

7133 Models D40 and T40  
Serial Disk Systems

# Hardware Technical Information



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## About This Book

This book is intended for system designers, programmers, engineers, and other professionals who need to understand the 7133 Models D40 and T40 Serial Disk Systems. These systems are Serial Storage Architecture (SSA) disk subsystems.

This book contains the following information:

- Chapter 1 gives general information about the components of an SSA subsystem.
- Chapter 2 summarizes the physical characteristics of the 7133 Models D40 and T40.
- Chapter 3 describes the external connectors of the 7133 Models D40 and T40.

For similar information about 7133 Models 010, 020, 500, and 600, refer to the *7133 SSA Disk Subsystem: Hardware Technical Information* manual, SA33-3261.

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## Web Support Pages

When performing SSA device or subsystem planning, installation, upgrades, or preventive maintenance, please refer to the following web support pages. These pages should also be reviewed in preparation for system hardware or operating system upgrades if SSA devices are included in the configuration. These web pages provide access to the latest SSA publications and support code for the using system, SSA adapters and SSA subsystems.

<http://www.hursley.ibm.com/ssa/> - Contains links to SSA publications and other SSA web pages, including the ones below.

<http://www.hursley.ibm.com/ssa/rs6k/> - Contains lists of the latest SSA support code and provides download capability for the RS/6000 and AIX environments.

<http://www.hursley.ibm.com/ssa/pcserver/> - Contains lists of the latest SSA support code and provides code download capability for PC Server environments.

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AIX  
@server  
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RS/6000

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## Related Publications

ANSI<sup>1</sup> specification SCSI/2 X3T9.2/86-109 revision 10H

ANSI specification X3.131-199X

*Site and Hardware Planning Information*, SA38-0508

*Adapters, Devices, and Cables Information for Micro Channel Bus Systems*, SA23-2764

*7133 Models D40 and T40 Serial Disk System: Operator Guide*, SA33-3278.

Manuals for your system and its SSA attachment; for example, for RISC systems:

- *Adapters, Devices, and Cables Information for Multiple Bus Systems*, SA23-0510
- *SSA 4-Port Adapter and Enhanced SSA 4-Port Adapter: Technical Reference*, S31H-8612
- *Micro Channel SSA RAID Adapters: Technical Reference*, SA33-3270
- *PCI SSA RAID Adapters: Technical Reference*, SA33-3225.
- *SSA Adapters: User's Guide and Maintenance Information*, SA33-3272.
- *PCI SSA Multi-Initiator/RAID-EL Adapters: Installation Guide*, 02L77235.

For PC server systems:

- *IBM Netfinity Rack: Planning and Installation Guide*, S24L-8055

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1. American National Standards Institute.

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## Chapter 1. Introduction

This section describes the 7133 Models D40 and T40 Serial Disk Systems and their components. These systems are Serial Storage Architecture (SSA) disk subsystems.

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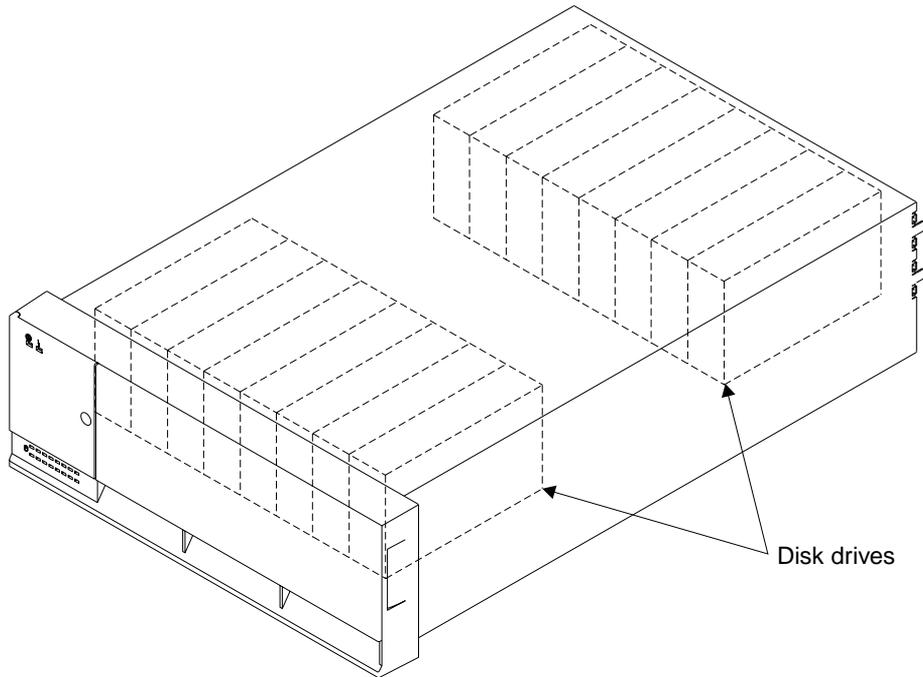
### Model D40 Rack-Mounted Units

The 7133 Model D40 is a rack-mounted SSA disk storage subsystem that can be attached to any computer that provides support for SSA. The Model D40 is sometimes referred to as a drawer; however, unlike a drawer, the D40 is fixed in the rack and not designed to be moved in or out in normal operation.

Up to 16 SSA disk drive modules, from 4 to 16 in increments of 1, can be installed in a Model D40 unit. The base machine includes four disk drive modules; alternative and additional disk drives are described in “SSA Disk Drive Modules” on page 6. You can change the position of disk drive modules, add more, and replace failed ones yourself without switching the 7133 unit off.

Each group of disk drives in a 7133 system is connected in a loop. Host attachment must be provided in the loop, for example, by an SSA adapter. An SSA loop can contain groups of disk drives that are installed in other 7133 units, and attachments to different system units.

A fully configured 7133 Model D40 looks like this:



The front covers hinges downward.

There are three autodocking fan assemblies at the front and two autodocking power-supply assemblies at the back of each 7133 unit. These assemblies provide redundant power and cooling for all the disk drives in the unit.

If the Remote Power On Control feature (available only for RS/6000™ connected systems) is installed in the 7133 unit, power to the unit is turned on or off when power is turned on or off to the system unit.

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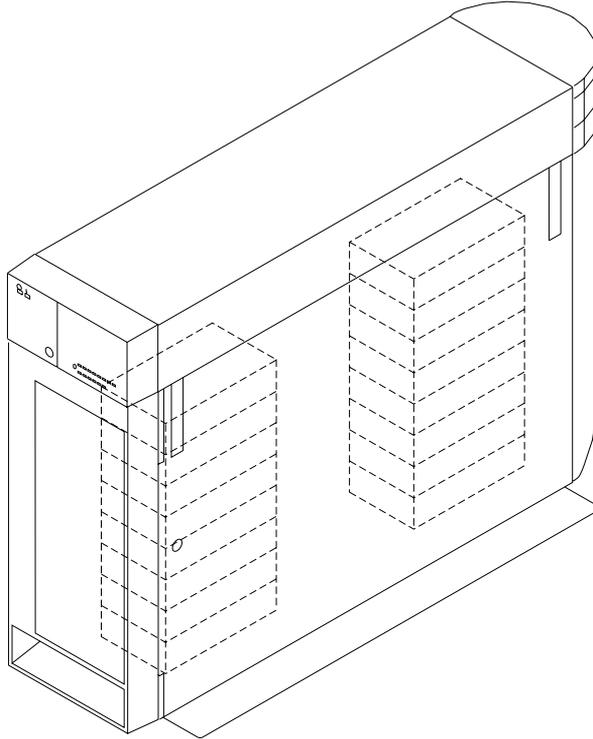
## Model T40 Deskside Units

The 7133 Model T40 is a deskside SSA disk storage subsystem that can be attached to any computer that provides support for SSA.

Up to 16 SSA disk drive modules, from 4 to 16 in increments of 1, can be installed in a Model T40 unit. The base machine includes four disk drive modules; alternative and additional disk drives are described in “SSA Disk Drive Modules” on page 6. You can change the position of disk drive modules, add more, and replace failed ones yourself without turning power off from the 7133 unit.

Each group of disk drives in a 7133 unit is connected in a loop that must also contain an SSA adapter. An SSA loop can contain groups of disk drives that are installed in other 7133 units, and SSA adapters that are installed in different system units.

A fully configured 7133 Model T40 looks like this:



The front and back covers hinge to the left to give access to the disk drive modules installed behind them. Locks are provided on the covers to prevent unauthorized access to the disk drive modules and system connections.

There are three autodocking fan assemblies at the front and two autodocking power-supply assemblies at the back of each 7133 unit. These assemblies provide redundant power and cooling for all the disk drives in the unit.

If the Remote Power On Control feature (available only for RS/6000 connected systems) is installed in the 7133 unit, power to the unit is turned on or off when power is turned on or off to the system unit.

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## Controller Card

Each 7133 Model D40 or T40 contains a controller card. The controller card:

- Monitors itself. If it detects a problem, the controller card can generate an SSA error message through the disk drive modules.
- Monitors the ambient air temperature. If the temperature is too high, the controller card can:
  - Increase the speed of the fans.
  - Generate an SSA error message through the disk drive modules.
  - Shut down the 7133, if necessary.
- Monitors the status of the fans. If a problem occurs with the fans, the controller card can:
  - Control the speed of the fans. For example, if one fan fails, the controller card increases the speed of the other two fans to increase the cooling.
  - Generate an SSA error message through the disk drive modules.
  - Shut down the 7133, if necessary.
- Monitors the status of the power supply assemblies. If a power supply assembly fails, the controller card can generate an SSA error message through the disk drive modules.
- Monitors the Remote Power On Feature (if installed) through the power supply assembly that is in position 1.
- Monitors and controls the bypass cards.
- Monitors and controls the operator panel.
- Provides support for SCSI Enclosure Services (SES).

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## SSA Adapters

The disk drive modules of the 7133 are connected through two or more SSA links to an SSA adapter that is located in the using system. The disk drive modules, SSA links, and SSA adapter are configured in loops. Each loop provides a data path that starts at one connector of the SSA adapter and passes through a link (external SSA cable) to the disk drive modules. The loop continues through the disk drive modules, then returns through another link to a second connector on the SSA adapter.

At the back of the 7133 are four bypass cards each of which has a pair of SSA connectors for the external cables. Each bypass card provides connections to the backplane assemblies of the 7133. If a bypass card loses both of its external SSA connections, it automatically reconfigures the SSA loop so that the loop remains complete.

---

## SSA Bypass Cards

There are four bypass cards at the back of each 7133 Model D40 or T40. These cards provide the connections between the external SSA cables and the disk drive module strings. Each bypass card has two external SSA connectors. Through these connectors, the bypass cards and, therefore, the disk drive module strings, can be connected to each other or to the using system.

The bypass cards can be jumpered for the following modes:

- Automatic mode
- Forced inline mode

When a bypass card is in Automatic mode, you can select additional modes by using the 7133 service aids or the Command Line tools. The additional modes are:

- Forced Inline mode
- Forced Bypass mode
- Forced Open mode

See the *7133 Models D40 and T40 Serial Disk Systems: Service Guide* for further information about the bypass cards.

**Note:** The cards need not all be in the same mode.

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## SSA Disk Drive Modules

Each 7133 Model D40 or T40 unit includes four SSA disk drive modules as standard. In your initial order, you can select the capacity of these disk drives. You can add up to twelve more SSA disk drive modules, either in your initial order, or later. You can install the additional disk drive modules yourself.

The actual storage capacity of these disk drives, when formatted in 512-byte blocks, is:

Nominal capacity	Speed RPM	Actual capacity	512 byte blocks
4.5 GB	7 200	4 512 701 440 bytes	8 813 870
9.1 GB	7 200	9 111 591 424 bytes	17 796 077
9.1 GB	10 000	9 111 591 424 bytes	17 796 077
18.2 GB	7 200	18 223 183 872 bytes	35 592 156
18.2 GB	10 000	18 223 183 872 bytes	35 592 156
18.2 GB	15 000	18 223 183 872 bytes	35 592 156
36.4 GB	7 200	36 446 367 744 bytes	71 184 312
36.4 GB	10 000	36 446 367 744 bytes	71 184 312
36.4 GB	15 000	36 446 367 744 bytes	71 184 312
72.8 GB	10 000	72 892 735 488 bytes	142 368 624
145.6 GB	10 000	145 785 470 976 bytes	284 737 248

### Limitations:

1. Various types of 10 000 rpm disk drives are available. Their actual speeds are in the range 9 991 through 10 091 rpm.
2. If a customer configures an @server pSeries™ volume group on a 15+P RAID-5 array that is using 72.8 GB disk drives, the customer must go to the command line and set the form factor to 2 or above. This action allows the number of physical partitions to be set inside the AIX® limit. If the customer does not do this action, the volume group fails to configure.
3. A pSeries RAID-0 volume group that uses 72.8 GB disk drives can contain no more than 15 of those disk drives.
4. On all drives, the adapter reserves 65 536 bytes for its own use.
5. Disk drive modules for 7133 Models 010, 020, 500, and 600 cannot be installed in 7133 Models D40 and T40. Also, disk drive modules for the 7133 Models D40 and T40 cannot be installed in 7133 Models 010, 020, 500, and 600.

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## Advanced SSA Optical Extender (Pair)

An Advanced SSA Optical Extender (Pair) feature can be installed with any 7133 model. The optical extenders can drive single-mode or multi-mode operations. However, if multi-mode operation is required, an Advanced Multi-Mode Conditioner (Pair) must be used. Two separate versions of the Advanced Multi-Mode Conditioners are available, one for 50/125 micron fibre and one for 62.5/125 micron fibre

Fibre optic cables and connectors must be to the following specifications:

For single-mode operations	9/125 microns
For multi-mode operations	50/125 microns or 62.5/125 microns
	<b>Note:</b> Each type of cable needs a particular type of Advanced Multi-Mode Conditioner (Pair)
Connector type	ST2 - Preferred for new installations
	ST - Existing installations
Uniter type (multi-mode only)	ST2
Maximum permitted length between two SSA nodes (for example, disk drives)	
single-mode	10 kilometers (32800 feet) See Note
multi-mode	3 kilometers (9842 feet) See Note
	<b>Note:</b> Lengths of 3 or 10 kilometers are permitted only if the fibre optic connection is between:
	<ul style="list-style-type: none"><li>• Two 7133s Model D40 or T40</li><li>• A 7133 Model D40 and a 7133 Model T40</li><li>• A 7133 Model D40 or T40 and an Advanced SerialRAID Adapter</li><li>• A 7133 Model D40 or T40 and an Advanced SerialRAID/X Adapter</li><li>• Two Advanced SerialRAID Adapters</li><li>• Two Advanced SerialRAID/X Adapters</li></ul>
	If the above conditions are not met, the maximum permitted length of fibre optic cable is 2.4 kilometers for either single-mode or multi-mode operations.



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## Chapter 2. Product Characteristics

This section describes the physical characteristics of the 7133 Models D40 and T40 and their environmental and power requirements.

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### Dimensions

Model	Height	Width	Depth
Model D40	171 mm (6.7 in.)	444 mm (17.5 in.)	737 mm (29 in.)
Model T40	610 mm (24.0 in.)	210 mm (8.3 in.)	861 mm (33.9 in.)

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### Weight

The weight of a 7133 unit depends on its configuration.

Model	Configuration	Disk Drive Modules	Weight
Model D40	Minimum	4	37.6 kg (83 lb)
	Maximum	16	53.5 kg (118 lb)
Model T40	Minimum	4	61.2 kg (135 lb)
	Maximum	16	76.2 kg (168 lb)

#### Attention:

1. No more than **six** 7133s can be present in any of these racks:
  - 7015 Model R00 Rack
  - 7014 Model S00 Rack
  - Netfinity 9306 Model 900 PC Server Rack Enclosure
2. No more than **nine** 7133s can be present in a 7014 Model T00 Rack
3. No more than **ten** 7133s can be present in a 7014 Model T42 Rack

If you are using any other type of rack, see the documentation for that rack.

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## Service Clearances

Model	Service Clearance
Model D40	The minimum is 114 cm (45 ins) front and 81 cm (32 ins) rear when the 7133 is mounted in a rack
Model T40	The minimum is 1 m (39 ins) front, rear, and on each side.

---

## Environment

7133 Models D40 and T40 Serial Disk Systems have the following environmental limits:

	Air Temperature	Relative Humidity	Maximum Wet Bulb
Operating	10°C to 40°C (50°F to 104°F) See note	8% to 80% noncondensing	27°C (80°F)
Recommended operating point	22°C (72°F)	45%	
Recommended operating range	20°C to 25°C (68°F to 77°F)	40% to 50%	
Nonoperating	10°C to 40°C (50°F to 104°F)	8% to 80% noncondensing	27°C (80°F)
Storing	1°C to 60°C (34°F to 140°F)	5% to 80% noncondensing	29°C (84°F)
Shipping	-40°C to 60°C (-40°F to 140°F)	5% to 100% condensing but not precipitating	29°C (84°F)

### Notes:

1. The recommended operating temperature is 22°C (72°F) or lower. At lower temperatures, the risk of failure in the unit is reduced. If the operating temperature is above 22°C (72°F) for long periods of time, the unit is exposed to a greater risk of failure from external causes.
2. Nonoperating environment must not exceed the operating environment limits for longer than 60 days.
3. Storage environment must not exceed operating environment limits for longer than 1 year.
4. Substantial deviations from the recommended operating range, in either direction, if sustained for extended periods of time, will expose the unit to greater risk of failure from external causes.

### Altitude (from sea level) for both models:

Operating: 0 to 2133 m (0 to 7000 ft)

Nonoperating: -304.8 m to 12 192 m (-1000 to 40 000 ft)

The upper dry bulb temperature limit of the rack-mounted unit is lowered by 1°C (2°F) for every 137 meters (450 feet) above 915 meters (3000 feet). The upper wet bulb temperature limit is lowered by 1°C (2°F) for every 274 meters (900 feet) above 305 meters (1000 feet).

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## Heat Output, Airflow, and Cooling

The maximum heat output of either model is 472 watts (1614 BTU/hr).

Each 7133 rack-mounted unit requires an airflow of 2.5 m<sup>3</sup> per minute (87 ft<sup>3</sup> per minute). The input air temperature to all racks is recommended to be in the range 20 through 25°C (68 through 77°F), with a recommended operating temperature of 22°C (72°F).

When racks containing many 7133 units are to be installed together, the following requirements must be met to ensure that the 7133 units are adequately cooled:

- Air enters at the front of the rack and leaves at the back. To prevent the air that is leaving the rack from entering the intake of another piece of equipment, racks must be positioned in alternate rows, back-to-back and front-to-front. This arrangement is known as “Cold Aisle / Hot Aisle” and is shown in Figure 1 on page 12.
- Where racks are in rows, each rack must touch the rack that is next to it to reduce the amount of hot air that can flow round from the back of the rack into the intakes of the 7133 units that are in that rack. It is recommended that Suite Attach Kits be used to completely seal any gaps that remain between the racks. For details of Suite Attach Kits, contact your marketing representative.
- Where racks are in rows front-to-front or back-to-back, a gap of at least 1220 mm (48 in) must separate the rows across the cold aisle.
- Where cold air is supplied through perforated tiles or gratings in the floor, it is recommended that the front of racks be positioned on floor-tile seams, with a full line of perforated tiles or grates immediately in front of the racks. The underfloor temperature must be not exceed 15°C (60°F) to allow the cold aisle temperature to be maintained.

Air conditioners must be located where they can take their input from the hot aisle, and supply cooled air to the underside of the cold aisle perforated tiles or gratings. It is recommended that the air conditioners be located at the ends of the hot aisles (see Figure 1 on page 12). This requirement ensures that hot exhaust air cannot flow over the top of the racks and reenter at the front.

The perforated tiles or gratings must be capable of handling the airflow requirements for all the 7133 units that are present in a rack. For example, if a T42 rack contains ten 7133 units, and the air conditioners are located at the ends of the hot aisles (see Figure 1 on page 12), the airflow required is 19.8 m<sup>3</sup> per minute (700 ft<sup>3</sup> per minute). Note that a 40% open grating is generally required to supply this volume of air. If the air conditioners are located in front of, or behind the racks, the airflow required for the example T42 rack is now 25.5 m<sup>3</sup> per minute (900<sup>3</sup> per minute).

- To ensure correct airflow in each rack, the rack filler plates must be installed in unused positions. Also, all the gaps in the front of the racks must be sealed, including the gaps between the 7133 units.

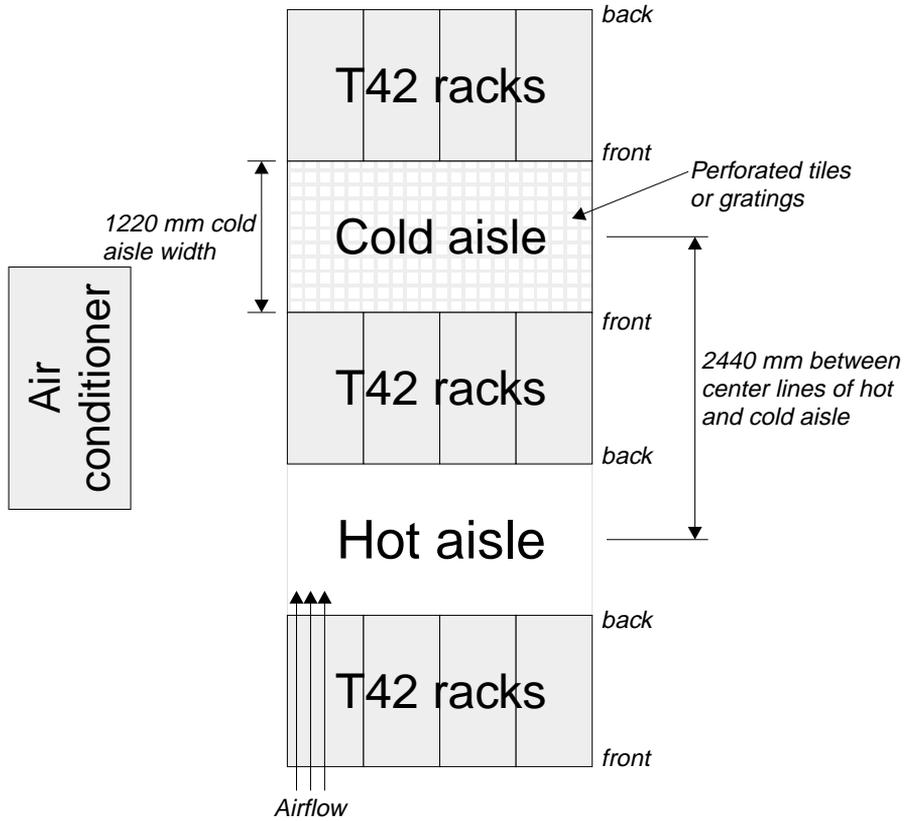


Figure 1. Example of Cold Aisle / Hot Aisle Rack Configuration

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## Acoustic Noise Declaration

Acoustic noise has been measured for a 7133 Model D40 in the following situation:

- The 7133 had 16 disk drive modules installed.
- The 7133 was in a 7014 Model T00 Rack. The rack had a back door that included an acoustic baffle.
- The 7133 system was at EIA position 17-20.
- The rest of the rack was fully populated with units to which power was not connected.
- All other openings in the front of the rack were closed with blanking plates.

Acoustic noise has been measured for a 7133 Model T40 in the following situation:

- The 7133 had 16 disk drive modules installed.

These levels were measured using a procedure in accordance with ISO standard DIS7779, *Measurement of Airborne Noise Emitted by Computer and Business Equipment*. The equipment was installed and operated as described in Appendix C.8 of that standard. Reported sound power values are declared values where:

$$LwA(\text{declared}) = LwA(\text{average}) + 0.3 \text{ Bel}$$

Sound pressure values are the average of the surface sound pressures that were measured at the four bystander microphones. Each microphone was located one meter from the 7133. The sound pressure values are designated as <LpA>.

*Table 1. Acoustic Noise Measurements*

7133 Unit	Sound Power (LwAD Bels)		Surface Sound Pressure (LpA, which is dBA at 1 Meter)	
	Idle	Seek	Idle	Seek
Model D40	6.4	6.5	48	49
Model T40	6.5	6.6	50	51

---

## Electrical Power

Electrical power is supplied to each 7133 Model D40 or T40 by two power-supply assemblies. These power-supply assemblies convert the input voltage to dc for distribution within the 7133 unit.

Each disk drive module receives power from both power-supply assemblies. If one power-supply assembly fails, all disk drive modules can continue to operate.

## Input-Voltage Requirements

### Main AC Supply

For the base models, the power-supply assemblies can run uninterrupted with ac inputs from 88 to 264 volts and from 47 to 63 Hz. Full operation is also possible with dc inputs from 240 to 375 volts although, after startup, the voltage can be reduced to 225 volts without affecting the operation of the 7133.

Power line transients (within the limits given in the following table) do not interrupt the operation of the 7133.

Transient Voltage	Duration	Frequency	Nominal Voltage
300 V rms	1.0 s	47 to 64 Hz	<260 V rms
260 V rms	infinite	47 to 64 Hz	–
90 V rms	infinite	47 to 64 Hz	–
80 V rms	2.0 s	47 to 64 Hz	>90 V rms
70 V rms	0.5 s	47 to 64 Hz	>90 V rms
0 V rms	40 ms	–	>90 V rms

### –48 Volts DC Supply

The –48 Volt Power Supply feature provides power supply assemblies that allow the 7133 Model D40 to be connected to –48 volt power sources. The 7133 must be connected to two separate power sources to ensure that operations are not interrupted if one power source fails. The –48 Volt power distribution panel (PDP) in the rack provides the power sources and the power cables. For details about how to connect a 7133 Model D40 to a –48 volt power source, see the *7133 Model D40 Serial Disk System: Installation Guide*.

For Model D40 units with the optional –48 V power supply feature, the input voltage must be in the range –40 V to –60 V.

Power line transients (within the limits given in the following table) do not interrupt the operation of the 7133.

Transient Voltage	Duration	Frequency	Nominal Voltage
-65 V dc	1.0 s	N/A	≤60 V dc
-38 V dc	2.0 s	N/A	≥40 V dc
-35 V dc	0.5 s	N/A	≥40 V dc
0 V dc	3 ms	N/A	≥40 V dc

**Attention:** Both power supply assemblies in a 7133 must be of the same voltage rating. ***Do not mix power supply assemblies of different voltage ratings.***

## Power Input

The following table shows the power input that is needed for a 7133 Model D40 or T40 unit. The values shown are for a 7133 that has 16 disk drive modules installed. The startup power assumes that no data transfer is occurring as the disk drive modules start up.

Input Voltage	Idle	100 operations per second
-48 V DC	336 Watts	384 Watts
100 V AC	448 VA 440 Watts	480 VA 450 Watts
220 V AC	495 VA 430 Watts	554 VA 472 Watts

### Notes:

- Under normal circumstances, the two power supply units (PSUs) in the 7133 share the load evenly (to within 10%). If both PSUs are powered from the same source, the capacity of the source must be 120 Watts greater than the above figures to accommodate the increased load if a PSU fails or the power input to a single PSU fails. This increased power demand is due to the fans increasing speed to provide the remaining PSU with additional cooling.  
The fans will also increase speed if an abnormally high temperature is detected. This will also cause a power demand increase of 120 watts greater than the above figures. Either condition, a single operating power supply or a high temperature, will cause the 120 watts increase.
- If the two PSUs are powered from independent sources, each source must have the capacity to carry the full load of all drawers connected to it plus 120 Watts for each drawer to accommodate the increased load if one source fails and the remaining one must maintain the supplies to the drawers. The increase is due to the fans increasing speed.

## Power Factor

Power-factor correction is applied within the power-supply assemblies of each 7133 Model D40 or T40 unit. This maintains the power factor of the unit at greater than 0.77.

## Output Protection

Each power-supply assembly has over-current and over-voltage protection.

## Early Power-Off Warning (EPOW)

Each power-supply assembly provides an early power-off warning (EPOW) signal to the controller card. When both power-supply assemblies signal an EPOW, the controller card signals an EPOW to each disk drive within the 7133 unit.

## Power Cables

Each 7133 Model T40 is supplied with a country specific power cable; the Model D40 power cables are not country specific. No power cables are supplied with the 7133 Model D40 with a -48 V DC feature. Power cables for the 7133 Model D40 with a -48 V DC feature are included with the optional DC Power Distribution Panel feature of IBM RS/6000 racks.

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## Power Control

The 7133 power switch (on the control panel) controls the dc output voltages that are provided by the power-supply assemblies within the 7133 unit.

## Remote Power Control

**Note:** The Remote Power On Control feature is available only for RS/6000 connected systems.

A 7133 that has the Remote Power On Control feature (available only for RS/6000 connected systems) can receive two remote power-control signals: main and auxiliary. Each receiver circuit in the remote-power-on control unit has two connectors wired in parallel to allow feed-through of the power-control signal from another unit. The main receiver circuit of the remote-power-on control unit senses the presence of a shorting link in the using-system power-control signal cable, which must be present for the power supply to be controlled remotely.

When no using-system power-control signal cable is present in either of the main power-control connectors, and the 7133 power switch and the remote-power-on control unit switch are set to On, the power-supply assemblies provide power to their attached loads as soon as the normal mainline voltages are applied to the mainline-power connector.

When cables are attached to the main power-control connectors (or to both the main and the auxiliary power-control connectors), and the shorting link is present in the main power-control cable, the loads are energized only after either of the power-control signals (main or auxiliary) is at an 'up' level of between 10 V and 20 V. The power-control signals in both cables must be at the 'down' level to turn off the power.

The cable from the remote-power-on control unit is connected to the left-hand (bottom) power-supply assembly within the 7133 unit.

## Power Sequencing

7133 Models D40 and T40 units have no power sequencing. All the disk drive modules start their power sequence when the input voltages are inside the specified limits. The disk drive module motors start under the control of the using system.

**Note:** To prevent an excessive demand for current, the disk drive module motors must not all be started at the same time. If there are no I/O operations in progress on any started drives, up to 8 disk drive modules can be started at the same time, with a minimum interval of 10 seconds before more drives are started. Normal start time for all the disk drive modules is less than 30 seconds.

## Auto Restart

7133 Models D40 and T40 units automatically restart when input power is restored within specification after a power failure. The disk drive module motors start under the control of the using system.

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## Safety Approvals

7133 Models D40 and T40 are certified to the following safety standards:

- IEC/ EN60950
- Binational UL/CSA60950

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## Electromagnetic Compatibility

### Federal Communications Commission (FCC) Statement

**Note:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Neither the provider nor the manufacturer is responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### Japanese Voluntary Control Council for Interference (VCCI) Statement

This product is a Class A Information Technology Equipment and conforms to the standards set by the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). In a domestic environment, this product might cause radio interference, in which event the user might be required to take adequate measures.

### Korean Government Ministry of Communication (MOC) Statement

Please note that this device has been approved for business purposes with regard to electromagnetic interference. If you find that this device is not suitable for your use, you can exchange it for one that is approved for non-business purposes.

### New Zealand Compliance Statement

This is a Class A product. In a domestic environment this product might cause radio interference, in which event the user might be required to take adequate measures

### International Electrotechnical Commission (IEC) Statement

This product has been designed and built to comply with (IEC) Standard 950.

### Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

## Industry Canada Compliance Statement

This Class A digital apparatus complies with IECs-003.

## United Kingdom Telecommunications Requirements

This apparatus is manufactured to the International Safety Standard EN60950 and as such is approved in the U.K. under approval number NS/G/1234/J/100003 for indirect connection to public telecommunications systems in the United Kingdom.

## European Union (EU) Statement

This product is in conformity with the protection requirements of EU council directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. Neither the provider nor the manufacturer can accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of option cards not supplied by the manufacturer.

This product is in conformity with the EU council directive 73/23/EEC (and the Complementary Markings Directive, 93/68/EEC) on the approximation of the laws of the Member States relating to electrical equipment designed for use with certain voltage limits. This conformity is based on compliance with the following harmonized standard: EN60950.

## Radio Protection for Germany

**Zulassungsbescheinigung laut Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) vom 30. August 1995.**

Dieses Gerät ist berechtigt in Übereinstimmung mit dem deutschen EMVG das EG-Konformitätszeichen zu führen.

Der Aussteller der Konformitätserklärung ist die IBM Deutschland.

Informationen in Hinsicht EMVG Paragraph 3 Abs. (2):

Das Gerät erfüllt die Schutzanforderungen nach EN 50082-1 und EN 55022 Klasse A.
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EN55022 Klasse A Geräte bedürfen folgender Hinweise:

Nach dem EMVG: "Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministeriums für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind." (Auszug aus dem EMVG, Para.3, Abs.4). Dieses Genehmigungsverfahren ist nach Paragraph 9 EMVG in Verbindung mit der entsprechenden Kostenverordnung (Amtsblatt 14/93) kostenpflichtig.

Nach der EN 55022: "Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Massnahmen durchzuführen und dafür aufzukommen."

Anmerkung: Um die Einhaltung des EMVG sicherzustellen, sind die Geräte wie in den Handbüchern angegeben zu installieren und zu betreiben.

## **Taiwan Class A Compliance Statement**

### **警告使用者:**

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

## Chapter 3. Physical Connections

Figure 2 shows the external connectors of the 7133 Model D40.

**Note:** The mainline power connector will be different if you are using a -48V power supply. The -48V connector is shown in “-48V Power Supply” on page 24.

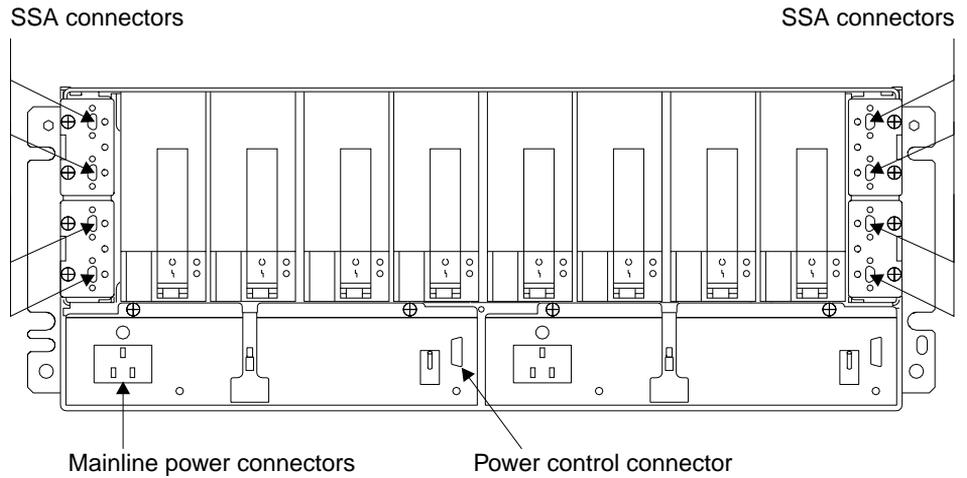
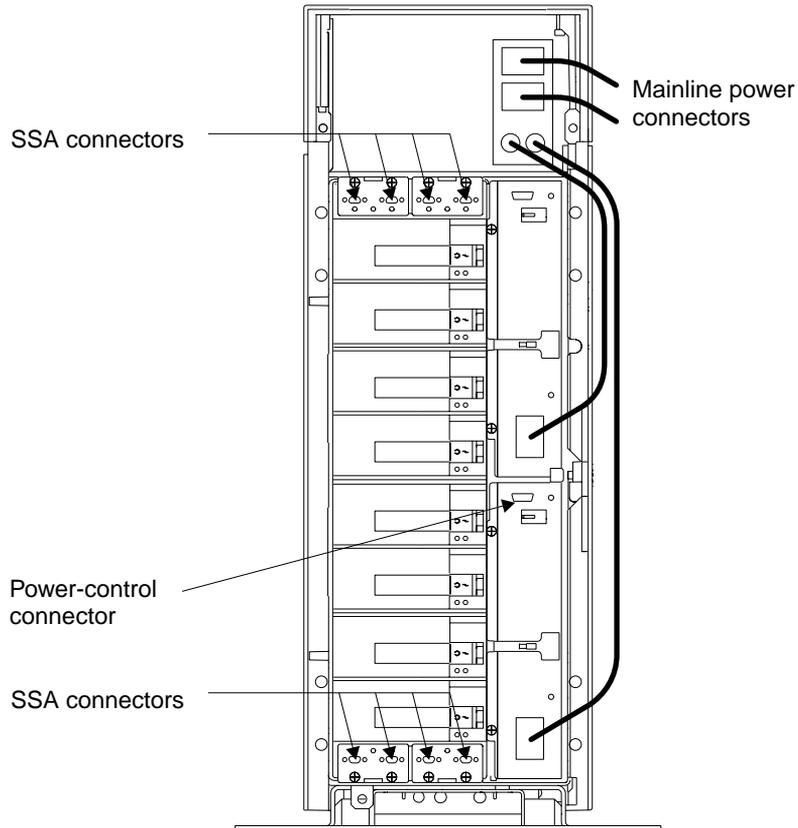


Figure 2. External Connectors of the 7133 Model D40

Figure 3 shows the external connectors of the 7133 Model T40



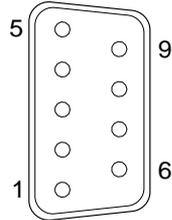
*Figure 3. External Connectors of the 7133 Model T40*

This section provides information about those connectors.

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## SSA Connectors

The SSA connectors are 9-pin high-density shielded ITT-Canon Micro MDSM connectors.



*Figure 4. SSA Connectors*

The pin assignments are:

Pin	Assignment	Pin	Assignment
1	Cable type	6	Line Out +
2	Line Out -	7	Advanced SSA Optical Extender
3	Ground	8	+5 V
4	Line In -	9	Line In +
5	Ground		

Because SSA systems are always cabled in loops, no terminators are required.

**Notes:**

1. If pin 1 is at ground, it indicates that a 40 MB/s cable is attached.
2. If pin 7 is at ground, it indicates that an Advanced SSA Optical Extender is connected.

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## Mainline-Power Connector

### Main AC Power Supply

1. **Model D40.** A mainline-power connector is on each power-supply assembly. It permits the 7133 to be connected to the ac or dc power supply in the rack. The connector is a 6-amp, three-pin, polarized, IEC-type connector.

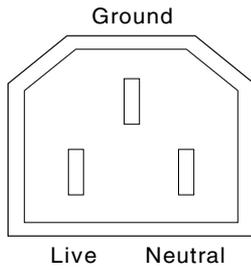


Figure 5. AC Mainline-Power Connector (Viewed from the Back of the 7133 Model D40)

2. **Model T40.** Two mainline-power connectors are on the Model T40 as shown in Figure 3 on page 22. They are 10-amp, three-pin, polarized, IEC-type connectors to be connected to the ac power source.

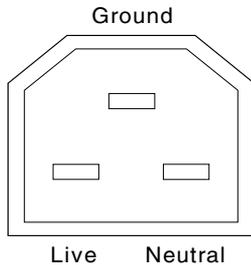


Figure 6. AC Mainline-Power Connector (Viewed from the Back of the 7133 Model T40)

### -48V Power Supply

There is one -48V power connector on each power-supply assembly in 7133 Model D40 units that have this optional feature. This permits the 7133 to be connected to a the -48V dc rack power distribution panel. The connector is a 12-pin connector.

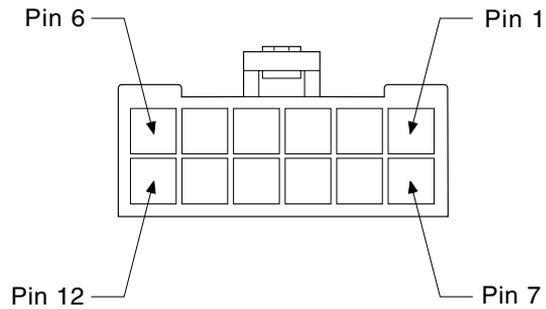
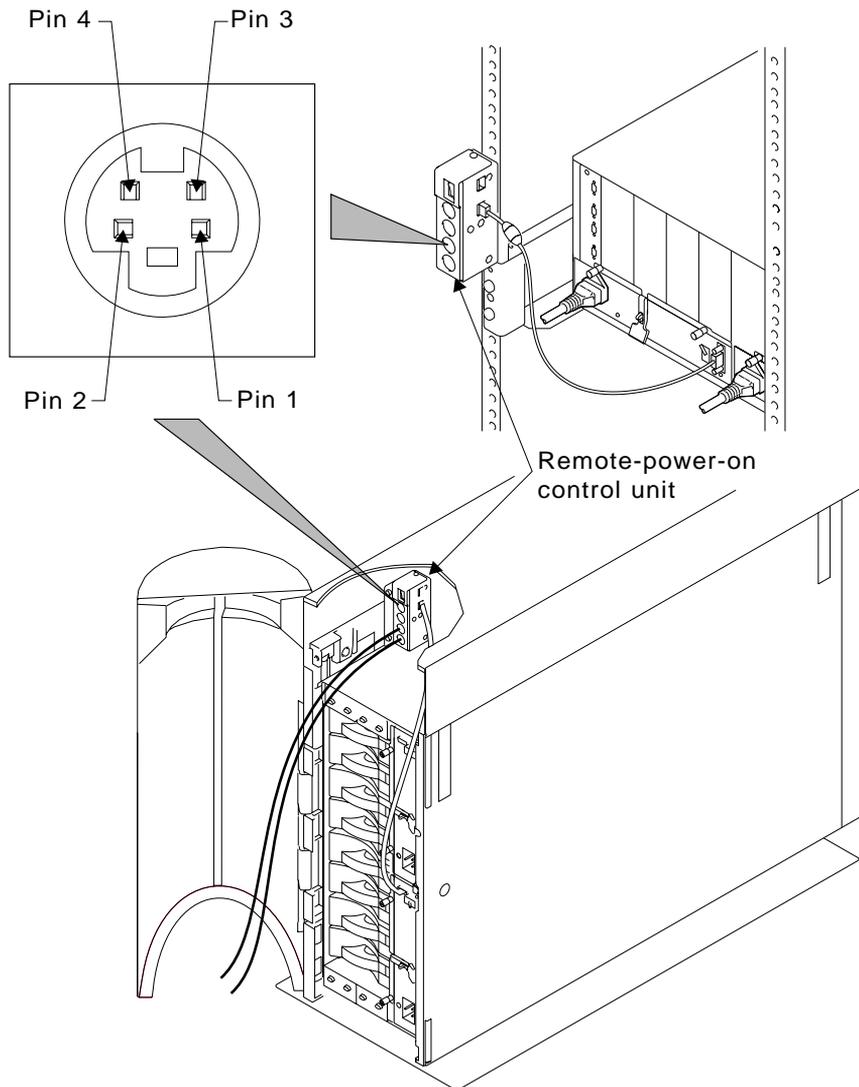


Figure 7. -48V Power Connector (Viewed from the Back of the 7133)

The pin assignments are:

Pin	Assignment	Pin	Assignment
1	Frame ground	7	Frame ground
2	Not used	8	Not used
3	-48 V return (0 V)	9	-48 V return (0 V)
4	-48 V return (0 V)	10	-48 V return (0 V)
5	-48 V in	11	-48 V in
6	-48 V in	12	-48 V in

## Power-Control Connectors



*Figure 8. Power-Control Connector (Viewed from the Outside)*

The power-control connectors are on the remote-power-on control unit of a 7133 that has the Remote Power On Control feature. The connectors are Mini-DIN connectors (or equivalent). Figure 8 shows the position of these connectors.

The main (MAIN) connector pin assignments are:

<b>Pin</b>	<b>Assignment</b>
1	Main PC +
2	Main PC -
3	Link
4	Ground

The auxiliary (AUX) connector pin assignments are:

<b>Pin</b>	<b>Assignment</b>
1	Aux PC +
2	Aux PC -
3	Link
4	Ground





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