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ROCHESTER INSTITUTE OF TECHNOLOGY

A Thesis Submitted to the Faculty of  
The College of Fine and Applied Arts  
in Candidacy for the Degree of

MASTER OF FINE ARTS

FRAME DESIGN

By

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19 May 1987

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Date: 19 May 1987

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## Introduction

In August, 1986, I proposed a thesis which would be a book that would visually express the process of interactive videodisc to an otherwise uninformed public. My original intention was to create a book about interactive videodisc which would visually and graphically represent and explain interactive videodisc. As of this date, few people are aware of the potential of interactive videodisc. My intention was to broaden the awareness of interactive videodisc using a medium that is more accessible to the general public. Research bore the plain fact that, in order to successfully design a program for interactive videodisc, it is first necessary to create effective screen design for the television monitor. Thus, for this thesis, a workbook was designed to help the viewer to become aware of using typographic and visual variables when designing for the frame or TV screen. Active participation by the reader became an essential criterion when using the workbook.

Since one often gets so involved with work on the screen that the actual design of the work is forgotten, the development of an interactive workbook dealing with frame design became apropos. As the number of

computer programs available to the public multiplies with the number of computers on the market, it seems logical that the programmers have at their disposal a set of guidelines for effective frame design. By creating a workbook, the user is drawn away from the screen and asked to interact with the tools of the print designer's trade-grids, text, headers, rules, and color as well as typographic and visual variables.

Since the original idea was intended for interactive videodisc, and projects that could be programmed using the VAX/PRO 350, overlay graphics played an important part. The VAX/PRO 350 will allow graphics to be seen in combination with an image played from a videodisc. This idea was the essence of the interactive play within the workbook. As the thesis evolved from an explanation of interactive videodisc to a workbook for effective frame design, the structure and idea for interactive participation were kept intact.



## Chapter One.

### Research

Communication of information has been an ongoing concern during the evolution of the human race. From the visual histories found at Lasceaux and Altamira to present technology, man has continually searched for the clearest and most rational means to convey ideas. As the world's population demands increasing data through its vast technological resources, a need has emerged for an art form whose precise aim is that of clarifying and interpreting this quantity of information in a logical and visually effective way. Thus, the graphic designer balances the organization of information with aesthetics when interpreting ideas.

Technology during the twentieth century has created the electronic age. This computer age adds a new dimension to the graphic designer whose major concern previously was the design of the printed page. As computers become as common as books are in the home, a need grows for designers to turn their interest and

expertise towards the television screen and create for a fixed format, that of the monitor frame. Aaron Marcus, a forerunner in the field of computer graphics, is concerned with frame design in this "Information Age". Marcus prepared a lecture series in 1981 in which he states the following:

"Communicating information visually implies the importance of information-oriented graphic design professionals who are skilled in typography, symbolism, color, spatial composition and temporal sequencing in the new media. I point out three ways in which all computer systems communicate through visual symbols. I call these three faces of computer systems: outer faces, interfaces, and inner faces. Outer faces are the end results of data processing: texts, tables, charts, maps, and diagrams. Interfaces are the frames of information and response that the user of a system is confronted with: screenfulls of texts and images or printed documentation. Inner faces are the frames of information that the builders and maintainers of systems require in order to create the tools that other people use to design images of information."<sup>1</sup>

There is a tendency for one predisposed with creativity to forget the rules at the base of effective, creative design. Electronic media, because of its very nature of animation and constant interaction by the user, falls into this realm of the "lost principles of design" more often than not. Therefore, this is one area where it is most necessary for the designer to step back periodically and evaluate his creative effort. As computers have become more user-friendly, a greater amount of information has emerged from desk-top publishing firms. Programmers have developed graphics packages for home use by the general public, and a vast amount of computer graphics information is being designed by those having little knowledge of the subject. The more engrossed with the information on the screen one becomes, the more one forgets the principles of effective design. Therefore, the idea grew for this manual on frame design. Since the monitor screen is such a compelling tool, this design is specifically in book form. This draws the computer-literate individual away from the monitor to the book, or hard copy format. Asked to interact with a printed template of a monitor and

acetate overlays, the user can develop title slides, posters, text layouts, and menus with the constant visual reminder of the safe title area, safe action area, and TV scanning area indicated.

The design principles covered in this manual can and should be applied to the screen. It is possible to construct similar grid systems which can be called up on the screen and hidden at will. One can quickly try out each problem described and develop solutions to the problems, but hard copy still has to be generated in order to compare several designs at once. And, as suggested previously, the temptation to get involved with the screen is kept to a minimum when the screen becomes a fixed tangible printed page. There is something very real to be said for building a design with overlays and physical structural components. Thus, this project is a workbook with acetate transparencies rather than a program to be worked out on the computer.

## The Content of the Workbook

Aimed at the computer literate audience, this manual is to be used by anyone who designs or programs on the computer. For those with little or no training in graphic design this manual may be used to establish basic guidelines for using visual and typographic variables. For graphic designers who are using the computer for most of their creative problem-solving, this workbook may be an asset as a reminder to keep copy within the safe title area of the screen and to use design principles accordingly.

When asked to draw a series of sketches showing changes that would occur in a room when any one of five items was changed, I painted acetate cells with the items in question. These cells could be interchanged at the viewer's discretion to create the room of choice. The cells eventually replaced a previously planned model, and became a pilot production for an educational videodisc project. A logical progression was to use acetate cells as the medium of this interactive book.

Our vocabulary changes and develops with growth and involvement in new interests. As we work in a new medium, our vocabulary naturally expands until we become literate in that field. One way to continue growing is to consciously work on adding to one's vocabulary. In the Design Concept, Allen Hurlburt states: "We learn language by applying words to visual experiences, and we create visual images to illustrate verbal ideas. This interaction of word and image is the background to contemporary communication."<sup>2</sup>

Grids are the basis for graphic design. Without a concrete understanding of grids and their use, there would be no structure beneath the visual and typographic variables, and the design would not hold together. In Graphic Design for Non-Profit Organizations, Massimo Vignelli introduces grids with the following paragraph.

"The grid is the most important tool that can be used by the layout designer. It is an invisible structure that provides a disciplined and consistent look while increasing production efficiency and maintaining the flexibility needed to solve a wide range of layout problems."<sup>3</sup>

Since it is the designer's responsibility to organize visual and verbal communication, the grid becomes a necessary tool for giving a sense of order to what could otherwise be a random selection. The three grids included in this guide are those most frequently used by the graphic designer. As grids are essential to the structure of design, this opportunity for those unaware of the use of grids to use them constructively is a key to the use of this interactive book. Figure 1 is an example of a compositional grid. This grid generally breaks up the field or page into equal parts. Figure 2 is the typographic unit grid designed for the screen template included in the workbook tools. This is a 24 point typographic unit grid. The large point size is for clarity of the projected text type on the screen when seen from a distance. Figure 3, the composite grid, is a series of rectangles made of groups of the unit grid. This grid helps the designer to place text, titles, and pictorial elements on a field with intent.

Jerrold E. Kemp has published in Planning and Producing Audiovisual Materials<sup>4</sup> suggested sizes of type

to be used in a projected medium. His recommendation of using text of at least 1/4 inch high seemed questionable at first. However, when reduced in scale to fit on the text pages within the guidebook, smaller point sizes became illegible. Reducing the size of the image has the same effect as increasing the distance between the viewer and the screen.

The graphic designer often uses visual puns to communicate the message. Another method at the disposal of the graphic designer is the control of the visual message by means of using Gestalt Principles. In Perception and Photography, Richard D. Zakia states:

"The Gestalt school of psychology, which was originated in Germany about 1912 by Dr. Max Wertheimer, provides us with some simple and convincing evidence about how man organizes and groups visual elements so that they are perceived as wholes."<sup>5</sup>

By understanding the difference between the whole and the sum of its parts, the graphic designer can manipulate how his audience sees the message. Gregg Berryman



discusses this in Notes on Graphic Design and Visual Communication.

"A thorough knowledge of visual Gestalt Principles gives the graphic designer an invaluable tool box. We know that audiences will react to overt or obvious Gestalt patterns. By matching a target audience with selected high impact Gestalt images we can shorten the distance to effective communications. We can, as designers, virtually guarantee an audience response, which is the bottom line of design efficiency."6

Color adds greater dimension to design. It is often more appealing than black and white, and draws the eye to itself. By employing color sparingly, the graphic designer gains greater mileage out of the printed piece. When using color monitors, it is easy to become engrossed in the color and forget principles of good design. Higher resolution graphics packages such as Artronics and Genigraphics which boast more colors than the human eye can discern at any one time are very alluring. However, the designer is advised to step back from this temptation and remember some basic rules and theories of color. Gregg Berryman suggests when

selecting colors, the graphic designer should:

"Analyze your target audience. Pick stimulating colors, those that will evoke a response. Choose hues that are namable, with good recognition, retention, recall. Limit your color combinations to two or three...Audience color preferences are in constant flux. They vary annually and seasonally. Age, economic conditions, sex, culture, geography, and religion influence color choices."<sup>7</sup>

One of the most important aspects of frame design is that of designing menus for the screen. A menu presents a selection to the user and asks for a decision.

All of the elements of graphic design come into play here because of the importance for clarity, legibility, and the need for interactive responses from the viewer. The menu should maintain the interest of the viewer while providing easy access of choices. Overcrowding the screen with information and confusing graphics at this stage can cause the user to quit the menu instead of proceeding towards a more viable solution to the program. Aaron Marcus discusses needs and expectations required of graphic designers in the computer world.

"In the computer graphics systems being created, there is and will continue to be, a great need for graphic designer's expertise in typography, spatial arrangement, and color selection. More important will be the influence designers can exert on computer manufacturers by advising them on how to produce better systems for the future. There will be a constant need for individually designed frames as well as graphic design systems for many frames. In the end it is quality that is important, even for computer graphics systems whose imagery is rather crude."<sup>8</sup>

Those who design for computers must realize the fatigue factor of the normal human being. A program that only has touch screen menus may quickly tire the user. Several questions have to be considered by the designer.

How many menus will there be in this program?

How long is the program?

How much text is there to read?

Interest can be added to the program by varying the interaction requested by the user. Choices may be made through the keyboard, a mouse, graphics tablet, joy stick or touch screen. Even programmers tend to lose interest

in programs that insist on numerous touch screen choices. The designer must consider the following.

How far away from the user is the screen?

What is the reach of the viewer?

Is the user right or left handed?

In his article, "Visuals for Interactive Video: Images for a New Technology (With Some Guidelines)", Roberts A. Braden, when discussing ergonomics and aesthetics, states:

"The visual design specialist must always keep in mind that his or her work is ultimately destined to be viewed by others. These viewers can be likened to the consumers of any tangible product. Their needs and desires are a high priority concern when the product is being fabricated. Viewer comfort thus becomes a primary consideration, as represented by letters that are large enough to read, color combinations that are easy to view, and any other of several techniques that minimize discomfort. The wise designer will even go a step further by catering to viewer preferences and sensitivities."<sup>9</sup>

Detailed explanation of problems and examples was kept to a minimum throughout the manual. Each

section of this workbook could expand into a complete book in itself. This work is meant as an introduction to, and a reminder of, the principles of graphic design. Therefore, a limited bibliography was included in the manual for reference by anyone interested in pursuing further explanation of the principles covered in the workbook. The bibliography is limited because this manual is geared towards non-designers who would look for basic materials first before heading towards design history, or work done by specific designers.

## Chapter Two.

### Construction

The format of the manual, 8 1/2 by 11 inches, is a comfortable size, easily handled, and easy to read. It is the same size as the acetate transparencies and color keys which are the constructional tools for developing design answers to the problems presented to the user in the manual. Uniformity of design was kept by continual placement of text on the right hand side of each page, reserving the left side for illustrations. The text is twelve point Helvetica Regular set on thirteen points of line spacing. The column width is twenty picas for ease of reading. The composite grid (Figure 4) for page structure is included in the appendix. Geared toward the technological world of computers, the text of the manual would naturally have to suggest the proper text to be used on the monitor. As a sans-serif, even-weight letter is the best font style for viewing on the screen, Helvetica became a logical choice.

The rule at the top of each page indicates the page division, and the use of the right side of each page for verbal information. The horizontal format follows the general horizontal shape of the monitor and prepares the reader for easy recognition of problem solving using the acetate cells and color keys. To establish a pattern of quick reference for the reader, the following symbols were developed.



Figure 5

The shape of the frame is a reminder of the final application of the manual. The exclamation point states that information is about to follow. The word Design, used here as a verb, requires action on the part of the viewer. The question mark requests the viewer to ponder the previous action taken and to work through a self-criticism of the problems.

The Macintosh Plus and MacDraft were used to create the frames found on the cover and throughout the manual. All text and titles were typeset on the Mergenthaler MVP-VIP typesetting equipment located in one of the Photocomposition Technology Labs of the School of Printing under the auspices of Mr. Robert Tompkins. The contents of the workbook were printed by Kathy Scherer on the Xerox 9500 in the Copy Center at RIT. The cover of the manual was screen printed on white railroad board with Advance Excello Black SAM-700 Screen Printing Ink mixed with 2.5% SS Zephyr RM Slow Thinner. The screen was a Monofilament Polyester with a mesh count of 254 threads per inch. The stencil was a Direct-Indirect Autotype Capillex 35 Capillary System Stencil. The manual was wire-bound using a James Burn Easy Bind Wire Binder and a 1/4 inch wire.

The template for the TV monitor scanning area, safe action area and safe title area was created on the Macintosh Plus using MacDraft. Reference material for the template was Kodak Publication H-42b, the Television Graphics Production Template for the Motion Picture and Audiovisual Markets Division of the Eastman Kodak Company.



## Binding

With the assistance and guidance of Mr. Werner Rebsamen, Professor of Planning and Finishing in the School of Printing, I was able to make a cloth-bound binder to house the completed project. The outer binder was screen-printed prior to final construction. Once cut to size the binder's cloth was printed with the cover and spine artwork in the Screen Printing Lab of the School of Printing with the help and instruction of Hans Mortensen. Using a Monofilament Polyester fabric with a mesh count of 306 threads per linear inch, a Direct-Indirect stencil was applied using Autotype Capillex 35 Capillary System Stencil. Once dry, the stencil is exposed to a film positive of the artwork for thirty seconds of VNH Flourescent tubes. After washing and blocking out non-printing areas of the screen, the pre-cut binder's cloth was printed with SS Zephyr-Set 500 Turquoise Blue K-67297 with 35% Additive of Zephyr Set Slow Thinner.

The binder was constructed in two parts, then bound together. The outer binder was bound using

traditional means of three cut binder's boards for the front, back and spine of the cover. All binding was accomplished using a white polymer glue. Once covered, the facing was covered, and weight applied over night to keep the cover flat. Next, the pocket was constructed in two pieces. The back was covered with binder's cloth and placed under weight. The pocket was made of three pieces of binder's boards. These were first glued together and held in place until dry with masking tape. The inside of the pocket was covered with binder's cloth, then the outside of the pocket was covered, leaving an excess of cloth for attachment to the back. The excess fabric was then glued to the outside of the back panel, and the finished pocket was weighted and left to dry. Finally the pocket was attached to the back of the outside binder, weighted, and left overnight to dry. A visual step representation of the above binding procedures is included in the appendix (Figure 6). The final result is a handsome clothbound binder with a pocket which can accomodate the manual, acetate overlays, and printed screen template, and any photocopies of the solutions to the problems that the user wishes to keep.

## Transparencies

For durability, I decided to photocopy the acetate cells. At first this presented a challenge in finding a material that would remain intact when fed through the copy machine. C-Line products proved to be unsuccessful. The light weight acetate tends to melt if the copy machine is the least bit overheated. In looking for a source to buy a quantity of acetate cells, I asked Kay Jenkins, Secretary for the College of Fine and Applied Arts. She mentioned that Assistant Dean Ed Lincoln had some Kodak Transparency Material which is for the purpose of making overhead projections from copy machines. Mr. Lincoln gave some transparencies to me to try and they proved to hold up well. After unsuccessfully trying to buy the quantity of transparencies needed for this project, I ended up purchasing two boxes of Kodak Transparency Material from the College of Fine and Applied Arts.

At first it was thought that screen printing on acetate transparencies would be the way to produce

color overlays. However, as it was thought that screen printing ink might chip off of the acetate easily, color keys were produced. Negatives were made using Orthochromatic D Litho Film - DuPont COD-4 which was exposed on a horizontal nuArc 1418 Process Camera, then processed in the Fuji Film Processor in the Reproduction Photographic Department in the School of Printing. Next, Color-Key Negative Imaging Material was placed under the negative film and exposed in a nuArc 26-1K Mercury Exposure System for forty-five units of time. The exposed Color-Key material was developed with 3-M Negative Color Proofing Film Hand Developer, then washed and dried. These color keys hold up quite well to handling.

The illustration of the Robot was created to add interest to the project for the viewer. Using a Macintosh Plus computer and the Pro-3D program, Lauren McDermott, a fellow MFA degree candidate in Industrial Design, taught me how to construct a three-dimensional figure using cubes, cylinders, spheres, and a lathe. The completed figure may be turned, enlarged or reduced, and

seen from any angle. It is then possible to obtain a laser print directly on a transparency. The various views of the figure were done in this manner. Subsequent copies were printed on the photo-copy machine directly onto transparencies.

## Chapter Three.

### Conclusion

One purpose behind this thesis was the desire to combine the skills I've learned at the Rochester Institute of Technology into one creative effort. Another purpose was to develop a teaching tool. This project has positively addressed these goals. From research begun in classes on videodisc, the idea emerged to develop a learning tool for interactive frame design. As the project grew, a conscious effort was made to access every area of my education at RIT. I was able to screen print the cover and binder, bind the project, process film negatives, and typeset the entire project in the School of Printing. The manual and overall project was designed with the knowledge and skills learned in Graphic Design in the College of Fine and Applied Arts. Computer skills were used to develop the screen template and the illustration of the Robot.

It is hoped that this manual will be useful to those pursuing a career in computer graphics, computer

programming, programming for interactive videodisc, or those who design in some capacity on the TV monitor. It is also hoped that this manual becomes a forerunner for subsequent instructional services concerned with frame design.

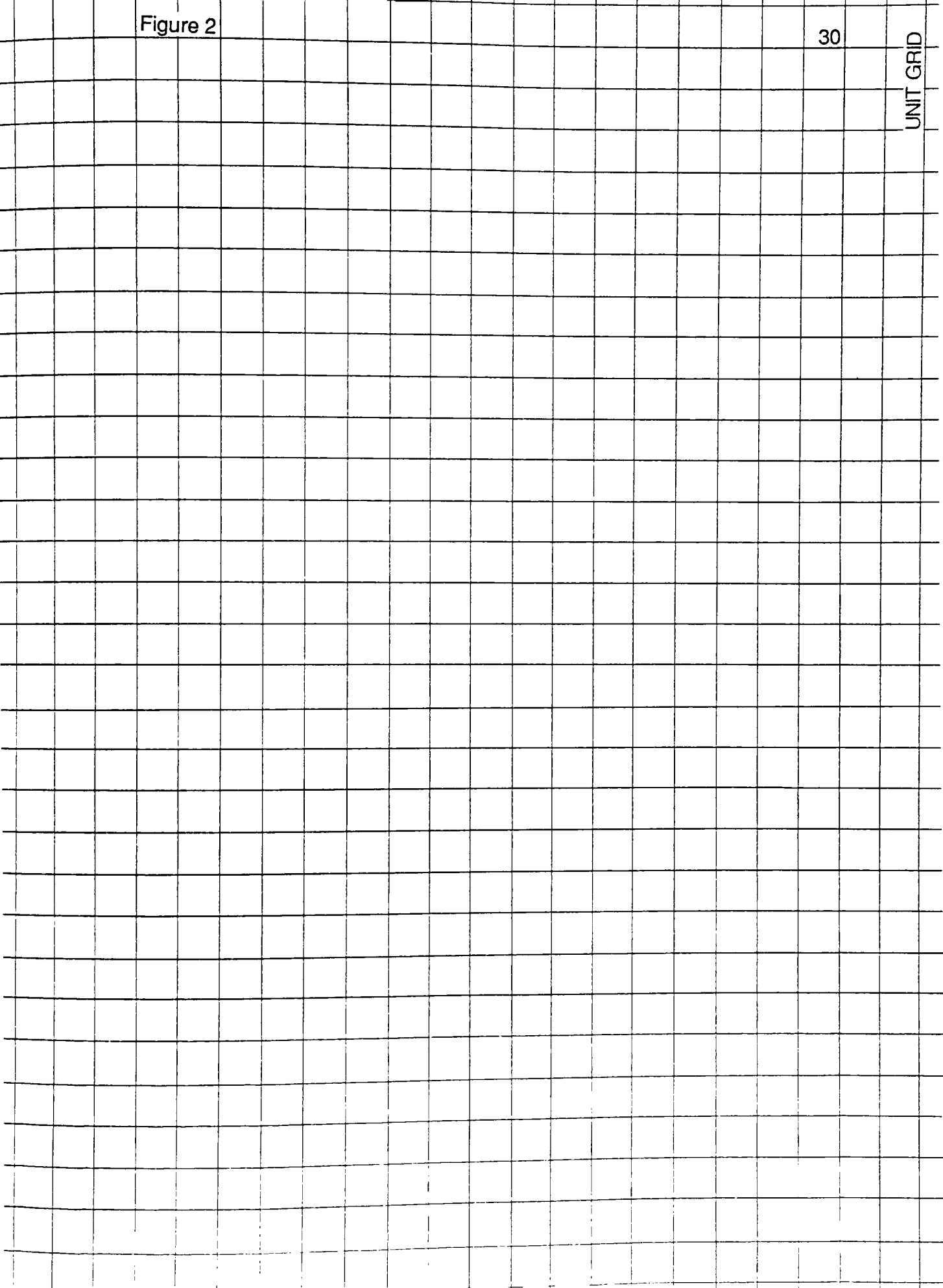
Footnotes.

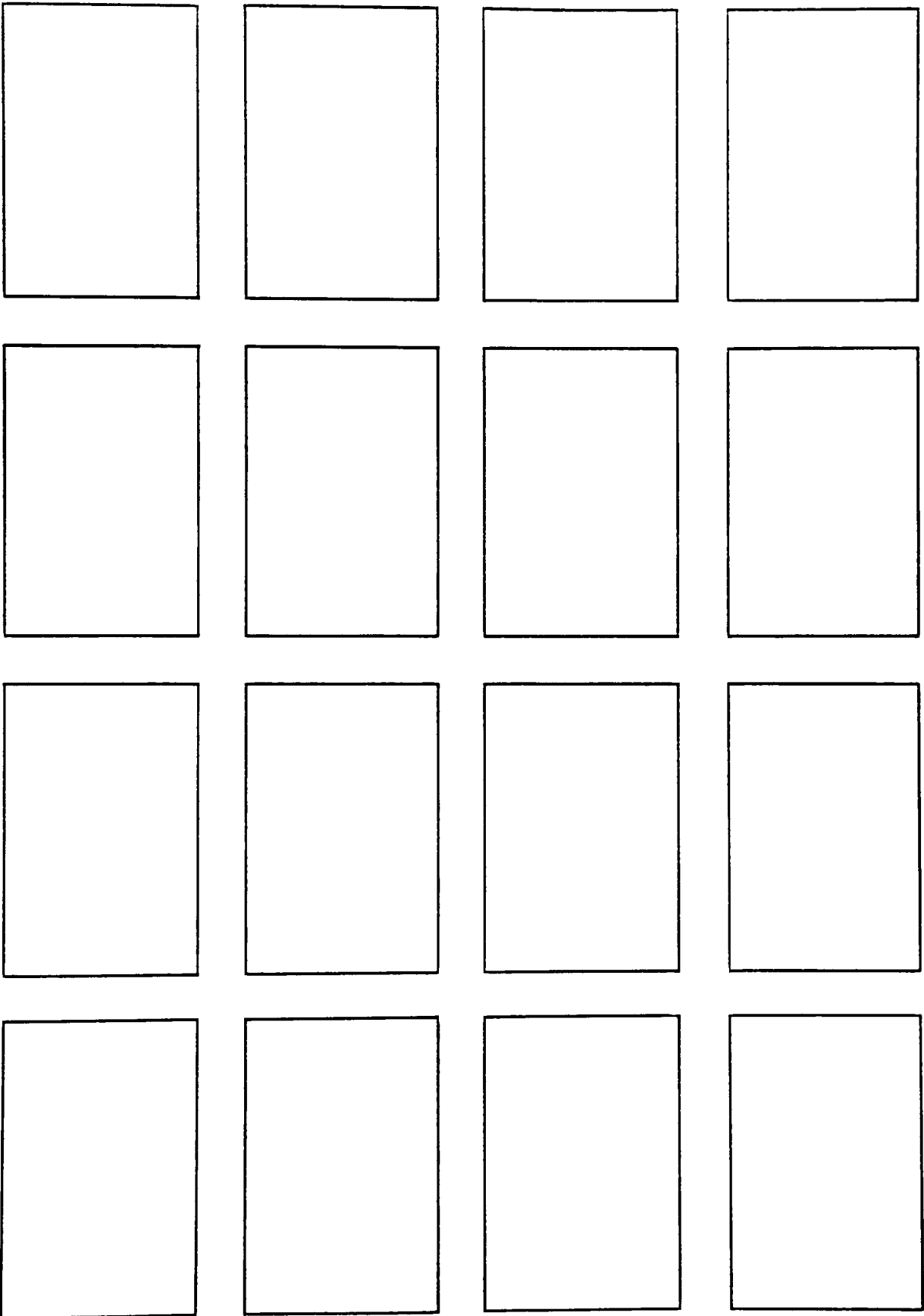
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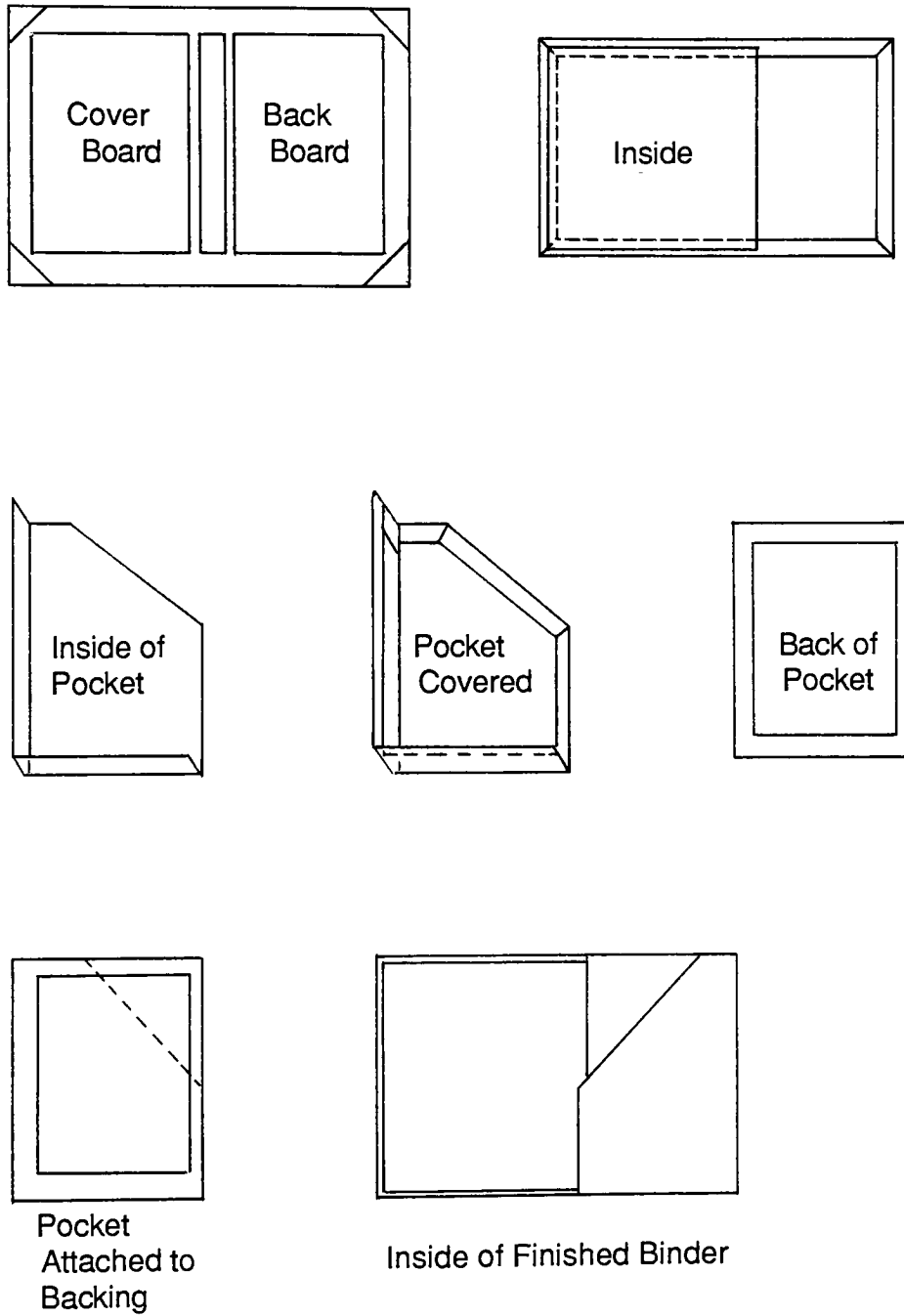


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