<Trump>

The design of this musical robot started with an old trumpet register taken from an early 19th century organ. Nearly all resonators, made of the infamous as well as anachronistic pipe metal (lead / tin) where smashed, rendering plans for restoration idle. The only parts we kept were the reeds and the shalots. The pipes give out in a large exponential horn constructed from stainless steel, and common for all pipes. The concept of this automaton is more or less the exact opposite of what instrument builders in previous centuries always attempted at: homogeneity of timbre over the entire compass of the instrument. Here we on purpose gave each pitch a timbre of its own. Therefore we calculated a series of small conical horns, such that the lowest sounding notes get the smallest cone, going slowly up in size to middle C and from there on down again up to midi note 68 (A). In the higher part of the register, it sounds very much trumpet like, whereas sharpness of tone color increases with decreasing pitch. The exponential horn homogenizes the sound to a certain extend but, more important, guaranteed a loud and very well projected, slightly agressive sound. The notes are switched in the windchest with electrical pallets, solenoid driven. Wind pressure control is possible, although as can be expected from single reedpipes, does not preserve tuning! Maximum wind pressure is 300mm watercolumn and generated by a Laukhuff Ventus-type organ blower driven by a programmable Hitachi motor controller. The entire circuitry for this robot makes use of a single fast PIC controller: a Microchip PIC18F252 - I/SP type. This controller takes care of the midi input parsing, the note on/offs for the latches, Mosfets and solenoids as well as of the PWM for the 3-phase motor controller, via an optoR (LED/LDR combination) coupler.

The circuit is assembled on a single eurocard and includes the 5V dc power supply (500mA) for this board as well as for the note latch boards.. The component specified as OptoR in the schematic is an encapsulated combination of a LDR and a small bulb or LED. For the housing we used the case of a very ancient 27MHz crystal, since this could be made completely lighttight and yet be opened again for possible replacement of the bulb or bright white LED. The use of an LDR here gives us signal integration for free, since these components are inherently very slow reacting devices. The construction further guarantees us complete galvanic separation between PIC board and associated electronics and the 3-phase motor controller. The use of a microcontroller obviously greatly simplifies the schematic and the circuitry required. The ingenuity is now required on the level of the software design for the PIC controller. We confined this task to our collaborator Johannes Taelman.

The power supply, although designed to cope with peak currents of over 7 A at 15V, was very straightforward, using a linear regulator mounted on a large heatsink.

Midi note range: 32- 68. (G#-g'#)