



How to Create a PD² Database*

May 10, 2000

* Because this topic is not covered by the current PMO funded SPS Helpdesk Agreement, this document has been provided to help you resolve this issue. If you still need assistance after reviewing this document, please contact a representative from your Customer Support Team.

Table of Contents

1.	Introduction	1
2.	Verifying Database Size and Usage Allocation	2
2.1	Using Sybase Central.....	2
2.2	Using SQL Advantage	3
3.	Creating a New Database (Basic).....	4
3.1	Using Sybase Central.....	4
3.1.1	Create a Database Device for the Data	4
3.1.2	Create a Database Device for the Transaction Log.....	6
3.1.3	Create the Database.....	8
3.1.4	Restore from a Backup.....	12
3.2	Using SQL Advantage	12
3.2.1	Create a Database Device for the Data	12
3.2.2	Create a Database Device for the Transaction Log.....	14
3.2.3	Create the Database.....	16
3.2.4	Restore from a Backup.....	16
4.	Creating a New Database (Advanced).....	17
4.1	Generate Create Database DDL.....	19
4.2	Executing the Generate Create Database DDL	20
4.2.1	Step 1: Create the Devices.....	20
4.2.2	Step 2: Modify the Database Name.....	20
4.2.3	Step 3: Modify the Device Names	21
4.3	Restore from a Backup	22
5.	Creating a Database Using the PD² CD.....	23

1. Introduction

Many sites have found it necessary to create a new database using a backup from another database. There are several reasons for doing this. The most common reason is for creating a database for testing. This paper will guide you through the various methods of creating or recreating a PD² database.

In Section 2: *Verifying Database Size and Usage Allocation*, you will learn how to determine the size and usage allocation of the database that you are copying.

In Section 3: *Creating a New Database (Basic)*, you will go through the basic steps of creating a new database using either Sybase Central or SQL Advantage. These instructions should only be followed if the database that you are copying has not been altered/increased since it was created.

In Section 4: *Creating a New Database (Advanced)*, you will go through the process of creating a database using the "Generate 'Create Database' DDL" function that is found in Sybase Central. This is the preferred method for recreating a database that has been altered/increased from its original space allocation.

Finally, in Section 5: *Creating a Database Using the PD² CD*, you are given information on where to go for instruction on how to create a "clean" PD² database.

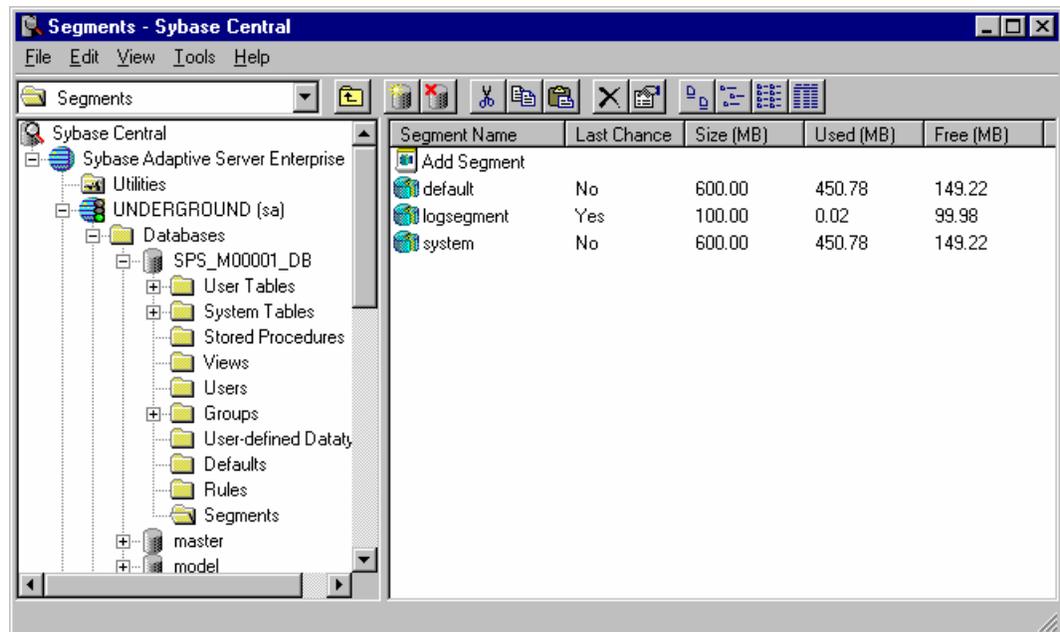
2. Verifying Database Size and Usage Allocation

Before creating a new database you need to determine the size and usage allocation of the database that you are going to copy. If the new database is too small then you will not be able to restore from a backup of the current database. The usage allocation is also important because you want to maintain the same distribution of log and data in the new database that was assigned in the old database.

2.1 Using Sybase Central

Note: If you do not have access to Sybase Central then follow the steps in Section 2.2: Using SQL Advantage.

From Sybase Central log on to the server using your "sa" id and password. Open the folder entitled "Databases" and double click on the name of your current database. Under the database name there is a folder called "Segments". Locate this folder and open it. You will notice the three segments that make up the database. They are the default, logsegment and system segments. In most cases, the default and system segments display the same information. These segments are used to store PD² data. The logsegment is used to store transaction log information. In the example below, the SPS_M00001_DB database has 600MB allocated for data and 100MB allocated for the transaction log.



2.2 Using SQL Advantage

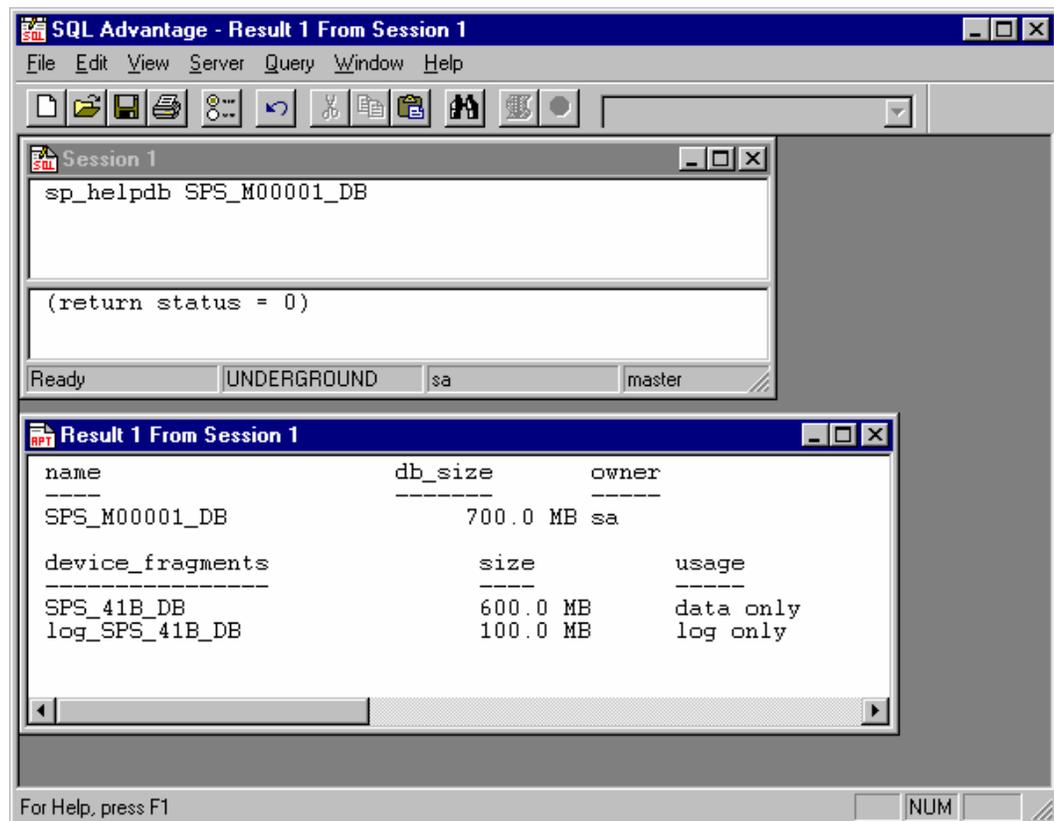
Note: If you do not have access to SQL Advantage then follow the instructions in Section 2.1: Using Sybase Central.

Log on to the server using SQL Advantage and execute the following command.

```
sp_helpdb <database_name>
```

<database_name> = the name of the current database.

The results will look similar to the following:



In this example the SPS_M00001_DB was created using 2 devices, 600MB for data only and 100MB for log only. These devices combine to make a 700MB database.

3. Creating a New Database (Basic)

The process of creating a database is divided into four steps. They are as follows:

1. Create a database device for the data
2. Create a database device for the transaction log
3. Create the database
4. Restore from a backup

Each step is described in the following sections.

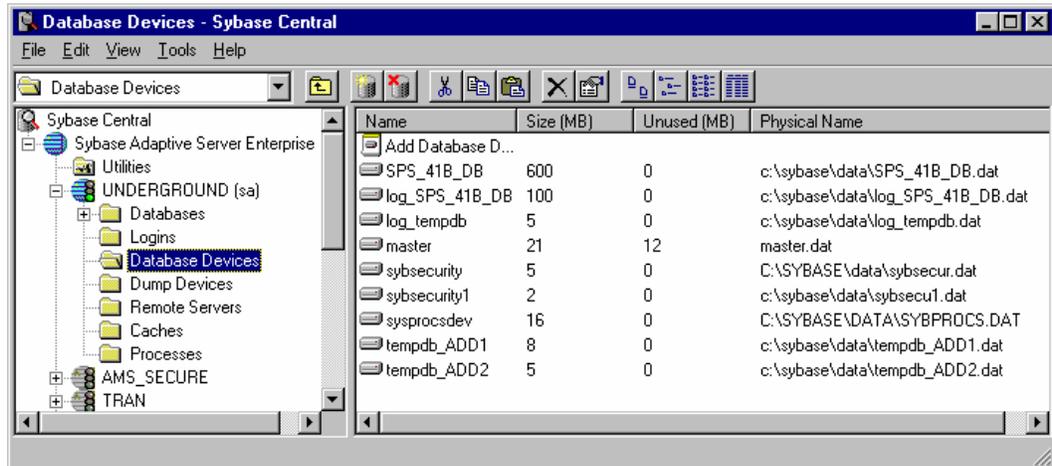
Note: Only follow these steps if the database that you are trying to recreate has not been altered/ increased since it was created. If the database has been altered then follow the steps under Section 4: Creating a New Database (Advanced)

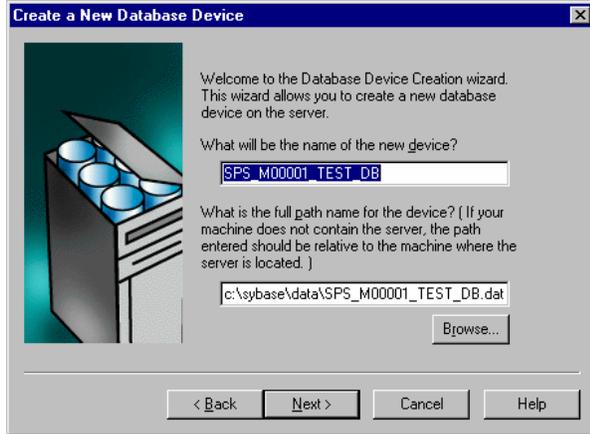
3.1 Using Sybase Central

Note: If you do not have access to Sybase Central then follow the instructions in Section 3.2: Using SQL Advantage.

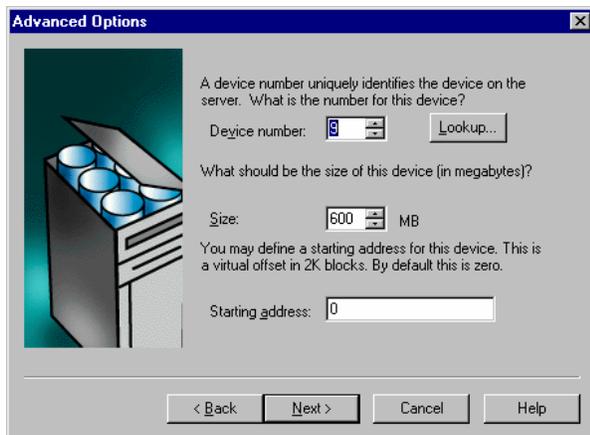
3.1.1 Create a Database Device for the Data

From Sybase Central log on to the server using your "sa" id and password. Open the folder entitled "Database Devices" and double click on the "Add Database Device" icon.





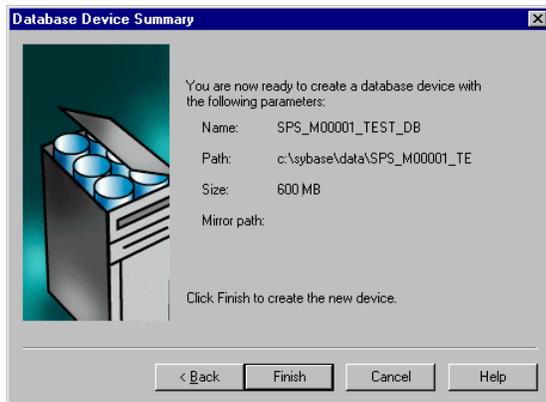
When the "Create New Database Device" wizard appears enter the name and full path name for the new database device which will be used to store PD² data. The full path name is the physical location of where the device will be located **on the server**. Be sure to add the .dat file extension to the end of the file name. If you are using a Unix server, make sure you use the proper naming convention. Then click on the "Next" button.



On the next screen you will be prompted to select the device number, size and starting address. Accept the default device number and enter the size allocated for data in Megabytes. Make sure the starting address is 0 and select the "Next" button.



On the next screen you will be prompted for mirroring information. In standard installations, database devices are not mirrored. Make sure this box is unchecked and click on the "Next" button.



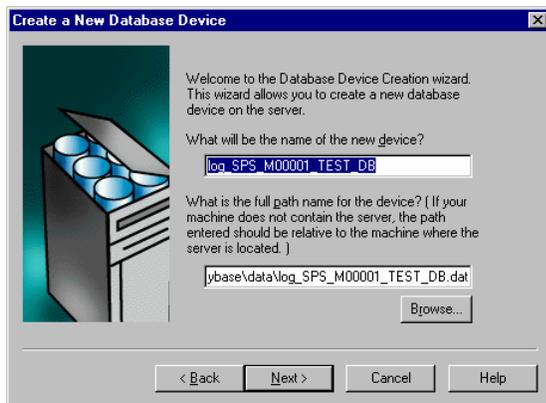
The final screen will summarize the information that was entered in the previous screens. Verify that everything is correct. If you can not see the entire Path, place your cursor in that field and use the right arrow button to scroll to the right. If everything is correct, click on the "Finish" button.

Note: Your screen will disappear and turn into a white box while the system is creating the database device. Be patient. Do not exit out of Sybase Central.

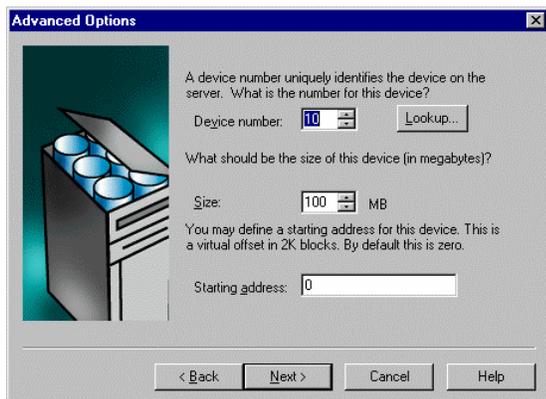
When the Sybase Central window reappears you will see the new database device in the Database Devices folder.

3.1.2 Create a Database Device for the Transaction Log

From Sybase Central log on to the server using your "sa" id and password. Open the folder entitled "Database Devices" and double click on the "Add Database Device" icon.



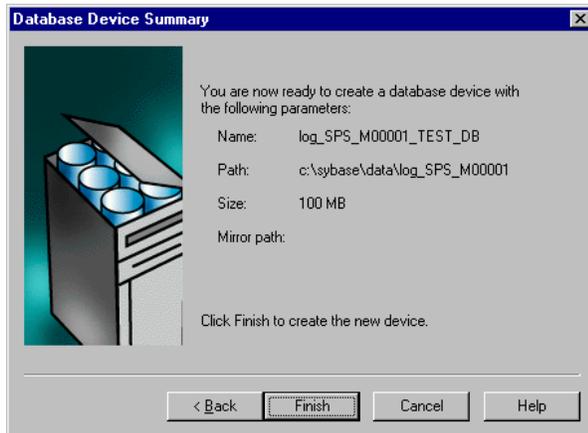
When the "Create New Database Device" wizard appears enter the name and full path name for the new database device which will be used to store transaction log data. The name should include the "log_" prefix. The full path name is the physical location of where the device will be located **on the server**. Be sure to add the .dat file extension to the end of the file name. If you are using a Unix server, make sure you use the proper naming convention. Then click on the "Next" button.



On the next screen you will be prompted to select the device number, size and starting address. Accept the default device number and enter the size allocated for the log in Megabytes. Make sure the starting address is 0 and select the "Next" button.



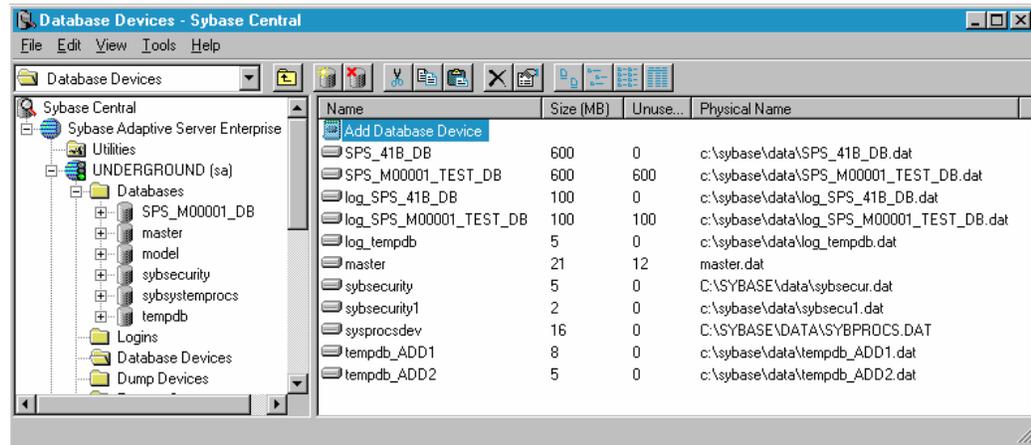
On the next screen you will be prompted for mirroring information. In standard installations, database devices are not mirrored. Make sure this box is unchecked and click on the "Next" button.



The final screen will summarize the information that was entered in the previous screens. Verify that everything is correct. If you can not see the entire Path, place your cursor in that field and use the right arrow button to scroll to the right. If everything is correct, click on the "Finish" button.

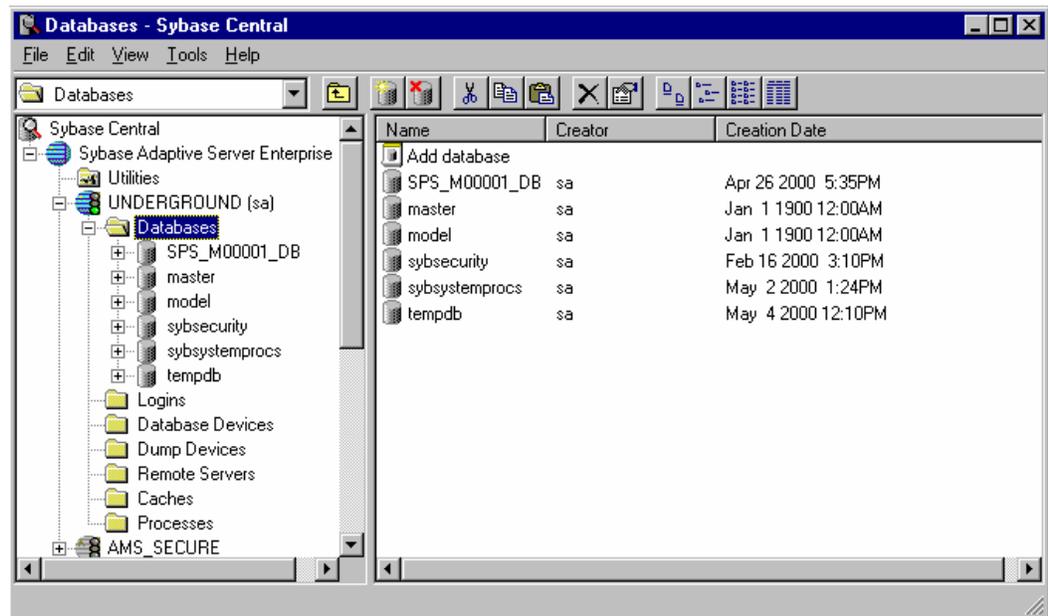
Note: Your screen will disappear and turn into a white box while the system is creating the database device. Be patient. Do not exit out of Sybase Central.

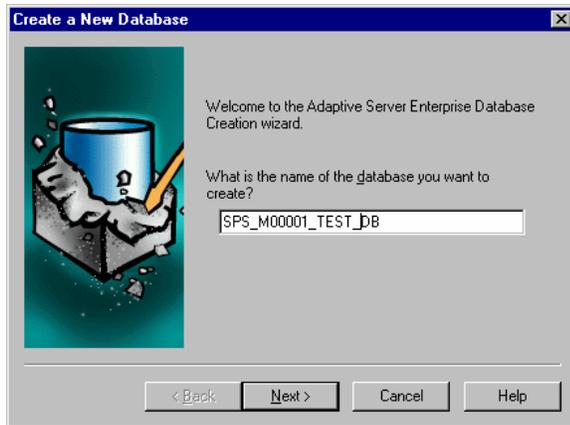
When the Sybase Central window reappears you will see the new database device.



3.1.3 Create the Database

Once the database devices have been created they can be combined to create a database. Using Sybase Central, locate the "Databases" folder and double click on the "Add Database" icon.





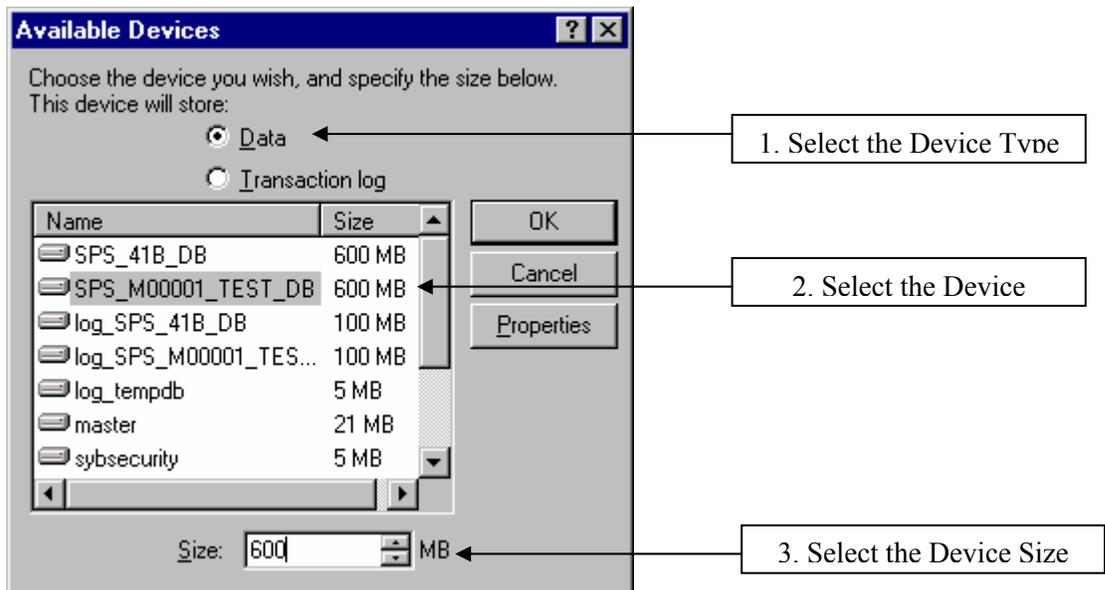
When the "Create a New Database" wizard appears enter a name for your new database then click on the "Next" button.

On the next screen (not pictured) you will be prompted to select the devices that will be used to create the database. Click on the "Add" button. A window with the list of available database devices will appear.

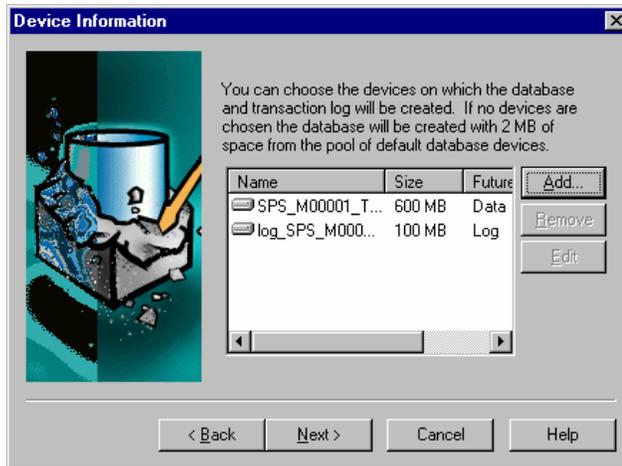
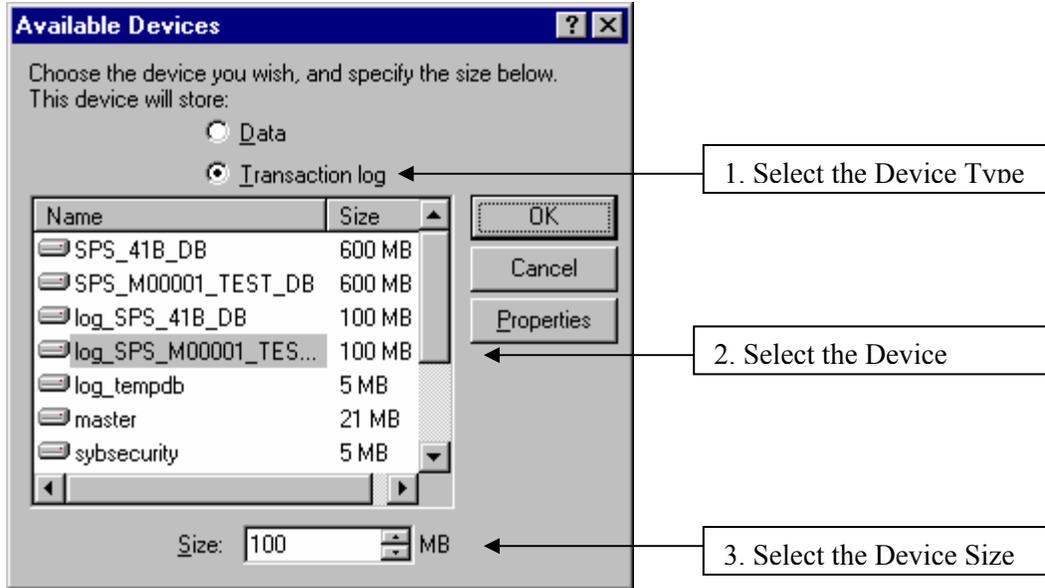
There are 3 steps to selecting a database device.

1. Select the device type
2. Select the device
3. Select the device size

Follow these steps to select a database device for storing data. Then click on the OK button.



Repeat these steps to select the database device for storing transaction log information then click on the OK button.



Verify the name, size and usage allocation of the devices that will be used for the new database then click on the "Next" button.

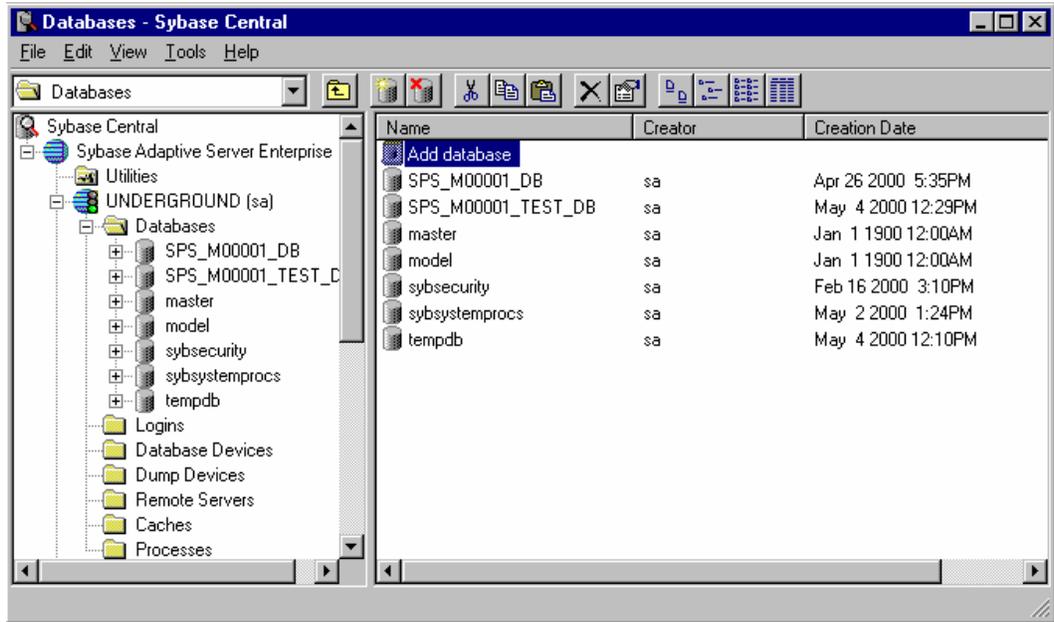


On the next screen you are prompted for Database Type Information. Because the new database will be populated using a backup from another database, make sure you check the box next to "For Load". Then click on the "Next" button.



On the final screen, select the "Finish" button.

Once the system has finished creating the database, you will be returned to the "Databases" folder where your new database will appear.



3.1.4 Restore from a Backup

Before accessing the new database it must be populated with data from a backup. Please refer to the paper entitled "How to Restore Your PD² Database" for instruction on how to restore a database from a backup.

3.2 Using SQL Advantage

Note: If you do not have access to SQL Advantage then follow the instructions in Section 3.1: Using Sybase Central.

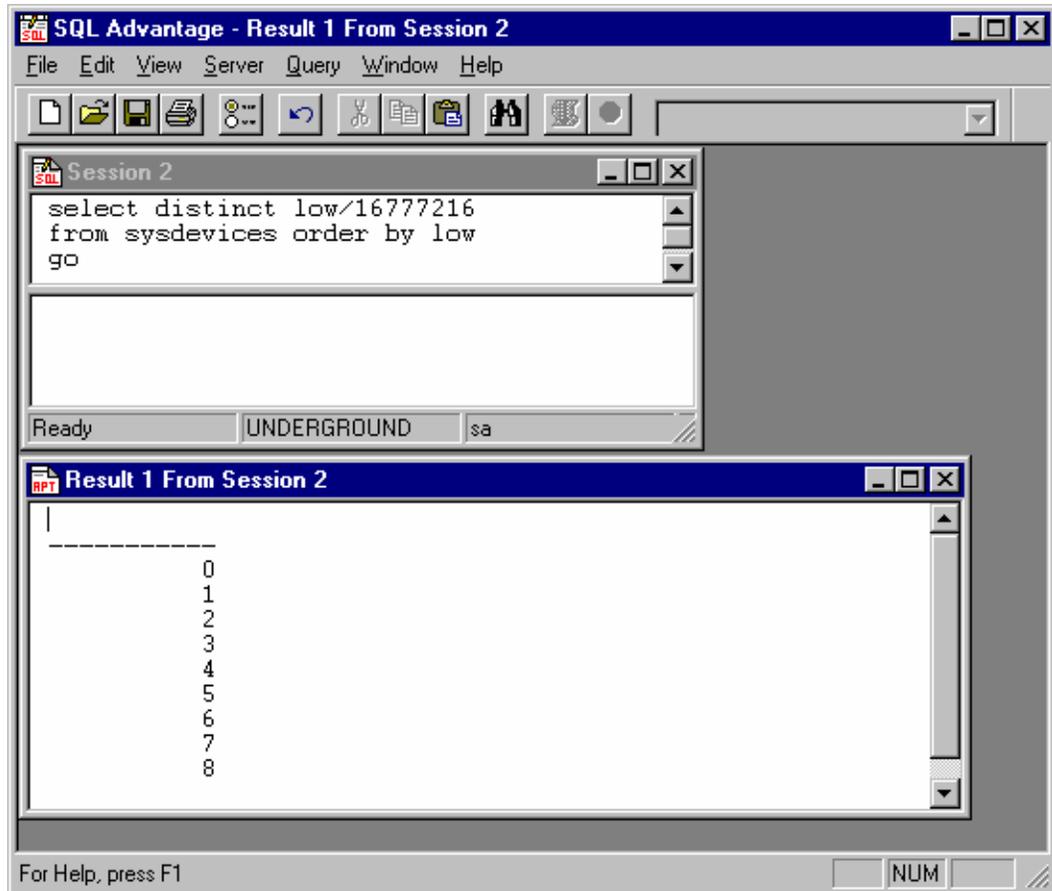
The four steps for creating a new database (See Section 3.1) are the same regardless of the application that you choose to use. In the following sections these four steps will be executed using SQL Advantage.

3.2.1 Create a Database Device for the Data

Log on to the server using SQL Advantage. Make sure you are connected to the master database. Run the following SQL command to determine the next available device number.

```
select distinct low/16777216
from sysdevices order by low
go
```

When the results appear, scroll to the bottom and determine the next available number. In the example below, the next available device number is 9.



Once you have obtained this information, you can create a database device by running the following command.

```
disk init name = "<device_name>",
physname = "<physical_name>",
vdevno = <virtual_device_number>,
size = <size_in_blocks>,
vstart = 0
```

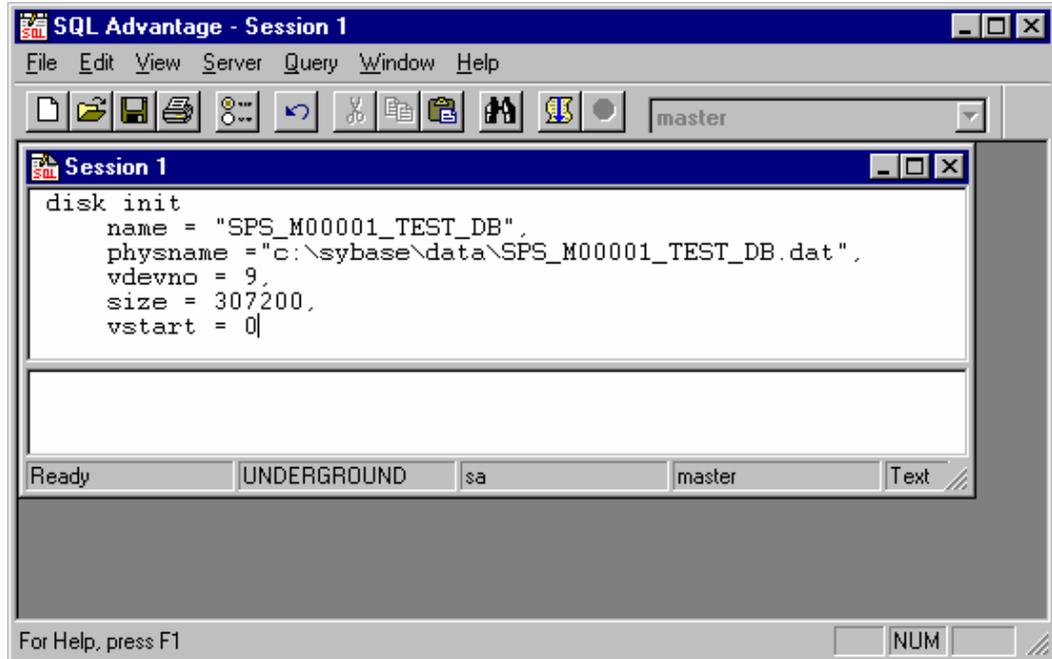
<device_name> = the name for the database device that you are going to create.

<physical_name> = the physical file name and location of where the device will be located (e.g. c:\sybase\devicename.dat). If you are using a Unix server, make sure you use the proper naming convention for this file.

<vdevno> = the virtual device number. As described above or you can use `sp_helpdevice` to see which virtual device numbers are currently being used.

<size> = the size in 2K blocks of the device (512 blocks = 1 MB).

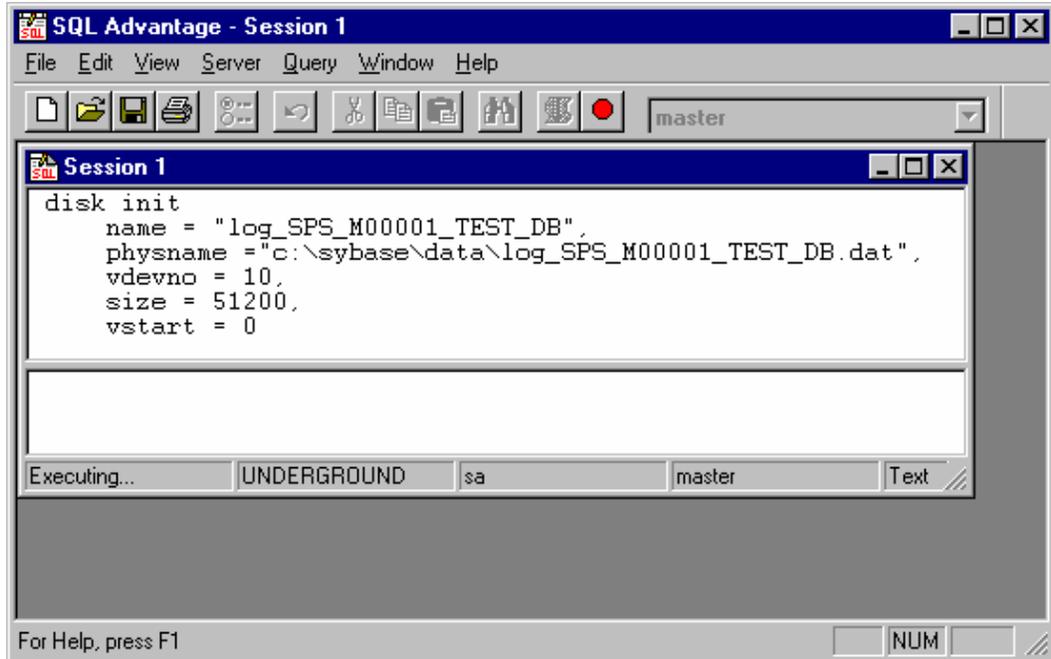
<vstart > = the starting address of the device. This is zero.



Execute the entire statement. When finished the microhelp in the lower left-hand corner will change from "Executing" to "Ready".

3.2.2 Create a Database Device for the Transaction Log

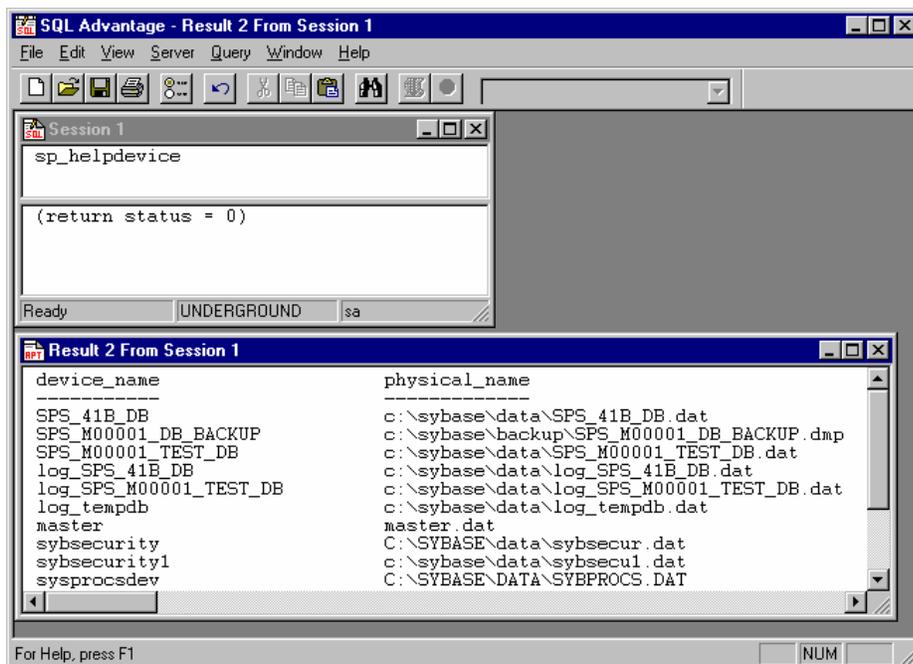
The syntax for creating a database device for storing the transaction log is the same one used to create a database device for storing data. However, you need to modify the name, physical name, the virtual device number and the size in order to create a database device for the transaction log with the correct name, size and file location.



Execute the entire statement. When finished the microhelp in the lower left-hand corner will change from "Executing" to "Ready".

To verify that the devices have been created run the *sp_helpdevice* command.

The results will look similar to the following output.



Use the output from this command to verify the database devices for log and data have been created with the correct size and placed in the proper locations.

3.2.3 Create the Database

Once the database devices have been created they can be combined to create a database. Log on to the server using SQL Advantage. Make sure that you are connected to the master database then run the following command to create your new database.

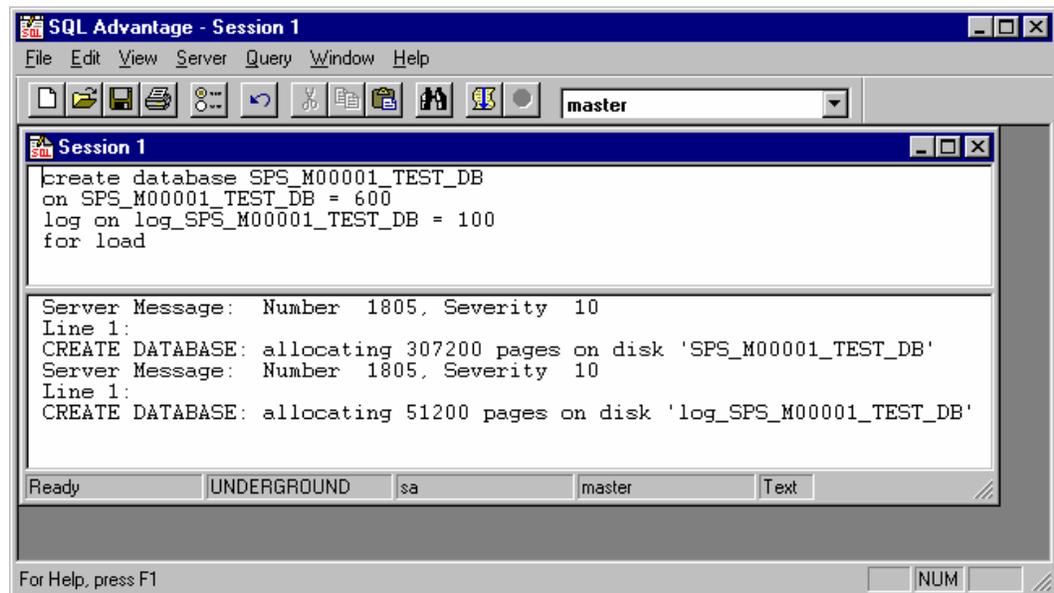
```
create database <database_name>  
on <device_name_for_data> = <size_in_MB>  
log on <device_name_for_log> = <size_in_MB>  
for load
```

<database_name> = the name of the new database.

<device_name_for_data> = the name of the database device that will be used for storing data.

<device_name_for_log> = the name of the database device that will be used for storing transaction log information.

<size_in_MB> = the size of the device in Megabytes.



Execute the entire statement. When finished, messages will appear listing the space allocation and names of the devices that were used to create the database.

3.2.4 Restore from a Backup

Before accessing the new database it must be populated with data from a backup. Please refer to the paper entitled "How to Restore Your PD² Database" for instruction on how to restore a database from a backup.

4. Creating a New Database (Advanced)

At many sites the original PD² database has probably been altered several times by adding additional database devices for data and/or transaction log. In which case creating a new database is a more complex process.

In the example below the SPS_M00001_DB is currently made up of 4 devices. Their size and usage allocation is as follows:

Device	Size	Allocation
SPS_M00001_DB	250.0 MB	data only
SPS_M00001_DB_ADD1	250.0 MB	data only
log_SPS_M00001_DB	85.0 MB	log only
log_SPS_M00001_DB_ADD1	15.0 MB	log only

These devices combine to create a 600MB database consisting of 500MB for data and 100MB for the transaction log. Notice that no device is used for both log and data.

The screenshot shows the SQL Advantage interface. The top window displays the command prompt with the following commands:

```
exec sp_helpdb SPS_M00001_DB
exec sp_helpdb SPS_M00001_TEST_DB
```

The bottom window displays the results of the queries. The first query shows the details for SPS_M00001_DB:

name	db_size	owner	dbid	created
SPS_M00001_DB	600.0 MB	sa		5 May 09, 2000

device_fragments	size	usage	free kbytes
SPS_M00001_DB	250.0 MB	data only	105840
SPS_M00001_DB_ADD1	250.0 MB	data only	256000
log_SPS_M00001_DB	85.0 MB	log only	87024
log_SPS_M00001_DB_ADD1	15.0 MB	log only	15360

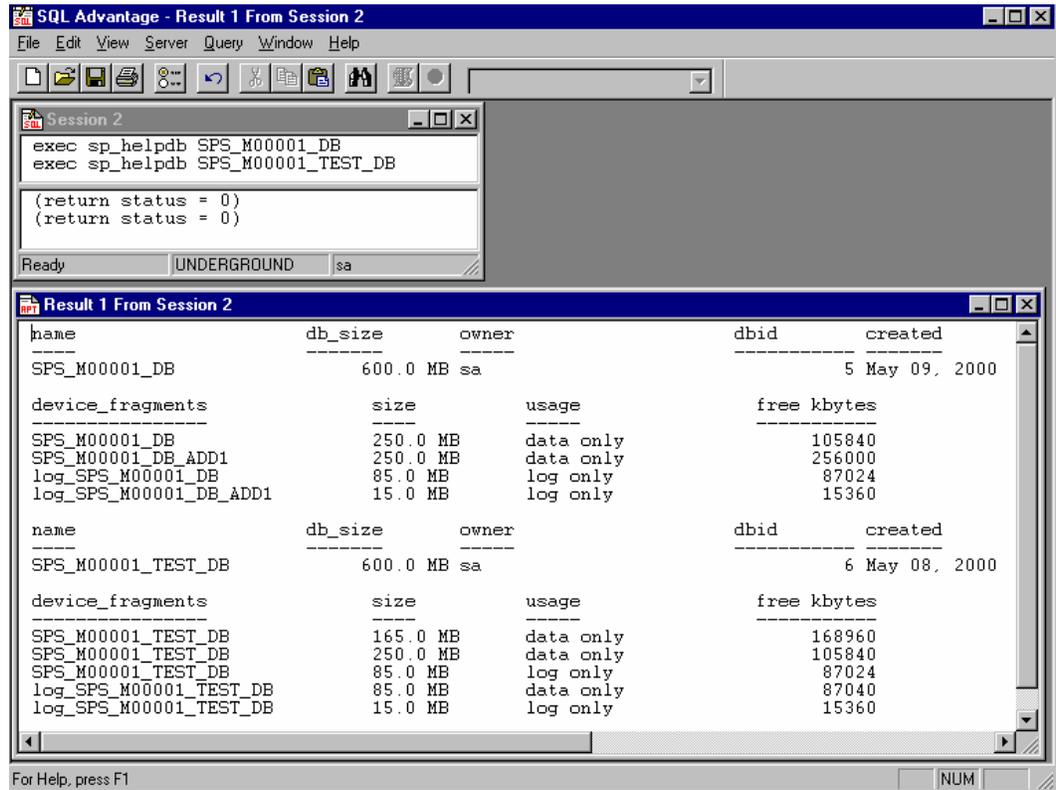
The second query shows the details for SPS_M00001_TEST_DB:

name	db_size	owner	dbid	created
SPS_M00001_TEST_DB	600.0 MB	sa		6 May 08, 2000

device_fragments	size	usage	free kbytes
SPS_M00001_TEST_DB	500.0 MB	data only	361840
log_SPS_M00001_TEST_DB	100.0 MB	log only	102384

In the same example the database named SPS_M00001_TEST_DB was created using only two devices, 500MB for data and 100MB for transaction log.

After restoring SPS_M00001_TEST_DB from a backup of SPS_M00001_DB, the usage allocations for SPS_M00001_TEST_DB have changed.



Before restoring, SPS_M00001_TEST_DB had the following usage allocation.

Device	Size	Allocation
SPS_M00001_TEST_DB	500.0 MB	data only
log_SPS_M00001_TEST_DB	100.0 MB	log only

After restoring the usage allocation has changed to the following.

Device	Size	Allocation
SPS_M00001_TEST_DB	415.0 MB	data only
SPS_M00001_TEST_DB	85.0 MB	log only
log_SPS_M00001_TEST_DB	85.0 MB	data only
log_SPS_M00001_TEST_DB	15.0 MB	log only

Notice that the transaction log and data now reside on the same device. Having data and log on the same device is not a recommended practice because it may cause the following problems.

- The dump transaction command can not be used to create backups of the transaction log
- The transaction log will compete for space that is needed for storing data
- Performance will be impacted
- In the event of a media failure, full recovery may be impossible

4.1 Generate Create Database DDL

In order to prevent this from happening you must create your new database using the same usage allocations as the original database. This can be done by utilizing the 'Generate Create Database DDL' feature that is found in Sybase Central.

Open Sybase Central and connect to the server using your 'sa' id and password. Open the "Databases" folder and right click on the original database who's backup will be used to restore to the new database. Select "Generate 'Create Database' DDL" from the pop-up menu.

The results will look similar to the following.

```
print      'SPS_M00001_DB'
use master
go
create database SPS_M00001_DB on SPS_M00001_DB = 250
alter database SPS_M00001_DB ON log_SPS_M00001_DB = 85
alter database SPS_M00001_DB ON SPS_M00001_DB_ADD1 = 250
alter database SPS_M00001_DB ON log_SPS_M00001_DB_ADD1 = 15
go

use SPS_M00001_DB
go

exec sp_extendsegment 'logsegment','SPS_M00001_DB',
'log_SPS_M00001_DB'
go

exec sp_extendsegment 'logsegment','SPS_M00001_DB',
'log_SPS_M00001_DB_ADD1'
go

exec sp_dropsegment 'logsegment', 'SPS_M00001_DB','SPS_M00001_DB'
go

use master
go
exec master.dbo.sp_dboption SPS_M00001_DB, 'allow nulls by default'
,true
go
```

```
exec master.dbo.sp_dboption SPS_M00001_DB, 'select into/bulkcopy'
,true
go

exec master.dbo.sp_dboption SPS_M00001_DB, 'trunc. log on chkpt'
,true
go

use SPS_M00001_DB
go
checkpoint
go

use SPS_M00001_DB
go
exec sp_changedbowner 'sa'
go
```

4.2 Executing the Generate Create Database DDL

The Create Database DDL contains all the scripts that are necessary for recreating the database with the same usage allocation as the original database. It also has the commands to set the database options and change the database owner if necessary.

4.2.1 Step 1: Create the Devices

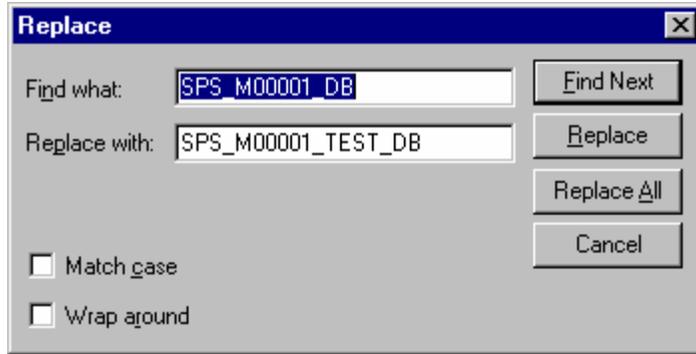
To execute the Create Database DDL, you must start by creating a database device for data and a database device for the transaction log. The database device for data should equal the combined total used for data in original database. The database device for the transaction log should equal the combined total used for log in original database. See sections 3.1.1 and 3.1.2 or 3.2.1 and 3.2.2 for information on creating devices.

The database devices that will be use for this example are listed below.

Device	Size	Allocation
SPS_M00001_TEST_DB	500.0 MB	data only
log_SPS_M00001_TEST_DB	100.0 MB	log only

4.2.2 Step 2: Modify the Database Name

Once the devices have been created, the text of the Create Database DDL needs to be modified. Fist and foremost the name of the original database, 'SPS_M00001_DB', needs to be replaced everywhere in the script. The easiest way to do this is to open SQL Advantage, paste the entire script into the query pane and press CTRL+H on your keyboard. This will bring up the Replace window.



Enter the name of the original database in the "Find What" field. Enter the Name of your new database in the "Replace With" field. Then click on the "Replace All" button. Verify that all replacements were made before you continue.

4.2.3 Step 3: Modify the Device Names

After the replacing the database name, look at the first set of statements in this example. The "alter" commands specify a device named SPS_M00001_TEST_DB_ADD1.

```

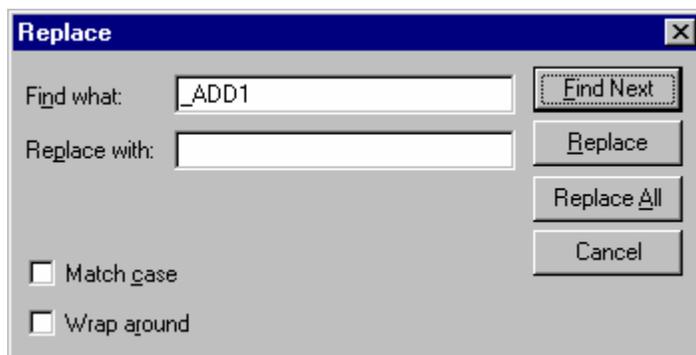
create database SPS_M00001_TEST_DB on
SPS_M00001_TEST_DB = 250

alter database SPS_M00001_TEST_DB ON
log_SPS_M00001_TEST_DB = 85

alter database SPS_M00001_TEST_DB ON
SPS_M00001_TEST_DB_ADD1 = 250

alter database SPS_M00001_TEST_DB ON
log_SPS_M00001_TEST_DB_ADD1 = 15
go
  
```

Currently a device w/ that name does not exist. In order to fix this open the Replace window in SQL Advantage (CTRL+H) and enter "_ADD1" in the "Find what" field. Do not enter anything into the "Replace with" field and then click on the "Replace All" button. Verify that all the "_ADD1" suffixes have been removed from the device names.



Note: Your database may have additional devices with different names. Please carefully go through the Create Database DDL to make sure all the device names are modified to reflect the new devices.

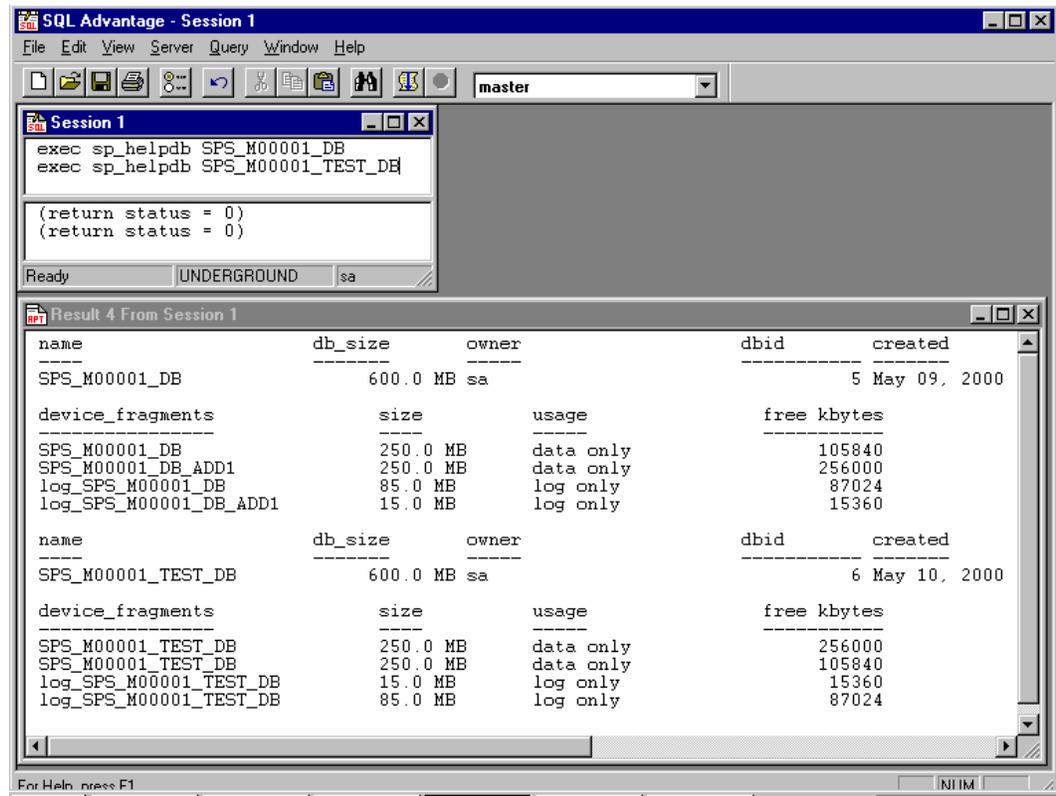
Go through the Create Database DDL one last time to make sure all database names and device names refer to the new database and new database devices. If everything is correct execute the entire script in SQL Advantage.

When the script has finished executing it will print several confirmation messages in the lower half of your SQL Advantage session. To verify that the database was successfully created run the *sp_helpdb* command and see if your new database is listed in the results.

4.3 Restore from a Backup

Before accessing the new database it must be populated with data from a backup. Please refer to the paper entitled "How to Restore Your PD² Database" for instruction on how to restore a database from a backup.

Once the database has been loaded from the backup run the *sp_helpdb* command to verify that the usage allocations for the new database are still intact.



As you can see in the example above all the usage allocations for the new database match those of the original database.

5. Creating a Database Using the PD² CD

There may come a time when you need to create a new database, which does not contain any data. This is sometimes referred to as a "clean" database. To do this you must refer to Chapter 5 of your 4.1 Installation Guide for detailed instructions on how to create this type of database.