
The tip of the iceberg: laptop music and the information-technological transformation of music

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Understanding laptop music requires more than a new perspective on the configuration of a ‘wearable computer and an audio interface’ as a musical instrument for performance. It combines the strategies and traditions of electronic media-related music composition of the twentieth century, like reproductive music, electronic music, computer music and Net music in a single, digital, multi-purpose device originally designed for business and multimedia applications. Consequently, what we hear is mostly not a genuine laptop music, but one facet of the information-technological transformation of music that has been the result of the digital integration of these established traditions. This article gives an overview of the aesthetic implications of these traditions and with respect to laptop performance and musical style.

1. INTRODUCTION

It is commonplace that information technology tools are hidden beneath virtually every production of audio media. The mediality of music, being distributed as data or sound files on CD, DVD, or directly on the Net, already substantiates a change whose forms and production processes are inseparably linked to the medium of the computer. Now, even at live electronic music shows, the laptops on the stages make apparent the tip of an iceberg whose dimensions can still barely be made out: The *information-technological transformation* of music takes performative shape. Laptops – or notebooks, as they are often called nowadays – as dominant instruments on the stage are both an expression of technological change as well as a token of conceptual transformation of the production and composition of music in the electronic medium.

2. MOBILISED TECHNOLOGY

It seems that the phenomenon is still most easily grasped as a stage of technological progress: Miniaturisation and increased performance render the personal computer portable, the desk environment (*desktop*) is now located in the lap (*laptop*) or in the palm (*palmtop*) of the user. The sketchbook, in the form of a notebook or a PDA (personal digital assistant), becomes a multimedia gadget. First and foremost, these are utilised to release office suites and home entertainment suites such as ‘iLife’, which Apple founder Steve Jobs

apostrophised as ‘Microsoft Office for the rest of your life’,¹ into mobile everyday life.

However, the professional tools of studio production, of sound editing, effects, virtual synthesizers, etc., and along with these, also parts of the once locally installed periphery, become portable as well (the audio interface MOTU *traveler*, for example, betrays its mobile purpose already in its name). At the same time, the programs burned into the hardware of keyboards and rack devices emigrate into the universal system architecture of portable computers. The advantages of specialised hardware, such as functionally designed interfaces with unambiguous assignment of control elements, operational stability, real-time behaviour, and the resulting instrumental characteristics, take a back seat when it comes to letting the options of technical configuration become the instrument itself.

In the meantime of course, the opposite direction has become possible too: the individualisation of conventional electronic instruments. The instrument design is done in the computer, in order to configure the hardware of an electronic instrument, which finally serves as the autonomous, mobile, tactile interface of an individually constructed instrument. Musical instruments such as the Clavia ‘Nord Modular’ enable musicians to construct their own individual synthesizer from application objects on the PC and then to load it into the hardware, which has the look and feel of an established electronic instrument. The result is a custom-made ‘personal synthesizer’. This is *not* what laptop performances are about at all. Even though there are two basic similarities, portability and modular programmability, this is an example of a musical instrument in the classical sense, with a well-defined sound production process, and a specific feel. A mobile computer, however, even in its function as an instrument (which we need to explore further), remains a computer, a universal information technology medium with medium-specific traditions.

This leads us to the key questions of the musical culture of laptops: What inspires a musician, a composer, to trade in their traditional tools for a mobile computer? What constitutes the characteristic difference

¹Steve Jobs’ presentation at ‘MacWorld’, San Francisco, 2004.

between compositional and instrumental concepts and traditional settings? What are prototypical aesthetic strategies in the use of laptops in music?

The later Beethoven sitting on a park bench with an Apple Powerbook on his knees instead of a sketchbook, using it to record his ideas and to try out first arrangements, is an amusing image. But why not – composers and arrangers have long been using sequencing and music notation software for these purposes. However, this kind of usage as a ‘better music typewriter’ is in fact still rooted in the aesthetic tradition of the nineteenth century, and for all the technical innovation, this talk about laptop music would not be necessary. So in order to deal with the above questions not only on a relatively trivial technical level, we need to put the historical place of the laptop in the culture of media in relation to the media-aesthetical changes in music. They become manifest in stages of change in the process of musical creation, in which technical media play an important part. During these, vital changes take place in the ways music is written, in the compositional material, in performance practice and in the development of instruments. These shall be briefly outlined in the following.

3. REPRODUCTIVE MUSIC – PHONOGRAPHIC TRADITIONS

Phonography, taking hold as a mass-medial appliance since the 1920s, no longer writes down music-structural instructions for performance, but the sound waves of the performance itself – contrary to the notation in scores or the cylinders and punched tapes of music machines. As a result, public and private archives of performances form, which establish themselves as media storages in addition to the cultural archives written in musical notation.

Just like musical notation however, the phonographic storages require a performance, a technical and cultural appliance of reception, in which now – this seems to be self-contradicting, but isn’t – stored performances are performed. In this sense, the media appliances, as second-order sound producers of a performance, compete with conventional instruments from the beginning. In the first phase of phonography, that’s what they actually referred to – music machines and speaking machines alike –² until the second phase of media-cultural adaptation, when the idea of authentic reproduction (of *high fidelity*) became dominant and turned them into ‘technical agents’ (Jungk 1971). Finally people become increasingly aware again of the sound-generating performance, which is necessarily

implemented in the phonographic playback settings, from the 1950s in *musique concrète* and in electronic music, and from the 1970s in hip hop. Reproductive performance instruments such as the Phonogene, Mellotron, DJ set and sampler are the basis of a new, second-order performance practice that ultimately establishes itself in the various forms of musical performance from the media-purist loudspeaker concert to the rock band plus DJ.

Likewise, in this realm of auditive culture, the recipients’ expectations concerning reproduced music change. The reproduction itself – and no longer the original of a past performance behind it – ‘is’ the music. Common ways of playing in DJ culture have trained their audiences – it is plain to see and hear that tracks constructed from looped breakbeats no longer refer to an actually played entity of time and form. The forms of electronic media and their production processes enter the creative process themselves as compositional material.³ Among these there are processes of editing, of montage and medium-specific transformation, which now appear as instrumental options and are used in all kinds of genres and styles, as the names of only a few of the protagonists of this practice indicate – Bob Ostertag, Christian Marclay, John Oswald, Grandmaster Flash.

The second-order performance emancipates itself from its assumed reproductive function as an independent aesthetic artefact. The keyword ‘sound’, currently appearing in all sorts of contexts, also illustrates this change: Unlike the tone, with which we are familiar as an instrumentally or vocally in-toned(!) sound element of a superimposed pre-formed tonal structure, ‘sound’ highlights the ‘how’ of sounds while leaving open their medial or non-medial origin.

Wherever laptops are used as samplers, where they assemble and transform pre-produced material, where they access the audio archives of cultural production, they stand in the tradition just described. As digital media machines, they have a command of the full palette of said creative options, in terms of functions (in current production practice, software samplers have made hardware obsolete), and develop them further. HiFi and reproductive music, as established media traditions, along with their performance practices, are taken up and sustained. The information-technological transformation, however – here is where it differs from the media tradition of its precursors – not just adapts these threads in mostly simulative settings, but combines them in a digital set-up with further creative strategies, of which I only want to address two: algorithmics and digital networking.⁴

²Ernst Toch, ‘Musik für mechanische Instrumente’, in *Musik und Maschine: Sonderheft der Musikblätter des Anbruch* (Stuckenschmidt, Hans-Heinz, 1926); see also Volker Straebel, ‘Klangraum und Klanginstallation’, in *Klangkunst*, Katalog zu Sonambiente, Festival für Hören und Sehen der Akademie der Künste Berlin, ed. Helga de la Motte-Haber (Munich, 1996).

³Thorsten Klages (2002) described this re-entry of form for the phase of analogue electronic media in detail.

⁴Unfortunately, for reasons of space we cannot go into the fields of intermedia and the visual, which have their own traditions whose integration also constitutes a vital aspect of information-technological transformation.

4. COMPUTER MUSIC

If we understand composition as rule-governed creation of musical structure, algorithmic methods in the broadest sense have always played a part in the generation of musical structure, from the counterpoint rules of Johann Joseph Fux via seriality and aleatorics to Iannis Xenakis' use of statistical methods. It is precisely the notation of Western classical music which promotes rule-governed work on tonal structure. So it is not much of a surprise that computers take up and sustain this tradition of creation. By nature, algorithmic processes are a domain of program-controlled calculating machines, and hence the generative resource of computer-based creation. The results of these kinds of processes can either be transferred to musical notation – like in the pioneer years of Lejaren A. Hiller – and then be played conventionally (e.g. by a string quartet in the 'Illiac Suite', 1956/67), or be output directly to machine-readable control data (like in the MIDI-protocol, from 1983). Furthermore, there is the controllability of sounds as well as – merging the computer's traditions of calculation and of medium – samples, and also the direct computation of sounds, in the tradition of the synthesizer. This means that information-technological production employs an additional form of writing, which perpetuates the pre-phonographic tradition of notation on the technical level and combines it with the digital sound-writing of phonography: data protocols for controlling the production and transformation of sound.

Seen from a historical perspective, it was at first consistent and consequential to assign the term 'computer music' to the genre of algorithmic music of calculating machines – before the computer became a digital medium, a media machine. But now, creative pre-settings no longer only settle in the generative routines of composing programs, but also in the calculi of the program architectures of sequencer, sampling and synthesizer software, and other tools. Furthermore, as a side effect of complex and partly unmanageable programming environments, a current variant of 'controlled chance' (Pierre Boulez) arises, which elevates the loss of control to a compositional method, and is being discussed as the *aesthetics of failure* (Cascone 2000).

Against this background of both technical as well as media-cultural change, a re-evaluation and disintegration of the term computer music is happening, and being carried further by each new generation, beyond academic residues. Paradoxically, this is particularly the case in countries with a more conservative musical orientation such as Japan, whose Western import of academic tradition (the computer as an algorithmic tool) and popular synthesizer music (computers as digital synthesizers) can hardly be adapted to the media-cultural practice in their own country.

"Computer music" simply denotes anything that is produced using the computer (which for any young musician includes sequencers as well as synthesizers) – anything controlled by the manipulation of digital data' (Loubet 2000). The Japanese computer music of mass culture, as Emmanuelle Loubet goes on to describe, takes place in the domains of karaoke and computer games. I will consider the consequences of this extreme position below.

In this situation of change – of the computer, not the laptop – the programs that make live performances with computers possible in the first place have come into existence, and continue to do so. They mediate between the information technological architecture of the universal office machine and the aims and options of musical play. In the same way, however, they also mediate between the previously mentioned traditions of musical (media) creation, they define the place of the configured machine. Accordingly, program development moves between the poles of algorithmic real-time composition (examples: 'M', 'Jam Factory', 'Ovaltune') on the one side, and media production tools modified for live performance such as sequencers ('ableton live'), samplers ('LiSa', *live sampling tool*, STEIM Amsterdam), editors and plug-ins on the other.⁵ These programs are specialised tools and require that the live performer decides upon one of the creation strategies described.

Pitted against them are modular systems such as 'Reaktor', 'MAX/MSP', and 'Pure Data', which offer a whole palette of program objects and which allow individual combinations of creative options. The latter two of these systems are the most flexible, which can be modified down to the program structures of their objects. The concept of 'incompleteness', as co-developer of MAX David Zicarelli puts it, requires an active examination of the operative relations of the individual elements: 'In Max, these relationships can be formed because the software specifies a wrapper for algorithms, devices, interface ideas, and technologies so they can all relate to each other in a common way' (Zicarelli 2002).

Yet the fact that MAX/MSP and Pure Data are among the most popular programming environments on the desk- and laptops of experimentally minded artists is not only due to the flexibility of the systems but also due to the existence of a community which makes a large number of self-developed objects available on the Internet.⁶

⁵A complete overview over the extensive field of popular programs and tools can be found in the 'non-academic' guidebook by Martin Delany (2004).

⁶Zicarelli mentions '400 supported objects' as part of the program suite and 'about 800 other objects' on the Internet for MAX/MSP in the year 2002 (*ibid.*, p. 46).

5. NETWORKING

This leads us to another vital aspect of the information-technological transformation of music: the changing of communicative processes and the appropriation of compositional material by means of global digital networks. The sharing of musical practices in the broadest sense, from the knowledge of compositional techniques via access to works, up to the knowledge of instruments and how they are played, accelerates and changes qualitatively in its medial form. This concerns not only the digital availability of phonographic production and the possibility of immediate *publication* of one's own output. Equally available in the public domain and the community spaces of the Internet are the artefacts of programming – programs, program objects and program code, tools, and so on. While the actual 'sound works' of cultural practice are stored in the phonographic archives, these archives accumulate cultural knowledge of creative strategies in technical-operative form (Grossmann 2005). The computer as a medium of cultural communication attains its complexity not only through technically but indeed culturally motivated and determined work with the programs. From this perspective, both the objects of digitally notated phonography as well as the likewise digitally notated operative calculi are media objects (Trogemann and Viehoff 2005), and as such compositional material of media-aesthetic creation. The crucial point is the combination of formerly disparate worlds: a specific generative potential is inscribed into the programs of media production, and in the phonographic notations of mp3 files, concrete sounds as well as auditive structures are at our disposal for creative use.

If the idea of combining these kinds of media objects is carried through, media products could change in fundamental ways. Imagine generative CDs, instead of audio CDs, which combine the audio data with elaborate rule sets and permit the recipient to create a class of possible performances on their own. Compositional processes and work concepts would be accessible on a qualitatively new level, and could ultimately be developed collectively in a world of interconnected archives and systems.

Markus Popp ('oval') tried out a first, still unconnected step of this vision in the form of an interactive player device for program objects. *Ovalprocess* (Ars Electronic 2001; see Figure 1) is an installation with a visual sequencer complete with integrated audio samples (the oval sound file archive), which leaves the production of oval music to the recipients themselves. The artist's laptop disappears in a design object with a touchscreen, which is at the listener's disposal in a public space. The result is a sound installation that gives the impression of an artistically designed point-of-information (POI) terminal, from which sounds, rather than multi-medial information, can be 'retrieved' in a public

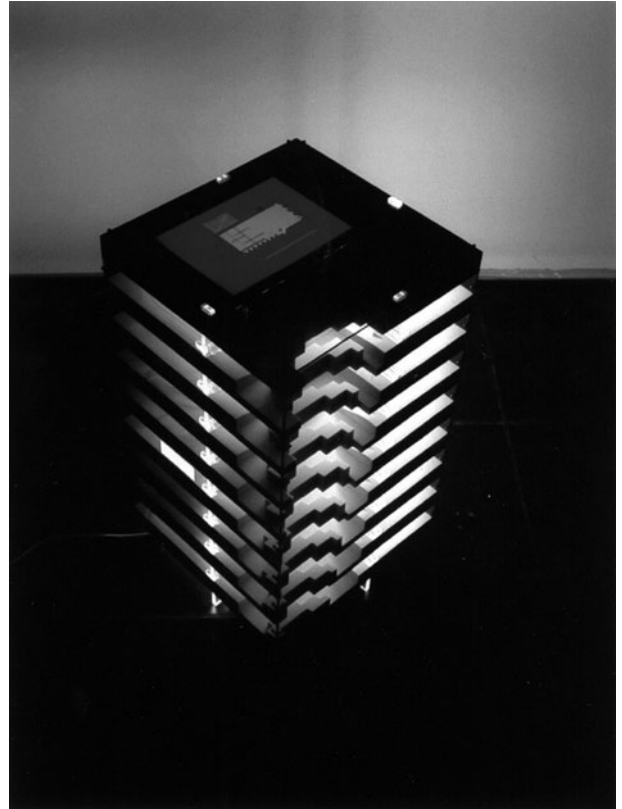


Figure 1. *Ovalprocess*, Installation, Markus Popp (2001).

space. It remains to be seen to what extent such kinds of media appliances will get established beyond such one-off installations.

With regard to instrumental play, networks include another aspect: the synchronisation of time structures and data volumes. In Robert Henke's *Atlantic Waves*, an online multi-user software system based on MAX for the compilation and editing of sound snippets and loops, once a connection is established between the participating players, their time metrics and the interface elements on their screens are identical. Here the tradition of joint music-making and jamming appears: agreements are necessary here and there, but are now made on the basis of a different – technically mediated – writing, which in turn corresponds to a different mediality of the sounds.

6. STYLE AND FASHION

In recent years, hardly any genre description has been more unsatisfactory than laptop music. Broken up into countless synonyms and sub-genres such as clicks and cuts, glitch funk, microsound, post-ambient, click techno or microhouse, laptop music was everything and nothing [...] In the course of the new economy explosion, laptop music was an expression of new media euphoria, soaked with musical promises of a digital New Frontier. (Lakeberg 2006)

The discomfort that Hendrik Lakeberg associates with the term laptop music in this introduction to an interview with Jan Werner (Mouse on Mars) is easy to comprehend. As should have become clear by now, it is true that the use of laptops in music stands in well-definable lines of tradition in the information-technological transformation of music, which can be made out beneath the surface of the visible iceberg of laptop performers. However, these traditions of phonographic reproductive music, of algorithmic composition and sound synthesis, of interconnected archives and workstations allow conclusions about styles and genres only to a limited extent. Within these, all sorts of forms develop – forms of DJ culture, of the popular avant-garde in the genre of electronica, experimental forms of sampling and of sound synthesis up to hybrid orchestra plus laptop compositions or sound installations.

Thus, laptop music generates its aesthetic statement more as a performative setting, rather than as a genre, the more so as the musical evolutions or revolutions (depending on the perspective) that are often proclaimed for it have already taken place within the sketched traditions for the most part. Last but not least, this is why many laptop performers are rooted in the DJ scene. When Luca Prinčič, arguably also being somewhat elated by the alluded promises, talks about a new mode of musicianship, it's the already mentioned all-in-one principle of the computer as a media machine which he highlights as the crucial feature: 'It is a new mode of musicianship: fusing self-research, composition, innovation, performance and distribution in a single technological device connected to digital networks' (Prinčič 2003).

The instrument-like character of this technical device, compared to the desktop computer, consists in its personalised mobile use, reminiscent of conventional instruments. Practising, working, jamming with others, all this is possible in comparable settings. 'The whole point of laptops is their portability [...] it's quite a strange experience to sit on Brighton beach with your laptop, and check your email, then open Reason and work on some drum parts – just keep the ice cream off your keyboard' (Delany 2004, p. 102). The situativity in time and space of the now mobile medium and its wireless (WLAN) connectivity alone give rise to more complex forms of use and new emergences compared to conventional instrumental play.

Just like traditional instruments, the laptop may also be performatively staged as an individual instrument, and as such it centres the attention and defines the performance situation. Laptop music and its staging are directly associated. Laptops on a stage or in a club – comparable to the DJ sets of the analogue phase – are primarily a visible sign of the generative use and creative appropriation of a modern media appliance. Settings occur that are absolutely similar to DJ sets plus MC or other co-musicians, a media instrument accompanying

vocals or some conventional sound production (Figure 2). A set-up with a traditional instrument (Figure 3) or a turntable combined with a laptop (e.g. DJ Sniff a.k.a. Takuro Mizuta Lippit; Figure 4) forms a hybrid instrument with traditional performance characteristics. Performatively though, pure laptop performers, with



Figure 2. Christian Fennesz and Mike Patton.



Figure 3. Christian Fennesz; guitar and laptop.



Figure 4. Takuro Mizuta Lippit; turntable and laptop.

their algorithmically enhanced digital electronic music media machines are far away from hip hop DJs or from virtuoso turntablism: their observable manual playing techniques usually cannot be related back by the audience to what they hear (Croft 2007).

In the appropriate situations, a purist setting with a performer, laptop and loudspeaker can be understood as an updated form of the loudspeaker concert in the tradition of electro-acoustic music. Rather than from an expressive and comprehensible handling of sound equipment, it obtains its aura from the concentration of the present artist, who adjusts the media appliance to the audience and the listening situation by manipulating the faders of the mixing desk or the virtual controllers on the laptop screen. In this kind of setting, a large part of the compositional work is done before the performance, and the laptop with its pre-configured software is a kind of 'generative tape recorder', which doesn't 'play back' sound, but the rules for its production as preformed material.

At the same time and first of all laptops are, contrary to their unwieldy and faceless precursors, whose place is under the table, accessories of digital lifestyle, a quality which can be aestheticised and reflected. In the simplest case, it leads to stereotypes of self-presentation, which signal a corresponding scene affiliation. 'There is a stereotype. White, male, skinny/undernourished looking, shaved head, jeans, khaki or similarly dull toned t-shirts. Performing glitch or ambient dub influenced music. It's true' (Delany 2004: 100).

As examples like Florian Hecker show, not only t-shirts but also outdoor fashion goes perfectly well with the powerbook (Figure 5). The laptop's character of a gadget becomes aesthetically productive once it impacts on the strategies and objects of sound production. This can be observed most clearly in the extreme position of Japanese artists⁷ who deal with sound just like they deal with all the other media content of the multi-media machine: as an editable file in the media pool of the stuffed hard-disk. 'Even for laptop performers, the computer constitutes, I think, more than a digital tool with particular characteristics, but a stage attitude: an exclusive mini-box worn like a fashionable clip. The computer is a sound layout machine – a fashion object' (Loubet 2000: 31).

In the special situation of Japan, as Emmanuelle Loubet describes, laptop performance is connected to their common appropriation forms of Western cultural production, the import of art as a product within an undifferentiated field of art, design and fashion, and the reverse import of Japanese art that is successful on



Figure 5. Laptop artist Florian Hecker.

the Western market. The objects of this practice are the components of an imported culture, its strategies are shaped by ahistorical appropriation and contextual indifference: '[...] the world and its complexity are reduced to the surface of a discount cultural supermarket' (Loubet 2000: 19). Here, the Powerbook's bitten apple as a meta-gadget lights the way through the jungle of gadgets of digital culture, through the thicket of fashion objects and pop-cultural archives. All the available media objects such as artistic artefacts, programs and tools can be combined, altered and superimposed regardless of their origins – a digital *cultural jamming* of pop clichés, techno loops, sound logos and so on, inspired by the design of the fashion magazines. This is a practice which, as a medium-specific utilisation of the laptop, transcends the traditions described, and focuses on the information-technologically shaped culture itself, by processing cultural artefacts and technical settings as media gadgets. Concentrating artistic activity towards this meta-level of cultural sediments without historical references and without regard to theoretical discourses also holds a chance for a form of cultural reflection, which was indeed claimed by the Western traditional and theoretical culture of the twentieth century, but seemed to have been lost in the process: the discovery of the societal in the autonomy of aesthetic artefacts that speak for and out of themselves.

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⁷A peculiar characteristic of the Japanese scene is the proportion of active women, which indicates that male obsession with technology and hacker mentality play a much smaller role than in Europe or the USA, where female laptop performers are still few and far between.

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