CDGen: Making It Work

Overview
This document is intended to address common setup problems associated with CDGen. It is not meant to replace or supersede the existing CDGen documentation, but rather to supplement the somewhat scanty (and out of date) troubleshooting portion of the manual, particularly where installation is concerned. Subjects covered will include dealing with operating systems, differences relating to the Sony-approved burners, and setup problems related to the SCSI host adapters that may be utilized with CDGen. Some of this material may seem elementary, for that I apologize. The simple fact is that disc burning is often regarded as a menial task, and as such may get passed to a new engineer, or even some non-technical member of the team.

SCEA would like to encourage all developers, especially those with limited Playstation experience, to get as much practice with CDGen as possible. Burn the occasional data disc, and use that instead of the emulator or the PC file system. Not only will it make you more CDGen-friendly, but the more time you spend waiting for data to load from the CD, the more motivated you will be to write the fastest CD accessing code possible. Try to avoid falling into that "I've got to burn a disc for a meeting with my publisher tomorrow, and CDGen is wrecking my life!" mode that we see happen far too often. This guide could be regarded as a first line of defense against that happening.

Much of the information listed here has come as a direct result of the author's tech-support experience; most, if not all, of the CDGen problems handled by SCEA for the past year have crossed my desk. Having said that, allow me to make it clear that I make no claim to be "The CDGen Guru." I have no real knowledge of the inner workings of this tool, nor access to it's source code, nor insider info regarding future updates and/or replacements for it, nor anything else in that vein. While reading this document, if you see something you think is wrong, or that doesn't fit in with your experience, please do not hesitate to let me hear about it.

Windows 3.1 vs. Windows 95
The choice of operating system is largely dependent on which burner you possess, although if you are just starting out, your preferred OS could instead determine the choice of burner. If you have the CDW-900E, it is officially supported only under Windows 3.1. (There is a workaround, described later, but it seems to not always work, and it is not "officially supported") The next generation of burners, the CDU-920, CDU-921, and CDU-924, work equally well under either OS. More about the various burners to follow. The CDGen software will run correctly with either version of Windows. It should also be mentioned that Windows for Workgroups will also work, but Windows NT will not.

Different versions of CDGen
The latest (I'd hesitate to call it current, no updates in almost two years) version of CDGen is 1.30. There has been some demand recently for the previous version (1.10), in order to use the workaround method of getting Win95 and the 900 burner to work together. To the user, the two versions are largely identical. Version 1.30 "remembers" the contents of a field or two that the earlier version does not, so it follows that the format of the image files differs slightly between versions. The biggest difference is under the hood, 1.10 uses a specific DOS ASPI manager while 1.30 uses the Windows ASPI manager.

What's ASPI? It stands for Advanced SCSI Programming Interface. Commonly referred to as an ASPI layer, it allows applications to communicate with a wide variety of SCSI devices in a standard way, rather than in some hardware-specific fashion based on the type of host adapter present. This will become more of an issue in the following section.

Differences between burners
We'll take the CDW-900E first. It's a bulky, expensive, high quality, professional caliber unit. Its main benefit is that multiple units can be daisy-chained (with expensive and exceedingly difficult-to-find cables)

and the time spent burning is thereby reduced. Additionally, based upon my own non-scientific, seat-of-the-pants observations, the MTBF (if there is such a thing for CD cutters) of the 900 exceeds that of the later burners by at least a factor of five.

The main problem with the 900 is its age. The 900 preceded the ASPI standard. Although the 900 conforms to the standard somewhat, it is not fully compliant. It doesn't recognize the full range of SCSI commands thrown at it. This is the root of its problems with Win95. Win95's native ASPI layer is unable to communicate with the "stone age" 900 unit. This also hampers the burner's versatility: good luck getting it to work with any other software packages. Other quibbles with the 900 are its lack of speed—although it is capable of double speed, the corresponding failure rate is very high—and its cost.

The other supported burners (920,921,924) could easily be lumped together, they're that close to being identical (a 921 is recognized as a 920 by Win95, a 924 may be as well, I don't know). The advantages of these burners are that they are fully ASPI compliant (and so can be used with just about any software), they perform accurate double speed burns, and they are much less expensive than the 900. The downside is that they are much less robust than the 900, and they cannot be daisy-chained. Age is also a problem for these burners, in that none of them are currently in production. SCEA has recently stopped selling the 921 (the other models were not carried) because it cannot obtain any more.

SCSI host adapters

Basically, there are two flavors, both by Adaptec. As with operating systems, which one you use is sort of dependent on which burner you have. For a 900 burner, you will need a 1540 series ISA card. For the 921 and its ilk, either a 1540 series or a 2940 series PCI card will work. For each of these cards, the drivers, version numbers, and SCSISelect settings will be listed.

I have heard stories of other Adaptec cards working. I have personally talked to two developers who said that they had a 1520 working, but it suddenly stopped. I cannot confirm these stories. Only the two mentioned cards are officially supported. If you get some other card to work, more power to you. Send me some Email and tell me how you did it. But if it mysteriously quits working one day, and you call me for help, the first thing that I will tell you is to get an approved card. If you have a card you'd like me to check out, go ahead and send it in and I'll have a look, but please understand that I probably will not spend two hours with you on the phone trying to fix things, at least not with my usual pleasant demeanor.

A 1540 series card (1542CF and 1542CP are the models usually encountered) will need the DOS ASPI manager (aspi4dos.sys) loaded in the CONFIG.SYS file if it is being used with the 900 burner. The syntax is like so:

DEVICE=C:\SCSI\ASPI4DOS.SYS /D /P330

It should of course reflect any path differences in your setup. The /D switch will display status info, including the version number (which should be 3.34) as the ASPI layer loads. The /P is the port address of the card, which is configurable via a bank of dipswitches. Do not attempt to load this high.

If the 900 burner is not used, this call is not necessary. The Windows ASPI manager, WINASPI.DLL, will handle SCSI device communications. Windows 3.1 will not ascribe a version to this file, but Win95 will (please note that this file is NOT interchangeable between 3.1 and 95). It should be 4.00 or greater. Additionally, a Win95 machine will load a miniport driver, AHA154X.MPD, for the card as well. It should be version 1.15 or later.

The card will typically have the following settings in the SCSISelect utility. Most of them will have no effect on burning performance, with the exception of the DMA transfer rate, which could produce buffer overrun if was set to maximum, and Disconnection, which must be disabled for the CDU-924 to work properly.

Configuration:
       IRQ   <system specific>

DMA	\<system specific\>
SCSI ID	7
SCSI Parity Checking	Enabled
DMA Transfer Rate	5.0 MB/sec
Host Adapter Termination	Enabled

SCSI Device Configuration (for the burner ID)

Enable Sync Negotiation	no
Enable Fast SCSI	no
Enable Disconnection	yes

Options Listed Below Have NO EFFECT if the BIOS is Disabled

Send Start Unit Command	no

Advanced Configuration Options

Floppy Controller I/O Port (AHA-1542CF only)	\<system specific\>
Reset SCSI Bus At Power-On	Enabled

Options Listed Below Have NO EFFECT if the BIOS is Disabled

Host Adapter BIOS (Configuration Utility Reserves BIOS Space)	Enabled
System Boot Controlled by Host Adapter BIOS	Enabled
Extended BIOS Translation for DOS Drives > 1 GByte	Disabled
Support Removable Drives Under BIOS as Fixed Disks	Disabled
Dynamically Scan SCSI Bus for BIOS Devices	Disabled
BIOS Support For More Than 2 Drives (MS-DOS(R) 5.0 and above)	Disabled
BIOS Support For INT 13h Extensions	Disabled
BIOS Support For Bootable CD-ROMs	Disabled
Immediate Return On Seek Command	Enabled
Display \<Ctrl\>\<A\> Message During BIOS Initialization	Enabled

If you have a 2940 series card, it is assumed that you are using Win95, CDGen 1.30, and one of the later burners. If that is not the case, you've gone boldly where I have not gone before. That's not to say that you will definitely have problems; if you do, however, I'll need some time to duplicate your oddball system.

As before, the version of WINASPI.DLL should be 4.00 or greater. The miniport driver for this card is called AIC78XX.MPD. Version 2.11 or better should work fine. The increased performance of this card, especially the ultra wide variant, increases the likelihood of buffer overrun. In the SCSISelect utility, the maximum sync transfer rate should be set as low as possible. If this doesn't do the trick, it may be necessary to disable ultra SCSI speed. Here is what a burner-friendly setup might look like (different model cards will not have all of these fields):

SCSI Bus Interface Definitions

Host Adapter SCSI ID	7
SCSI Parity Checking	Enabled
Host Adapter SCSI Termination	Auto

SCSI Device Configuration: (for the recorder ID)

Initiate Sync Negotiation	No
Maximum Sync Transfer Rate	20
Enable Disconnection	Yes
Initiate Wide Negotiation	No

Options Listed Below Have NO EFFECT if the BIOS is Disabled

Send Start Unit Command	No
Include in BIOS Scan	Yes

Advanced Host Adapter Configuration:

Plug and Play SCAM Support	Disabled
Reset SCSI Bus at IC Initialization	Enabled

Options Listed Below Have NO EFFECT if the BIOS is Disabled

Host Adapter BIOS (Configuration Utility Reserves BIOS Space)	Enabled
Support Removable Drives Under BIOS as Fixed Disks	Disabled
Extended BIOS Translation for DOS Drives >1	Enabled
Display <Ctrl><A> Message During BIOS Initialization	Enabled
Multiple LUN Support	Disabled
BIOS Support for Bootable CD-ROM	Disabled
BIOS Support for Int 13 Extensions	Enabled
Support for Ultra SCSI Speed	Disabled

If you use the UW controller, you CANNOT use all three ports at the same time.

Also check the following in the system:

In Device Manger, CD-Recordable/WORM, settings tab for recorder:
Disable Sync Data Transfer
Enable Disconnect

Common Problems
Condition: Error message "Cannot find the SCSI device driver"

There are a couple of things that could cause this. If your setup is using a 900 burner, this means that ASPI4DOS.SYS is not loading properly. Be sure to use the /D switch, and watch your boot screen carefully. Some sort of message should appear giving clues to what is wrong.

Another likely culprit is a corrupt/incorrect/missing miniport driver for the host adapter. Verify that your miniport driver exists—look in \windows\system\iosubsys\. If it's there, right click on it, select properties, then click on the version tab. For the ISA card, it should be 1.15 or later. For the PCI card, it should be version 2.11 or later.

Condition: Error messages "SCSI host adapter is incorrect"

This is another message that applies to more than one problem. The most literal meaning is that there is no approved host adapter present in the machine. However, the most probable cause is that you're using the original version of WINASPI.DLL on your Win95 machine. Installing EZ-SCSI 4.0, or visiting Adaptec's web site for the latest file should get things back on track.

Condition: CDGen locks up when the "REC" button is clicked

Make sure your hard drive has enough free space to allow CDGen to make temporary files. The general rule of thumb is 1MB of space is needed for every 4000 files on the disc image.

Check to see that your RECLOG.TXT has not become corrupted, and/or incredibly large. If Notepad won't open it, chances are neither will CDGen. You can delete this file with impunity.

One of the application files may be corrupted. Delete the folders associated with CDGen, and do a fresh install.

Condition: "Verify" often fails

If you are using a 900 burner, perform all crucial burns (and verifies) at single speed.

Be sure to use a high quality media. Tiptoe around the burner when it is active. Place it on a heavy table or desk that is less susceptible to shaking.

Check the RECLOG.TXT for any messages that indicate write errors. If present, it may be an indication that your burner is in need of calibration.

Avoid switching applications while CDGen is running. Don't do anything that requires accessing the source hard drive. Disable any screensaver, or set the activation time to something greater than the typical burn time.

Condition: When cutting a disc, the burner hangs during/just after writing the lead-in

This is been seen only on the 921, and has several possible causes. Here are the possible fixes, in ascending degrees of pain:

Update the pertinent miniport driver to the version listed above. While you're at it, update the Win95 ASPI manager as well.

Check the SCSISelect settings for your host adapter. If the transfer rate is too high, a buffer overrun condition could occur, leading to just this sort of occurrence.

Win95 sees the burner as a CD-ROM drive. This is probably the most common cause. Some versions of certain CD mastering packages (Easy CD Pro, CD Creator, possibly others) install drivers that treat the 921 as a CD-ROM drive. This is generally bad news for CDGen, as Win95 regularly tries to update the status of its currently available drives. Perhaps the other applications trap this somehow, but CDGen does not. The end result is a wasted disc. I've talked to one person who said that simply disabling Auto Insert Notification fixed things, but that has yet to work for me. The way I've gone about fixing it is to delete the offending drivers, CDR4VSD.VXD and (if present) CDRASPI.VXD. It may also be necessary to remove the burner from the list of CD-ROM drives in Device Manager. After rebooting the system, CDGen should work fine.

It may be that your burner is in need of repair or adjustment. Check your RECLOG.TXT for indications of this. If you have other mastering software, see if it can make the burner work. If you happen to have another burner in a working setup, try swapping them and see if the problem follows the burner.

Avoiding More Trouble

CDGen is sometimes difficult to get up and running. Once it is successfully installed, it performs consistently and reliably—in the absence outside stimuli. The proper care and feeding of CDGen is not meant to include a lot of drastic changes. Everyone reading this document should sincerely ask themselves the following questions: How much potential damage could be done to my project if this burner setup was to suddenly quit working? Does everyone who currently has access to this burner *really* need it? Piracy issues aside, should my colleagues and I pile up so many hours on this burner by pumping out copies of all the latest releases? Couldn't I just as easily archive all of my junk on a couple of those nifty Jazz cartridges?

When you get CDGen working properly, *don't mess with it!* The best thing to do is to set it up on some old orphaned machine that you have no other use for. This will make the temptation to upgrade and/or tinker easier to resist. For example, here at SCEA Tech Support the general purpose burning station is an ancient 486/66 with an extra hard drive. Nobody could possibly want it for anything else, and as a result it is almost never disturbed.

In addition to curbing your own urges, you must attempt to deny your coworkers' as well. This is easy if you have your own burner sitting on your desk, but if it's out in some community area, it becomes more problematic. There's always someone wanting save the various incarnations of 'cha-cha baby' for posterity, or assemble the cool collection of polka .WAV's they downloaded at lunch into one easy-to-carry package. Do what you can to discourage these people—plead, threaten, whine to your boss, whatever it

takes. Each non-essential person that uses the machine increases the chance of some wrench being dropped into the works.

One way to keep the traffic down is to make the burner more difficult to use. To that end, if at all possible, do not put any other CD mastering software on the machine. CDGen is not the most user- friendly bit of software ever devised. If it takes more than a few mouse clicks to burn an original or make a copy, odds are that the casual user will be discouraged and give up. This also may serve to reduce your own frivolous "recreational" use of the burner.

Additional Topics

What's the ideal burn setup?

For the 900 burner, an Adaptec 1542CF, Windows 3.1, and CDGen 1.30. For the 921 burner, an Adaptec 2940, Windows 95, and CDGen 1.30. These are the most solid setups in my opinion. As far as the PC end of it goes, any old box will do, as long as it has at least a 486, 16MB RAM, and a 1GB hard drive. Once again, I would recommend using some machine at or near its retirement. Ordering up a DellWay WhizBang 6000 with all the trimmings may be more exciting, but it's far more likely that some new cutting-edge "feature" will make life tough for CDGen.

Using the 900 burner with Win95

This has been posted a couple times already in the newsgroups. A couple of things to bear in mind before you proceed. You *must* have a 1540 series card for it to work. Most importantly, this method is *not officially supported by SCEA*. It is listed here as an interesting alternative to the standard techniques. If you choose to try it, and have trouble as a result, no heroic measures will be taken by Tech Support to drag you from the fire. It will be more along the lines of "try these three things, if that doesn't work, go back to Win 3.1." Most of the people who have tried it have had good luck, but a couple have been unable to make it work. This may be related to differences in OSR 2 (a.k.a. Win95 B) which both of the unlucky souls happened to be using, but as I haven't had the time to test it out I could not say for certain.

Here are the easy to follow steps:

1. Make sure the SCSI chain is in the following order: MACHINE-----SCSI HARD DRIVE-----900
If it's not a SCSI hard drive, make sure it's a fast IDE drive, since Win95 will slow it down a bit.

2. Start Win95 and make sure that it can see the 900.

3. Disable the WIN95 native SCSI device manager.
   Open Control Panel
   Open System
   Open Device Manager Tab
   Expand SCSI controller
   Select SCSI host adapter
   Uncheck the "Original Configuration" box in the Device usage box

4. Go to DOS

5. Add the following line to the CONFIG.SYS:
   device=aspi4dos.sys
Add the path and any command line switches if needed.

6. Reboot Windows.

7. Check the Win95 SCSI device manager again. A message should be displayed that says the SCSI devices are not running optimally. This is because it is running in 16-bit mode, and not 32-bit mode.

8. Check to see that it still recognizes the 900 and the hard drive.

9. Run CDGen

Things to do before you call Tech Support
Read this document. Ensure that your setup conforms in every possible way to the settings listed here.

Do a fresh install of the CDGen software. This has solved more mysteries than I can count.

Have the following information handy. You may have to reboot your machine a few times; some of the info is only visible during the startup screens. This is the first batch of questions I'll ask:

Win95 or 3.1
If Win95, is it OSR 2 (Version 4.00.950 B shown in System Properties)
What Adaptec card you have
What burner are you using
Which version of CDGen are you running
Does your system boot from a SCSI or IDE drive
If you have an IDE CD ROM drive in your system, does it emulate a SCSI drive?
Are there multiple host adapters in your system (such as one on the motherboard and one or more cards)?
If it is enabled, what version of EZ-BIOS (visible at boot) you have
What version of EZ-SCSI tools you have
What version of WINASPI.DLL you have
What version of AIC78XX.MPD (2940 series card) or AHA154X.MPD (1540 series card) you have
If Win95, how is 921 shown in device manager:
        CD-Recordable/WORM, Other Device, CD ROM, or not shown at all
Does the device list shown by SCSI Explorer show everything as you think it should
What is the exact error message you are seeing
Have you attempted or completed a burn using another computer/software combination

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