

# Selecting an economical 19-in. rack system

*Construction, accessories, and customization capabilities  
should be taken into account*

BY RAVI JAIN  
Bud Industries  
Willoughby, OH  
<http://www.budind.com>

In today's tough economic environment, engineers and system integrators are under increasing pressure to optimize their design and find low-cost solutions for their 19-in. rack systems. While an abundance of manufacturers and suppliers offer a variety of 19-in. racks and accessories, it can be a challenging task to select the right components that will provide the best value.

## Construction features

Most racks are available in welded or knockdown styles. While welded racks are more rigid and sturdy, they are more expensive, difficult to modify, and require more space for storage prior to use.

Although less expensive to ship and store than welded racks, knockdown styles require more assembly time. If you select a knockdown style, make sure it is easy to assemble and remember that total assembly cost must be considered in the final cost analysis.

Removable side panels are preferred because they provide easy access to interior components. Racks with fixed or integrated side panels are less expensive and are easier to seal against environmental factors such as dust, moisture, and EMI/RFI.

Side panels may be flush mounted or surface mounted. Flush-mounted sides require no additional space, but limit the space between



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the frame and sides that could be used for wire routing. Surface-mounted sides provide more wire-routing space and are easier to seal.

Both solid and see-through doors are available in flush-mounted as well as surface-mounted styles. Although flush styles are generally less expensive, they reduce available space in front of panels that may be needed to clear panel-mounted components such as knobs and switches.

When selecting a see-through door, make sure that the see-through opening is wide enough for your application. See-through doors come in extruded aluminum or steel.

Extruded aluminum offers an attractive appearance while keeping weight light. Heavier steel is less expensive.

Top covers could be either fixed or removable and ventilated or non-ventilated. While fixed covers are cheaper, they block access from the top and make it difficult to machine cable access or fan-mounting holes.

Ventilated covers allow natural exhausting of hot air and help keep the rack cool inside. Some manufacturers provide ventilated tops with prepunched holes for mounting an exhaust fan if one is needed.

Most manufacturers supply racks with fixed or adjustable EIA equipment mounting rails. Although fixed rails provide cost savings, they limit the flexibility of mounting different types of equipment.

Front rails may need to be moved back to clear components and wires in the front. Rear rails may need adjustment to suit the depth of equipment.

The shape of the mounting rails also varies between various manufacturers. Typical L-shaped mounting rails, while less expensive, make assembly of accessories tedious.

Some manufacturers provide a specially shaped rail with a second accessory-mounting flange. This additional flange makes it much easier to assemble accessories such as shelves, drawers, or support brackets. Pretapped rails are preferred over rails with square or round holes that require expensive cage nuts for assembly of equipment.

## Finish

The most common finish for racks and accessories is powder coating, and most manufacturers now prefer powder coatings to liquid paint primarily because of environ-

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mental regulations. Powder coating also provides a more durable, uniform, and better-quality finish.

Finishes may either be smooth or textured. Textured finishes are preferred because they hide minor blemishes on the metal surfaces and are easier to control. However, if the surface needs to be silk screened, a fine texture or a smooth finish is preferred.

Powder finishes are available in a variety of types, including epoxy, polyester, and urethane. Consult the manufacturer for your exact application. When specifying colors for your finish (powder or paint), try to use an industry-standard color such as Pantone or Federal Specification 595B.

### Accessories

Many accessories are required to build a complete system. Availability of a variety of off-the-shelf accessories at reasonable cost should be a key factor in selecting the rack manufacturer.

One of the more important

accessory features is cooling, which can be provided via fans and blowers. Typically used for exhausting hot air from the system, as well as honing in on specific hot spots, cooling fans with ball bearings typically offer longer life.

Blowers, which suit densely packed racks, are most desirable with lower noise levels. Noise ratings from 50 to 65 dB are typical. Designers must ensure that device, whether a fan or blower, provides adequate airflow (typically measured in cubic feet per minute) under actual backpressure conditions.

In addition to the above key accessories, many manufacturers offer a wide selection of off-the-shelf accessories such as power strips, shelves, panels, drawers, desktops, mounting brackets, casters, levelers, slides, handles, and wire-management accessories that can be used to build your system.

### Custom modifications

Many systems in their final configuration may require some type of modification of the off-the-shelf compo-

nents to achieve the intended functionality. The most common modifications include drilling or punching of holes, machining of cutouts, silk screening, and preassembly of accessories.

It is often very difficult for the end user to perform these modifications. Most manufacturers can provide these modifications at a much lower cost than what the end user would incur when doing it on his or her own.

Other custom modifications may include special height, width, depth, custom colors, and environmental protection features such as EMI/RFI shielding and compliance to UL/NEMA requirements. It is important to choose a vendor that provides a wide selection of styles, sizes, finishes, and accessories and has the ability to provide custom modifications.

If you need to build a complex system, it is important to get expert design help. Manufacturers have an in-house design staff that can provide advice and help in designing the exact system to suit your needs. 



TEL: 440-946-3200 • FAX: 440-951-4015  
saleseast@budind.com  
www.budind.com