

The Interactive Engineer



Volume 5, Number 3, March/July 1996

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■ Editorial

As you see, Interactive Engineer has a new face. Format changes always take a lot of time and therefore your IE is a little later than expected. Even worse, number two didn't ship. On the other hand, number three is a little earlier than scheduled and has more pages. So don't worry; all articles from number two are in this issue.

The objective of all these changes are to serve our customers even better.

As CD-i developer, PIMC informs you about the latest developments in the world of CD-I through Interactive Engineer. But...if you have articles that are of interest to the rest of the development community, you can contribute them to the IE editorial staff. Simply send them by one of the common communication channels (email, fax,...) or media (paper, floppy, ...) to one of the addresses mentioned at the last page of IE. Be aware that we can't process contributions on punchtape. When your ideas are published in IE, we will send you, as reward, a box of authentic Belgian chocolates. Yes, Belgian chocolates!

IE editorial staff

■ Encoding and production

Transferring data to Digital Video is not immune to the effects described in Murphy's law.

However, when a few simple rules are followed, the coding process will be less vulnerable to errors:

- Deliver a master tape or a first generation copy of the video material (PAL or NTSC) on Digital Betacam, Betacam SP or D1. The following formats are accepted: analog composite, digital composite, analog component, digital component. The quality of encoding increase in the same order as the formats are listed.
- Add a 75% saturated colour bar to the video material.
- Be sure the VITC and LTC timecode on tape are equal and increment in time.
- Start the timecode on tape at least 5 seconds before the sequence to be encoded.
- Deliver audio, especially music, on a digital medium, e.g. DAT tape with SMPTE timecode. When using DAT, don't start the first audio sequence on time code 00:00:00:00 but at timecode 00:00:01:00.
- If audio material is only available on Betacam (PAL or NTSC), use the FM audio (AFM) channels rather than the longitudinal (LNG) channels.
- When audio and video are on different media (video on Betacam and audio on DAT), the media should have the same timecode basis (corresponding SMPTE time code).
- Timecodes delivered on paper should match the source, frame accurate.

To make things easier, PIMC developed the "Encoding Request Form" (see facing page). Use this form each time you would like to schedule Digital Video encoding at the PIMC site. This form will help us in quoting and planning your production. The booking starts when we have received your Encoding Request Form.

This document is only a request form. We would appreciate if you would use this form to request DV encoding time at our site. Please fill in as much as you can. This will help us in making a quote for your production. We will reply on your request with an official quote form. If we do not

have capacity in the time-schedule you have specified, this form will also contain the nearest time that capacity will be available. The production is planned as soon as the official quote form is acknowledged.

For any further questions please feel free to contact Mare Jozefczak or Kurt Liefsoons or contact PIMC support (see 'How to reach PIMC' at the last page of this publication).

This form only defines how data is formatted prior to encoding. Except for this formatting, the video material must be recorded with encoding in mind because some types of 'shots' don't encode well.

The best images to encode are natural, soft images with low contrast and soft or natural edges. Try to avoid shots with high contrast or containing fast moving objects..

Digital Video is intended to be viewed on a television and not on large screens. Panoramic shots or very detailed images will not be shown to their advantage on a small screen. MPEG compression does not always encode fast sequences or fast camera movements correctly because of the large amounts of changing information contained in such images. A romantically sparkling lake reflecting the lurid red and orange setting sun is a typical example. The continuous motion of the water and the highly saturated colours of the sun represent very much new data. Explosions belong to this category as well.

Marc Jozefczak

■ PIMC Encoding Request Form

Encoding Request Form used as:

Quotation
Date ERF

Reservation

Company

Name
 Contact
 Address

 Phone
 Fax

Project Name
 Delivery Address

 Invoice Address

Source video

Tape Betacam SP D1 1-inch
 Digital Betacam Umatic Other:
 Origin Film Video
 Generation Edit master Dub Archive
 Quality Archive Medium New
 Timecode LTC VITC=LTC VITC ITC
 (Linear Time Code - Variable Interval Time Code)

Source audio

Audio On videotape DAT without time code
 Not to be encoded DAT with time code

Source TGA (24 bit or 32 bit)

Delivered on Exabyte tape ISO 9660 WORM
 Number of TGA's
 1 TGA/sec. 12 TGA's/sec.
 24 TGA's/sec. 25 TGA's/sec.

Type of encoding Video CD (White Book) CD-i (Green Book)
Encoding Quality Non RealTime (High Quality) Real Time (Delta vx)
Disc Building Video CD CD-I

Technical Video CD (White Book)

Fixed Video Window: 352 x 288
 Fixed Bitrate: Video 1.151.600 bits/sec. - Audio 224.000 bits/sec.
 Audio Mode Joint stereo Dual Channel Dolby Surround

Technical CD-I (Green Book - Only non-RealTime)

Video Window Standard - 368 x 272 Other:
 Scaling% from normal window.
 Bitrates Standard - Video 1.180.000 bits/sec. - Audio 192.000 bits/sec.
 Dolby Surround - Video 1.151.600 bits/sec. - Audio 224.000 bits/sec.
 Other Videobits/sec. - Audio..... bits/sec.
 Audio Mode Mono Joint stereo Stereo
 Dual Channel Dolby Surround (224.000 bits/sec.)

■ Training

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

CD-i Design Principles

Aug. 07-09 '96

Nov. 06-08 '96

Price:BEF 45.000

CD-i Programming With MediaMogul™

Jul. 23-26 '96

Aug. 27-30 '96

Sep. 24-27 '96

Oct. 22-25 '96

Nov. 26-29 '96

Dec. 17-20 '96

Price:BEF 60.000

CD-i Programming With Balboa

Jul. 09-12 '96

Aug. 13-16 '96

Sep. 10-13 '96

Oct. 08-11 '96

Nov. 12-15 '96

Dec. 03-06 '96

Price:BEF 60.000

Digital Video Principles

Jul. 16 '96

Sep. 17 '96

Oct. 15 '96

Dec. 10 '96

Price:BEF 15.000

Digital Video Hands-On Delta Vx

Jul. 17 '96

Sep. 18 '96

Oct. 16 '96

Dec. 11 '96

Price:BEF 15.000

We recommend the designers course for people who are planning to produce a CD-i title, preferably before they make a deal with their first customer.

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

For detailed information and/or registration, please contact your local distributor or PIMC:

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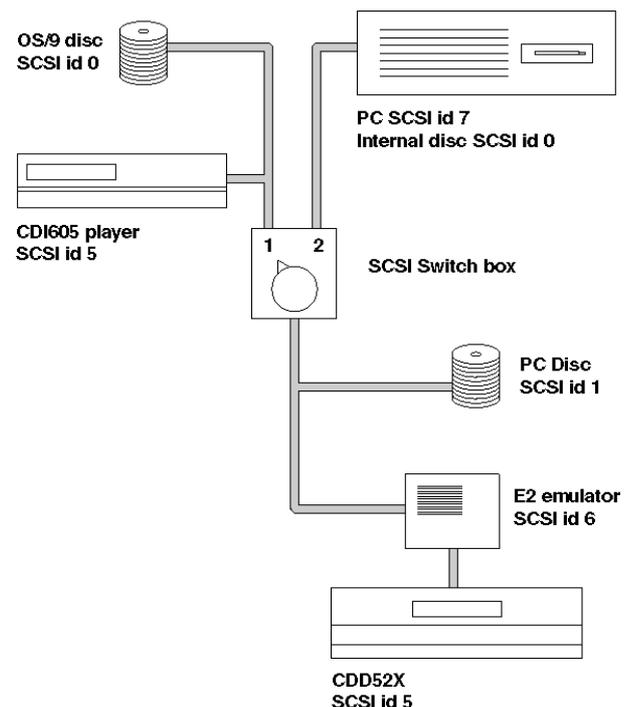
PIMC Training & Customers Support

■ MediaMogul™ and Script2Disc

PIMC Hasselt has tested a simple and cheap way to speed up Script2Disc drastically.

As Script2Disc runs much faster on a PC (486 or better) than on a CDI605 player it would be obvious to develop the script with MediaMogul™ on the CDI605 and emulate the script or transfer the script to a disc image on the PC. This approach, however, involves a lot of data transport from one platform the the other.

A simple solution to this problem is presented in the picture below:



The intention of this setup is to create a harddisk that is shared between the CDI605 player and the PC. A SCSI switchbox in both chains will do the job: in position one, the PC harddisk, Emulator and CDD52X are connected to the CDI650 while in position two, these SCSI devices are connected to the PC.

In developing phase, all scripts created in MediaMogul™ are written to the PC harddisk at address 1 (/h1 or /h2 emulator disc) instead of writing them to the OS/9 harddisk. Once the scripts are ready to burn, they are ported to the PC simply by toggling the SCSI switch box.

One disadvantage of this set-up is that both systems must be switched off before the routing in the switchbox can be changed.

To enable the CDI605 to read and write PC volumes, the 'Script2Disc Migration OS/9 to PC' software package (22SW1719/90) must be installed on the OS/9 system and as the 'shared' disc is a SCSI device, the PC must be fitted with an SCSI card. This set-up was tested with an Adaptec 154X SCSI card.

Contact PIMC Support for more information on this set-up. Ideas for improving this set-up are of course welcome.

Jaap van Zoest

■ **MediaMogul™ Plug-Ins**

Plug-Ins give more possibilities to the MediaMogul™. They pave the way for CD-i applications with enhanced features. With MediaMogul™ you can create certain applications that previously required C programming.

Six completely new plug-ins are added to the MediaMogul™ spectrum and already existing plug-ins have been upgraded.

NEW PLUG-INS

• **Course Map**

The Course Map™ Plug-in is an ideal instrument to track and graphically display each section branch the user has entered, completed or otherwise met tracking criteria. Course Map consists of two plug-ins: `cdi_cmap` and `cdi_sti`.

`cdi_cmap`: allows the user to track his progress through the title. The plug-in compares the hotspots listed in a string variable with the hotspots in a menu file. When the user enters a branch, the corresponding hotspot in the 'string variable list' is marked as being mapped. The branches are graphically presented in a flow chart.

`cdi_stri`: this plug-in inserts a hotspot name into a string variable to be read by the `cdi_cmap`.

• **Dynamic Hotspots**

Dynamic Hotspots Plug-In helps the developer to create more flexible titles by changing the functionality of the MediaMogul™ menus at run-time. Take for example a hotspot by which the user can start the training program. The Dynamic Hotspots Plug-in makes it possible to start the training for beginners or advanced users based on the category the user previously entered.

This plug-in also allows the designer to change the look and placement of hotspots based on variable settings that can change at run-time.

By making the hotspots more "intelligent" the program itself can be made simpler.

Dynamic Hotspots Plug-In offers the greatest flexibility when used in conjunction with String Variables Plug-In, allowing to use script names in the menu files composed of text mixed with variables.

• **Bar Code Reader Plug-In**

The bar code system is, together with magnetic stripe reading, probably the fastest and most accurate way for the input of information. This device was already possible for laser disc players, which were expensive and necessitated use of a PC. Thanks to the Bar Code Reader Plug-In this technique can also be used in CD-i applications.

The information gained by scanning the bar code can be stored in a string variable, recorded into an on screen keyboard or guide the user immediately to a specific section of a title.

• **Magnetic Stripe Reader**

The Magnetic Stripe Reader Plug-In makes it possible to scan credit cards and identification cards. The plug-in reads and processes the scanned information directly into the title, eliminating errors that sometimes occur with keyboard entry.

Think also of the benefits of this device at some trade shows. The registration of interested visitors can be realised by simply swiping their identification card.

Magnetic Stripe Reader Plug-In requires the attachment of a compatible magnetic stripe reader device connected to a serial port of the player.

• **Keyboard Plug-In**

This plug-in enables you to connect a RS-232 serial keyboard, a CD-i or Player Control keyboard to the CD-i player. This set-up is for many visitors and certain applications far more interesting than the traditional pointing device.

A full sized keyboard allows input of name and address information, test responses and any other needed information.

On the other hand there is also a small numeric keypad which allows the user to select options displayed on a kiosk screen without the cost of a touchscreen. This user input method is similar to the interactivity of a video CD player.

This plug-in also allows the MediaMogul™ title to redefine the special function buttons (next, previous, stop, play, pause) located on the CD-i remote infrared controller to use them for other functions within a title.

• **Printer Manager**

For users who wish to take information with them after an 'interactive experience' with a CD-i player, Printer Manager Plug-In is the answer. This plug-in allows connection of printers to a CD-i player equipped with a serial or parallel port and lets the MediaMogul™ author control the printing process. Typical uses of this plug-in are:

- Report testing results
- Print requested information
- Print a description of a product with pricing information
- Remind the user how to contact a business for further activity
- Print special PostScript images from the CD with added information
- Print files that have been stored in NVRAM with File Access Plug-In

UPGRADED PLUG-INS

• **Super Image Scroller Plug-In**

This plug-in gives the designer the freedom to go beyond the limits of the image display area.

Now the developer can use images that are wider or taller than the display. As the image moves, hotspot definitions move with the image.

The user scrolls the image by clicking on scrolling control hotspots. The user can see the relative position of the scrolling image by a special indicator bar. This plug-in supports images stored in CLUT4 or CLUT7. The memory available to the plug-in, at the time it is invoked, defines the size of the image that can be scrolled.

• **String Variables Plug-In**

MediaMogul™ has always offered the ability to store and use twenty-six integer variables. For storing and manipulating text data, C programming was necessary. With String Variables however, you can handle many of those functions with MediaMogul™.

Since several new plug-ins were developed, String Variables became more important. That's why we have made it available as a separate plug-in rather than a component of the Kiosk Plug-In Package.

String Variables are used by many other plug-in modules including:

- Virtual Keyboard (in Kiosk Plug-In Package)
- File Access Plug-In
- Printer Manager Plug-In
- Course Map Plug-In
- Magnetic Stripe Reader Plug-In
- Bar Code Reader Plug-In
- Dynamic Hotspots Plug-In
- Keyboard Plug-In
- Test Engine Plug-In

String Variables Plug-In enables the MediaMogul™ author to:

- Increase the number of variables from 26 to whatever they need
- Add more mathematical functions to variable logic (Add, Subtract, Multiply, Divide)
- Add logical operators (And, Or, Not, Less Than, Greater Than, Equal, Not Equal)
- Use variables that contain more than numeric information

- Perform simple text manipulation functions
- Use Time and Date functions
- Displays the strings as text on the display
- Branch to scripts contained in string variables

Plug-ins included with MediaMogul™

MediaMogul 2.2.1 includes many plug-ins that were offered at extra cost in earlier versions. The following plug-ins are included in MediaMogul™:

• Irregular Menus

A device to implement hotspots in other than rectangular shapes

• Pointerless Menus

Thanks to this plug-in the user does not need perfect aim to get a pointer over a hotspot. The selection happens much easier and faster.

• Talking Menus

This plug-in makes it possible to create hotspots that make a certain noise when they are pointed at.

• Constrain Cursor

A plug-in which prevents the user to move the pointer off the edge of the screen.

• Screen Dimmer

With Screen Dimmer, the CD-i screen will dim after a specified period of inactivity. This can eliminate problems with images that get “burned in” to a screen from prolonged display.

Other plug-ins available at additional cost include:

• Digital Video Plug-In

This plug-in allows the author to incorporate the power of high quality MPEG digital video.

• Pop-Up Menu

With this device a menu appears at any time in a title.

• QHY Package

This package allows the designer to create a rectangle around a hotspot when it is aimed at.

Another feature offers the ability to select one quarter of the image and zoom in or “magnify” that area to full screen. This is especially interesting for maps or other images where more detail is needed.

• Run Length Package

This package adds pop-up images or small animations when a user moves a pointer into a hotspot region.

• Test Engine

The Test Engine is aimed at training and education by means of asking, responding and tracking test questions. In conjunction with String Variables and File Access Plug-Ins it is possible to store the tracking information in non-volatile RAM or on a floppy disk or hard drive.

• File Access

File Access is useful to read information from, write information to, and make limited string searches in files.

• Kiosk Plug-In Package (New Price, New Contents)

Includes: Menu Manager and Virtual Keyboard

This plug-in requires String Variable Plug-In. Menu manager allows the designer to make a title that can help the user to avoid travelling down the same path accidentally. It can offer additional guidance to insure that the title is navigated with the minimum frustration. The Virtual Keyboard allows the user to enter textual information without the need for an external keyboard. Popular uses are entry of names, identification or test answers.

Ask PIMC Sales or your local distributor for details and pricing of these plug-ins and external devices.

Erik Beerten

■ Access to the Line Control Tables

Recent work on a disc brought to light a potential problem for other titles. The problem concerns the direct access of an application to system line control tables (LCTs). There is a problem when the application relies on a fixed address for the LCT. To rely on a fixed address for the system LCTs is not green.

With new players the address is different. Titles with the problem will crash on players with system software CD-RTOS 1.1.2 or later. Related players are the 470,615,740 and later players.

In chapter V paragraph 4.5.1 of the Green Book, you will find a description of the buffering system which is still the safest way to access the LCTs.

Neil Kenneally

■ I²M Authoring board versus I²M playback board

The recently released I²M playback board has many features in common with the I²M authoring board. However, some important differences between both boards (except for the price) makes it impossible to interchange them.

The Authoring board is used for developing titles while the playback board can only play the titles.

Both boards are delivered with the same software, but more features are offered when the authoring board is installed.

The software checks which of the two board is installed.

Only the Authoring board is capable of running in CD-RTOS mode. This mode is necessary to create CD-i applications using authoring tools like MediaMogul™. Due to these applications, a regular computer on which an authoring board is installed offers the same possibilities as the much more expensive Philips 605 player as emulator for CD-i authoring.

The playback board as well as the authoring board can run in CD-i mode for playing titles from disc or through emulation of a disc image from a hard disc or over a network.

In CD-i mode, both boards can preview Digital Video, Video-CD and MPEG-1 Real Time Files. CD-i IFF audio and video files can only be previewed by the Authoring board.

Both boards can emulate a CDDA disc image, but none of them are capable of playing a CDDA disc.

The output of these boards can be connected to NTSC or PAL televisions with composite or RGB inputs. The stereo audio output can also be linked to a television or other audio playback equipment. The boards also offers a CD-i compatible serial I/O port.

The system's CD-ROM player however must be CD-i compatible (Mode 2).

Edwin Verjans

Feature	Authoring	Playboard
CD-RTOS mode	Yes	No
CD-i mode	Yes	Yes
Preview	Yes	only MPEG
Emulation of discimage from Harddisk/Server	Yes	Yes
CPU speed	Variable	Fixed
NVRAM	8Kb or 32 Kb	Fixed

■ Using soundmaps in Balboa

Here's a quick starter for using soundmaps in Balboa. I recommend not experimenting with the

priority parameter of `bam_queue_sm()`, the priority mechanism isn't implemented.

The following sample code is used for initialising, loading and playing a soundmap.

Continued on page 11

```
/* Constant Definitions */
#define AUDIO_SIZE 72
#define ATTENUATION 0x00800080

/* Global Variables */
char *pSoundBuffer; /* Pointer to buffer for audio data */
int lAudioDev; /* Path Id to the audio device */
int lSmmapId; /* Soundmap Id returned by sm_creat() */

int fInit(argc, argv)
int argc;
char *argv[];
{
...
...

/*
 * Initialize the audio manager. Set attenuation to full volume left-to-left
 * and right-to-right.
 */

lAudioDev = bam_init (ATTENUATION);

/*
 * Create a soundmap
 */

lSmmapId = sm_creat(lAudioDev,D_MONO,AUDIO_SIZE*18,&pSoundBuffer);
if (lSmmapId == SYSERR)
{
    fMyError("sm_creat()");
}
...
...

/*
 * And finally set up a buffer for the soundmap.
 */

(void) pml_add_buffer(CHANNEL(AUDIO_CHANNEL),AUDIO_TYPE,AUDIO_SIZE,
    pSoundBuffer,NULL,NULL,DISPATCHED);
...
...
}

fHotHandle()
{
...
...

/*
 * Play a soundmap, then reactivate the hotspot tree
 */

bam_queue_sm(lSmmapId,1,ft09Enable,NULL,DISPATCHED);
...
...
}
```

Note the special technique by which one can circumvent difficulties which can occur when soundmaps are created with implicit malloc's.

You can create a soundmap with the size of 1 soundgroup, and then afterwards change the `smd_smaddr` and `smd_smsize` of the soundmap descriptor (see the `sm_info` call) to your own allocated memory for the soundmap.

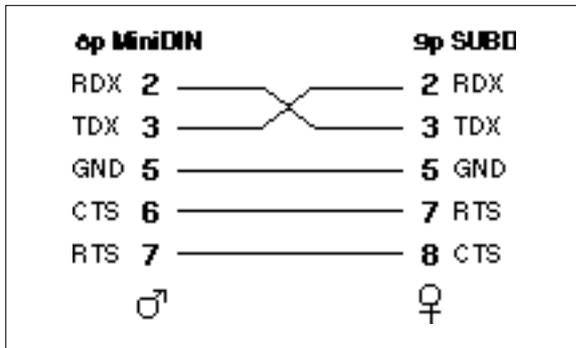
By using this procedure you cannot avoid the implicit malloc's, but it certainly gives you a better control of your memory-management.

Rudi Verslegers

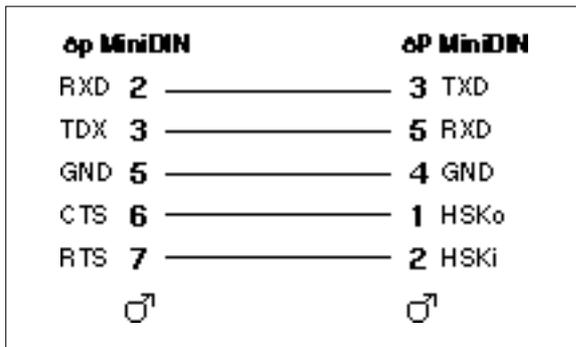
Serial connections

Have you ever experienced a problem connecting equipment? In most cases you only have the cable you don't need at the moment. These 'do-it-yourself' schematics will help you making the right connection:

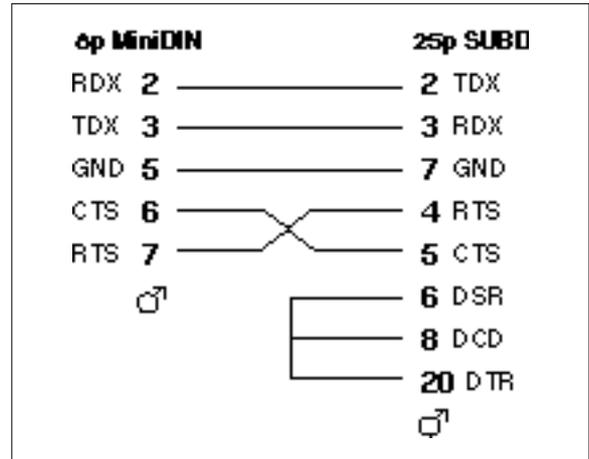
• CD-i consumer player ↔ PC



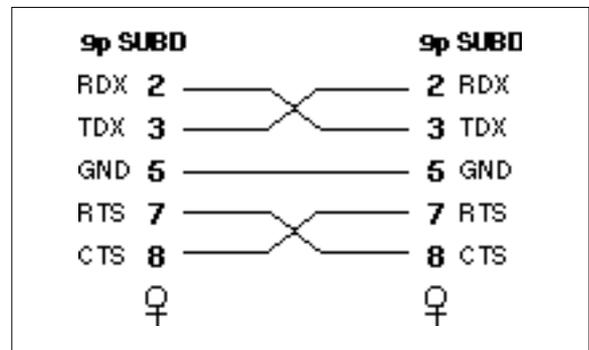
• CD-i consumer player ↔ MAC



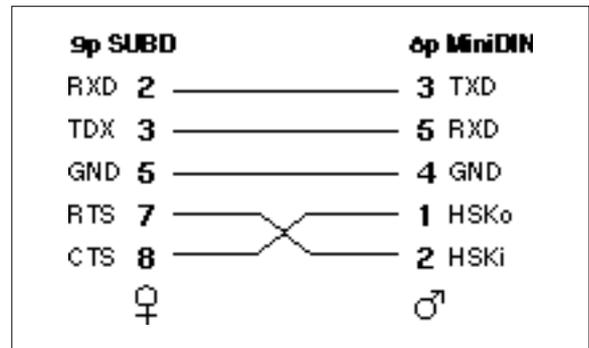
• CD-i consumer player ↔ SUN



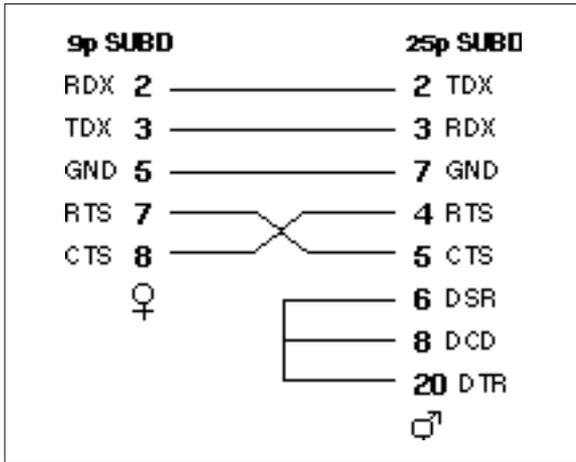
• CD-i 605 development player (P3) ↔ PC



• CD-i 605 development player (P3) ↔ MAC

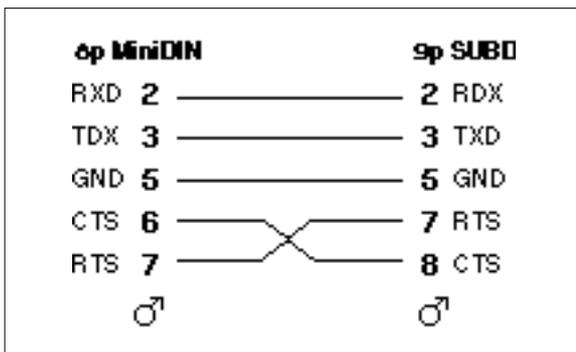


• **CD-i 605 development player (P3) ↔ SUN**

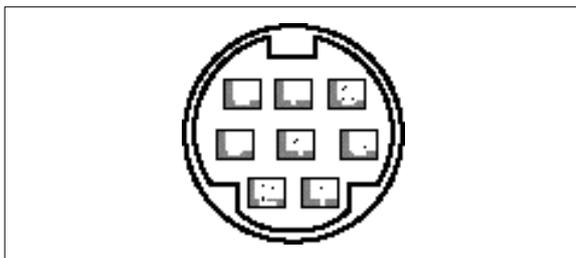


When you have the cables for the development player but want them to use with a consumer player, the following adaptor will make a 'consumer' cable from the 'developer' cable:

• **CD-i consumer player ↔ adaptor**



The female 8 pins MiniDIN on the CD-i consumer player has the following layout, seen from the front:



■ How to contact PIMC

• **PIMC SUPPORT EMAIL**

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The Interactive Engineer

is a publication of Philips Interactive Media
Its purpose is to provide up-to-date information on CD-i technology to all supported developers and PIM software engineers.

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