The Electro-acoustic Music Studio at The Royal Academy of Music, Copenhagen

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I Background.

The electro-acoustic studio at the Royal Danish Academy of Music in Copenhagen was established almost 10 years ago to provide production facilities for the students majoring in musical composition. From the beginning and due to lack of funding, the equipment imposed heavy restrictions on the productions, causing an impact on MIDI-based interactive compositions. However, during the last few years the studio has developed into a modest, but flexible computer music studio.

The studio is situated on the 5th floor of the Royal Academy of Music, close to a video-room and the controlroom for the concert hall. There are plans to fit up neighbouring rooms for computerized editing for the tone-mester-students. All 3 rooms are connected to a 4 channel (Ambisonic) listening room situated in an adjacent building.

II The equipment.

The major production facility is a Macintosh IIfx 201600 computer equipped with Sound Tools II, SampleCell and Protes NUBUS-cards, a Capiybara 33 and a T.C. Electronic TCM400 Digital Audio Mainframe as external devices (connected through AES/EBU) - with a total of 3 GB hard disc space for computer synthesis of sound and a Pinnacle PMD-650 optical storage as back-up.

The main software includes the Sound Designer II, IRCAM Patchwork environment (to be installed during the summer of 1995) Kyma, Csound, SoundHack, Lemur and other commercial and public domain software.

The MIDI-setup includes 2 Yamaha TG77 and 2 Yamaha TX802. The Mac II fx computer is running Apple MIDI Manager and Opcode MIDI System (OMS) concurrently without problems, which allow MIDI communication to and from non-Opcode compatible software, without sacrificing the advantages of OMS and the Opcode Studio 5 MIDI-interface. Software includes MAX, HMXL, Digital Performer, and Galaxy. In addition the studio has two minor MIDI-workstations based on two Macintosh IIfi 12/80 computers.

Recording media consists of 2 Alesis ADAT and 2 Panastic SV-3700 DAT-machines.

A research workstation for computer-assisted learning is planned to be built around a Power Macintosh 8100 (80 MHz) 32/512 computer.

III Educational activities.

Musical composition is offered in a 5-year course divided into 2 (I) + 3 years (II). During the first year the student will receive an obligatory course (30 hours) on electro-acoustic music, its history, aesthetics and methodology. Second year an optional course (30 hours) gives access to work in the studio. After (I) the students have the possibility of choosing a 'classical' composition line, an electro-acoustic line or a mixed line, combining classical acoustic composition and electro-acoustic.
Apart from the composition class (3-5 students with electro-acoustic’s as a main subject) the following other courses are offered:

a. A Studio "drivers license" for instrumentalists at the conservatory, enabling the students to work by themselves in the studio.

b. A course is instrumental/vocal sound and acoustics – an introduction to acoustics and the different physical representations of sound to psychoacoustics and computer modelling of cognitiv = processes.

c. MIDI - a general introduction; the MIDI-specification, basic MIDI-software, sequencing, music notation software, MIDI-file exchange and MAX.

IV The compositional activities.

Studio productions are concentrated around the works of the composition students. More than 35 compositions have been created, covering the following categories:

a. Interactive MIDI - e.g. Hans Peter Stubbe Teglberg: Zonar-project I-IV (1990-92)


c. Tape alone - e.g. Einar Kanding: Composition I. Grass (1993)

d. Tape w.instruments - e.g. Sunleif Rasmussen: Fuglægjönn (1994)

e. Installations - e.g. Jørg Hørsing: Morphoeus-project (1994)

All genres from orchestra with tape, over chamber music and interactive solo-instrument to opera and film/video music are represented. In 1995 about 1 new composition is expected to be completed.

V Research activities.

A compositional toolbox has been developed in the interactive HMLE/ODE/Forth environment. The basic assumption was that it is not possible to produce unified single-algorithmic descriptions of a complex artistic expression. However, during the compositional process a lot of formalized interrelated procedures are needed. An interactive "oracle" was assumed to be a possible approach to meet this situation with flexibility and extendability. "L'oracle d'Eve" provides a Forte-set library and a number of set manipulations, a number of stochastic procedures, spectral functions (e.g. virtual-pitch transients), objects for complex data-structures and interpolations, means for simple music notation, file I/O including Csound sco-files - in total more than 200 functional additions to the HMLE/ODE/Forth environment.

A recent project was initiated to collect information about computer-assisted learning through Internet in order to evaluate experiences and the relevance for Danish musical life.

VI The recent established education as tømmeister.

The education as tømmeister is established and developed as a collaboration between the Royal Danish Academy of Music, DELTA Acoustics and Vibration (ATV) and Danish Pro Audio. The tømmeister - education is of 4 years duration and includes subjects as skills of recording, music-production, acoustic-extraining, sound aesthetics, style- and genre-knowledge and a line of general musical and technical subjects.

More information on the education as tømmeister can be obtained from

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