

Control unit Type 8197

part of the Rebecca Mk8 equipment

Introduction

1. Control unit Type 8197 is similar to the control unit Type 909, used in the Rebecca Mk7 equipment, with the exception of the following features --

- (1) Beam approach home (BAH) and - tuning (BAT) positions are added to the main function switch (SW1)
- (2) Frequency pre-selection devices are added for BAH working
- (3) Different circuit reference numbers have been allocated.

2. The control unit is fitted in the pilot's cockpit and controls all the equipment through the six switches shown in fig 1. The purpose of these switches is as follows. --

SW1. Main function switch with six positions: OFF-SB-200-20-BAT-BAH

SW2. Receiver frequency control switch (RX)
with eight positions marked 1 to 8.

SW3. Transmitter frequency control switch (TX)
with eight positions marked A to H

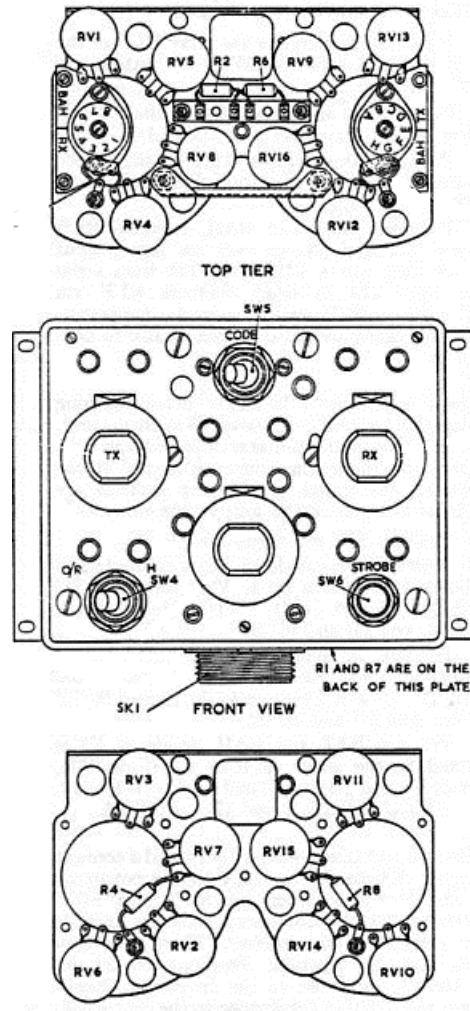
SW4. Aerial switch with two positions O/R
(omni range) and H (Homing)

SW5. Code switch with two positions ON-OFF

SW6. Strobe release press button.

3. In addition to the six switches there are 16 preset potentiometers RV1 to RV16 which can be set to give pre-selected potentials. RV 1-8 slider potentials can be switched to the receiver frequency selector circuit by SW2, and RV 9-16 slider potentials can be switched to the transmitter frequency selector circuit by SW3.

Each position of these two switches selects a potential between earth and +28V which sets the datum potential to which the slider of the slave potentiometer in the receiver or the transmitter, has to be driven to rebalance the motor control circuit.



Circuit description (fig. 2)

4. The circuit of the control unit shows that all the connections enter and leave the control unit via PL1, connection is then made to the junction box 8196, via PL2, and out to the chassis assembly 8202, via SK3, where it is routed to the various units concerned with the completion of the control circuits. These are shown in chap.1, part 3 interconnection diagram. A study of this diagram will show that all outgoing circuits enter the strobe unit, except the RX and TX tuning circuits from terminals H and A of PLJ1 respectively.

Function switch (SW1)

5. This wafer type switch is fitted in the bottom centre position of the front panel and has four wafers marked "a" to "d".

The "a" wafer connects all the contacts to earth potential progressively and the following functions are performed : --

(1) Position SB energizes the relay RLB of the junction box and switches 28V to all heaters via PL1/N

(2) Position 200 energizes RLA of the JB and switches 28V to the power unit via PL1/K

(3) Position 20 energizes RLA in the strobe unit and changes the operation from 200 to 20 miles range via PL1.D

(4) Positions BAT and BAH energize RLB in the strobe unit and change over the signal input to the heading valves V12a and V13b from aerial switch Type 273 to relay contacts RLE via PL1/P. The O/R-H switch is made inoperative by the unit being switched automatically to O/R via SW1b.

The "b" wafer selects the anode bottom-catching potential for the transitron valve V3 in the strobe unit. This defines the minimum search period and consequently the minimum range which the strobe will reach. The range zero-setting controls are brought into circuit in the following manner : --

(1) Position SB, no connection

(2) Position 200, anode of V3 is connected to the slider of RV4, via diode V2a, terminals SU and JB/21, JB and CU/Q, SW1(b)/12 and 8, CU and JB/M, and JB and SU/24.

NOTE - Earth is automatically provided at the O/R terminal F when SW1 is in the stand-by position.

(3) Position 20, anode of V3 is connected to the slider of RV5, via diode V2a, terminals SU and JB/21, JB and CU/Q, SW1(b)/12 and 9, CU and JB/I, and JB and SU/22.

(4) Position BAT and BAH, anode of V3 is connected to the slider of RV3, via diode V2a, terminals SU and JB/21, JB and CU/Q, SW1(b)/12,11 and 10, CU and JB/R, and JB and SU/26.

7. The two additional wafers SW1 c and d connect the correct TX and RX tuning potentials from the switch contacts of SW3 and SW2, respectively, to the frequency control circuits in the transmitter and receiver. There is no connection in the SB position. Positions 200, 20 and BAT are all connected to the frequency change switches and position BAH is fed to the centre contact of the pre-selection device, used to select the correct BA home station frequency. The remainder of the circuit is self explanatory.

Frequency change switches (SW2 and 3)

8. The two 8-position switches SW2 and SW3 select potentials set by the sliders of potentiometers. These switches cause motors in the receiver and in the transmitter to run until the slider of slave potentiometers driven by them reach a potential corresponding to that preset in the control unit. Each position of the switches selects a potential between earth and 28V from networks shown in fig.2. Each of the preset potentiometers is adjustable from the front of the control panel through a protected window. A full description of the frequency selection circuit is given in chapter 4, part 2 for the transmitter and chapter 5, part 2 for the receiver.

Home - Omni/range switch (SW4)

9. The H-O/R switch SW4 is used to select the type of aerial best suited to the condition under which the aircraft is flying. It provides an earth potential to either the heading terminal O or the omni-range terminal F when SW1 is set to any position except BAH or BAT. In these two positions the moving contact of SW4 is isolated from earth.

When SW4 is set to O/R position, PL1/F is earthed and relay RLD in the switch unit 273 is energized via : +28V, contact RLB1, winding of RLD to earth via PL1/F.

Contacts PLD1 open and contacts RLD2 are locked in the port or omni-range position. The relay in the aerial switch unit Type 78A or Type 514 is de-energized and under these conditions the signals from the omni-range aerial are fed to receiver via contacts RLD2.

When SW4 is set to H position, the earth is transferred from PL1/F to PL1/O and the aerial switch unit Type 78A or Type 514 is energized, changing over the contacts from the omni-range aerial to the port aerial. Relay RLD circuit now becomes self-interrupting through the action of contacts RLD1 and contacts RLD2 switch alternate port and starboard signals to the receiver.

Code switching (SW5)

10. The code ON-OFF switch SW5 controls the code signals of 1000 cycles to the pilot's headset. The signals are introduced into the secondary winding of TR4 in the strobe unit and are fed to terminal SK2/13; they are then routed through the junction box via terminals SK3/13 and PL1/C, the control unit via SK1/C to SW5 contacts thence to SK1/B and back to earth in the junction box via terminal PL1/B and RV2. The slider of RV2 takes off some of the signals to feed the pilot's headset via PL2/A and back to earth via PL2/B.

Strobe release (SW6)

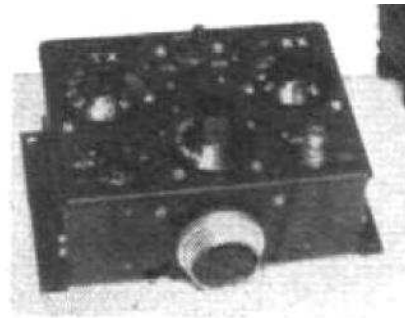
11. The strobe release switch SW6 connects -150V bias potential from terminal PL1/2 to terminal PL1/5 in the strobe unit and raises the normal bias voltage of -21V to about -100V. In this way the locking signals are cancelled at the following points in the circuit : --

- (1) Range gate V4 suppressor grid
- (2) Signal feed to heading valves at V12b anode and heading valves V12a and V13a grid circuits.

The completion of the circuit from terminal PL1/2 to PL1/5 in the strobe unit is as follows :--Junction box terminals SK3/2 and PL1/Z Control unit SK1/Z, SW6 contacts, SK1/E to

junction box terminals PL1/E and SK3/5 to strobe unit PL1/5

Control box



Servicing information

12. There is little first and second line servicing that can be done on this sub-assembly. Replacement and servicing information is presented in Vol. 6 of the AP however the following should be noted:--

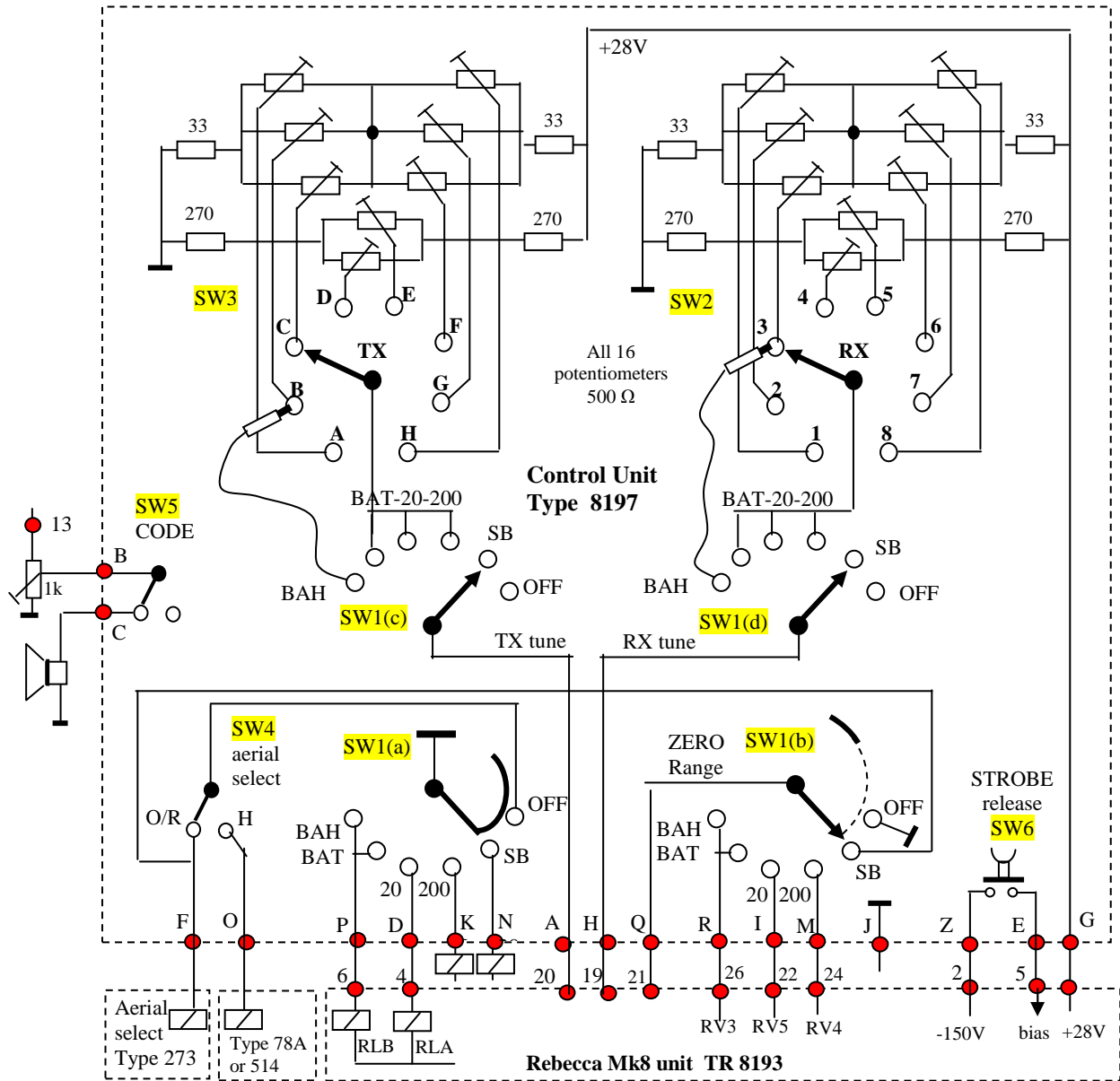
- (1) When removing the cover to reset the BAH frequency control, first release the top screw (non-spring loaded) then the two bottom spring loaded screws. This method ensures that the cover comes away from the unit automatically.
- (2) When refitting the cover ensure that the lips of the cover sit on each side of the bracket holding the socket SK1.
- (3) Excessive force when screwing the plug to SK1 will cause the socket to loose its grip on the bracket.

Connector

Plessey style 104 Mk4 25 pole

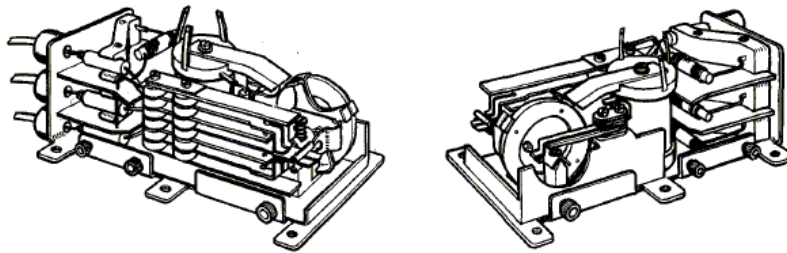
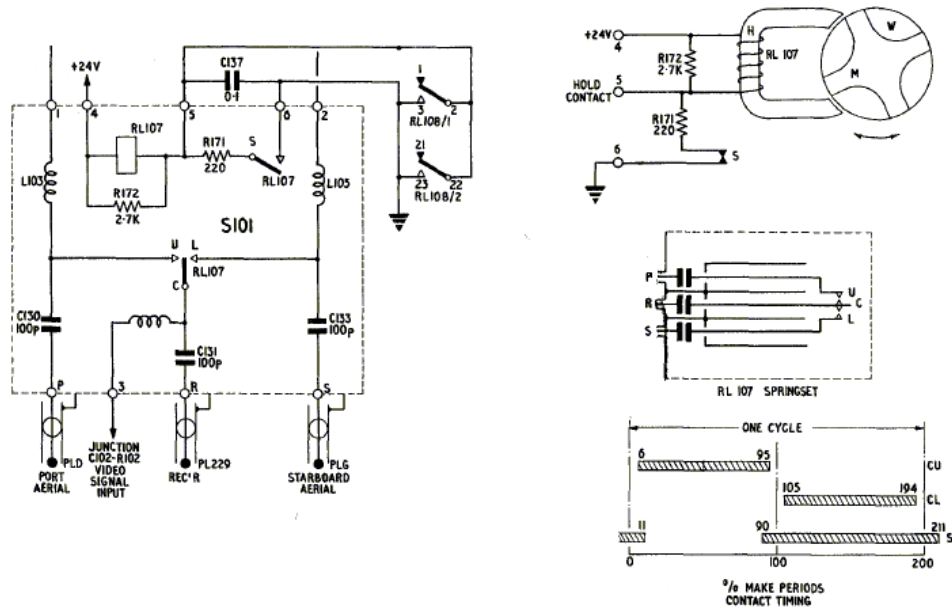


Control Unit Type 8193 Circuit diagram



Aerial switch Type 273

As used for the receiver aerials in Rebecca Mk4 thru Mk 8



ARI5610 - TR.3624 - switch unit 273

This unit switches alternating the port or starboard aerial to the Rebecca receiver. It functions like a vibrator, but the speed is stabilized by an oscillating disc at 22 - 23 c/s. With a typical pulse repetition frequency (prf) of 170 c/s, each cycle has 4 pulses from the port aerial, and 4 from the starboard aerial.

There is only a *single* switch-over contact to switch *both* the aerials *and* the feed back to the heading circuit in the strobe unit to get a perfect synchronization.

The vibrator is locked in the "port" position when pin 5 is earthed as required in the beam approach modes BAT and BAH

When oscillating, the average coil current is 25 mA, (40mA peak).

In port-locked condition, the 450 Ω coil current is 60 mA (1.6W)

Impedance of the shielded RF contacts is 50 ohms, impedance mismatch varies from 1.2:1 to 1.4 to 1 in the frequency range 174 - 236 Mc

Cross-talk is less than 5%