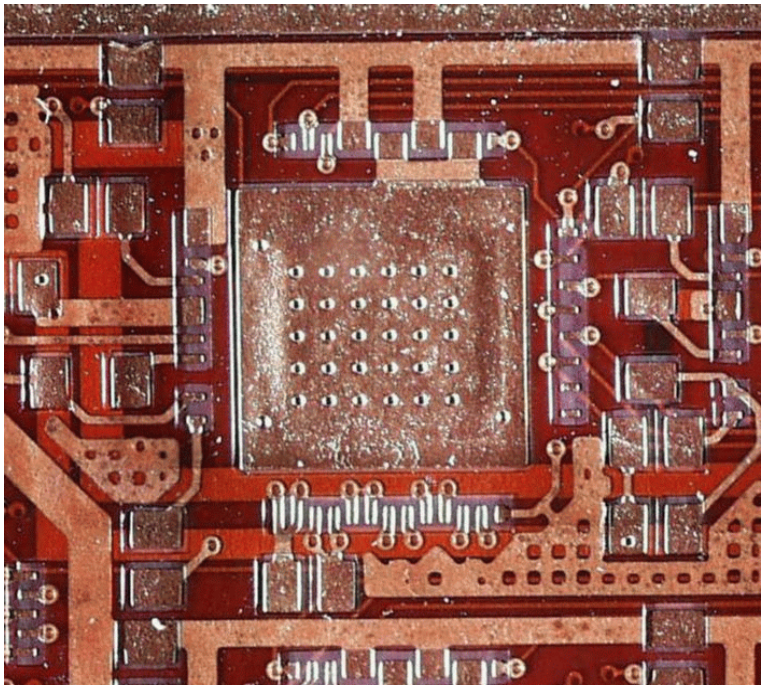
# The status of the Pre−Processor Multi−Chip Module

W. Hinderer, Kirchhoff−Institut für Physik, Universität Heidelberg, Germany

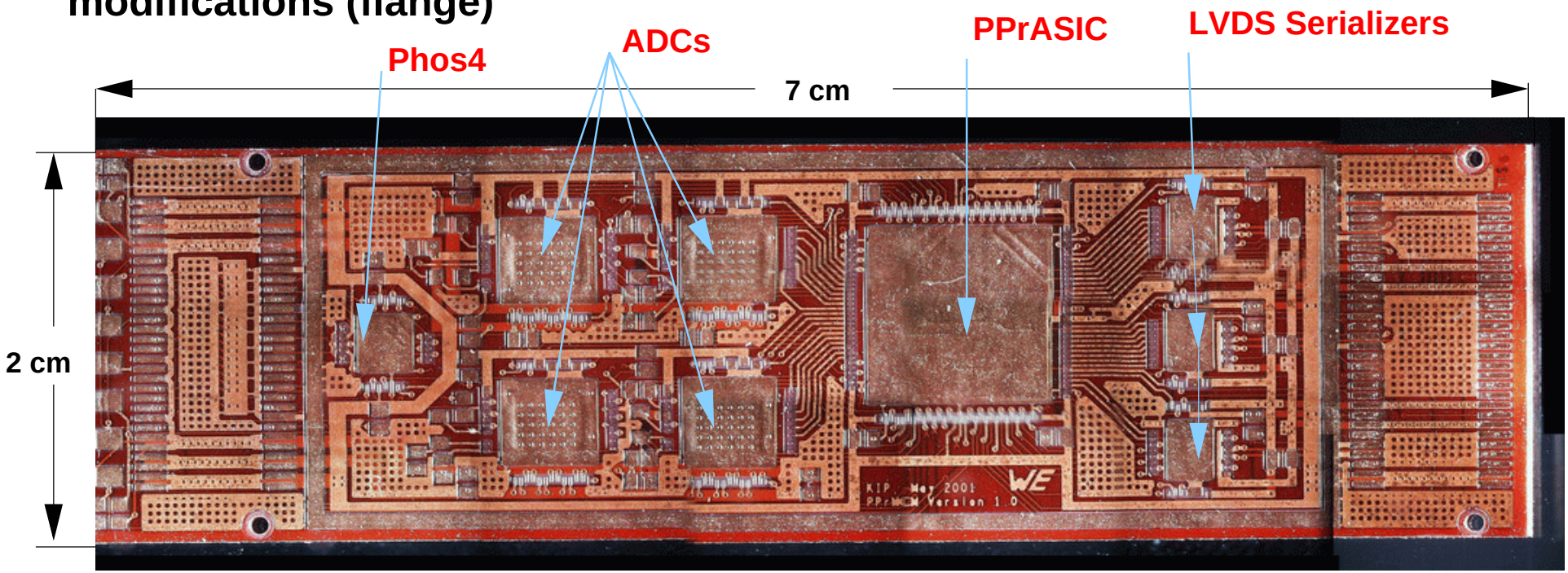
- **status of the MCM**
- **status of the preparation for the MCM−test**
- **introduction to the adapter board**
- **possible ASIC−test**



**detail of the MCM substrate**

# Final Multi−Chip Module

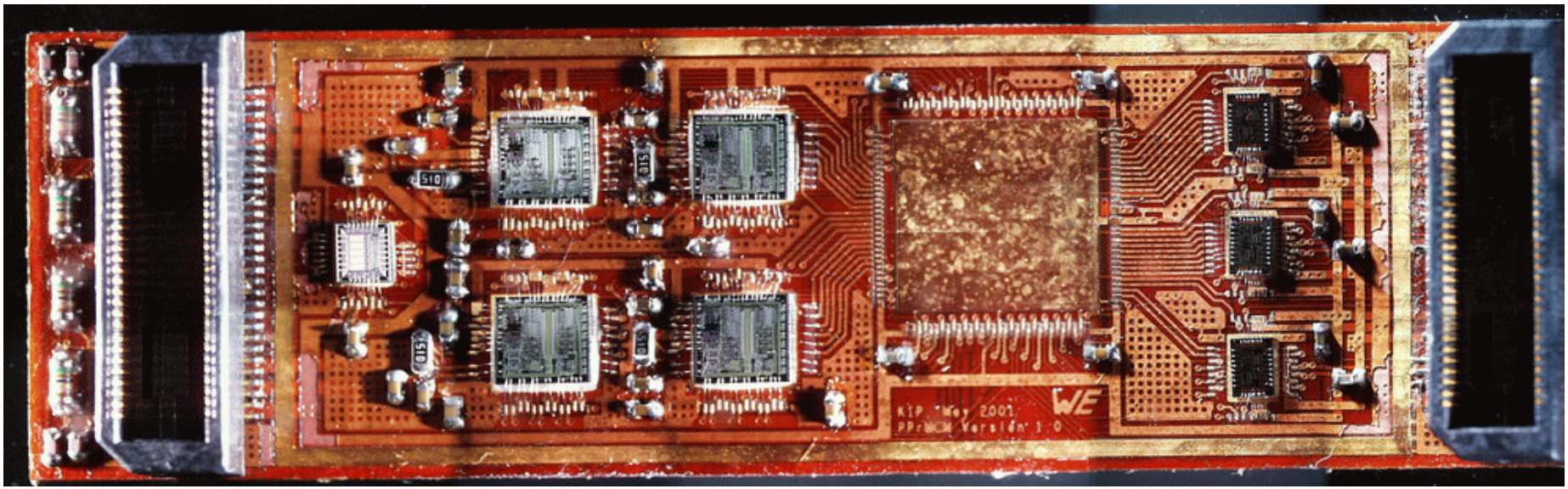
- pre−series of 6 Multi−Chip Modules was manufactured by Würth Elektronik
- 3 Multi−Chip Modules were partly assembled by hand in our ASIC−Lab
- 2 substrates (with components to be mounted) were sent to Hasec for evaluation
- Hasec will do test soldering, bonding shouldn't be a problem
- our mechanical workshop made some lids, Hasec wants to have some modifications (flange)



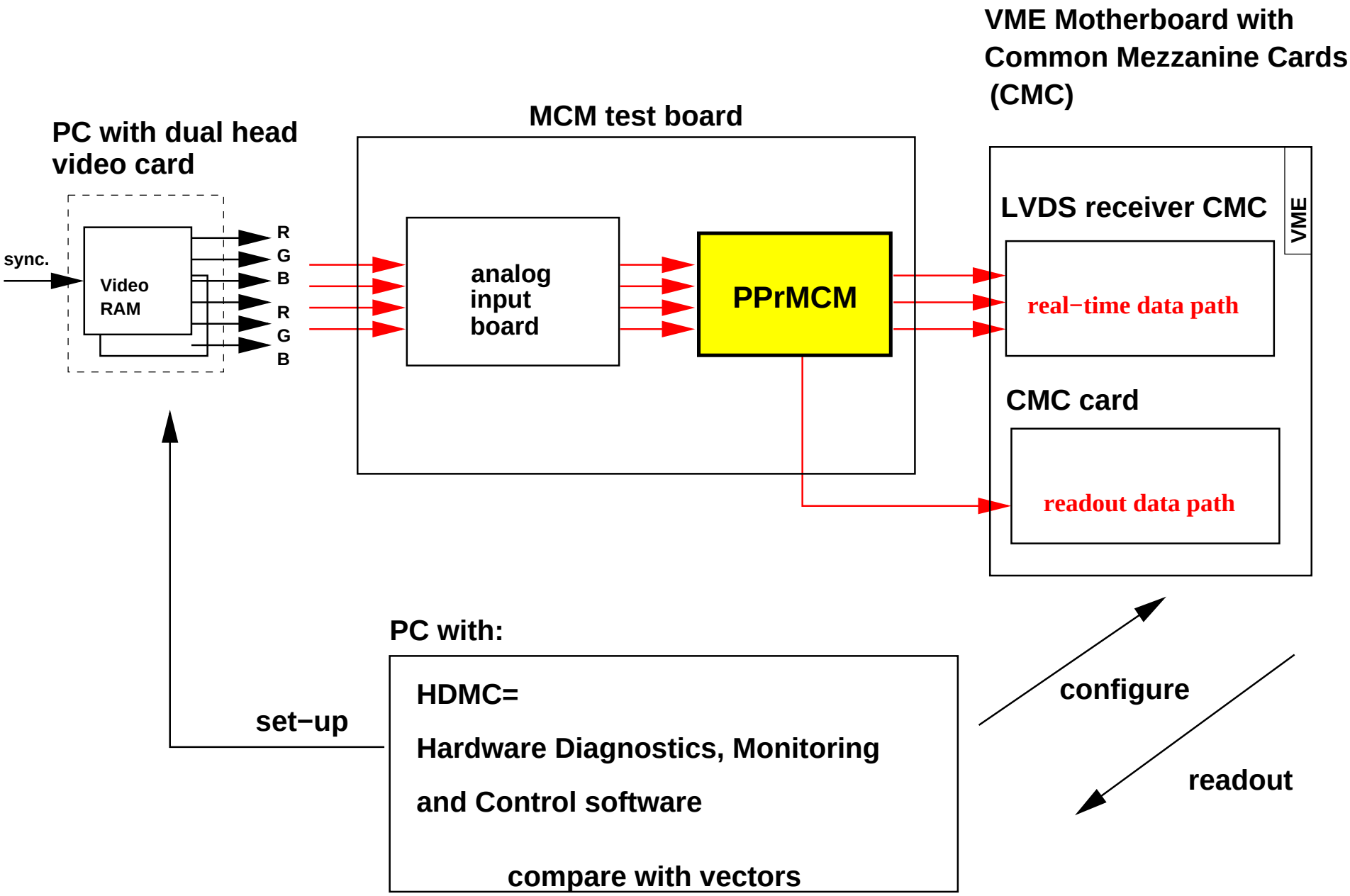
# Final Multi−Chip Module

- DC power test done with all three partly assembled MCMs: currents matched the theoretical values
- one ADC of one MCM had a shortcut, after removing the wire bonds from the defective chip the shortcut was eliminated, defective chip has to be replaced
- footprint of the LVDS Serializer designed for 40−60 MHz operation fits the footprint of the LVDS Serializer currently in use

## Partly Assembled:



# MCM Test Setup



# Status of the test board

**− the circuit design has been finalized**

**− necessary parts have been added to the libraries**

**− started to implement the circuit into the schematic editor "concept"**

**Some features of the test board:**

− a PLL in conjunction with a frequency divider (implemented into a CPLD) in order to generate a 40 MHz clock out of the horizontal frequency from the video card

− separated power for the MCM to be tested and the rest of the board

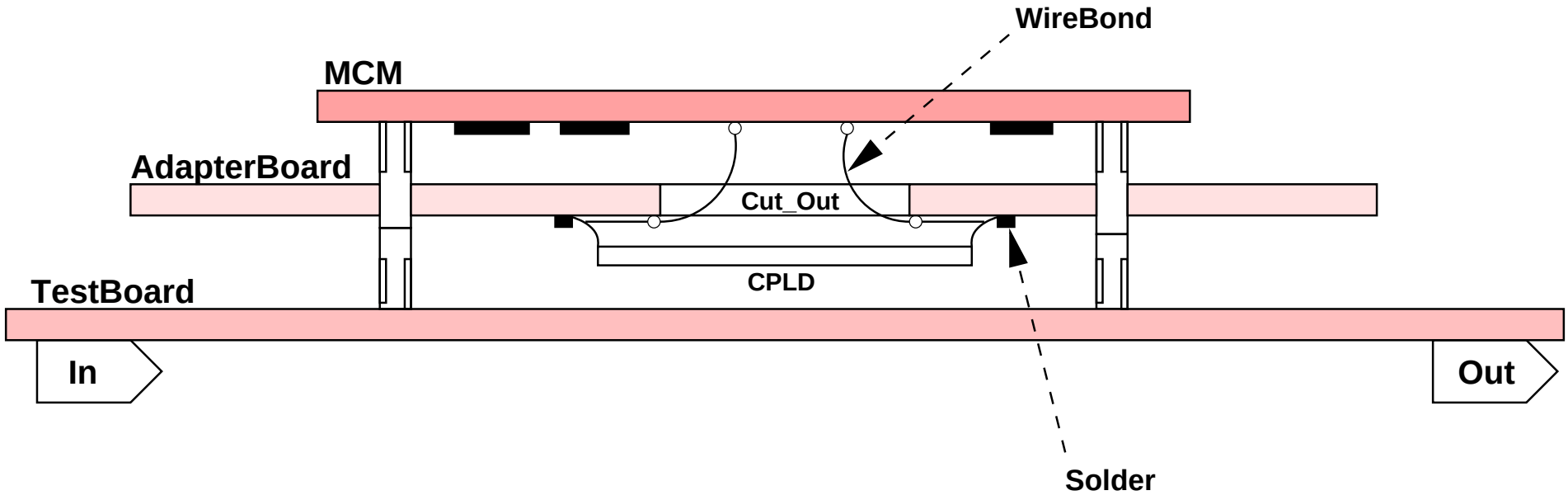
− five voltage regulators, in case of the MCM two voltage regulators with adjustable current limit are used

− the current consumption of the MCM is monitored by ADCs which have a 2−wire serial interface (I2C compatibel)

− the single−line signals coming from the video cards are converted to differential signals by differential line drivers

− all MCM signals leaving or entering the test board are transmitted differentially (differential line drivers / receivers are used)

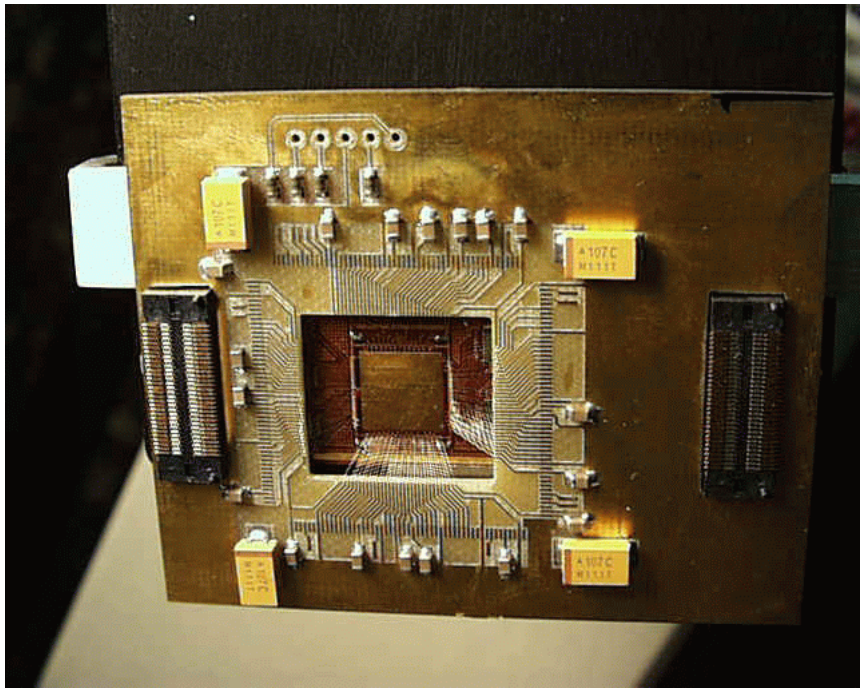
## Test of the MCM without the PPrASIC−Die

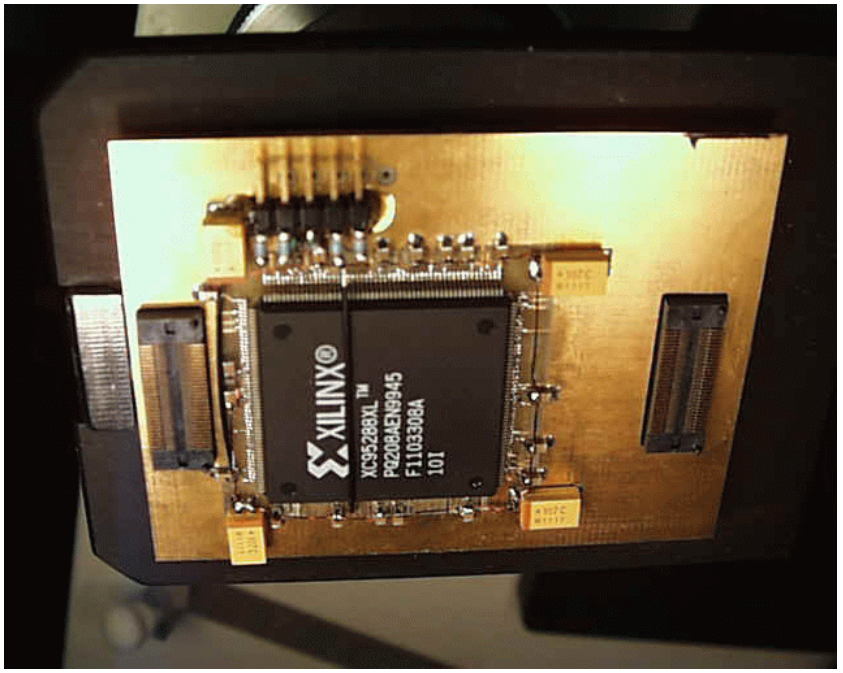


# Adapter Board (1)



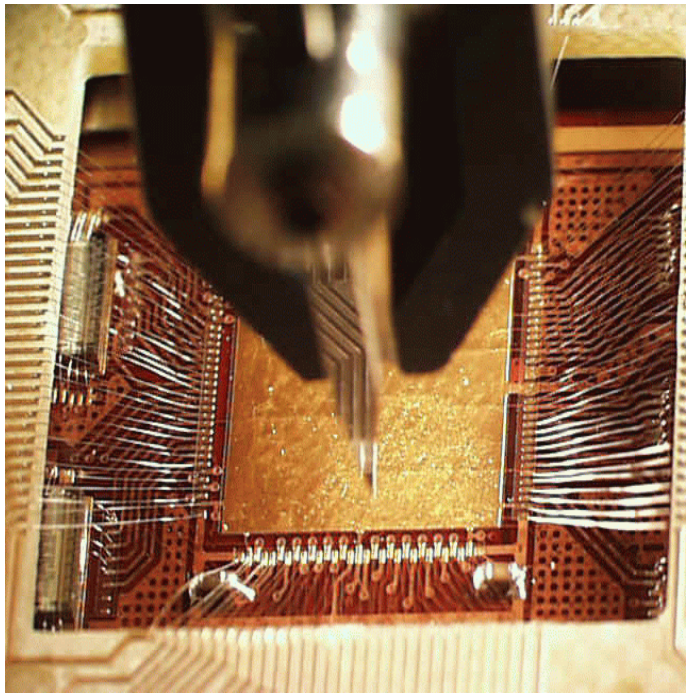
**Test of the MCM without the PPrASIC−Die**

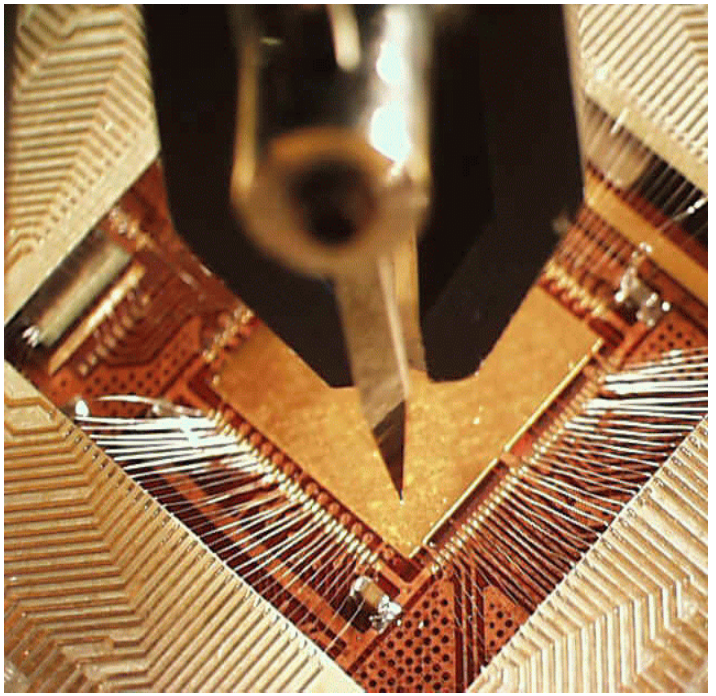




# Adapter Board (2)

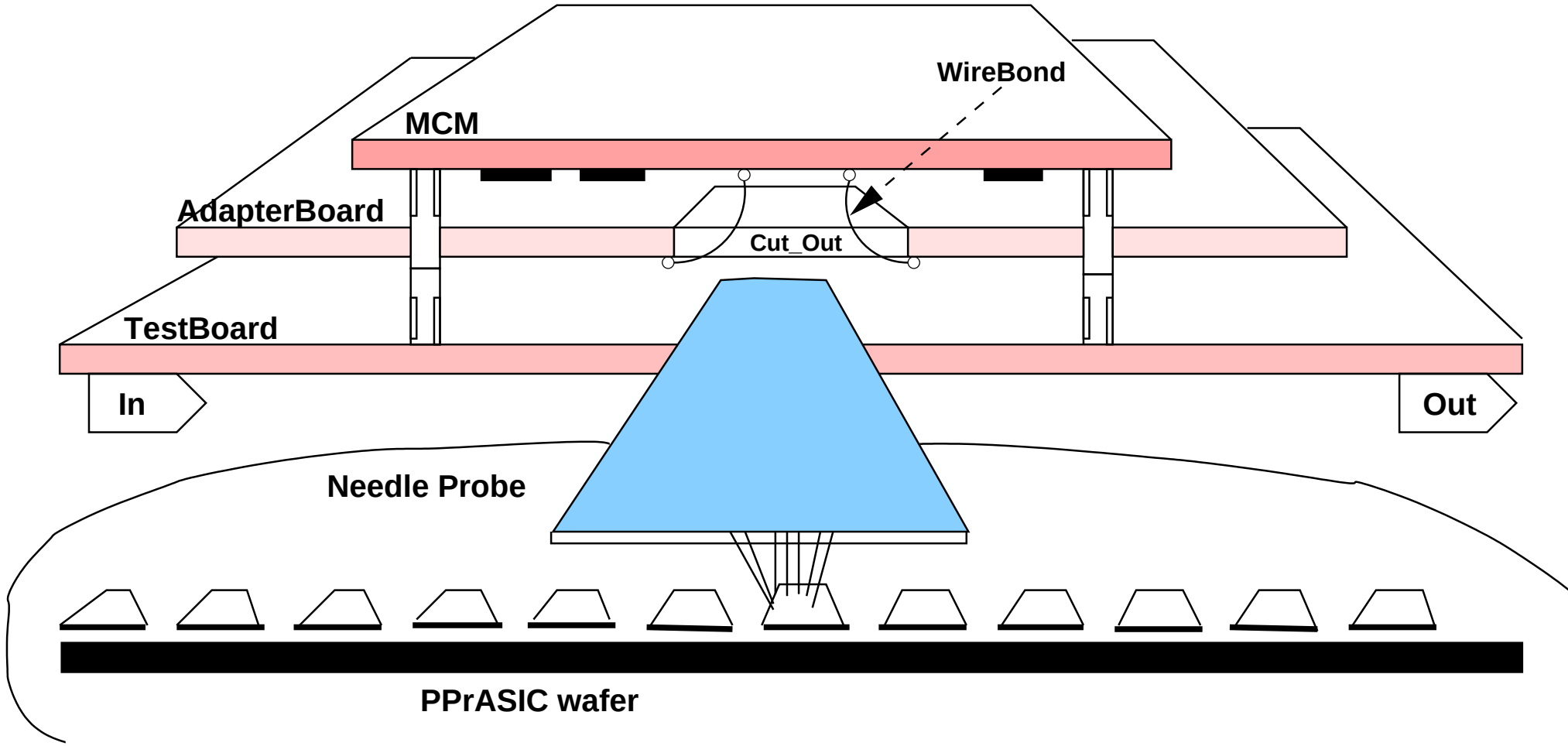
## Test of the MCM without the PPrASIC−Die



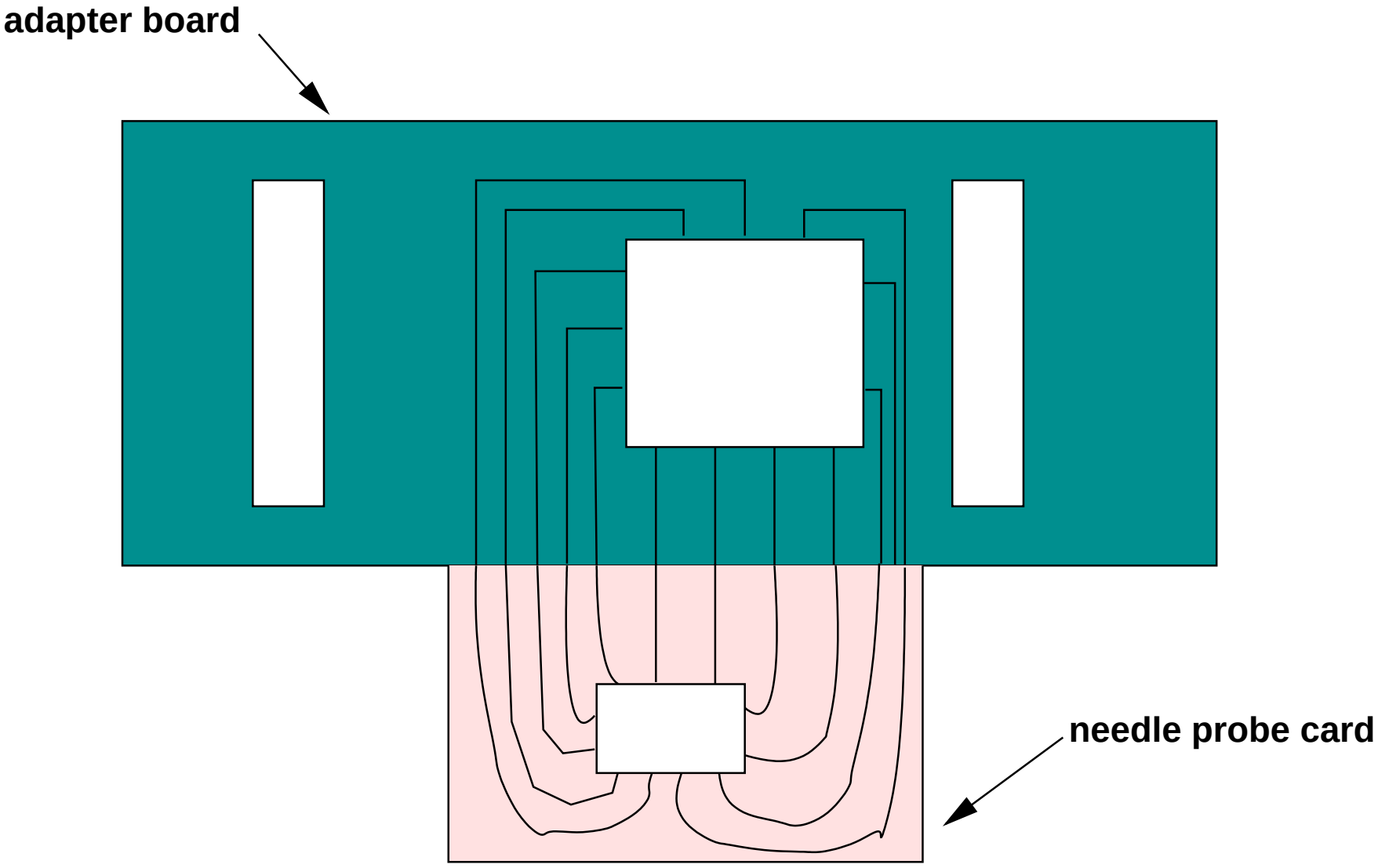


# ASIC−Test (1)

## Possible "functional" wafer−test of PPrASIC−Dies



# ASIC Test (2)



# Summary

- no serious problems for the mass production of the MCMs occurred
- all necessary hardware for the MCM−test is now under construction
- with the help of the adapter board, first MCM tests are possible (with or without the ASIC)
- a functional ASIC test was introduced