Testing with Palm OS® Garnet Simulator

Palm OS® Garnet, Release 5.4

CONTRIBUTORS

Written by Brian Maas and Denise Stone.
Engineering contributions by Patrick Porlan, Luc Yriarte, David Fedor, Ezekiel Sanborn de Asis, Derek Johnson, Thierry Escande, Herve Fayolle, and Regis Nicolas.

Testing with Palm OS Garnet Simulator
Document Number 3102-004
January 29, 2004
For the latest version of this document, visit
http://www.palmos.com/dev/support/docs/.

PalmSource, Inc.
1240 Crossman Avenue
Sunnyvale, CA 94089
USA
www.palmsource.com

Table of Contents

About This Document

Testing with Palm OS® Garnet Simulator provides conceptual, guidance, and reference information for developers who want to use Palm OS Garnet Simulator to test their applications.

This document is specific to the Palm OS Simulator for release Palm OS Garnet, release 5.4.

What This Volume Contains

This volume has the following organization:

- Chapter 1, "Introducing Palm OS Garnet Simulator," on page 1 describes general concepts that will help you understand how to use Palm OS Garnet Simulator.
- Chapter 2, "Using Palm OS Garnet Simulator," on page 5 provides task information describing how to use Palm OS Garnet Simulator functions.
- Chapter 3, "Palm OS Garnet Simulator User Interface Reference," on page 29 documents the Palm OS Garnet Simulator menu commands and cross references relevant task information.

Additional Resources

- Documentation

  PalmSource publishes its latest versions of this and other documents for Palm OS developers at

  http://www.palmos.com/dev/support/docs/

- Training

  PalmSource and its partners host training classes for Palm OS developers. For topics and schedules, check

  http://www.palmos.com/dev/training

- Knowledge Base

  The Knowledge Base is a fast, web-based database of technical information. Search for frequently asked questions (FAQs), sample code, white papers, and development documentation at

  http://www.palmos.com/dev/support/kb/

1

Introducing Palm OS Garnet Simulator

This chapter provides conceptual information that will help you learn about Palm OS® Garnet Simulator.

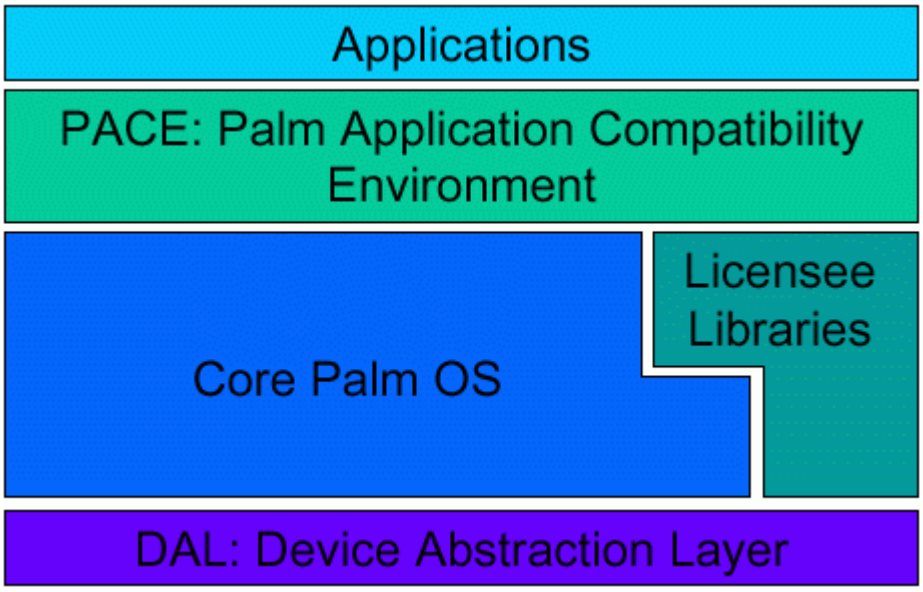
This chapter contains the following sections:

What Is Palm OS Garnet Simulator?

Palm OS Garnet Simulator is Palm OS recompiled for a desktop machine processor. Palm OS Garnet Simulator combines the following into a single execution environment:

- Palm OS applications
- Palm Application Compatibility Environment (PACE)
- Palm OS system code
- An implementation of the Device Abstraction Layer (DAL)

Figure 1.1 Palm OS Garnet Simulator Components



Palm OS Applications

Palm OS Garnet Simulator includes all of the built-in Palm OS applications, such as Address Book, Date Book, Memo Pad, and To Do List. The built-in Palm OS applications are included in the Simulator ROM file.

You can add other Palm OS applications to a Simulator session as well. For more information, see "Installing Applications" on page 19.

Palm OS System Code

Palm OS Garnet Simulator includes all of the Palm OS 5 system code, compiled to run on Windows.

Palm OS Runtime Services

Palm OS Garnet Simulator implements the Palm OS 5 runtime services by using desktop system library files (DLLs). These DLLs are located in the Palm OS Garnet Simulator directory, and are loaded when the code that they contain needs to be executed.

Communication Stacks

Palm OS Garnet Simulator uses the communication stacks for NetLib and Telephony components. Palm OS Garnet Simulator can optionally redirect NetLib calls to the host machine TCP/IP stack.

Palm Application Compatibility Environment

When you use Simulator to test your existing 68K application, the application is run in the Palm Application Compatibility Environment (PACE). PACE provides a 68K application environment that is equivalent to Palm OS 4.1.

PACE handles the data translation required for a 68K application to run on Palm OS 5. For example, 68K applications read and write data in big-endian mode, but Palm OS 5 views data in little-endian mode. When a 68K application calls a Palm OS function, PACE handles the translation of the parameters, objects, and structure layouts so that existing applications do not have to be updated to handle the change of endianness. PACE creates “shadow structures” for the 68K application’s data that allow the 68K application to run under Palm OS 5.

Device Abstraction Layer

The Device Abstraction Layer (DAL) is responsible for insulating Palm OS from the underlying system and hardware. By running Palm OS on top of the DAL for the desktop machine, Palm OS Garnet Simulator recreates the Palm OS program execution environment in the desktop machine.

Applications that run in this environment see the same functionality provided by the Palm OS managers, libraries, and applications as on a Palm Powered handheld.

Because Palm OS Garnet Simulator runs on a desktop machine, it can be integrated with the desktop tools for Palm OS development. This integration allows full source level debugging of the code that is targeted for Palm Powered handhelds.

How Does Palm OS Garnet Simulator Compare to Palm Simulator for Macintosh?

Palm OS Garnet Simulator has significant advantages over the Macintosh simulator in use with Palm OS 4.0:

- All of the applications and shared libraries that can be loaded onto a handheld can be loaded in Palm OS Garnet Simulator at the same time. This allows analyzing the interactions between the applications, shared libraries, and Palm OS with a much better accuracy than before.
- Palm OS Garnet Simulator supports multi-threading.
- Palm OS Garnet Simulator runs the same Palm OS code that runs on a Palm Powered handheld. The only difference between Palm OS running on a handheld and Palm OS Garnet Simulator is the DAL.
- The Macintosh simulator required that components be statically linked together. Because Palm OS Garnet Simulator does not have this requirement, the simulation reproduces accurately the Palm OS runtime architecture on top of the desktop machine system.

Prerequisites

Palm OS Garnet Simulator runs on Windows NT 4 x86, Windows 2000, Windows XP, Windows 98, and Windows ME.

Palm OS Garnet Simulator is flexible enough to be used with most C/C++ development chains, with or without an associated integrated development environment (IDEs such as Visual C++).

2

Using Palm OS Garnet Simulator

This chapter provides guidance and reference information that will help you use Palm OS® Garnet Simulator.

Installing Palm OS Garnet Simulator

Palm OS Garnet Simulator consists of the following:

- The executable file: `PalmSim.EXE`
- A ROM file
- The DLLs required by the ROM file

The ROM file is specific to Palm OS Garnet Simulator; the ROM file is not the same as ROM files used with Palm OS Emulator. ARM-based PRCs and 68K-based PRCs are embedded in this ROM file. However, ARM-based PRCs don't really contain code; rather, they reference external DLL files. As a result, there is at least one DLL per ARM-based application or shared library.

The DLLs required by the ROM file can be in the same directory as the executable file `PalmSim.EXE`, or in the subfolder for the locale-specific ROM file (such as `enUS` or `jpJP`).

To use tracing functions with Palm OS Garnet Simulator, you need to have the files `PalmTrace.DLL` and `Reporter.EXE` in a directory included in the `PATH` environment variable.

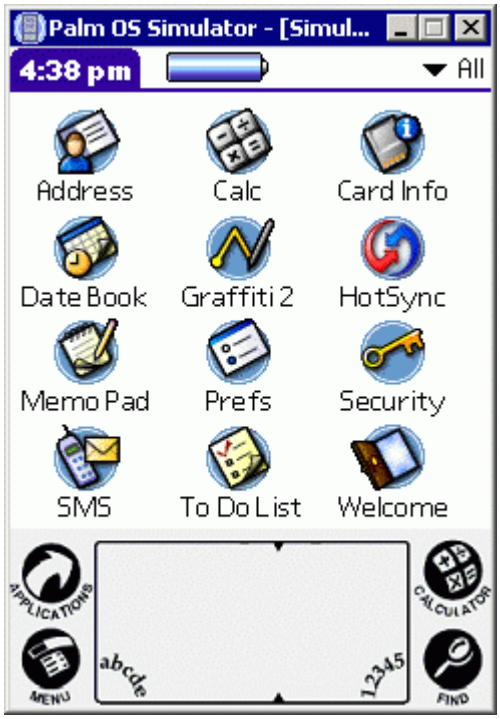
Starting Palm OS Garnet Simulator

To start Palm OS Garnet Simulator, run `PalmSim.EXE`. The first time you start Palm OS Garnet Simulator, you are asked to select a ROM file.

You can also start Palm OS Garnet Simulator by dragging and dropping a Simulator ROM file onto the `PalmSim.EXE` icon. (Note again that the Simulator ROM file is not the same as the ROM files used for Palm OS Emulator. You should not drop an Emulator ROM file on the `PalmSim.EXE` icon.)

When Palm OS Garnet Simulator starts, the main window is displayed, as shown in Figure 2.1 on page 7.

Figure 2.1 Palm OS Garnet Simulator's Main Window



Specifying Command Line Arguments

You can supply the session parameters for Palm OS Garnet Simulator as command line options. For example:

```
PalmSim.EXE -rom:Simulator_Full_EFIGS_Release.rom
```

Table 2.1 on page 8 shows the options that you can specify with the command line version of Palm OS Garnet Simulator.

NOTE: The command line options are not case sensitive, but the values specified for the options might be (for example, the four-character application creator ID for the `-appcreator` option).

Table 2.1 Command Line Options

Option Syntax	Parameter Values
`-68kdebuggerport:[host:port|None]`	*host* - The name of the host used for the 68K debugger. *port* - The port used for the 68K debugger. **Example:** `-68KDebuggerPort:localhost:2000` For more information, see "Communication>Communication Ports" on page 40.
`-68kdebuggerporttype:type`	*type* - The type of port used for the 68K debugger. The default is `TCP/IP`. For more information, see "Communication>Communication Ports" on page 40.
`-additionalports:COMx`	*COMx* - Additional communications ports. For more information, see "Communication>Communication Ports" on page 40.
`-allowedscreendepths:mask`	*mask* - A number representing the screen depths you want to allow. The default is a mask representing all possible depths. For more information, see "Display>Allowed Screen Depths" on page 37.
`-alwaysontop:[on|off]`	Indicates whether the Simulator window should stay in front of other windows on the desktop. The default is `off`. For more information, see "Display>Always on Top" on page 38.

Table 2.1 Command Line Options *(continued)*

Option Syntax	Parameter Values
`-appcreator:`*`xxxx`*	*`xxxx`* - A four-character Creator ID indicating the application to start. For more information, see Chapter 2, "Using AppCreator to Start an Application," on page 20.
`-autoload:[`*`filename`*`|`*`directory`*`]`	*`filename`* - The PRC or PDB file that you want Palm OS Garnet Simulator to automatically load. *`directory`* - The directory containing the PRC and PDB files that you want Palm OS Garnet Simulator to automatically load. For more information on using AutoLoad, see "Using AutoRun, AutoLoad, and AutoRunAndQuit" on page 19.
`-autorunandquit:[`*`filename`*`|`*`directory`*`]`	*`filename`* - The PRC or PDB file that you want Palm OS Garnet Simulator to automatically run. *`directory`* - The directory containing the PRC and PDB files that you want Palm OS Garnet Simulator to automatically run. For more information on using AutoRunAndQuit, see "Using AutoRun, AutoLoad, and AutoRunAndQuit" on page 19.

Table 2.1 Command Line Options *(continued)*

Option Syntax	Parameter Values
`-autorun:[`*`filename`*`|`*`directory`*`]`	*`filename`* - The PRC or PDB file that you want Palm OS Garnet Simulator to automatically run. *`directory`* - The directory containing the PRC and PDB files that you want Palm OS Garnet Simulator to automatically run. For more information on using AutoRun, see "Using AutoRun, AutoLoad, and AutoRunAndQuit" on page 19.
`-bitdepth:[1|2|4|8|16]`	The screen bit depth. The default is `8`. For more information, see "Display>Allowed Screen Depths" on page 37.
`-cradleport:`*`COMx`*	*`COMx`* - The communications port used to talk to the cradle. For more information, see "Communication>Communication Ports" on page 40.
`-cradleporttype:`*`type`*	*`type`* - The type of port used for communication with the cradle. The default is `Standard RS-232`. For more information, see "Communication>Communication Ports" on page 40.
`-directscreenaccess:[on|off]`	Indicates whether the installed applications have access to the LCD screen buffer. The default is `off`. For more information, see "Display>Allow Direct Screen Access" on page 38.

Table 2.1 Command Line Options *(continued)*

Option Syntax	Parameter Values
`-dllpath:`*`directories`*	*`directories`* - A list of directories, separated by semicolons (;), that specify where you want Palm OS Garnet Simulator to look to find DLLs. This command line option is similar to the `PALMSOURCE_SIM_PATH` environment variable (described in "Installing Applications" on page 19). If you use both the environment variable and the command line option, Palm OS Garnet Simulator looks in the paths specified by the environment variable first.
`-dyn:`*`size`*	*`size`* - An integer value indicating the amount of dynamic heap to emulate during the session, specified in kilobytes. The default is `512`. For more information, see "Memory>Dynamic Heap Size" on page 39.
`-extendedmemorychecks:[on|off]`	Indicates whether PACE should do extended checks of applications' use of system memory. The default is `off`. For more information, see "PACE" on page 41.
`-hassilkscreen: [on|off]`	Indicates whether the display screen has a dynamic input area. The default is `off`. For more information, see "Display>Resolution" on page 38.

Table 2.1 Command Line Options *(continued)*

Option Syntax	Parameter Values
`-infraredport:[COMx|None]`	*COMx* - The communications port used for infrared. For more information, see "Communication>Communication Ports" on page 40.
`-infraredporttype:type`	*type* - The type of port used for infrared communication. For more information, see "Communication>Communication Ports" on page 40.
`-ram:size`	*size* - An integer value indicating the amount of RAM to emulate during the session, specified in kilobytes. The default is `8192`. For more information, see "Memory>RAM Size" on page 39.
`-redirectnetlibcalls:[on|off]`	Indicates whether you want to redirect NetLib calls to the host machine's TCP/IP stack. The default is `off`. For more information, see "Communication>Redirect NetLib Calls to Host TCP/IP" on page 40.
`-rom:romname`	*romname* - The name of the ROM file. If you do not specify a value for this option when you first start Simulator, Simulator opens a dialog box asking for you to specify a ROM file. If you do not specify a value for this option on subsequent uses of Simulator, Simulator loads the ROM file name from the initialization file.

Table 2.1 Command Line Options *(continued)*

Option Syntax	Parameter Values
`-screendensity: [72|108|144]`	Sets the density of the display screen. The default is `108`. For more information, see "Display>Resolution" on page 38.
`-screenheight: [160|220|240|320|480]`	Sets the height of the display screen. The default is `240`. For more information, see "Display>Resolution" on page 38.
`-screenwidth: [160|240|320]`	Sets the width of the display screen. The default is `240`. For more information, see "Display>Resolution" on page 38.
`-skipcalibration:[on|off]`	Used to skip the digitizer calibration step during the boot sequence. The default is `on`. This command line option only works with single locale PalmSource ROMs. Since EFIGS ROMs have different Welcome applications, this option may not work. To skip calibration with a multiple-locale ROM, use **Storage>Save** to save a storage snapshot file, then use the `storagesnapshotfile` option to reload it when Simulator restarts after a hard reset. For more information, see "Storage Menu" on page 44.
`-sound:[on|off]`	Activates or deactivates sound output. The default is `off`. For more information, see "Enable Sound" on page 43.

Table 2.1 Command Line Options *(continued)*

Option Syntax	Parameter Values
`-stayonincradle:[on|off]`	Specifies the default value of the "Stay on in Cradle" option that appears in the Preferences application's General panel. This option prevents the simulated device from entering sleep mode after a few minutes of inactivity. The default is `on`.
`-storageprotection:[on|off]`	Activates or deactivates write protection for the storage memory. The default is `off`. For more information, see "Memory>Storage Is Write-Protected" on page 39.
`-storagesnapshotfile:`*`ssfname`*	*`ssfname`* - The name of the storage snapshot file (SSF), indicating the saved storage snapshot that you want Simulator to load at startup or upon hard reset. For more information, see "Storage Menu" on page 44.

`-tracetarget:[`*`machine`*`|`*`file`*`|`*`stderr`*`]`	*`machine`* - The identifier of the machine to which you want traces redirected. For example:
	
	`-tracetarget:tcp:localhost:25998`
	
	`file` - The file to which you want traces redirected. For example:
	
	`-tracetarget:file:myfile.txt`
	
	`stderr` - Redirects trace output to standard error.

Table 2.1 Command Line Options *(continued)*

Option Syntax	Parameter Values
`-usehostbatteryinfo:[on|off]`	Indicates whether the changes in the host machine should be indicated in the battery state of the handheld (for example, when you want to have the battery state of a laptop computer mapped to the Palm OS Garnet Simulator display). The default is `off`. For more information, see "Battery" on page 42.
`-windoworiginx:`*`integer`*	*`integer`* - Specifies Simulator's horizontal distance from the left of the screen when the window is opened. The default is `0`.
`-windoworiginy:`*`integer`*	*`integer`* - Specifies Simulator's vertical distance from the top of the screen when the window is opened. The default is `0`.
`-zoom:[1|2|3|4]`	The magnification level. The default is `1`. For more information, see "Display>Magnification" on page 38.

Using the Initialization File

The command line arguments can be set in the Simulator initialization file, `palmsim.ini`. Any options specified on the command line will override the initialization file settings.

When you exit Simulator, the session's values are written to `palmsim.ini` for the next time you start Simulator.

NOTE: The initialization file options use an equals sign (=) to separate the option from the value, rather than the colon character (:) used in the command line version. Also, boolean values in the initialization file are indicated using 0 and 1 rather than `off` and `on`.

Listing 2.1 Sample palmsim.ini File

```
[Settings]
ROM=C:\Palm OS Garnet
Simulator\ROM\Simulator_Full_EFIGS_Release.rom
RAM=4096
DYN=512
Sound=0
StorageProtection=1
Zoom=1
BitDepth=8
DebugThroughTCP=1
AlwaysOnTop=0
UseHostBatteryInfo=1
WindowOriginX=310
WindowOriginY=140
RedirectNetLibCalls=0
AllowedScreenDepths=32907
LastSilkScreen=
AppCreator=
CradlePort=
CradlePortType=Standard RS-232
InfraredPort=
InfraredPortType=
68KDebuggerPort=localhost:2000
68KDebuggerPortType=TCP/IP
AdditionalPorts=
TraceTarget=tcp:localhost:25998
GremlinsFromValue=0
GremlinsToValue=0
GremlinsSwitchAfter=0
GremlinsSwitchAfterValue=0
GremlinsStopAfter=0
GremlinsStopAfterValue=0
GremlinsSelectedApps=
GremlinsFirstApp=
GremlinsAllowScreenUpdates=1
GremlinsWindowOriginX=0
GremlinsWindowOriginY=0
```

```
LogErrorMessages=0
DirectScreenAccess=0
ExtendedMemoryChecks=1
LastStorageSnapshot=storage snapshot.ssf
StorageSnapshotFile=mysnapshot.ssf
ScreenDensity=108
ScreenWidth=240
ScreenHeight=240
HasSilkScreen=1
SkipCalibration=1
StayOnCradle=1
EventsFilter=7;25;26
```

Loading ROM Images

When you first run Palm OS Garnet Simulator, you can specify the ROM image filename using the `-rom` command line option. If you do not specify a value for this option, Simulator opens a dialog box asking for you to specify a ROM file.

When you restart Simulator, it assumes you want to use the ROM file that you specified when you first started Simulator.

To run Simulator with a different ROM file, you can do one of the following:

- Change the `ROM` option value in the `palmsim.ini` file.
- Specify a new value using the `-rom` command line option.
- Hold down the SHIFT key when you start Simulator. Then, Simulator opens a dialog box asking for you to specify a ROM file.
- Drag and drop a ROM file onto the `PalmSim.EXE` icon.

NOTE: If you are running the Release version of Palm OS Garnet Simulator, you must use a Release version ROM file. If you are running the Debug version of Palm OS Garnet Simulator, you must use a Debug version ROM file.

Running Palm OS Garnet Simulator

This section provides an overview how to use Palm OS Garnet Simulator.

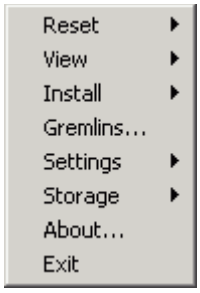
Palm OS Garnet Simulator Display

The Palm OS Garnet Simulator display looks very much like a real Palm Powered handheld device. You can use your mouse to perform actions that you perform with the stylus on handheld devices, and you can use the menus to access Palm OS Garnet Simulator functions.

Displaying Menu Items

Right-click (use mouse button 2) on the Palm OS Garnet Simulator screen display to access the menu items. The Palm OS Garnet Simulator menu displays, as shown in Figure 2.2.

Figure 2.2 The Palm OS Garnet Simulator Menu



For more information about the Palm OS Garnet Simulator menu items, see "Menu Reference Summary" on page 29.

Entering Data

Palm OS Garnet Simulator supports handwriting recognition. You can draw characters using a mouse.

Palm OS Garnet Simulator also supports keyboard input. When a field is active, you can use the keyboard to enter text. You can also use keyboard equivalents for hardware buttons and other functions.

For more information, see "Keyboard Equivalents Reference" on page 46.

Installing Applications

To install Palm OS applications, you can either use the **Install** menu item or drag and drop files onto Simulator.

NOTE: Palm OS applications written for Palm OS 4 or earlier (68K applications) run in Palm OS Garnet Simulator without any changes.

However, if you are installing a Palm OS application that uses ARM-native code, you must recompile the ARM-native code into a Windows DLL. Palm OS Garnet Simulator recognizes a call to an ARM-native subroutine as a call into a DLL.

Place the DLL either in the Palm OS Garnet Simulator directory or in a directory specified by using the `-dllpath` command line option.

Using the Install Menu Item

Use **Install>Database** to open the Install Database dialog box. You can install a single PRC, PDB, or PQA file, or you can use SHIFT-click to select multiple databases for installation. You will receive a warning message if Palm OS Garnet Simulator cannot use a PRC, PDB, or PQA file.

Using Drag and Drop

Drag and drop PRC, PDB, and PQA files onto the Palm OS Garnet Simulator main window. You will receive a warning message if Palm OS Garnet Simulator cannot use a PRC, PDB, or PQA file.

Using AutoRun, AutoLoad, and AutoRunAndQuit

Palm OS Garnet Simulator also supports the AutoRun, AutoLoad and AutoRunAndQuit features that are available with Palm OS Emulator.

You can use these features either by using the command line options (`-autorun`, `-autoload`, `-autorunandquit`) or by creating special directories.

For more information about command line options, see Table 2.1 on page 8.

To use an AutoRun directory:

- Create a subdirectory of the Simulator directory called `AutoRun`.
- Place the PRC, PDB, and PQA files that you want to automatically run in the `AutoRun` directory.
- When you start Simulator, Simulator automatically loads the PRC, PDB, and PQA files.

To use AutoLoad or AutoRunAndQuit, follow the steps listed above using `AutoLoad` or `AutoRunAndQuit` as the directory name rather than `AutoRun`.

Using AppCreator to Start an Application

To have Simulator switch to a specific application at startup, you can either set the `AppCreator` value to the application's creator ID in the `palmsim.ini` file, or you can specify the `-AppCreator` command line argument. See "Specifying Command Line Arguments" on page 7 for more information about command line arguments.

Starting Simulator with a Storage Snapshot File

To have Simulator load a specific storage snapshot file at startup or upon hard reset, you can either:

- Set the `storagesnapshotfile` value in the `palmsim.ini` file
- Specify the `-StorageSnapshotFile` command line argument.

Note that the storage image size specified by the storage snapshot file must match the current storage size setting.

See "Specifying Command Line Arguments" on page 7 for more information about command line arguments. For more information about storage snapshot files, see "Storage Menu" on page 44.

Using Communication Functions

Palm OS Garnet Simulator supports the following communication functions.

Performing a HotSync Operation

You can perform a HotSync® operation through serial connection, through IrDA, or through TCP/IP.

HotSync Operation with Two Serial Ports

1. Connect the serial ports with a `NULL` serial cable.
2. Set the properties for the HotSync application to perform a local HotSync operation with one of the serial ports.
3. Using the Simulator menu **Settings > Communication > Communication Ports**, set the cradle's port to `Standard RS232` bound to the other serial communication port.

HotSync Operation with One Serial Port

1. Select the Simulator menu **Settings>Communication> Redirect NetLib calls to TCP/IP** in order to redirect the NetLib calls to the host machine's TCP/IP stack.
2. Using the Simulator menu **Settings>Communication> Communication Ports**, set the cradle's port to `TCP/IP` bound to `localhost:6420`.
3. In the HotSync settings for the host computer, enable **Network** Hotsync.
4. In the HotSync application in the simulation session, set the following settings:
   - Tap **Modem**.
   - Select **Options>Modem Sync Prefs** and tap **Network**. Tap **OK** to save the changes.

– Select **Options>LANSync Preferences** and tap **LANSync**. Tap **OK** to save the changes.
– Select **Options>Primary PC Setup** and enter `127.0.0.1` as the Primary PC Address. Tap **OK** to save the changes.
– Select **Options>Connection Setup** and select **Cradle/Cradle**. Tap **Done** to save the changes.
– Tap **Select Service** to set your service preferences, and then tap **Done**.

Using External Debug Tools with Palm OS Garnet Simulator

Palm OS Garnet Simulator can be used with a 68K debugger to examine the state of the 68K emulated applications.

Using Palm OS Garnet Simulator with 68K Debuggers

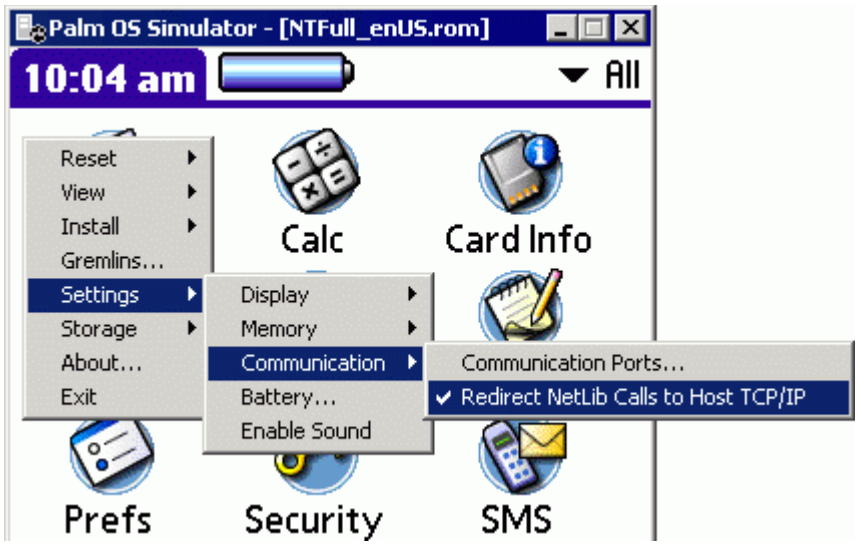
Palm OS Garnet Simulator is a debug target, just as an actual device or Palm OS Emulator. You can use Palm Debugger, Metrowerks CodeWarrior Debugger, or any other debugger you are used to using with Palm OS Emulator.

Using Metrowerks CodeWarrior Debugger

For example, you can use Palm OS Garnet Simulator with Metrowerks CodeWarrior by following these steps:

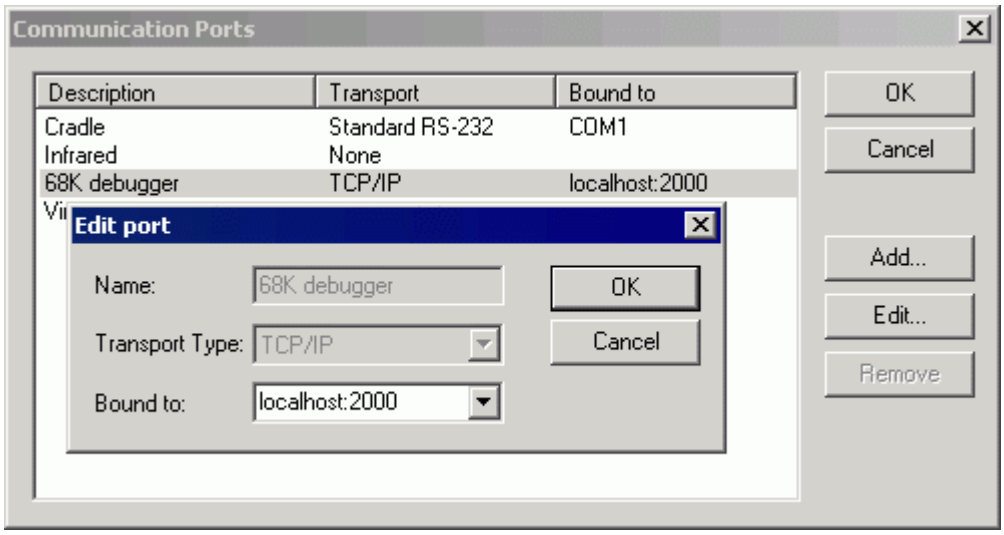
- In Palm OS Garnet Simulator, select **Settings>Communication> Redirect NetLib Calls to Host TCP/IP**, as shown in Figure 2.3 on page 23, in order to redirect the NetLib calls to the host machine's TCP/IP stack.

Figure 2.3 Redirect NetLib Calls to Host TCP/IP



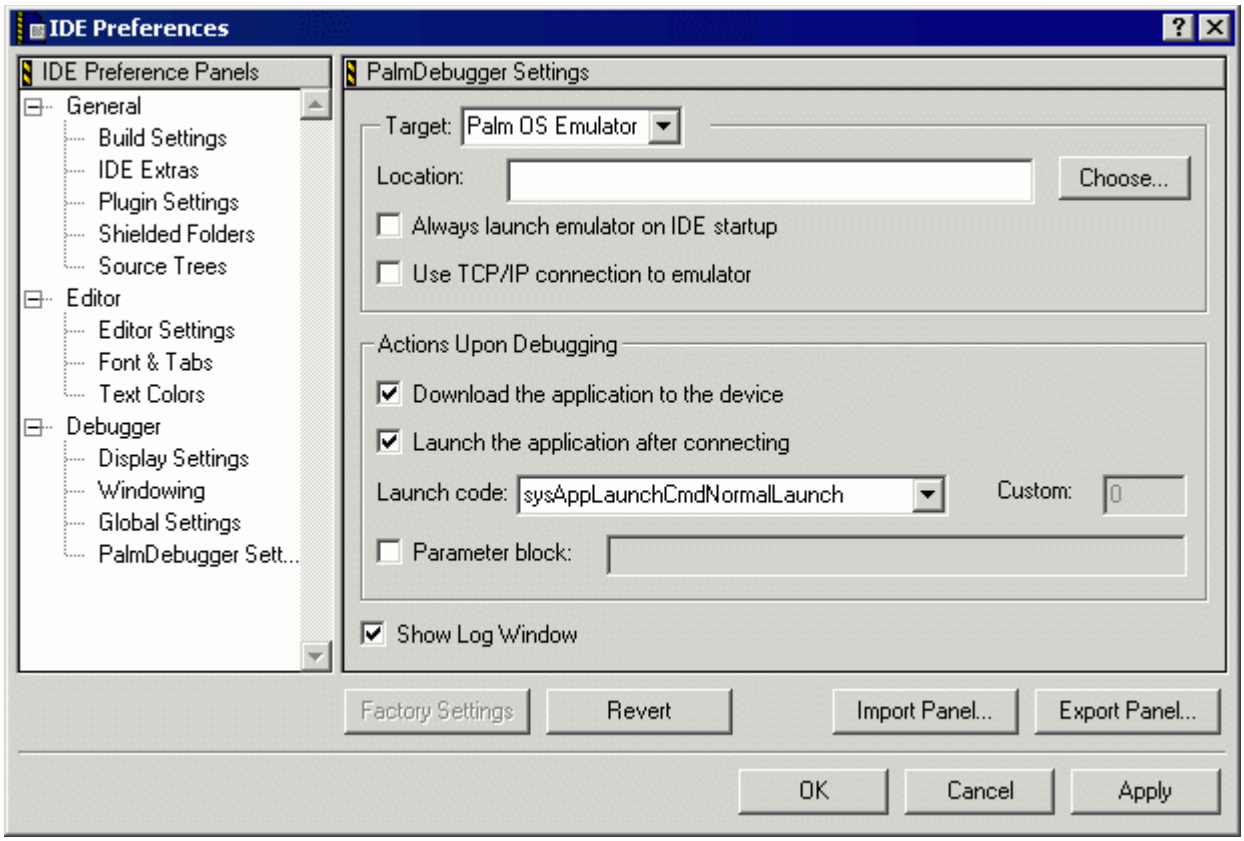
- Also in Palm OS Garnet Simulator, select **Settings> Communication>Communication Ports** to bind the 68K debugger transport to `localhost:2000`, as shown in Figure 2.4.

Figure 2.4 Setting the 68K Debugger Transport Values



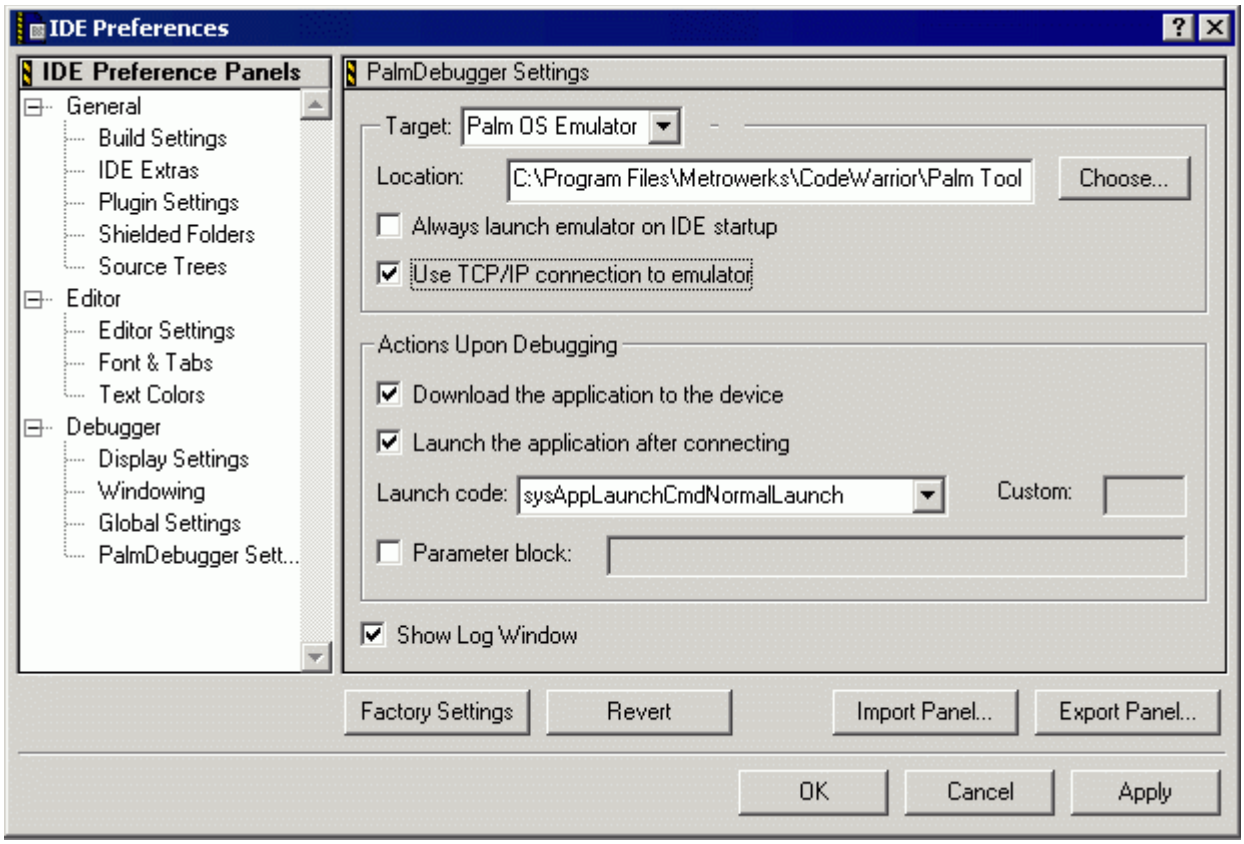
- In CodeWarrior, select **Edit>Preferences** to display the IDE Preferences dialog box, shown in Figure 2.5 on page 24.

Figure 2.5 IDE Preferences Dialog Box



- Click **PalmDebugger Settings** in the IDE Preference Panels tree to display the PalmDebugger Settings panel.
- Set the Target selection to be Palm OS Emulator.
- Click **Choose** next to the Location entry field.
- Use the Choose File dialog box to select the `PalmSim.exe` executable.
- Select the **Use TCP/IP connection to emulator** setting.

Figure 2.6 Setting the CodeWarrior IDE Preferences



- Click **Apply** or **OK** to set your new values so that Palm OS Garnet Simulator is used to run your application rather than Palm OS Emulator.

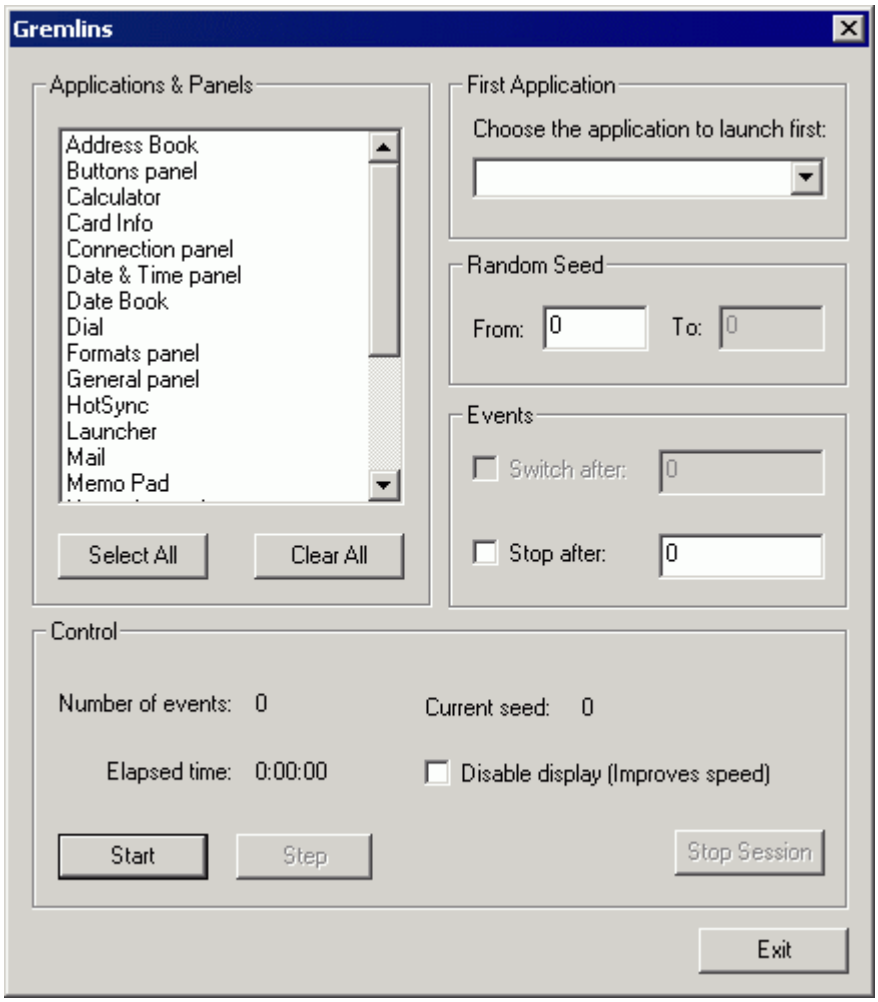
NOTE: Simulator supports Metrowerks CodeWarrior for Palm OS Version 7 and later.

Using Gremlins

Palm OS Garnet Simulator's Gremlins testing is similar to the Gremlins testing provided by Palm OS Emulator.

To use Gremlins, use the **Gremlins** menu item to display the Gremlins dialog box, as shown in Figure 2.7. In this dialog box, you specify the characteristics of the Gremlins you want to use to test your application.

Figure 2.7 Gremlins Dialog Box



Applications & Panels

Use this multiple selection list to select the set of applications and OS panels that the Gremlins are to run. You can select a single application or panel, a group of applications and panels, or all applications and panels.

First Application

Use this drop-down list to select the first application the Gremlins are to run.

Random Seed

Use the **From** entry field to set the seed for the Gremlin pseudo-random number generator.

NOTE: The **To** entry field is not yet supported.

Events

Use the **Stop after** entry field to set the maximum number of events for each Gremlin. Simulator stops running each Gremlin after it posts this many events, or after it terminates with an error.

NOTE: The **Switch after** entry field is not yet supported.

Control

This area allows you to start, step, and stop Gremlin testing. It also allows you to monitor Gremlin testing as it is happening.

Using the Host Control API

A subset of the host control API, as recognized by Palm OS Emulator, is supported in Palm OS Garnet Simulator:

- Standard C Library wrapper selectors
- Remote Procedure Call (RPC)
- External tracing tool support and all selectors required by `HostFS.prc`.

To determine whether a specific host control function is supported, use the `HostIsSelectorImplemented` function.

For more information about the host control API, see *Using Palm OS Emulator*.

3

Palm OS Garnet Simulator User Interface Reference

This chapter provides a reference for the Palm OS® Garnet Simulator user interface elements.

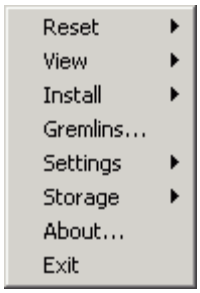
Menu Reference Summary

The Palm OS Garnet Simulator menus include:

Displaying the Palm OS Garnet Simulator Menu Items

Right-click (use mouse button 2) on the Palm OS Garnet Simulator screen to display the menu items.

Figure 3.1 Palm OS Garnet Simulator Menu Items



Reset Menu

Use the **Reset** menu to perform a reset of the current simulation session.

Soft

Performs a soft reset of the current simulation session. This is equivalent to pressing the reset button on the back of a handheld.

Hard

Performs a hard reset of the current simulation session. A hard reset erases all data in the simulation session, restoring it to the equivalent of a new handheld.

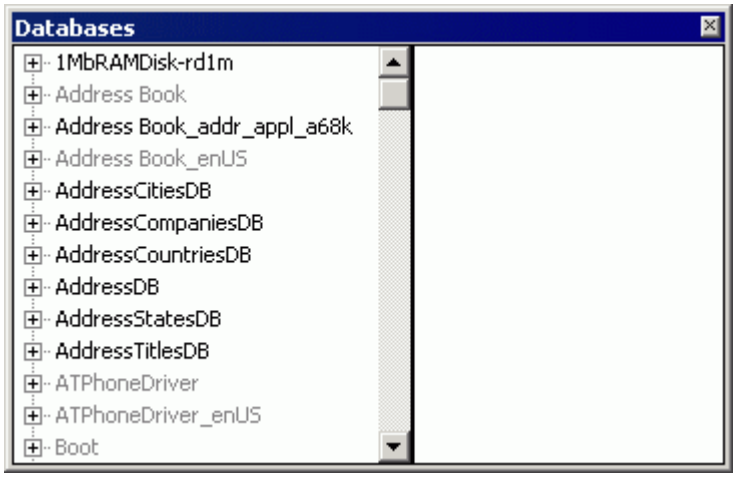
View Menu

Use the **View** menu to view information about the installed databases, the contents of the heap, or the user interface events.

Databases

Opens the Databases dialog box, shown in Figure 3.2, which lists the databases included in the current simulator session.

Figure 3.2 View>Databases Dialog Box



Using the Databases Dialog Box

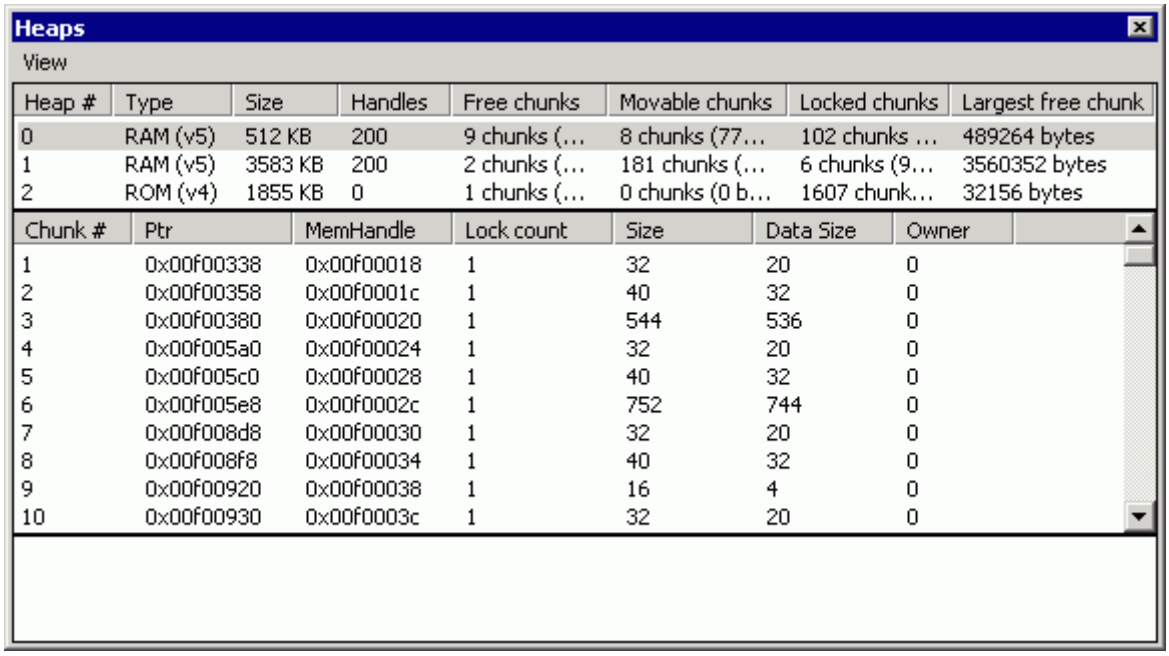
- Click on the plus sign icons to view the details of a database.
- Click on the minus sign icons to close the details view of a database.
- For databases that have contents, click on a record to view the record's contents in the right view pane.

NOTE: The dimmed databases in the Databases dialog box are the read-only databases.

Heaps

Opens the Heaps dialog box, shown in Figure 3.3, which displays the contents of the heaps for the current simulator session.

Figure 3.3 View>Heaps Dialog Box



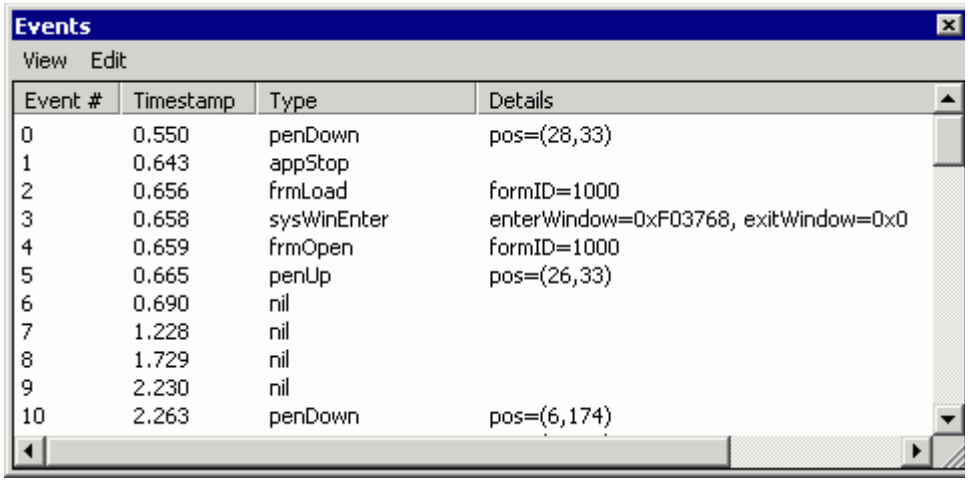
Using the Heaps Dialog Box

- Use the **View>Refresh** menu to refresh the heap information that is displayed.
- Use the **View>Lock** menu to keep the heap information from being updated.
- Use the **View>Unlock** menu to allow the heap information to be updated.
- When viewing the ROM heap, click on a chunk number to view the contents of a chunk in the bottom view pane.

Events

Opens the Events dialog box, shown in Figure 3.4, which displays the user interface events for the current simulator session. If the SHIFT key is held down in the event viewer, the numerical ID of an event is appended to its name in the `hte` log.

Figure 3.4 View>Events Dialog Box



Using the Events Dialog Box

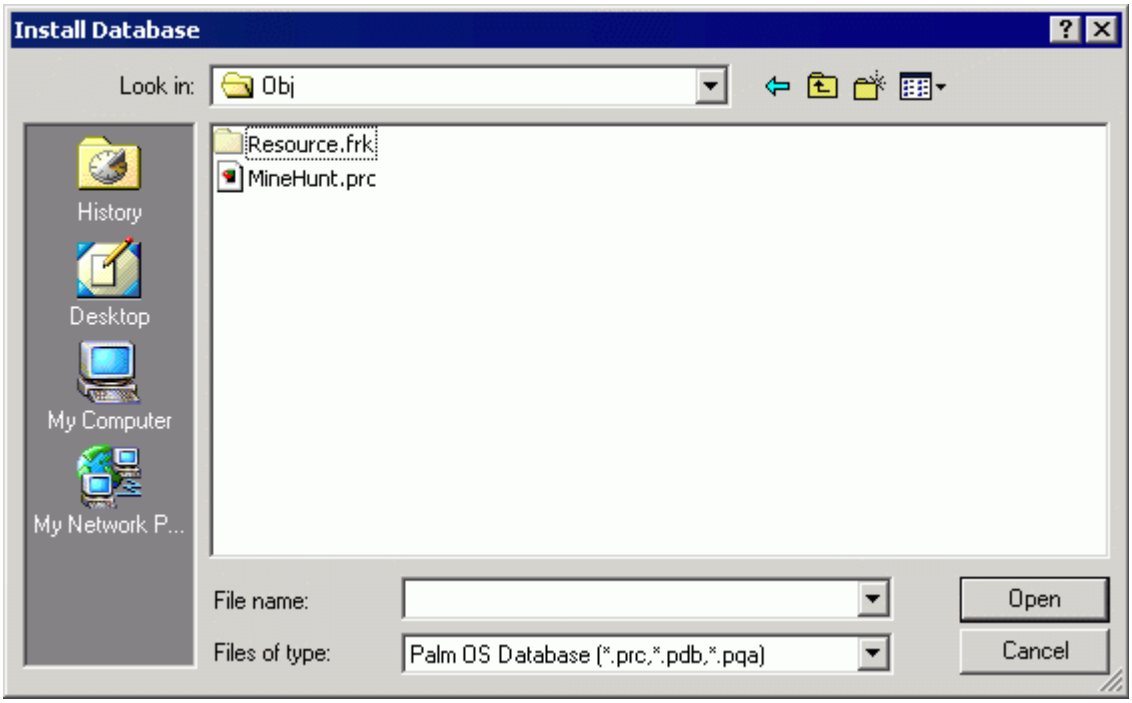
- Use the **View>Lock** menu to keep the events information from being updated.
- Use the **View>Unlock** menu to allow the events information to be updated.
- Use the **View>Filters** menu to allow filtering events to be displayed in the event viewer, as shown in Figure 3.5 on page 34.
- Use the **Edit>Clear** menu to clear the events information that is displayed.
- Use CTRL-A to select all the events information.
- Use the **Edit>Copy** menu or CTRL-C to copy the events information to your system clipboard.

Figure 3.5 Event Filters Dialog Box

Install Menu

Use the **Install>Database** menu to install PRC, PDB, and PQA files. The **Install>Database** menu displays the Install Database dialog box, shown in Figure 3.6.

Figure 3.6 Install Database Dialog Box



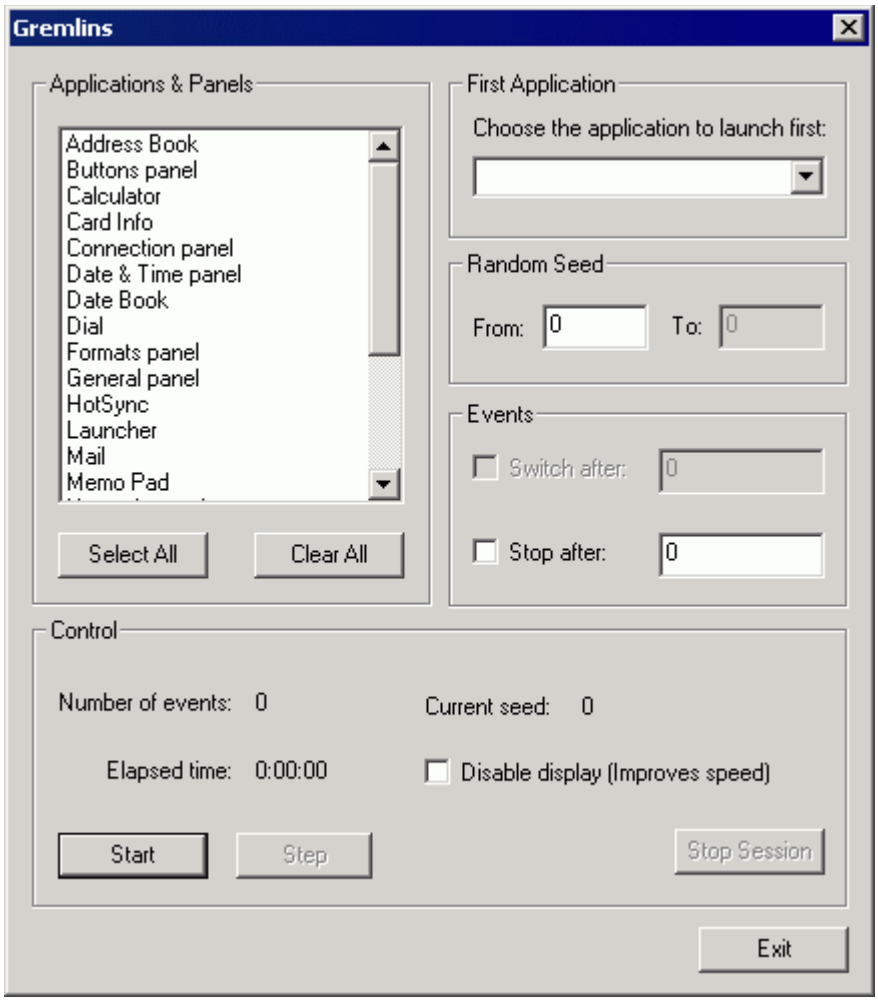
Using the Install Database Dialog Box

- To install a single database, select a PRC, PDB, or PQA file and click **Open**.
- To install multiple databases, use SHIFT-click to select multiple PRC, PDB, and PQA files and click **Open**.

Gremlins Menu

Use the **Gremlins** menu to perform Gremlin testing. The **Gremlins** menu displays the Gremlins dialog box, as shown in Figure 3.7.

Figure 3.7 Gremlins Dialog Box



For more information on using Gremlins, see "Using Gremlins" on page 26.

Settings Menu

Use the **Settings** menu to change the settings for the current simulation session.

Display>Color Depth

Set the color depth for this simulation session:

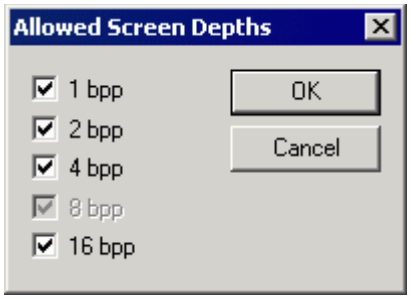
- 2 colors
- 4 colors
- 16 colors
- 256 colors
- 65536 colors

NOTE: If you change the setting for **Color Depth**, Palm OS Garnet Simulator performs a soft reset.

Display>Allowed Screen Depths

Opens the Allowed Screen Depths dialog box, shown in Figure 3.8, so that you can set the screen depths appropriate for this simulation session.

Figure 3.8 Allowed Screen Depths Dialog Box



NOTE: If you change the setting for **Allowed Screen Depths**, Palm OS Garnet Simulator performs a soft reset.

Display>Allow Direct Screen Access

Indicates whether installed applications are allowed to have direct access to the LCD screen buffer.

Display>Magnification

Sets the scaling size for the simulation session display:

- 1:1 (This is the default selection.)
- 2:1
- 3:1
- 4:1

Display>Always on Top

Indicates whether the Simulator window should stay on top when you switch to other application windows.

Display>Resolution

Sets the pixel resolution for the simulation session display.

- 160x160 – Select this setting for a low density display.
- 160x220 – Select this setting for a low density display with a dynamic input area.
- 240x240 – Select this setting for a one-and-one-half (1.5X) density screen.
- 240x320 – Select this setting for a one-and-one-half (1.5X) density screen with a dynamic input area.
- 320x320 – Select this setting for a double density screen.
- 320x480 – Select this setting for a double density screen with a dynamic input area.

Memory>RAM Size

Sets the RAM size for this simulation session:

- 1 MB
- 2 MB
- 4 MB
- 8 MB
- 16 MB
- 32 MB
- 64 MB
- 128 MB

NOTE: If you change the value of the **RAM Size** setting, Palm OS Garnet Simulator performs a hard reset.

Memory>Dynamic Heap Size

Sets the dynamic heap size for this simulation session:

- 512 KB
- 1024 KB
- 2048 KB

NOTE: If you change the value of the **Dynamic Heap Size** setting, Palm OS Garnet Simulator performs a hard reset.

Memory>Storage Is Write-Protected

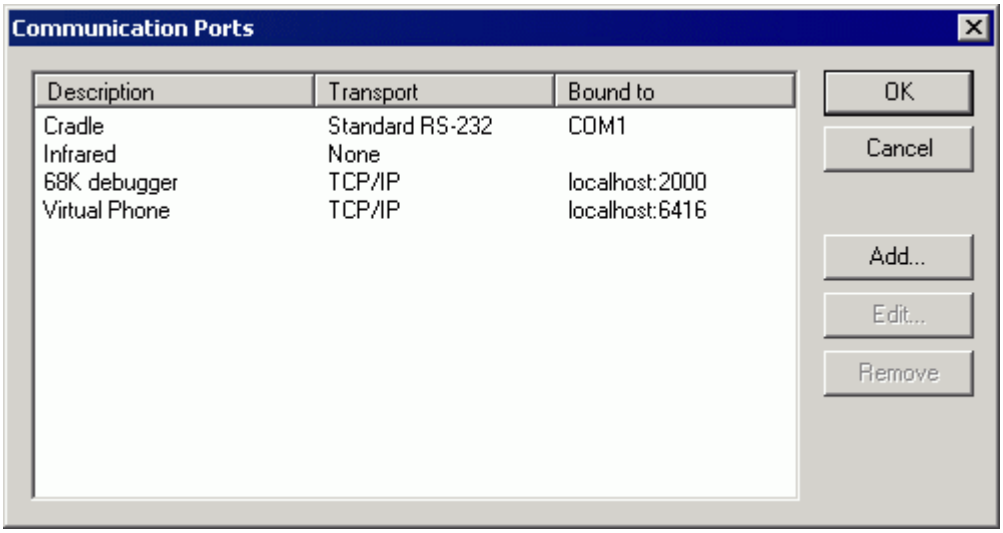
Indicates whether the storage is write-protected for this simulation session.

NOTE: If you change the setting for **Storage Is Write-Protected**, Palm OS Garnet Simulator performs a soft reset.

Communication>Communication Ports

Displays the Communication Ports dialog box, shown in Figure 3.9, so that you can change the communication port settings for the current simulation session. For more information on setting communication ports, see "Using Communication Functions" on page 21.

Figure 3.9 Communication Ports Dialog Box



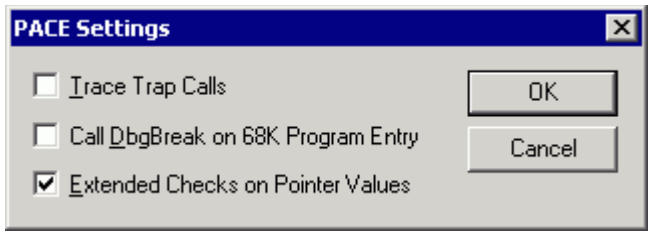
Communication>Redirect NetLib Calls to Host TCP/IP

Indicates whether NetLib calls should be redirected to the host TCP/IP communication stack. For more information on setting communication ports, see "Using External Debug Tools with Palm OS Garnet Simulator" on page 22.

PACE

PACE (Palm Application Compatibility Environment) handles the data translation required for a 68K application to run on Palm OS 5.

Figure 3.10 PACE Settings Dialog Box



Using the PACE Settings Dialog Box:

- Select the **Trace Trap Calls** setting to cause a trace to be emitted each time a trap instruction is processed by PACE. This setting is disabled at reset and works only for databases located in RAM.
- Select the **Call DbgBreak on 68K Program Entry** setting to cause an automatic debugger break when the entry point of a 68K module is reached. This setting is disabled at reset and works only for databases located in RAM.
- Select the **Extended Checks on Pointer Calls** setting to cause PACE to be somewhat stricter when it reads pointer values from the 68K stack.

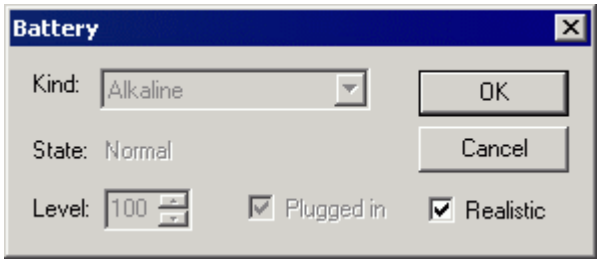
  PACE checks pointer values before passing them to API functions, and creates an alert for unexpected `NULL` pointer values. Select this setting to keep PACE's standard behavior: that is, avoid generating alerts in a few specific cases, where `NULL` pointers are passed to native calls that should not accept them, but don't actually fail. Clear this setting to relax PACE's checking of `NULL` pointers.

For more information about PACE, see"Palm Application Compatibility Environment" on page 3.

Battery

Displays the Battery dialog box, shown in Figure 3.11, so that you can change the simulated battery settings.

Figure 3.11 Battery Dialog Box



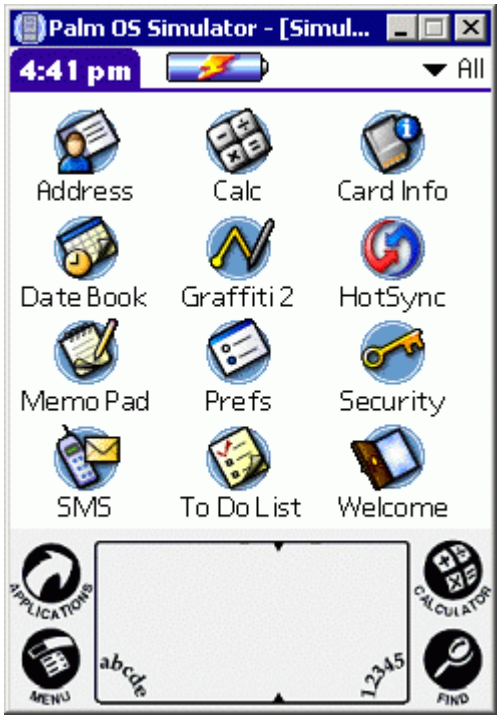
Using the Battery Dialog Box

- Select the **Kind** of battery you want to simulate from the supported list:
  - Alkaline: a hydrous alkaline (non-rechargeable) battery
  - NiCad: a rechargeable nickel cadmium battery
  - LiIon: a rechargeable lithium ion battery
  - RechAlk: a rechargeable alkaline battery
  - NiMH: a rechargeable nickel metal hydride battery
  - LiIon1400: a rechargeable lithium ion battery with a capacity of 1400 mAh (milliamperes hours)
- The battery **State** is dependent on the **Level** selected:

State	Level
Normal	100 to 21
Low	20 to 11
Critical	10 to 6
Shutdown	5 to 0

- If the battery type is `LiIon` or `LiIon1400` and the **Plugged in** setting is selected, then the simulated device is in battery charging mode, as shown in Figure 3.12 on page 43.

Figure 3.12 Battery Charging Mode



Enable Sound

Select Enable Sound to enable sound simulation for this simulation session.

NOTE: If you change the value of the **Enable Sound** setting, Palm OS Garnet Simulator performs a soft reset.

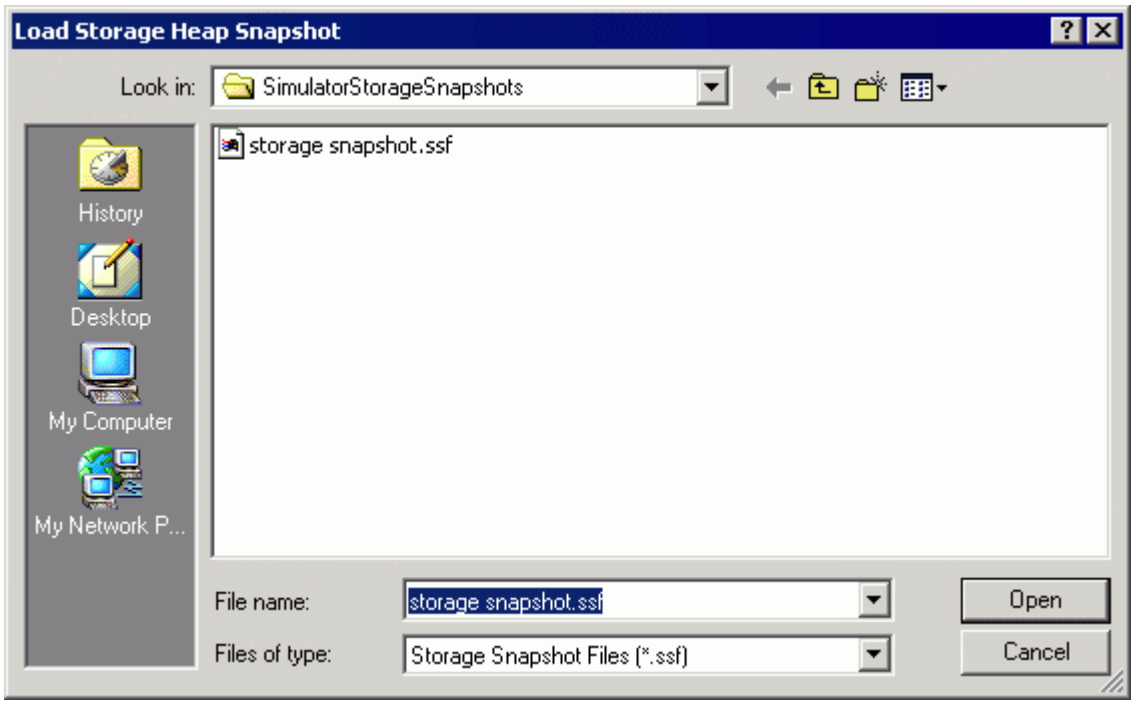
Storage Menu

Use the **Storage** menu to load and save a storage snapshot file (SSF file).

Load

Opens the Load Storage Heap Snapshot dialog box, shown in Figure 3.13, so that you can load the storage heap with contents that were previously saved to a storage snapshot file (SSF file).

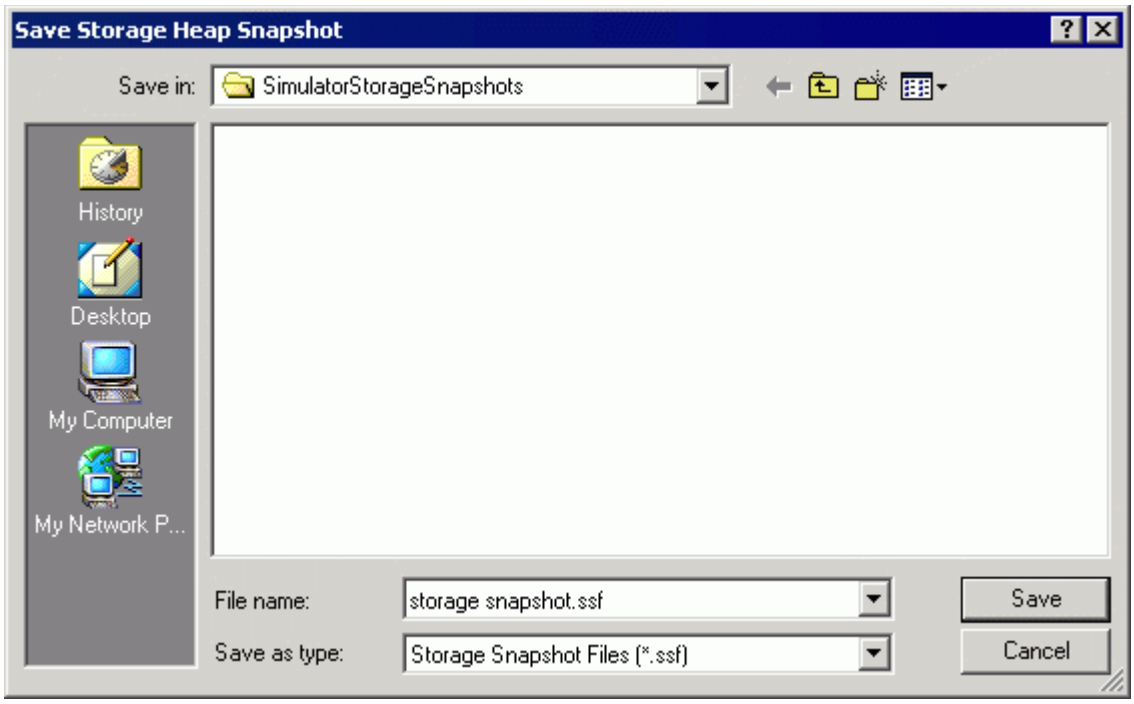
Figure 3.13 Load Storage Heap Snapshot Dialog Box



Save

Opens the Save Storage Heap Snapshot dialog box, shown in Figure 3.14 on page 45, so that you can save the current contents of the storage heap to a storage snapshot file (SSF file).

Figure 3.14 Save Storage Heap Snapshot Dialog Box



About Menu

Use the **About** menu to get release information about Palm OS Garnet Simulator.

Exit Menu

Use the **Exit** menu to exit Palm OS Garnet Simulator.

When you exit Simulator, the current option values are written to the file `palmsim.ini` for the next time you start Simulator. For more information on using `palmsim.ini`, see Chapter 2, "Using the Initialization File," on page 15.

Keyboard Equivalents Reference

Because it is more difficult to use the mouse in place of a handheld stylus, Palm OS Garnet Simulator provides keyboard equivalents for many functions.

Hardware Buttons

The keyboard equivalents for handheld hardware buttons is similar to the key mapping recognized by Palm OS Emulator.

Table 3.1 Keyboard Equivalents for Hardware Buttons

Hardware Button	Keyboard Equivalent
Power (on/off)	ESC
Hardware button 1 (Date Book application)	F1
Hardware button 2 (Address Book application)	F2
Hardware button 3 (To Do List application)	F3
Hardware button 4 (Memo Pad application)	F4
Toggles on or off a mode where the cursor (x, y) coordinates replace the window title	F5
Invokes the HotSync® application	F6
Scroll up	PGUP
Scroll down	PGDN

Additional Keyboard Functions

In addition to hardware button equivalents, Palm OS Garnet Simulator provides the following functions that can be invoked from the keyboard.

Table 3.2 Palm OS Garnet Simulator Keyboard Functions

Function	Keyboard Equivalent
Enter a shortcut character and a period.	PAUSE | ATTN
Display the pop-up menu.	CTRL + A
Enter the menu command stroke.	CTRL + C
Enter a confirmation character.	CTRL + D
Tap the Applications icon.	CTRL + E
Display the onscreen keyboard (tap the "abc" in the input area).	CTRL + F
Tap the Find icon.	CTRL + I
Tap the Calculator icon.	CTRL + K
Enter a linefeed character.	CTRL + M
Tab to the next field.	CTRL + N
Tab to the previous field.	CTRL + P
Perform a soft reset.	CTRL + R
Perform a hard reset.	CTRL + SHIFT + R
Power (on/off).	CTRL + S
Enter the 68K debugger.	CTRL + PAUSE

Index

I

K

L

M

N

O

P

R

S

T

U

V

W