

# The Interactive Engineer



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## ■ Editorial

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Despite the rumours in the professional literature, the professional market is getting stronger for CD-i. It is true that DVD is gaining importance and we all will have to take this fact into account, but the only standardised alternative at the moment is still the CD-i platform.

A new topic are the Internet applications, in full exploitation since the introduction of the 'Internet toolkit'. This results in a great demand for 'Hybrid' Internet solutions.

Also promising in Europe is the Spanish market: six thousand players were sold for professional applications there in just one month recently.

In Eastern Europe, particularly in Russia there is great interest in CD-i. It is a platform far less expensive than a similar PC solution, an important fact for these emerging markets. In Asia and Thailand in particular, there are projects under way to utilise CD-i for Internet access using the Internet toolkit.

*Ie editorial staff*

## ■ MediaMogul Click

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If the standard MediaMogul 'click' sound keeps boring you or is not the sound for your application, simply change it!

Unfortunately it isn't documented by what the h0/AUDIO/click.cmono or /h2/CDIMAGES/click.cmono audio file must be replaced. When keeping a few rules in mind, this job is fairly easy to do.

First of all you need some knowledge of the Macintosh, the AudioMedia II sound card with the Sound Designer II program and the AudioStack conversion utility. Other sound capture devices and/or other sound editing program will also do the job, but only this setup was tested.

Open the sound file -or directly digitise the sound from within the application- containing the sound fragment that will be used as new 'click' and highlight (or select) the new 'click' in the sound file. The length of the selected part should be at least 180 ms and not exceed 210 ms. If the original file or capture is in stereo, select only a portion in either the left or right channel, but not both. Then copy the selected portion to the 'clipboard' by pressing **⌘ C** on the keyboard.

Open a new Sound Designer file (or a new file in an other application) as MONO, 16 Bit, Sound Designer II and paste the clipboard into the new file. Apply filtering, compression, etc. as desired. The peak amplitude of the sound file should be 3-6 dB below maximum (0 dB or 100%) to prevent undue distortion when converting to CMONO. Correct the amplitude of the 'click' if necessary. It is also recommended to fade out a small part ( $\pm 10\%$ ) of the trailing end to prevent a 'pop' caused by a sudden digital silence at the end of the file. Finally, check the sound by playing it in 'loop' mode and save the file when the result fits your needs.

Now open AudioStack, select the sound just saved file and convert it to CMONO. The resulting CMONO file should be around 2390 bytes. If it is substantially larger (like 3000 bytes or more), go back to your sound editing program, reduce the 'click' to less than 213 ms and convert it again to a CMONO file.

The last thing to do is replacing the h0/AUDIO/click.cmono or /h2/CDIMAGES/click.cmono audio file with the new file. Remember MediaMogul must be re-

started before it will load the new click.cmono file. If you want to replace a 'click' in an existing application, replace the click.cmono file in /h0/CDIMAGES and any other build directory with the new click.cmono audio file. In this case the title must be re-mastered -at minimum- or rebuilt from 'cdbuild' to include the new click file.

*Peter Boots*

## ■ OOPS

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Unfortunately, the survey of 'CD-i players on the market', on page 4-5 of IE5 contained some outdated information. Philips Media Systems - Product Management was so kind to correct our information lag. We apologize for the possible misunderstandings this could have caused. Anyway, you'll have to update the items in the table by the items below:

### **CDI605, etc.:**

production stopped (even for CDI605T)

### **CDI450, etc.:**

production stopped (only re-route of stock and re-build of one version into another for projects)

### **CDI210F4, etc.:**

production stopped (only re-route of stock and re-build of one version into another for projects)

### **CDI740/00, etc.:**

development finalised, but not yet released for market introduction

### **CDI370:**

in production

For your information: a new model -the CDI490- will be introduced: it is a facelift of CDI470 with 32kB NVRAM. Market introduction scheduled end of Q1 1997.

We'll keep you informed.

*Peer Custers & IE Editorial Staff*

## ■ OS-9 command shell and emulation

While debugging a CD-i application, it can be useful to retain the access to the OS-9 commands like MFREE, MDIR=, PROCS or others. This allows you to trace memory related problems (and a lot of others) while emulating a title.

To access the OS-9 shell, you'll need to connect a terminal, or a Mac/PC running terminal emulation software, to the CD-i player. Connect the terminal to port 3 of the 605 CD-i player and power up the player. Be sure that the switch 'EXTERNAL/INTERNAL', at the back of the 605 CD-i player, is set to INTERNAL.

Starting from the power-on Philips screen, first click on the 'SETTINGS' icon and then on the 'SYSTEM' icon. The system will respond with a \$-prompt on the terminal screen.

Type now the following commands on the terminal:

```
chx /h0/cmds
chd /cd
dir -e /cd/CDI
```

Locate in this directory listing a file ending with the .MMO suffix (use CNTRL-S and CNTRL-Q to pause/continue the display if necessary). (↗)

Id	Pid	Grp.	Usr	Prior	Mem	Siz	Sig	S	CPU	Time	Age	Module & I/O
2	6	0.0		128	445.71k	503		a	2.78		1:14	videopro <>>>nil
3	6	0.0		256	28.76k	0		s	0.14		1:14	audiopro <>>>nil
4	0	0.0		128	19.76k	0		w	2.32		1:14	optshell <term
>>>vid												
5	2	0.0		128	26.51k	0		s	1.24		1:14	inputpro <>>>nil
6	0	0.0		128	10.51k	0		s	0.25		1:14	statepro <>>>nil
7	2	0.0		128	14.70k	0		s	0.00		1:14	filepro <>>>nil
8	4	0.0		128	104.21k	0		s	2.86		1:14	browser <term >>>nil
9	4	0.0		128	7.10k	0		s	11.52		1:14	cdishell <term
>>>vid												
10	11	0.0		128	6.64k	0		w	3.24		0:01	shell <>>>pks00
11	0	0.0		128	22.20k	0		e	3.97		0:01	telnetdc <pks00
12	0	0.0		128	11.96k	0		e	0.63		1:14	telnetd <>>>nil
13	0	0.0		128	2.00k	0		e	3.02		1:14	ifman
14	0	0.0		128	2.00k	0		s	0.29		1:14	sockman
15	0	0.0		128	11.96k	0		e	0.14		1:14	ftpd <>>>nil
16	10	0.0		128	18.01k	0		*	0.44		0:00	procs <>>pks00 >dd

The figures in this table are useful to trace 'heavy' modules, slowing down the overall performance of an application.

Another useful command is MFREE. Typing MFREE on the terminal returns the current (↗)

This file is the CD-i application on the CD-disc.

Type this name behind the \$-prompt on the terminal exactly as shown, including its path and terminate the name with a &-character (for example: /cd/CDI/MY\_SCRIPT.MMO&). The &-character forces the application to start in background. The \$-prompt will return while the application starts to play on the CD-i screen.

The PROCS OS-9 command is very helpful while debugging an application. This command displays the processes currently running both in foreground and background. While debugging, it is interesting to know how many copies of a module are in memory and which priority it has. At any time, there should only be ONE copy of each module in memory. Duplicates can cause sluggish or erratic operation and are usually the result of multiple "Call\_bg" to a MediaMogul Plugin module. Another interesting parameter is the priority of a process. The priority value indicates the relative amount of processor time the module or process consumes. A module with a high priority uses a large percentage of the processor's capacity and will slow down the other processes.

The next table shows the screen on the terminal when invoking PROCS:

amount of free RAM on the system:

Current total free RAM: 3667.94 K-bytes

Adding the option -e to the MFREE command returns a detailed map of memory segmentation:

Segment	Address	Size of	Segment
\$A80000	\$80000	512.00	K-bytes
\$6029C0	\$1B0	0.42	K-bytes
\$6175F0	\$8C0	2.18	K-bytes
\$61A270	\$2AC0	10.68	K-bytes
\$61F800	\$2D6560	2905.34	K-bytes
\$90B9B0	\$30	0.04	K-bytes
\$92FF90	\$40	0.06	K-bytes
\$932D70	\$F0	0.23	K-bytes
\$934680	\$A0	0.15	K-bytes
\$9348B0	\$E0	0.21	K-bytes
\$9360E0	\$10	0.01	K-bytes
\$9361F0	\$20	0.03	K-bytes
\$9369F0	\$50	0.07	K-bytes
\$936A70	\$80	0.12	K-bytes
\$937BF0	\$10	0.01	K-bytes
\$9A3CC0	\$10	0.01	K-bytes
\$9A3DE0	\$B0	0.17	K-bytes
\$9A3F30	\$A0	0.15	K-bytes
\$9A41B0	\$10	0.01	K-bytes
\$9A49E0	\$40	0.06	K-bytes
\$9E0540	\$10	0.01	K-bytes
\$9E0DE0	\$10	0.01	K-bytes
\$9EE870	\$10	0.01	K-bytes
\$9F8040	\$10	0.01	K-bytes
\$9FFCC0	\$10	0.01	K-bytes
\$80500	\$1FA10	126.51	K-bytes
\$FDC80	\$19A0	6.40	K-bytes
\$3D2A	\$1D6	0.45	K-bytes
\$4000	\$197E0	101.96	K-bytes
\$5FCA0	\$1E0	0.46	K-bytes

Total RAM at startup indicates the grand total of RAM installed on the mother board, expansion card and DV card present at startup.

To calculate the amount of RAM used by your title, subtract the Current total free RAM reported by MFREE while the application is running, from the Current total free RAM reported just before you started the .MM0 file.

According the Green Book, a base-case CD-i player must have two segments of at least 480 Kb free, resulting in a Current total free RAM of 960 Kb (for a 1 Mb base-case). Some base-case players will have more than 960 kB free as their OS-9 kernel use less RAM from the 1024Kb (1 Mb). A DV cartridge adds another 1024 Kb of RAM, bringing the Current total free RAM to 1980 Kb. The script2disc modules, plugins and their required buffers must fit in the Current total free RAM: 960 Kb for a base case player or 1980Kb for a DV cartridge equipped one. It is thus important not to exceed these limits during the development of a title on a 605 CD-i machine (usually with a lot of memory). An intelligent use of the sticky attribute for modules will reduce the momentary memory usage of the application but increase the time needed to load/unload the modules in

memory. Another memory hogs include any plugin that must allocate memory for sound maps (like talking menus) or video (like QHY zoom). Reducing number or size of the sound maps or image byte counts can help to reduce the memory consumption of the application.

*Peter Boots*

## ■ Internet & CD-i

A few users of the 'CD-i Internet toolkit' reported some interesting items to be aware of when developing Internet applications. As this Internet topic is fairly new, we don't aim to give a complete overview of what's possible and what not. Therefore, all hints that makes life easier are welcome.

First of all, we have to realise that a CD-i browser is NOT the same as a browser running under Windows™ or MacOS™. An inherent difference between CD-i and other platforms is the screen resolution. Computer screens -not counting the happy few still owning an EGA video card-usually have a (much) higher resolution than a TV screen. As most websites are developed for a VGA- or SVGA-equivalent screen, this results in a different graphical interpretation of characters and pictures on a CD-i screen. It also causes a relatively slow decoding of full featured webpages, certainly when the page contains graphics. The conclusion of all this would be that Netscape™ alike applications on CD-i will probably not have the same success as Netscape™.

On the other hand, building an application where all CD-i specific data is on disc and variable data (pricing, ordering info, name & address,...) is available on-line solves all resolution and decoding speed problems. This approach opens a way to dedicated but fast 'information retrieval systems' with the navigating system locally on disc and the variable information scattered all over the world.

A less efficient approach would be to store the HTML tree on disc. This approach, however, will slow down the ISO filesystem when a great number of files are involved.

*Stefan Maris*

## ■ Determining the real IP address of the 605 Player

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The ispmode module in the startnet script, used to establish the Ethernet backbone for the 605 CD-i player, doesn't report the correct IP address of the player. The IFSTAT module of the 605 player, however, can be used as work around to determine the actual IP address of the machine.

The origin of this incorrect behaviour is the way the ispmode module reads the address parameters. It only reads the address parameter supplied when editing the startnet script. The new address is copied to the le0 module in memory which maintains the ENTIRE IP address. In reality, the network software only uses the first three octets from the le0 address and reads the expansion board switches to fill in the fourth octet. It is thus possible for the le0 address value to differ from the actual address value. For example: suppose the ispmode line in startnet is set to address 192.7.45.100, which is then copied to the le0 module in memory. If the expansion board switches were accidentally set to 110, the REAL address of the CD-i player would be 192.7.45.110 and not 192.7.45.100 as reported by the startnet script.

To overcome this problem, use the IFSTAT module -located in the 605 ROMS- to determine the ACTUAL IP address of the player. This module extracts the first three octets from le0 and then reads the last octet from the switch settings.

First you'll have to start a shell on an external terminal connected to the 605 CD-i player (see the 'OS-9 command shell and emulation' article in this issue) and then type the following command after the \$-prompt:

```
run: startnet.  
run: ifstat -a
```

The typical screen ifstat -a puts on the terminal screen is as follows:

```
ifdev(0).if_next = 009f52b0  
ifdev(0).if_prev = 009f63d0  
ifdev(0).if_mtu = 1500  
ifdev(0).if_flags = 0022  
ifdev(0).if_subnet = 0  
ifdev(0).if_addr = 192.7.45.118  
ifdev(0).if_addr.family_type = 2
```

```
ifdev(0).if_addr.port = 0  
ifdev(0).if_devnam = le0  
ifdev(0).if_dvrnam = am7990  
ifdev(1).if_next = 009f63d0  
ifdev(1).if_prev = 009f4f60  
ifdev(1).if_mtu = -1  
ifdev(1).if_flags = 00a0  
ifdev(1).if_subnet = 0  
ifdev(1).if_addr = 127.0.0.1  
ifdev(1).if_addr.family_type =  
ifdev(1).if_addr.port = 0  
ifdev(1).if_devnam = lo0  
ifdev(1).if_dvrnam = ifloop
```

The line of interest is in boldface and holds the correct IP address of the player. Compare the last octet here (the actual switch setting) with the last octet from the ispmode line in startnet. When all settings are correct, those two addresses should match. If they don't, change the switch settings, restart startnet and check the addresses again with the ifstat -a command.

*Peter Boots*

## ■ DV plane shift - 605 IMPEG DVC

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If you are developing a CD-i title on a 605(T) using an IMPEG DVC, you could encounter some positioning problem between the normal video planes (Plane A and Plane B) and the DV plane.

The problem shows up as a shift between the alignment of the video planes and the DV plane.

With an IMPEG DVC on the 605(T), the Backdrop (DV) plane is shifted approximately 8 pixels horizontally to the left in comparison to the Basecase planes (Plane A and Plane B).

This problem, however, is not noticed neither with a VMPEG DVC nor on consumer players with IMPEG DVC.

Trying to correct this error in the development stage would transport the shift between the planes to the consumer.

*Patrick De Jong*

## ■ 605 CD-i Ethernet self check

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Most Ethernet machines (really, TCP/IP protocol) are able to FTP to itself in a sort of loopback test. The 605 CD-i player also supports this method of verifying the system. This test method can be especially useful to detect a faulty machine in a network where several 605 CD-i player are connected. To run the self test, a terminal must be connected to the player.

Starting from the power-on Philips screen, first click on the 'SETTINGS' icon and then on the 'SYSTEM' icon. The system will respond with a \$-prompt on the terminal screen.

Type the following commands on the terminal:

```
chx/h0/CMDS
```

```
chd/h0
```

```
startnet
```

and wait until the \$-prompt returns on the terminal screen.

To establish an FTP connection to itself type the following command on the terminal:

```
ftp machine_address
```

where: `machine_address` is the address of your 605 (e.g. 192.7.45.17)

In response to the ftp command, the following (or a similar response) should appear on the terminal screen :

```
connected to 192.7.45.17
```

```
220 OS-9 ftp server V1.0 ready
```

```
Name (192.7.45.17:user): _
```

When these lines appear on the terminal screen, it means that the connection was successful. If you've gotten this far, the basic hardware and software drivers are installed and running properly. When you get a Connection failed or similar message on the terminal screen, you'll have to check the address of the CD-i player and the startnet script. Also check if there is a password file in `/h0/SYS` directory and if `idbgen` was executed.

The line `Name (192.7.45.17:user): _` prompts you to login. Login with the name of `super`. When the system responds with

```
Password (192.7.45.17:super):
```

type `user` behind the prompt.

The system will respond with `Connected to 192.7.45.17` followed by status messages whereafter the `ftp>` prompt appears on the screen. If you get the message `Login failed` you probably typed the name or password incorrectly. Retry the login by typing `user` at the "ftp>" prompt. It will ask for your name (`super`) and password (`user`) again.

You can type a ?-sign after the `ftp>` prompt to get on-line assistance or download the FTP document from the BBS.

If previous commands worked correctly, the 605 CD-i player is working fine. All the hardware, drivers and required support files for FTP are in place and working. If the 605 CD-i player passes its self test, but can't establish a connection with another machine, the problem is MOST likely to be found on one of the other machines in the network or with the physical connections between them.

*Peter Boots*

## ■ Index volume 5 1996

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Herewith a chronological list, followed by an alphabetical list of topics in the 1996 issues of Interactive Engineer. Volume 5, number 2 has not been published.

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## ■ Training

The Multimedia Training Service of PIMC plans the following training courses in 1997:

### CD-i Programming With MediaMogul™

Jan.	21-23	'97
Feb.	25-27	'97
Mar.	25-27	'97
Apr.	22-24	'97
May.	27-29	'97
Jun.	24-26	'97
Jul.	22-24	'97
Aug.	26-28	'97
Sep.	23-25	'97
Oct.	28-30	'97
Nov.	25-27	'97
Dec.	16-18	'97

Price: BEF 75.000

## CD-i Programming With Balboa

Jan.	07-10 '97
Feb.	11-14 '97
Mar.	11-14 '97
Apr.	08-11 '97
May.	13-16 '97
Aug.	05-08 '97
Nov.	04-07 '97

Price:BEF 100.000

This training schedule is preliminary and might be subject to change.

All courses will be held in Hasselt,Belgium. Hasselt is easily accessible by car or by train.

The MediaMogul™ and Balboa courses are recommended to be followed shortly before customers receive those packages.

For detailed information and/or to obtain a booking form,please contact your local distributor or PIMC:

### PIMC

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## ■ How to contact PIMC

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### The Interactive Engineer

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