Electronic changeover switching

The circuit shown in Fig. 1 effects a changeover function when only a single pair of contacts is available. When the switch is open, only input A is admitted to the output via R_4. When the switch is closed, input B is admitted to the output together with an inversion of the input A signal, which cancels the direct signal A and leaves only signal B present. A gain of two is given to input B by the op-amp circuit, to bring the system gain to unity for both inputs A and B by compensating for the attenuation of signal B through R_5

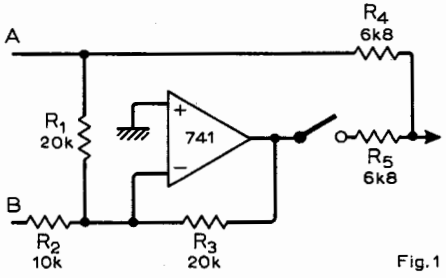

Fig. 1

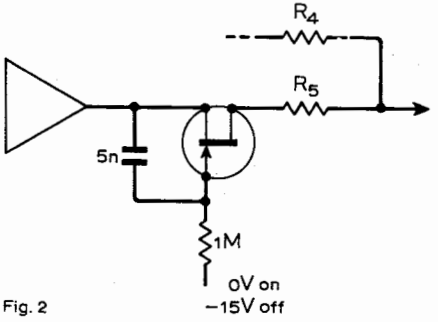

Fig. 2

and R_4 (assuming source impedance at input A $\ll$ 6.8kΩ. The degree of attenuation of the unselected input depends on the tolerances of R_1, R_3, R_4 and R_5, and if more than about 30dB rejection is required, some trimming may be necessary.

Electronic switching can be accomplished by substituting an f.e.t. to replace the switch, as shown in Fig. 2. The 5nF capacitor prevents the f.e.t. from cutting off during the positive half-cycles above about 100Hz which exceed the f.e.t. pinch-off voltage when in the on state.

In certain multi-changeover switch functions the operational amplifier could be a section of a programmable op-amp.

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