

OBJECT NUMBER: 460.2006

ARTIST: John Maeda

TITLE: The Reactive Square

DATE: 1994 (created), 2006 (acquired by MoMA, gift from artist)

ACCESSION NUMBER: not on MoMA record

DEPARTMENT: Architecture & Design

MEDIUM (or COMPUTER TECHNOLOGY):

1994 "Reactive Book" CD-ROM version: Relief-printed book jacket and folded lithograph poster insert with compact disc for use on computer.

2010 MoMA installation version: Interactive Installation with iMac (OS9), LCD monitor, microphone and keypad.

DESCRIPTION:

John Maeda's Reactive Books is a series of four printed books (five books were originally planned, though the fifth, Mirror Mirror, was never released in book form) with digital components on compact and floppy discs. This series is considered as a seminal work of interactive design and can be thought of as poems of human-computer interaction.

When I was just starting out in 1992 to create interactive, or reactive as I dubbed them, graphics, there was a great deal of CD-ROM-based content emerging that seemed to miss the point of computational media. With the digital media publisher Digitalogue, I created 4 books (the 5th never made it to print) that focused upon different aspects of the computer as related to the visual medium. The first was entitled The Reactive Square released in 1994. The Reactive Square was 10 squares that respond to input from the microphone. - John Maeda

Significance

The Reactive Square is Maeda's most well-known work to date, depicting a simple black square on a computer screen that changes shape as sounds are input into a microphone. It is highly significant as the first Reactive Book. It is an adaptation and recasting of the revolutionary Russian Suprematist painting Black Square (1915), by Kazimir Malevich, for the new epoch of the digital realm. This book can also be thought of as an "Ode to Malevich" as it uses the simplicity of a black square to emphasize the inherent differences between and qualities of print and digital representation. The Reactive Square presents ten compositions that translate sound into motion graphics. Maeda's children and their interactions with the computer

sparked the inspiration and impetus for this book. Rather than the use of a mouse or keyboard, the user of The Reactive Square simply speaks into or manipulates a microphone and the square reacts and morphs in different ways in response to the sounds.

One of the artist's first digitally created designs, The Reactive Square, takes the most basic forms – the square – and turns it into a blank screen computer “canvas” which undergoes a series of permutation set off by the sensitivity of the sonic interaction. The black square is broken up, dispersed, and reconstituted in multiple ways. Transcending the boundaries between art and computer science, Maeda uses code writing similar to the way a painter uses brushstrokes, exploring the subtlety of form, color, and pattern to create works that are both playful and yet visually stunning.

Installation, Environment, Technology and Interactivity

In The Reactive Square there are ten different modes or variations. These are activated by pressing the numbers on the keypad located beneath the computer. In the MoMA installation, these visualizations are presented on the iMac and on a separate flat-screen monitor (which is mounted on the wall just above the computer).

The numbers on the keypad (0-9) correspond to the 10 modes and variations that are presented for users. Below is a description of the ten interactive environments within The Reactive Square. (See Appendix I for screen grabs)

Selection of zero (0) on the keypad starts "Flutter" which is the “default” screen. This is the iconic black square attributed to Malevich. This image is ultra sound sensitive. A slight tap on the microphone or any subtle sound will cause the edges of the square to wiggle about. This selection is the “call to the viewer” – the lure of the work – for engagement and interaction; the flutter of a “heart of the work”.

Selection one (1) on the keypad engages "Tide," which is as its name indicates, a wave visualized within the confines or borders of the square. The echoing of sound is visualized within the screen. The colors here are black and various shades of grey. The echoing is reminiscent of the early minimalist painting of Frank Stella. The movement of grey frames-within-frames from the center of the square to the outermost edges. The effect can also be described akin to the echoing ripples in water from a thrown rock.

Selecting two (2) on the keypad triggers "Voice" and is very sensitive to sound as its name illustrates. In this section, a small red dot is framed by the black square. As the level of sound input increases so does the circle, so much so that it engulfs the square. The red becomes a translucent pink over the black and has a feeling of lightness that one does not expect to encounter within a computer screen.

Selecting three (3) on the keypad starts "Sparkle" which is one of the more dynamic of the ten. The louder the sound input the more erratic the square reacts. Silence brings us back to one single black square but sound disperses this into a fractured mosaic of squares. A crazy shaking ensues!

Selecting four (4) on the keypad triggers "Comet" which is an infinite visual spiral. This is black and white only. Silence takes us back to a placid state of the black square again.

Selecting five (5) on the keypad activates "Talk" which contains the color red, black and various shades of grey. This selection produces a left to right horizontal movement of squares across the black field. The speed of this movement is consistent despite the audio input. The general sense of this is a "scanning of sound" across time and space.

Selecting six (6) on the keypad launches "Flight" which contains an inward movement. Breaking up the square into four parts, this mode reacts with slightly different movements and directions which echo moiré patterns.

Selecting seven (7) on the keypad triggers "Flash" which as a more subtle movement and reactions. The image is black and white with circles that are produced both big and small. This is true Op Art!

Selecting eight (8) on the keypad starts "Cast" which has a lot of movement within the now askew square, which is on its side and being filled in with a jagged grey and black lines along the perimeters, flowing from the outside into the center.

Selecting nine (9) on the keypad initiates "Dance" which is a spinning counter clockwise red circular motion within the black square. The louder the sound input the wider the circle. The color shifts as it cycles around from black to red and to pink then back down the color wheel again through this limited palette.

By selecting 0 or 000 the viewer can return to the main "Flutter" screen which may be considered the "default" screen. This selection is the most sensitive to ambient noise. The following keypad buttons do not have a corresponding reaction on the screen: the number lock, forward slash (/), asterisk (*), BS, minus (-), plus (+), Enter and Del.

Components

The current installation includes an iMac computer with a microphone, a keypad, and second flat screen placed above the iMac. Placed just above the average sightline, the wall-mounted iMac is angled down towards the user. The user interacts with the artwork through the microphone and a keypad that is mounted on the wall. (See photos in Appendix II)

Depending on the number selected, different changes take place to the square appearing on the computer screen. Users observe visual variations on the iMac screen while other museum visitors can view it on the flat screen monitor. That the Architecture and Design Department had added the second screen in the earlier 2006 installation implies the organic nature of the work. In addition, the 2006 MoMA exhibition was slightly different than the current 2010 installation as the five books are displayed in reverse order chronologically from right to left.

The most important factor in this work is the fact that when the artist created the work in the 1990's Apple was selling the computer with an internal microphone. "The Macintosh computer was sold with an internal microphone at the time so I thought - let's use this!" said the artist. This work was created using his children as inspiration to learn about the computer and how computers respond to sound.

As the use of the microphone was essential in the creation, it is a key quality of this work. Lose the microphone and you have lost the essential interactivity or the essence of the piece. While the 10 modes of display can loop on their own, the interactive sonic element brings another "human" level to the work. Despite the importance of the microphone it seems from the artist interview that the artist does not care about sensitivity of the microphone nor model that is used in the installation.

ARTIST INTENTIONS:

"Art is about the people. The interaction is the main focus - not the art." - John Maeda

During the interview, Maeda did not have strong opinions on the ideal installation condition for The Reactive Square. He claimed to not care whether or not the cables for the computers were visible or if it needed to be run on other models. That this artist is flexible with his materials is evident in the following quote below comparing a book to a film. He is an artist of the moment, constantly moving forward with an eye toward the future. He is an artist that is not tied to medium specificity but moves through the future of media technology.

"A book is a human-powered film projector (complete with feature film) that advances at a speed fully customized to the viewer's mood or fancy. This rare harmony between object and user arises from the minimal skills required to manipulate a bound sequence of pages. Each piece of paper embodies a corresponding instant of time which remains frozen until liberated by the act of turning a page." - John Maeda

FUTURE MODIFICATIONS:

Maeda gave no limits on any future modifications to this work during the interview process. He suggested that it would be acceptable to have video documentation

exhibited, showing people interacting with this work and the reactions his program has with them. It is worth noting that during the interview Maeda mentions that the work "lives" currently on the web, where each of the 10 modes of The Reactive Square are represented on his personal website, both as video documentation and as downloadable apps. In regards to future modifications, Maeda did not suggest that the code can or should be altered for future installations and he was discouraging MoMA in capturing the source code at all and claiming it is not relevant at this time and would be difficult to read.

TECHNOLOGY (or COMPUTER ENVIRONMENT):

Dedicated:

.APP file, name unknown (listed incorrectly as TTW_NEW.app on MOMA install sheet)

Written in C, version unknown, but must have existed in 1994 (C89 or earlier)

Compiler unknown, but must have existed in 1994

Code written from scratch by John Maeda

MOMA does not have source code; it may be in Maeda's possession

File currently installed on iMac in gallery (see below), with additional copies on a DVD "data disc" and on a hard drive

Non-dedicated (current MOMA installation):

"bubble" iMac running Mac OS9: exact specifications unknown, but appears to be a "snow" iMac G3, meaning likely specs are:

Processor: 600 MHz PowerPC G3

Memory: 128MB PC100 SDRAM

Hard Drive: 40 GB 3.5" Ultra ATA/33

Optical Drive: Compact slot-loading CD-ROM

Graphics Card: ATI Rage 128 Ultra with 16MB SDRAM on a 2x AGP bus

Monitor Port: VGA

Audio In/Out: 3.5mm audio input, 3.5 mm audio output, 2 headphone sockets

Speakers: Built-in stereo speakers

USB: Two USB 1.1 ports

FireWire: Two FireWire 400 ports

Display: 15" CRT

Resolution: 1024x768 pixels

Pixel density: 93 dpi

MacMice MicFlex USB microphone

Toshiba USB Keypad

Samsung SyncMaster 940BF LCD Display

Diagonal Size: 19"

Resolution: 1280x1024

Color Support: 24 bit

Input: VGA, DVI

CONDITION ASSESSMENT:

The installed work is currently fully operational.

Observations

However, one potential problem is that many visitors are unable to reach the microphone for example, young children (from whom the initial inspiration came!) cannot interact with it. The other problem is the potential loss of keypad numbers and function over time from normal wear and tear. The object identification tags on the wall should correctly reflect what the piece currently on view is, rather than reflect the donated gift in 1994 by referencing the physical book.

RISK ASSESSMENT:

The primary point of risk towards the continued display of this work is its reliance on the Mac OS9 operating system and the PowerPC architecture. Regarding the operating system, as the code for The Reactive Square was written in 1994, it would have been designed for an operating system that existed at the time, most likely a version of Mac OS7. In MOMA's installation, it is currently running on OS9. Given the significant differences between OS9 and OS X, we can safely assume that it would not run on OS X. Moreover, Apple no longer supports OS 9, and no longer offers its OS 9 emulator – "Classic" – on its newer computers. Thus, it is possible that at some point in the future, OS 9 will no longer be available.

Regarding the architecture, Apple stopped selling computers with PowerPC processors in 2006, switching to Intel x86 processors. Since the code was written in C, which can communicate directly with system hardware, it is likely that the program would not run on a non-PowerPC Macintosh. Confirming this, Maeda's website states that the program requires a PowerPC Macintosh.

Therefore, a related risk is the possible failure of the iMac computers in MOMA's possession. Aside from the five iMacs currently on display, MOMA owns three spares devoted to the Reactive Books. If enough of these were to fail, it would compromise the museum's ability to display this work. At that point, any newer computers that could be obtained would most likely not support OS9 and would not run on a PowerPC processor.

The microphone and keypad do not seem like significant risks. While the models currently being used at MOMA are reliant on USB connections, the code was written in 1994, predating USB. Thus, we can assume that the program is not reliant on any particular peripheral hardware model, simply working with the audio and keystroke inputs once they have entered the computer. As Maeda has stated that he does not care what peripheral hardware is used, the microphone and keypad could be replaced in the future.

RECOMMENDATIONS:

1. Obtain more iMacs or other PowerPC Macs that can run OS9 to ensure that MOMA can run the program in its native environment for as long as possible. Ideally MOMA would have at least one backup machine dedicated to each work in the Reactive Books series – that is, five total backups.
2. Document the behaviors of the work as thoroughly as possible. Include video recordings of each visualization along with the audio stimuli that caused it.
3. Include more information in the installation about the work's original context, highlighting the fact that these works used to run much faster than other similar computer programs.
4. Conduct a new one-on-one interview with John Maeda. Discuss the possibility of obtaining the source code and emulating or re-compiling the program at a later date when compatible hardware is no longer available. These solutions are not ideal, given that they may alter the behavior of the work in both profound and subtle ways, but would be a way to continue to display the works in the future.
5. Change the wall panels in the MOMA exhibit to match the works on display (remove reference to the books), or make it clear that the books are part of the museum collection but are not currently on display.

BIBLIOGRAPHY / INTERNAL RESOURCES

Maeda, John. The Five Reactive Books: 1995-1999. QuickTime video. 2002.
<http://www.maedastudio.com/2004/rbooks2k/rbooksbig.html>.
This video explaining the Reactive Books series includes a section on The Reactive Square that demonstrates the piece 10 variations.

Maeda, John. The Reactive Square.
<http://www.maedastudio.com/2004/rbooks2k/rsquare.html>
States that The Reactive Square requires a PowerPC Macintosh running OS 9.

AUTHORS: Sandra Gibson, Jonah Volk

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APPENDIX I: SCREEN GRABS OF REACTIVE SQUARE VARIATIONS

APPENDIX II: 2010 MOMA WALL TAG, 2010 INSTALLATION VIEW, 2006
INSTALLATION VIEW, KEYPAD, REACTIVE SQAURE, VISITOR INTERACTION WITH
MIRCOPHONE INPUT

APPENDIX III: VELLUM BOOK COVER, SCREEN GRABS OF WEBSITE, PORTRAIT OF
ARTIST, INSTALLATION IN 2001 IN JAPAN

APPENDIX I: SCREEN GRABS OF REACTIVE SQUARE VARIATIONS



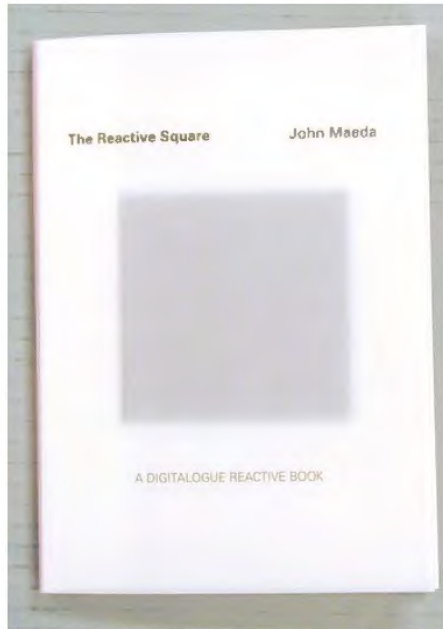


APPENDIX II: 2010 MOMA WALL TAG, 2010 INSTALLATION VIEW, 2006
INSTALLATION VIEW, KEYPAD, REACTIVE SQAURE, VISITOR INTERACTION WITH
MICROPHONE INPUT

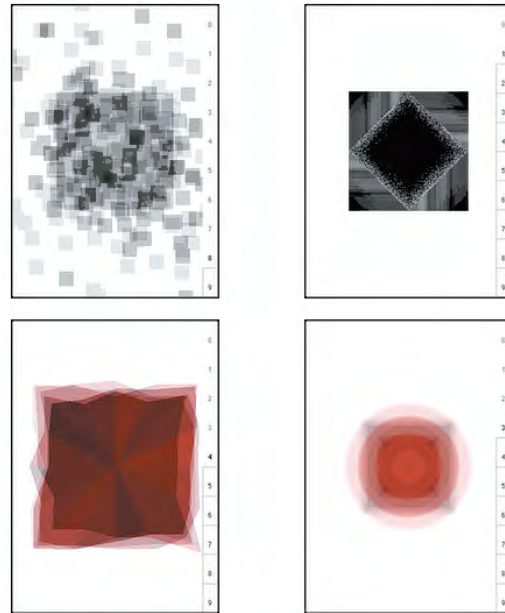
John Maeda (American, born 1966)
The Reactive Square 1994
Vellum cover with letterpress typographic design on front, thirty-two letterpress illustrations (letterpress text includes typographic designs and page tabs), and compact disc for use on computer
Gift of the designer with additional support from Samsung



APPENDIX III: VELLUM BOOK COVER, SCREEN GRABS OF WEBSITE, PORTRAIT OF ARTIST, INSTALLATION IN 2001 IN JAPAN



Vellum cover book



Screen Grab from Internet



John Maeda



The Reactive Square installation at ICC in Japan (2001)