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With a foreword by Marc Laidlaw

HACK
#52

Hack the Dreamcast Visual Memory Unit

Play homebrew games on Dreamcast's LCD-toting memory card.

One of the more unique aspects of the Sega Dreamcast is the visual memory unit, a 128-KB memory card with a 48×32 resolution LCD monochrome screen. The VMU has clever uses for memory card management (you can manipulate and delete saves without plugging it into a Dreamcast and even connect two memory cards to trade saves), but we're really interested in it for its ability to store games. It comes with a battery and built-in controls (a D-pad minicontroller and two buttons), so you can play standalone games using it, even though it normally plugs into your Dreamcast controller.

Basically, the device resembles a teeny tiny Nintendo Game Boy. As such, it's eminently hackable.

VMU History

The VMU, also known as the Visual Memory System (VMS) in the United States, never reached its full potential during the height of the Dreamcast's popularity. If connected to your Dreamcast controller, it would sometimes show the game, logo, vital statistics, or other information while playing games. Some multiplayer games provided personal data, hidden from your opponents.

You can also use standalone VMU games with a few commercial titles. Games such as *Power Stone* use standalone VMU games intriguingly. Sega's *Sonic Adventure* is particularly interesting because it allows you to grow a cute-looking Chao creature on your VMU and then import this data into the Dreamcast game. There were also several official VMU games downloadable from the Internet via the Dreamcast's web browser, for titles such as Namco's excellent fighting game *Soul Calibur*. However, with the Dreamcast's cancellation and the homebrew scene's interest, the VMU has seen significant and interesting independent development efforts.

Acquiring Your VMU

As discussed previously, you should be able to find a Dreamcast VMU for anywhere between \$5 and \$10 at your local specialty game store or on eBay. They come in a variety of fetching colors, with even limited-edition VMUs sporting *Godzilla* and *Sonic Team* themes. White and transparent are the most common colors, so don't spend too much time collecting. Just pick one up.

When you track down a VMU, whether bought in the store or unearthed in the closet, you may find that its batteries have died. The unit takes two CR2032 lithium batteries, also found in watches and cameras, so it's easy to track down replacements for around \$5 for the pair. Just remove the small screw holding on the back compartment and replace the batteries to return your VMU to fighting shape.

Arming Your VMU

Transferring files from your PC to your Dreamcast may not be exactly straightforward. You have several possible choices:

Hop online

If you can browse the Web from your Dreamcast (“Use Your Dreamcast Online” [Hack #54]), simply type—the Dreamcast keyboard is an optional and handy extra here!—a relevant URL, such as <http://www.rockin-b.de/vm/VM-downloads.htm>, and then click on the DC links to download VMU games directly to your memory card.

The advantage of this method is that you don't need to burn CDs to manipulate VMU games. A major disadvantage is that you'll need to take your Dreamcast online somehow, which probably means you need a dial-up ISP or an ultra-expensive Dreamcast broadband adaptor.

XDP for fun and VMU profit

A simple if dubious method for acquiring VMU saves is to burn a disc of the XDP Standalone utilities and web browser package from the Psilocybin Dreams site (<http://www.psilocybindreams.com>).

Click one of the browser options to reach the main menu, then use the digital controller to choose the Menu option. Finally, choose the VMU Mini Games option to see a web page (as if you were actually online) that includes over 30 freeware, freely distributable VMU games. This includes the vast majority of the games we'll talk about in the next section. However, the disc also contains highly customized versions of Dreamcast browser software that, while possibly being abandonware in some abstract sense, the developers may not have permission to distribute. Bear this in mind before downloading.

This solution works because the developers burned an offline web page and a web browser onto the same disc, so it's a little like you're online.

VMU copy

The final, incomplete solution unfortunately works only for vanilla VMU data saves right now, not VMU games. This comes in the form of a downloadable utility called VMUCopy, available at <http://ljsdcdev.sunsite.dk/dl.php>. VMUCopy allows you to burn up to 19 VMU saves

into a `VMUFILES` directory on a disc image alongside the `VMUCopy` executable (called `1st_read.bin`). If you then use a boot disc such as `DCHakker` and swap in your `VMUCopy` disc, you can run `1st_read.bin` and then use the up/down directions on the joypad and the A button to upload them to your VMU (see “Burn Dreamcast Homebrew Discs” [Hack #57]).

While this option is excellent if you have normal Dreamcast save games that you’d like to transfer to your Dreamcast without going online and grabbing them, there’s currently no functionality to detect if a save is actually a VMU game, so VMU game support is broken. Perhaps this will change in the future, though.

Do you think you’re a hardcore programmer capable of creating your own VMU games from scratch? It’s definitely possible, but it won’t be easy. Start with the VMU Development page at <http://www.maushammer.com/vmu.html>.

This site provides info on a VMU assembler, available in Windows, Linux, and even Amiga (!) flavors. However, VMU development has poor documentation and requires assembly code, so it’s hardly straightforward. Also bear in mind that some of the interest in the Dreamcast VMU scene started to die out when the DC began to fade, so many of these pages have fallen into disarray in recent years.

To aid you in your programming task, and heck, even to run the previously mentioned VMU games on your PC as a test, download a PC emulator that claims to emulate the VMU. This should be handy if you want to check ongoing development. However, both the Windows-based VMU emulators, `DirectVMS` (<http://www.dcemulation.com/emu-directvms.htm>) and `SoftVMS` (<http://www.dcemulation.com/emu-softvms.htm>), seem to crash with some regularity on the most recent versions of Windows. You may have better luck with a Mac OS port of `SoftVMS` (<http://www.bannister.org/software/softvms.htm>).

Finally, if you want to know anything else about the VMU, the VMU FAQ at <http://vmu.maushammer.com/faq.html> is an extremely useful document that explains many common problems, from how to reset your VMU to animation constraints. However, please bear in mind that its writing preceded the discovery of self-booting methods for burning Dreamcast-compatible CDs, so it doesn’t cover any of the self-boot options for running VMUs.

Choosing the Best VMU Games

After you've successfully downloaded a VMU game onto your memory card, you can access it by removing your memory card from its berth in the Dreamcast controller. Press the Mode button on the controller until the playing-card icon flashes, then press the A button to enter the VMU game.

Please note that you can have only one VMU game on your memory card at a time, although you can also store multiple Dreamcast non-minigame saves. The VMU has no multiboot concept; you can't select between multiple games. VMU games may use up to 128 blocks (the official maximum), so you also need to ensure you have enough space, even if the new VMU game writes over the old one.

However, separating the quality games from the mere demos can be tricky when it comes to playable VMU titles. Frankly, it's fun to download everything because the entire VMU pantheon is limited to tens of titles. You can make your own decisions then. If you'd like to do that, you might want to check out the following:

Rockin B's VMU page

This excellent page has quality ratings for each title, with careful picks and even screenshots of the better VMU titles. Because there's no concept of copy protection for VMU titles, it's very clear which are commercial and which are noncommercial VMU games. This page has no commercial VMU titles. See <http://www.rockin-b.de/vm/VM-downloads.htm>.

PlanetWeb's VMU site

The people behind the PlanetWeb browser for the Dreamcast still have their page up. It includes a few VMU minigames and massive amounts of VMU animations and normal Dreamcast save games, in conjunction with the fan site Booyaka. Visit <http://dreamcast.planetweb.com/vmul/>.

DCEmulation's VMU Games

Although it lumps everything together, this resource has some interesting VMU games of various kinds, from the sublime to the ridiculous. Learn more at <http://www.dcemulation.com/covers/index.cgi?browse&Vmu%20Games>.

If I had to pick some homebrew VMU games you should check out because they're wacky, weird, cool, or any of the above, they'd be the following:

Alien Fighter by Soren Gust

This is an excellent vertically scrolling shooter with sound, a saved high score, addictive old-school gameplay, and all the bells and whistles that come with low-resolution black-and-white VMU fun!

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Glucky Labyrinth by Omar Cornut

This game is a fine attempt at a DOOM-style 3D maze game, with chests to open, levels to ascend, and smooth-scrolling 3D dungeons to traverse—impressive on such a limited piece of hardware.

Snaky by Anonymous

This classic game featuring the snake with the ever extending tail that the player mustn't bump into, is fairly straightforward but still plenty of fun. It also features a high-score table for your greatest slithers.

Minesweeper by Soren Gust

You all probably know and have suffered inadvisable addictions to the Minesweeper-style game. This is an excellent version, complete with both sound and save games.

You can download these and others (shown in Figure 5-4) from the Rockin B site.



Figure 5-4. Title screens