

Hello — and thanks for taking a look at my work!

My name is Rich Kurz and I am an experienced graphics design professional. My philosophy has grown simpler through the years. Good design is not about me, but about us. I want to do good work that serves the needs of my client and that I am proud to put in my portfolio. This pdf shows some of my capabilities.

**Note that all concepts and initial drawings are owned by Hewlett-Packard Co. The images in this document are my own and are under copyright to Rich Kurz.**

This product note was the first piece that was all mine when I worked in HP Marcom. This pdf shows the cover, the first two front matter spreads, and a typical interior spread. Following those are some of the conceptualization sketches leading to the final design.

Of note is that this was produced before computer-based desktop publishing. ALL artwork was by hand and the boards that went to the printer were traditional paste-ups with a set of boards for each plate. It was a great foundation to carry into the modern world of cloud-based digital tools. I am very glad I was able to learn it that way.

Production involved developing the visual concept while working within a corporate standard layout template, specifying typesetting, doing hand paste-up and technical artwork, coordinating with sales engineers to get written content and screen shots, working with the printer's prepress department, and finally, press-checking...at whatever hour of the day or night the printer would run it.

Deliverables: 24 page, 8½" × 11" trimmed, saddle stitched, three spot colors plus semi-matte varnish on the cover  
Separation-ready art boards for each spread and each plate  
Printer pre-press coordination, press-proofing

I am available to discuss your design, illustration, marketing, and advertising needs. Let's talk!



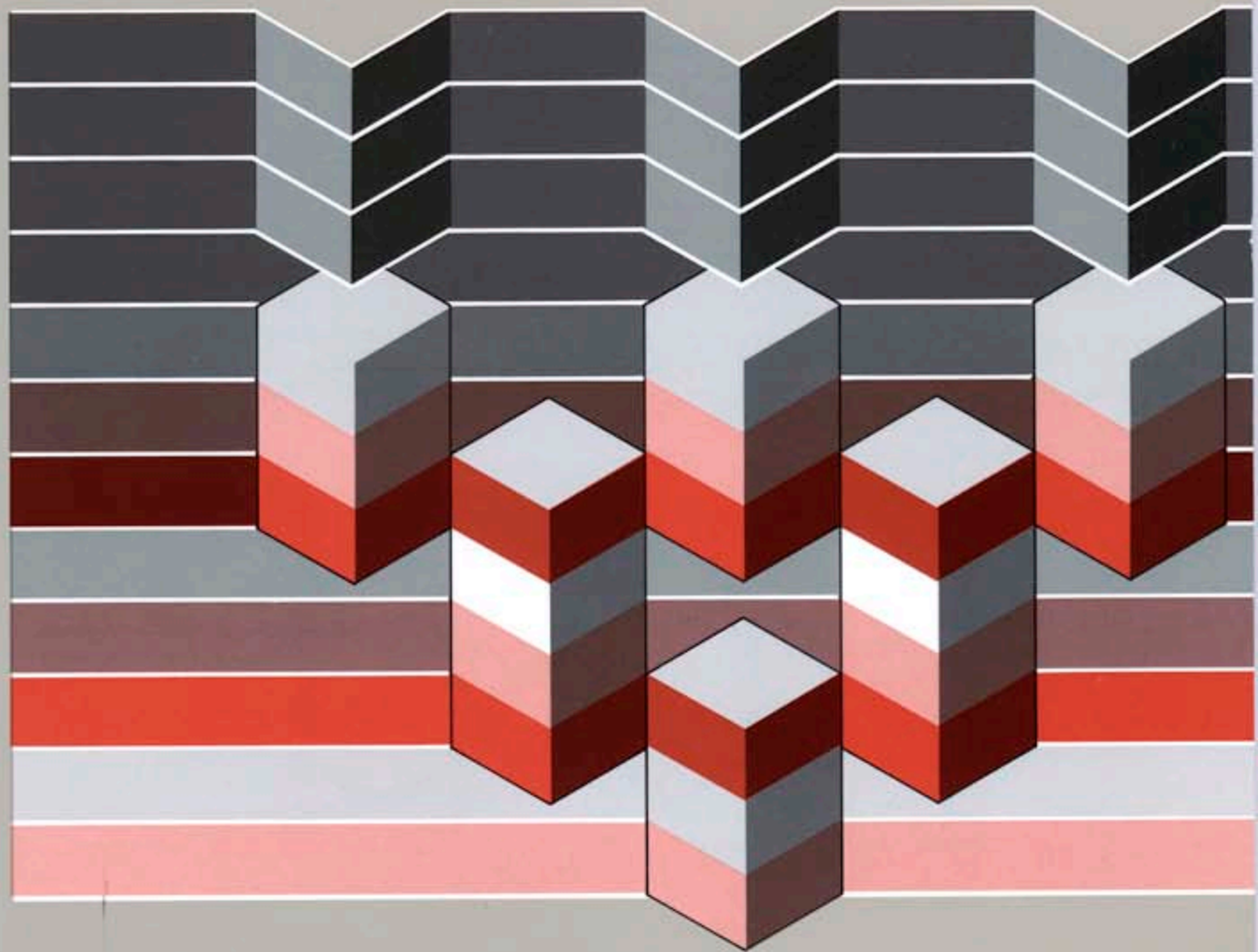
Rich Kurz

# A Guide to Cross-Domain Analysis

 HEWLETT  
PACKARD

Solving Complex Digital Design Problems With The HP1631A/D

Product Note HP1631A/D-1



## TABLE OF CONTENTS

Introduction .....	1
Analog Waveform Analysis .....	4
Timing Analysis .....	8
Timing and Analog Post-processing .....	10
Interactive Timing and Analog .....	14
State Analysis .....	16
Interactive Analysis .....	20
System Performance Analysis .....	22

FOR ADDITIONAL INFORMATION  
on the HP1631A/D Logic Analyzer,  
refer to the HP1631A/D technical  
Data Sheet, publication number 5954-2614.

## THE HP 1631A/D... INTRODUCTION

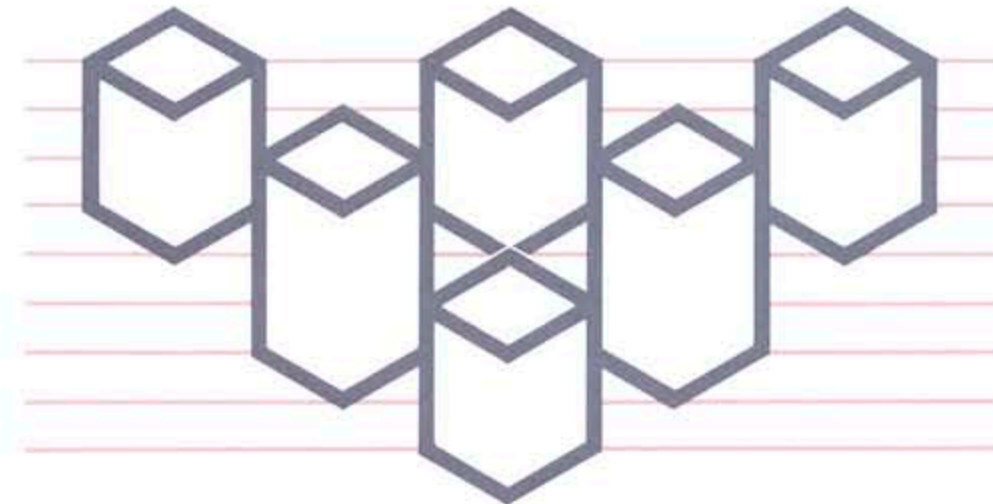
### The One Tool For Every Phase Of The Test Of A Digital System

The HP 1631A/D is effective throughout the entire design cycle. A digital system has independent software, digital hardware, and analog hardware paths, with each requiring unique, diagnostic methods.

Integration at the functional level requires separate examination of 1) target system performance—the effectiveness with which resident code functions and hardware executes, and 2) total hardware performance—the

effectiveness with which digital hardware executes and the correct analog parameters result. Integration at the system level requires examining the entire system design with each of the separate designs operating interactively.

This design model is used throughout this product note to assist you in matching each of the HP 1631A/D's instrument functions to your measurement tasks.





# THE HP 1631A/D... INTRODUCTION

## The One Tool For Every Phase Of The Design Of A Digital System

### FUNCTION PHASE

#### State Analysis

- Simultaneous capture of up to 43 channels of data
  - Synchronous to target system up to 25 MHz
  - 1k of memory per channel
- Measurement window positioning at any code location
  - States can be uniquely marked
  - Demultiplexing for code isolation
  - Resources for indexing and storage
- Software and hardware performance analysis
  - Histograms display execution time, usage time, and activity

#### Analog: Waveform Analysis

- Viewing
  - Single-shot capture for viewing infrequent events (200 megasamples per second digitizing rate)
  - Continuous viewing for general testing
  - Cumulative viewing for observing time and amplitude changes.
- Two channels of simultaneous acquisition (50 MHz bandwidth)
  - For correlating events
  - 1k of memory per channel
  - Pre-trigger viewing
- Time and voltage measurements, and a display of the answers

#### Analog: Post-processing

- Voltage and time statistics for hardware characterization
  - Mean and standard deviation to measure performance
  - Minimum and maximum values to guide next debug step
- Specify automatic single-shot measurements
- Search-and-then-stop acquisition under user-definable conditions.

#### Timing Analysis

- Up to 16 channels of simultaneous acquisition single-shot, continuous, or cumulative sampling
  - Asynchronous (100 MHz)
  - 1k of memory per channel
- Triggering on entering or leaving a pattern

- Time measurements with answers displayed
- Analyze glitches in timing diagrams

#### Timing: Post-processing

- Time-interval statistics for hardware characterization
  - Mean and standard deviation to measure performance
  - Minimum and maximum values to guide next debug step
- Specify automatic single-shot measurements
- Search-and-then-stop acquisition under user-definable conditions.

### PERFORMANCE PHASE

#### Interactive: State And Timing, State And Analog

- User-definable specifications allow state, timing, or analog to arm simultaneous data acquisition by the remaining two.

#### Interactive: Timing And Analog

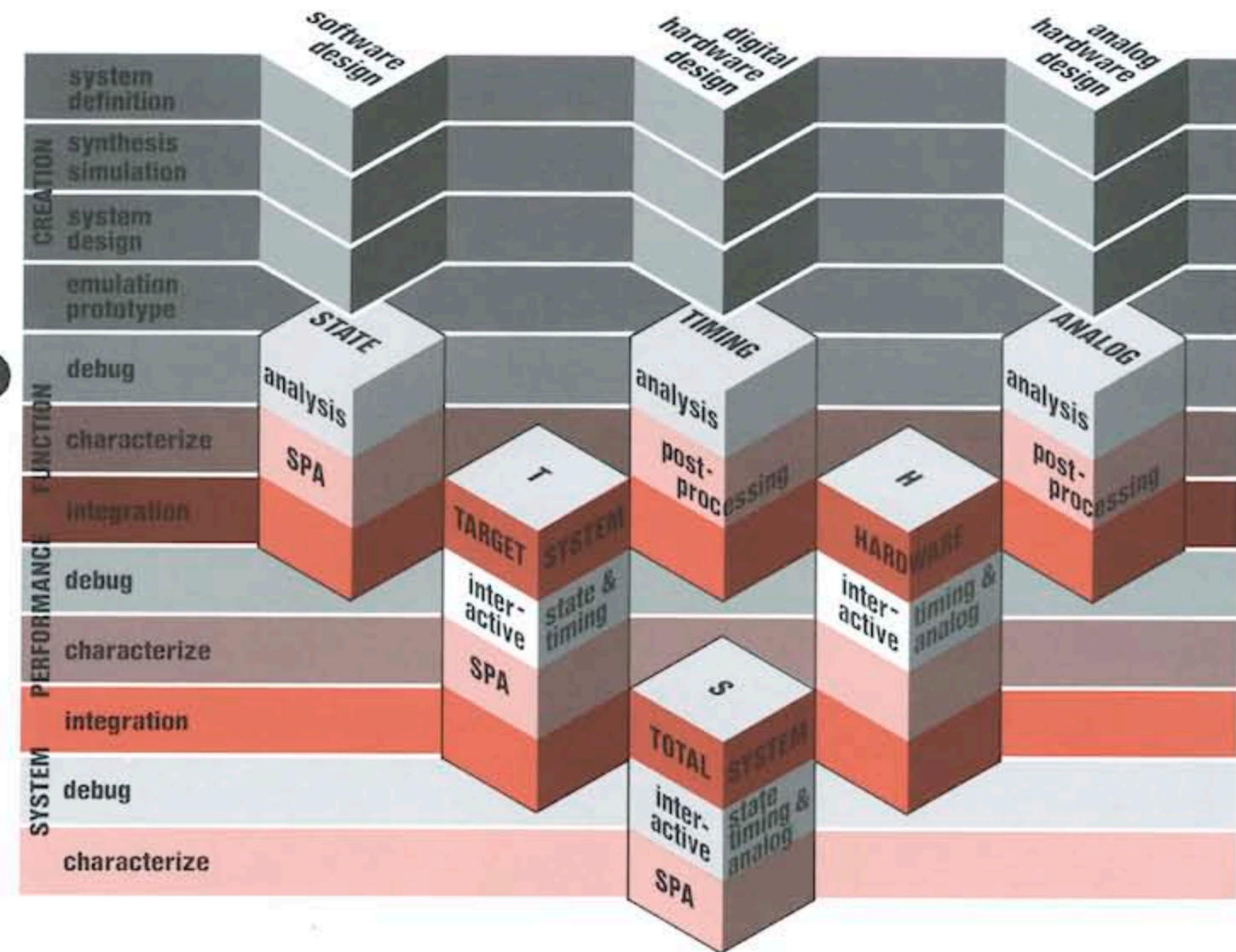
- Simultaneous acquisition and display of timing waveforms and analog waveforms with time correlation
- Timing pattern specification used for capturing analog waveforms
- Analog trigger specifications used for capturing timing patterns
- Two simultaneous time interval measurements
  - Interactive cursor pairs for correlating events

### SYSTEM PHASE

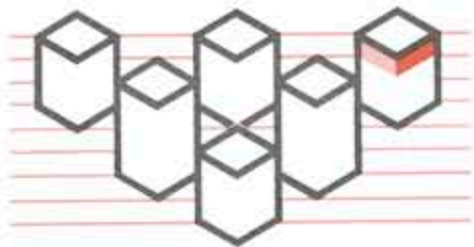
#### System Integration, Debug, And Final Characterization

The design of a digital system evolves through three iterations of debug, characterization, and integration. The HP 1631A/D provides the user with tools to examine performance at 1) the global level (system performance analysis), 2) the functional level (state and timing analysis) and 3) the parametric level (analog waveform analysis). Then the user can use that information to guide total system debug with interactive measurements and selective debug with post-acquisition triggering.

## The Design Of A Digital System







# ANALOG WAVEFORM ANALYSIS

## Combines Basic Oscilloscope Capability With Single-shot Digitizing



[ ] indicates parameters that can be changed using NEXT and PREV keys.

Traces can be continuous or single-shot. Continuous traces can be displayed single-shot or cumulative.

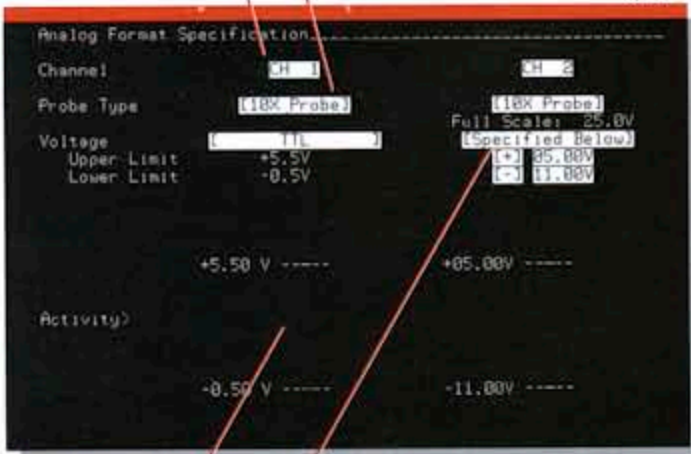
Sample period selection (5 ns - 500 ms) is used to control time per division. Total acquisition time is displayed.

Post-processing allows access to the menu that defines X and 0 cursors. To make statistical measurements, the HP 1631A/D must be in a continuous trace mode. Mean, and standard deviation, and maximum and minimum statistical values are displayed.

Assigned labels automatically appear on appropriate channels.

Probe attenuation automatically sets full-scale voltage limit for probe type selected (X1, X10, X50).

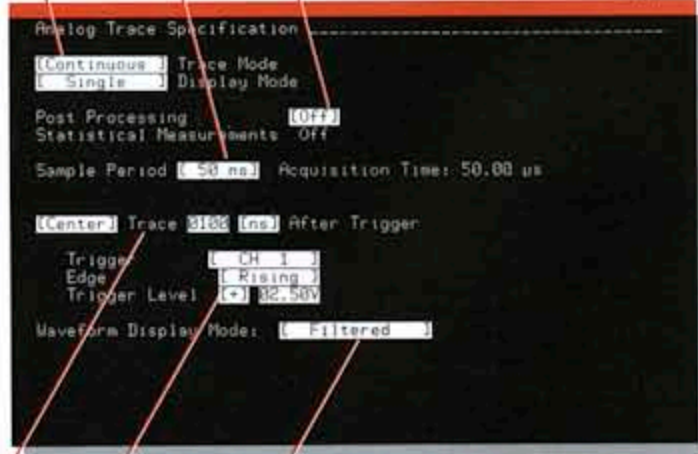
figure 1



User can specify voltage range and offset by setting upper and lower limits to the user-specified range or by selecting TTL or ECL presets.

The activity indicator shows the dynamic range of the input signal, which aids in selecting the correct upper and lower voltage limit for maximum viewable signal height.

figure 2



Filter selection allows stair-step interconnection of real samples [Off], or uses a data interpolator that calculates and displays up to 19 points between samples [On].

Allows selection of trigger source: channel one, two, or external, plus rising or falling edge, and trigger voltage level.

Tracepoint equals trigger plus delay; tracepoint can be placed at start, center, or end of acquisition.

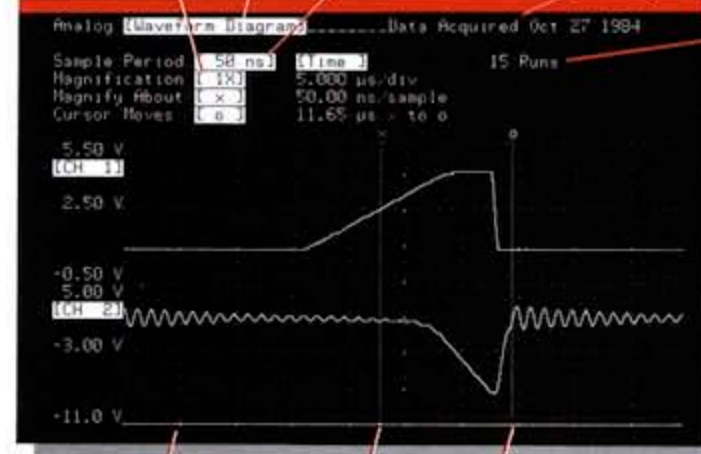
Magnification is selectable from 1 to 40 and can be centered about either cursor. Independent control of X and 0 cursors provides time-interval measurements. Answers are displayed.

Allows choice of user access to trace specification while monitoring display or cursor control, magnification, and readout of volts or time by pushing NEXT and PREV keys.

Sample period selection (5 ns - 500 ms) is used to control time per division. Total acquisition time is displayed.

Advisory indicates status of trigger in slow single-shot mode (low repetition rate). It also guides cursor-correlated interaction after a single-shot measurement is complete.

figure 3



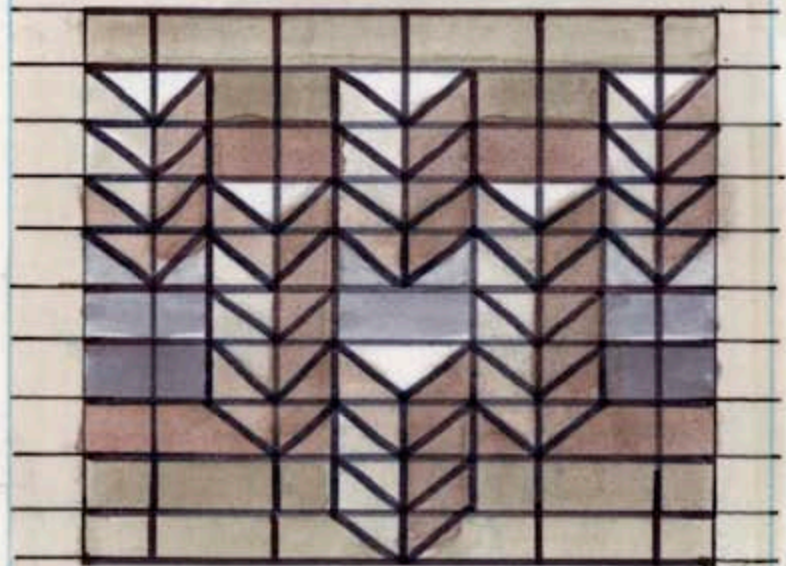
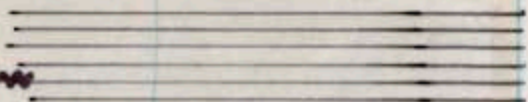
Runs indicates the total number of acquisitions.

Cursors can be moved together with a single control for time interval comparison measurements. Time-interval (X to 0) answers are displayed.

Indicates portion and location of memory displayed on-screen. Also displayed are the location of X (above the line) and 0 (below the line) cursors—especially helpful when cursors are off-screen.

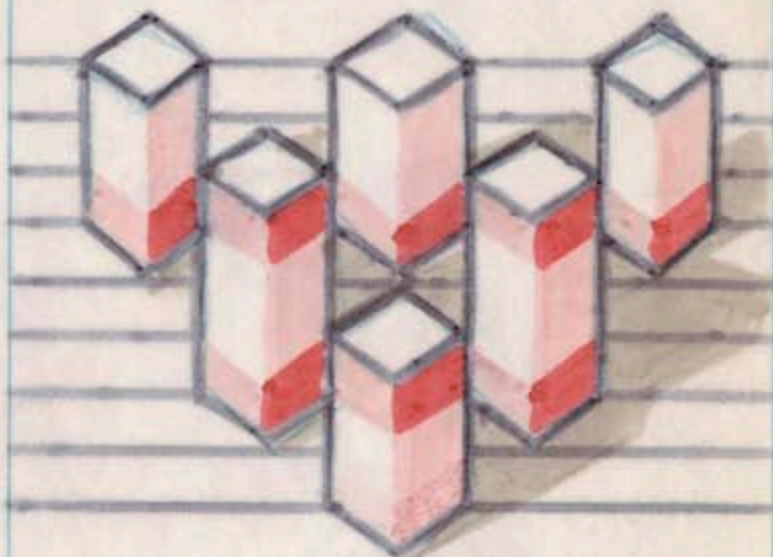
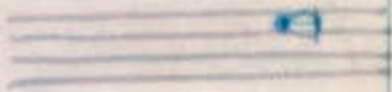


Wavy lines



Wavy lines

Wavy lines



Wavy lines

W.C. SHADOW

6-454

CONT. ON BACK COVER

183 / 190  
185 / 192

454

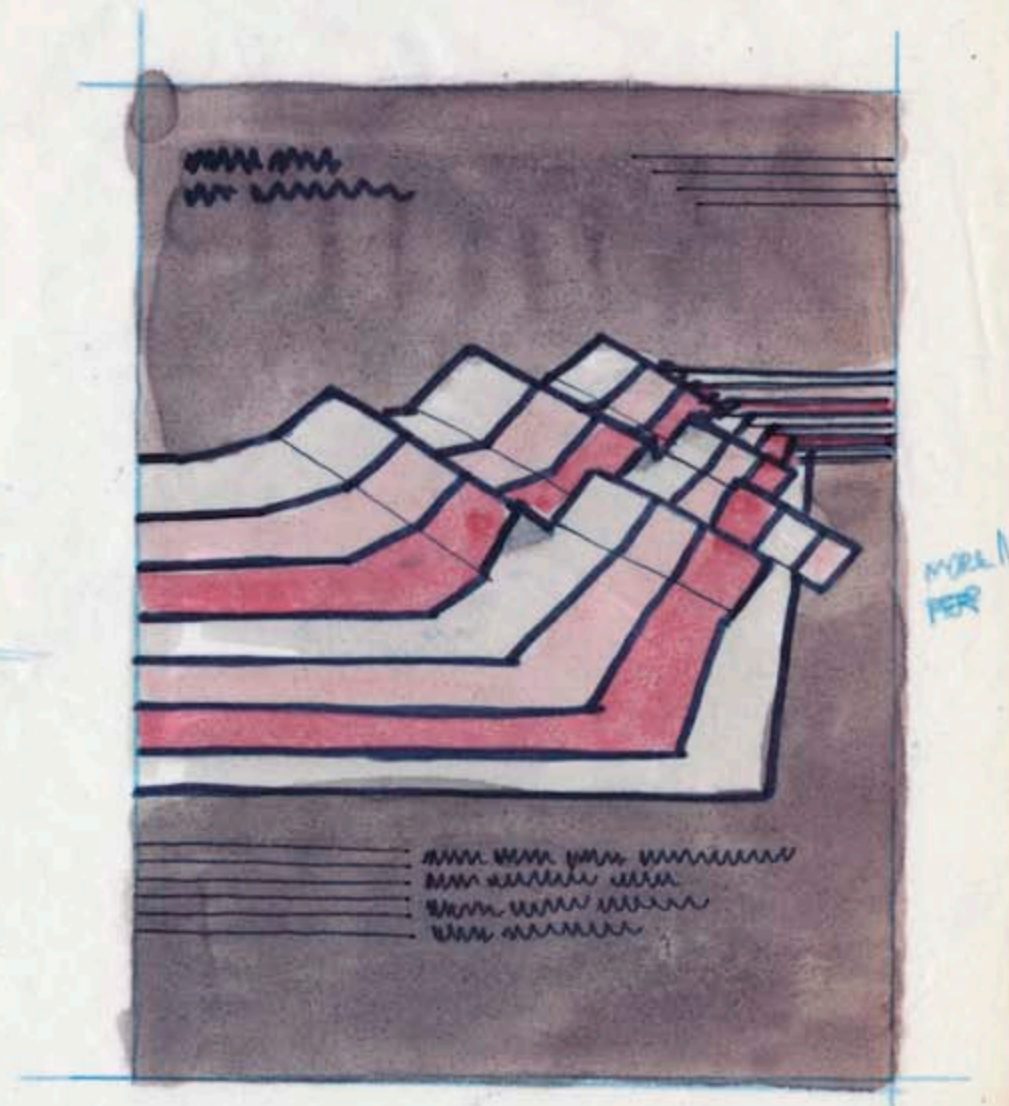
1  
400-405  
440-434  
438, 440

A hand-drawn diagram of a book cover. At the top, there are five horizontal lines with wavy patterns above and below them, resembling musical notation. A blue box with the number '18' is on the right. Below this are two red horizontal bars with the numbers '183 / 190' and '185 / 192' written in blue. Further down are two more red horizontal bars. At the bottom, there are five horizontal lines with wavy patterns above and below them. The number '454' is written in blue. On the left side, there is a vertical double-headed arrow with the text 'CONT. ON BACK COVER'. At the bottom left, there are handwritten numbers: '1', '400-405', '440-434', and '438, 440'.

CONT. w/ TABLE OF CONTENTS

A hand-drawn diagram of a book cover. At the top, there are five horizontal lines with wavy patterns above and below them. Below this is a large, irregular shape representing a torn piece of paper. This shape is filled with a complex pattern of black lines and red areas. At the bottom, there are five horizontal lines with wavy patterns above and below them. The text 'CONT. w/ TABLE OF CONTENTS' is written in blue. The entire diagram is enclosed in a blue rectangular border.



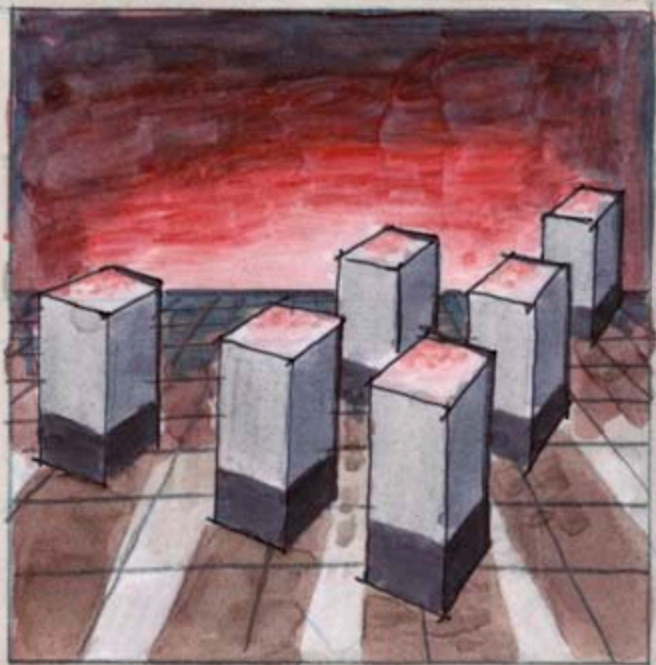


Wavy lines in black ink at the top left of the drawing.

MORE  
PER

Wavy lines in black ink at the bottom of the drawing.





FLATTER  
HOUSE VP

WAVE A WAVE WAVE  
WAVE WAVE WAVE  
WAVE WAVE WAVE  
WAVE WAVE WAVE