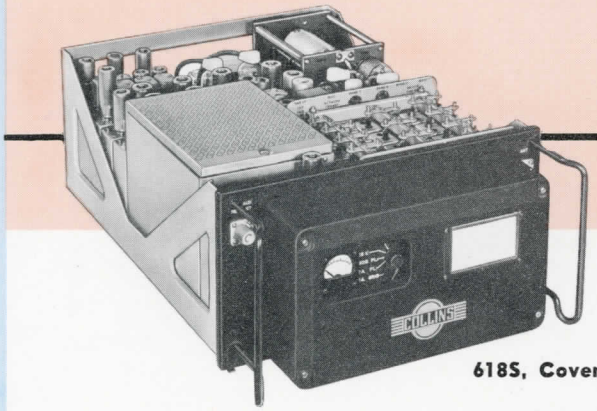
618S
Transceiver

COLLINS

144 channels--100 watt power for WORLD-WIDE OPERATION



618S, Cover Removed

The Collins 618S Transceiver is designed to meet the requirements of the many commercial airlines engaged in interchange agreements and international operations.

Airline executives will be quick to recognize the advantages of this new, fully integrated radio transmitting and receiving equipment for all commercial aircraft.

The special requirements for which this new equipment was designed are as follows:

1. Large number of frequency channels required by international flight.
2. System flexibility.
3. Automatic tuning.
4. Ease of maintenance through modular construction.
5. Provision for possible future requirements.

The 618S equipment provides both transmitting and receiving facilities for up to 144 crystal-controlled frequencies assigned in the frequency range of 2.0 to 25.0 mc. The frequency control system was chosen to provide common usage of crystals for both transmitting and receiving. The full power transmitter output of 100 watts is available throughout the frequency range, and has been proven completely adequate for domestic and overseas operations.

System flexibility is provided by the use of automatic tuning. The set-up of a new frequency channel merely requires that the channel selection control be turned to the new channel designation. All circuits within the main case are tuned automatically and the Collins 180L-2 Automatic Tuning Unit will automatically make all antenna adjustments.

This antenna tuning unit matches the output of the 618S to standard aircraft antenna and guarantees peak performance on ALL frequencies under ALL conditions. Another advanced receiver design feature is the use of the Collins Mechanical Filter in the i-f circuit which provides maximum adjacent channel rejection.

Since the 180L-2 Automatic Tuning Unit will operate with a wide variation of aircraft antenna impedances, and requires no pre-information, complete inter-changeability of equipments between aircraft is provided. Changes in antenna impedance from aircraft on the ground to in the air are automatically corrected by the 180L-2. Radio equipment-change time, normally required for route changes; changes in frequency assignment or antenna modification, have been virtually eliminated.

The initial set-up of a new frequency consists merely of plugging in the proper crystal. All circuits, including antenna, are tuned automatically and no installation adjustments are normally necessary.

A unique feature of the 618S is the modular construction employed. A standard unit of volume or module into which all standard aircraft case sizes can be sub-divided, has been determined. All subassemblies have dimensions which are multiples of those of the basic module. This type of construction not only offers the advantages of standardized plug-in subassemblies from a maintenance and repair viewpoint, but also allows possible interchangeable use of a subassembly in several types of equipment. Possibly an even more important advantage of this construction is the ease with which future modifications can be incorporated into the equipment.

The design of the 618S also considers provision for future needs of the air transport industry. A Collins Stabilized Master Oscillator (S.M.O.) can replace the 144 crystal oscillator unit where more complete channelization is required. This facility completely eliminates the requirement of individual crystals for each frequency, yet provides crystal controlled stability on any frequency within the tuning range of the equipment.

DETAILED DESCRIPTION

The 618S consists of a main chassis and panel which forms the mounting base for a number of plug-in units. These units are all removable from the top of the chassis by means of captive hold-down screws. The front panel is constructed to make good electrical contact with a dust cover which is removable from the rear of the unit. This type of construction combined with the line filters which are located in the shockmount, allows good radiation shielding of harmonics and spurious signals from the high level r-f stages of the transmitter.

All electrical connections to these plug-in units are made through plugs located on the bottom of the chassis. The connections to the external power supply and control boxes are made through two connectors mounted in the rear of the main chassis and making connection with mating plugs mounted on the shockmount.

Individual plug-in units which require mechanical linkage to each other or to the front panel, are built with quick disconnect, flexible couplers to allow quick and easy removal from the main chassis. Once these mechanical linkages are synchronized, it is possible to remove and replace units without additional alignment.

A blower mounted on the front panel draws air in through an air filter, and distributes this air to any portion of the set that requires forced air cooling. This is done by locating holes in the bottom chassis at appropriate places to direct air streams on the components to be cooled.

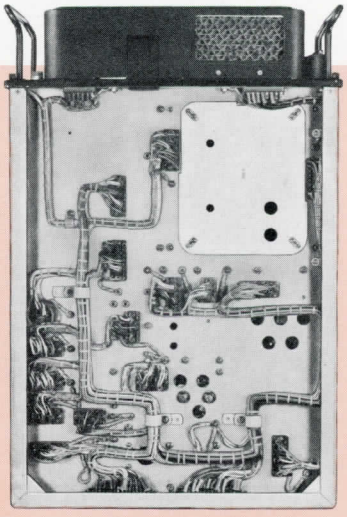
OPERATION

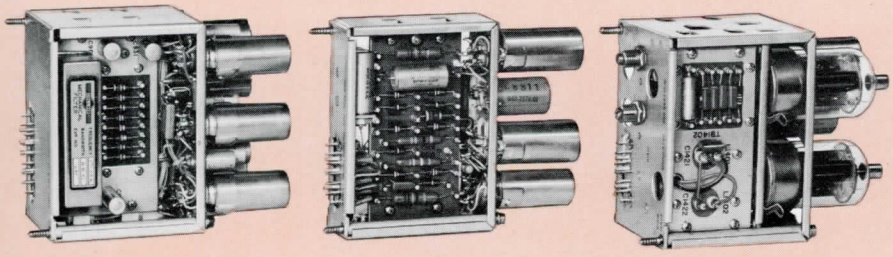
The circuit functions of the 618S can best be described by referring to the block diagram. To simplify the signal flow through the circuits, blue blocks are used for receiver functions, brown for transmitter functions, and those blocks which are used in common for both transmission and reception are shown in both brown and blue. Unused circuits are turned off by opening the cathode ground return of the various tubes involved. The transfer from reception to transmission is indicated by a number of switches marked R and T.

Radio signals from the aircraft antenna pass through the 180L to the transmit-receive relay to a tuned r-f amplifier covering the range 2.0 to 25.0 mc. Signals are further amplified in the second r-f amplifier and then fed to a receiver-mixer together with the output of a frequency multiplier. The desired mixed product in the range 2.00 to 3.75 mc is selected in a variable i-f amplifier and then fed to a second receiver-mixer. This mixer also receives radio frequency injection voltage in the range 1.75 to 3.50 mc resulting in an output frequency of 250 kc. The desired selectivity characteristic for the 618S Transceiver is obtained in the 250 kc i-f amplifier through the use of a Collins Mechanical Filter. Subsequent detection and audio amplification provide audio output from the receiver.

For transmission, a 250 kc crystal oscillator at the upper right-hand corner of the block diagram is injected into a transmitter-mixer with a signal 1.75 to

Right: 618S, Bottom View





618S Module Units, Cover Removed