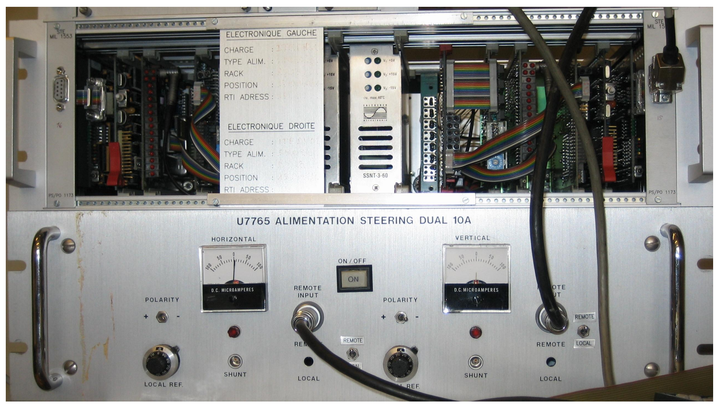
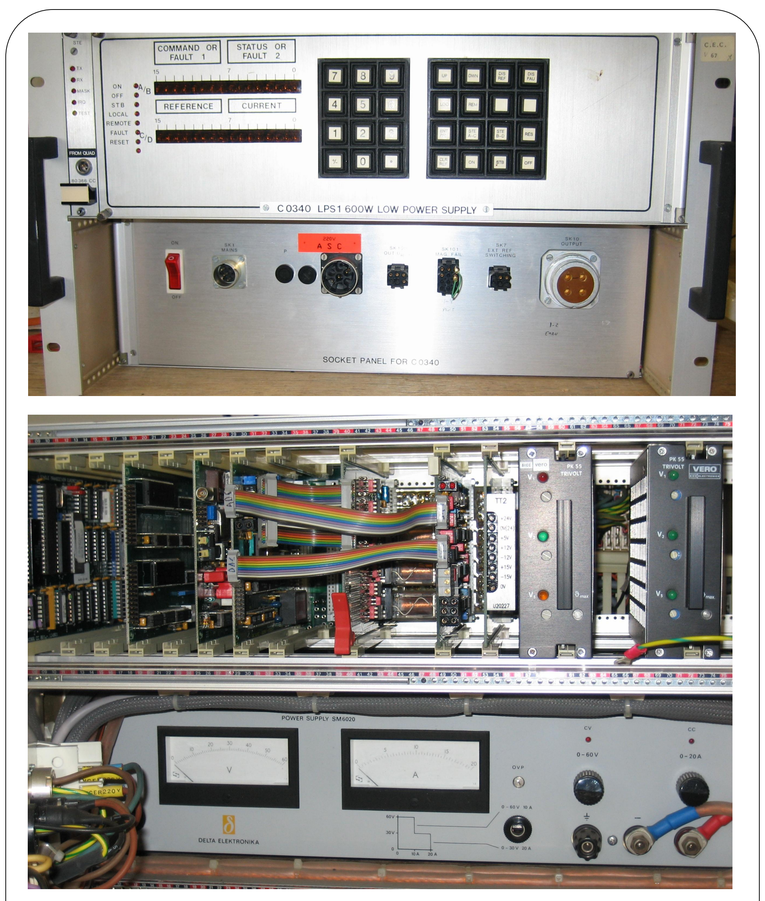
The G-64 Chassis at CERN after 25 years of operation

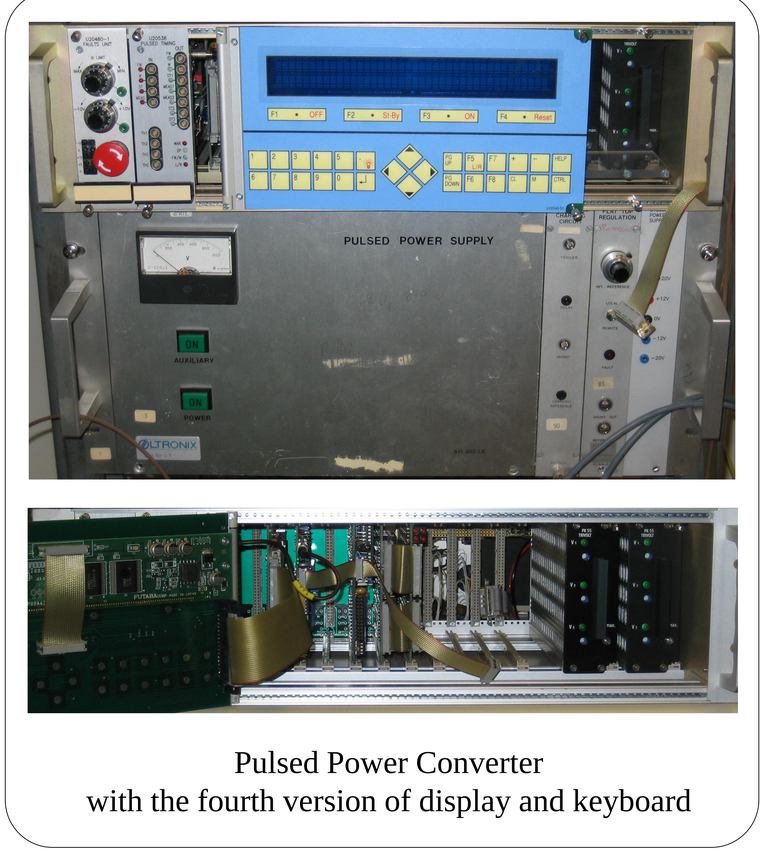
D. Calcoen, CERN



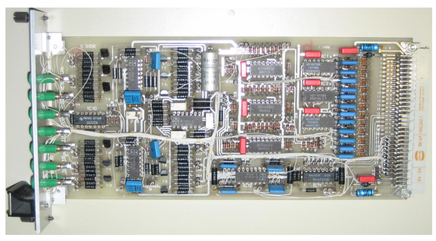
Which decisions taken by the designers in the 1970s allowed this hardware to still operate effectively in 2005, despite the amazing changes we have witnessed in electronics during the past 25 years?



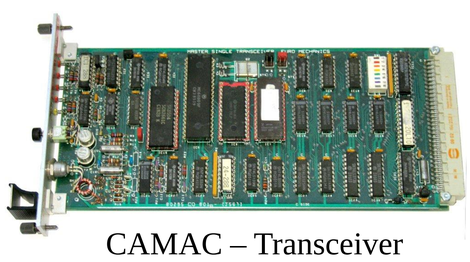
600W Power Converter
with the first version of display and keyboard



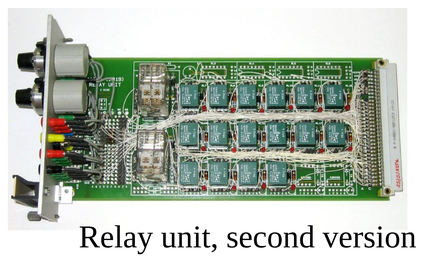
Pulsed Power Converter
with the fourth version of display and keyboard



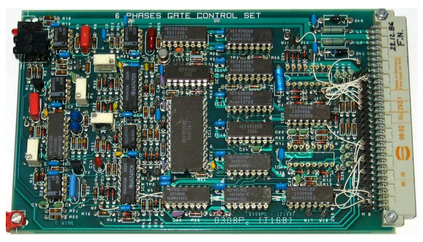
Timing and charge



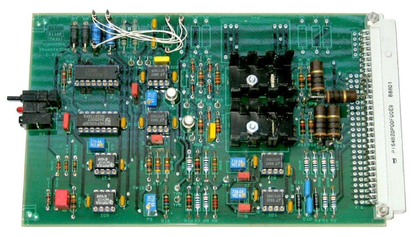
CAMAC – Transceiver



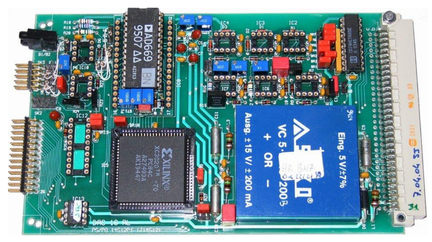
Relay unit, second version



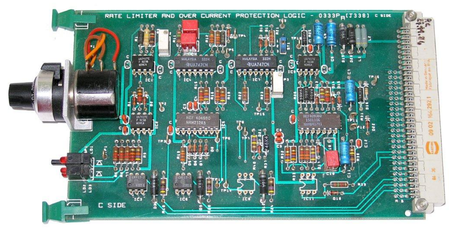
6-phase gate control



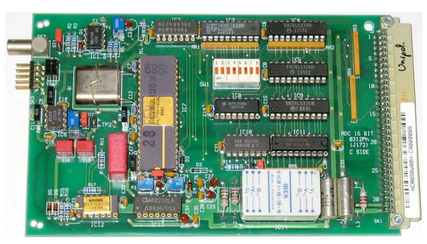
Transistor driver



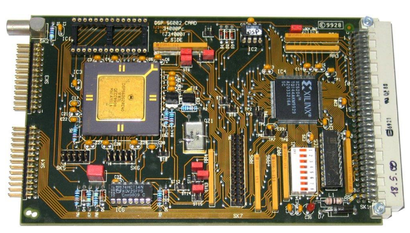
DAC, 12/14 or 16-bit



Rate limiter and over-current protection



16-bit ADC, second version



Digital Regulation with DSP, third version

The key elements include:

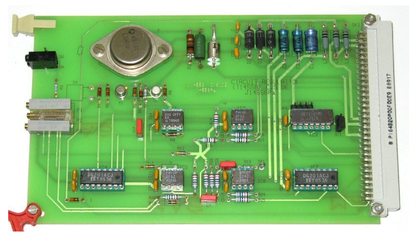
- ✓ Modular approach
- ✓ Reliable connectors
- ✓ Simple design
- ✓ Easy-to-handle card size
- ✓ Mechanical robustness

The solution had to be extremely flexible to provide the required performance enhancements over the years as well as completely new functionalities. Numerous modules had to evolve as components became obsolete, but overall the systems continued to operate.

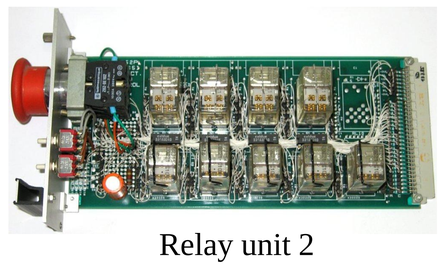
Now as we prepare a new solution to replace the G-64 chassis (hopefully to work for the next 25 years!) we find that in the 21st century it is the software that has become the hardest part of the development. A modern 15-Euro DSP has more computing power than a super-computer from 1980, but software development techniques and tools have not kept up.

Systems must now be built to run standard software and not the other way around.

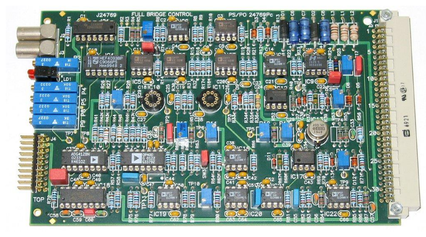
Some of the modules used in G-64 chassis



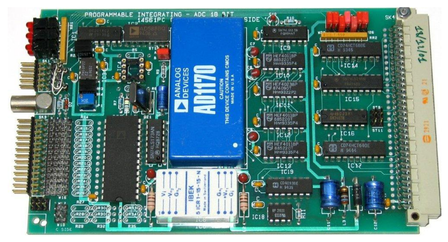
Regulation circuit



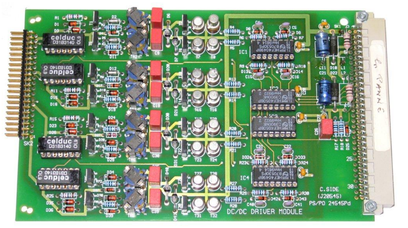
Relay unit 2



Full bridge control

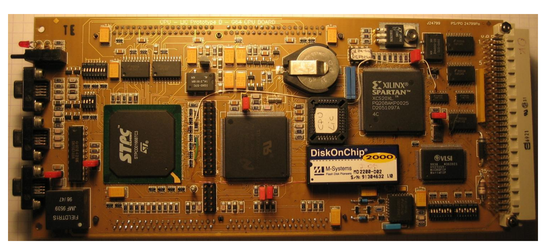


Integrating ADC, 18-bit



DC/DC driver

MC6809 CPU, third version



PC compatible CPU