	4038P	83	Puddle	1549	61
ORGANIZATIONAL CHARTS		91	Pump, Gasoline	2263	78
Ounce (oz)	2792	74	Pump, Oil Well	1966	78
Output (Flowchart)	1915	94	Punched Card (Flowchart)	1652	94
Ovals		68	Punched Tape (Flowchart)	1657	94



Description	Number	Page	Description	Number	Page
Pyramids		69	Signs (on Roadside)	4302P	90
Pyramids	4375P	88	SIGNS		
Quadrilaterals		67	Airport	4067	76
Quarter Note (Music)	1751	52	Baggage	4001	76
Question Mark	1505	74	Bar	4064	76
Question Mark, 3D	2731	75	Barrier	4060	77
Question Mark, Tapered	1583	74	Bus Stop	4134	76
Radiation	1598	52	Construction	4083	76
Radio Tower	2406	78	Danger!	1996	76
Radio, Modern	2288	79	Directional	4176	77
Radio, Old-Fashioned	2048	81	Do Not Enter	1930	77
Railroad Car	1968	79	Electrical Danger	1629	76
Railroad Engine, Modern	1967	79	Elevator	4062	76
Railroad Engine, Steam	4098	79	Explosives	4085	76
Railroad Tracks	4339P	90	Falling Rocks	1975	76
Rainbow w/Pot of Gold	2702P	83	Fire Hazard	4075	76
Reactor	4047	78	First Aid	4066	76
Record Player	4428P	83	Flammable	4075	76
Reference Point (Flowchart)	1116	94	Food Service	4088	76
Refinery	2434	78	Handicapped	1597	76
Refinery (Horizon)	4078P	89	Information	4065	76
Refrigerator	2293	81	Intersection	1957	77
Registered Trademark (®)	2745	75	Interstate Highway	1997	76
Registration Marks		52	Keep Right	4092	77
Remote Batch Terminal	1678	95	Left Turn	4094	77
Retort	4390P	87	Left Turn or Straight	4093	77
Rhombus	1004	67	Median Ahead	1998	77
Ribbon (1st Place)	4371P	83	Merging Traffic	4177	77
Rifle	2712	81	No Bridge	1999	76
Right Angle	2620	66	No Left Turn	1909	77
Ring-The-Bell (Front View)	4333P	83	No Parking	2111	77
Ring-The-Bell (Top View)	4335P	83	No Right Turn	1911	77
Road, Curved	4459P	90	No Smoking	4055	76
Road, Intersections		90	No Trucks	1910	77
Road, Mountainside	4081P	90	No U Turn	1908	77
Road Roller	4110P	86	One Way	1929	77
Road, Straight	3343P	90	Parking Permitted	2112	77
Road w/Hills	4154P	90	Pedestrian X-ing	1995	77
Road w/Hills	4236P	90	Picnic Area	4096	76
Road w/Signs	4302P	90	Prohibited (Generic)	1801	76
Road Signs (see Signs)			Radiation	4074	76
Rockets	4053	79	Railroad	1939	77
Rocky Slopes	4151P	88	Railroad Crossing	4136	77
Rotary (Flowchart)	2024	95	Restaurant	4088	76
Round Table w/Chairs (Layout)	1693	96	Riverbank	1999	76
Rowhouse	4010	78	Road Curves	1902	77
Ruler	4024P	87	Road Narrows	1994	77
Running Figure	4446P	85	Road Splits	1730	77
Rural Scene	4080P	89	Road Turns	1956	77
Safe (Vault)	4213P	87	S-Curve	1729	77
Sailboat	2045	79	School Crossing	4135	76
Satellite	4054	79	Secondary Road	1955	77
Satellite (Flowchart)	2022	95	Slippery When Wet	4175	77
Satellite Dish Antenna	4433P	86	Stop	1912	77
Saturn	1741	79	Taxi	4068	76
Scale, Balanced	4005	80	Telephone	3392	76
Scale, Unbalanced	4006	80	Three-Way	1907	77
Schoolhouse	2040	78	Train Stop	4084	76
Scissors (Open)	4382P	84	U.S. Highway	1630	76
Scissors (Closed)	4321P	84	Wear Goggles	4087	76
Screen, CRT	1097	94	Winding Road	1903	77
Screen w/Function Keys	1264	94	Y-intersection	1730	77
Screen (F-Keys Enlarged)	1263	94	Yield	1906	77
Scroll	2113	82	Signal Light	1926	77
Scroll (Page Borders)	3381	60	Signal Light w/Arrow	1925	77
Section Mark (Notation)	1717	74	Sine/Cosine Curve	3330	66
Septagon	2523	67	Sink	2291	81
Shaking Hands	4130P	85	Skeleton Key	4361P	84
Shamrock	1948	81	Skull & Crossbones	4056P	81
Ship	4355P	86	Skyscraper	4050	78
Ship, Cargo	1947	79	Snail	4442P	85
Ship, Destroyer	2014	79	Snowflake	1553	53
Shipyard (Horizon)	4455P	89	Socket, Electrical	2264	81
Shortsword	4359P	84	Sofa, 2 Cushion (Layout)	1289	96
Shovel and Pick	2417	79	Sofa, 3 Cushion (Layout)	1551	96
Shrubs		89	Sort (Flowchart)	1919	94
Sigma (Notation)	1713	75	Sow (Pig)	4328P	85
Sign Borders		76	Spade (Playing Card)	1934	52
Sign Post (3 Arrows)	4412P	90	Spark Plug	4354P	84
Sign Post (4 Arrows)	4432P	90	Spilled Liquid	2743	61
Signboard	3382	60	Sparkles		53
Signs (Many/Confusing)	4310P	86	SPLASHES		61

Description	Number	Page
Sports Car	4388P	86
Spyglass	4377P	84
Square Root (Notation)	1711	75
Stag (Deer)	4082	80
Stairs (Perspective)	4429P	90
Stamp, Postage	1496	82
Stapler	2429	82
Stars	3360P	88
STARS		62
State Lines (for USA Map)	4395P	87
States (USA Map)	4349P	87
Steam Engine	4098	79
Steam Roller	4110P	86
Steel Mill Ladle	2407	79
Sterling, Pound (Sign)	2039	74
Stone Tablets	2736	64
Stool	2287	81
Storage, Disc (Flowchart)	1914	94
Storage, On-Line (Flowchart)	1658	94
Streetlamp	2404	78
Strong Man	4204P	85
Submarine	2013	79
Suburbs (Horizon)	4079P	89
Sun	1731	79
Sun	3353P	89
Sunrise		53
Surveyor's Transit	2418	79
Sword (Broadsword)	4346P	84
Sword (Cutlass)	4340P	84
Sword (Foil)	4336P	84
Sword (Short)	4359P	84
Table	2401	81
Tables, Office (Layout)		96
Tag (Package)	4114P	87
Tape Dispenser	2428	82
Tape, Magnetic (Flowchart)	1662	94
Tape, Punched (Flowchart)	1657	94
Tape, Transmittal (Flowchart)	1923	94
Teardrop	2598	52
Teddy Bear	4235P	85
Tepee	2277	78
Telephone	2275	82
Telephone	4444P	87
Telephone (Flowchart)	2021	95
Telephone Poles		90
Teletypewriter (Flowchart)	2020	95
Telescope	4377P	84
Television	4072	82
Tent	4137	78
TERMINALS		
CRT	1971	82
Display (Flowchart)	2023	95
Polled (Flowchart)	1675	95
Remote Batch (Flowchart)	1678	95
Terminal Interrupt (Flowchart)	1656	94
Test Equipment (Flowchart)	1656	95
Test Tube	4121P	87
Test Tube	4020	79
Tetrahedrons		73
TEXT BLOCKS		64
Bulletin Board Note	2663	64
Dollar Sign	1057	64
Paper (Curled Edge)	1547	64
Quotation Marks	2116	64
Stone Tablets	2736	64
Tight Rope w/Humpty Dumpty	4311P	85
Time Zones (for USA Map)	4126P	87
Top Hat	4237	80
Top Hat (Uncle Sam's)	4332P	84
Tornado	4143P	88
Tower Crane	4367P	86
Tracks, Railroad	4339P	90
Tractor w/Driver	4099	79
Transmission Tower	2440	78
Transit	2418	79
Transmittal Tape (Flowchart)	1923	94
Transmitter Tower, Radio	2406	78
Transistor Radio	2288	79
Trapezoids		67
Trash Can	2281	81
Trashbasket (Door/Lid)	2044	81
Trebble Clef	1750	52

Description	Number	Page
Tree	2270	81
Tree, Evergreen	2266	81
Trees		89
Trestle Bridge	2403	78
Triangle, Acute/Obtuse	2504	67
Triangle, Equilateral	2501	67
Triangle, Isosceles	2502	67
Triangle, Right	2503	67
Tripod	4393P	87
Trophy Cup	4027	80
Truck, 18-Wheeler	4108P	86
Tumbling Boxes	4360P	83
TV	4072	82
Umbrella	4203P	84
USA Map		
Outline	4103P	87
3D	4350P	87
State Lines	4395P	87
States	4349P	87
Time Zones	4126P	87
Vault Safe	4213P	87
Video Screen	1097	94
Vial	4020	79
Vial	4121P	87
Volumetric Flask	4231P	87
Water Droplet	2598	52
Water/Ocean	3365P	88
Water Tower	2409	78
Whorl (Accent)	1932	53
Windmill	4051	78
Wizard's Hat w/Crystal Ball	4217P	84
Woman	2284	80
Woman (Face)	4402P	85
Wood Plane	2416	79
WORD BALLOONS		65
Work Stations (Layout)		96
World w/Grid	4036	82
World w/Meridians	4037	82
X-Axes, 12 Months	4192	92
X-Axes, 24 Months	4193	92
X-Axes, 53 Weeks	4194	92
X-Mark on Grid	4223P	83
X-Mark	1765	52
Yen Sign	2735	74



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