Abstracts

Cryogenic Microwave Channelized Receiver

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The channelized receiver being presented demonstrates the use of high temperature superconductor technology in a microwave system setting where superconductor, microwave-monolithic-integrated-circuit, and hybrid-integrated-circuit components are united in one package and cooled to liquid-nitrogen temperatures. The receiver consists of a superconducting X-band four-channel demultiplexer with 100-MHz-wide channels, four commercial monolithically integrated mixers, and four custom-designed hybrid-circuit detectors containing heterostructure ramp diodes. The composite receiver unit has been integrated into the payload of the second-phase NRL high temperature superconductor space experiment (HTSSE-II). Prior to payload assembly, the response characteristics of the receiver were measured as functions of frequency, temperature, and drive levels. The article describes the circuitry, discusses the key issues related to design and implementation, and summarizes the experimental results.

❑ Return to main document.