

The Army Electronics Command contracting officer has advised us that improvements to the AN/PRC-25 radio were necessary to assure compatibility with a radio frequency amplifier which would extend the range of the radio. Although the amplifier would have the desirable effect of intensifying the output signal, it would also have the undesirable effect of intensifying unwanted signals. A product improvement program was initiated by the Army Electronics Command to meet the problem and also to improve reliability and logistic support by a complete solid-state design and elimination of the electron tube R-F output amplifier.

On March 31, 1965, RCA was awarded a contract for the reengineering and modification of 12 AN/PRC-25 sets. The contract was modified January 17, 1966, to provide for interface facilities with classified equipment. This new requirement was considered to affect interchangeability of the basic radio. As a result, a new designation, AN/PRC-77, was assigned to the modified AN/PRC-25. The contract was modified again on April 29, 1966, for other services on an additional quantity in connection with the classified program.

The differences between the AN/PRC-25 and the AN/PRC-77 radios are summarized by the contracting officer as follows:

"Externally, the AN/PRC-25 and AN/PRC-77 radios are identical in appearance with identical panel controls and equipment cases. However, the AN/PRC-77 in addition to the functional capabilities of the AN/PRC-25, has significant advantages over the AN/PRC-25 for operation with R-F amplifier AM-4306 and with classified equipment. The AN/PRC-77 is of complete solid-state design whereas the AN/PRC-25 utilizes one electron tube as the output R-F power amplifier. The elimination of the electron tube permitted use of the existing front panel power connector for interface connection with the classified equipment. The solid-state design also permitted the elimination of the AN/PRC-25 power converter. Receiver R-F amplifier and squelch circuitry of AN/PRC-77 provide substantial improvement over the original AN/PRC-25 design:

"(1) The receiver is less vulnerable to desensitization in the presence of high-energy R-F fields.

"(2) Re-transmission operation has been substantially improved.

"(3) Wide band output circuitry has been added to accommodate interface with classified equipment.

"In the transmitter portion of the AN/PRC-77, the original AN/PRC-25 frequency control and modulation schemes were re-designed. Notably, the side-step oscillator, a major source of signal interference was eliminated.

"Reduced spurious radiations has resulted in a significantly larger number of available operating channels when operating with other radios. Modulator circuitry was also added, again to accommodate interface requirements with classified equipment. Of the twenty-five (25) electronic modules originally used in both the transmitter and receiver portions of the AN/PRC-25, only eight (8) of the modules used in the AN/PRC-77 are interchangeable with the AN/PRC-25."

Concerning the differences in the radios and the utility of the improvements, the contracting officer has advised:

"(1) Complete solid state design of the AN/PRC-77 permitted removal of the power converter and use of the existing front panel power connector for interface connection with classified equipment. In replacement of the electron tube power amplified additional R-F driver stages were required. Accordingly, two (2) additional sections were added to the variable tuning capacitor. Maximum R-F power output was increased from 1.0 watts to 1.5 watts in the high-frequency band and from 1.5 watts to 2 watts in the low-frequency band. Input power was reduced approximately $\frac{1}{2}$ of that required by the AN/PRC-25, increasing battery life correspondingly. Weight was reduced by approximately $\frac{1}{2}$ lb.

"(2) Transmitter frequency control generation and modulation schemes were re-designed, reducing the number and amplitude of spurious radiations. This has resulted in substantial reduced radio-frequency interference when operating with other radios. Previously, frequency assignments in which the radio could operate had to be spaced sufficiently far enough apart to assure that one radio operating on a given frequency would not interfere with a second radio located near by but operating on a separate frequency. The redesign of the radio had the effect of drastically reducing the frequency separations previously required. The additional frequency assignments now available in re-transmission operation are of particular importance since it offers greater selectivity to the Commander in a tactical situation in his choice of channels of communication and elimina-