NAME
altera_sdcard - driver for the Altera University Program Secure Data Card IP Core

SYNOPSIS
device altera_sdcard

In */boot/device.hints*:
hint.altera_sdcardc.0.at="nexus0"
hint.altera_sdcardc.0.maddr=0x7f008000
hint.altera_sdcardc.0.msize=0x400

DESCRIPTION
The **altera_sdcard** device driver provides support for the Altera University Program Secure Data Card (SD Card) IP Core device. A controller device, altera_sdcardcX, will be attached during boot. Inserted disks are presented as disk(9) devices, altera_sdcardX, corresponding to the controller number.

HARDWARE
The current version of the **altera_sdcard** driver supports the SD Card IP core as described in the August 2011 version of Altera's documentation. The core supports only cards up to 2G (CSD 0); larger cards, or cards using newer CSD versions, will not be detected. The IP core has two key limitations: a lack of interrupt support, requiring timer-driven polling to detect I/O completion, and support for only single 512-byte block read and write operations at a time. The combined effect of those two limits is that the system clock rate, HZ, must be set to at least 200 in order to accomplish the maximum 100KB/s data rate supported by the IP core.

SEE ALSO
disk(9)

Altera University Program Secure Data Card IP Core, *Altera Corporation - University Program*, ftp://ftp.altera.com/up/pub/Altera_Material/11.0/University_Program_IP_Cores/Memory/SD_Card_Interface_for_SoPC August 2011.

HISTORY
The **altera_sdcard** device driver first appeared in FreeBSD 10.0.

AUTHORS
The **altera_sdcard** device driver and this manual page were developed by SRI International and the University of Cambridge Computer Laboratory under DARPA/AFRL contract (FA8750-10-C-0237) ("CTSRD"), as part of the DARPA CRASH research programme. This device driver was written by Robert N. M. Watson.

BUGS

altera_sdcard contains a number of work-arounds for IP core bugs. Perhaps most critically, **altera_sdcard** ignores the CRC error bit returned in the RR1 register, which appears to be unexpectedly set by the IP core.

altera_sdcard uses fixed polling intervals are used for card insertion/removal and I/O completion detection; an adaptive strategy might improve performance by reducing the latency to detecting completed I/O. However, in our experiments, using polling rates greater than 200 times a second did not improve performance.

altera_sdcard supports only a nexus bus attachment, which is appropriate for system-on-chip busses such as Altera's Avalon bus. If the IP core is configured off of another bus type, then additional bus attachments will be required.