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ORIGINAL ARTICLE

The application of UniBoard as a beam former for APERTIF

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Abstract In this paper a description is given of the UniBoard (Universal Board) design and its application in the APERTIF (APERture Tile In Focus) beam former project. The UniBoard is a complex high-performance computing platform, designed for data-intensive applications in radio astronomy, such as beam forming, correlation, pulsar processing and digital filtering. Thanks to its scalable design, multiple UniBoards can be combined for higher performance, in terms of IO, memory and processing power. At the end of June 2013 36 UniBoards had been produced and one prototype APERTIF beam former.

Keywords Beam former · Digital processing · Digital hardware · Phased array feed

1 Introduction

The FOV (field of view) of a single-feed radio telescope is determined by its area [6]. This also holds for interferometric instruments such as the WSRT (Westerbork Synthesis Radio Telescope), which has a FOV limited by the diameter of its individual dishes (25 m). One way to increase the FOV and with it the survey speed of a dish is to form multiple beams[1] on the sky using a PAF (phased array

[1] The term beam is used in this paper to refer to a single polarized beam.

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