Drift Calibration Module (DCM)

LLRF Collaboration Workshop

WUT, Warsaw, 15.12.2011

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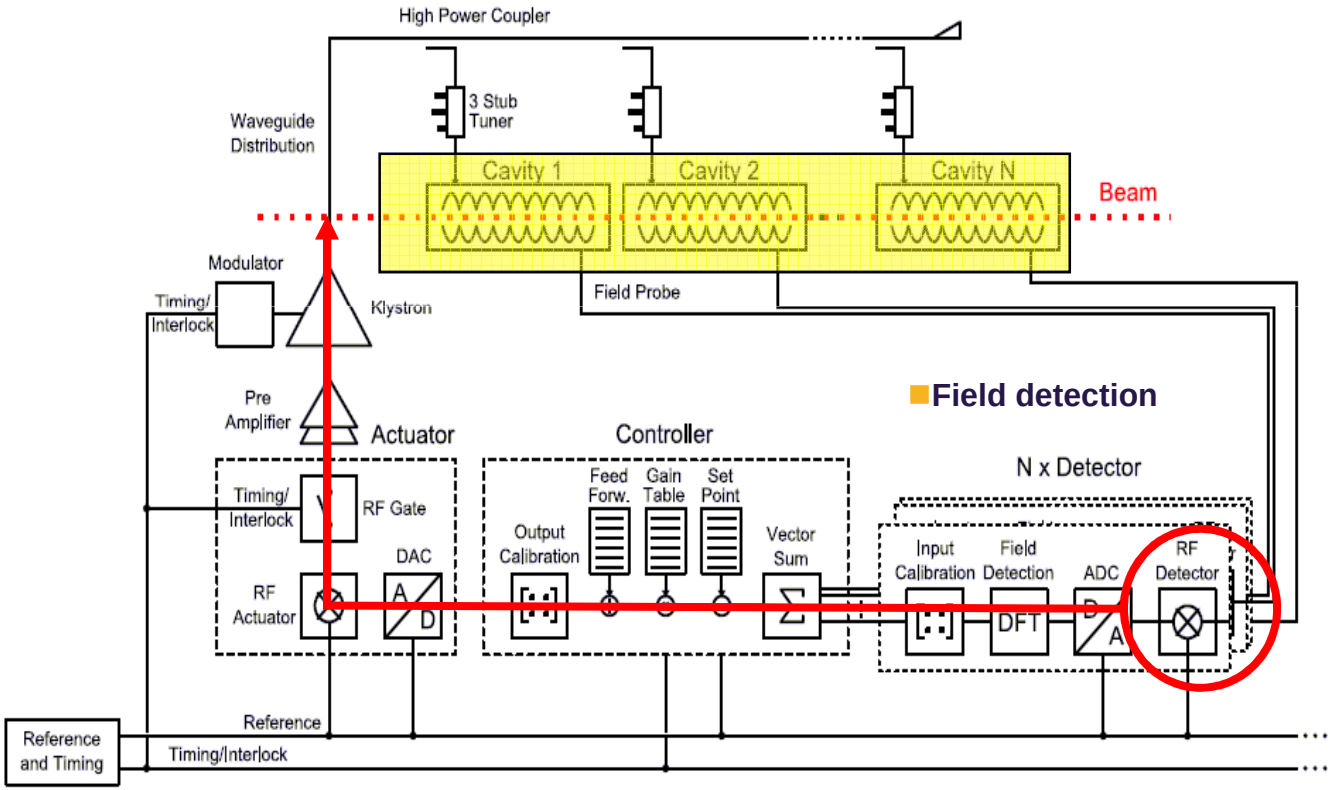
ISE/WUT

Introduction

- Long-term Cavity Field Regulation

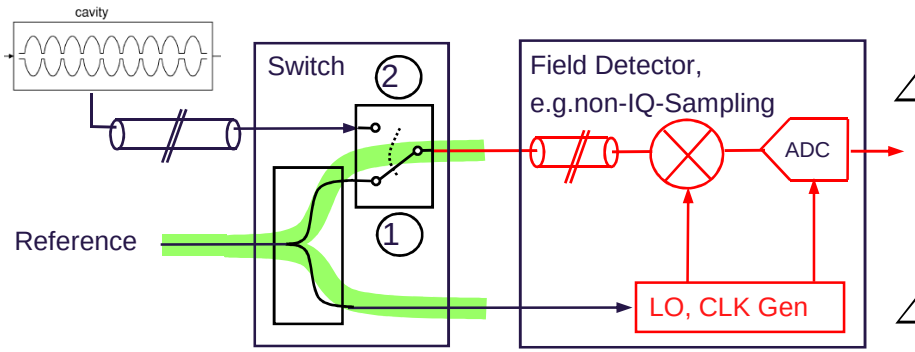


Drifts from Field Detector are amplified and pushed to the beam.

Introduction

Reference Injection

Relative Phase Calibration :



$\Delta\varphi = 0$

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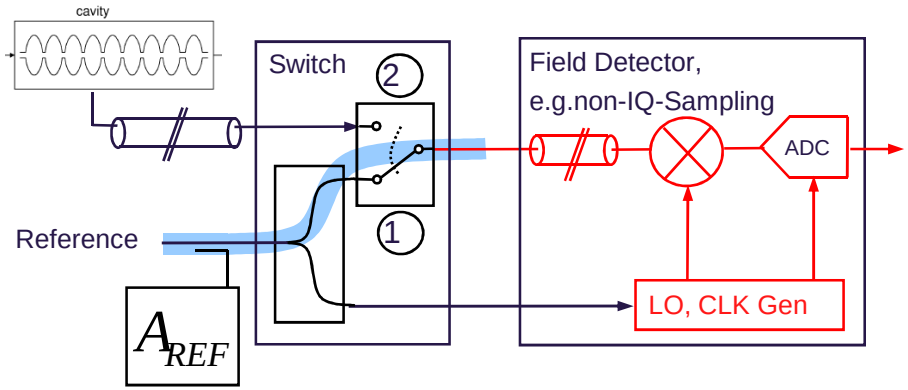
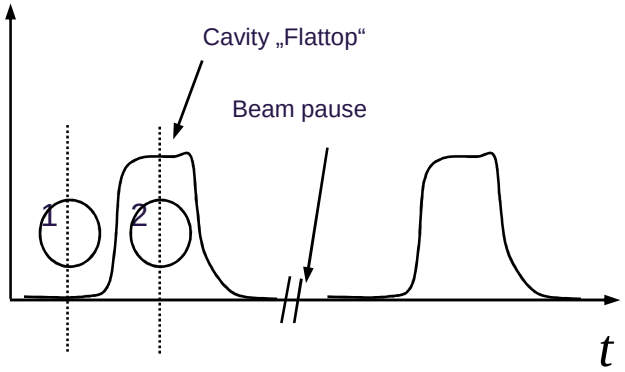
C.Gerth, K.Hacker, M.Hoffmann, W.Jalmuzna, F.Ludwig, G.Möller, P.Morozov, C.Schmidt

Absolute Amplitude Calibration :



A_{REF}

A_{DWC}



It will calibrate also microphonic effects (cables and connectors)

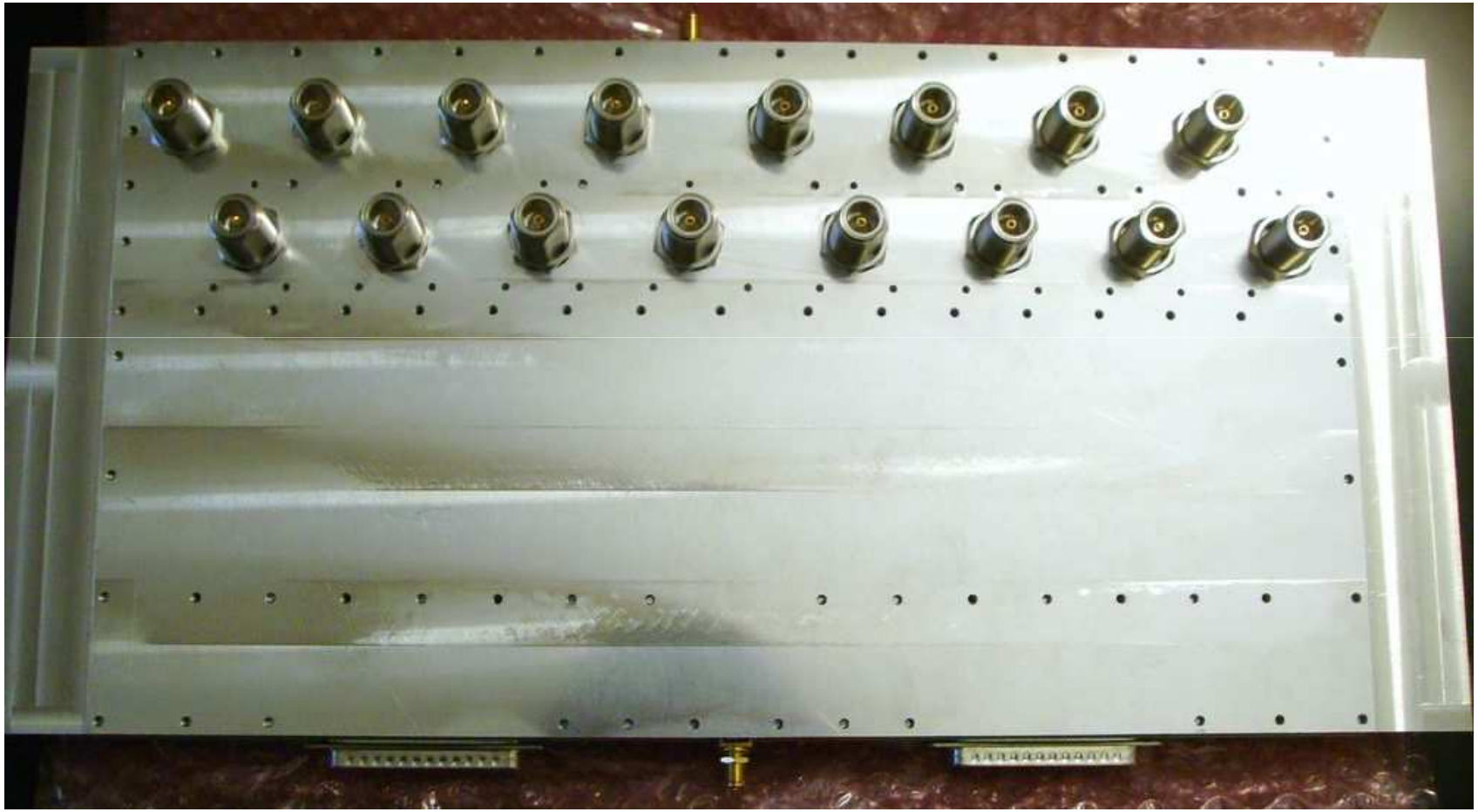
DCM – RF part

- Reference distribution:
  - -3dB power level splitted to LO Generation Module
  - -20dB coupled to Amplitude Detector
  - The rest of REF power splitted to 16 channels (-12dB)
- The channel contains:
  - Tripple switch
  - Digitally controlled attenuator

European XFEL

DCM – RF part

Top view



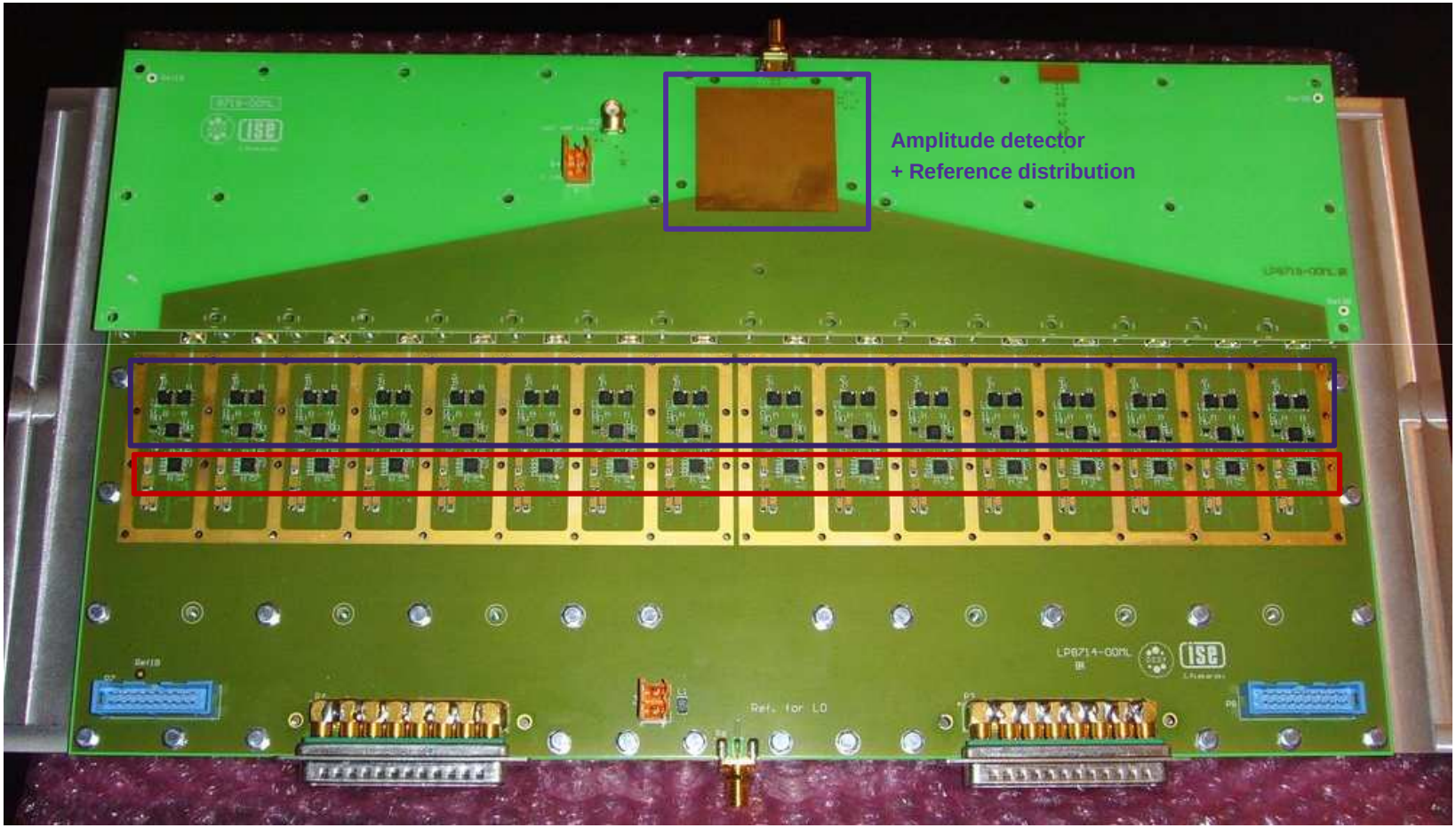
design of the housing – Daniel Kuehn

European XFEL

DCM – RF part

Bottom view

Stable reference

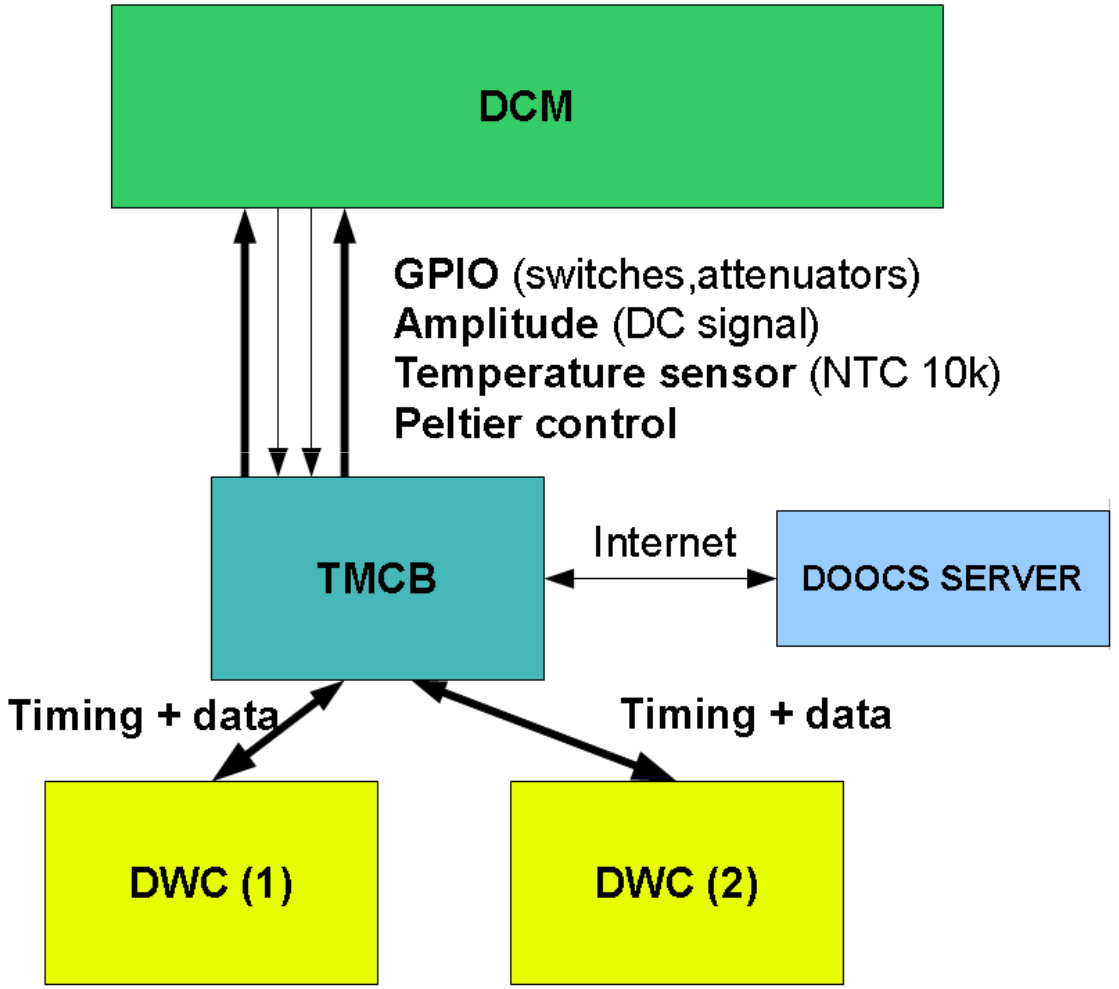


8xFBM to RTM DWC

Ref for LOGM

8xFBM to RTM DWC

DCM – Digital & Analog DC part



DCM – RTM DWC communication

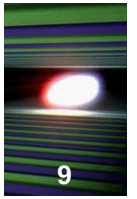
Two solutions are possible:

A) **Timing, Clock, input, output**

B) All signals used for some protocol,

timing decoded from data

TMCB Software for DCM (Bin Yang)



- Done :
  - Manual control of switches and attenuators (Chipscope)
  - Switches are controlled by internal TMCB clock
- In progress:
  - Communication via LAN (via MATLAB)
- Next steps:
  - Communication with SIS8300 via RTM DWC (Bin Yang and T. Jezynski)
  - Phase & amplitude cal. (W. Jałmużna)
  - Communication with DOOCS (Bin Yang)
  - Temperature PID Controller (Bin Yang)

DCM – first RF tests, problems

Bugs

- one pin (switch) should be DC decoupled

(solved – Bart Szczepański)

Problems:

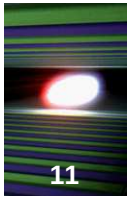
- FBM matching is quite random

  (from -18 dB to -12dB)

concerning also RTM DWC

- ✓ No other problems has been found, but RF tests are still in progress (high number of connectors and DCM states to check)

DCM – to discuss soon



- attenuators on DCM are not needed (they are placed on RTM DWC also)
- Reflectometer
  - we need to know the reflection coefficient of the cavity
  - is it possible to add some module near cavity ?
- CW mode

Thank You For Your Attention