Richard Jennings's Music Compiler

The original program has been retyped and is in the file 'music_compiler.edsc'. Although in principle it is possible for the emulator to send output to the computer sound card this cannot be done in a way that is portable across different platforms. We have therefore decided to write the output to a sound file which can be played externally.

In order to make the compiler run a few changes have been made but the strategy has been to keep these to the absolute minimum.

- The 'nn' prefix used in the constants in register 214 is not implemented and 'nn1' is replaced by 2^{20}.

- The masks at p60, p64, p68 and p71 are replaced by the equivalent order pairs because the 'pp' prefix is not implemented.

- In the playing routine the 66 orders, which are simply time delays and perform no other function, are replaced by the special 125 order which constructs the sound samples to be added to the output file.

- The original program either CYCLEs or STOPs at a wait instruction ready for a new data tape. In either case the emulator is unable to close the output file and shut down properly. In the new version the CYCLE option still exists but does nothing useful and the STOP option goes to p23. Here the new 126 order writes the output file and it is followed by stop instruction to stop the emulator.

It is worth stressing that most of the interaction with the hardware is retained. The machine still measures how fast it is running so that the music is played at the correct pitch. In the original this used the frequency of the mains and in the new version the phase of the mains cycle is found from the computer clock. It turns out that on my laptop the speed of the emulator is more-or-less the same as the original, about 3.5 microseconds per microstep. If the emulator runs much more slowly then the pitches of some notes will become inaccurate because the time delays are rounded to integers. The loudspeaker on EDSAC2 was connected to the 32 bit of the address part of the current instruction and the entry in the sound output file is still determined in the same way.

Notes on the preparation of he data tapes and an annotated version of the program are in the file 'How_to_prepare_music_data_tapes.pdf'

The file 'Original_sound.wav' is a recording taken from the actual machine.