AF input selection

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Input selection in the battery operated preamplifier published in the January 1997 issue of this magazine is by rotary switch. This does not give the best possible performance as far as crosstalk and channel separation are concerned. This article proposes a better means, which also enables the number of input to be extended to 12. In this design, each input source is linked to the circuit via a bistable relay (described elsewhere in this issue).

Use is made of a single-pole, 12 position rotary switch, S_1, with which and 12 pull-down resistors the input source is selected. Since only one resistor is linked to the positive supply line at any one time, the current drawn by the circuit is only 15 µA, which, in the case of a battery operated preamplifier, is an important advantage.

The 12 outputs of S_1 are linked to parity checker IC_3. The output of this device is high only if an odd number of inputs is high. When S_1 is turned, all inputs go low briefly and so the output of S_3 also becomes low for an instant. The output of IC_3 then triggers monostable multivibrator (MMV) IC_{4a}. Since this is retriggerable, its output will be a single pulse even with contact bounce of S_1. As long as trigger pulses arrive during the period the output is active, the output pulse is stretched. To make absolutely sure, the time can be set with P_1 between 0.1 s and 1 s.

The outputs of S_1 are also linked to D-type bistables IC_1 and IC_2, which ensure a stable change-over of the output levels. The bistables have the advantage that they can be reset. This facility is made use of by resetting all relays before a change of input, so ensuring that only one input is linked to the circuit at any one time. This arrangement provides a dead time between the releasing of one relay and the tripping of another. This dead time corresponds to the sum of the mono times of IC_{4a} and IC_{4b}. MMV IC_{4b} serves to clock the inputs of all the D-type bistable. Since this requires a pulse of only 10 µs, the dead time is determined primarily by IC_{4a}.

The Q output of IC_{4a} is used to reset the D-type bistables, but it also provides the reset pulse for all relays together. Accordingly, the new data from S_1 is accepted by the D-type bistables 10 µs after the reset pulse. To enable the position of S_1 to be assumed during the rise time of the supply lines, the bistables need an additional pulse and this is provided by R_5-C_3.

About 4 seconds after the supply has been switched on, the 13th input of the parity checker changes state, which results in the output of IC_3 changing from low to high and the triggering of IC_{4a}. This means that all relays are reset after switch-on, immediately followed by the enabling of the relevant input. This entire process must be completed before the output of the preamplifier becomes active.

The circuit requires a power supply of about 15 V. The diagram shows how this may be derived from the ±7.2 V supply of the battery operated preamplifier.

The ICs are protected against overvoltage by zener diode D_1. To ensure that the current through this diode is held within limits when the battery voltage is high, current source T_1 is provided in series with D_1.

When the supply voltage is lower than 15 V, the drop across R_6 and T_1 may be ignored, but when it is higher, the current is limited to about 400 µA.

The value of capacitor C_8 is purposely large since this component provides the energy required for changing over the inputs. This becomes clearer on reading the 'AF input module' elsewhere in this issue.

Finally, diode D_2 prevents C_8 being discharged via T_1.

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