NAME

fd, fdc – drivers for floppy disks and floppy disk controllers

SYNOPSIS

SPARC

/dev/diskette0
/dev/rdiskette0

x86

/dev/diskette[0-1]
/dev/rdiskette[0-1]

DESCRIPTION

The **fd** driver provides the interfaces to the floppy disks using the Intel 82072 on sun4c systems and the Intel 82077 on sun4m and sun4u systems.

The **fd** and **fdc** drivers provide the interfaces to floppy disks using the Intel 8272, Intel 82077, NEC 765, or compatible disk controllers on x86 systems.

The default partitions for the floppy driver are:

- **a** All cylinders except the last
- **b** Only the last cylinder
- **c** Entire diskette

The **fd** driver autosenses the density of the diskette.

When the floppy is first opened the driver looks for a SunOS label in logical block 0 of the diskette. If attempts to read the SunOS label fail, the open will fail. If block 0 is read successfully but a SunOS label is not found, auto-sensed geometry and default partitioning are assumed.

The **fd** driver supports both block and raw interfaces. The block files access the diskette using the system's normal buffering mechanism and may be read and written without regard to physical diskette records. There is also a “raw” interface that provides for direct transmission between the diskette and the user's read or write buffer. A single **read**(2) or **write**(2) call usually results in one I/O operation; therefore raw I/O is considerably more efficient when many words are transmitted.

3.5" Diskettes

For 3.5" double-sided diskettes, the following densities are supported:

SPARC

1.7 Mbyte density	80 cylinders, 21 sectors per track, 1.7 Mbyte capacity
high density	80 cylinders, 18 sectors per track, 1.44 Mbyte capacity
double density	80 cylinders, 9 sectors per track, 720 Kbyte capacity
medium density	77 cylinders, 8 sectors per track, 1.2 Mbyte capacity (sun4m and sun4u only)

x86

extended density	80 cylinders, 36 sectors per track, 2.88 Mbyte capacity
1.7 Mbyte density	80 cylinders, 21 sectors per track, 1.7 Mbyte capacity
high density	80 cylinders, 18 sectors per track, 1.44 Mbyte capacity
double density	80 cylinders, 9 sectors per track, 760 Kbyte capacity
medium density	77 cylinders, 8 sectors per track, 1.2 Mbyte capacity (requires appropriate hardware; see **NOTES**)

5.25" Diskettes

For 5.25" double-sided diskettes, the following densities are supported:

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5.25" diskettes are not supported.

x86

high density	80 cylinders, 15 sectors per track, 1.2 Mbyte capacity
double density	40 cylinders, 9 sectors per track, 360 Kbyte capacity
double density	40 cylinders, 8 sectors per track, 320 Kbyte capacity
quad density	80 cylinders, 9 sectors per track, 720 Kbyte capacity
double density	40 cylinders, 16 sectors per track (256 bytes per sector), 320 Kbyte capacity
double density	40 cylinders, 4 sectors per track (1024 bytes per sector), 320 Kbyte capacity

ERRORS

EBUSY During opening, the partition has been opened for exclusive access and another process wants to open the partition. Once open, this error is returned if the floppy disk driver attempted to pass a command to the floppy disk controller when the controller was busy handling another command. In this case, the application should try the operation again.

EFAULT An invalid address was specified in an ioctl command (see **fdio**(7I)).

EINVAL The number of bytes read or written is not a multiple of the diskette's sector size. This error is also returned when an unsupported command is specified using the **FDIOCMD** ioctl command (see **fdio**(7I)).

EIO During opening, the diskette does not have a label or there is no diskette in the drive. Once open, this error is returned if the requested I/O transfer could not be completed.

ENOSPC An attempt was made to write past the end of the diskette.

ENOTTY The floppy disk driver does not support the requested ioctl functions (see **fdio**(7I)).

ENXIO The floppy disk device does not exist or the device is not ready.

EROFS The floppy disk device is opened for write access and the diskette in the drive is write protected.

x86 Only

ENOSYS The floppy disk device does not support the requested ioctl function (**FDEJECT**).

CONFIGURATION

x86

The driver attempts to initialize itself using CMOS configuration memory for floppy drive size and capacity. This information in the file **/platform/i86pc/kernel/drv/fd.conf** needs to be edited only if more than two floppy drives are installed, or if a 3D mode (760 KB, 1.2 MB and 1.44 MB) 3.5" floppy drive exists.

```
name="fd"  parent="fdc"  unit=0  mode_3D=0;
name="fd"  parent="fdc"  unit=1  mode_3D=0;
```

FILES

/platform/*platform-name***/kernel/drv/fd**	driver module. *platform-name* can be found using the –**i** option of **uname**(1).
/usr/include/sys/fdio.h	structs and definitions for floppy disk I/O

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/usr/include/sys/fdreg.h	structs and definitions for floppy disk controllers
/usr/include/sys/fdvar.h	structs and definitions for floppy disk drivers
/dev/diskette0	device file (same as **/dev/diskette**)
/dev/rdiskette0	raw device file (same as **/dev/rdiskette**)
/vol/dev/diskette0	directory with volume manager device file
/vol/dev/rdiskette0	directory with volume manager raw device file
/vol/dev/aliases/floppy0	symbolic link to the entry in **/vol/dev/rdiskette0**
/dev/fd0[a-c]	block file (for ucb compatibility)
/dev/rfd0[a-c]	raw file (for ucb compatibility)

x86

/platform/i86pc/kernel/drv/fd.conf	configuration file for floppy driver
/platform/i86pc/kernel/drv/fdc	floppy-controller driver module
/platform/i86pc/kernel/drv/fdc.conf	configuration file for the floppy-controller
/usr/include/sys/fdc.h	structs and definitions for x86 floppy devices
/usr/include/sys/fdmedia.h	structs and definitions for x86 floppy media
/usr/include/sys/fd_debug.h	definitions for debugging x86 floppy media
First Drive:	
/dev/diskette0	device file (same as **/dev/diskette**)
/dev/rdiskette0	raw device file (same as **/dev/rdiskette**)
/vol/dev/diskette0	directory with volume manager device file
/vol/dev/rdiskette0	directory with volume manager raw device file
/vol/dev/aliases/floppy0	symbolic link to the entry in **/vol/dev/rdiskette0**
/dev/fd0[a-c]	block file (for ucb compatibility)
/dev/rfd0[a-c]	raw file (for ucb compatibility)
Second Drive:	
/dev/diskette1	device file
/dev/rdiskette1	raw device file
/vol/dev/diskette1	directory with volume manager device file
/vol/dev/rdiskette1	directory with volume manager raw device file
/vol/dev/aliases/floppy1	symbolic link to the entry in **/vol/dev/rdiskette1**
/dev/fd1[a-c]	block file (for ucb compatibility)
/dev/rfd1[a-c]	raw file (for ucb compatibility)

SEE ALSO

fdformat(1), **uname**(1), **dd**(1M), **drvconfig**(1M), **vold**(1M), **read**(2), **write**(2), **driver.conf**(4), **dkio**(7I), **fdio**(7I)

Solaris 2.x x86 Hardware Compatibility List

DIAGNOSTICS

fd<n>: <command name> failed (<sr1> <sr2> <sr3>)
The <command name> failed after several retries on drive <n>. The three hex values in parenthesis are the contents of status register 0, status register 1, and status register 2 of the Intel 8272, the Intel 82072, and the Intel 82077 Floppy Disk Controller on completion of the command as documented in the data sheet for that part. This error message is usually followed by one of the following, interpreting the bits of the status register:

fd<n>: not writable

fd<n>: crc error blk <block number>
There was a data error on <block number>.

fd<n>: bad format

fd<n>: timeout

fd<n>: drive not ready

fd<n>: unformatted diskette or no diskette in drive

fd<n>: block <block number> is past the end! (nblk=<total block count>)
The operation tried to access a block number that is greater than the total number of blocks.

fd<n>: b_bcount 0x<op_size> not % 0x<sect_size>
The size of an operation is not a multiple of the sector size.

fd<n>: overrun/underrun

fd<n>: host bus error
There was a hardware error on a system bus.

SPARC

Overrun/underrun errors occur when accessing a diskette while the system is heavily loaded. These errors are caused by a hardware limitation and cannot be fixed in the software.

NOTES

3.5" high density diskettes have 18 sectors per track and 5.25" high density diskettes have 15 sectors per track. They can cross a track (though not a cylinder) boundary without losing data, so when using **dd**(1M) to or from a diskette, you should specify **bs=18k** or multiples thereof for 3.5" diskettes, and **bs=15k** or multiples thereof for 5.25" diskettes.

The SPARC **fd** driver is *not* an unloadable module.

Under Solaris x86, the configuration of the floppy drives is specified in CMOS configuration memory. Use the BIOS setup program or an EISA or Micro Channel configuration program for the system to define the diskette size and density/capacity for each installed drive. Note that MS-DOS may operate the floppy drives correctly, even though the CMOS configuration may be in error. Solaris x86 relies on the CMOS configuration to be accurate.

Solaris x86 also supports "medium" density, the 1.2-Mbyte, 77-cylinder, 1024-byte sector format on 3.5" high-density diskettes, used by NEC-DOS. This feature has two hardware requirements. First, the floppy drive must be one of the supported, dual-speed, high-density drives. Second, the floppy controller must be one of the supported enhanced controllers that provide a programmable DENSEL output. For specific manufacturers and model/part numbers of supported drives and controllers, refer to the *Solaris 2.x x86 Hardware Compatibility List*. This feature is enabled by editing the This feature is enabled by editing the **fd.conf** file and assigning a non-zero value to the **mode_3D** property for the appropriate drive entry.