

## Switch matrix for space applications based on RF MEMS

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In this contribution an RF MEMS based switch matrix for space applications is introduced. RF MEMS switches are an interesting component for satellite applications due to their low power consumption and small size. Therefore an RF MEMS based switch matrix has been developed in conjunction with ESA. The realized prototype is a 12 by 12 matrix to switch between different communication channels, employing electrostatic activated RF MEMS switches. The electrostatic switches are produced on Silicon in micromachining technology, they are easy to fabricate and offer nowadays a high reliability. The whole system consists of a packaged LTCC multilayered board, where Silicon-chips with the RF MEMS switches are integrated on one side, and a separate control electronic on the other side. Compared to the 12x12 switch matrix used on ARTES4/AMOS4 flexible telecom satellite (2013), the measured weight of the MEMS Switch Matrix is only 2.4 Kg. against 9.5 kg.; while the size is 28x9x16cm compared to 30x26x12cm (see Fig.1).

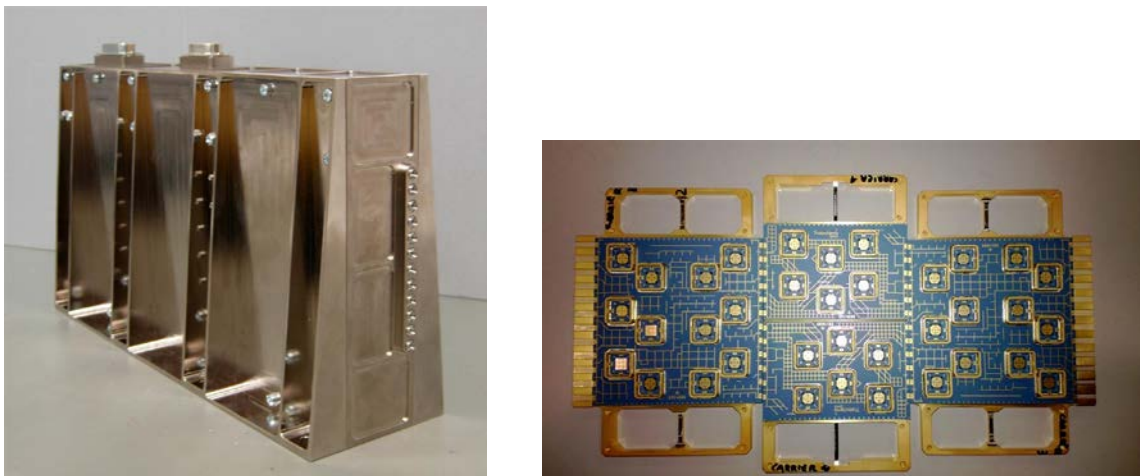


Fig. 1: RF MEMS switch matrix system and interior LTCC boards

This severe reduction of size and weight has been obtained by the combination of the RF MEMS switch technology on silicon, which has resulted in a compact 2x2 ring matrix, used as a building block, and the multilayered LTCC technology, which allows an efficient routing of the 12 input RF signals to the 12 outputs on the same board as well as the necessary hermetic packaging of the MEMS switches.

The connectivity is based on a Benes-architecture, each input can be connected to each output. The measured performance of the realized structure and details of the system design will be presented.