Transputers in Musical Synthesis

Nick Bailey, Hans Strasburger, Klaus Bickert

Music Department, University of Durham, UK
Institute for Medical Psychology, Munich, Germany
MPI for Extraterrestrial Physics, Garching, Germany

The direct digital synthesis of high quality musical sound signals requires a computational bandwidth of at least 20 MFlops. Consequently, recently introduced personal music workstations rely on DSP chip hardware fitted to a personal computer. An alternative to DSP hardware is to use a network of transputers. This approach is advantageous when existing software is readily parallelized and also offers the possibility of real-time synthesis using more complex algorithms. The CSound music compiler (B. Vercoe, MIT) has been parallelized and ported to the transputer by a group of researchers at the University of Durham, UK (N. Bailey, P. Manning, I. Purvis). CSound uses a file of musical notes together with a file containing algorithmic descriptions of musical instruments for compiling a (digitized) sound signal. The parallelizing is achieved in the note file by assigning simultaneously sounding notes to different transputers. A parallelization advantage could be demonstrated up to at least seven transputers. Further, the FOF singing voice simulation was successfully ported to the transputer. A project currently underway, headed by P. Zinterhof and I. Radauer, aims at interfacing a transputer network to the Atari ST personal computer as part of the Composers' Desktop Project (CDP) workstation and at integrating CSound into this environment (H. Strasburger, K. Bickert, N. Bailey).