DTL-H2500 Installation and Operation

Revision 1.005 (CDROM)

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Chapter 1: About this Manual

About this Release

This is the CDROM release of the Installation and Operation Manual for the DTL-H2500 Development System. Library functions and structures are detailed in the Library Reference volume of the PlayStation Developer Reference Series.

Related Documentation

In addition to this document, the installation sheets that came with your hardware have helpful information.

The Documentation CD contains documentation in "*.pdf" format, and can be read using the Adobe Acrobat readers supplied on the CDROM. Please insert the Documentation into your PC and run the setup programs to install the Adobe Acrobat reader.

Note that the Developer Support BBS posts late breaking developments regarding the Libraries and also provides notice of forthcoming documentation releases and upgrades.

Technical assistance

If you need help, you can use any of the following resources:

Developer Support Hotline (415-655-8181) Available Monday through Friday, 8am to 5pm, Pacific Standard Time.

Email. Send your questions to DevTech_Support@interactive.sony.com. Questions about any of the Psy-Q tools can also be sent to support@snsys.com.

PlayStation Developer Support BBS (415-655-8181). Available 24 hours a day, seven days a week. In order to access the BBS, you must have a user ID, which you can get by contacting your account executive or the Developer Support Hotline. Through the BBS, you can ask questions to tech-support, catch the latest news, participate in discussions with other PlayStation licensees, and download software updates. We recommend that you log on at least once a week.

PlayStation Developer WEB site (http://www.scea.sony.com/dev) Beginning January 1997, we will introduce the PlayStation Developer WEB site. This will replace our existing dial-up BBS and provide the same services.

Access to the BBS

What do I need to get an account?
You must complete both the Non-Disclosure Agreement and a developers, publishers, or sub-contractors agreement and have it filed and accepted by Sony Computer Entertainment America Contact the developer support hotline at (415)-655-8181 and arrange an account with the BBS-Coordinator. Your account will be activated after the BBS coordinator completes the setup for your account.

The BBS phone Number is: **(415) 655-8119**

How do I activate my account?
To Activate your account, follow these steps:

- Call the BBS using a VT-100 or ANSI terminal emulat or telecommunications program. If you already have the FirstClass Client software, you may use that. Connect at up to 14400 baud, 8 bits, no parity, 1 stop bit. The First Class client software can be retrieved from www.softarc.com. We recommend using the following mo dems: USRobotics Courier Dual Standard Modem or the USRobotics Sportster v.34 Modems (28.8). If you would like to use these modems, they are available through either MicroWarehouse (1-800-367-6808 x2098) or Egghead Software (1-800-344-1123).

- Login using the user ID given . You may want to write both your logon name and password below.

User ID: _____

Initial password:_____

After your first call, you may change your pas sword to anything you want.

If you don't already have version 2.6 of the First Class software, download it. It is located under the "Releases" Conference. Both Macintosh and Windows versions are available.
If you are having difficulties logging on, please call your Dev eloper Support representative, or the developer support hotline at 415-655-8181.

How many accounts can my company have?
BBS Accounts are given with developer tool kits, with one account being given per tool kit. E.G. Code-R-Us software has purchased 3 developer kits, they are allowed three accounts.

How do I obtain access to other conferences?
The BBS administrator grants access to conferences depending on toolkits purchased.

Access to the PlayStation Developer Web Site

What do I need to get an account?
You must complete both the Non-Disclosure Agreement and a developers, publishers, or sub-contractors agreement and have it filed and accepted by Sony Computer Entertainment America.
Contact the developer support hotline at (415)-655-8181 and arrange an account with the Web-Coordinator. Your account will be activated after the Web-master completes the setup for your account.

The URL for the PlayStation Developer Web Page is:
HTTP://www.scea.sony.com/dev

This is a secure web site and will require an internet connection, a user logon name and password (provided by Sony Computer Entertainment America) and Netscape 2.0 or later or Internet Explorer.

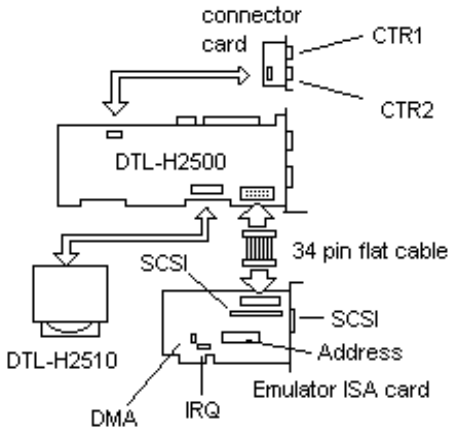
The structure of the web site is similar to the BBS. A messaging system, as well as a chat area are featured on the web site. All old messages posted to the BBS are archived into a document that will be available for downloading.

How many accounts can my company have?
One account is given to each licensed developer. Multiple logons to the web site are allowed.

Chapter 2: Hardware Installation

Before you Begin

This chapter describes the installation procedures for the following equipment:



Required:

DTL-H2500 PCI card and an available PCI slot
DTL-H2500 connector card
Psy-Q security dongle, which allows you to use Psy-Q's software.

Optional:

DTL-H2510 CD-ROM drive
CD-ROM Emulator ISA card, an available ISA slot, and an AV SCSI hard drive (such as the Micropolis 3243 AV or the Micropolis 4221 AV):

Hardware Installation Procedure

Step 1: Turn off your computer.

Step 2: Connect the DTL-H2500 connector card onto an open slot on the PC.

Step 3: Insert the DTL-H2500 (PCI card) into a available PCI slot.
Because the PCI card is Plug & Play, you do not need to set IRQ's or DMA numbers.

Step 4: Connect the PCI to the controller connector card.
Connect the DTL-H2500 PCI card to the DTL-H2500 connector card using the 10 pin flat cable included in your kit.

Step 5: Connect the audio/visual outputs to your television.
Refer to the "DTL-H2500 PlayStation Board Operating Instructions" sheet for further details.

Step 6: Attach the PlayStation controllers to the outputs of the DTL-H2500 board
Refer to the "DTL-H2500 PlayStation Board Operating Instructions" sheet for further details.

- **United States developers** In the US, the DTL-K2500 Programmers Tool Kit includes the DTL-H2080 Controller Box along with 2 SCPH-1010 Controllers. If you didn't get your controllers, call the Tool Operations Group at (US) 415-655-8145.

- **European developers** In Europe, the DTL-H2500 PlayStation development board is licensed as a separate unit and does not include controllers. We recommend you order a DTL-H2080 Controller Box with your DTL-H2500; call the Tool Operations Group at (Europe) 0171-4471650.

Step 7: Attach the Psy-Q security dongle onto the PC's parallel printer port.
Warning: Do not connect any peripherals to the back of the security dongle. Although it was meant to be a pass through device, the dongle may be damaged when connected to certain devices such as external parallel-interface SCSI hard disks. Damaging the dongle will result in not being able to launch the assembler or debugger until the dongle is replaced.

Step 8: (optional) Install the DTL-H2510 CD-ROM drive
The CD-ROM drive reads PlayStation debugging disks. Follow these steps:

- Place the drive in an open drive bay on the PC.
- Connect the 50 pin flat cable, included in your kit, to the CD-ROM drive.
- Connect the other end of the 50 pin flat cable of the CD-ROM drive to the DTL-H2500 board.
- Connect the 4 pin hard-drive power cable into the CD-ROM drive's power inlet.

Step 9: (optional) Install the emulator card.
If you have a CD-ROM emulator card (PSX-04 or DTL-K4) and a dedicated AV SCSI hard drive (for more details, refer to the manual "DTL-H2510 CD-ROM drive"), please read the comprehensive "readme.txt" that came with the software in that kit. That "readme.txt" will show you how to install your card. However, you should defer this installation until after you are certain that your PCI card is functioning properly.

Please make a note of the address settings, DMA, and IRQ on the ISA card:

DMA: _____
IRQ: _____
IO Address: _____

Although the emulator card's actual address is in 4 byte hexadecimals, the DIP switch host's A15 -A4 3 bytes are in decimal format. The actual addresses and a table of their equivalents are entered below:

IO Address Hex Decimal Notation	Actual Notation	Remarks Address	
300	**0x12C**	**0x12C0**	
308	**0x134**	**0x1340**	**Default**
310	**0x136**	**0x1360**	
318	**0x13E**	**0x13E0**	
380	**0x17C**	**0x17C0**	
388	**0x184**	**0x1840**	
390	**0x186**	**0x1860**	
398	**0x18E**	**0x18E0**	

In this case, take A15-A4 from 0x1340 and match it with 0x134 to get "308". In addition, the DMA channel and the interrupt number have their own DIP switches. Make a note of the settings, since they will be used as parameters to the driver software in Chapter 3.

Step 10: Reboot your computer.

If you have Windows 95 with Plug & Play support, the hardware wizard will report that it has found the PCI card. Next you will be asked if you want to install the driver or not; make sure to choose "Do not install the driver". The PCI's device driver is an MS-DOS, so it is not possible to install it from the Windows 95 hardware wizard.

If the computer doesn't boot up properly,

- Recheck your work.
- Make sure all cables are securely plugged in
- Make sure the boards fit snugly in their slots.
- Try switching boards and slots. For instance, if your computer has multiple PCI slots, try temporarily detaching a board which is not necessary for PlayStation development, reinstall the PCI card into that slot, and then try to start the system again. Refer to the case study in Chapter 6 to see how one person ran into similar problems -- and solved them.

Read the next chapter to learn how to install the DTL-2500 device drivers and the PlayStation development software.

Chapter 3: Software Installation

Before you Begin

Before following the instructions in this chapter, you should have already completed the steps in the previous chapter. This chapter describes the installation procedures for the PlayStation software tools, which are distributed the Programmer Tools CD DTL-H2500 Update disk.

Make sure your Psy-Q security dongle is in place. Go on to the next section, "Installing Software Drivers and Software Tools".

Installing Software Drivers and Software Tools

In the following steps, we assume that the local hard drive is your “c:\” drive and your PC CD-ROM drive is “ d:\”:

Step 1: Insert your Programmer’s Tools CDROM
Insert the Programmers Tools CD (DTL-S2002) into your CD-ROM drive (not the DTL-H2510) of your system. **If you have Windows 95**, you can run the Setup program, "setup.bat" in the root directory of the CDROM. Follow all of the instructions. After the computer reboots (to set environment variables) skip to **Step 6**.

Step 2: Install the “psx” tool
The directory “[cdrom]:\psx” contains the PlayStation Development directory, which includes over 100 sample programs with full source code, the includes, and the linking libraries.

- If applicable, backup or delete your previous "c:\psx" directory.
- To be consistent with the automatic installation of the software under Win95, we are creating a parent directory “PS” which all PlayStation software will be installed under. Copy the "psx" directory, d:\psx, from the CD to your local hard drive c:\ps\psx:

```
xcopy /s d:\psx  c:\ps\psx
```

(or just drag and drop the folder).

- Add the line

```
set path=%path%;  c:\ps\psx\bin
```

to the end of your “c:\autoexec.bat” file.

Step 3: Install the “psyq” tools

The directory “[cdrom]:\psyq” contains the Psy-Q development system, which includes an interactive debugger and the C compiler.

- If applicable, backup or delete your previous "c:\psyq" directory.
- Copy the "psyq" directory, d:\psyq, from the CD to your local hard drive c:\ps\psyq.
- Copy the contents of the "gnu" directory, d:\gnu, from the CD to your local hard drive c:\ps\psyq:

```
xcopy /s d:\gnu\* c:\ps\psyq\bin
```

- Add the line

```
set path=%path%;c:\ps\psyq\bin
```

to the end of your “c:\autoexec.bat” file.

Step 4: (optional) Install the “psxgraph” tools.
The directory “[cdrom]:\psxgraph” contains the tools for converting between standard graphics file formats and the PlayStation formats. Although we are setting up the “Graphic Artist Tools program” area, it does not contain entire tool set for the Graphic Artist Tools. Only the conversion tools are included on this CD. Please contact your regional tool’s coordinator on information on how to obtain the Graphic Artist Tools CD (DTL-S220).

- If applicable, backup or delete your previous "c:\psxgraph" directory.
- Copy the "psxgraph" directory, d:\psxgraph, from the CD to your local hard drive c:\ps\psxgraph.
- Add the line

```
set path=%path%;c:\ps\psxgraph\bin
```

to the end of your “c:\autoexec.bat” file.

- Copy the all files located in the "system" directory, d:\psxgraph\system, to the window's system directory, i.e. c:\windows\system. These files are used by the Movie Converter.

- If you have Windows 95, skip on to the next step, Step 6. Otherwise, you will have to create the groups and match the icons yourself, by performing the following steps in Windows 3.1:

Graphic Artist Tools program group Create a Graphic Artist Tools program group in the Windows 3.1 environment.

1. Under the Program manager "File" pulldown click on the "File>New" button.
2. Select Program Group; press OK

3. Fill in the Description "Graphic Artist Tools". You may leave the "Group File" field blank.A new group will be displayed.
4. You are now ready to add the individual tool icons. Please follow the individual program install instructions listed below if you are using Windows 3.1. Note: For additional details on setting up program icons, please refer to your Windows 3.1 manual

Movie Converter With the "Graphic Artist Tools" program group selected, create a program icon for the Movie Converter tool:

1. Under the Program manager "File" pulldown click on "File->New" button.
2. Select Program Item; press OK
3. A Program Item Properties dialog will pop up. Fill in the Description field with "Movie Converter"
4. Use the Browse, to identify the name of the executable to be placed in the "Command Line" field (i.e. c:\ps\psxgraph\bin\movconv.exe)
5. Click OK.

Movie Pack With the "Graphic Artist Tools" program group selected, create program icon for the Movie Pack tool:

1. Under the Program manager "File" pulldown click on "File>New" button.
2. Select Program Item; press OK
3. A Program Item Properties dialog will pop up. Fill in the Description field with "Movie Pack"
4. Use the Browse, to identify the name of the executable to be placed in the "Command Line" field (i.e. c:\ps\psxgraph\bin\movpack.exe)
5. Click OK.

3D Studio Plug-In This release is for 3D Studio plug-in utilities. We highly recommend the following: Please remove the Psy-Q dongle, and attach the 3DStudio dongle before progressing with a modeling session utilizing the 3DStudio plug in. **Warning**: Do not remove or add dongles while the PC is powered on.

Do not start a 3DStudio plug in session before accomplishing the following:

1. remove dexbios (only if dexbios installed)
2. remove mess1.com (only if mess1 installed)
3. cdbios (only if CDBIOS installed)

Please read the files *.doc and *.txt in the "c:\ps\3rdParty\3ds" directory. Specific installation instructions are included in the 3dstod_e.txt file.

Step 5: Add environment variables.
Edit your autoexec.bat file to contain the lines listed below. Note: This example depends on where you have set up your root PSX and Psy-Q directory. The file paths contain forward slashes, unlike the normal DOS convention which uses backward slashes.

```
REM ===== PSX Development Environment Variables =====
set  PSYQ_PATH=c:/ ps/psyq/bin
set  COMPILER_PATH=c:/ ps/psyq/bin
set  PSX_PATH=c:/ ps/psx/bin
set  C_INCLUDE_PATH=c:/ ps/psx/include
set  C_PLUS_INCLUDE_PATH=c:/ ps/psx/include
set  LIBRARY_PATH=c:/ ps/psx/lib
```

```
set GO32=DMPISTACK 1000000

REM ===== GNU C/C++ ================================
set GO32TMP=c:/tmp
set TMPDIR=c:/TMP

REM If your computer does not have a floating point
REM co-processor then uncomment the following line:
REM set GO32=emu  c:\ps\psyq\bin\emu387
REM ================================================
```

The file c:\ps\psyq\bin\PSYQ.INI is referenced by the compiler. This file can be used to contain some of the DOS environment variables. When the environment variables and PSYQ.INI are both defined, PSYQ.INI is given preference. For example, your c:\ps\psyq\bin\PSYQ.INI file could include

```
[ccpsx]
    stdlib=libapi.lib .....
    set  PSYQ_PATH=c:\ps\psyq\bin
     COMPILER_PATH=c:\ps\psyq\bin
     LIBRARY_PATH=c:\ps\psx\lib
     C_INCLUDE_PATH=c:\ps\psx\include
```

to achieve the same result.

Step 6: Verify your ability to compile.

To make sure you can compile, **reboot** your machine to register the environment variables. Make sure your paths are set correctly. If they aren't, you may have to increase the environment memory space in your config.sys, using a line like this:

```
shell = command.com /E:1024 /p
```

The "/E:1024' sets the environment size to 1024 (valid ranges are from 160 to 32768), and '/p' makes this command.com the default command prompt. (See p.342 of *Peter Norton's Complete Guide to DOS 6.22* 6th Edition for further details).

Once you are certain your paths are set up correctly, you can proceed to compile. At an MS-DOS prompt, type the following two lines:

```
cd c:\ps\psx\sample\graphics\balls
psymake all
```

The sample should compile with no errors, and return a command-line prompt. If you have problems, please recheck your steps. Otherwise please contact us (refer to the section in Chapter 1 about Technical Assistance).

However, you cannot run the program, because the device drivers for the DTL-H2500 board have not been installed yet. The next steps show you how to do this.

Step 7 (optional): Install the CDROM emulator software.

If you have the CD-ROM emulator, you can install it now. However, we recommend that you defer this installation until after you have finished installing the driver software for the DLT-H2500, since you might encounter problems. You should finish the rest of the installation, and then come back to this step.

Read the "readme.txt" that came with your CD-ROM emulator kit, which is a full set of instructions for setting up your emulator card. In addition, note that the “cdbios” driver contains commands of the following form:

```
cdbios /a<address> /d<dma>  /i<interrupt>
```

The address, dma channel, and interrupt number correspond to the three DIP switch settings on the ISA board. Although the emulator board’s actual address is in 4 byte hexadecimals, the DIP switch host’s A15 -A4 3 bytes are in decimal format. The actual addresses and a table of their equivalents are entered below:

Decimal Notation	Notation Notation	Actual Address (in hex)	Remarks
300	0x12C	0x12C0	
308	**0x134**	**0x1340**	**Default**
310	0x136	0x1360	
318	0x13E	0x13E0	
380	0x17C	0x17C0	
388	0x184	0x1840	
390	0x186	0x1860	
398	0x18E	0x18E0	

In this case, take A15-A4 from 0x1340 and match it with 0x134 to get “308”. For more information, please refer to the “CD Emulator” book on the Developer Tools CDROM.

In some PC’s it is difficult to use the short ribbon cable supplied with the emulator board to the DTL-H2500. The cable is standard, and a longer version can be acquired from most electronic shops.

Step 8: Install the device drivers for the DTL-H2500.
You are now ready to read the next section, "Installing the H25DRV.EXE driver."

Installing the H25DRV.EXE driver

There are currently two device drivers.

H25Drv.exe allows you to use a terminal based program called DECICONS. To debug your programs, you will must use “printf's'. You cannot use the Psy-Q tools for running programs or loading memory, although you can still compile programs using “psymake”. H25Drv.exe is the basic, “no-frills” device driver that works with the PCI card. **You must use this driver to verify that your PCI card is functional.**

H25Bios.Com allows you to use the Psy-Q tools RUN, PQBLOAD, and the interactive debugger DBUGPSX.

To install H25DRV.EXE, perform the following steps:

Step 1: Edit "config.sys" and "system.ini".
Add the following line to "c:\config.sys":

```
DEVICE=C:\ps\psx\bin\H25DRV.EXE  /V   /N
```

If you use the EMM386.EXE memory manager, add the following line to "c:\config.sys":

```
DEVICE=EMM386.EXE. . . . . X=C800-C9FF
```

This reserves a block of memory for the PCI card.

To allow the DECICONS program (discussed later) to use colors, you should add a line like the following to your "c:\config.sys" file:

```
devicehigh=c:\dos\ansi.sys
```

Your "ansi.sys" file might exist in a different directory, so please modify the above line accordingly. Otherwise, some of the text output by the DECICONS program will look like garbage.

If you use **Windows 3.1**, add the following line to the "386Enh" section of "c:\windows\system.ini":

```
[386Enh]
EMMExclude=C800-C8FF
```

Step 2: Run FLASHB8.BAT.
If your PCI board was okay on bootup, run FLASHB8.BAT **(**you only need to do this once):

```
cd c:\ps\psx\bin
flashb8.bat
```

This loads the OS ROM image file c:\ps\psx\bin\H2500.img into the flash ROM of the PCI board, which enables access to the PC filing system (PCFS). During the installation, your TV monitor will flash weird colors for a period of time. This does not indicate a problem - leave it alone until the configuration has finished.

Step 3: Shut down your machine.

Step 4: Reboot.
If you still have problems, review the previous steps and recheck your work. For additional information, refer to the chapter "Troubleshooting your installation."

Step 5: Rename RESET25.exe.

This is a program that resets (initializes) the PCI card. Every time you intend to run a PlayStation program, you need to run this program first. If you intend to use the PCI board in NTSC mode, rename RESET25N.EXE to RESET25.EXE by typing the following:

```
cd c:\ps\psx\bin
rename reset25n.exe  reset25.exe
```

If you intend to use the PCI board in PAL mode, rename RESET25P.EXE to RESET25.EXE by typing the following:

```
cd c:\ps\psx\bin
rename reset25p.exe reset25.exe
```

Step 6: Run a sample program using H25DRV.EXE and the DECICONS utility.
The sample program resides in c:\ps\psx\sample\balls, so type

```
cd c:\ps\psx\sample\graphics\balls
```

To start decicons, type

```
decicons
```

If the H2500 is operating correctly, the DOS prompt will switch to the DTL-H2500 Console Mode. Now you can use the following commands:

[F1]	displays help	
[F4]	loads a program file	
[F3]	runs loaded program	
[F7]	sets switch	
	0	boots PlayStation CD-ROM
	1	PSX> prompt mode
	2	boots PlayStation CD-ROM with tty out
[F5]	Sets up logfile. All messages, such as printf out put, will be sent to the file name you specify, as well as to the screen. To stop the output, hit [F10], [F5].	
[F9][F7]	Set video mode	
	0	NTSC mode
	1	PAL mode
[F9][F10]	resets	
[F10][F2]	quits decicons	

Note: After hitting F9, F10 to reset the boards, hit F8 to get the prompt back.

The following steps show you how to run the sample program, BALLS.EXE:

- Press the [F9][10] keys to reset the PCI board.

- Press the [F4] key. This puts decicons into a “downloading” mode.
- When “Load[1]” is displayed type

BALLS.EXE

- Press the [F3] key This executes the downloaded program.
- You should see a ball bouncing around on a blue screen (make sure your color television is hooked up and on).
- Press [F10] [F2] key to exit out of the DECICONS mode.

If you don’t see the bouncing ball, please recheck your work. Then refer to the chapter “Toubleshooting the installation” for more help.

Step 7: (optional) Running other sample programs.
Using the DECICONS console, you can run the other examples in the “ c:\ps\psx\sample” directory. For example, to run a sound demo,

- Type “decicons”. This puts you into the terminal mode.
- Press the [F9][F10] keys to reset the PCI board.
- Wait until the message “Monitor started” appears.
- Press the [F2] key. This puts you in DOS mode. Type

```
cd c:\ps\psx\sample\graphics\clutfog
```

- Press the [F2] key (yes, again).

```
psymake all
```

- Press the [F2] key. Type

```
edit makefile.mak
```

"edit" just happens to be the editor on most DOS machines. Invoke any editor you want. Replace the word "pqbload" with "bload25". These programs will load raw binary data into the RAM of the PCI card. "bload25" works with H25DRV.Exe; "pqbload" works with "H25bios.com", which will be installed later.

Exit out of the editor, and you will automatically be in decicons mode.

- Press the [F2] key. Type

```
psymake load
```

- Press the [F2] key. Type

```
run25  tuto0.cpe
```

You’ll get in the habit of pressing the F2 keys time and again.

- When you are satisfied that your installation is working properly, re-edit the makefile.mak and replace the word "bload25" with "pqbload".

Installing the H25BIOS.COM driver

Now that you're sure that your PCI card is running under H25DRV.exe, you can install the Psy-Q driver H25BIOS.COM. This driver allows you to use the Psy-Q tools *run, pqbload, resetps,* and *DBUGPSX* version 4.93 (or above).

Step 1: Edit and reboot.
Since you already installed the H25DRV.exe driver, delete the line

```
DEVICE=C:\H2500\DOS\H25DRV.EXE  /V   /N
```

from your "c:\config.sys" file and reboot your machine.

Step 1: Run PFLASH.BAT.
Your PCI board has a flash ROM. Install the new kernel and debug stub into the flash ROM by running **PFLASH.BAT**. You only need to do this once.

```
cd c:\ps\psyq\bin
pflash.bat
```

Step 2: Invoke the H2500 device drivers for the Psy-Q tools.
Type the following in an MS-DOS prompt:

```
h25bios.com
mess1.com
```

Unlike the previous H2000 drivers, these are effective only for the DOS-session in which these commands are executed. We don't recommend putting these in your "config.sys" or "autoexec.bat", so you must run these device drivers after every reboot. Under Windows 95 you may want to put these in a .BAT batch file associated with a DOS box used for development.

You can turn off the "h25bios.com" by typing

```
h25bios.com
```

Note to PlayStation developers familiar with the DTL-H2000 ISA Developer's Board: You should now be able to use PQBLOAD, RUN, RESETPS, DBUGPSX as you normally did using the ISA board. There is **no need** to RUN SNPATCH.CPE. You can switch from Emulator to CD-ROM drive by running SELCD.CPE, SELEMU.CPE and using CDEXEC.CPE as with DTL-H2000 systems. Use TESTMESS for message output.

Step 3: Run a sample program.
To verify that the installation was successful, run a sample program such as "balls.cpe". Type the following lines:

```
cd c:\ps\psx\samples\graphics\balls
```

```
psymake all
resetps
run balls.cpe
```

A bouncing ball should appear on a blue screen. If you have problems running the program, please recheck you work. Then read the chapter “Troubleshooting the installation”.

For some of the other samples in the “ c:\ps\psx\sample” directory, you must execute “psymake load” to load the data into the RAM of the PCI card. Read the individual “readme_e.txt” files in each sample subdirectory to learn more about the samples.

Note the following syntax for the functions "h25bios" and "resetps":

H25BIOS (Version 1.36 or above)
Usage : h25bios <options>
Options :

- /b <size> ; specify file transfer buffer size (in K bytes 2 - 32)
- /p ; set PAL video mode (NTSC is default)

RESETPS (Version 1.04 or above)
Usage: RESETPS <optional switches> <num> <optional switches>
Switches for DTL-H2500 only:-

- /n set NTSC video mode
- /p set PAL video mode

Step 4: Run other sample programs.
Programs can be built by giving the command PSYMAKE. The makefile can also be used to run a program as some programs the preloading of model and texture data before being executed.

For some of the samples you may need to execute **psymake load**to download the necessary data files to the development boards.

The following is a list of file suffixes that may be found in some of the sample directories:

```
.c        C source
.h        C include (header) file
.obj      object file
.sym      symbol file
.cpe      PS-X executable file
.tim      texture data file
.tmd      3D model data file
.lnk      psylink command file

makefile.mak          makefile for building executable
```

All of the samples assume that you placed the "psyq" and "psx" directories directly in the "c\" directory. If you have a different directory structure for the PSX libraries and header files, you will need to modify the .lnk files for some programs. The .lnk linker command file specifies the file path where the libraries can be found and additional object modules used in the program.

Installing the DTL-2510 CD-ROM Drive (optional)

No software drivers need to be installed to run this CD-ROM drive. However, either H25DRV.EXE or H25BIOS.COM should be running before you to try to run anything from the DTL-2510.

A sample program has already been compiled on the Programmer Tools CDROM (DTL-S2002) and will run directly from the DTL-H2510. Read the next two sections to learn how to run it.

Running with H25DRV.EXE

- Insert the Programmer Tools CDROM into the DTL-H2510.
- Reset the board by typing

```
reset25 0
```

The CDMENU.EXE from the CD-ROM will be started and the menu will appear. The Up/Down key and start button on the PAD can access and execute the sample program. The source code for “CDMENU.EXE” is in \psx\utility\menu\cdexec.

Running with H25BIOS.COM

- Insert the Programmer Tools CDROM (DTL-S2002) into the DTL-H2510.
- Type the following

```
resetps 1
run /w5 c:\ps\psyq\bin\selcd
run /w5 c:\ps\psyq\bin\cdexec
```

The CDMENU.EXE from the CD-ROM will be started and the menu will appear. The Up/Down key and start button on the PAD can access and execute the sample program. The source code for “CDMENU.EXE” is in `\ps\psx\utility\menu\cdexec` .

Miscellaneous

Compiler
For a quick summary on the compiler, please refer to the ccpsx.txt document included in the compiler document on the Technical Reference CD (DTL-S2002), in the directory `progcd\psyq\gnu.`

The GNU CC document is also available.

No Floating Point Co-processor on PC
If your PC does not have a floating point co-processor then add the following line in your autoexec.bat as well

```
set GO32=emu  c:\ps\psyq\bin\emu387
```

Global Allocation
Please refer to the file GblReg.doc included in the Technical Notes document directory of the Technical Reference CD, in `technote\.`

Debugger
For a quick tutorial on how to use the debugger, refer to the file debugdoc.txt in the Technical Reference CD, in the `progcd\psyq\debugger` directory.

Chapter 4:Troubleshooting the installation

Preliminaries

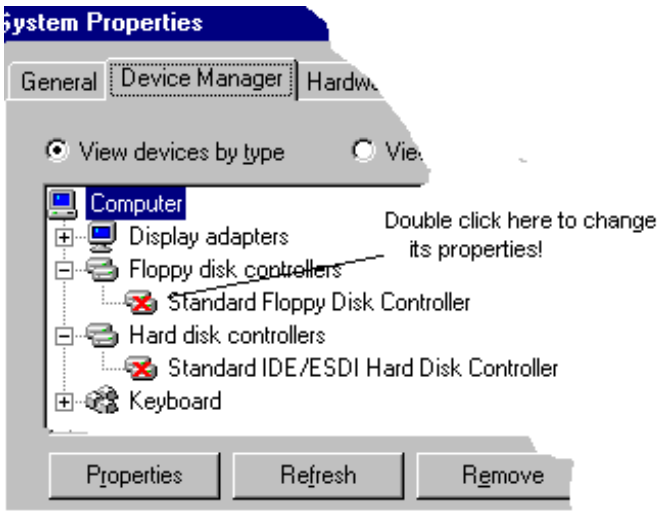
Check your board. It should have at least a PD2 chip on it.

Check your interrupts. Your PCI card should be assigned to one interrupt, and **no** other peripherals can be assigned to that interrupt. You can use the "MSD" program included in most versions of DOS. Or, in Windows 95, you can see what interrupts are assigned by performing the following:

1) Go the “My Computer” icon. Yours may be named differently, but it looks like a computer:

2) Right click on it ; select “Properties”.
3) Select the “Device Manager” tab.
4) Select the “Computer” icon. Then click on the “Properties” button at the bottom of the screen.
5) If other devices are assigned to the same interrupt as the PCI card, disable the other peripherals by reinstalling the peripheral’s device drivers, or by changing the properties of

the peripherals. For example, in the “Device Manager” list, you can double-click on the icons of the peripherals as in the diagram below:



A dialog with the properties of the device should appear. Using the “Resources” tab, determine which “Interrupt Request” it uses (you may have to scroll down to this field). If it matches the interrupt you want, select the “General tab”. In the “Device Usage” field, there may be a check box with the caption “Original Configuration (Current)”. If this is selected, then deselect it. This will disable the peripheral and thereby prevent it from generating interrupts that will confuse the PCI card. Continue through the list of peripherals, then reboot your computer to register the changes.

Alternatively, some IBM PC-Compatibles are equipped with a "Setup" routine hidden in the boot sector of the boot-up hard drive that can be accessed during a cold-boot (turning off the computer's power supply, then turning it back on). After the computer runs its memory check, and the cursor moves to the top-right corner of the screen, you can hit a function key (F1 through F10) to get into the "setup" mode. Since computers vary, you may have try them one at a time. If you have a manual for your computer, read it for more information.

We are working on improving the PCI card so that it won’t have this problem in the future.

Problem: PC fails to recognize board

The DTL-H2500 main board is the board for the PCI slot. When a PC is started up with the main board mounted into the slot, the PC usually recognizes the main board automatically. However, some models of PCs may fail to recognize it. The problem with the PCI BUS interface can be caused by BIOS bugs or hardware bugs. Currently, there are no general purpose solutions for either bugs. Some models of PCs which may cause problems should not be used. Please check the table below.

Known problems with BIOS of PC

Problems	**Workaround**

General known compatibility with PC Brands and models

Maker	Model	PCI Chip Set	Operation
Assus Motherboard P166	Tech P/I - P55TP4N / 100, with Award Modula Bios V.4.51 PG from Award Software.		OK
Archiplego	P133	Intel Endeavour	OK
DELL	XM5100	Neptune	OK
	XMT5100	Neptune	OK
	XMT5120	Neptune	OK
	MT XPS Pentium Pro 200N		OK
	P120T Pentium		Incompatible ?
Compaq	Deskpro 5100	Compaq	OK
DEC	Venturis FP5100		OK
	Celebris FP590		OK
	Celebris XL5100	Neptune	OK
	Celebris GL5133ST	Triton	OK
Gateway	All Tested		Incompatible
IBM	PS/V Master 100		OK
	PS/V Master P120	Triton	Incompatible
	PC 750		OK
HP	Vectra XM	VLSI	OK
Mesh	Elite 120R Pentium		Incompatible
Fujitsu	FMV 590DE		OK
Olivetti	M4 82		Incompatible
Oki	IF Station 590/DG		OK

Diagnostic steps

If your board isn't in the table above, then the board's addresses could be incorrect, or the PCI bus is malfunctioning. Before you can proceed with the diagnosis, the H25DRV.EXE needs to be installed, and the BIOS settings may have to be changed. These are explained in Step 1 and Step 2 below.

Step 1: Install the H25DRV.EXE driver.
Before the DTL-H2500 main board can be used, the DTL-H2500 main board should be mounted into the PCI slot (see the chapter "Installing the Hardware"), and the device driver for DTL-H2500 should be installed as well (see the chapter "Installing the Software", in the section "Installing the H25DRV.EXE driver). Make sure that you don't have a dexbios or h25bios.com running.

Step 2: Change the BIOS settings.

The BIOS settings may need to be changed for some models of PCs. A setup utility is usually accessible on PC's by hitting the F10 key:

- Turn off your computer.
- Turn on your computer. A memory check will be run.
- When the memory check finishes, the cursor will appear on the right of the screen. Hit the F10 key to invoke the CMOS setup program.

The main changes to be made to the settings are as follows:

- Enable the PCI BUS
- Disable the Shadow area in RAM
- Disable the 4 KB Shadow area to be allocated to the DTL-H2500.

Step 3: Check for failure in address mapping.

Executing FRESET.EXE tells you which addresses the PC allocates for the PCI card. Generally, the PC allocates an area with one of addresses 0x000C8000 to 0x000EFFFF.

```
C:\ps\psx\bin\FRESET.EXE
```

and the following message should appear:

PCI version 2.10 Special Cycle 1, Config Mechanism 1 1 bus

bus 0: dev=13 func=0 irq=11, io=000C8000

UNIT 0: I/O addr=0x000C8000, IRQ=11(vect=0x0073, 8259=a0)

If "addr" is set to any of the addresses from 0x00000001 to 0x000FFFFF (1 M or less), the address mapping by the PCI will fail.

The solution is to modify the mapping with a special utility for modifying the address mapping called REALLOC.EXE. Typing the following will allocate some PCI memory at 0x000c8000

```
realloc 0x000c8000
```

When the address has been modified, warm-boot the PC (with Alt+Ctrl+Del). The address should be mapped to 0x000c8000, and the main board should begin to work properly. This method has been shown to work for DEC PCs (DECpc XL 466d2 and DECpc LPx 560) .

Step 4: If the previous step didn't work, check for problems with the PCI bus interface.
If the address mapping succeed, check the PCI interface operation with the DOS **debug** command by doing the following:

Type “debug”. You are now in the debugging mode of DOS.

At the “-” prompt, type “d c800:0000”. This number is the lead address of the area allocated to the PCI board.

You should see something like the following:

C800:0000 01 01 00 09 01 01 00 09-01 01 00 09 01 01 00 09 .....

C800:0010 01 01 00 09 01 01 00 09-01 01 00 09 01 01 00 09 .....

If the PCI works properly, a lot of numeric characters are displayed with regular patterns by 4 bytes. If numeric characters are displayed with an irregular pattern, something is wrong with the PCI BUS interface.

Problem: Board Won’t Reset/ Can’t run programs

Step 1: If using **decicons**, and the boards do not reset correctly (F9 ,F10) or download programs (F4): Try reinstalling the PlayStation OS ROM image on the board, using **Flashb8.bat** (Remember not to use PFLASH.BAT if you wish to use DECICONS).

Step 2: If using **decicons**, try running **decicons** on your Win95 PC in “DOS” mode, rather than in a DOS shell. If this works, it would infer that you have a Win95 related clash.

Step 3: If step (2) didn’t help (or not using decicons), use the standard DOS **debug** option to examine the memory used by the driver. I.e. if 0xE7000 is the start of the address space allocated for the driver, run debug, and type “-d e800:0” . A hex dump will be displayed - if the sequence isn’t of the form “01 00 09 00 01 00 09 00-01 00 09 00 01 00 09 00”, then review the "shadow" setting of BIOS. The "shadow" at E7000h (fin this case) must be disabled.

Step 4: If this does not cure the problem, you should check the version of BIOS that you’re using. SCEE found problems with some H2500’s in PC’s with AMI BIOS and Intel mother boards. In particular BIOS version 1.00.02.CB0 works, but later versions do not. Their solution was to downgrade the PC’s BIOS to 1.00.02.CB0 and reinstall Win95. (Win95’s installer appears to make some choices about the hardware and these can’t be changed once the program in installed.) This file can be downloaded from:

`ftp://ftp.funet.fi/pub/hw/vendors/intel/bios`

There is a known problem with this version of the BIOS. Sometimes it does not recognize the PC hard-disk. Rebooting with CTRL-ALT Delete seems to cure this problem. We will let you know when we find the latest version of the BIOS which works correctly.

Chapter 5:DTL-H2500 Questionnaire

We would greatly value your help with the attached questionnaire so that we can let other developers know about other problematic PCs.

DTL-H2500 Questionnaire

Please FAX back to (Attention *Developer Support*)

44 (0) 171 390 4324 (Europe)

1-415-655-5511 (United States)

Company Name	**Contact Name**	**Tel Number**

DTL-H2500 Serial No.	
Is your system in use ? **If yes, for how long ?**	
Make of PC and OS (e.g. Archipelego, Win95)	
PC Speed and RAM (e.g. 120MHz, 16Mb)	
PC Chipset (e.g. Triton)	
PC BIOS Manufacturer/Version (e.g. AMIBIOS 1.00.02.CB0)	

Chapter 6: Case study

Since every IBM-PC compatible seems to have its own character, you may have to take additional steps during the installation. For instance, you may have to move IRQs around, or switch boards and slots. Here is the experience and advice of one of our techies, who was trying to install a DTL-H2500 PCI board and the CDROM-emulator card.

The PSX development system using the DTL-H2500 PCI development board will need two IRQs for its exclusive use, one for the PCI dev board and the other for the CDROM emulator. The PCI Dev board tries to use IRQ11, so it will be safe to have this interrupt free for its exclusive use. The emulation card uses one of IRQ5,7,10,11,12,15.

So before we start installing the development boards on a Windows95 based system, we should follow the following steps :

1. Switch on your machine and find out the list of IRQs, DMA Channels and I/O addresses already in use. If you are using Windows95 the process is very easy. Choose "System" from the control panel and click on the Device Manager. Printing "All devices and system summary" will make a hard copy of all various system resources utilized and various drivers loaded.

2. Install the PCI Dev Board in one of the empty slots and boot up your machine again. Go into the device manager and check which IRQ has been assigned to our Dev Board. If the IRQ assigned to the Dev Board is available exclusively for its use (i.e. is not shared by any other devices), you are all set. The system assigns IRQ11 to the Dev Board most of the time.

Otherwise you should shut down you machine and remove the Dev Board. Boot up your machine and go into BIOS setup by pressing F10 (in most cases) while you machine is just starting up. Try to reassign IRQs to various devices and free IRQ11 (or the one the dev board was requesting earlier in this step). Save the BIOS setting and quit the system setup. Bootup your machine. Under Windows95 you should be able to check the list of IRQs in the device manager. The IRQ11 should be free at this point. If any other device is trying to use that IRQ disable under the device manager.

While reassigning IRQs under system setup, also try to free one of the IRQ5,7,10,12,15 for the CDROM Emulator card.

3. Shut down your machine once again and install the PCI dev board. Rebooting your machine will assign IRQ11 to the PCI development board. Under Windows95, you can go back into the Device Manager to verify that IRQ11 is being exclusively used by the development board only. At this point you should have one of the other IRQs which you freed in the previous step for Emulators use.

4. Follow the steps given in the Installation Guide to install various drivers and test if your system is working properly.

5. Shutdown your machine. Change jumper settings on the CDROM Emulator board to reflect the IRQ (freed in Step 2 above), the DMA channel and the IO addresses. Put the card in one of the empty slot and connect it to the PCI development board using the 10-pin flat cable. Connect

the emulator drive (follow the steps given in the CD Emulation manual). Reboot your machine and try installing various drivers and emulator initialization routines.

6. Now the system is ready for PSX development.

Another tech supporter discovered that the PCI board was being assigned to IRQ 9, which was shared by other devices. Again, since your computer and its configuration could be different from our own, your mileage may vary.