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Development of an FMC+ carrier in MicroTCA

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The ecosystem of FMC/FMC+ carriers in MicroTCA (Advanced Mezzanine Card form factor) is very diverse. The requirements for such a board are very demanding, and sometimes even opposing to each other. The definition of a set of requirements that will satisfy most of the use cases is a challenging task. Presented here is the DAMC-FMC2ZUP, a modern and high-performance FMC+ carrier in AMC form factor, hosting a Xilinx Zynq UltraScale+ MPSoC. The FPGA has a total of 52 transceivers (32 GTH, 16 GTY, 4 GTR) providing support to the diverse communication interfaces towards the FMC slots, backplane and RTM. The four cores ARM processor with Mali graphics, and the availability of DisplayPort and USB interfaces over USB type-C allow to use the board in stand-alone mode.

The board is fully backward compatible with DAMC-FMC25, an FMC carrier based on two-FPGA solution, with Virtex-5 and Spartan-6.

There are two firmware projects already available for the board. The first one contains support for all peripheral components and can serve as a reference design for custom projects. The second one contains the Intellectual Property (IP) cores to support two DFMC-DS500/800 FMC mezzanines, providing a digitizer solution with 4 channels, 12 bits and up to 800 MSPS. Mounting two DFMC-4SFP+ creates a solution with 8 SFP+ connections on the front panel, each one able to communicate at data rates of 10 Gbit/s and higher.

DAMC-FMC2ZUP is a versatile platform ideal to perform control tasks around a particle accelerator. Combined with the modularity of the MicroTCA platform it can be a building block for a larger system.

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