Abstracts

System demonstration of a multigigabit network switch

4/spl times/4 single-flux-quantum (SFQ) network switch has been packaged and successfully demonstrated in a hybrid closed-cycle refrigerator (CCR) system at multigigabit data rates. Full operation of the packaged switch, with self-routing of 1-Gb/s data packets, was demonstrated using a 1-GHz address header decode. The switch is packaged on a superconducting multichip module (MCM) mounted on the 4.5-K stage of the CCR. On-chip asynchronous Josephson drivers and cooled GaAs preamplifiers are used to amplify the SFQ outputs of the switch. The maximum operation bandwidth of the switch is currently limited by the asynchronous Josephson driver. New designs of the Josephson drivers, which have demonstrated operation at 10 Gb/s, are expected to enable switch operation at 10 Gb/s. The system is equipped with fiber-optical inputs and high-speed cryogenic photodetectors. The fiber-optic interfaces, RF packaging, and MCM packaging in the CCR system have demonstrated error-free operation at 10 Gb/s.

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