



IBM System x iDataPlex — Next-generation data center solution from System x

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At a glance

System x takes a new approach to solving data center challenges through its latest innovation, iDataPlex: a flexible and power-efficient design that enables massive scale-out deployments with affordable and customized value. Benefits include:

- Efficient power and cooling
- Flexible, integrated configurations
- New levels of density
- Cost-optimized solution
- Single-point management
- Data center planning and power and cooling assessment

IBM service options: One- or three-year customer replaceable unit (CRU) and on-site¹ limited warranty²

Easy-to-order, robust factory-built configurations are supported by IBM.

For ordering, contact:

Your IBM representative or the Americas Call Centers at

800-IBM-CALL Reference: SE001

Overview

IBM System x™ announces the next-generation data center solution for clients finding limitations in their scale out computing environments. iDataPlex is an innovative data center solution for Web 2.0, HPC cluster, and corporate batch processing clients who are experiencing limitations of power, cooling, or physical space. Using a holistic approach to the design, iDataPlex employs innovative ways to integrate Intel®-based processing at the node, rack, and data center levels to maximize power and cooling efficiencies while providing the compute-density needed.

An iDataPlex Rack is built with industry-standard components to create flexible configurations of servers, chassis, and networking switches that integrate easily. Using technology for flexible node configurations, iDataPlex can configure customized solutions for your applications to meet your specific business needs for computing power, storage intensity, and the right I/O and networking.

IBM is continuously working to improve the power efficiency rate at which your compute nodes perform, and this is planned to continue with a high efficiency 375-watt power supply and low power memory planned for iDataPlex in the future.

Note: This information represents IBM's current intentions, goals, and

objectives, and is subject to change or withdrawal without additional or prior notice.

In addition to flexibility at the server level, iDataPlex offers flexibility at the rack level. It can be cabled either through the bottom, if it is set on a raised floor, or from the ceiling. Front access cabling and Direct Dock Power allow you to make changes in networking, power connections, and storage quickly and easily.

The rack also supports multiple networking topologies including Ethernet, InfiniBand, and Fibre Channel. IBM manufacturing sites fully integrate the components on site and test them as a complete solution before shipping the rack to your location. When you receive the rack, it is uncrated, placed in its proper location, powered up, and connected to the network in minimal time. IBM personnel confirm that the servers and network are functioning properly before acceptance.

With the optional IBM Rear Door Heat eXchanger as part of an iDataPlex solution, you can have a high-density data center environment that can alleviate the cooling challenges. With further adjustments, the Rear Door Heat eXchanger can help cool the room — helping reduce the need for air conditioning in the data center.

- Innovative blade-like design saves power and cooling costs for more affordable computing.
- Unparalleled efficiency and easy deployment help you get up and running quickly.
- Flexible node and rack configuration enables better customization for expanding data centers.
- Complete front access and intelligent rack components simplify serviceability and manageability.

¹ You may be asked certain diagnostic questions before a technician is sent.

² For information on IBM's Statement of Limited Warranty, contact your IBM representative. Copies are available upon request.

Key prerequisites

- Supported operating system
- USB CD-RW/DVD drive
- Device drivers, as required

Planned availability date

June 2, 2008

Description

Rack management appliance (4369): The iDataPlex solution comes configurable with a rack management appliance based on the Avocent MergePoint 5300 device. The device, which uses the IPMI 2.0 protocol for multiple management functions, offers an intelligent aggregated rack solution. Clients with custom solutions that depend on IPMI 2.0 can find full functionality with iDataPlex servers and can manage systems management data at the rack level.

IBM System x iDataPlex Rack (7825): This specially designed rack is used in iDataPlex configurations.

The iDataPlex Rack is designated as IBM-installed for easy on-site installation. This designation, coupled with the factory integration services and optional on-site installation and verification of software, results in a ready-to-run cluster system.

The iDataPlex solution offers increased density in a holistic rack design. For ease of serviceability, all hard drive, planar, and I/O access is from the front of the rack.

Flex nodes: Technology for flexible node configurations enables the servers for iDataPlex to be configured in numerous ways. In addition to compute-oriented configurations, the iDataPlex solution offers a storage-rich configuration.

System x iDataPlex 2U Flex chassis (7831)

- One or two server nodes
- Supports for both high-performance SAS and low-cost, high-capacity SATA HDDs
- High-density storage offering
- Shared high-efficiency power supply
- Shared lower power-consuming fans
- Choice of SAS, Ethernet, or iSCSI host interface

System x iDataPlex 3U chassis (7834): This chassis is ideal for intensive storage applications.

Power and cooling advantages:

iDataPlex servers help pack more processors into the same power and cooling envelope, better utilize floor space, and "right size" data-center design. With the iDataPlex solution, less power per processor means more processing capacity per kilowatt. The iDataPlex can run cooler to deliver greater reliability.

System x iDataPlex Rear Door Heat eXchanger (43V6048): For dense data-center environments, IBM offers smart rack-level heat management solutions like the super-efficient IBM Rear Door Heat eXchanger. The water-cooled door is designed to dissipate heat generated from the back of the rack to reduce the overall room temperature. With this combination of benefits at the server and data-center level, IBM systems deliver strong power and cooling benefits to iDataPlex clients.

The iDataPlex Rear Door Heat eXchanger for iDataPlex racks helps keep your growing data center to approximately the same air temperature as that entering the rack, alleviating the need to add air conditioning units. This unobtrusive solution brings more cooling capacity to areas where the heat is greatest, around racks of servers with multiple, more powerful processors.

Design simplicity delivers chilling results. This cooling efficiency can help alleviate or even eliminate the need for additional air conditioning power and the associated construction cost.

IBM High Density Plus PDU: The new PDUs make it quick and simple to deploy, protect, and manage your high density System x iDataPlex rack environment. iDataPlex Enterprise PDU+ models combine receptacle density with advanced intelligent power management capabilities that seamlessly integrates with IBM Systems Director Active Energy Manager.

iDataPlex Enterprise PDU models: Common features across PDU and PDU+ models:

- Designed with improved usability and cable management
- Easily accessible individual breakers per load group for higher availability

Additional features of PDU+ models:

- Monitored power draw at the breaker level
- Advanced remote monitoring capability
- Detailed data-logging for statistical analysis and diagnostics
- Integrates with Active Energy Manager for consolidated rack-power monitoring
- Comprehensive power management and flexible configuration through a Web browser, NMS, Telnet, SNMP, or HyperTerminal (console)

Additional enhancements

New OEM technology and hardware

- Blade Network Technologies RackSwitch G8000

This switch is a cost-optimized Ethernet switch designed specifically for the data center. With cooling optimized directional airflow, 48 1 Gb Ethernet ports, and up to four 10 Gb Ethernet ports, the G8000 is ideal for aggregating servers and network storage arrays. The RackSwitch

G8000 is built on the mature blade operating system with many industry-leading, server-specific features and security. into a variety of well-known network and systems management platforms. By offering high-bandwidth performance and unique server-enhancing functionality at a fraction of the cost of other stackable 1/10G switches, the RackSwitch G8000 is the ideal choice for simplifying data-center network infrastructure.

- Blade Network Technologies RackSwitch G8100

This switch is a high-performance, low-latency Ethernet switch designed specifically for the data center. With datacenter-friendly directional airflow and twenty-four 10 Gb Ethernet ports, the G8100 is ideal for aggregating servers, network storage arrays, and blade switches. The RackSwitch G8100 is built on the mature blade operating system with many industry-leading, server-specific features and security. It can integrate into a variety of well-known network and systems management platforms. By offering high-bandwidth performance and unique server-enhancing functionality at a fraction of the cost of other 10 Gb Ethernet switches, the RackSwitch G8100 is the ideal choice for simplifying your network infrastructure.

Features:

- Twenty 10Gbase-CX4 Ethernet and four 10 Gb Ethernet SFP+ ports
- Front-to-rear or rear-to-front directional air flow identical to that of servers and storage devices
- Unique server-enhancing feature set
- Robust, high redundancy with uplink failure detection (UFD) and subsecond uplink fail-over without spanning tree (hot links)
- Mature blade operating systems
- Line rate performance with port-to-port latency of as little as 300 ns
- Layer 2 and layer 3, flexible topology options and clear network boundaries
- Simplified configuration with ISCLI (Cisco-compatible CLI)
- Seamless, standards-based integration into existing Cisco and other networks to help reduce downtime and learning curve

Previously announced OEM technology and hardware

- Cisco 4948-10GE 48-port switch

The Cisco Catalyst 4948-10GE delivers throughput with low latency for data-intensive applications using a 136-Gbps switching fabric with a 102 million packets per second (mpps) forwarding rate in hardware for layer 2 through 4 traffic. High-performance switching can be delivered regardless of the number of route entries or layer 3 and 4 services enabled. Hardware-based Cisco Express Forwarding routing architecture allows for increased scalability and performance.

- Cisco 2960G 24-port switch

The Cisco Catalyst 2960G offers entry-level, enterprise-class, fixed configuration switching, optimized for access layer deployments requiring intelligent services, such as fast Ethernet and Gigabit Ethernet to the desktop configurations. It is ideal for entry-level enterprise, mid-market, and branch office environments, and compact switches for deployments outside the wiring closet.

Solution Enablement Consulting

Solution Enablement Consulting is available at a flat-rate price per day that includes resource, travel, and expenses for predefined engagements.

The fee covers expenses for solution enablement engagements of the following type:

- Staging and integration of hardware and software components at the manufacture site or another location
- Solution integration into an existing cluster or cluster upgrades
- Solution acceptance testing

- Software installation and integration, including operating system, management software, file system, compilers, or customer applications
- Instructor-led on-site training
- Project management

Factory integration — product customization services

The iDataPlex offering features several hardware validation and test services collectively referred to as product customization services. These services include the integration of hardware and software on Intel processor-based System x servers in state-of-the-art manufacturing facilities. You can deploy systems in almost any IT environment. This means your IT resources can be better used elsewhere.

These options are integrated into the servers. IBM can install the chassis in an iDataPlex Rack and have it shipped to you. Performing the same services on site could take hours or even days.

In addition, iDataPlex manufacturing offers specific services for the iDataPlex called Cluster Systems Validation and Test to confirm that all system settings are enabled and tested to ensure smooth on-site deployment:

- Enable BIOS management
- Configure BIOS on each node
- Set up ASM and RSA
- Create disk partitioning
- Configure (network, firewall, language, and time zone)
- Configure services
- Set up storage
- Install terminal server
- Set up DNS
- Test, debug, and confirm that cluster is ready for operation

IBM has the skills and technology to offer this type of service. The iDataPlex product customization portfolio delivers tremendous value, especially for clients interested in complex offerings such as Linux™ cluster.

Services

Installation and deployment services:: The System x iDataPlex solutions deployed in the iDataPlex rack enclosures include on-site hardware installation service:

- Basic installation planning services
- On-site installation of hardware

Additional optional on-site software installation and customization services include Linux and Windows® customization and skills transfer for system administration personnel.

Lab services

iDataPlex installation planning

Features:

- Assess client's air conditioning and air distribution in support of iDataPlex systems
- Evaluate the need for any Rear Door Heat eXchanger installations and offer necessary guidance
- Review the iDataPlex power specifications based on the client's hardware configurations and offer necessary guidance

Typical benefits:

- Offers accurate environmental information as required for supporting iDataPlex systems most reliably
- Identifies the most efficient approach to the iDataPlex system cooling and ventilation needs
- Reduces potential installation shortfalls with open and ongoing communication with the client surrounding their specific iDataPlex system requirements

On-site post installation services

Cluster setup and configuration:

- Configure and verify console switches
- Configure management node:
 - Verify and update BIOS
 - Verify and configure RAID
 - Install and configure operating system
 - Install and configure cluster manager
- Configure and verify Ethernet networking equipment:
 - Configure switch
 - Test and validate Gb Ethernet network operation
- Configure storage subsystem
- Verify and configure storage node RAID
- Load and validate operating system on compute nodes and storage nodes
- Check and update node BIOS and firmware
- Configure and verify InfiniBand networking equipment (depending on configuration)
 - Configure InfiniBand switch
 - Test and validate InfiniBand network
- Implement and verify:
 - File system
 - Default configurations of resource manager, scheduler resource manager, and scheduler
 - Miscellaneous cluster software and functions, including compilers, MPI, and SSH

Test and validate cluster operation:

- Perform™ power-down and power-up test
- Perform testing (stream, ping-pong) to place load on the cluster
- Analyze results for anomalies and address problems

Skills transfer

Quarterly health check: One-year support agreement includes:

- 8 x 5 support (except weekends and holidays) with 24-hour response time
- Remote monitoring and alerting of the systems and monitoring the operating system
- Maintaining patch and firmware releases (Red Hat, SUSE Linux, and Storage Manager) as certified by IBM on ongoing basis
- Four site visits per year (one per quarter):
 - Health check assessment
 - Software update (firmware, device drivers, and patches for other software if applicable)
 - Skills transfer on best practices, such as TRENDS administration and updates and Storage

Manager (if applicable)

- Performance tuning (if applicable)

For more information on these services, visit

<http://www.ibm.com/servers/eserver/services>

iDataPlex Systems Management

The System x iDataPlex product family provides systems management support for large scale-out compute environments via standards-based, scriptable interfaces. This support starts with the embedded Intelligent Platform Management Interface (IPMI) baseboard management controller (BMC).

For rapid diagnosis of problems, iDataPlex supports IBM Dynamic System Analysis (DSA) preboot diagnostics as well as online data collection for problem determination in supported Windows and Linux environments. Refer to the Dynamic System Analysis product documentation for additional detail on DSA features.

For large-scale environments where out-of-band management aggregation is needed, the iDataPlex product portfolio includes the Avocent MergePoint 5300. This device enables aggregation of IPMI BMC devices on the management network with serial terminal server-style behavior for serial over LAN (SOL) as well as proxy services for the Distributed Management Task Force (DMTF), Systems Management Architecture for Server Hardware (SMASH), Command Line Protocol (CLP), DMTF Web Services for Management (WS-Management), and Simple Network Management Protocol (SNMP). A dedicated management network and shared network topology are both supported.

iDataPlex compute nodes support IBM Systems Director with limited function. Refer to IBM Systems Director product documentation for specific details on supported functions on iDataPlex hardware.

The compute nodes have been tested with the Extreme Cluster Administration Toolkit (xCAT), an open source, community-based cluster administration tool set tailored to scale-out compute environments. You can download xCAT from SourceForge at

<http://sourceforge.net/projects/xcat/>

For additional information on xCAT, contact your IBM Sales and Support Team, or visit

<http://www.xcat.org/>

Accessibility by people with disabilities

You can request a U.S. Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance at

http://www.ibm.com/able/product_accessibility/index.html

Product positioning

IBM delivers innovations that meet your specific needs. The right choice depends on your business requirements, target applications, and operating environment. iDataPlex focuses on:

- Price/performance per watt
- Fast, large scale-out deployments
- Compute density
- Customization
- Targeted workloads
- Data center model for rip-and-replace IT resources

The iDataPlex hardware platform is positioned for cost-conscious large enterprises that rely on

recovery-oriented architecture that enables redundancy through the software layer instead of redundant hardware.

Reference information

Refer to:

- Hardware Announcement [107-676](#), dated November 6, 2007 (System Cluster 1350)
- Hardware Announcement [107-198](#), dated April 17, 2007 (System Cluster 1350)

Trademarks

System x and Perform are trademarks of International Business Machines Corporation in the United States or other countries or both.

Intel is a registered trademark of Intel Corporation.

Windows is a registered trademark of Microsoft Corporation.

Linux is a trademark of Linus Torvalds in the United States, other countries or both.

Other company, product, and service names may be trademarks or service marks of others.

Additional information

Product customization services

The following product customization services are included with iDataPlex.

For information, refer to the following and contact your IBM representative.

Description	Feature number
iDataPlex Rack Assembly (100U)	2312
Rack Installation of 1U Component in iDataPlex	2313
Rack Installation of >1U Component in iDataPlex	2314
iDataPlex Hardware / Configuration Verification	2315

Applicable quantities are configuration-dependent and will be determined in the configuration process.

Publications

The Installation Guide, Maintenance Guide, and Problem Determination and Service Guide for iDataPlex solutions, in U.S. English versions, are available from

<https://www-304.ibm.com/systems/support/>

Under Product Support, select System x, and under Popular links, select Publications lookup. Select the Product family and click on continue.

IBM Systems Information Center provides you with a single information center where you can access product documentation for IBM systems hardware, operating systems, and server software. Through a consistent framework, you can efficiently find information and personalize your access. The IBM Systems information Center is at

<http://publib14.boulder.ibm.com/infocenter/systems>

Services

Global Technology Services

IBM services include business consulting, outsourcing, hosting services, applications, and other technology management.

These services help you learn about, plan, install, manage, or optimize your IT infrastructure to be an On Demand Business. They can help you integrate your high-speed networks, storage systems, application servers, wireless protocols, and an array of platforms, middleware, and communications software for IBM and many non-IBM offerings. IBM is your one-stop shop for IT support needs.

For details on available services, contact your IBM representative or visit

<http://www.ibm.com/services/>

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or visit

<http://www.ibm.com/services/continuity>

For details on education offerings related to specific products, visit

<http://www.ibm.com/services/learning/index.html>

Select your country, and then select the product as the category.

System x and BladeCenter® support services

Recommended core technical support: When you buy IBM System x technology, include the support services you need — to help keep both your hardware and software working for you, day after day, at peak performance. It's your first step toward helping to protect your investment and sustain high levels of system availability. IBM offers service-level and response-time options to fit your business needs. And they will help you get started with a core support package that includes:

- **Continuous system monitoring**

Electronic monitoring that helps speed up problem-solving with automated, early detection of potential problems and system errors.

- **Hardware maintenance**

World-class remote and on-site hardware problem determination and repair services.

- **Software technical support**

Access to help line calls for fast, accurate answers to your questions during installation and throughout ongoing operations.

For more information, visit

<http://www.ibm.com/servers/eserver/xseries/services.html>

Technical information

Specified operating environment

Standards: Typical configurations of the iDataPlex will be tested under the Class A requirement plus jurisdictional regulations for offer of sale in all target markets identified by marketing.

- Title 47 CFR Part 15 Subpart B: U.S.
- ICES-003: Canada
- CISPR 22

- CISPR 24

Product safety regulatory compliance strategy: The iDataPlex will meet the jurisdictional regulations for offer of sale in all traditional and targeted markets.

- U.S. Certification to UL 60950-1 1st Edition
- Canada: Certification to CSA C22.2 No. 60950-1-3 1st Edition

Operating environment: The iDataPlex products are designed to operate in a general business environment, such as a Class A or A1, temperature and humidity controlled room.

- Temperature:
 - 10° to 35°C (50° to 95°F) (server on)
 - 0° to 60°C (-32° to 140°F) (server off)
- Relative humidity: 10% to 80%
- Maximum altitude: 3,048 m (10,000 ft) at 28°C. Decrease maximum altitude by 1,000 ft for every 1°C increase in ambient temperature up to 3,000 ft at 35°C ambient.
- Declared noise level: 5.7 bels (idling)

Hardware requirements: For service, the iDataPlex requires a compatible:

- Monitor
- Combination USB keyboard and pointing device such as IBM part number 40K5372
- USB CD-RW/DVD drive such as the IBM and Lenovo™ part number 73P4515 or 73P4516

Note: Rack must have 784.86 mm (30.9 in) minimum clearance on the front and back sides of the rack to allow service.

Software requirements: The following network operating systems are supported in the iDataPlex:

- Microsoft®
 - Windows® Server 2003/2003 R2, Enterprise Edition
 - Windows Server 2003/2003 R2, Enterprise x64 Edition
 - Windows Server 2003/2003 R2, Standard Edition
 - Windows Server 2003/2003 R2, Standard x64 Edition
 - Windows Server 2003/2003 R2, Web Edition
 - Windows Server 2003, Enterprise Edition (64-bit) with Windows Compute Cluster Service (WCCS)
- Linux™
 - Red Hat Enterprise Linux 4 AS for x86
 - Red Hat Enterprise Linux 4 AS for AMD64/EM64T
 - Red Hat Enterprise Linux 4 ES for x86
 - Red Hat Enterprise Linux 4 ES for AMD64/EM64T

Note: For additional support, certification, and version information on network operating systems, visit

<http://www-03.ibm.com/servers/eserver/serverproven/compat/us/>

Compatibility: All components of the System x iDataPlex are compatible when purchased as a supported iDataPlex solution.

Limitations

- System x iDataPlex options are only supported when ordered and deployed in a iDataPlex solution. They will not be supported when ordered without a corresponding order for an iDataPlex Rack configuration.
- The 4369 Rack Management Appliance is supported only when deployed in a iDataPlex configuration and with iDataPlex supported BOM content.
- Rear Door Heat eXchanger:
 - The Rear Door Heat eXchanger is shipped separately from the iDataPlex rack for delivery and installation to the rack by an IBM authorized supplier.
 - When the Rear Door Heat eXchanger is part of the iDataPlex solution, an IBM authorized supplier will attach the door to the rack. The client is responsible for filling the heat exchange door with fluid and hooking up all plumbing connections. The client is also responsible for draining the heat exchange door and disconnecting all plumbing connections prior to an IBM servicer coming on-site for replacement of the door assembly. After the servicer has replaced the heat exchange door assembly on the rack, it is the client's responsibility to refill the heat exchange door and reconnect all plumbing connections. All preventative maintenance on the rack is the sole responsibility of the client.
 - Use of the iDataPlex Rack outside of the iDataPlex offering is not supported.

Planning information

Customer responsibilities: Installation of hardware components is provided by IBM on the iDataPlex.

Clients are responsible for preparing their site for installation.

You are expected to review the Installation Planning Guide before the delivery of your iDataPlex. Clients' responsibilities must be verified as complete before scheduling an IBM installer to come on site. Visit

<https://www-304.ibm.com/systems/support/>

To service your iDataPlex or obtain IBM service, the iDataPlex requires a compatible:

- Monitor
- Combination USB keyboard and pointing device such as IBM part number 40K5372
- USB CD-RW/DVD drive such as the IBM and Lenovo part number 73P4515 or 73P4516

Note: Rack must have 784.86 mm (30.9 in) minimum clearance on the front and back sides of the rack to allow service.

Cable orders: All cables are supplied with the iDataPlex. Depending on the applications, the cables may be fully installed, partially installed (plugged at one end and packaged for shipping), or included as part of a shipment group.

Installability: Installation of hardware components is provided by IBM with the exception of plumbing connections to the optional Rear Door Heat eXchanger. (Refer to the Limitations section for additional information.)

Packaging

System x iDataPlex Shipping Contents

Documentation CD, which contains the following books in PDF:

- IBM Safety Information (multilingual)
- IBM Rack Safety Information (multilingual)
- IBM iDataPlex Rack Type 7825 Installation and User's Guide
- IBM Rear Door Heat eXchanger for the iDataPlex Rack Installation and Maintenance Guide
- IBM System x iDataPlex dx340 User's Guide for Types 7831, 7832, and 7834
- IBM System x iDataPlex dx340 Problem Determination and Service Guide for Types 7831, 7832, and 7834

IBM Type 7825, 7831, 7832, 7834, and Rear Door Heat eXchanger
Warranty and Support Information
IBM Distributed Power Interconnect Enterprise Power Distribution Unit
Installation and Maintenance Guide
IBM DPI (R) C13 PDU+, DPI C13 3-phase PDU+ DPI C19 PDU+, and DPI C19
3-phase PDU+ Installation and Maintenance Guide
IBM License Agreement for Machine Code

One 8-page printed important notices multilingual document contains all of the legal, safety, emissions, and environmental statements.

Security, auditability, and control

This offering uses the security and auditability features from standard IBM offerings and supported Linux distributions.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

Terms and conditions

IBM credit corporation financing: Yes

To obtain copies of the IBM Statement of Limited Warranty, contact your reseller or IBM.

In the United States, call 800-IBM-SERV (426-7378), or write to:

Warranty Information
P.O. Box 12195
Research Triangle Park, NC 27709
Attn: Dept JDJA/B203

Warranty period

- Machine type 0446 — Three years
- Machine type 7825 — Three years
- Machine type 4369 — Three years
- Machine type 7831 — One year
- Machine type 7832 — One year
- Machine type 7834 — One year
- Optional features — One year

Optional IBM features initially installed in an IBM machine carry the same warranty period as the machine. If installed after the initial machine installation, they carry the balance of the machine warranty or the optional feature warranty, whichever is greater.

The following have been designated as consumables or supply items; therefore, not covered by this warranty:

Battery

Warranty service: If required, IBM provides repair or exchange service depending on the type of warranty service specified for the machine. IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response-time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations. Additional charges may apply outside IBM's normal service area. Contact your local IBM representative or your reseller for country- and location-specific information.

The type of service is customer replaceable unit (for example, keyboard, mouse, speaker,

memory, or HDD) service and on-site service.

Customer replaceable unit (CRU) service: IBM provides a replacement CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM at any time on your request. A CRU is designated as being either a Tier 1 or a Tier 2 CRU. Installation of a Tier 1 CRU is your responsibility. If IBM installs a Tier 1 CRU, at your request, you will be charged for the installation. You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service specified.

Based upon availability, a CRU will be shipped for next-business-day (NBD) delivery. IBM specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to IBM. When return is required, return instructions and a container are shipped with the replacement CRU, and you may be charged for the replacement CRU if IBM does not receive the defective CRU within 15 days of your receipt of the replacement.

The following have been designated as a Tier 1 CRU:

- Blank filler
- HDD
- Power cord
- Service label
- System label
- Top cover

On-site service: This provides on-site repair, 9 hours per day, Monday through Friday excluding holidays, NBD response. IBM or your reseller will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose. On-site Service is not available in all countries, and some countries have kilometer or mileage limitations from an IBM service center. In those locations where on-site service is not available, the normal in-county service delivery is used.

Call IBM at 800-IBM-SERV (426-7378) to assist with problem isolation for hardware to determine if warranty service is required. Telephone support may be subject to additional charges, even during the limited warranty period.

Calls must be received by 5:00 p.m. local time in order to qualify for NBD service.

International Warranty Service (IWS): IWS is available in selected countries or regions.

The warranty service type and the service level provided in the servicing country may be different from that provided in the country in which the machine was purchased.

Under IWS, warranty service will be provided with the prevailing warranty service type and service level available for the IWS-eligible machine type in the servicing country and the warranty period observed will be that of the country in which the machine was purchased.

To determine the eligibility of your machine and to view a list of countries where service is available, visit

<http://www-304.ibm.com/jct01004c/systems/support/supportsite.wss/warrantyform?brandind=5000008>

For more information on IWS, refer to Services Announcement [601-034](#), dated September 25, 2001.

Licensing: Programs included with this product are licensed under the terms and conditions of the license agreements that are shipped with the system.

Maintenance services

ServicePac®, ServiceSuite™, ServiceElect, and ServiceElite: ServicePac, ServiceSuite, ServiceElect, and ServiceElite provide hardware warranty service upgrades, maintenance, and selected support services in one agreement.

Warranty service upgrade: During the warranty period, a warranty service upgrade provides an enhanced level of on-site service for an additional charge. A warranty service upgrade must be purchased during the warranty period and is for a fixed term (duration). It is not refundable or transferable and may not be prorated. If required, IBM will provide the warranty service upgrade enhanced level of on-site service acquired by the customer. Service levels are response-time objectives and are not guaranteed.

IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability.

CRUs will be provided as part of the machine's standard warranty CRU Service except that you may install a Tier 1 CRU yourself or request IBM installation, at no additional charge, under one of the on-site service levels specified.

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose.

Maintenance service: If required, IBM provides repair or exchange service depending on the type of maintenance service specified below for the machine. IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response-time objectives and are not guaranteed.

CRU service: If your problem can be resolved with a CRU (for example, keyboard, mouse, speaker, memory, or HDD), IBM will ship the CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM at any time on your request.

IBM specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to IBM. When return is required, return instructions and a container are shipped with the replacement CRU, and you may be charged for the replacement CRU if IBM does not receive the defective CRU within 15 days of your receipt of the replacement.

On-site service: IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose.

Maintenance service (ICA)

Maintenance services are available for ICA legacy contracts.

Alternative service (warranty service upgrades): During the warranty period, a warranty service upgrade provides an enhanced level of on-site service for an additional charge. A warranty service upgrade must be purchased during the warranty period and is for a fixed term (duration). It is not refundable or transferable and may not be prorated. If required, IBM will provide the warranty service upgrade enhanced level of on-site service acquired by the customer. Service levels are response-time objectives and are not guaranteed.

IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability.

A CRU will be provided as part of the machine's standard warranty CRU service except that you may install a Tier 1 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service specified.

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well-lit, and suitable for the purpose.

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Non-IBM parts support

Warranty service: IBM is now shipping machines with selected non-IBM parts that contain an IBM field replaceable unit (FRU) part number label. These parts are to be serviced during the IBM machine warranty period. IBM is covering the service on these selected non-IBM parts as an accommodation to their customers, and normal warranty service procedures for the IBM machine apply.

Warranty service upgrades and maintenance services: Under certain conditions, IBM Integrated Technology Services repairs selected non-IBM parts at no additional charge for machines that are covered under warranty service upgrades or maintenance services.

IBM Service provides hardware problem determination on non-IBM parts (for example, adapter cards, PCMCIA cards, disk drives, or memory) installed within IBM machines covered under warranty service upgrades or maintenance services and provides the labor to replace the failing parts at no additional charge.

If IBM has a Technical Service Agreement with the manufacturer of the failing part, or if the failing part is an accommodations part (a part with an IBM FRU label), IBM may also source and replace the failing part at no additional charge. For all other non-IBM parts, customers are responsible for sourcing the parts. Installation labor is provided at no additional charge, if the machine is covered under a warranty service upgrade or a maintenance service.

IBM hourly service rate classification: One

Field-installable features: Yes

Model conversions: No

Machine installation

Machine type	CSU
0446	No
7825	No
7831	No
7832	No
4369	No
7834	No

Graduated program license charges apply: No

Licensed Machine Code: IBM Machine Code is licensed for use by a customer on the IBM machine for which it was provided by IBM under the terms and conditions of the IBM License Agreement for Machine Code, to enable the machine to function in accordance with its specifications, and only for the capacity authorized by IBM and acquired by the customer. You can obtain the agreement by contacting your IBM representative or visiting

http://www-1.ibm.com/servers/support/machine_warranties/machine_code.html

IBM may release changes to the Machine Code. IBM plans to make the Machine Code changes available for download from the IBM System x technical support Web site

<http://www-304.ibm.com/systems/support/>

If the machine does not function as warranted and your problem can be resolved through your application of downloadable Machine Code, you are responsible for downloading and installing these designated Machine Code changes as IBM specifies. If you would prefer, you may request IBM to install downloadable Machine Code changes; however, you may be charged for that service.

Educational allowance: None

Prices

Contact your IBM representative for pricing.

For ServiceElect (ESA) maintenance service charges, contact IBM Global Services at 888-IBM-4343 (426-4343).

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