

A FREQUENCY MODULATED S-BAND TELEMETRY TRANSMITTER

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Summary

The need to efficiently collect data from remote locations has resulted in the widespread use of radio frequency telemetry. This paper addresses the requirements, considerations, and implementation of such a system. Since many components of a telemetry link are subjected to harsh operating environments, considerations of system constraints imposed on the transmitter by these conditions will be presented. Several design approaches of an S-Band frequency modulated telemetry transmitter will be offered, and tradeoffs associated with each discussed.

Having selected the most desirable transmitter design approach a pictorial display of the hardware used to fulfill the requirements will be presented along with measured performance data. The key circuits discussed will be an S-Band VCO, parametric divider, buffer/power amplifier, and stabilizer/modulator. The RF circuits employ microwave integrated circuit construction while the stabilizer/modulator utilizes thin and thick film hybrid technology. Extensive use was made of computer analysis resulting in uniformly producible circuits that provide good correlation between measured and specified performance. This helped to produce a 25% reduction in production cost over the previous discrete component design of 1969 vintage. Basic circuit design lends itself well to special mechanical configurations, as well as flexibility in modulation formats and RF power output levels. By using the computer aided design approach, five percent RF bandwidths were realized which would enable the transmitter to be frequency agile for secure or multi-vehicle telemetry.