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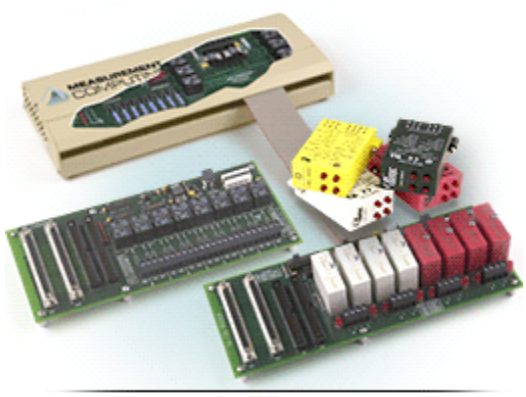
MEASUREMENT COMPUTING

The leader in low cost PC-based data acquisition, control, and GPIB hardware and software.

Technical Note

Electromechanical Relays vs. Solid-State Relays



When searching for digital signal conditioning, there are two popular choices: electromechanical relays or solid state relays. Though there are no absolute rules, an application that requires very low on resistance (e.g. an analog multiplexing circuit), or very high off resistance (low leakage current) should use an electromechanical relay. In these circumstances, the electromechanical relays provide a true open circuit as long as the contact ratings are not exceeded. In addition, electromechanical relays are available in several "forms" (Form A, or Normally Open, Form B, or Normally Closed, and Form C, or a combination of Forms A and B) and a wide variety of pole configurations (SPDT, DPDT, etc.). This enables them to better serve as cross point and multiplexing switches as opposed to simple on/off devices.

Solid-state relays, on the other hand, also have a variety of advantages. Among these advantages are:

- They can switch AC signals at the zero crossing, thus reducing surge currents. That is not the purpose of a relay.
- They are quiet, meaning they do not chatter or click when they energize.
- They frequently require less drive/control current than electromechanical relays.
- They do not exhibit contact "bounce."
- They can be made to act faster than many electromechanical devices.

As a result, an application that requires very fast response times would be better served by Solid State Relay (or SSR) modules. In addition, the modular nature of the SSRs provides more flexibility in developing a high voltage system. For example, the SSR modules are usually mounted in racks that have both input and output capability. This modularity enables the user to build a system using a combination of modules with different specifications. Thus, for more complex, input-output applications, the SSRs would be a better choice.

Many applications are well served by either type of relay and your decision may then move on to other criteria such as price, input requirements or personal preference. The modularity of the SSRs gives you the opportunity to customize, but that comes with a price—the cost of an SSR system tends to be higher than an electromechanical relay-based system with similar specifications. On the other hand, longevity—the life span of an instrument or device—also contributes to cost. When operated within their specifications, solid-state I/O modules typically have a longer life than

electromechanical relays.

Measurement Computing offers relays in both electromechanical and solid-state products, both as external accessories to digital I/O boards and as boards or devices that integrate relays with I/O functions, for a variety of buses and interfaces:

Product Name	Relay Type	# Relay Channels	Bus/Interface Supported	External or Integrated
CIO-ERB08 CIO-ERB24 CIO-ERB48	Electromech.	8 24 48	PCI, ISA, USB	External
6K-ERB08	Electromech.	8	PCI (6000 Series)	External
CIO-RELAY08 CIO-RELAY16 CIO-RELAY32	Electromech.	8 16 32	ISA	Integrated
USB-ERB08 USB-ERB24	Electromech.	8 24	USB	Integrated
CIO-PDISO8 CIO-PDISO16	Electromech.	8 16	ISA	Integrated
PCI-PDISO8 PCI-PDISO16	Electromech.	8 16	PCI	Integrated
USB-PDISO8	Electromech.	8	USB	Integrated
E-PDISO16	Electromech.	16	Ethernet	Integrated
SSR-RACK08 SSR-RACK24 SSR-RACK48	Solid-state	8 24 48	PCI, ISA, USB	External
6K-SSR-RACK08	Solid-state	8	PCI (6000 Series)	External
USB-SSR08 USB-SSR24	Solid-state	8 24	USB	Integrated

The bottom line with high voltage relays, as with any other data acquisition purchase, is that you should buy what you actually need, which is not always the product that will give you the highest performance or the greatest range or the greatest flexibility. Buying what you need instead of paying for features and capabilities that you won't use will result in significant cost savings.

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