Solid state vs electromechanical multiplexers

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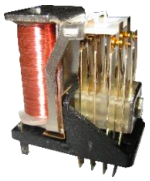
INTRODUCTION:

Multiplexers are devices that interconnect a common line with one or several channels. They allow sharing common resources in experimental setups or driving a variable number of transducers at different times among other many uses. Multiplexers are based on electronic switches which can be implemented through either electromechanical or solid-state devices. The aim of this note is to describe the benefits and drawbacks of each technology and help users to select and use an appropriate model.

COMPARISSON:

Electromechanical switches are widely refered to as relays. The switch is based on two thin plates that are mechanically contacted or separated by an electromagnet. Due to their mechanical nature, relays are slow and relatively prone to break. The lifetime is guaranteed for an specific number of commutations, 100kcycles being a typical value. Electromechanical switches are cheap and can handle high currents withough a significant heat dissipation.



On the other hand, solid-state swithces employ semiconductor devices to open or close the circuits. One of their main advantages is a very high switching speed. In addition, since they do not incorporate mechanical parts, solid state switches offer a much longer lifetime. Their drawbacks consist of a higher resistance for circulating currents and a lower isolation.

CIPRIAN MULTIPLEXERS:

Ciprian offers both types of technologies, leting the user to select the most appropriate device. Note The table below compares the main parameters of the products related with the two technologies:

	Electromechanical	Solid state
Lifetime of switches	10^5 cycles min. (hard switch) $2 \cdot 10^6$ cycles min. (soft switch)	Unlimited
Switching speed	15ms	3µs
On resistance	30mΩ	1.2Ω (SSM-08-A model) 600mΩ (SSM-08-B model)
Isolation at 1MHz, 50Ω	-56dB	-60dB (SSM-08-A model) -23dB (SSM-08-B model)
Maximum voltage	$800V_{pp}$	$1400V_{pp}$
Maximum current	5A	2A

Please, contact us at support@ciprian.com for any question related to the use of a multiplexer in your specific application.

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