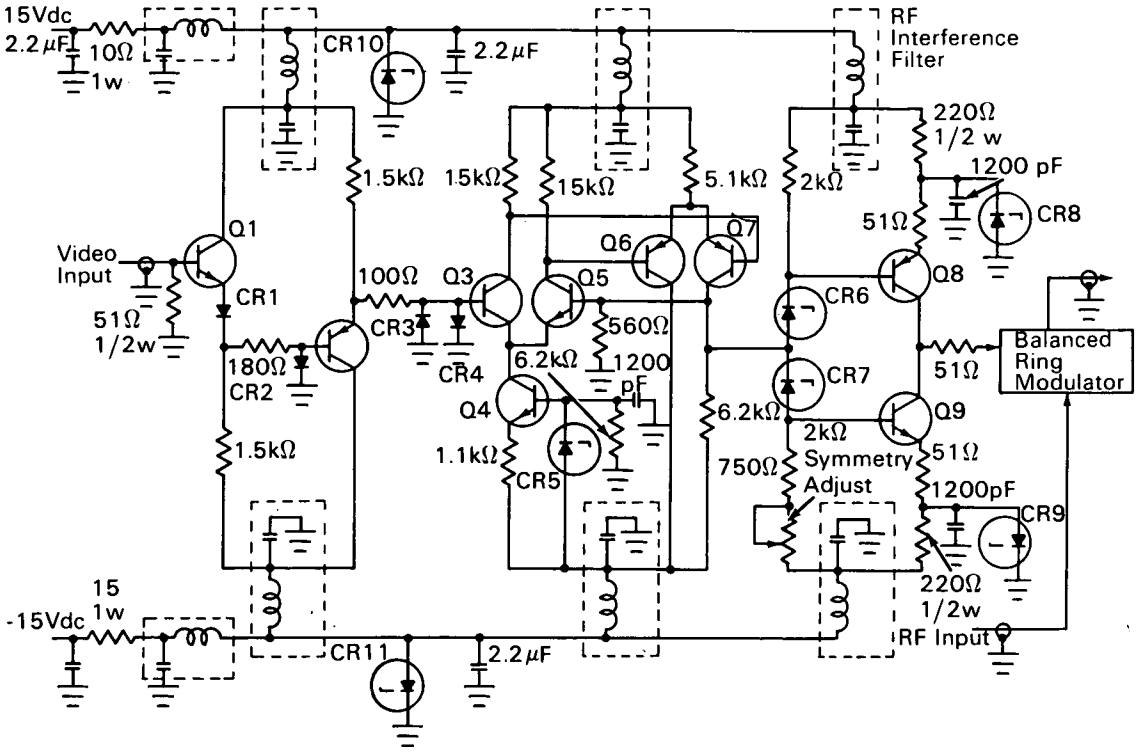
NASA TECH BRIEF

Signal Phase Switches Offer Greater Dynamic Range



Use of signal-phase switch (see fig.) in a communication receiver improves the signal-to-noise (SN) ratio by 3 db. The switch is a novel circuit placed in the signal path of a closed-loop receiver to modulate telemetered data in the 10-MHz spectrum. This novel system includes means for demodulation of the telemetered signals when the phase switch is driven by a video signal, the spectrum of which corresponds to that of the original modulating signal. This causes the output of the signal-phase switch to be an unmodulated carrier when the local model of the modulator is locked to the input signal. This carrier signal can now be narrow-banded and thus remove the added noise caused by the i.f. "image." The switch operates with considerable stability and linearity over power levels up to 3 dbm, with minimum carrier suppression of 50 db below unmodulated carriers.

Originally developed for telemetry from space, the system is applicable to terrestrial radio-communication systems in which phase-locking techniques are

(continued overleaf)

required for demodulation of telemetered or other data signals with great fidelity; it can be applied to any scheme having binary modulation, to measure correlation of modulation with local code. The switch can be used in a commercial receiver to reduce the effect of image-noise folding.

With the binary-modulator scheme just described, the signal-phase switch can be used in military receivers to reduce the effect of image-noise folding. Because thus far the equipment has been developed for digital modulation, secure military communications, using pseudorandom codes, seem to provide an excellent application for signal-phase switches.

Thus the signal-phase switch has two advantages: (1) it enables reduction of subsequent bandwidth and so improves the SN ratio by 3 db by rejection of image noise; and (2) by this reduction of bandwidth the noise overload on the following stages is reduced, so that the system has a greater dynamic range.

Note:

The following documentation is available from:
Clearinghouse for Federal Scientific
and Technical Information
Springfield, Virginia 22151
Single document price $3.00
(or microfiche $0.65)

Reference: NASA-CR-90199 (N68-11006),
Development of 10-MHz Phase Switches

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No patent action is contemplated by NASA.

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