

The new Master Oscillator for FLASH

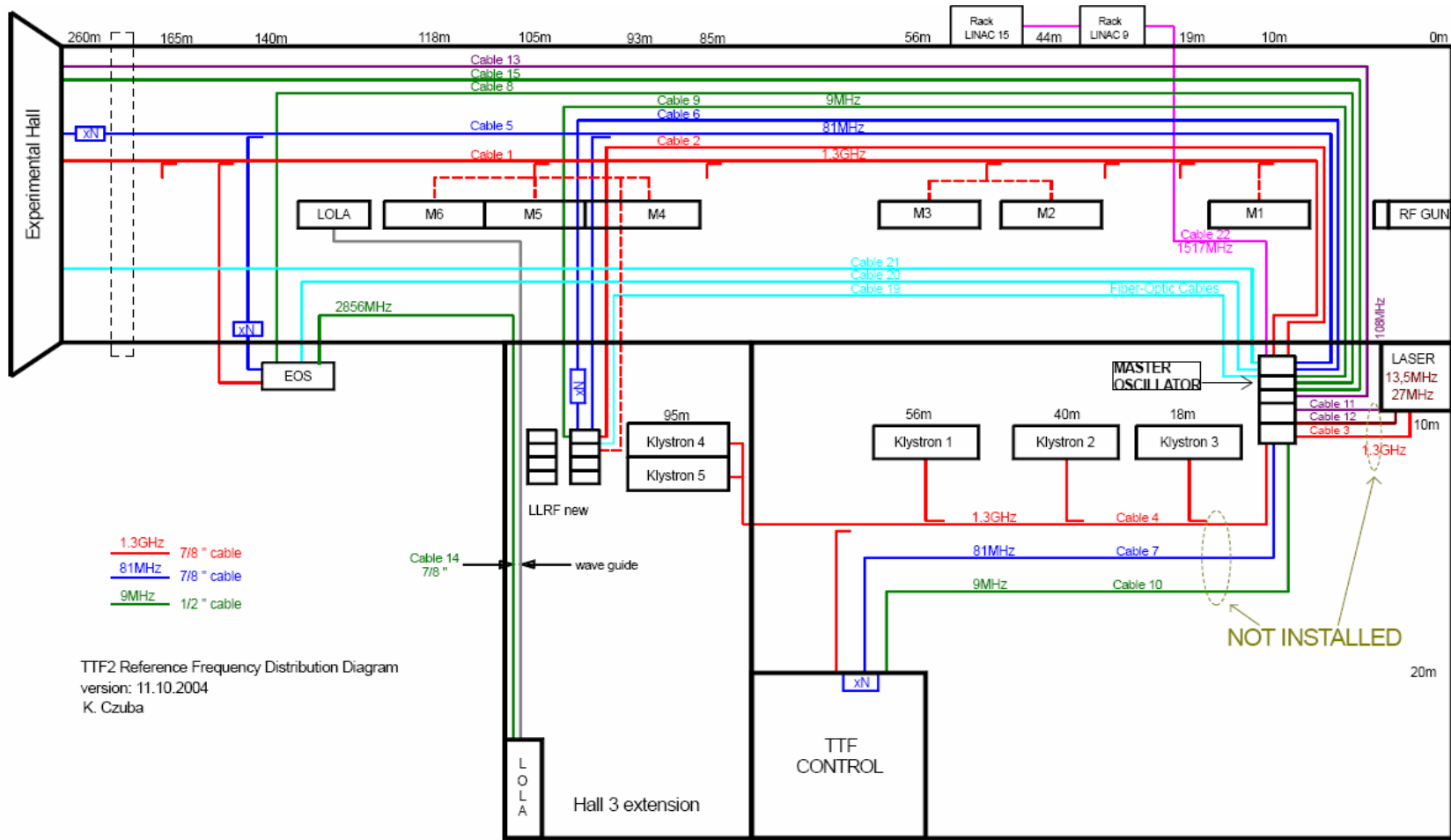
Henning Christof Weddig MHF-p

- Overview
- Crates of the new MO
- Phase noise
- Drifts
- Problems

Requirements for the new M;O

- Required frequencies: *50Hz*, **1 MHz**, **9MHz**, **13.5MHz**, **27MHz**, **81MHz**, **108MHz**, **1.3GHz**, **1.517GHz**, **2.856GHz**
- Required stability:
 - within macropulse (1ms): 0.1ps
 - integrated timing jitter ($\Delta f=1\text{MHz}$): 1ps
 - long term: 1ps (minutes)
 - 2ps (hours)
 - 10ps

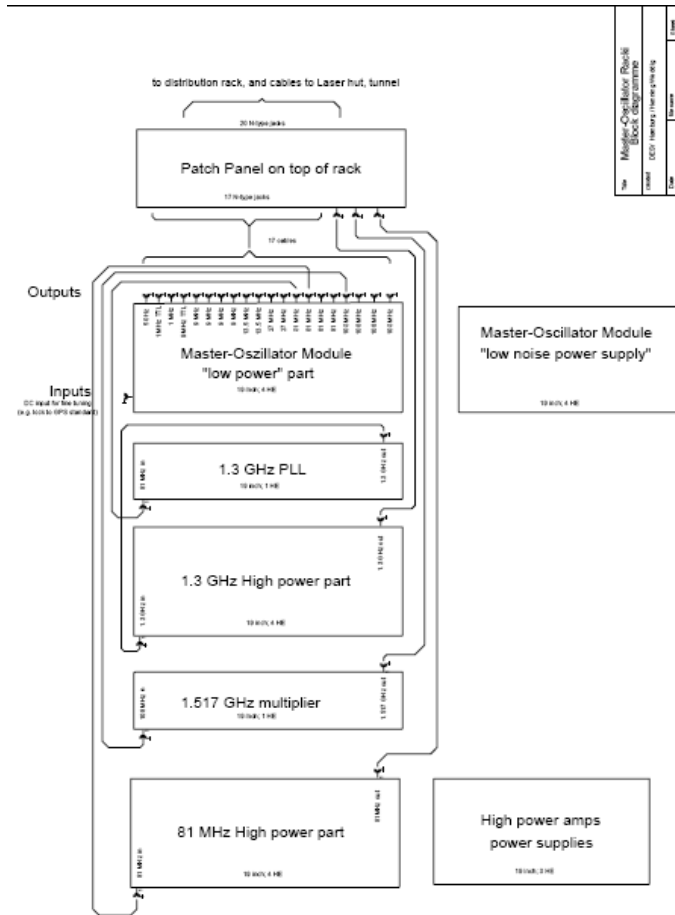
Cable Layout



Crates for the MO Rack

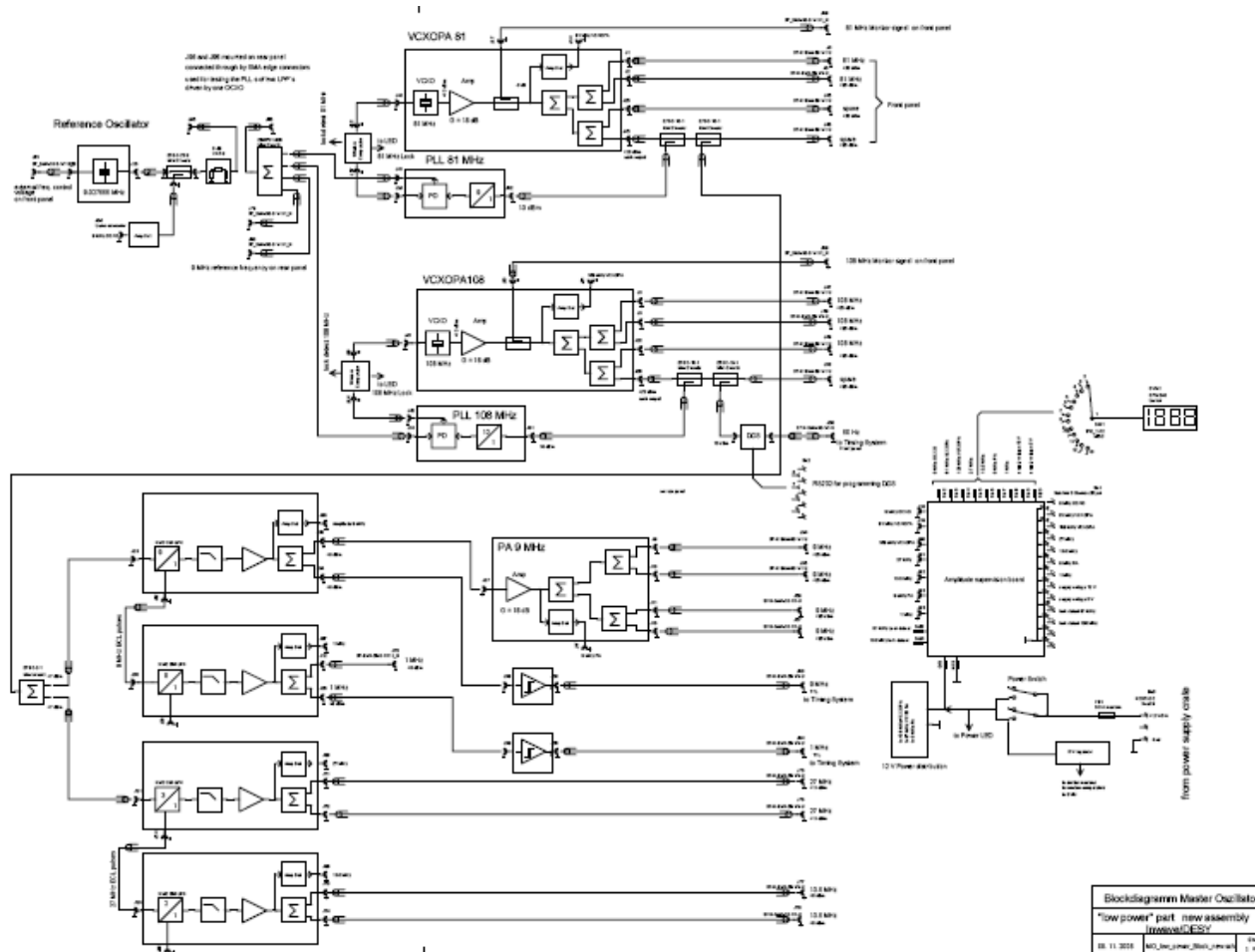
- Low power part (generation of all frequencies for 50 Hz to 108 MHz)
- 81 MHz high power amp
- 1.3 GHz PLL
- 1.3 GHz high power amp
- 81 MHz distribution crate
- 1.3 GHz distribution crate
- 1.517 GHz multiplier
- Battery backed up Power supply for the LPPs
- Power supply for the HPA's
- 3 HE drate with microcontrolers to collect data from the crates and send them to the DOOCs panel
- „LOLA PLL“ will be installed in Hall 3 extension

Layout of one MO rack



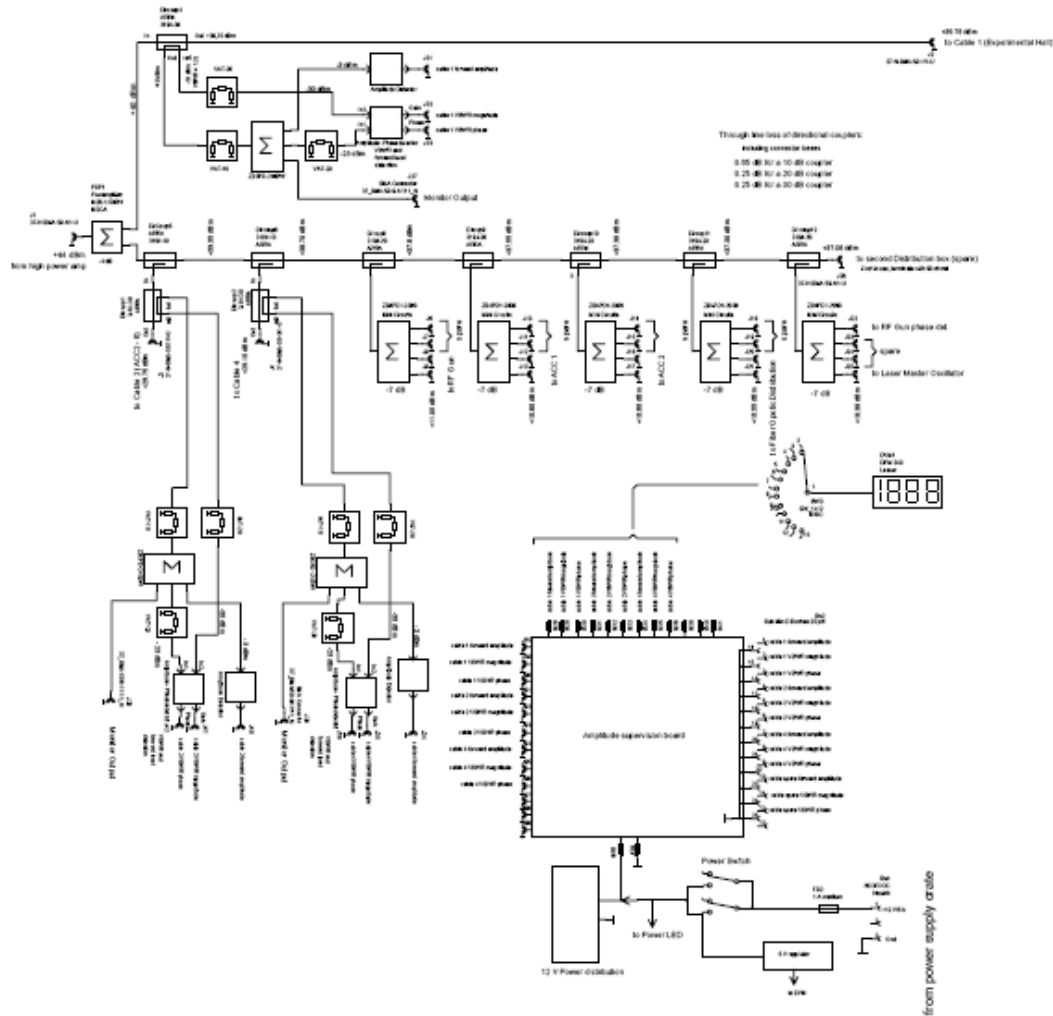
Low power part of the new MO

Block diagramme

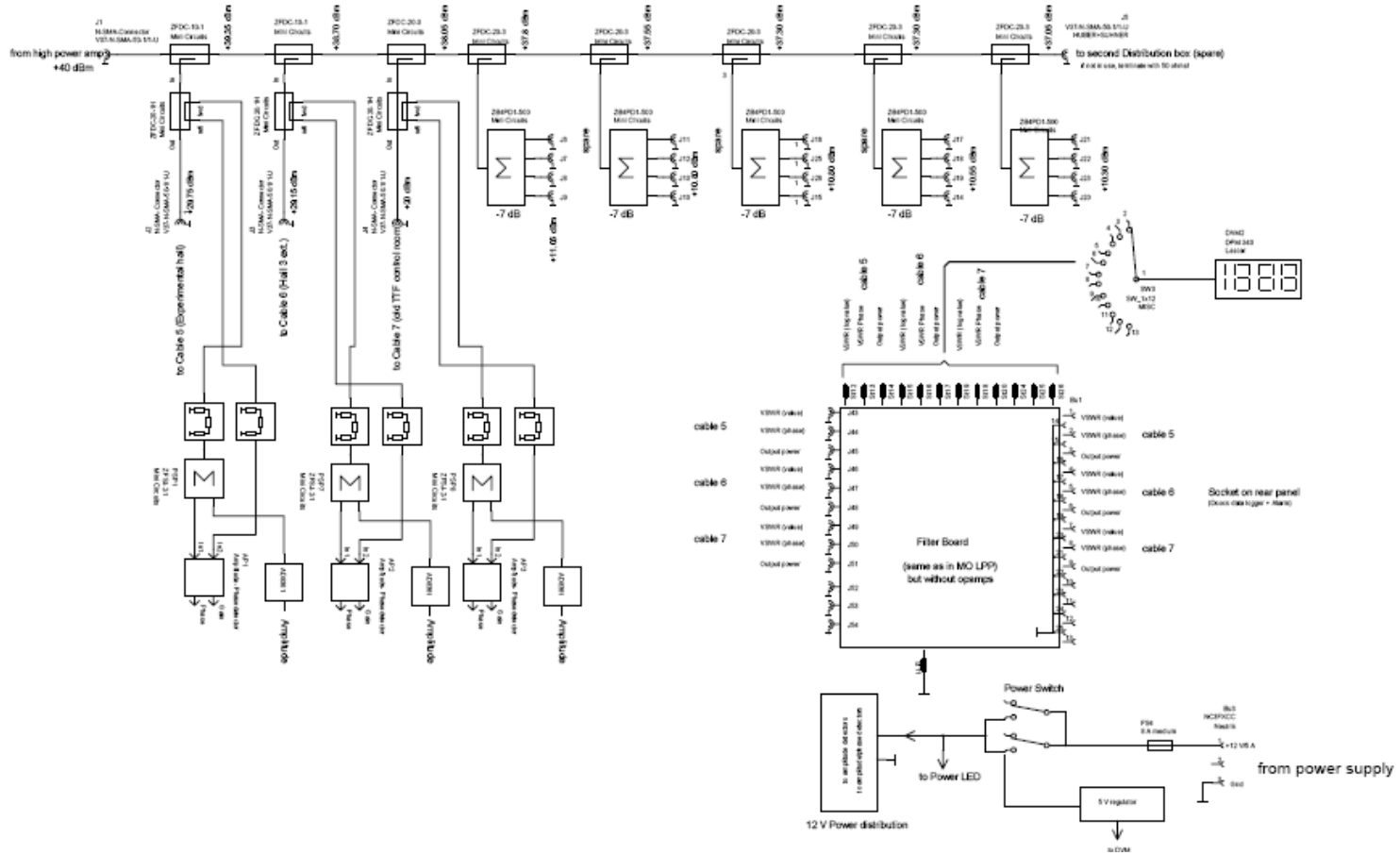


1.3 GHz distribution box

Block diagramme



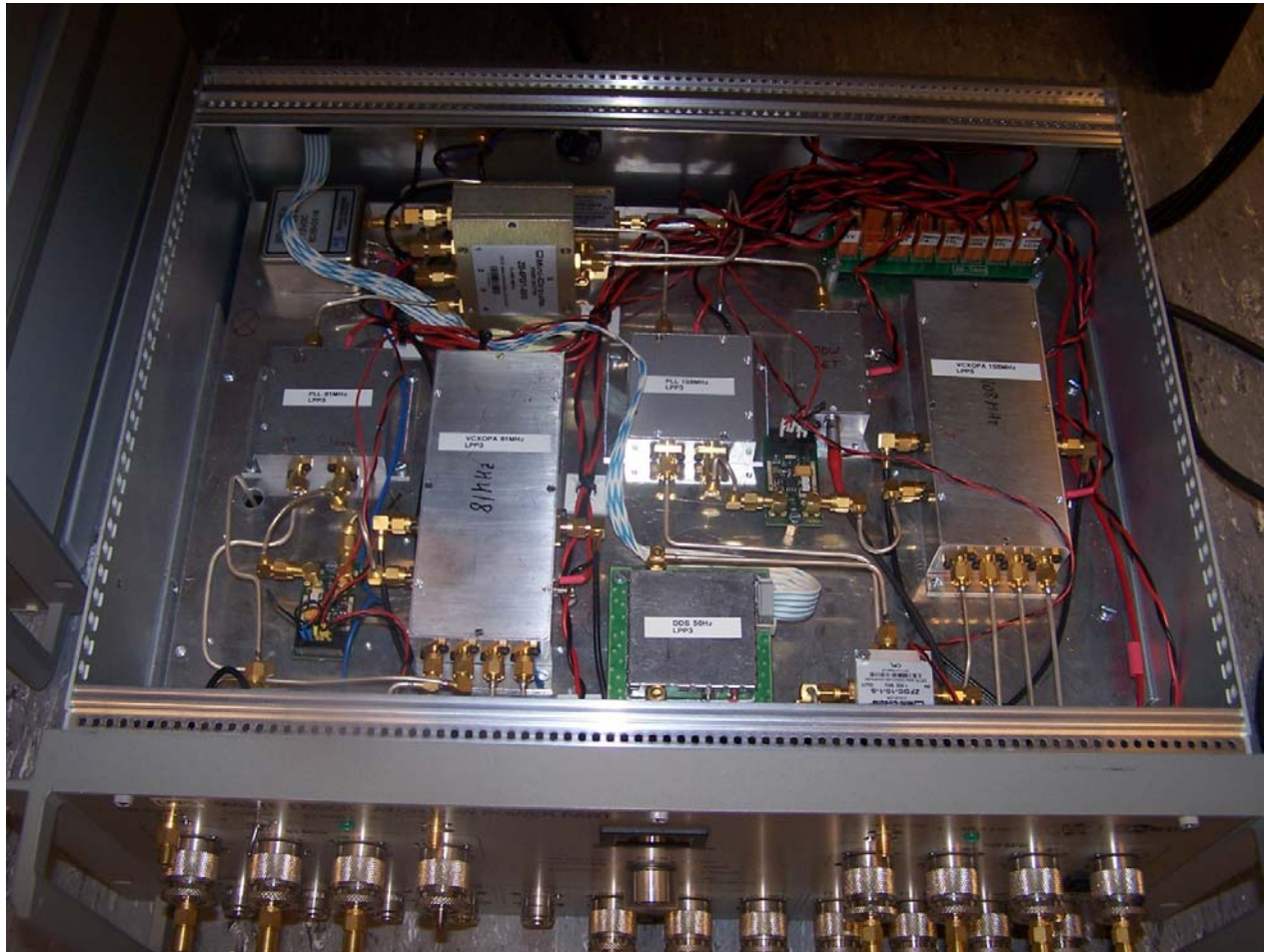
81 MHz distribution crate



Low power part (LPP)



Low power part (LPP) top view



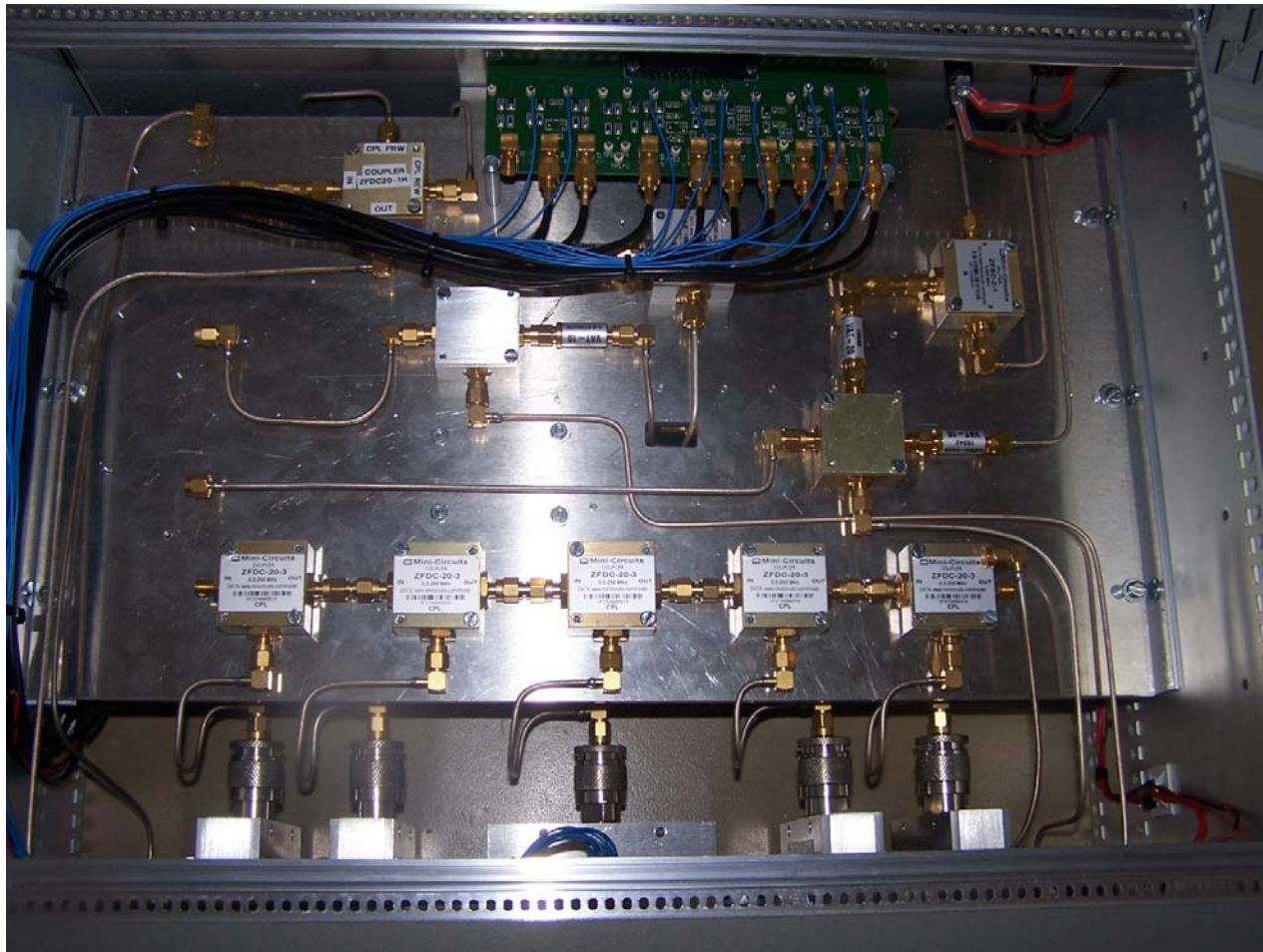
1.3 GHz HPA + LPP Power supply



81 MHz Distribution box



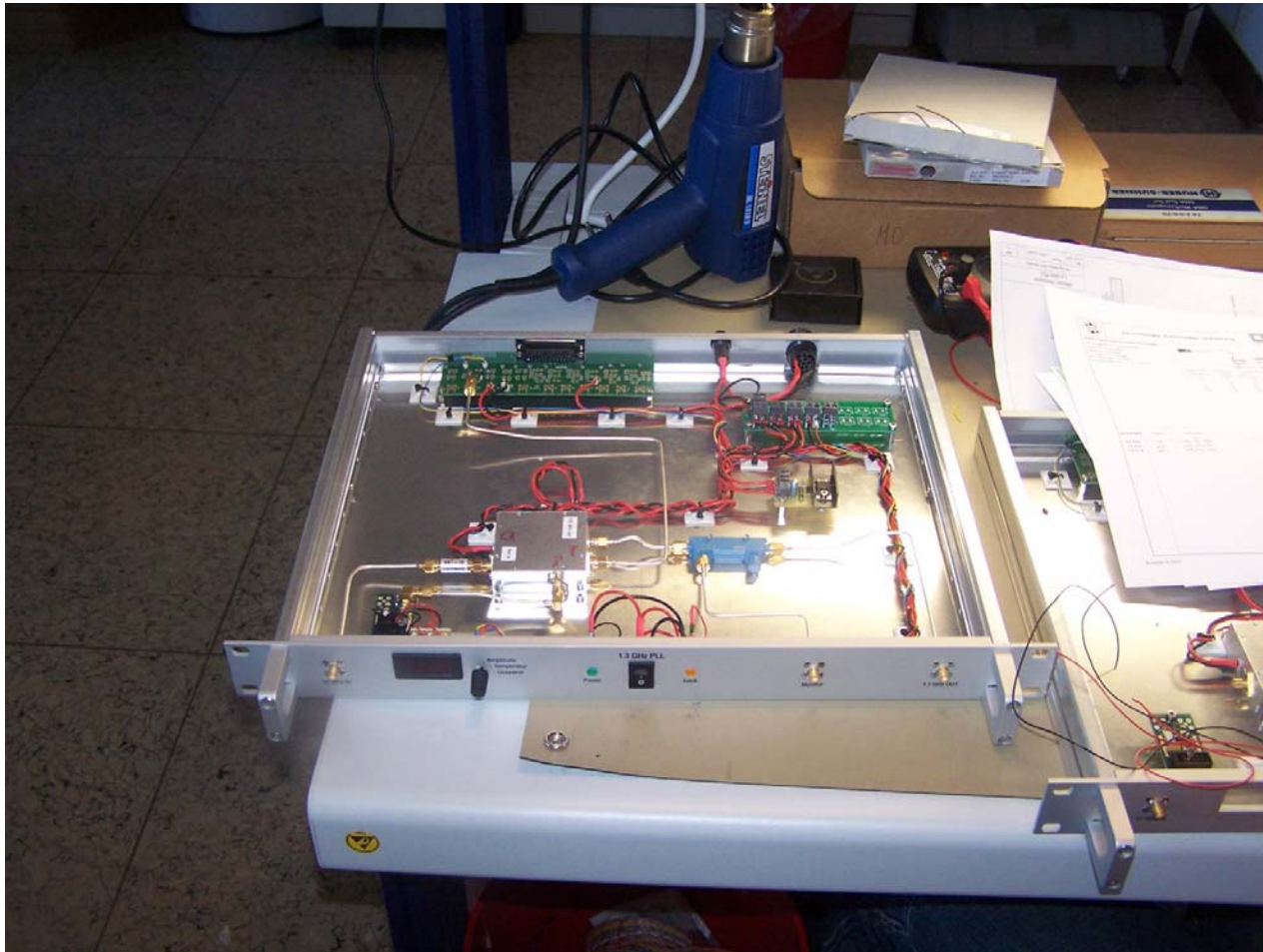
81 MHz Distribution box top view



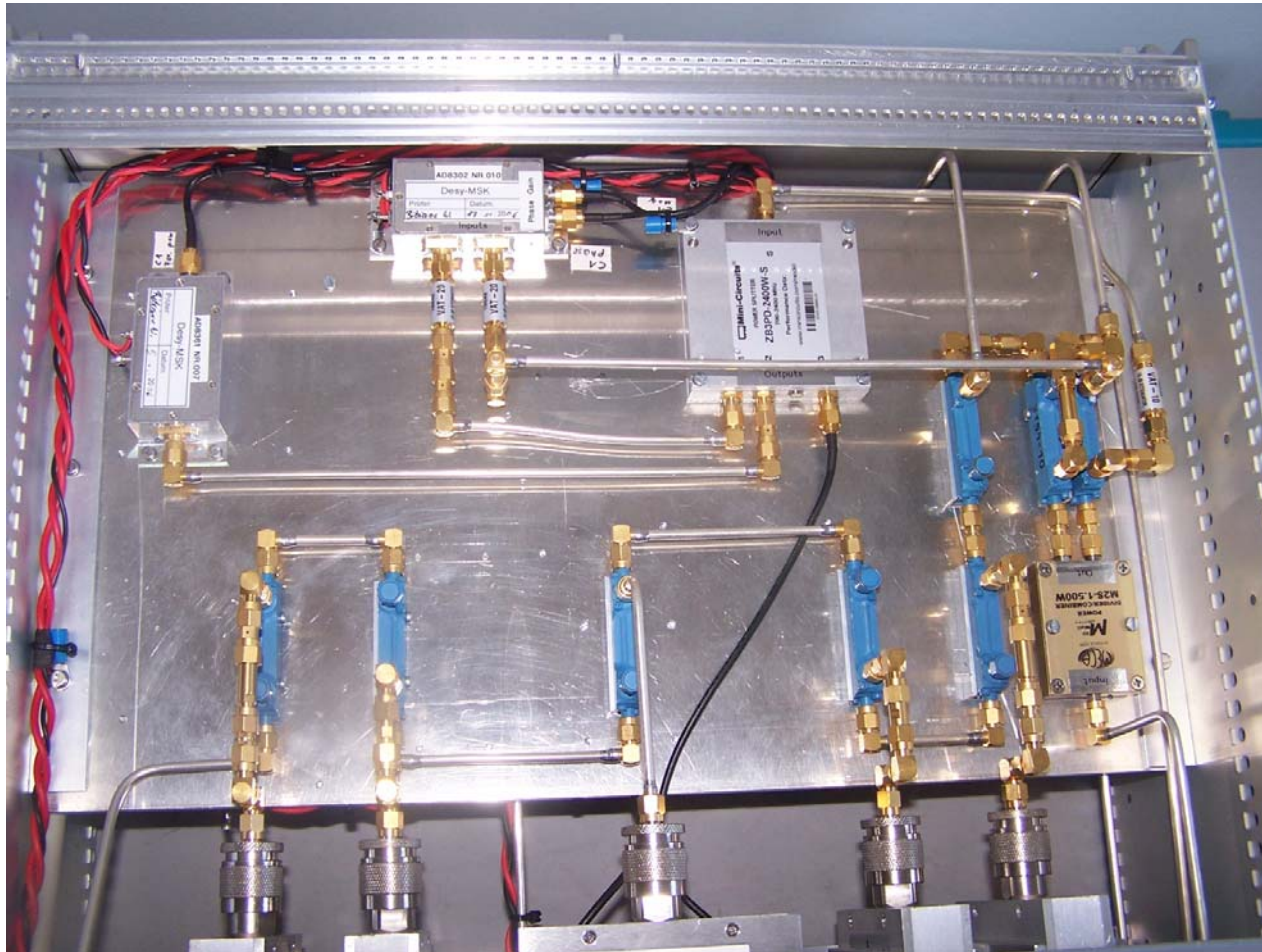
1.3 GHz distribution box



1.3 GHz PLL



1.3 GHz Distribution box bottom view



Problems

- Several mechanical layouts of the LPP had to be done until a servicable and optimal heat dissipating design was found
- Dividers (Hittite HMC394LP4) broke during operation – vendor problem! New chips are ok.
- 81 MHz distribution crate: new directional couplers are ordered, delivery time 10 to 12 weeks (from March on)
- Problem with LPP battery backed up power supply: no UPS functionality given, no modification possible with this design
- UPS form EA has to be checked concerning functionality and performance (EMI?)
- 1.3 GHz PLL has low temperature drift, but phase noise spec. Is not fulfilled.
- For the PSI 1.3 GHz DRO the mating PLL will come soon.
- New semi rigid cables to be manufactured at elspec in June/July
- Rack cabling (company elspec) in June