

## Select the right rack and rack options for your IBM @server xSeries servers



### Completing your server solution with IBM racks and rack options

No solution built from rack-ready IBM @server xSeries™ servers should be considered complete without an IBM rack. IBM offers an extensive range of industry-standard, EIA-compatible rack enclosures, expansion units and rack options that are designed to accommodate our line of rack-ready products, including the line of xSeries servers and storage options.

There are compelling reasons for purchasing IBM racks and rack options instead of using rack products from other manufacturers, including:

- A fully configured, all-IBM rack solution—including power distribution units (PDUs), uninterruptible power supply (UPS), console switches and cables—may help you speed implementation with one-stop shopping and simplify installation with the assurance that the pieces will work together out of the box.
- Ready-to-run solutions may also help speed implementation and reduce the workload on your staff. IBM can ship certain racks preloaded with xSeries servers, server options and rack options.
- IBM racks offer exceptional thermal protection for your server investments by providing outstanding airflow and heat dissipation *without* relying on failure-prone fans or other mechanical components.
- IBM racks are competitively priced and offer exceptional value, with many standard features that many other manufacturers provide only as extra-cost options.
- IBM racks offer many choices, with value-priced standard racks in two sizes, a more rugged IBM 42U Enterprise rack and an 11U rack that are designed to provide complete small business solutions.
- Customers can mix IBM and non-IBM servers and network storage solutions in a single rack or suite of racks, which may help optimize space and simplify management. What's more, IBM rack solutions are modular, so you can buy from IBM with confidence that your investment is designed to support business growth over the long term.

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#### IBM rack solutions

IBM offers flexible rack solutions that help you consolidate servers and save space, while permitting easy access to crucial components and cable management. The IBM family of rack solutions includes:

- **NetBAY42™ Enterprise Rack**
- **IBM S2 42U Rack**
- **IBM S2 25U Rack**
- **NetBAY11™ Standard Rack**
- **Rack options**
- **A full complement of xSeries server conversion kits**
- **IBM @server xSeries Rack Configurator software**

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## Addressing customer requirements

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**Scalability.** IBM rack solutions are modular and may be expanded readily to help accommodate data center growth. IBM rack solutions are designed to help you implement enterprise-class systems, with massive storage, easily and cost-effectively.

**Flexibility.** With the IBM range of standard and enterprise rack offerings, customers may choose the solutions that best meet their budgets and their business needs. Customers may mix and match new rack-ready IBM products with existing EIA-compatible equipment.

**Availability and reliability.** PDUs that are designed to enable connectivity to redundant, diverse power sources, plus IBM UPS options, may help increase system availability and reliability.

**Manageability.** The IBM @server xSeries Rack Configurator is an easy-to-use tool to aid in planning and to validate your installation. Plus, customers can plan and control racked systems from a single console with IBM Director server management software.

**Rapid implementation.** Both NetBAY42 Enterprise Rack models, the IBM S2 25U Rack and the new NetBAY11 Standard Rack can be shipped fully equipped and ready to run.

**Security.** Lockable doors—a standard feature on IBM racks—help provide a more secure environment to better protect hardware, media and data.

**Space optimization.** Flexible rack solutions help consolidate servers and save space while permitting easy access to crucial components. The new NetBAY11 Standard Rack provides 11U of rack space—the capacity your small business may need to centralize your IT operations. That's flexibility and ease of use.

**Cost-effective and cost-saving solutions.** IBM rack solutions are competitively priced in the marketplace. These solutions may help you achieve operational cost savings with simplified management, ease of configuration and installation, simplified cabling and potential reductions in costly office "real estate" for IT equipment.

**Service and support.** Customers purchasing an IBM rack and other rack and systems options along with xSeries servers get the benefit of one-stop shopping plus acclaimed service and support from IBM Business Partners and IBM HelpCenter® staff. IBM racks, plus IBM rack options installed at the time of purchase, come with a three-year limited warranty\*\*.

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## Solutions for your business

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- **Large data centers and rack-dense server installations.** Large enterprise customers, NetGen companies with large Web installations, telecommunications providers, ASPs (application service providers) and ISPs (Internet service providers) may all benefit from installing rack-dense xSeries servers in combination with IBM rack solutions.
- **Branch office rollouts.** IBM can help you streamline the task of replicating a complete server/storage/backup/networking solution across multiple remote locations. With the compact IBM 25U Rack, IBM can preload the solution and ship cabinets designed to ready to "plug and play" to each location.
- **Small business solution.** The NetBAY11 Standard Rack is intended to provide the framework for complete small business solutions. Its 11U footprint and big rack features help customers squeeze more computing power in a smaller space.
- **Storage.** Using the new 3U IBM DS300 or IBM DS400 storage units and 300GB<sup>2</sup> hard disk drives, customers may pack more than 58TB<sup>2</sup> of storage in a single IBM S2 42U rack<sup>3</sup>.
- **Clustered server configurations.** By consolidating redundant servers and shared storage in a single cabinet or rack suite, you may build a complete high-availability solution.
- **Space constraints.** With their space-saving footprint and exceptional cable management design, IBM rack solutions help you significantly reduce the data center "real estate" required for computing resources.
- **Security concerns.** IBM racks include locking doors and side panels as standard equipment to help protect critical business data.

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\*\* See page 18 for additional information on limited warranty <sup>1</sup>

### Shopping strategies

When you are shopping for rack solutions, be sure to keep the following points in mind:

1. IBM racks, rack options and the full line of xSeries servers and xSeries options have been **compatibility tested** under the IBM ServerProven® program. That means customers can configure IBM solutions with confidence that the **components work well together** out of the box—which may help you simplify installation and speed return on investment.
2. **Beware of fans!** Competing racks may offer optional fan kits, touting fans as effective “boosters” for handling thermal loads. **IBM racks offer exceptional cooling performance in a “fan free” environment.** Our racks are designed and tested to handle challenging thermal loads, including a cabinet full of heat-generating rack-dense servers—without requiring fans to enhance air flow. Why is this an advantage? Fans are mechanical devices that maybe prone to failure. **By eliminating fans through excellence in engineering, we have eliminated a potential point of failure and helped reduce the cost of the solution.**
3. **Underneath the covers, not all racks are alike.** Shopping for racks requires careful study of features, specs and options to achieve an apples-to-apples comparison. **IBM racks are competitively configured, with many standard features included in the base price** that are often add-on, extra-price options on racks from other vendors. Beware of hidden costs!
4. **Space is expensive.** Rack-ready xSeries servers and storage components are designed to pack an amazing amount of processing power plus terabytes of data into a very compact space, helping reduce the need for acquiring, air conditioning and powering office (or data center) real estate.
5. **Small business solution.** If you’re considering deployment of tower units in several locations, you should consider consolidating your IT operations in the NetBAY11 Standard Rack. This unique rack provides 11U of rack space—just the capacity your small business may need to centralize your IT operations. Make flexibility and ease of use your ally.
6. **The more complex the solution, the more important the choice of rack solution.** For customers who are purchasing large-scale server solutions, a rack is no longer simply a convenient shelving system for organizing equipment and saving space. For example, 42 1U rack-dense servers can be installed per cabinet, generating **potentially damaging thermal loads.** And with clustered solutions, a rack can house terabytes of **business-critical data.** In these complex environments, the rack solution becomes **a critical tool for protecting your investment** in hardware and data and helping to ensure a reliable, highly available IT environment.

### Selection considerations

Points to consider	Factors influencing purchase decisions
Has the rack you are planning to use been designed and tested to handle the high thermal loads placed on it by xSeries servers?	Temperature has been identified as one of the leading causes of data loss, hardware damage and downtime. Housing xSeries servers in a rack that cannot handle the challenging thermal loads of a cabinet full of heat-generating rack-dense servers may put your hardware investment and data at risk. IBM racks have been tested to handle these thermal loads.
Are you confident that the rack you are planning to use offers the right cost/benefit for your organization?	With two families of racks—enterprise and S2—IBM offers customers who need only basic features and functions a price alternative that is currently unavailable from other vendors. IBM S2 Racks are some of the lowest priced racks in the marketplace (including after-market products), and are built to IBM quality standards.
In your cost comparisons between IBM and other vendors’ racks, have you factored in all of the options you will need to purchase for a complete solution?	Many competitors’ racks do not include the same standard features as IBM racks. Make sure you understand the add-on costs required to buy a fully configured rack. See details on page 10.
What is the value of your data and the business processes that your servers will house and run? How much would an outage cost your company? Have you included power protection in your solution configuration?	Every day businesses large and small are at risk of occasional power fluctuations and interruptions. It’s a reality that electric service cannot be guaranteed 24/7. IBM UPS products help safeguard customers’ investments in technology and data by protecting your sensitive electronic equipment. IBM UPS products offer surge protection, power conditioning, battery backup and peace of mind.

## Products and solutions

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### **IBM Rack product family**

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#### Key features

- **Availability and reliability** - Thermally balanced design provides a fan-free environment and helps enhance airflow to help protect equipment
- **Flexibility** - Sized to handle space requirements of deeper xSeries servers without requiring cabinet extenders, supporting a mix of new rack-ready IBM products with existing EIA-compatible equipment
- **Space optimization** - Zero-space optimization (see explanation of "Zero Space" under "power distribution" section below on Page ??) and improved cable management help maximize EIA space
- **Scalability** - Modular design makes it easy to add racks and servers as needed to accommodate data center growth
- **Rapid implementation** - Robust mechanical design helps enable shipping solutions ready to run
- **Security** - Lockable doors and heavy-duty slide-out component rails help provide a more secure environment for equipment and data
- **Manageability** - Powerful yet easy-to-use configuration and management software from IBM helps simplify planning, installation and ongoing operation of data center environments
- **Cost-effective solutions** - Two rack families—NetBAY and S2 Racks, conversion kits and rack options offer a virtually unmatched set of price alternatives that help you deploy rack solutions that meet your business, technical and budget requirements



#### NetBAY42 Enterprise Rack

- 42U of fan-free rack space designed for enhanced air flow
- Four 1U sidewall compartments for power distribution and other components
- Generous space and easy rear access for cable management
- Outstanding ruggedness and stability with welded-steel construction and heavy-duty casters
- Fits easily through standard 2.03m (80") doorways
- **Is designed to be shipped preloaded and ready to run, plus can be relocated easily even when fully loaded**



#### IBM S2 42U Rack

- 42U of fan-free rack space designed for enhanced air flow
- Six 1U sidewall compartments for power distribution and other components
- Value-priced rack for entry-level and midrange rack solutions



#### IBM S2 25U Rack

- 25U of full-function, EIA-compatible fan-free rack space designed for enhanced air flow
  - Two 1U sidewall compartments for power distribution and other components
  - Small rack cabinet ideal for branch office, small-business or space-constrained environments
  - **Is designed to be shipped preloaded and ready to run**
  - Value-priced
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## Space-efficient protection for networked systems



### NetBAY11 Standard Rack

- 11U of full-function, EIA-compatible fan-free rack space designed for enhanced air flow
- Big rack features in 11U capacity to help you squeeze more computing power into a smaller space
- Is designed to provide the framework for complete small business solutions that are assembled, tested and ready to run
- Retractable stabilizer foot that helps allow components to slide forward for safe, easy service and configuration
- Provides a common building block for xSeries system rack-to-tower conversions

### IBM @server xSeries Rack Configurator software

The variety of sizes, access, component cabling and power supply requirements of servers, accessories and storage components make it a challenge to configure a complex networked system. The IBM @server xSeries Rack Configurator provides a tool that helps you design the optimum layout. The configurator helps you check, correct and report the following:

- Components by product number and position
- Infrastructure specifications, including weight, power, volt-amps (VA), heat (BTU/hr), bays, EIA, outlets and console ports
- Width and depth; front, rear and side clearances; total weight and top clearance
- Cables and connectors by component position

### Overview

xSeries Rack Options, ranging from cables to power distribution units to console switches, help you optimize rack layouts with space-saving designs. IBM rack-mountable components help allow you to complete the most efficient rack solution with confidence. xSeries and IBM rack options are ServerProven for compatibility. Highlights of key rack options follow. For a detailed parts list, see page 14 of this guide.

## IBM rack options

### Console support

#### IBM NetBAY 1x4 and IBM NetBAY 2x8 Console Switches

The IBM family of console switches consists of the IBM ACT family as well as an array of traditional KVM products. Both these product sets help allow multiple users access to your entire solution. These products take switching to the next level with intuitive GUI interfaces - point and click to switch from one server to another. These switches offer:

- Exceptional flexibility, with support for multiple users, platforms and languages
- Flash-upgradable firmware (via serial port) helps ensure future hardware compatibility
- Universal voltage (100-240V AC, 50-60Hz)

See the WW Rack web page at <http://www-1.ibm.com/servers/eserver/xseries/storage/rack.html> for more information on ACT and other KVM products.

### Flat panel monitor console kits



IBM Flat Panel Monitor Console Kits deliver solutions to help solve critical space problems. The new IBM 17" 1U Flat Panel Monitor Console Kit and the IBM 2U 15" Flat Panel Monitor Console Kit [help](#) allow IT professionals to administer their systems without sacrificing rack space.

When rack real estate is crucial, choose the IBM 17" 1U Flat Panel Monitor Console Kit. This Flat Panel Monitor family provides a sleek, contoured design with integrated tray, keyboard and monitor that's 50% smaller than the 2U solution. Its slender 1U form factor helps provide maximum system density, while its easy-to-install, preloaded configuration offers a solution that's designed to be ready to run. With two models available—one with a U.S. keyboard and the other without the keyboard (for National Language Support)—you can choose your desired setup. Ideal for high-density IT solutions, the IBM 17" 1U Flat Panel Monitor Console Kit helps complete your rack-optimized infrastructure.

The 1U product offers:

- Integrated design ready to install
- High-quality 17" TFT active matrix screen with 1,280 x 1,024 resolution
- Standard VGA connector and onscreen display adjustments
- Universal power supply that allows operation at 100-240V, 50-60Hz



If conserving maximum rack space is not as important to you, consider the affordable 2U Flat Panel Monitor Console Kit. This 2U unit yields a solution that is a proven winner with its high-quality display, easy operation and the ServerProven® assurance of interoperability. To help save time and make operation easier, the kits mount on industry-standard 19" rails, and both units pair a 15" flat panel monitor with the IBM UltraNav keyboard built around the IBM TrackPoint® device. NLS keyboards are available for a wide variety of languages.

### **Power distribution** IBM DPI Rack Power Distribution Units

IBM offers multiple DPI Rack PDU models. These PDUs support various size configurations, from a few servers to 42 1U servers in a single rack, or multiple rack-optimized servers or IBM BladeCenters. IBM DPI PDUs offer these key features:

- **Zero space** - The PDUs can be installed in 1U sidewall compartments in IBM racks to help minimize required rack space.
- **High availability** - IBM DPI PDUs can be configured to help provide redundant power distribution, helping to eliminate points of failure and increase data availability. The PDUs can be used in combination with IBM rack-mountable UPS products to help provide an advanced fault-tolerant power distribution system.
- **Scalability** - Innovative modular design allows units to be mixed together to help accommodate growth of power distribution needs.

**DPI Universal Rack PDU.** This low-cost, basic PDU supports:

- Universal voltage (100-240V) AC power input
- Seven C13 outputs (Nema version also available)

**DPI Front-End PDU.**

- Available either as low voltage (100-120V) or high voltage (220-240V)
- Available in either single phase (30,60 Amp) or 3 phase (32, 63 Amp)
- Provides three C19 outlets
- Includes nonreplaceable fuse for protection

**DPI High Density PDU.**

- Available as high voltage (208-250V)
- Available in either single phase (60, 63 Amp) or 3 phase (32, 60 Amp)
- Provides twelve C19 outlets
- Includes nonreplaceable fuses for protection

**DPI Enterprise PDU.** A universal wiring unit:

- Available either as low voltage (100-120V) or high voltage (220-240V)
- Available in either single phase (30,60 Amp) or 3 phase (32, 63 Amp)
- Provides either six C19 or twelve C13 outlets
- Nonreplaceable fuses for protection, outlets and cord connection are all on the same side for easier access.

### **Uninterruptible power supplies (UPS)**

IBM offers a selection of UPS products that have been tested for compatibility with xSeries systems. UPS products from IBM help protect customers' valuable investments in technology and data. This line of rack-ready and tower UPS products offers surge protection, power conditioning and battery backup.

Purchasing UPS products from IBM offers these advantages:

- PowerChute Business Edition software for advanced UPS power management and diagnostics helps provide easy integration with IBM Director server management software.
- PowerNet SNMP Snap-Ins help ensure smooth integration with IBM Director and Tivoli® TME 10™ Network Management solutions, offering central control of all UPS systems across monitored LANs.
- IBM products carry a three-year limited warranty\*\*.
- IBM products are color matched (black) to xSeries, Netfinity® and NetBAY products.

IBM offers low- and high-voltage rack-ready UPS models:

- **IBM UPS 3000 XLV** - 2U, 100-127V, six C14 & one NEMA 5-20R outlet
- **IBM UPS 3000 XHV** - 2U, 220-240V, seven C14 & one C20 outlet
- **APC Smart-UPS 5000RMB** - 5U, 208V, eight IEC 320-C13 outlets, one IEC 320-C19 outlets
- **APC Smart-UPS 5000RMiB** - 5U, 220-240V, eight IEC 320-C13 outlets, two IEC 320-C19 outlets
- **IBM UPS 7500 HXV** - 6U, 200-240V, four C19 outlets
- **IBM UPS 10,000 HXV** - 6U, 200-240V, four C19 outlets

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\*\*See page 18 for additional information on limited warranty.<sup>1,4</sup>

### **Additional options**

IBM offers a comprehensive range of industry-standard options and accessories that help optimize space utilization within IBM racks and scale rack systems to meet growing requirements. Rack options include:

- Monitor compartment and a selection of CRT color monitors

## Space-efficient protection for networked systems

- Blank filler panels that help maintain maximum airflow in racks that are not filled with equipment
- Fixed shelf to support up to 100 lb of equipment not configured for rack mounting

### **Conversion kits**

Conversion kits help allow customers to convert a rack-ready xSeries or Netfinity server to a tower configuration. This is intended afford you an exceptional degree of flexibility and, potentially, investment protection, helping to simplify the reallocation of server assets as business needs change.

**The NetBAY11 Standard Rack** provides a common building block for xSeries rack-to-tower conversions. This rack is especially useful for high-end xSeries servers and options. The common building-block feature helps eliminate the need for multiple conversion kits, allowing you to simplify your IT operations and focus on more important business matters. The NetBAY11 is designed to accommodate any rack-optimized xSeries server, option or storage product customers have deployed. That's flexibility and ease of use working for you.

In addition to the NetBay11, IBM offers a complete suite of tower-to-rack conversion kit options to help allow you to mount a tower style system into your IBM rack:

- 09N4300 4U x 24"D
- 26K6122 4U x 24"D
- 13N0956 5U x 24"D
- 13N2455 5U x 20"D
- 32R0719 7U Kit
- 32P1474 7U x 26"D

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### **Service and support**

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IBM IBM Rack solutions are backed by the acclaimed service and support of IBM.

- IBM racks and installed IBM rack options come with a three-year limited warranty\*\*
- IBM offers services to help facilitate the planning, installation and configuration of rack solutions.
- *ServicePac™ for SmoothStart™ Services are available from IBM Business Partners for stand-alone or clustered xSeries servers.*
- IBM HelpCenter® locations provide telephone support virtually around the clock.

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\*\*See page 18 for additional information on limited warranty.<sup>1</sup>

# Product specifications

## IBM Racks

	NetBAY42 Enterprise Rack	IBM S2 42U Rack
Part Number	930842S (stand-alone) 930842E (expansion)	93074SX (stand-alone) 93074EX (expansion)
Industry-standard cabinet	EIA 310-D-Type A cabinet with universal hole spacing	
Door style	All models include a perforated front and rear door standard	
Unit mounting capacity	42U, plus four 1U sidewall compartments	42U, plus six 1U sidewall compartments
Side panels	Included with P/N 930842S	Included with P/N 93074SX
External dimensions (HxWxD)	202x65x110cm (79.5"x25.6"x43.3")	200x61x100cm (78.7"x24"x39.4")
Weight	On casters or leveling pads	On casters or leveling pads
Empty cabinet	261kg (575 lb)	138kg (303 lb)
Load capacity	667kg (1467 lb)	952kg (2100 lb)
Total	928kg (2042 lb)	1090kg (2403 lb)
Shared console support option	Console server selector switch; 4, 8 ports per switch; two-level switch tiering; 8x8 = 64 ports maximum	
Power distribution options (country-specific)	Power distribution units: Universal Rack DPI PDU; Front End DPI PDU; High Density DPI PDU; Enterprise DPI PDU. Uninterruptible power source: 1400VA; 3000VA; 5000VA; 7500VA and 10,000VA	
Supported devices	xSeries systems; older IBM Netfinity servers; IBM storage expansion units; IBM tape libraries; IBM console devices; IBM monitors; IBM keyboards; power systems (including APC UPSs); Flat Panel Monitor Rack Mount Kit ; user-defined components	
Planning aid	The IBM @server xSeries Rack Configurator	
Standard features	Lockable doors Lockable side panels (930842S only) Marriage kit (930842E only) Stabilizer foot	Lockable doors Lockable side panels (93064SX only) Marriage kit (93064EX only) Stabilizer foot Side stabilizers
Limited warranty**	3-year	

\*\*See page 18 for additional information on limited warranty.<sup>1</sup>

## Product specifications

### IBM NetBAY racks

	IBM S2 25U Rack	NetBAY11 Standard Rack
Part Number	93072SX (stand-alone)	9306110 (stand-alone)
Industry-standard cabinet	EIA 310-D-Type A cabinet with universal hole spacing	
Door style	All models include a perforated door standard	
Unit mounting capacity	25U, plus two 1U sidewall compartments	11U
Side panels	Included with P/N 93074SX	Not applicable
External dimensions (HxWxD)	124x61x100cm (49x24"x39.4")	61x52x88cm (24"x20.4"x34.4")
Weight	On casters or leveling pads	On casters or leveling pads
Empty cabinet	98kg (217 lb)	34kg (75 lb)
Load capacity	567kg (1250 lb)	182kg (400 lb)
Total	665kg (1467 lb)	216kg (475 lb)
Shared console support option	Console server selector switch; 4, 8 ports per switch; two-level switch tiering; 8x8 = 64 ports maximum	
Power distribution options (country-specific)	Power distribution units: Universal Rack DPI PDU; Front End DPI PDU; High Density DPI PDU; Enterprise DPI PDU. Uninterruptible power source: 1400VA; 3000VA; 5000VA; 7500VA and 10,000VA	
Supported devices	xSeries systems; older IBM Netfinity servers; IBM storage expansion units; IBM tape libraries; IBM console devices; IBM monitors; IBM keyboards; power systems (including APC UPSs); Flat Panel Monitor Rack Mount Kit ; user-defined components	
Planning aid	The IBM @server xSeries Rack Configurator	
Standard features	Lockable doors Lockable side panels Stabilizer foot	Lockable front door Retractable stabilizer foot
Limited warranty**	3-year	

\*\*See page 18 for additional information on limited warranty.<sup>1</sup>

## Space-efficient protection for networked systems

### **Product summary** **IBM 930842S/930842E**

#### **IBM advantages**

- Robust design with high load capacity
- Room at the rear for cable management
- Cable tie-down points included in the design of the rack
- Lower side covers can be removed without tools to access side pocket devices
- Front door opens more than 170 degrees, allowing easier access to equipment in the rack
- Rear door easy to remove and reinstall
- Stability (wider, deeper), with ballast built in
- **Ship-loaded capacity**
- Rack may be disassembled partially to help reduce height for shipping

### **Product summary** **IBM 93074SX/93074EX**

#### **IBM advantages**

- Lower price point for customers looking for a basic rack solution
- Room at the rear for cable management
- Side covers removed without tools
- Front door can be changed easily to swing from either direction, split rear door
- Tip resistance; plus, front and side stabilizers are easy to install

### **Product summary** **IBM 93072SX**

#### **IBM advantages**

- Generally more space (3U) and lower cost than traditional half rack (22U)
- Room at rear for cable management
- Side covers can be removed without tools
- Front door can be changed easily to swing from either direction, split rear door
- **Ship-loaded capacity**

### **Product summary** **IBM 9306110**

#### **IBM advantages**

- 11U of rack space to help deliver complete small business solutions
- May help you eliminate multiple tower units and consolidate your IT operations into one centralized unit and squeeze more computing power into a smaller space
- Provides common building block for xSeries rack-to-tower conversions, helping to simplify your operations and allowing you to focus on more important matters
- Front door can be changed easily to swing from either direction
- This rack fits under most tables
- **Ship-loaded capacity**

### **Standard/option feature comparison<sup>5</sup>**

<b>Feature</b>	<b>NetBAY Enterprise Rack 930842S 930842E</b>	<b>NetBAY Standard Rack 93074SX 93074EX 93072SX</b>	<b>HP10000 series 10642 10636 10622</b>
Side panels	Standard on 930842S	Standard on 93074SX	Option: on 10642
Stabilizer foot	Standard	Standard	Option: Added cost
Extension kit	Not required*	Not required*	Option: Added cost
Marriage kits (baying kits)	Standard on 930842E	Standard on 93074EX	Option: Added cost
Fan kit	Not required***	Not required***	Option: Added cost
Ship-loaded pallet	Standard	Standard on 93072SX	Option: Added cost

\* NetBAY Enterprise and S2 racks are 43.3" and 39.4" deep respectively; HP racks are 39.3".

\*\*\*IBM Racks are designed to handle demanding thermal loads without a fan.

## IBM rack options

### Rack options overview

Part Number	Description	Information
28L4707	Netfinity Rack Keyboard Tray	Supports keyboards in racks, also used with Flat Panel Monitor Rack Mount Kit II
73P3144	IBM PS/2 UltraNav Keyboard (Country specific versions available)	1U, includes TrackPoint and TouchPad mouse devices, requires Flat Panel Console kit
94G7444	Monitor Compartment	To hold up to 19" monitors
17231UX	IBM 1U 17" Flat Panel Console Kit	1U includes US keyboard
17231NX	IBM 1U 17" Flat Panel Console Kit	1U no keyboard included
17232UX	IBM 2U 15" Flat Panel Console Kit	2U includes US keyboard
17232NX	IBM 2U 15" Flat Panel Console Kit	2U no keyboard included
09N4290	NetBAY 1x4 Console Switch	1U, mounts in sidewall compartments, EIA space or monitor compartment; supports one to four servers, one console
09N4291	NetBAY 2x8 Console Switch	1U, mounts in sidewall compartments, EIA space or monitor compartment; supports one to eight servers, two consoles (only one console when installed in the monitor compartment)
09N4293	Console Cable Set -7ft	Connects servers to console switch
94G7447	Console Cable Set -12ft	Connects servers to console switch
1735L04	Local Console Manager (LCM)	4 port switch; 1U; supports up to 64 servers with ACT cabling technology
1735R16	Remote Console Manager (RCM)	16 port switch; 1U; supports up to 256 servers with ACT cabling technology
32P1636	KVM Conversion option (short KCO)	4 pack; 250mm cable for systems w/o cable management arm
32P1652	KVM Conversion option (long KCO)	4 pack; 1.5M cable for systems w/ cable management arms
32P1736	DPI Universal Rack PDU (Country specific versions available)	1U, 100-120V, 20 amps, mounts in sidewall compartment or EIA space, 7 C13 outlets.
32P1752	DPI Front End PDU (Country specific versions available)	1U, 100-120V 30 or 60 amps, mounts in sidewall compartment or EIA space, three C19 outlets
73P5844	DPI High Density PDU	1U, 208-250V, 32 amp 3phase; 60 amp single or 3 phase; 63 amp 3phase, mounts in sidewall compartment or EIA space, twelve IEC 320-C19 outlets
26K4241	Enterprise PDU (Country specific versions available)	1U full width, 108-250V, 30 (32) or 60 (63) amps, mounts in sidewall compartment, six IEC 320-C19 outlets, or twelve IEC 320-C13
25R5560	Blank Filler Panel Kit	Consists of five 3U Quick Install Filler Panels
25R5559	Blank Filler Panel Kit	Consists of five 1U Quick Install Filler Panels
94G7442	Fixed Shelf	Supports up to 100 lb
90P4849	IEC 309 C19 to C20 Jumper cable	Jumper cable
23K4809	IEC 309 C20 to C13 Jumper cable	Jumper cable
94G7448	12 foot Power Cord C13-C14	12 foot power cord
A complete selection of rackable UPS products (see UPS section, page 15)		

## Space-efficient protection for networked systems

### Console switches

	1x4 Console Switch	2x8 Console Switch
Part number	09N4290	09N4291
Number of ports	<ul style="list-style-type: none"><li>• Supports up to 4 servers, in a tiered configuration up to 32 servers</li></ul>	<ul style="list-style-type: none"><li>• Supports up to 8 servers, in a tiered configuration up to 64 servers</li></ul>
Dimensions (HxWxD)	<ul style="list-style-type: none"><li>• 44mm x 432mm x 203mm (1.7" x 17" x 8")</li></ul>	<ul style="list-style-type: none"><li>• 44mm x 432mm x 203mm (1.7" x 17" x 8")</li></ul>
Weight	2.38kg (5.25 lb)	2.38kg (5.25 lb)
Operating temperature	0°C-70°C (32°F-158°F)	0°C-70°C (32°F-158°F)
Power	100-240VAC	100-240VAC
Rack mounting	<ul style="list-style-type: none"><li>• Sidewall mounting</li><li>• Mounting on monitor shelf</li><li>• Mounting behind flat panel above keyboard tray</li><li>• In EIA space, brackets not included</li></ul>	<ul style="list-style-type: none"><li>• Sidewall mounting</li><li>• Mounting on monitor shelf</li><li>• Mounting behind flat panel above keyboard tray</li><li>• In EIA space, brackets included</li></ul>
Interface	OSCAR® menu (On-Screen Configuration and	Activity Reporting) Graphical interface
Locking cable connectors	Optional and available in 2m (7ft) (P/N 09N4293) and 3.6m (12ft) (P/N 94G7447)	
Compatibility	Compatible with previous IBM switches	
Video resolution	1600x1280 video resolution	
Flash software updates	Yes	Yes
Password protection	Yes	Yes
Limited warranty**	3-year limited warranty when installed in an IBM Rack or used with xSeries servers	

\*\*See page 20 for additional information on limited warranty.<sup>1</sup>

## Space-efficient protection for networked systems

### IBM Flat Panel Monitor Console Kits

	IBM 1U	IBM 2U
Part numbers	17231UX with U.S. keyboard 17231JX with Japan keyboard 17231NX without keyboard	17232UX with US keyboard 17232NX with no keyboard
Form factor	1U	2U
Monitor size	17"	15"
Monitor design	Flip forward	Flip back
Monitor garage	Yes	No
Limited warranty**	3-year	3-year
Rack shippable	Yes	Yes
KVM mounting in same amount of space	Yes	Yes
Slide length	24"	22"
Cable management arm	Yes	Yes

### IBM 1U Flat Panel Monitor Technical Specifications

	2U Flat Panel Monitor	1U Flat Panel Color Monitor
<b>Panel</b>		
Type	TFT active matrix LCD	SXGA TN/TFT
Size	15"	17"
Pixel pitch	0.297mm	0.264mm
Brightness	250cd/m <sup>2</sup>	270cd/m <sup>2</sup>
Contrast ratio	300:1	350:1
Viewing angle	120°/150° (H/V)	150°/125° (H/V)
<b>Scanning frequency</b>		
Horizontal rate	30-61 KHz	30-80KHz
Vertical rate	50-75Hz	50-75Hz
Maximum pixel rate	80MHz	80MHz
<b>Controls</b>	Brightness, contrast, H/V-position, coarse, fine, auto adjustment, color temperature, color control, (RGB gain), color reset, image reset, language select, OSD position and OSD display time	Brightness, contrast, H/V-position, coarse, fine, auto adjustment, color temperature, color control, (RGB gain), color reset, Image reset, language select, OSD position and OSD display time
<b>Resolution</b>		
Maximum	1,024x768	1,280x1,024 @ 85MHz
Native	1,024x768	1,280x1,024 @ 60MHZ
<b>Color</b>		
Maximum	16 million	16.2 million
<b>Signal input</b>		
Video input	Analog RGB (0.7Vp-p)	Analog RGB (0.7Vp-p)
Sync. type	H and V separate	H and V separate
<b>Connector</b>	15-pin D-sub	15-pin D-sub
<b>Power</b>		
On working	32W maximum	32W maximum
Off	<3W	<3W
<b>OSD control</b>	Yes, in English, French, Spanish, German, Italian	Yes, in English, French, Spanish, German, Italian and Russian
	**See page 18 for additional information on limited warranty	.1

## Space-efficient protection for networked systems

### Power distribution units

	DPI Universal Rack PDU	DPI Front End PDU	DPI High Density PDU	DPI Enterprise PDU
Part number	32P1761 (Nema style) 32P1736 (US LV & HV) 32P1737-47 (Country versions)	32P1751 32P1766 32P1767	73P5844 (32A 3phase) 73P5847 (60A 3phase) 73P5855 (60A 1phase) 73P5847 (63A 1phase)	26K4241 - 26K4246 26K4256 - 26K4259
Form factor	Rack/1U, half width	Rack/1U, half width	Rack/1U, full width	Rack/1U, half width
Description	Low & high voltage versions, general purpose PDU	Single phase (30 & 60A) front end PDU w/ three IEC 320 C19 outlets	32A, 60A, 63A / Single or 3 phase; high voltage PDU with twelve C19 outlets	30A, 32A, 60A, 63A / Single or 3 phase; high voltage PDU with either six C19 or twelve C13 outlets
Capacity	<ul style="list-style-type: none"> <li>• Up to 1905W (LV)</li> <li>• Up to 3120W (HV)</li> </ul>	<ul style="list-style-type: none"> <li>• Up to 3048W (LV)</li> <li>• Up to 9360W (60A HV)</li> </ul>	<ul style="list-style-type: none"> <li>• Up to 9984W (1 phase)</li> <li>• Up to 17097W (3phase)</li> </ul>	<ul style="list-style-type: none"> <li>• Up to 4992W (30a 208v)</li> <li>• Up to 23040W (32a 3phase HV)</li> </ul>
Device support	<ul style="list-style-type: none"> <li>• 7 IEC C13 or 6 NEMA 5-15 outlets</li> <li>• Supports up to 7 devices</li> </ul>	<ul style="list-style-type: none"> <li>• Three IEC C19 outlets either of 2 power sources</li> </ul>	<ul style="list-style-type: none"> <li>• 12 IEC C19 outlets 3</li> </ul>	<ul style="list-style-type: none"> <li>• Either six C19 or twelve C13 outlets</li> </ul>
Cord capabilities <i>Plug types</i>	<ul style="list-style-type: none"> <li>• Fixed line cord (2.5m)</li> <li>• NEMA L5-15</li> <li>• NEMA L5-20P</li> <li>• NEMA L6-20P</li> </ul>	<ul style="list-style-type: none"> <li>• Fixed line cord</li> <li>• NEMA L5-30</li> <li>• NEMA L6-30</li> <li>• IEC 309 60a 2P+G</li> </ul>	<ul style="list-style-type: none"> <li>• Fixed line cord (4.3m)</li> <li>• IEC 309 2P+G</li> <li>• IEC 309 3P+G</li> </ul>	<ul style="list-style-type: none"> <li>• One line cord</li> <li>• NEMA L21-30P</li> </ul>
Power source	100-240Vac, 50/60Hz (single phase)	100-240Vac, 50/60Hz (single phase)	200-208Vac, 50/60Hz (single phase)	208-250Vac, 50/60Hz based on model
Mounting option	Sidewall or EIA space	Sidewall or EIA space	Sidewall or EIA space	Sidewall
Protection	15amp dual pole circuit breaker	Non-replaceable fuse included with each outlet circuit for protection	15A push button circuit breaker for each outlet	
Dimensions	41.5 x 114.5 x 223mm (1.7x 4.5 x 8.7")	41 x 225 x 223mm (1.7 x8.7 x 8.7")	42x450x213mm (1.7x17.7x8.4")	41.4x225.5x225mm (1.7x8.7x8.7")
Service and support	3-year onsite limited warranty** when installed in an IBM rack			
Configuration software	IBM @server xSeries Rack Configurator <a href="http://www-1.ibm.com/servers/eserver/xseries/library/configtools.html">http://www-1.ibm.com/servers/eserver/xseries/library/configtools.html</a>			

**Space-efficient protection for networked systems**

**Rackable UPS options**

	<b>APC Smart-UPS 1400RMB, 1400RMiB</b>	<b>IBM UPS3000 XLV IBM UPS3000 XHV</b>	<b>APC Smart-UPS 5000RMB, 5000RMiB</b>
<b>UPS attributes</b>			
Part number	32P1020, 32P1022	2130R30, 2130R31	37L6861, 37L6862
Unit height	2U	2U	5U
Limited warranty**	3-year	3-year	3-year
Color	Black	Black	Black
Emergency power -off cable	No	Yes	Yes
Rail kit	No	Included	Yes (IBM)
<b>US models</b>			
Line input	NEMA L5-15P	LV fixed 30 amp	NEMA L6-30P
Output receptacles	6 NEMA 5-15R	LV: 6 IEC C13 & 1 Nema 5-20R	8 IEC 320-C13 (10amp) 2 IEC 320-C19 (16amp)
<b>International Models</b>			
Line Input	IEC 320-C14 (10amp)	HV C19/C-20	Hardwire
Output Receptacles	4 IEC 320-C13 (10amp)	HV: 7 IEC C13 & 1 IEC C19	8 IEC 320-C13 (10amp) 2 IEC 320-C19 (16amp)

	<b>IBM UPS 7500XHV</b>	<b>IBM UPS10,000XHV</b>	<b>3U Extended Battery Pack</b>
<b>UPS Attributes</b>			
Part Number	21306RX	21308RX	25R5582
Unit Height	6U	6U	3U
Limited warranty	3 year	3 year	3 year
Color	Black	Black	Black
Emergency power-off cable	Yes	Yes	N/A
Rail kit	Included	Included	Included
<b>US models</b>			
Line Input	208-250V Hard wired	208-250V Hard wired	N/A
Output Receptacles	Four IEC C19	Four IEC C19	N/A
<b>International Models</b>			
Line Input	208-250V Hard wired	208-250V Hard wired	N/A
Output receptacles	Four IEC C19	Four IEC C19	N/A

## Space-efficient protection for networked systems

### Sizing guide for UPS options

#### Step 1:

Identify the devices contained in the rack configuration

#### Step 2:

Sum the total load (watts) of all devices in the configuration, using either Maximum Load for minimum runtime or Typical Load for typical runtime.

Servers	# Power Cords	AC Watts Load Max/Typical
xSeries 206	1/1	485/340
xSeries 226	1/2	707/495
xSeries 236	1/2	930/570
xSeries 255	2/2	1000/530
xSeries 306	1/1	270/200
eServer e326	1	587/400
xSeries 336	1/2	687/400
xSeries 346	1/2	833/535
xSeries 365	1/2	1100/770
xSeries 445	2/2	900/850
xSeries 455	1/2	950/800
BladeCenter (two 2000W ps)	2/4	2650/1855
BladeCenter (four 2000W ps)	4/4	5300/1710
<b>Other Devices</b>		
RXE-100 (8684-2RX)	2/2	370/260
EXP400 Storage Expansion Unit	2/2	440/310
DS4100 Disk System	2/2	390/275
DS4300 Disk System	2/2	557/390
DS4400 Disk System	2/2	390/275
DS4500 Disk System	2/2	390/275
DS4000 EXP100 Storage Expansion Unit	2/2	350/245
DS4000 EXP700 Storage Expansion Unit	2/2	350/245
SAN Fibre Channel Switch, 16 port	1/2	200/ na
Magstar MP 3570 Tape Subsystem	1/1	200/140
NetBAY Tape Enclosure	1/1	457/320
SDLT/LTO Modular Tape Library	1/1	430/300

#### Step 3:

Find the Total Configuration Load in the table to the right

#### Step 4:

For the new IBM 7500 UPS check the runtime to the chart below. If you'd prefer another IBM UPS product, please refer to the Configuration and Options Guide @

<http://www-1.ibm.com/servers/eserver/xseries/library/configtools/cog.html>

Load (W)	Number of Battery Packs			
	Internal	+1	+2	+4
50	7.56	13.83	21.50	37.68
100	6.00	10.93	17.06	29.83
200	4.16	7.65	11.93	20.90
300	3.16	5.83	9.11	16.00
400	2.51	4.68	7.36	12.89
500	2.11	3.91	6.12	10.75
600	1.80	3.33	5.25	9.23
700	1.56	2.90	4.52	8.00
800	1.38	2.56	4.01	7.03
900	1.23	2.30	3.61	6.38
1000	1.10	2.08	3.28	5.78
1200	55	1.73	2.74	4.83
1400	47	1.50	2.35	4.16
1600	41	1.28	2.05	3.63
1800	36	1.13	1.81	3.23
2000	32	1.00	1.61	2.90
2500	24	48	1.28	2.28
3000	19	39	1.05	1.88
3400	17	34	55	1.65
4000	13	28	46	1.36
5000	10	21	35	1.06
6000	7	16	28	52
<b>Recharge Hours</b>	3	7	10	17

### Conversion kit alternatives

Conversion kits

	09N4300 4U x 20D Tower-to- Rack Kit	13N2455 5U x 20" Tower-to- Rack Kit	13N0956 5U x 24D Tower- to-Rack Kit	26K6122 4U x 24D Tower-to- Rack Kit	32R0719 7U Tower-to- Rack Kit	32P1474 7U x 26D Tower to Rack Kit	NetBAY11 Standard Rack, common building block for xSeries Rack-to- Tower conversions
<b>Servers</b>							
xSeries 206	X						
xSeries 226		X					
xSeries 236			X	X			
xSeries 255						X	
XSeries 260					X		
eserver e326							X
xSeries 306							X
xSeries 336							X
xSeries 346							X
xSeries 365							X
xSeries 445							X

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**For more  
information**

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**IBM @server xSeries Racks and Rack Options**

<http://www-1.ibm.com/servers/eserver/xseries/storage/rack.html>

**IBM @server xSeries Storage Options**

<http://www-1.ibm.com/servers/eserver/xseries/storage.html>

**IBM @server xSeries Rack Configurator**

<http://www-1.ibm.com/servers/eserver/xseries/library/configtools.html>

**IBM @server xSeries Configuration and Options Guide**

<http://www-1.ibm.com/servers/eserver/xseries/library/configtools/cog.html>

**xSeries Solution Guides**

<http://www.developer.ibm.com/welcome/myvc.pl>

**Tested xSeries Solutions**

<http://www.pc.ibm.com/us/compat/>

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## Space-efficient protection for networked systems

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1) For terms and conditions or copies of the IBM limited warranty, call 1 800 772-2227 in the U.S. and in Canada call 1 800-426-2255. Limited warranty includes International Warranty Service in those countries where this product is offered. Registration is required. Telephone support may be subject to additional charges. For warranties including on site service, IBM sends a technician after attempting to resolve the problem remotely.

2) When referring to hard disk drive capacity, GB means 1,000,000,000 bytes and TB means 1,000,000,000,000 bytes. Total user-accessible capacity may vary depending on operating environments.

3) Assumes that the EXP400 storage expansion unit has all 14 bays loaded with 146GB HDDs for a total storage capacity of 2TB per EXP300. Fourteen EXP400 units can be loaded in a IBM42U rack for a total storage capacity of 28TB.

4) APC offers a three-year limited warranty when the APC UPS is purchased through IBM.

5) Data on competitive products is obtained from publicly available information that is subject to change without notice. IBM has not tested those products and cannot confirm the performance, compatibility, or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products. Contact the suppliers or manufacturers of non-IBM products for the most recent information regarding those products.

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