

Application of RIS(6)

2. The automatic noise limiter which is incorporated in the i.f. amplifiers of the CUJ Receiver and the FU1. Receiver is an amplitude limiter. It will limit the amplitude of random pulse type interference to the same level as the receiver carrier modulation. Although it provides some protection against random noise pulses, it is not completely effective against very strong interference from high power radars such as the Type 965.
3. The system of interference suppression used in RIS(6) is to open circuit the intermediate frequency output signal from the first mixer in the UHF receiver for the duration of the radar pulse. In order for this system to provide adequate protection it is essential for the switching of the receiver i.f. signal to occur simultaneously with the radar power pulse. In RIS(6) this is achieved by deriving the radar pulse and the receive switching pulse from the same source. This source is the Trigger Unit A.P.164232 associated with Radar Type 965.

General Description of RIS(6)

4. RIS(6) comprises Drive Unit A.P.164234 and Suppressor Unit Pulsed A.P.164002. Figure 1.1.1 shows in block diagram form the connections between the units of RIS(6) and associated equipment.
5. A sine wave of 6.08 kc/s is generated in the Trigger Unit A.P.164232. This sine wave of amplitude between one and seven volts r.m.s., which is harmonically related to the radar p.r.f., is fed into the Drive Unit. The Drive Unit incorporates a phase changer, limiter and amplifier stages. The output from the Drive Unit is a sine wave of 6.08 kc/s with a maximum power level of five watts into a load impedance of 10 ohms. The output level for any given setting is independent of input level over a wide range of inputs and is not affected by phase changer setting.
6. The sine wave output from the Drive Unit is fed to a Suppressor Unit which is fitted inside each UHF Receiver.
7. The signal amplitude required at the input of the Suppressor Unit is six volts r.m.s., and the output power level from the Drive Unit will depend upon the number of receivers connected in the system. The input impedance of the Suppressor Unit is 200 ohms. Thus, when the maximum number of 20 receivers are connected in parallel the impedance connected across the Drive Unit output will be 10 ohms.

8. In the receiver the Suppressor Unit is connected between the first mixer output and the i.f. amplifier (Figure 1.1.1.).
9. The 6.08 kc/s sine wave which is fed to the Suppressor Unit is converted into a switching pulse which cuts off the 24 Mc/s amplifier for 18 μ s every 165 μ s. When the 24 Mc/s amplifier is in the cut off condition the attenuation is greater than 70 dB.
10. The Suppressor Unit uses two valves. The first valve is a double triode, one section operating an overdriven amplifier which produces a pulse at the anode when fed with a sine wave input. The second section is connected as a cathode follower which is coupled to the second valve. The second valve is a single pentode operating as a 24 Mc/s amplifier with unity gain. The valve operates effectively as a series gate between the receiver mixer and receiver first i.f. stages. The receiver first i.f. is 24 Mc/s.
11. The Suppressor Unit does not degrade the Noise factor of the Receiver by more than one dB, and the total harmonic distortion of the receiver output with the suppressor unit working is less than 12 per cent.
12. If the Radar Type 965 is operating with a p.r.f. of 190 p.p.s. one Suppressor Unit pulse in every 32 will be coincident with the radar interference pulse. If the p.r.f. of the radar is changed to 380 p.p.s. then one suppressor unit pulse in every 16 will be coincident with the radar interference pulse. Effective suppression of the interference takes place with either radar p.r.f. and with radar pulse lengths up to 10 μ s. It has been necessary to use a high switching frequency for the Suppressor Unit in order that the resultant audio component is outside the audio bandwidth of the receiver, and so will not of itself cause interference. The receiver audio bandwidth is 300 c/s to 3 kc/s.
13. An operate ON/OFF switch on the Suppressor Unit permits the unit to be switched out of use when not required. This switch is manually operated and is located on the Suppressor Unit. Operation of this switch does not affect the loading on the Drive Unit. In the OFF position the 24 Mc/s amplifier operates as a normal (unswitched) amplifier. The Suppressor Unit will normally be switched off when the receiver is tuned to 320 Mc/s or above. RIS(6) is effective at all receiver frequencies but the amount of interference caused by the radar at frequencies above 320 Mc/s does not warrant its use.
14. The Drive Unit requires a power supply of 115 volts or 230 volts a.c. single phase 45 c/s to 65 c/s. The power consumption is 35 watts. Power supplies for the Suppressor Unit are obtained from the CUJ or FU1 receiver power unit.

Installation

15. Connections between the Trigger Unit located in Radar Type 965 office and the drive Unit located in the UHF Receiver office are via lead covered cable which forms part of the ship's wiring. Connections between the Drive Unit and the CUJ or FU1 receivers are made in lead covered cable to the receiver junction box. Where more than one receiver is connected in the system, the feed from the Drive Unit is looped between receiver junction boxes with lead covered cable. Under these conditions, the phasing of the input leads must be the same for all receivers.