

**NAME**

**at45d** - driver for DataFlash(tm) non-volatile storage devices

**SYNOPSIS**

To compile this driver into the kernel, place the following line in your kernel configuration file:

```
device at45d
```

Alternatively, to load the driver as a module at boot time, place the following line in loader.conf(5):

```
at45d_load="YES"
```

**DESCRIPTION**

The **at45d** driver provides support for the family of non-volatile storage devices known collectively as DataFlash(tm). DataFlash chips typically have part numbers beginning with AT45DB. The **at45d** driver supports only the SPI bus versions of each AT45DB device, indicated by the last digit of the part number being 1 or 2.

The **at45d** driver uses opcode 0x9f to read the manufacturer and device ID data to determine whether the device is supported. The device ID is looked up using a table of data within the driver which describes the attributes of each supported device, such as block size, sector size, and device capacity. When a supported device is found, the **at45d** driver creates a disk device and makes it accessible at */dev/flash/at45d?*. The new disk device is then tasted by the available geom(4) modules as with any disk device.

**HARDWARE**

The **at45d** driver provides support for the following devices:

- ⊕ AT45DB011B
- ⊕ AT45DB021B
- ⊕ AT45DB041x
- ⊕ AT45DB081B
- ⊕ AT45DB161x
- ⊕ AT45DB321x
- ⊕ AT45DB321x
- ⊕ AT45DB641E
- ⊕ AT45DB642x

**FDT CONFIGURATION**

On an fdt(4) based system, the **at45d** device is defined as a slave device subnode of the SPI bus

controller node. All properties documented in the *spibus.txt* bindings document can be used with the **at45d** device. The most commonly-used ones are documented below.

The following properties are required in the **at45d** device subnode:

*compatible*

Must be the string "atmel,at45".

*reg* Chip select address of device.

*spi-max-frequency*

The maximum bus frequency to use when communicating with this slave device. Actual bus speed may be lower, depending on the capabilities of the SPI bus controller hardware.

The following properties are optional for the **at45d** device subnode:

*freebsd,sectorsize*

The sector size of the disk created for this storage device. It must be a multiple of the device's page size. The default is the device page size.

*spi-cpha*

Empty property indicating the slave device requires shifted clock phase (CPHA) mode.

*spi-cpol*

Empty property indicating the slave device requires inverse clock polarity (CPOL) mode.

*spi-cs-high*

Empty property indicating the slave device requires chip select active high.

## HINTS CONFIGURATION

On a device.hints(5) based system, such as MIPS, these values are configurable for **at45d**:

*hint.at45d.%d.at*

The spibus the **at45d** instance is attached to.

*hint.at45d.%d.clock*

The maximum bus frequency to use when communicating with this device. Actual bus speed may be lower, depending on the capabilities of the SPI bus controller hardware.

*hint.at45d.%d.cs*

The chip-select number to assert when performing I/O for this device. Set the high bit ( $1 \ll 31$ ) to invert the logic level of the chip select line.

*hint.at45d.%d.mode*

The SPI mode (0-3) to use when communicating with this device.

*hint.at45d.%d.sectorsize*

The sector size of the disk created for this storage device. It must be a multiple of the device's page size. The default is the device page size.

## FILES

*/dev/flash/at45d?* Provides read/write access to the storage device.

*/dev/flash/spi?* An alias for the */dev/at45d?* device, for backwards compatibility with older versions of the driver.

## SEE ALSO

fdt(4), geom(4)

## HISTORY

The **at45d** driver first appeared in FreeBSD 6.0.