

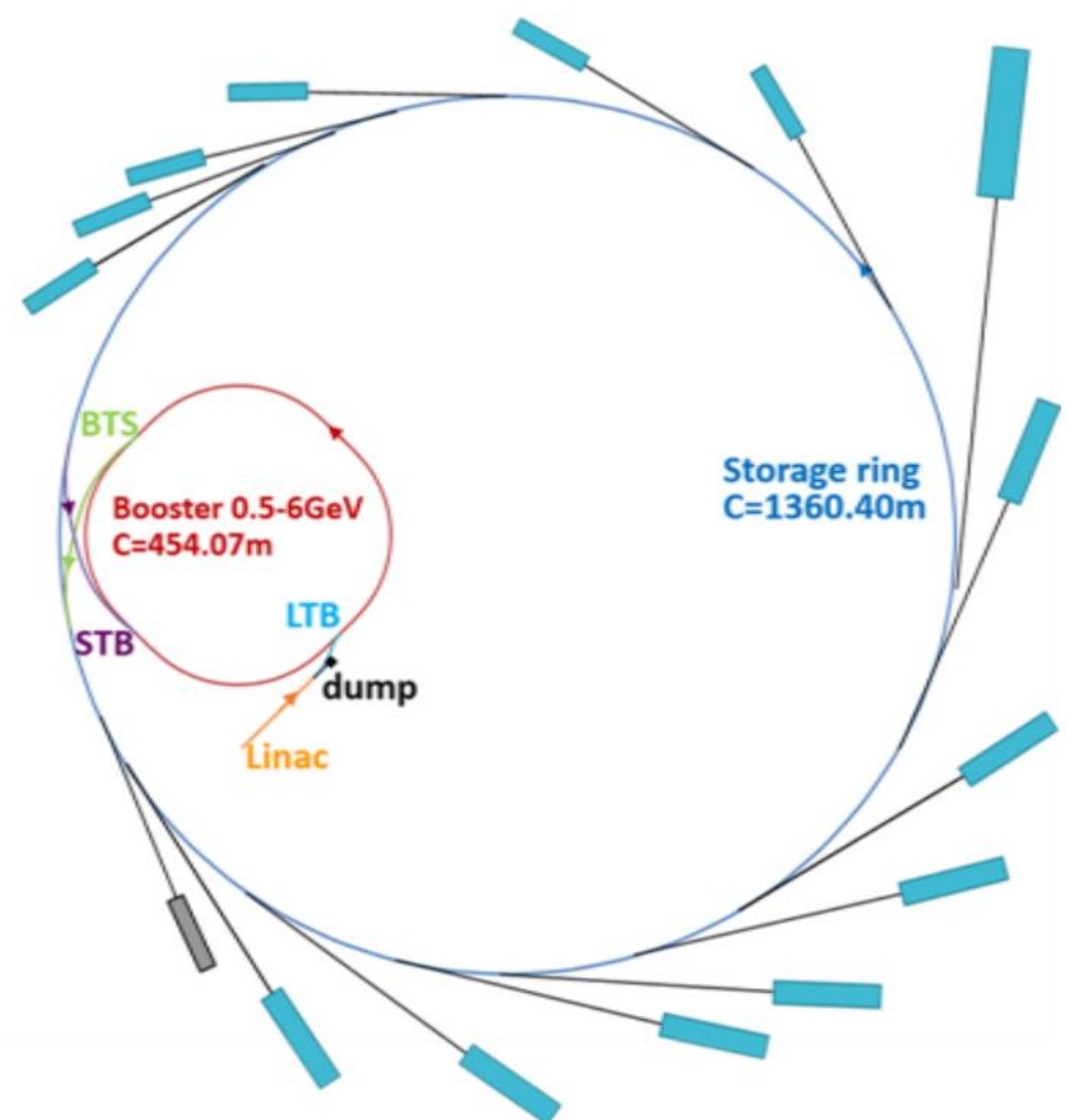
Development of beam position monitor processor for HEPS

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Abstract

High Energy Photon Source (HEPS) is a proposed new generation light source with a beam energy of 6 GeV, high brightness, and ultra-low beam emittance. An RF BPM electronic has been designed at IHEP as part of an R&D program to meet the requirements of both the injection system and storage ring. The RF BPM electronic architecture consists of an Analog Front-End (AFE) board and a Digital Front-End board (DFE) based on a custom platform. In this paper, we present the overall architecture of the RF BPM electronics system and the performance evaluation of the BPM processor, including position resolution and beam current dependence.

Introduction



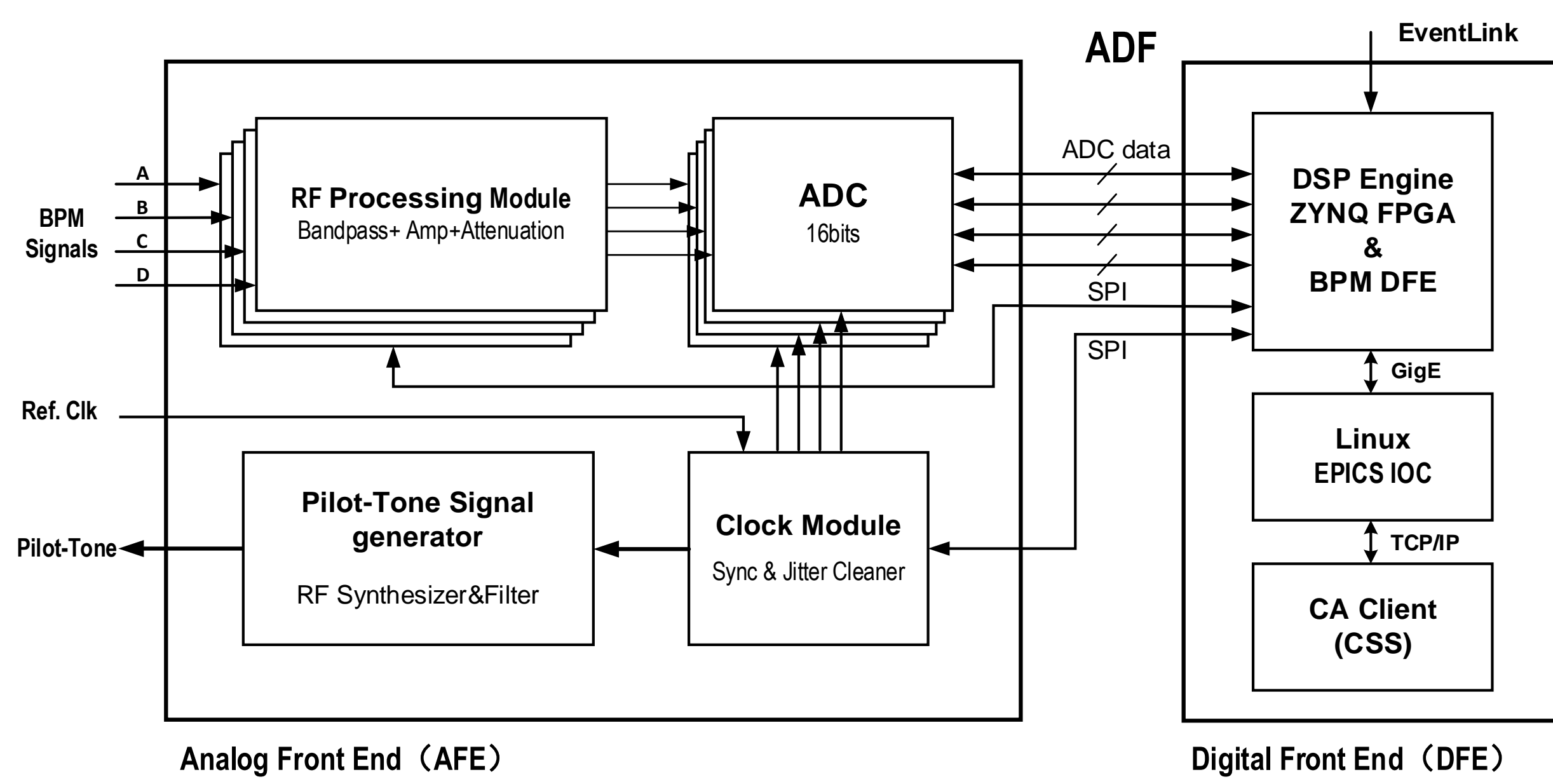
Layout of the HEPS accelerator

High Energy Photon Source (HEPS) is a new 6GeV synchrotron light source under construction in China. HEPS consists of a storage ring with a circumference of 1360.4m and energy of 6 GeV; booster with a circumference of 454m and energy range of 0.5 to 6 GeV; LINAC accelerator with a length of 49 m and 0.5 GeV. With the HEPS storage ring to a multi-bend achromat lattice, about 700 digital Beam Position Monitors (DBPM) will be required.

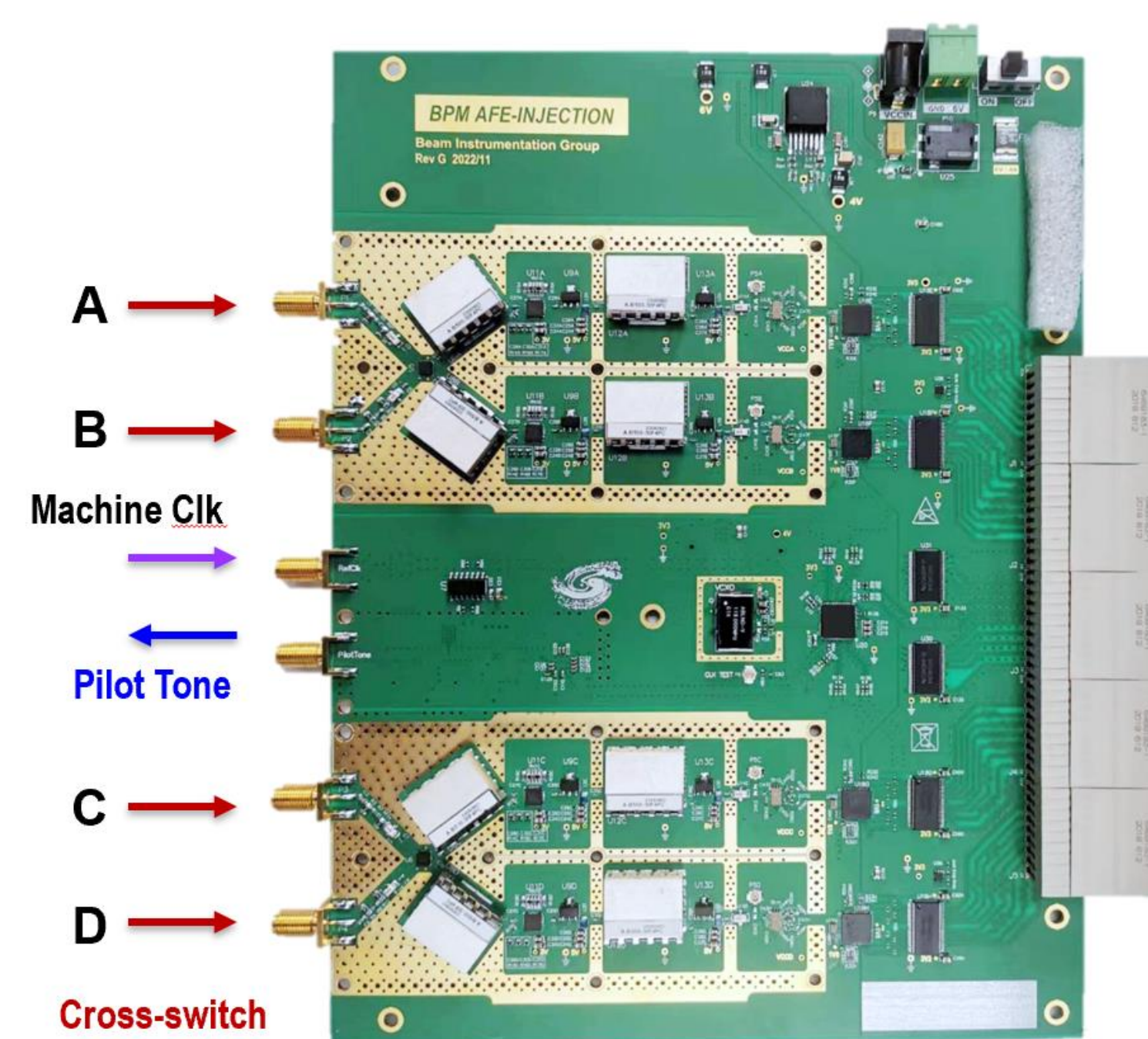
HEPS	BPM Number
LINAC	8
LTB	11
Booster	78
BTS	11
STB	11
Storage Ring	578

HEPS BPM Number Requirements List

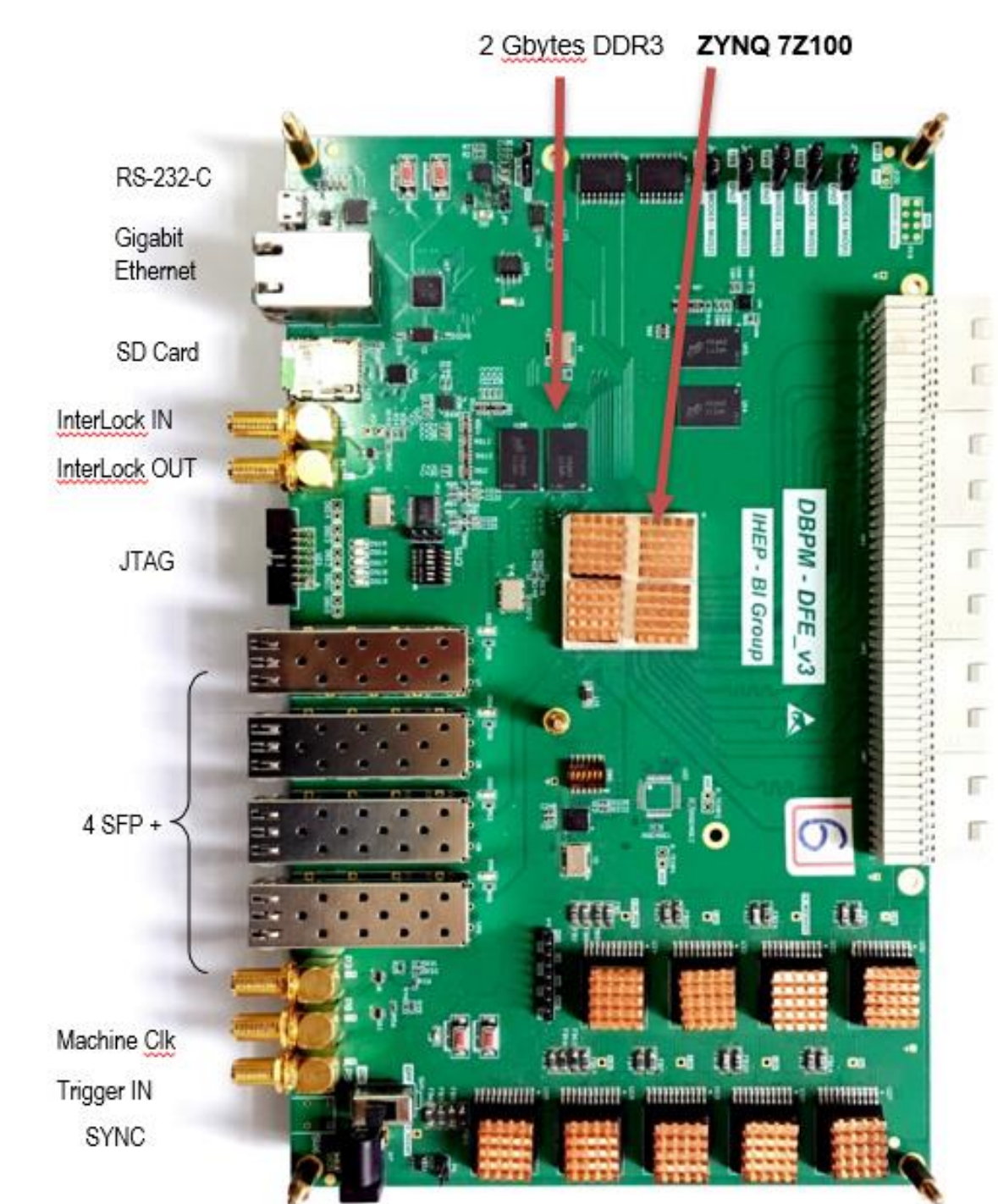
System Architecture



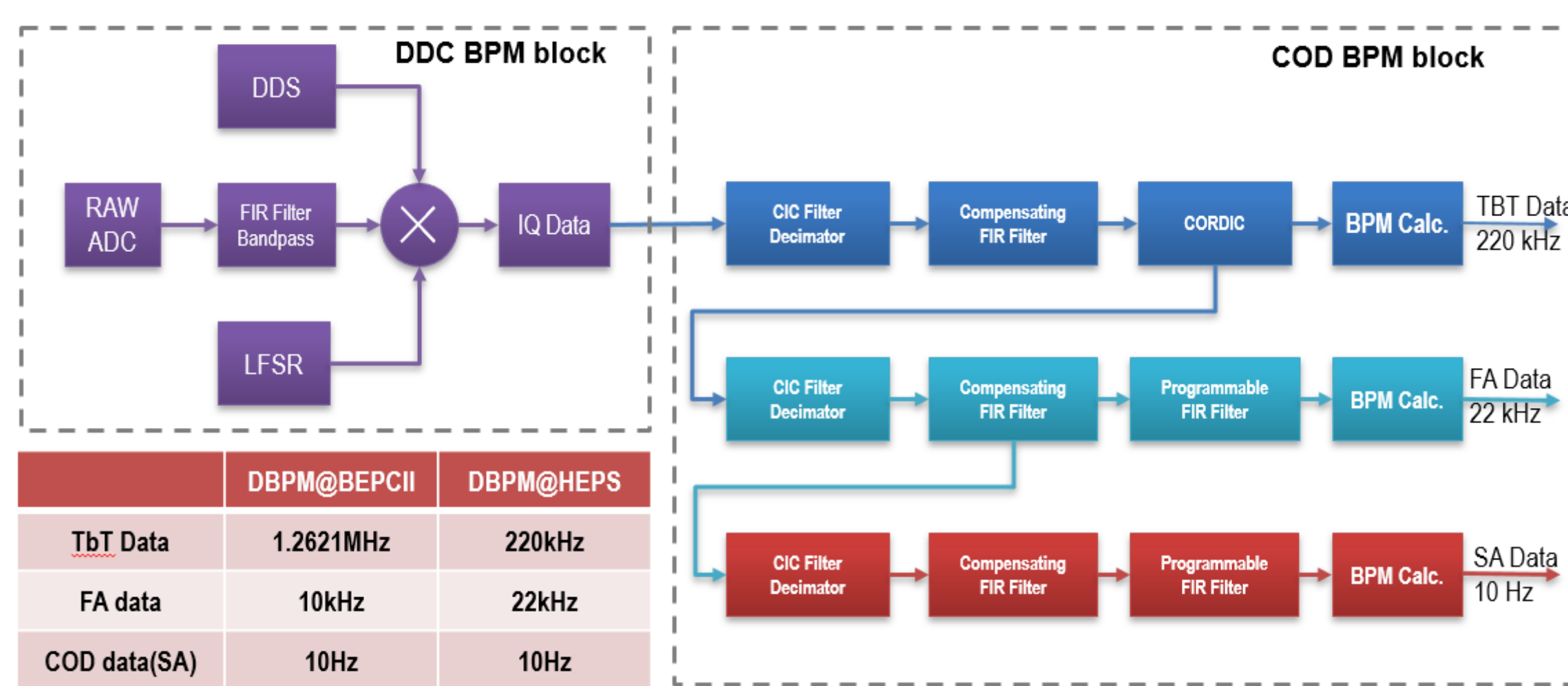
The diagram of HEPS BPM electronic



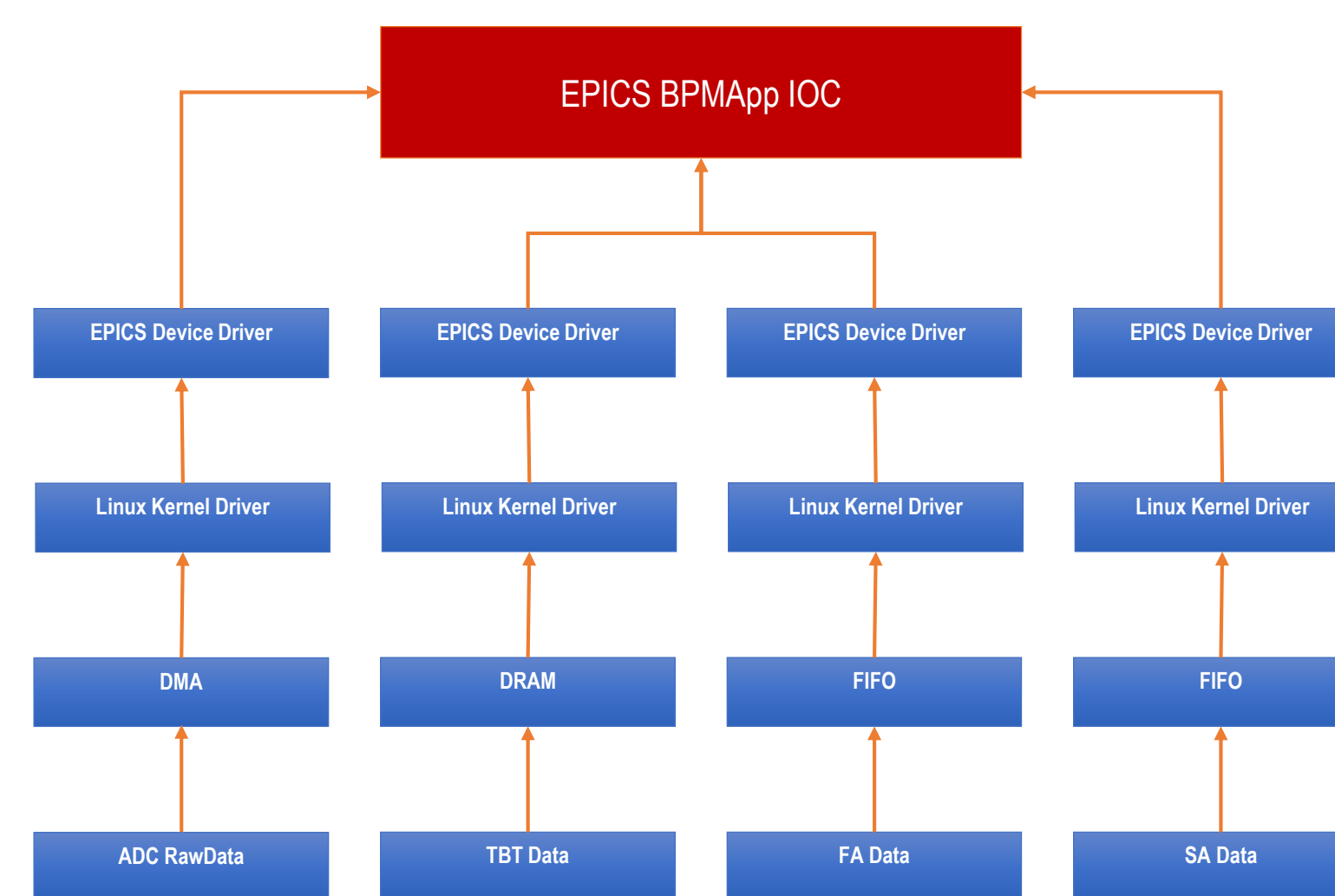
Analog Front End (AFE)



Digital Front End (DFE)



The architecture of the BPM DSP module



The architecture of the embedded EPICS driver

Performance Test

