



IRISH RESEARCH COUNCIL
An Chomhairle um Thaighde in Éirinn

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Government of Ireland Postdoctoral
Fellowship programme

Format fractures in media- focused sound art spanning the analog/digital divide

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28 February 2020, 1 p.m.
Stack B

Trinity College Dublin



0.

Background/context



Opening the “Red Book” overview

Duration: October 2019–September 2021

Mentor: Nicholas Brown (Department of Music)

Strand 1

Audio CD as format

- “history” of IEC 908
- focus on listening tests in R&D context
- error correction/concealment

Strand 2

Format fractures

- CD and “glitch” music
- “cracked media” (sound) art
- theories of media + destruction



Strand 3

Simulating skips

- glitch/stutter plugins
- dropout simulations/models
- non-technological simulations cf. “phonorealism” (Ablinger)

Strand 4

Beyond the “Red Book”

- CDDA → CD-ROM
- multisession discs
- digital multimedia/timecodes
 - copy protection
 - non-compliant CDs

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**NORME
INTERNATIONALE
INTERNATIONAL
STANDARD**

**CEI
IEC**

60908

Deuxième édition
Second edition
1999-02

**Enregistrement audio –
Système audionumérique à disque compact**

**Audio recording –
Compact disc digital audio system**

“recpies for reality” (Busch 2011)

Strand 3

Simulating skips

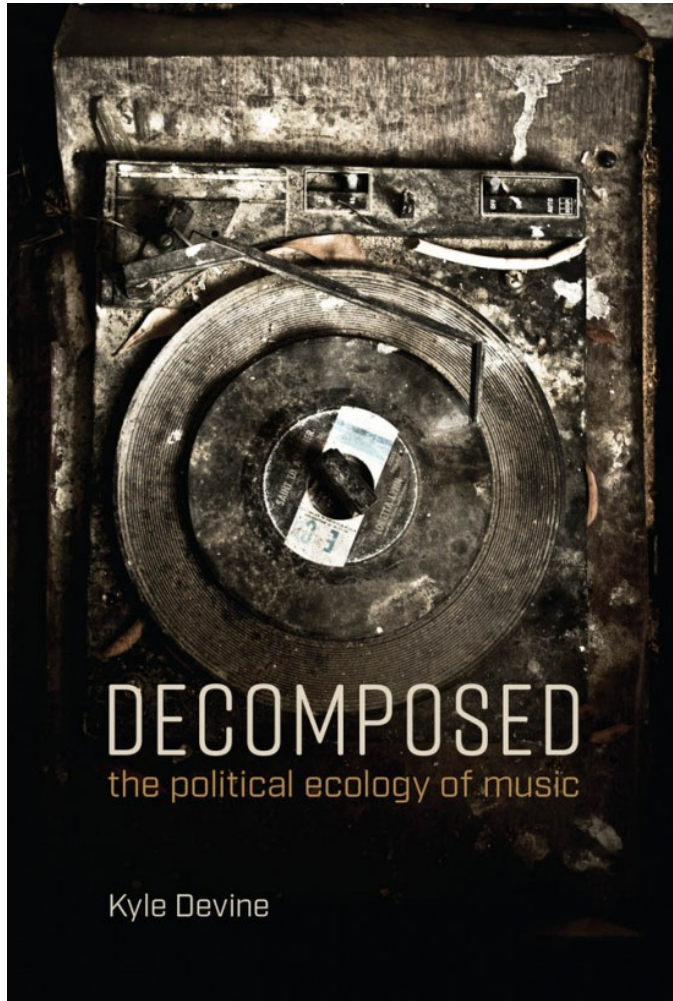
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Strand 4

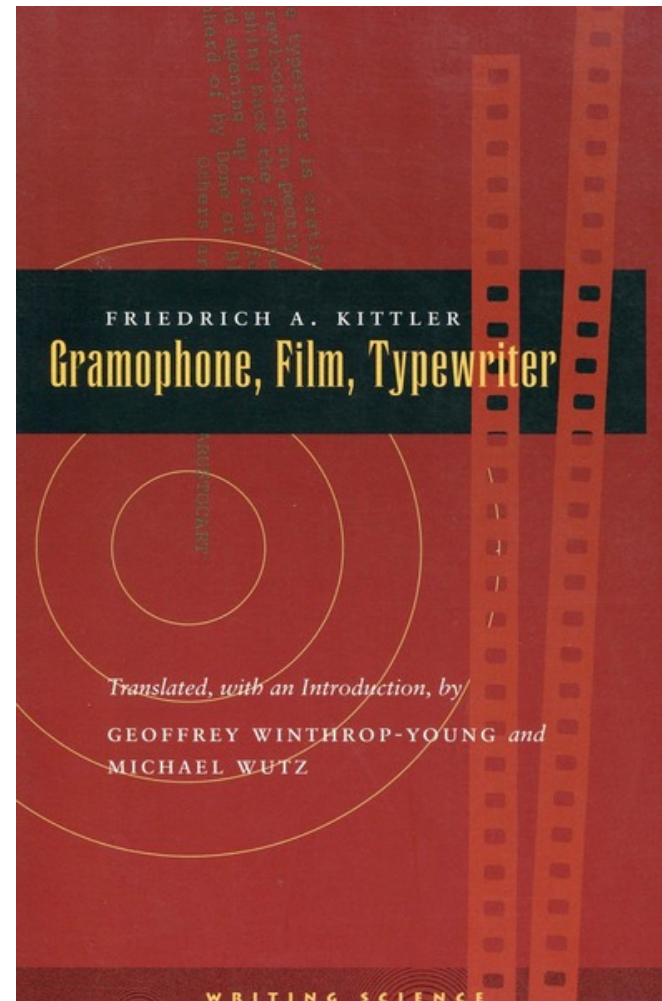
Beyond the “Red Book”

- CDDA → CD-ROM
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 - non-compliant CDs

musicology ↔ media archaeology



(Devine 2019)



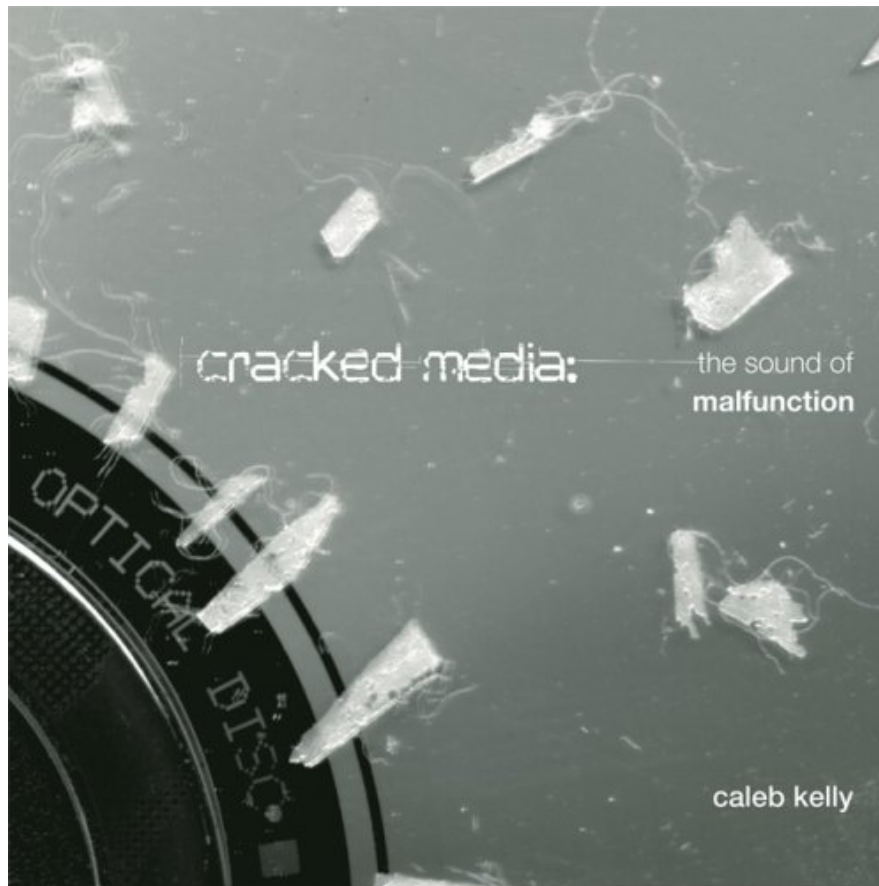
(Kittler 1999 [1986])



I.

From *Cracked Media* to a vulnerology of format fractures

Kelly, *Cracked Media* (2009)

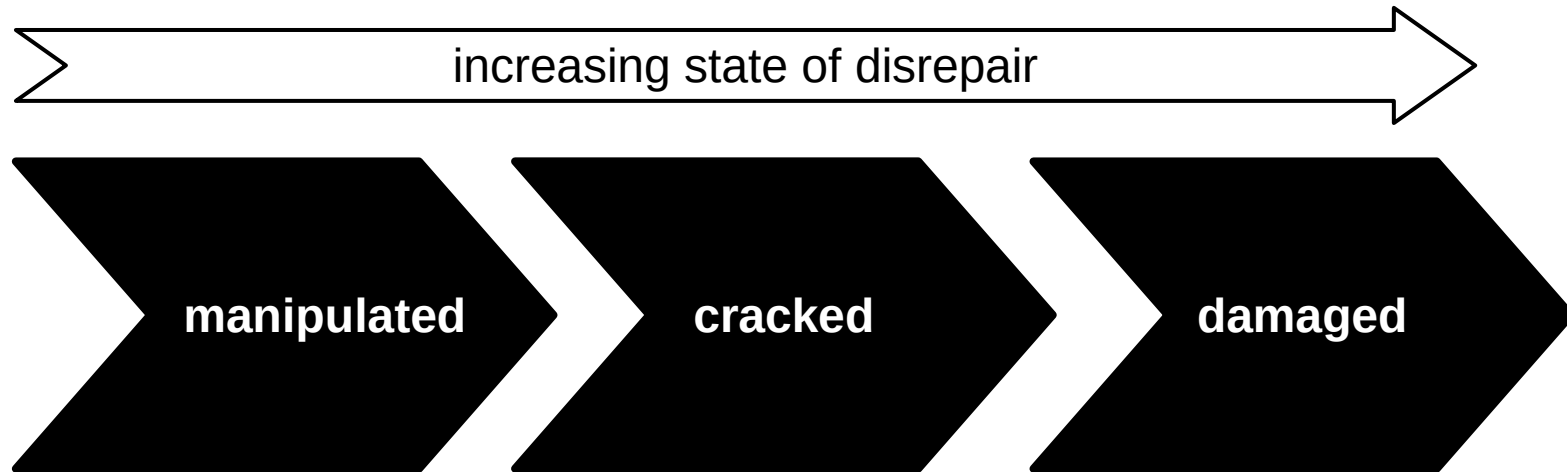


cracked media: the sound of malfunction

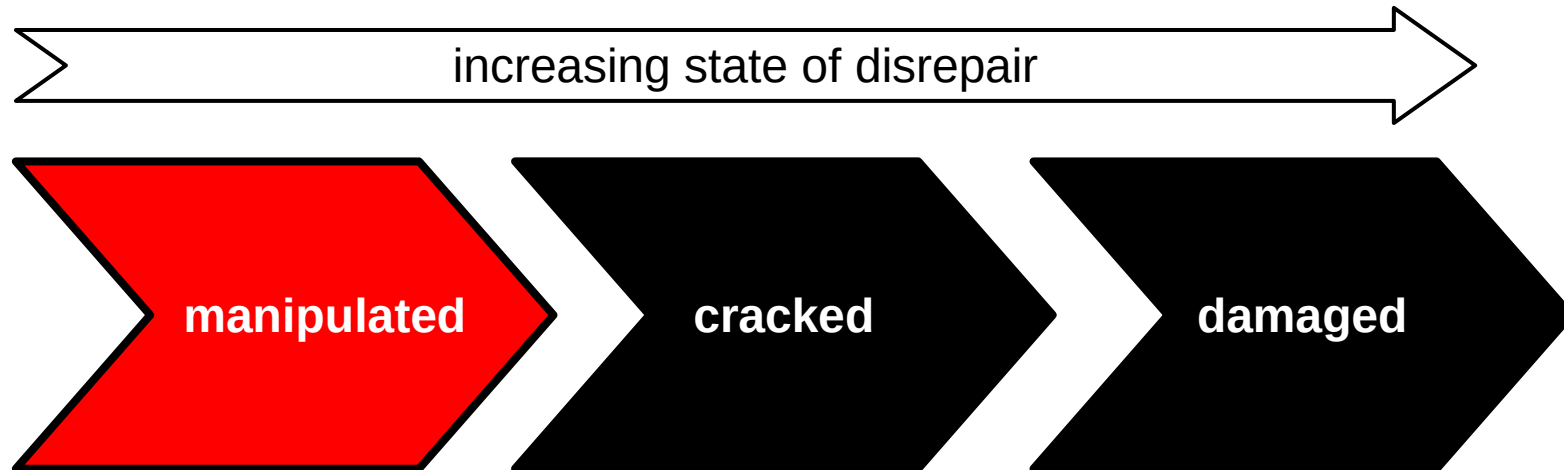
caleb kelly

Kelly, Caleb. Cracked Media: The Sound of Malfunction. Cambridge, Mass: MIT Press, 2009.

Kelly, *Cracked Media* (2009)



Kelly, *Cracked Media* (2009)



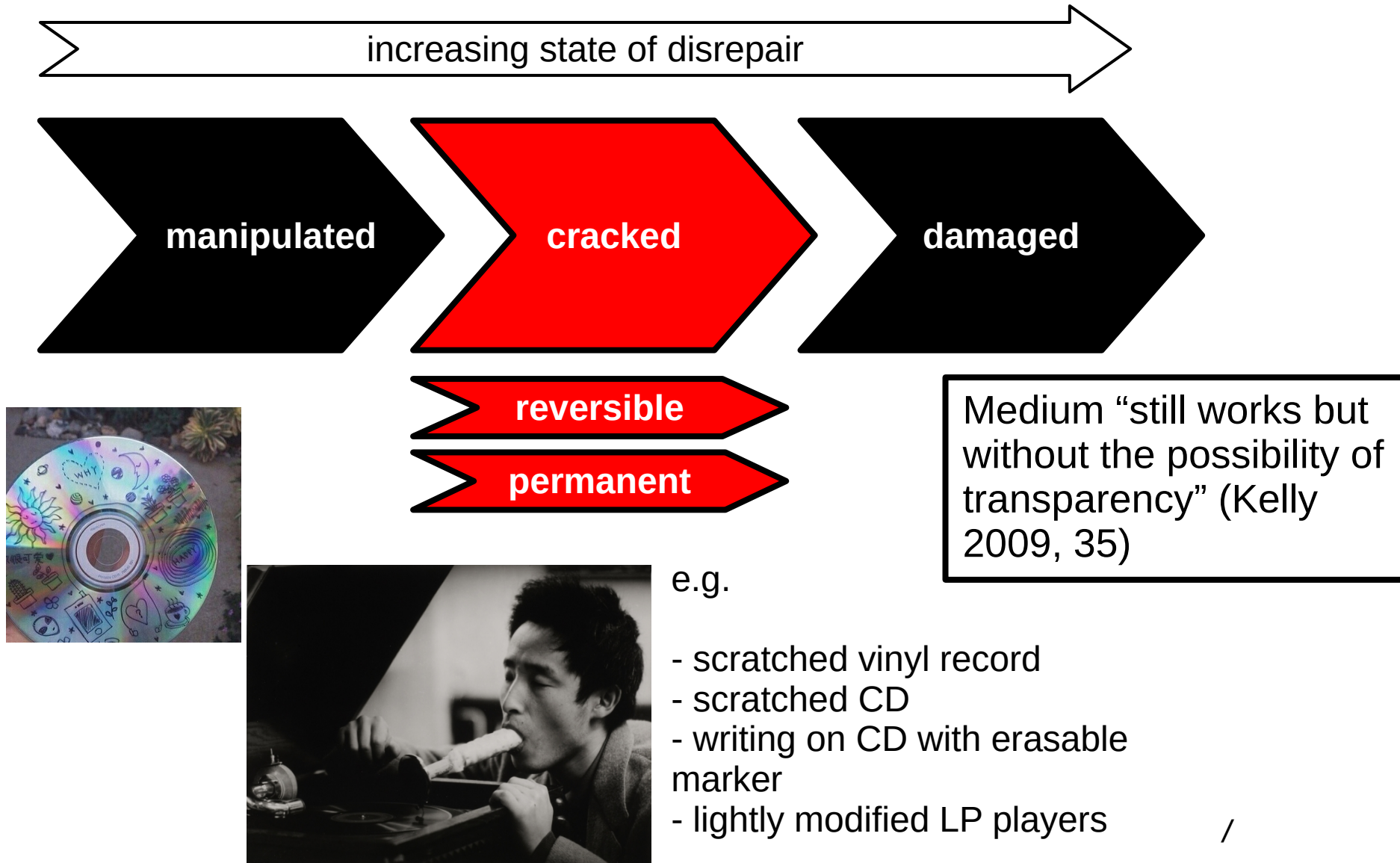
“a temporary disruption to the steady flow of recorded data, rather than a permanent crack or actual break” (Kelly 2009, 33)

e.g.

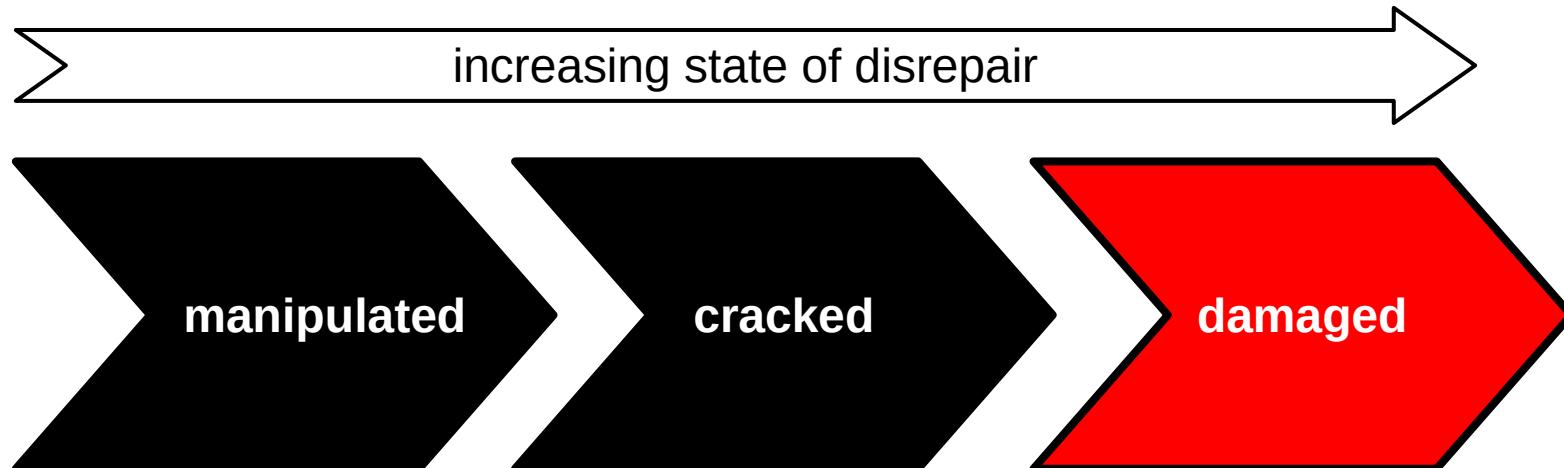
- turntablism (direct drive)
- varispeed tape players
- interfering w/capstans
- forcing buffer overruns

/

Kelly, *Cracked Media* (2009)



Kelly, *Cracked Media* (2009)



“most extreme practices of damage and destruction [...] often extreme audio outcome [...] high level of chance and chaos” (Kelly 2009, 33)

e.g.

- dismantled tape players
- vinyls spun by drills etc.
- shattered records





format fracture

discontinuity in the materials of
media that compromises the
integrity of the information stored



discontinuity

materials

integrity

format fracture

discontinuity in the materials of
media that compromises the
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discontinuity

Insists on a “break”...

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...in things, including but not
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...a loosening in the
correspondence between the
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...a loosening in the
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‘integrity’ is sociohistorically
contingent: it is felt or heard in
relation to the norms/values of a
particular situation /



format fracture

discontinuity in the materials of
media that compromises the
integrity of the information stored

traumatic

- the result of forces/processes external to the materials of media
- often intentional
- usually short time-scale



format fracture

discontinuity in the materials of media that compromises the integrity of the information stored

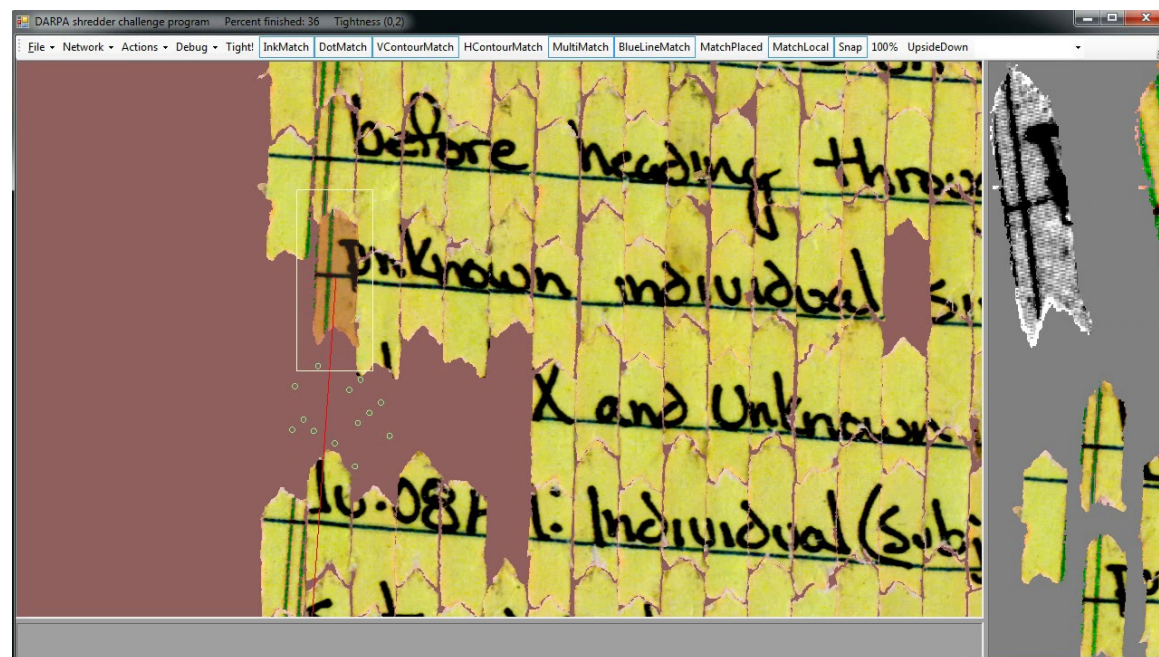
traumatic

- the result of forces/processes external to the materials of media
- often intentional
- usually short time-scale

pathological

- the result of forces/processes internal to the materials of media
- often unintentional
- usually longer time-scale

Examples of “format fracture”



Format fracture: further examples

Format	“traumatic”	“pathological”
Magnetic tape	splicing	disintegration
FATxx filesystem + HDD	MBR virus (e.g. Ripper)	fragmentation
Bluetooth A2DP	[dropout]*	
MPEG-4 (.mp4 video)	deleting i-frames	[depends on container]*
VHS	“chewed up” tape	stretching from repeated recueing
LaserDisc	dust	“laser rot”
CD	scratches fingerpints	“bronzing” (c. 1988–1993 @ PDO UK)
CD-R	tilt (from warping) jolting player mute “hack” (Collins et al.)	dye disintegration (from UV exposure)
paper	shredding	yellowing
(broadcast)NTSC television	vertical roll	“snow”/static

Advantages of “format fracture”

1. Facilitates a distinction between traumatic and pathological format fractures
 - a new, complementary axis of analysis
2. Enacts a shift of focus from medium to format suggested in Jonathan Sterne’s work on MP3 and taken up by “format studies”/format theory (Axel Volmar et al.)
3. In dialogue with “vulnerology”, an (in)discipline of bodies at their limits, which treats flesh as media
 - media as flesh?
 - towards “predictive” vulnerology
4. Many constituencies are interested in format fracture, **not just artists**

Advantages of “format fracture”

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3. In dialogue with “vulnerology”, an (in)discipline of bodies at their limits, which treats flesh as media
 - suggesting the inversion
 - predictive vulnerology
4. Many constituencies are interested in format “fracture”, **not just artists.**

Other benefits? less committed to notions of reparability/value in the moment of analysis, A/D-ambivalent, historically sensitive (“integrity”)...

Gregory Whitehead

DISORDER SPEECH—cast o

Only a Flesh Wound
Dead Letters Live On Air!
Ostentatio Vulnerum—a dead lang
If a voice like, then what?
Eva, can I stab bats in a cave?—a
Blunt Trauma
escalated ZIGGURAT inhalation

FIGURE 3-17B. The subject was sev
tracheal rim, inducing repetitive intra
epiglottis, gravely impairing the hole o
a rare hemotrophic hypostrophe in th



DISORDER SPEECH

cast out texts—Gregory Whitehead

© 1985 Gregory Whitehead

DISPLAY WOUNDS

Gregory Whitehead

Obviously, if you're analysing a woundscape resulting from the collision of bullet trains or the crash of a supersonic jet, the literal meaning of the individual wounds frequently cannot be translated. The practice of the vulnerologist is oriented more towards getting the *feel* of the wound, sensing its quality, sensing the deeper implications of its experience.

Built from the deformative potentials of the technological environment, the th... described on the surface of humi

US-based radio artist and playwright

© 1986 Gregory Whitehead

Design: Patrick Sumner

e.g. *If a voice like, then what?*
(1984–5)

Radio plays/radio art which examines the “woundscape”

- Dead Letters (1983-85)
- Disorder Speech (1985)
- Display Wounds (1986)
- Pressures of the Unspeakable (1992)

DISPLAY WOUNDS

Gregory Whitehead

DISPLAY WOUNDS was originally commissioned for the pilot edition of NEW AMERICAN RADIO

© Gregory Whitehead

Gregory Whitehead—"vulnerology"



"Vulnerology is the knowledge of wounds—how to interpret the wound such that each opening, or leak, or rupture, reveals new meaning. [...] Wounds are the physical repositories for the memory of experience that most people would prefer to suppress or forget. The experience of receiving a wound is a shock and the connection between shock and amnesia is pretty well known. There is simply a massive individual and cultural resistance to recognizing the significance of wounds."

Gregory Whitehead, Display Wounds. Radio play 1985/1986.

DISORDER SPEECH



FIGURE 3-17B

DISORDER SPEECH

cast out texts—Gregory Whitehead

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Gregory Whitehead, Display Wounds. Radio play 1985/1986.

"The vulnerologist is a semiotician of wounds and a genealogist (in the Foucauldian sense of the term) of "woundscapes"—territories marked by injuries to bodies that index particular moments in the wounding capacities of technologies."



Terry, Jennifer. "Significant Injury: War, Medicine, and Empire in Claudia's Case." WSQ: Women's Studies Quarterly 37, no. 1 (June 3, 2009): 200–225.

Gregory Whitehead—"vulnerology"

DISORDER SPEECH—cast out texts—Gregory Whitehead

Only a Flesh Wound

Dead Letters Live On Air!

Ostentatio Vulnerum—a dead language lesson

If a voice like, then what?

Eva, can I stab bats in a cave?—a palindrome drone

Blunt Trauma

escalated ZIGGURAT inhalation

FIGURE 3-17B. The subject was severely tracheal rim, inducing repetitive intradiaphragmatic epiglottitis, gravely impairing the hole of the saccus, a rare hemotrophic hypostrophe in the posterior

https://youtu.be/m_dja-QfUsM?t=499

"Stopping the bleeding has really nothing to do with treating the wound [...] I don't feel that the wound has really been treated until it has been given a voice, until it has been empowered to speak. No wound ever speaks for itself. [...] The first thing that we do is we make an abstraction of the wound. [...] What we discovered is that most wounds, biomechanically, have a strong resemblance to the human larynx. So the next step was to find ways to get... the wounds... to speak."

Gregory Whitehead, Display Wounds. Radio play 1985/1986.

DISPLAY WOUNDS

Gregory Whitehead

Obviously, if you're analysing a woundscape resulting from the collision of bullet trains or the crash of a supersonic jet, the literal meaning of the individual wounds frequently cannot be translated. The practice of the vulnerologist is oriented more towards getting the *feel* of the wound, sensing its quality, sensing the deeper implications of its experience.

Built from the deformative potentials of the technological environment, the theatre of wounds is a *memory* theatre inscribed on the surface of human flesh.

Design: Patrick Sumner

DISPLAY WOUNDS was originally commissioned for the pilot edition of NEW AMERICAN RADIO

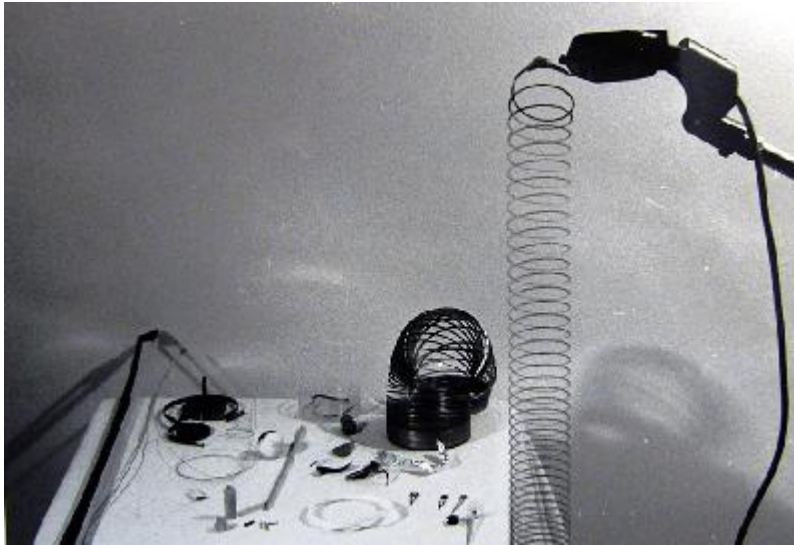


II.

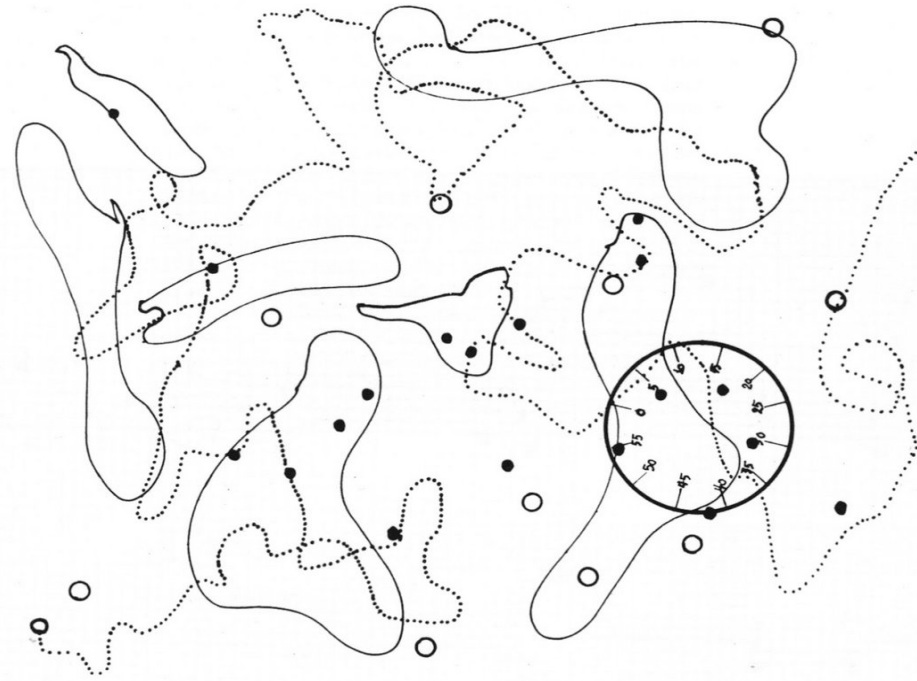
Format fractures in 20C sound art and music

John Cage (1919–1992)

Transducer
setup
for 1968
performance
of
Cartridge Music



(One) realisation of the score for John Cage, Cartridge Music (1960) edn. Peters



A 2018 (?) performance of Cage, Imaginary Landscape No. 1 (1939)

/

Nam June Paik (1932–2006)



Paik. Random Access [2000 version]. 1963, 2000. Tate Modern (2019). Photo credit: Guy Bell.

Wolf Vostell playing Nam June Paik's Random Access (Schallplatten-Schaschlik). 1963. Photo credit: Manfred Leve. (Kelly 2009)



Milan Knížák (b. 1940)



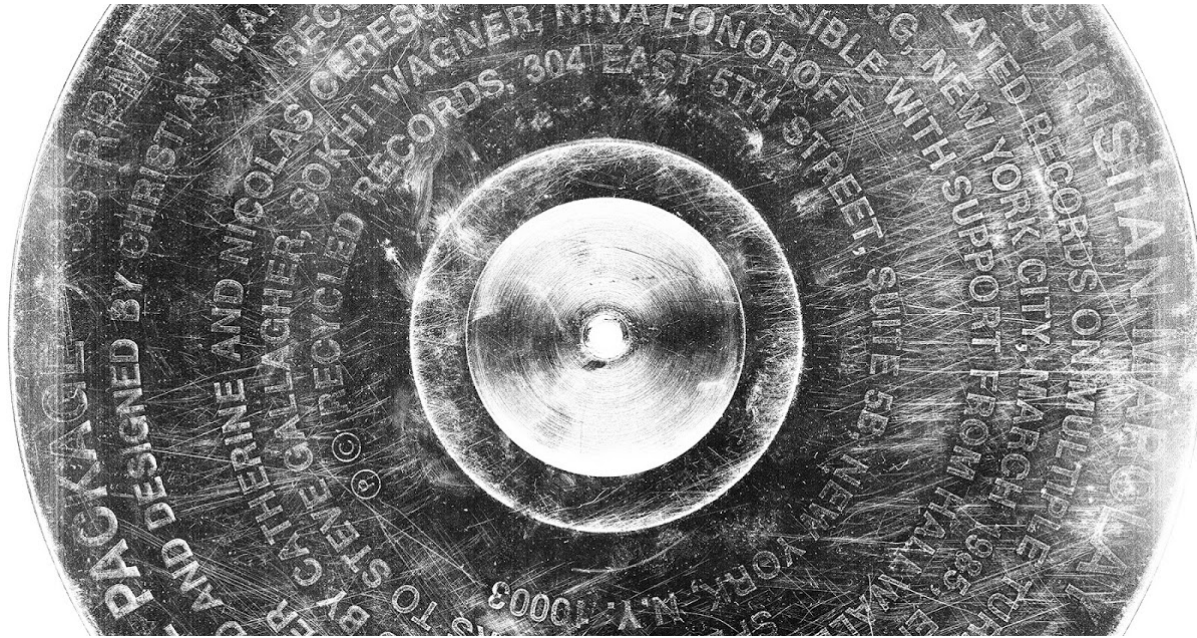
Milan Knížák. Destroyed Music. 1963, fabricated 1975. Altered vinyl record. Record, 9 13/16" (25 cm). The Museum of Modern Art, New York.



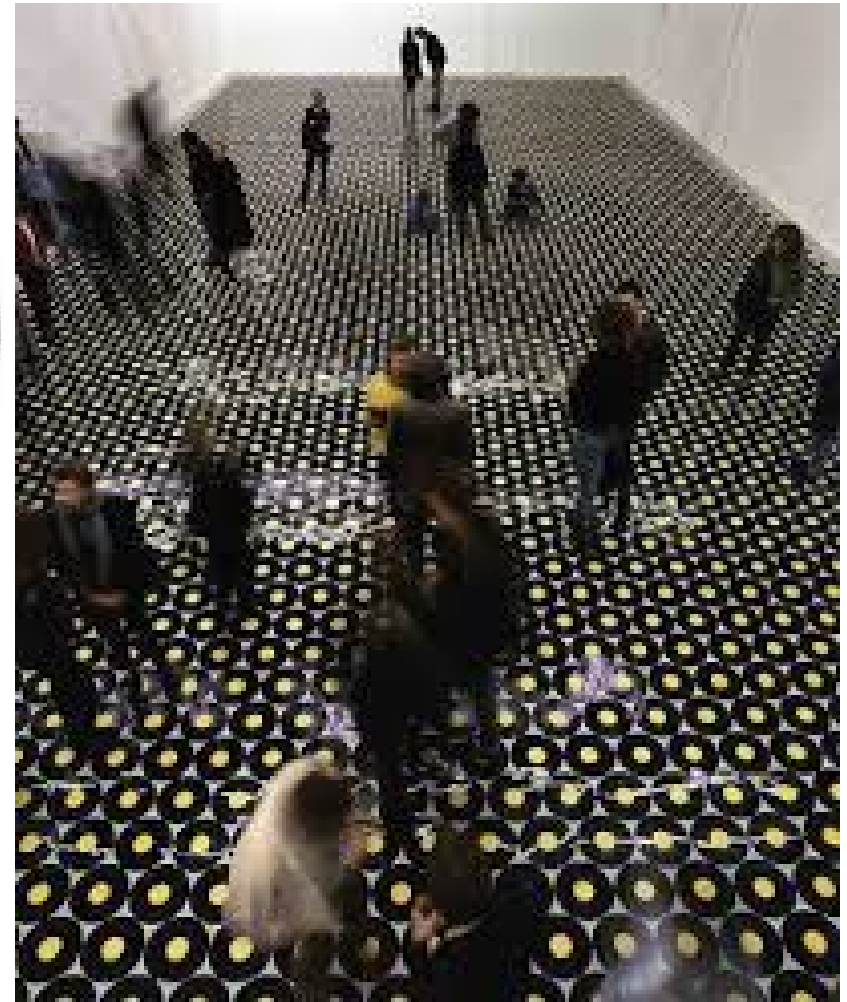
Milan Knížák. Broken Music. 1979. Multipla Records n°5. [Selection and assemblage of materials made by Walter Marchetti]

<https://www.youtube.com/watch?v=88ONydyRX7c>

Christian Marclay (b. 1955)



Christian Marclay. Record Without a Cover. 1985.



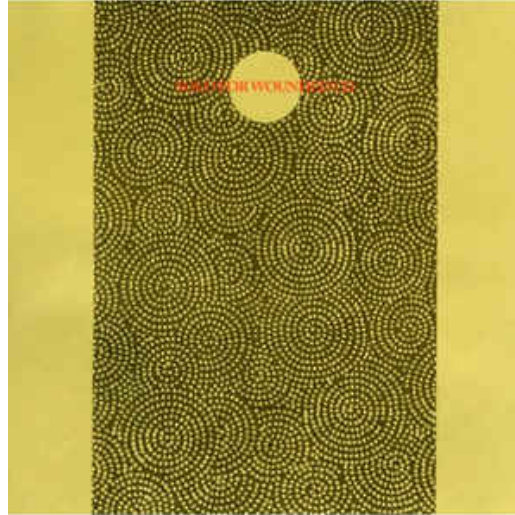
Christian Marclay. Footsteps. 1989. Shedhalle Gallery, Zurich.

Yasunao Tone (b. 1935)



Yasunao Tone performing performing Music for 2 CD players, DIA Art Foundation, New York, June 1987. Photo: Paula Court. Detail showing “wounded” compact disc (Kelly 2009)

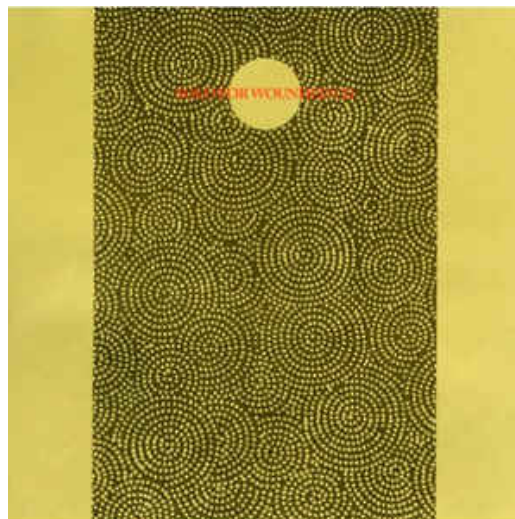
Tone's “Wounded” CDs



Yasunao Tone. Solo
For Wounded CD.
1997. Tzadik. TZ
7212

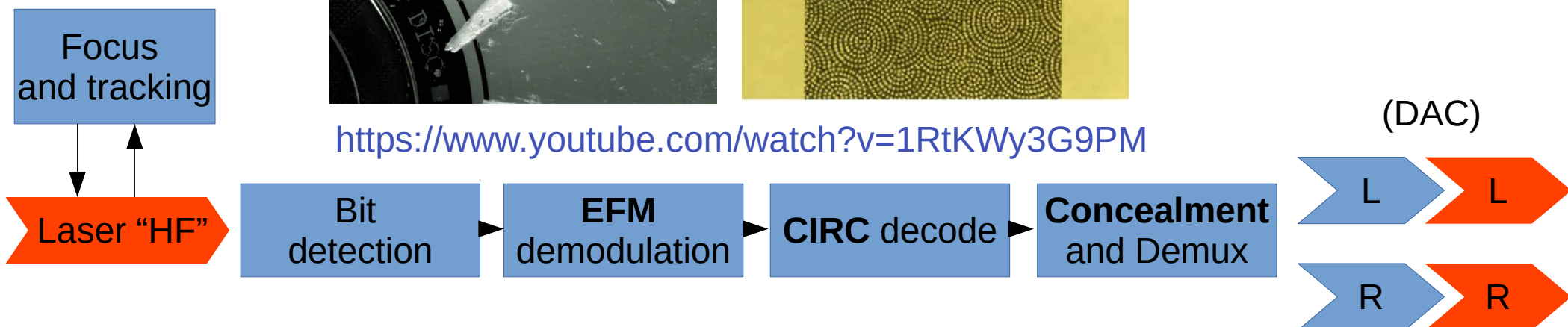
<https://www.youtube.com/watch?v=1RtKWY3G9PM>

Vulnerology of the “Red Book” CD

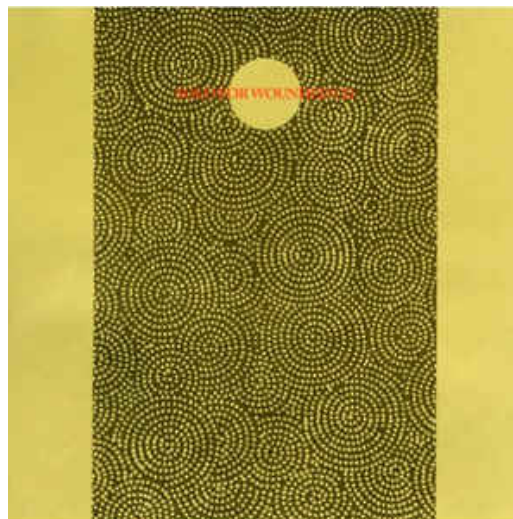
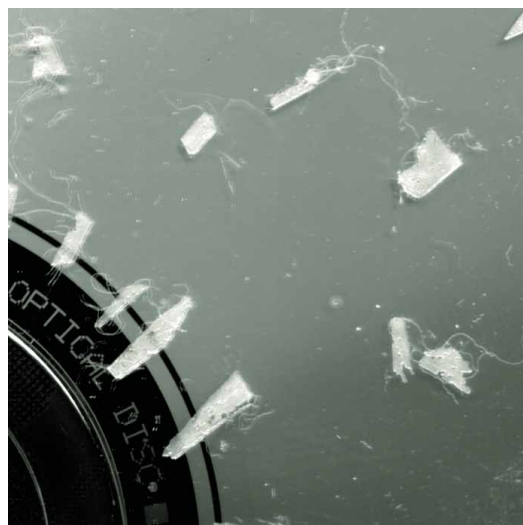


Yasunao Tone. Solo For Wounded CD.
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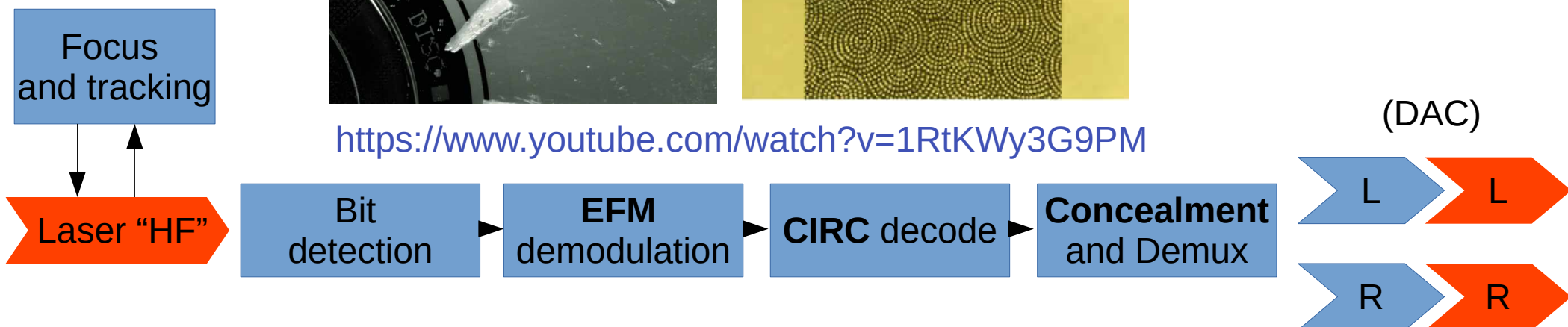
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Vulnerology of the “Red Book” CD



Yasunao Tone. Solo For Wounded CD.
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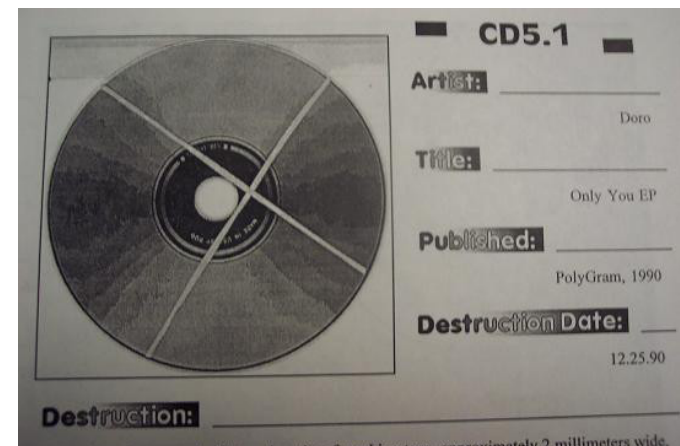
EFM = eight-to-fourteen modulation
(DC-free channel code using “merging” bits)

CIRC = cross-interleaved Reed-Solomon Code
(error-correction scheme developed by Philips/Sony, mostly Sony though)

Concealment strategies: (1) sample and hold, (2) linear, (3) muting

The Evolution Control Committee

The Evolution Control Committee.
Compact Disctructions. 1994.
(Cass., CD + 37 pp. binder with transcripts)



DISC

- Mozart, Sinfonia Concertante for Violin, Viola and Orchestra K. 364 (1779)
- → Michael Nyman, “Fish Beach” (Score to *Drowning By Numbers*, 1988)
- → DISC, “Call It In The Air” on GaijinCD4 (1997)

DISC. GaijinCD4. 1997.
Vinyl Communications VC-143



DISC

DISC. Transfer. 1999(?) Deluxe.
DLX006LP

“Featuring 10 songs and 105 locked grooves, Transfer functions as an interactive artifact to allow DJs to build more extended compositions. Transfer strikes a balance between free digital noise and structured composition in which the sounds of CDs skipping are built into extended songs.

With the timeframe of locked grooves allowing only 1.8 seconds to work in, many of the locked grooves resolve into a hypnotic 4/4 techno minimalism paced at exactly 133.33 bpm, generated entirely from CD-based means.”



Oval

(1991–c. 1993)

- Holger Lindmüller
- Frank Metzger
- Sebastian Oschatz
- Markus Popp →

(c. 1993)

- Lindmüller leaves

(1995)

- Metzger and Oschatz leave



Oval

(1991–c. 1993)

- Holger Lindmüller
- Frank Metzger
- Sebastian Oschatz
- Markus Popp →

(c. 1993)

- Lindmüller leaves
- (1995)**
- Metzger and Oschatz leave

“samples” Aphex Twin, SAW2

sampled by Bjork on
Vespertine (“Unison”)

Album releases

1993	<u>Wohnton</u>
1994	<u>Systemisch</u>
1995	<u>94diskont.</u>
1998	<u>Dok</u>
2000	<u>Ovalprocess</u>
2001	<u>Ovalcommers</u>





Oval

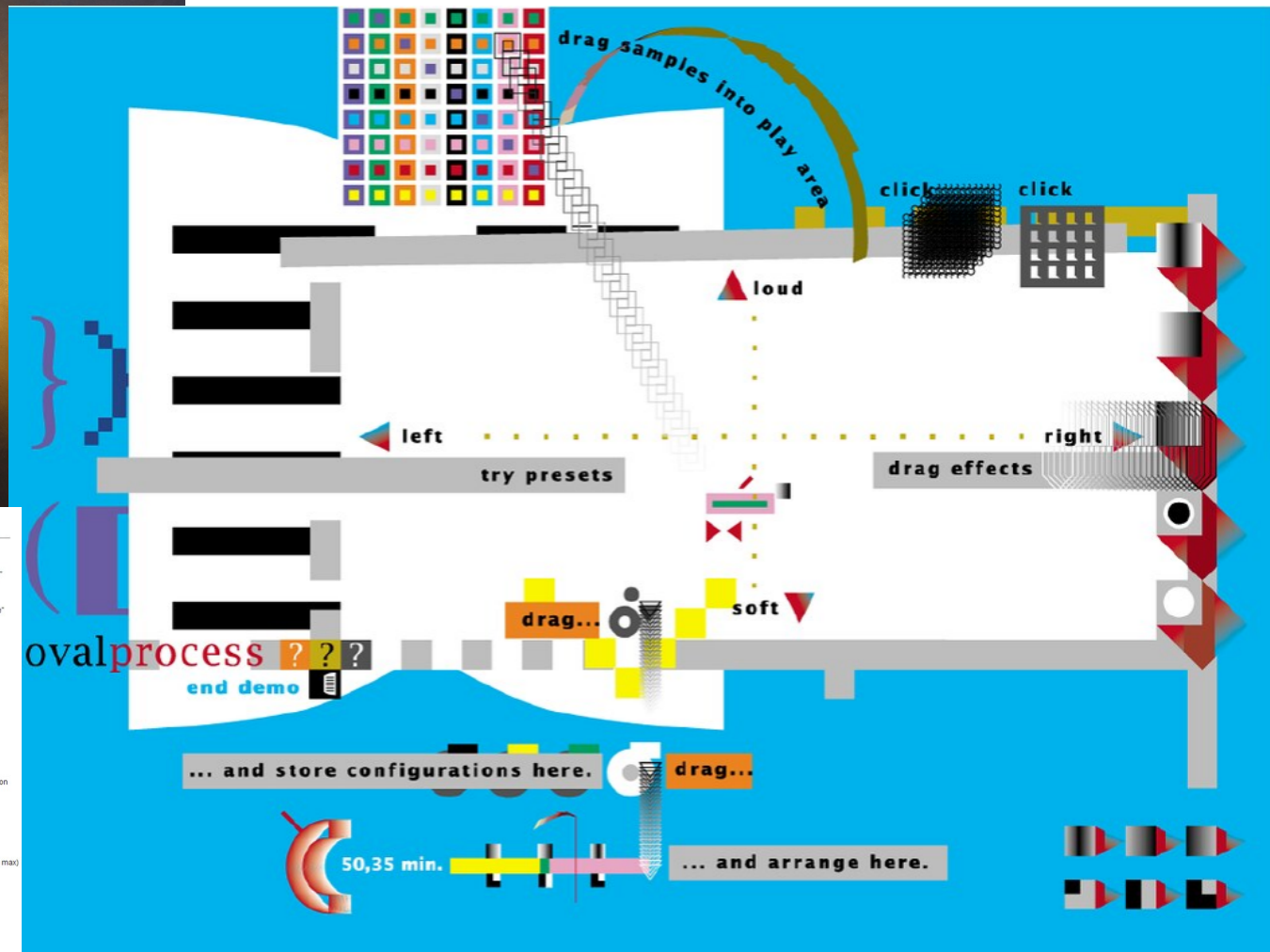
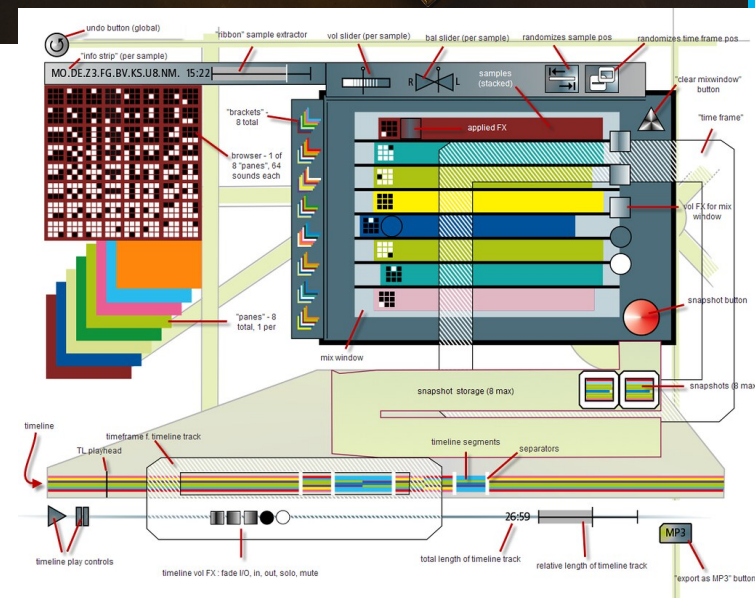
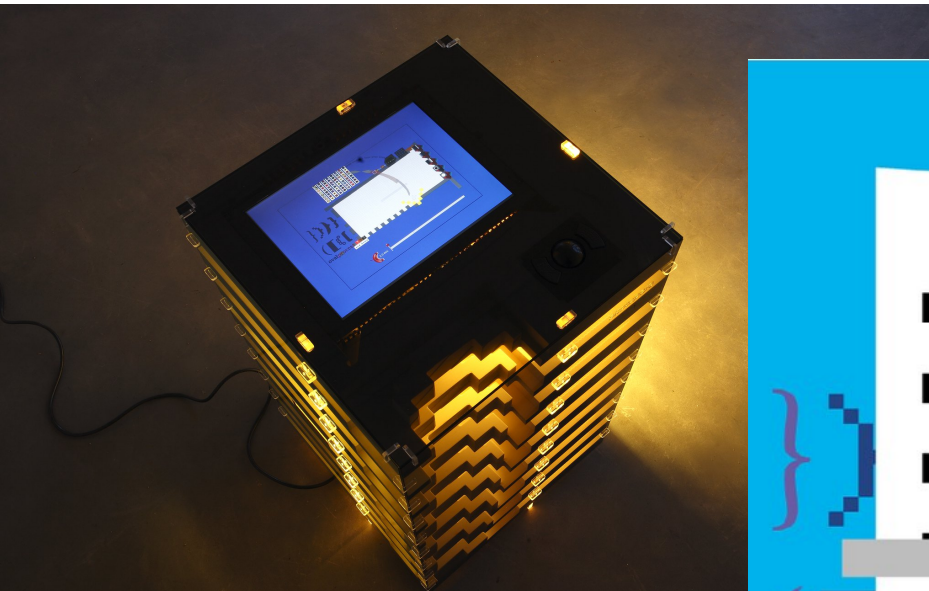
Hallodraußen (4'14")

Wohnton, 1993

Ata Tak WR 6CD

Markus Popp, ovalprocess (c. 2001)

Distinction in the “Digital Music Category” at Prix Ars Electronica, 2001.
(Ikeda won the category for Matrix)





Nicolas Collins on CD hacking (1997)

“I went inside the CD player and looked, because I suspected – and I was right – that the laser was always reading information off the disc, even when you're on pause or moving from track one to track 30. It's always reading information, but the control computer ‘censors’ the output, decides for us what is music (i.e., the clean playback) and what is ‘noise’ (scratching, skipping).



Nicolas Collins on CD hacking (1997)

“I went inside the CD player and looked, because I suspected – and I was right – that the laser was always reading information off the disc, even when you're on pause or moving from track one to track 30. It's always reading information, but the control computer ‘censors’ the output, decides for us what is music (i.e., the clean playback) and what is ‘noise’ (scratching, skipping).

So I found that control signal, marked ‘mute’ and I simply flipped that pin off the chip so that it could no longer mute anything. And that opened the door to the inner world of the CD: you could hear anything that the CD-player was doing at any time.”

— In interview with Martin Conrads (1997)



The Soldier Quartet

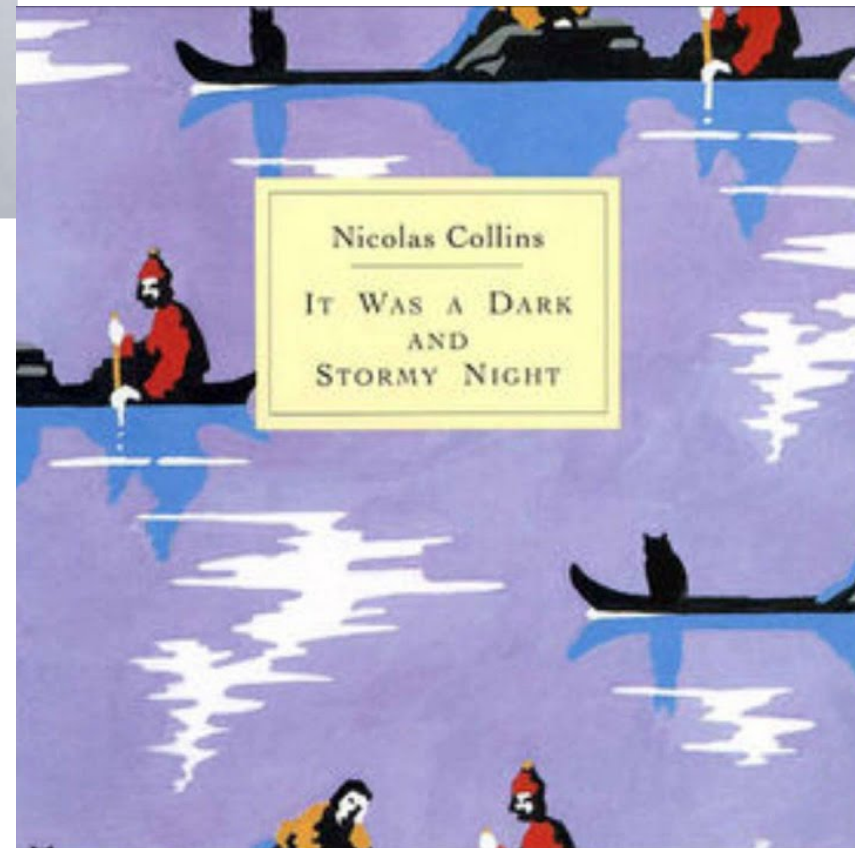
Nicolas Collins

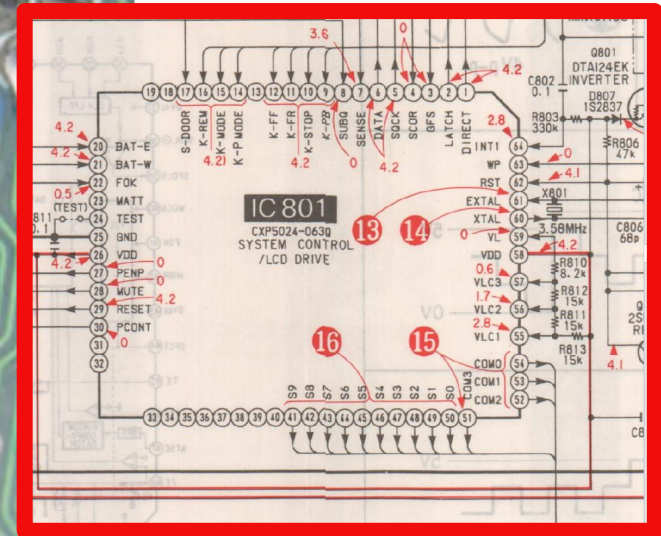
Broken Light, I. ("Corelli") (4:57)

It Was a Dark and Stormy Night

Trace Elements Records, 1997

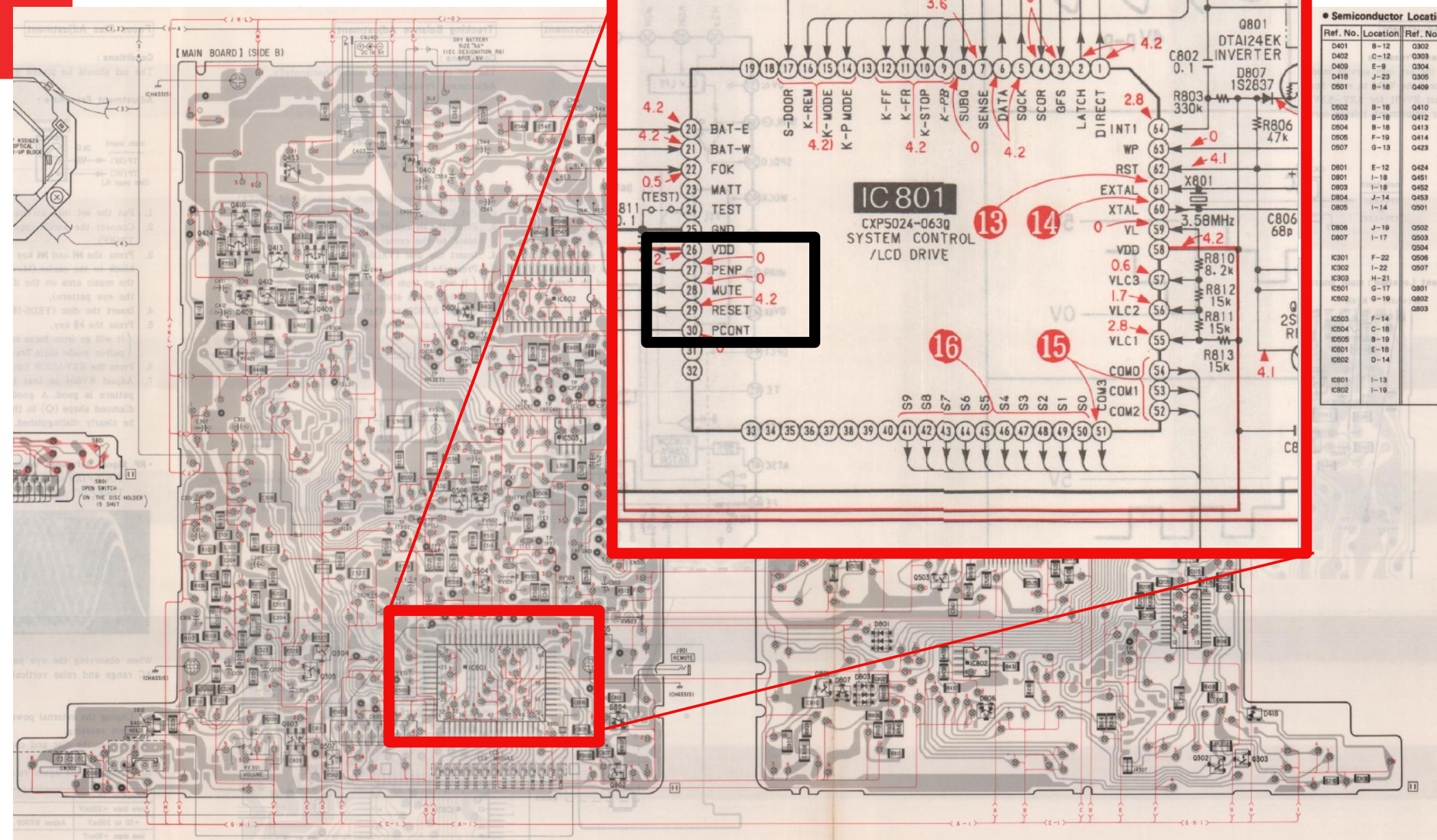
Set-up for Broken Light, showing hacked Sony D2 Discman; modified Sony remote control (in blue box); breakout box for connecting footswitches to remote control; footswitches to call up tracks for three movements ("1", "2", "3"), scratch across CD ("S"), and nudge through tracks ("N"). (Collins 2009)





Lifted “mute” pin on chip in Sony D2 Discman
(wires go to switch for mute enable/disable.)
(Collins 2009)





Sony Corporation. Service Manual for Discman D-2 (launched c. 1988) ,

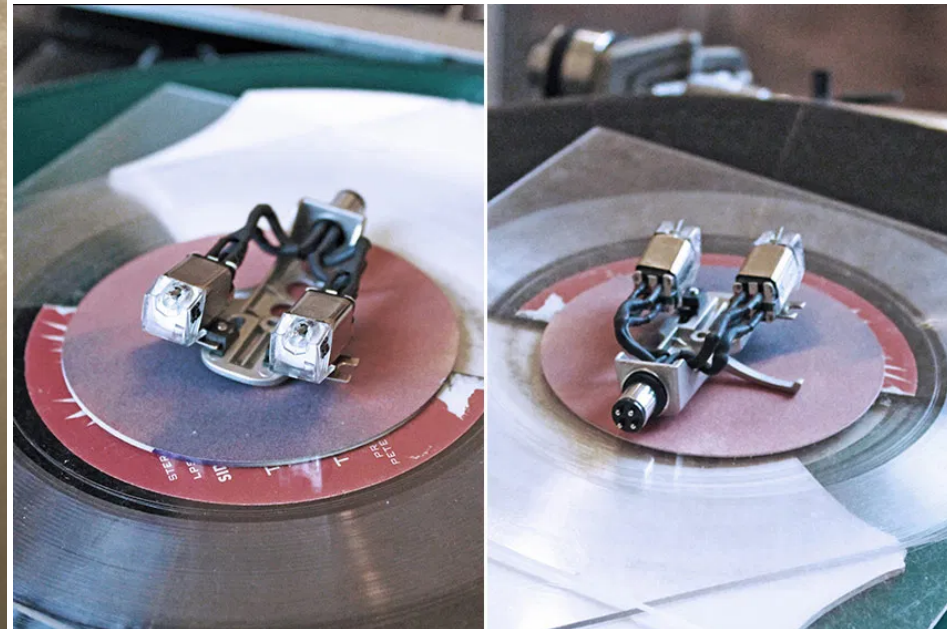
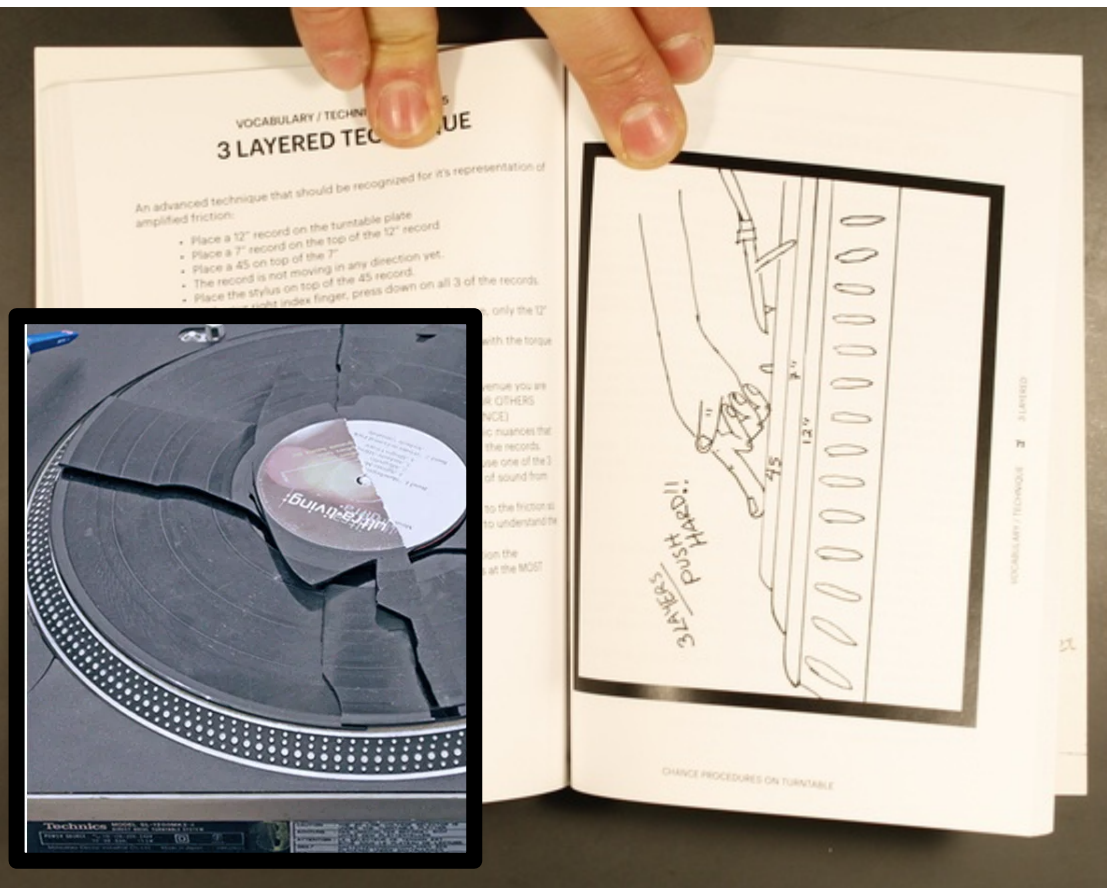
Maria Chavez (b. 1980)

Maria Chavez, Of Technique: Chance Procedures on Turntable. New York: Printed Matter. 2013.

OF TECHNIQUE: CHANCE PROCEDURES ON TURNTABLE

A BOOK OF ESSAYS & ILLUSTRATIONS
BY MARIA CHAVEZ

<https://youtu.be/ruDZM-mrTpA?t=189>



CD glitches “in the wild”



A CD player reached the end of its life. Funny!

2,758 views • Jul 29, 2018

28 0 SHARE SAVE ...

https://www.youtube.com/watch?v=_SffWnLGtB4



Skipping Cd

15,045 views • Jan 19, 2009

97 0 SHARE SAVE ...



Tony sopranos hates it when his CD skips

81,419 views • Sep 27, 2011

162 1 SHARE SAVE ...

/

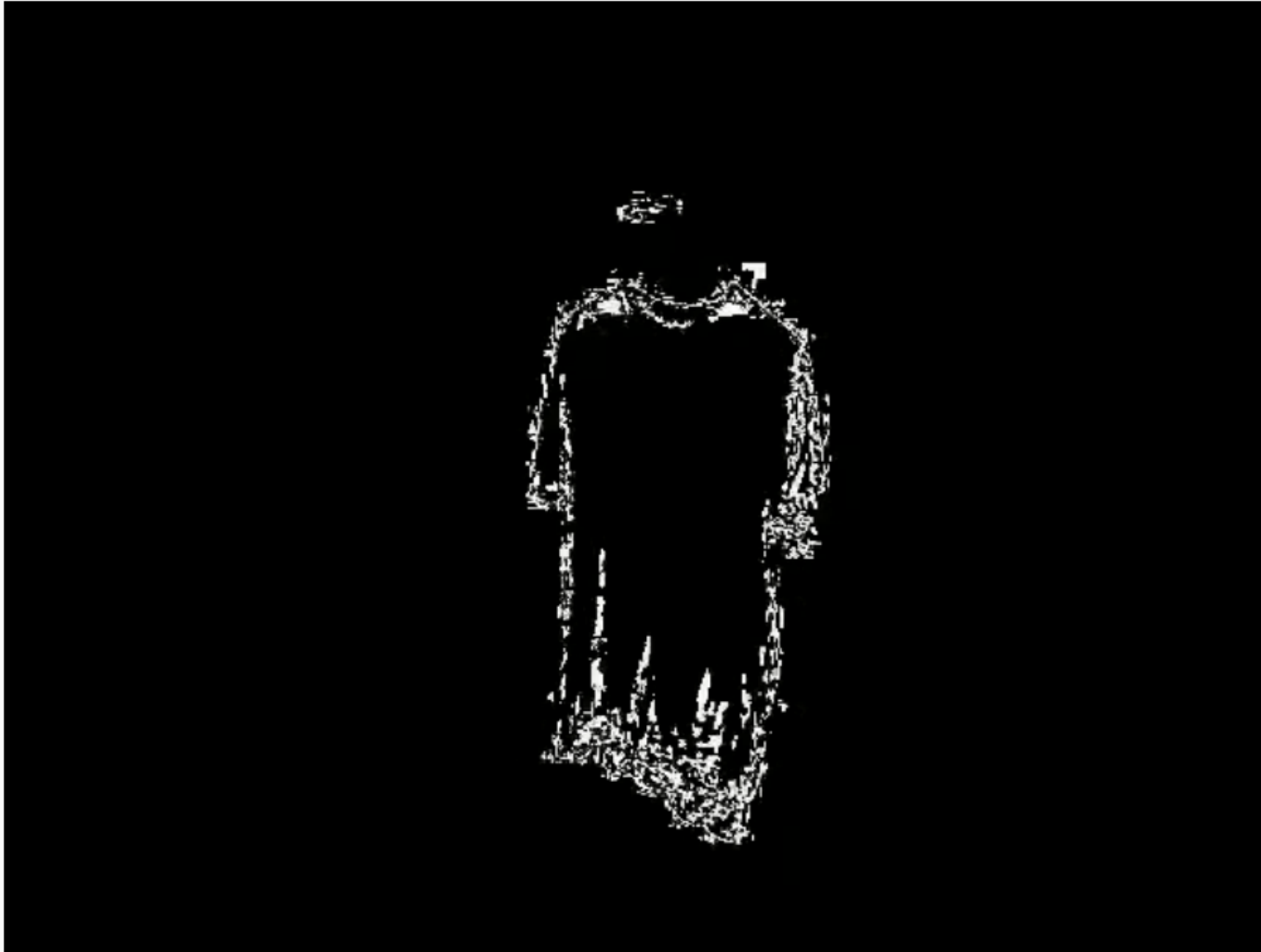
Joan Jonas (b. 1936)



Joan Jonas. Vertical Roll.
1972. Video (black and
white, sound), 19:38 min

<https://www.youtube.com/watch?v=jpstpzBDJ7s>

Ryan Maguire (b. 1984), moDernisT



moDernisT

16,051 views • Oct 2, 2014

👍 230 💬 2 ➦ SHARE ≡ SAVE ...

Ryan Maguire, “The Ghost in the MP3.” In *Proceedings ICMC | SMC | 2014*, 243–247. Athens, Greece, 2014. <http://dx.doi.org/10.5281/zenodo.850515>

<https://vimeo.com/120153502>



moDernisT_v2

More from Ryan Patrick Maguire
Autoplay next video

<https://www.youtube.com/watch?v=4-ISLpKhQJI>

Further Reading

<https://redbook.space>

- Cox, Christoph, and Daniel Warner, eds. 2017. *Audio Culture: Readings in Modern Music*. Revised edition. New York, NY: Bloomsbury Academic, an imprint of Bloomsbury Publishing Inc.
- Devine, Kyle. 2019a. *Decomposed: The Political Ecology of Music*. Cambridge, Mass.: MIT Press.
- . 2019b. “Musicology Without Music.” In *On Popular Music and Its Unruly Entanglements*, edited by Nick Braae and Kai Arne Hansen, 15–37. Pop Music, Culture and Identity. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-18099-7_2.
- Hainge, Greg. 2013. *Noise Matters: Towards an Ontology of Noise*. Sound Studies. New York, NY: Bloomsbury Acad.
- Helvoirt, Jan van. 2002. “Disc Defect Handling in Optical Disc Drives.” MSc thesis, Eindhoven University of Technology. <https://pure.tue.nl/ws/portalfiles/portal/46906941/633153-1.pdf>.
- Higgins, Hannah. 2002. *Fluxus Experience*. Berkeley: University of California Press.
- Kahn, Douglas. 1999. *Noise, Water, Meat: A History of Sound in the Arts*. Cambridge, Mass: MIT Press.
- Katz, Mark. 2010. *Capturing Sound: How Technology Has Changed Music*. Rev. ed. Berkeley, Calif. ; London: University of California Press.
- Kelly, Caleb. 2009. *Cracked Media: The Sound of Malfunction*. Cambridge, Mass: MIT Press.
- Morris, Jeremy Wade. 2015. *Selling Digital Music, Formatting Culture*. Oakland, CA: University of California Press.
- Sterne, Jonathan. 2003. *The Audible Past: Cultural Origins of Sound Reproduction*. Durham: Duke University Press.
- . 2012. *MP3: The Meaning of a Format*. Sign, Storage, Transmission. Durham: Duke University Press.