

# DTL-H2000 Installation and Operation

Revision 1.010 (CDROM)

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Version 1.006 - March 12, 1997. Added information about how to run a CD-ROM directly from the "black box". Fixed footer information to read "DTL-H2000 Installation and Operation", rather than "DTL-H2500..."

Version 1.007 - June 8, 1997. Removed references to the BBS.

Version 1.008 - July 28, 1997. Changed the method for determining the available IO port addresses and interrupts (you can use the "Print..." to print out the summary).

Version 1.009-August 6, 1997. Changed the "415" area code to "650". Removed the stuff about obtaining a Web account for North American folks, and put in the generic technical support information from the "readme.htm".

Version 1.010- July 15, 1998. Removed references to the now obsolete PSYQ security dongle. Changed references to Psyq.ini to SN.ini. Modified appropriate path names to reflect current directory structures on the CD.

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## About this Manual

## About this Release

This is the CDROM release of the Installation and Operation Manual for the DTL-H2000 Development System. Library functions and structures are detailed in the Library Reference volume of the PlayStation Developer Reference Series.

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## 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.

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## Technical assistance

If you're having problems, we highly recommend that you first search the Technical Reference CD -- it's the same tool we use at Technical Support when we attack a problem. Chances are that somebody has had your problem before, and it's been solved and documented on the Technical Reference CD. But don't bang your head against the wall! If (and only if) you are a licensed developer, you can reach technical support for your region at the following addresses and telephone numbers. For more information and for a set of bug report forms, refer to the Technical Reference CD.

### **SN Systems**

*SN Systems writes the compilers for the standard PlayStation development kits. All licensees of SCEA and SCEE are welcome to email bug reports or ask questions about the compilers.*

**E-mail:** [support@snsys.com](mailto:support@snsys.com) .

**Web Site:** <http://www.snsys.com>.

### **Sony Computer Entertainment America**

*SCEA is available to licensees in North America only.*

**E-mail:** [DevTech\\_Support@interactive.sony.com](mailto:DevTech_Support@interactive.sony.com)

**Web Site:** <http://www.scea.sony.com/dev>

**Developer Support Hotline:** 650-655-8181, Monday through Friday, 8am to 5pm, Pacific Standard Time.

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**Sony Computer Entertainment Europe**

*SCEE is available to licensees in Europe only.*

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## Installing 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-H2010) 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 5**.

### 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 SN tools

The directory "[cdrom]:\pssn" contains the standard PlayStation development system, which includes an interactive debugger and the C compiler.

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

```
xcopy /s d:\gnu* c:\ps\pssn
```

The GNU license is labeled gnu.txt.

- Add the line

```
set path=%path%;c:\ps\ pssn
```

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 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. remove cdbios (only if CDBIOS installed)

Please read the files \*.doc and \*.txt in the "c:\ps\psxgraph\doc\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/pssn
set COMPILER_PATH=c:/ps/pssn
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=DMPSTACK 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:\pssn\emu387
REM =====

```

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

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

to achieve the same result.

#### **Step 5: Turn off your computer.**

#### **Step 6: Reboot your machine.**

#### **Step 7: 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\basic
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-H2000 board have not been installed yet. The next steps show you how to do this.

#### **Step 9 (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-H2000, 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	<b>Default</b>
<b>308</b>	<b>0x134</b>	<b>0x1340</b>	
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.

#### Step 10: Install the DTL-H2000 boards.

The next section shows you how to install the DTL-H2000 board.

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## Installing the DTL-H2000

### Step 1: Determine a free memory address and a free IRQ for your boards.

By default, the dip-switch/jumper settings of the board are set to

```
IRQ: OFF
Base Port Address: 1340
```

You will have to set the jumpers of the board to an available interrupt and address. Follow the installation instructions entitled "PlayStation Board" (for PC/AT) that is packaged with the boards. **Note:** You may have to refer to the Japanese version of these instructions to see the value each jumper setting corresponds. This is because the English version may be illegible. **The interrupt and address you choose should not be in conflict with other boards on the system.**

There are a number of ways to determine which interrupts and addresses are available. You can use the "MSD" program included in most versions of DOS. Or, if you are running 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 "Print..." button.
- 5) Choose the "All devices and system summary".
- 6) Print out the document. For available IRQ's, read the "IRQ SUMMARY" section. For available I/O port addresses, refer to the "IO PORT SUMMARY" section.

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 to try them one at a time. If you have a manual for your computer, read it for more information.

**Step 2: Edit your autoexec.bat to include the "dexbios" device driver.**

Suppose you modified the interrupt jumper on the board from **OFF** to an unused interrupt **11**. Then the dexbios line in the autoexec.bat file must be modified as follows:

```
c:\ps\pssn\dexbios /a1340 /i11
```

This example assumes that you placed "pssn" directly under the "c:\ps\" directory.

In general, the syntax of the line should be as follows:

```
<parent>\ps\pssn\dexbios /a<address> /I<interrupt>
```

Modify your autoexec.bat and save your changes.

**Step 2: Turn off your computer.**

**Step 3: Install the two development boards into two free 16-bit ISA slots in the PC.**

Make sure that the ISA boards fit snugly in their sockets.

**Step 4: Reboot your computer.**

If you have difficulties during the booting process, you probably have an interrupt or memory conflict. Recheck your work.

**Step 5: Run a program.**

Open up a DOS-command window. Alternatively, it may help to run the computer completely in DOS, without Windows 3.1 or Windows 95.

- Type

```
resetps 1
```

This resets the DTL-H2000.

- Type

```
run /w5 c:\ps\pssn\snpatch.cpe
```

This patch fixes a bug in the ROM of the DTL-H2000. Throughout the literature of the PlayStation, you may see references to "patchw" or "patchx" or "patchj". Ignore them, since "snpatch.cpe" is the current version.

- Type

```
run /w5 main.cpe
```

This loads the file main.cpe into the memory of the DTL-H2000 after pausing for a delay of "5" and runs the program.

- Wait for few seconds. What should appear on your video monitor is a blue screen with a bouncing ball. If the program does not execute, type "resetps 1" and repeat the sample program steps. If it fails again, review your setup procedures. Make sure that "dexbios" is actually running.

NOTE: If you receive "Cannot connect to target" while executing your set commands, add a longer pause between your commands or verify your board settings.

- To exit the sample press the rectangle button, "select", on the pad-controller.

#### Step 6: Run other example programs.

Programs can be built by giving the command PSYMAKE. The makefile can also be used to run a program as some programs the pre-loading 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 "pssn" and "psx" directories directly in the "c:\ps\" 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.

---

## Running from the CDROM

No software drivers need to be installed to run the external CDROM drive DTL-H2010 (the "black box").

**Running samples:** A sample program has already been compiled on the Programmer Tools CDROM (DTL-S2002) and will run directly from the DTL-H2010. The following represents the flow which you may use to execute a program in the CD-ROM player.

- Insert the Programmer Tools CDROM (DTL-S2002) into the DTL-H2010 drive.
- At a DOS-command prompt, type the following:

```
resetps 1
run /w5 c:\ps\pssn\snpatch
run /w5 c:\ps\pssn\selcd
run /w5 c:\ps\pssn\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\sample\module\cdexec.

**Running finished CD-ROMs:** The above procedure can also be used for running commercial CDROMs. On most DTL-H2000's and all DTL-H2500's, you can alternatively run "resetps" with an argument of 0:

```
resetps 0
```

This will reboot the development environment and run from the black box.

---

## 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-S2003), in the directory Progcd\gnu\doc\.

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 G032=emu c:\ps\pssn \emu387
```

### Global Allocation

Please refer to the file GblReg.doc included in the Technical Notes document directory of the Technical Reference CD (DTL-S2003), in \Technote.

### Debugger

For a quick tutorial on how to use the debugger, refer to the file debugdoc.txt in the Technical Reference CD (DTL-S2003), in the \progcd\pssn\debugger directory.

**Known Problems.**

We've experienced problems with time-outs when quickly using "run.exe" immediately after the command "resetps 1". This is most often the case when the commands are placed in a batch file. We recommend that a pause or a delay command be inserted between the resetps and run commands.

Sometimes one is unable to remove the CD that is in the DTL-2010. Make sure the "selcd" switch is executed to activate it.