

SELECTOR HOLD ALARM FAULT INDICATOR IN5/3

General Description

The IN5/3 detects faulty operation of a group of motor uniselectors in a source selection bay for a particular location, for example a continuity suite. It operates, in conjunction with source selection panel PA8/306, to return the faulty selector to its home outlet, and it provides an audible alarm.

A description of the operation of the selector circuit is given in Design Department Technical Memorandum 3.33(60).

The unit requires a 50-volt power supply, and is constructed on a printed circuit board with dimensions of 6 by 3 inches (15.2 by 7.6 mm), and with fixing centres of 4 by $2\frac{5}{8}$ inches (10.2 by 6.7 mm). The audible alarm is provided by a 12-volt bleeptone unit which is not mounted on the board.

Circuit Function (Fig. 1)

Source Selection Started

When a source selection is started by the operation of a selector key, for example on a continuity desk, WA7 closes and begins a sequence of operations which results, if WA7 remains closed, in the operation after $1\frac{1}{2}$ seconds of the switching transistor TR6.

Normal Working

Under normal conditions, the selector muting relay is operated during the selection process, and on the successful selection of a source, after a maximum closure period of $\frac{3}{4}$ second, it opens and the alarm circuit returns to normal.

Fault Condition 1

If the muting relay fails to open after $1\frac{1}{2}$ seconds, operation of TR6 applies an earth to the outgoing switching line, removing the selector marking and permitting the selector to home and release the muting. In the interval between the operation of TR6 and the opening of WA7, a continuous alarm is sounded. After the operation of WA7 the alarm becomes intermittent and is silenced with the restoration of the circuit to normal by the operation of the muting release key on the desk.

Fault Condition 2

If after automatic homing the muting relay fails to release, the audible alarm remains continuous. Operation of the muting release key may release the selector circuit and silence the alarm. If the alarm restarts after a slight pause, further investigation in the switch-room is required.

Circuit Description

A brief description of the circuit operation corresponding to the above conditions is as follows.

Before Selection

TR1 is turned on by the current through R2, C1 is fully charged, TR3 is on and TR4 is off, CSR1 is non-conducting and TR5 and TR6 are off so that the output terminal 4 is free. TR7 and TR8 are off and the multivibrator TR9 and TR10 cannot operate.

Normal Working

WA7 closes; TR1 is cut off and C1 starts to discharge through R3. When the required source is selected WA7 opens, the circuit returns to normal, and no alarm is given.

Fault Condition

WA7 closes, C1 discharges, the source potential of TR2 falls and the base potential of TR3 falls until TR3 is cut off, after a delay of $1\frac{1}{2}$ seconds. TR4 is turned on and the negative step at TR4 collector turns TR8 on and, via C2 and R12, trips CSR1. TR5, TR6

and TR7 are turned on. TR6 applies an earth to the outgoing switching line, permitting the selector to home. TR7 and TR8 complete the circuit for the bleeptone to sound. If WA7 now releases, TR1, TR2, TR3, TR4 and TR8 revert to the initial state, CSR1 remains conducting, TR6 maintains the disablement of the marking circuit, and TR7 maintains the supply to the oscillator TR9 and TR10. The bleeptone sounds intermittently with a large mark-to-space ratio. CSR1 is released by the operation of the muting release key.

D2 removes the positive spike occurring when TR4 switches off; D3, D4 provide bias for CSR1 anode to keep it non-conducting against supply surges. D7 prevents the bleeptone from operating over the path, 0 volts, R11, R21, TR8 base-collector, R26, D6, -50 volts.

When the 50-volt supply is connected to the IN5/3 the circuit may give an alarm, due to the CSR1 firing on a supply transient. The muting release key will cancel the alarm. If it is undesirable that this should happen, a network of 100 ohms in series with the -50 volt leg, and a shunt capacitor of 4 microfarads on the IN5/3 terminals 7 and 8 will slow the transient and prevent the false alarm. It should be noted that the 100-ohm resistor will reduce the IN5/3 supply voltage, so that if the supply is not stable, the unit may fail to operate.

Test Procedure

Apparatus Required

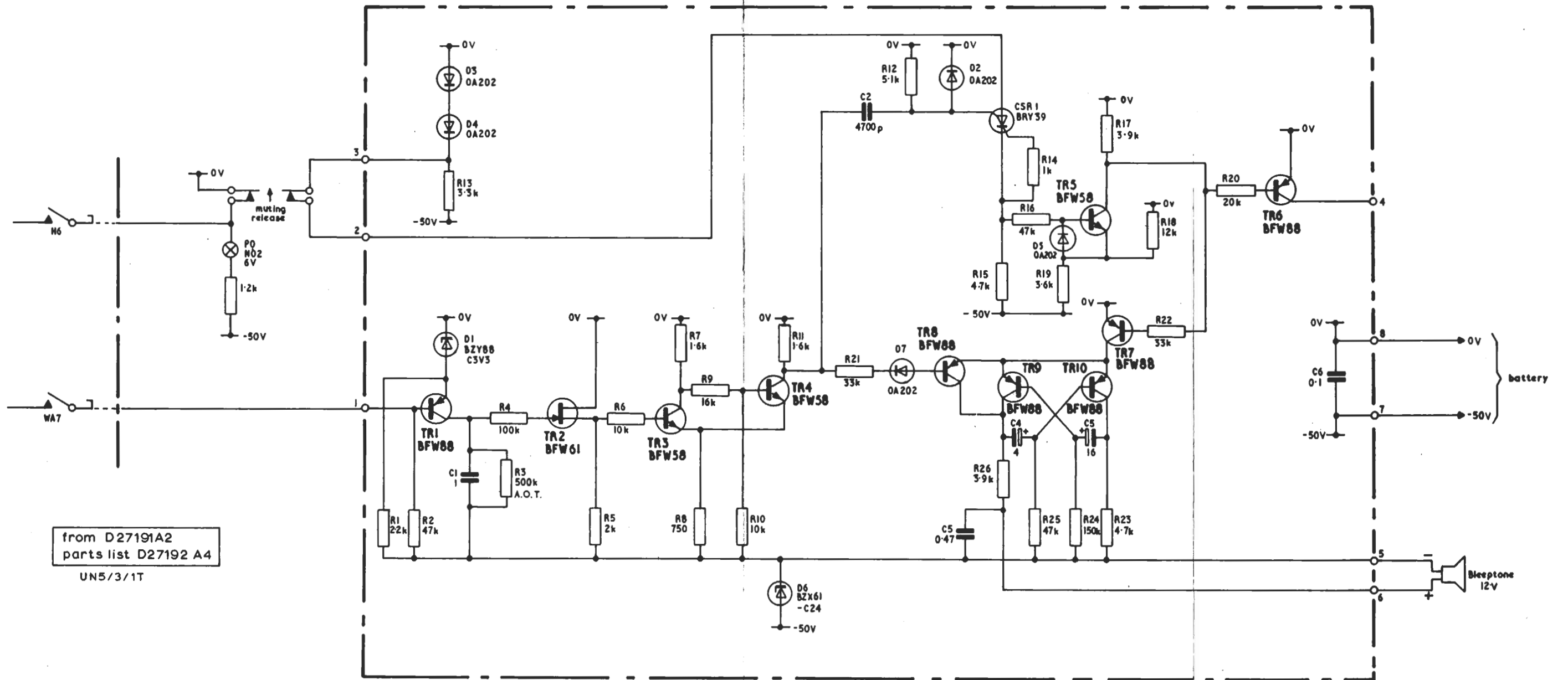
- 50-volt d.c. Power Supply
- 12-volt Bleeptone Unit
- Timer
- 1200-ohm $2\frac{1}{2}$ -watt resistor
- 6-volt P.O. No. 2 lamp

Connections

1. Connect the 50-volt supply to terminals 7 (negative) and 8 (positive) and link terminals 2 and 3.
2. Connect the bleeptone to terminals 5 (negative) and 6 (positive).
3. Connect the resistor and lamp in series between the 50-volt negative supply and terminal 4.
4. Connect the timer to terminals 1 (start) and 4 (stop).

Tests

1. Connect terminal 1 to the 50-volt supply positive. In not less than $1\frac{1}{2}$ seconds the bleeptone should sound continuously and the lamp should light. If it does not, try a higher value for (500-kilohm) a.o.t. resistor R3.
2. Disconnect terminal 1 from the positive supply terminal. The sound should become intermittent.
3. In either of the above conditions the sound should cease if the link between 2 and 3 is removed. The lamp should remain lit until the link is removed.



from D27191A2
parts list D27192 A4
UN5/3/1T

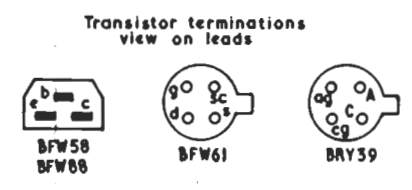


Fig.1. Circuit of INS/3