TRANSMITTER TUBESTER DESCRIPTIONS

CIRCUITS: Like the receiver circuits, the transmitter Tubesters use an FET, MOSFET or bipolar transistor and a high voltage transistor in a configuration suited to the gain and control requirements of the stage. However, seven of the transmitter stages must provide significant power output, and the transmitter power supply voltage exceeds +300 volts. (In the typical 32S-1 or 32S-3 using the Collins 516F-2 power supply the nominal "+275 Volt" supply line is actually between +340V and +365V during Standby, dropping to between +300V and +320V in PTT or Key Down). To meet these higher power and voltage requirements, the NSD135 TO-202 power transistor rated at 375 volts is used extensively in these circuits, and added cooling provision is made in the casing.

The ST303 IF Amplifier and the ST306 RF Amplifier use a MOSFET-NSD135 combination to meet the multi-purpose requirements of high gain, some power output with linearity, and "grid" control response to the ALC voltages. Open-top cases are used to provide adequate ventilation to the power transistors. Similar treatment is given to the ST304 1st Mixer and the ST314 Vox/Anti-Vox amplifiers. The NSD135 is used also in the ST304 2nd Mixer, but the open-top case is not needed; it is fully enclosed. The ST312 Heterodyne Oscillator and the ST311 Vox Relay Actuator run at about 1½ watts input; their NSD135 transistors protrude from the cases, with heat sinks attached.

PERFORMANCE: Operation and performance of the transmitters are unchanged with any or all of the Tubesters installed for the tubes. The following individual characteristics are noteworthy:

The ST301 1st and 2nd Audio has a few db more gain than the tube replaced. The Side Tone Oscillator of the ST311 has slightly less output than the tube, but ample for its CW monitor and Vox-activating functions. The input circuits of the ST305 Mixer match the grid-block keying characteristics of the tube, maintaining the excellent Collins keying shape.

The DX Engineering LC-1-32S Speech Processor may be used at V3 with the ST303 Tubester installed in it. The input circuits of the ST303 IF and the ST306 RF are designed to give normal ALC control with or without the processor.

The ST314 Vox/Anti-Vox amplifier, ST310 Vox Rectifier and ST311 Vox Actuator provide the normal VOX control; a Schmitt Trigger circuit in the ST311 gives the system improved stability. The ST315 VFO is more stable than the tube during the early minutes of warm-up.

HEAT REDUCTION is an important improvement in the transmitters made by the Tubesters. The heat in the cabinet is a full 30 watts less, due mostly to the eliminated filaments. This represents a surprising 50% reduction in wasted power and heat when the transmitter is in Standby. Since usually the transmitter is in Standby a much larger percentage of the total power-on time than it is Key Down or PTT, the transmitters run much cooler.

INSTALLATION AND ALIGNMENT: The Tubesters simply plug in to replace the tubes. No modification of the transmitter is needed or recommended. The RF and OSC trimmers will need touch-up after the exchanges at V5, V6 and V12; the ALC Zero re-set with the V3 exchange; and the Vox gain and time constant settings may be changed slightly when ST314 and ST311 are installed. All alignments are in accord with the Collins manual, and full instructions are included in the Installation Manual furnished with the Tubester Sets.